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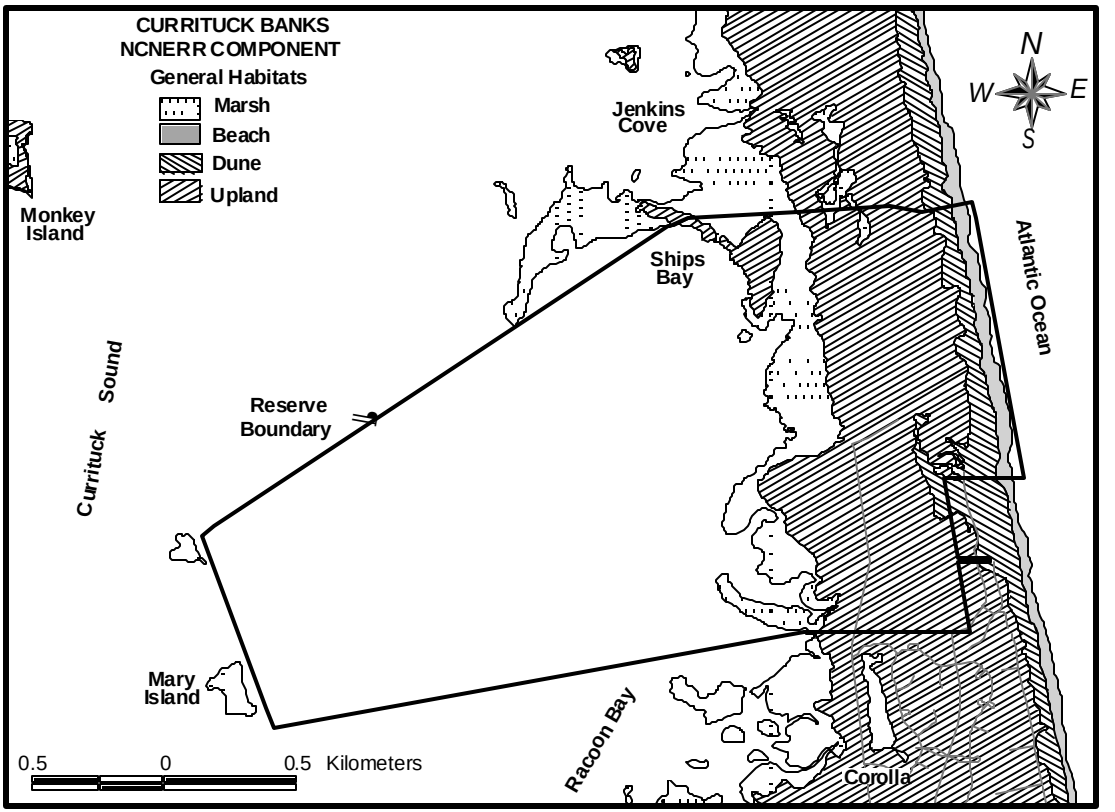
Chapter Two

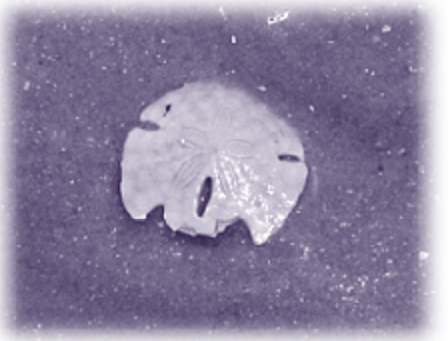
Sites of the Coastal Reserve

Currituck Banks



Currituck Banks

The Setting



Remote and untouched by development, the Currituck Banks site is an excellent example of an undisturbed barrier island and low-salinity estuarine system. The site lies in the northeastern corner of North Carolina, 10 miles south of the Virginia border and three-quarters of a mile north of the unincorporated village of Corolla. Bounded by Currituck Sound and the Atlantic Ocean, the site encompasses 954 acres. Neighboring tracts are owned by The Nature Conservancy and the U.S. Fish and Wildlife Service. Although management of each property is separate, the combined 2,807-acre area is used for research and education.

The site is located in Currituck County, one of the five fastest-growing counties in the state. The mainland of the county is mostly rural, with several small communities dotting a landscape of farms, forest, and open water. The county's barrier island communities, though expanding rapidly, are still relatively small and difficult to reach. No roads exist north of the reserve property, and residents who live beyond the town must drive along the beach to reach their homes.

While tourism and resort development has stimulated growth of this area, most of the expansion has resulted from people working in the Hampton Roads, Virginia, metropolitan area moving into the county. Because of its location, Currituck County's economy has traditionally been more closely tied to Virginia than to North Carolina. The only town in North Carolina within 75 miles of the Currituck site that has more than 10,000 people is Elizabeth City, 20 miles west of the site.

The abundant waterfowl and fisheries of

ABOUT CURRITUCK BANKS:

The site encompasses 954 acres. It is located 10 miles south of the Virginia border and three-quarters of a mile north of the unincorporated village of Corolla.

Currituck Sound have made Currituck County one of the state's most popular recreational hunting and fishing areas, which is an important aspect of the county's economy. Also contributing to the economy is the substantial tourist traffic that passes through mainland Currituck County on the way to and from Dare County's Outer Banks, one of the nation's most popular vacation areas.

The History

Before the European settlement of northeastern North Carolina, the area now known as Currituck County was home to the Poteskeet Indians. Although their main village was located on the mainland, the Poteskeet hunted and fished in Currituck Sound and on Currituck Banks. Oyster shells and pottery fragments have been found at the reserve site, indicating that the Poteskeet had some sort of encampment there.

In 1584, the English first attempted settlement in the New World on nearby Roanoke Island. Despite the failure of Sir Walter Raleigh's "Lost Colony," English settlement was firmly established north of Currituck, in southeastern Virginia. English settlers began moving into the region by the late seventeenth century, and survived by farming and fishing. They lived on the Currituck mainland and transported cattle and sheep to the Banks to feed on the abundant marsh grasses. While documents of the period record several nonviolent disputes over territorial rights with the Poteskeet in the early eighteenth century, the Poteskeet had virtually disappeared from Currituck by 1730.

One or more inlets through the Currituck Banks directly connected Currituck Sound to the Atlantic Ocean. The English documented one inlet, known as Musketo Inlet, in the 1580s at or near the reserve site. By 1680, shifting sands began to fill the inlet and eventually closed it. Currituck Inlet was used to set the boundary between North Carolina and Virginia in 1663. By 1828, New Currituck Inlet - the last of the inlets through the Banks - had closed. This began the transformation of Currituck Sound from a high-salinity estuarine environment to a low-salinity estuarine environment. The sound's extensive shellfish beds started to vanish, while new

ABOUT CURRITUCK BANKS:
Throughout recent geologic time, Currituck Banks has been a dynamic barrier landform, moving or "migrating" in response to sea level changes.

estuarine species, submerged aquatic plants and waterfowl began to appear.

The marshes and waters of Currituck Sound became well known throughout the nation as prime waterfowl hunting grounds. This led to the founding and construction of several hunting clubs, the first of which was the Currituck Shooting Club, built in 1857. Wealthy members of these clubs bought large tracts of land on the Banks to preserve waterfowl feeding areas and to ensure a continuous bounty of geese, ducks, and other migratory game birds. Several of the architecturally interesting clubhouses that were built still exist, although they are used less frequently than in the past.

During the late 1800s and early 1900s, several small farming and fishing communities were established on the Banks. Following several shipwrecks in the early 1870s, the U.S. Lifesaving Service built five lifesaving stations along the Currituck Banks as well as the Currituck Beach Lighthouse at Corolla.

In 1895, a post office was established in Corolla, which gave the community a sense of permanence. Around 1900, a sturgeon gill-netting operation began in Corolla, but its success quickly depleted the sturgeon population and the business disbanded within 10 years. Net Scaffold Point, in the Reserve site, probably gets its name from this period. Farming and commercial fishing gradually declined on the Currituck Banks during the twentieth century, while waterfowl hunting and sport fishing became even more popular.

Since World War II, real estate development has played an important role in shaping the character of the Currituck Banks. Several large tracts of land from the Virginia line to the Dare county line have been subdivided for resort homes. Although the Banks remain sparsely settled compared with other parts of the North Carolina coast, the area is changing rapidly.

The Ecology

Throughout recent geologic time, Currituck Banks has been a dynamic barrier landform,

ABOUT CURRITUCK BANKS:

The climate, layout of the land and remoteness of the area combine to give the Currituck Banks site a wealth of plant and animal life.

moving or "migrating" in response to sea level changes (see page 17) for a more detailed explanation of this process). While the Banks was once a series of islands, it is currently part of a complex barrier spit that extends about 70 miles from Virginia Beach to Oregon Inlet. Behind this barrier spit, extensive marshes have built up from inlet deltas and overwash fans that were submerged by rising sea level.

Although at one time there were as many as three inlets along Currituck Banks, the closest opening to the sea is now Oregon Inlet, 45 miles south of the reserve site. After the last inlet closed in 1828, the sound gradually became what is now virtually a freshwater estuary. Water level in Currituck Sound is mainly determined by wind direction and speed rather than lunar tides. The water level is, therefore, relatively higher when southerly winds push water in from Albemarle Sound and lower when northerly winds push water back into Albemarle Sound.

The average depth of the sound is five feet, while the deepest parts average slightly more than 10 feet. Surface temperatures in the sound range from about 40 degrees Fahrenheit in January to an average of 86 degrees in July. The mixing of warm Gulf Stream currents and cooler northern currents off Currituck Banks creates a climate where northern species reach the southern limit of their ranges and southern species reach the northern limit of their ranges. As a result, a diversity of species from both regions is found here.

The climate, layout of the land, and remoteness of the area combine to give the Currituck Banks site a wealth of plant and animal life, as well as productive habitats that are still relatively pristine. The habitats described in Chapter Three that are found within the Currituck Banks site are the ocean beach, sand dunes, grasslands, shrub thicket, maritime forest, brackish and freshwater marshes, tidal flats, and subtidal soft bottoms.

The Currituck site contains a rich resource of commercial and game fish. Largemouth bass, yellow perch, tidewater silverside, pumpkinseed, and blue-spotted sunfish are the most common species. Other game fishes include white perch, pumpkinseed,

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ABOUT CURRITUCK BANKS:

Birds found in the area that are of special concern include osprey and three species of shorebirds.

bluegill, black crappie, chain pickerel and channel catfish. Commercial fish catches include white perch, catfish, carp, shad, herring, and eel. Except for crabbing, shellfishing is not commercially important in Currituck Sound.

The site's marshes serve as important nesting and feeding grounds for numerous birds, mammals, reptiles, and other organisms, many of which are described in Chapter Three. Four animals listed by the federal government as endangered, threatened or of special concern are found in the vicinity of Currituck Banks, as are 63 species recognized as such by state biologists. Scattered nesting sites of the loggerhead sea turtle, a federally threatened reptile, have been reported on the beaches of Back Bay National Wildlife Refuge, False Cape State Park and Currituck Banks.

Birds found in the area that are of special concern include osprey and three species of shorebirds. The osprey population is thought to be increasing in Currituck Sound. Ospreys nest on channel markers, platforms, and in trees and are reasonably tolerant of people. The shorebirds of concern - Wilson's plover, black skimmer, and least tern - have been found nesting within the reserve site as well. Piping plovers, which are threatened, are seen occasionally, but are not known to be nesting in the area.

Currituck Sound is located within the Atlantic Flyway and therefore attracts a diversity of migrating birds including falcons, ducks, geese, warblers, gulls, terns, herons, and egrets, as well as mainland species, like the indigo bunting and bob-white. The site is especially important for waterfowl: an estimated 6 percent of the waterfowl spending the winter along the Atlantic Flyway and 32 percent of North Carolina's wintering fowl are found on Currituck Sound. Annual midwinter counts of the waterfowl on the sound from 1975 to 1978 found 59,650 dabbling ducks, 11,250 black ducks, 12,000 diving ducks, 24,250 geese, 9,050 whistling swans, and 59,325 American coots.

The area is an important breeding territory for wading birds such as herons and egrets. Several heron rookeries, or nesting areas, are found along Currituck Sound. These

ABOUT CURRITUCK BANKS:

The nearshore waters of Currituck Sound contain dense beds of aquatic plants, such as widgeon grass, milfoil, tape grass and horned pondweed.

colonies reflect the health of the estuarine system because wading birds are the final consumers in many estuarine food chains. Changes in the health of the ecosystem, for example those caused by a pollutant, will be reflected in the health of the birds.

Getting to the Site

N.C. 12 in Currituck County leads to an ocean beach ramp within the reserve site; however, parking is only allowed on the ocean beach. Access along the ocean beach from the north through Back Bay National Wildlife Refuge and False Cape State Park is limited to permanent local residents. The site can also be reached by driving up the beach strand from Dare County or by boating across Currituck Sound.

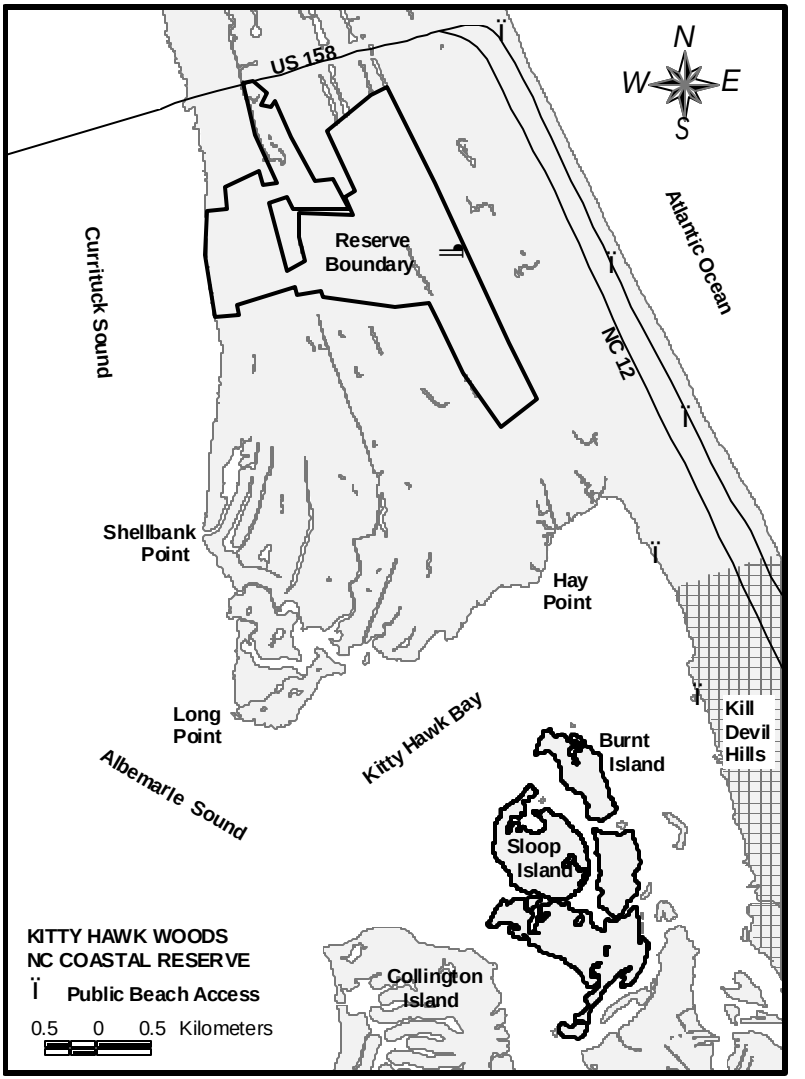
Visiting the Site

A number of foot and jeep trails crisscross the Currituck Banks site, particularly in the southern half, and there is a Virginia Electric Power Company right-of-way, which may be followed. The trails that pass through the shrub thicket and maritime forest provide the best access with the least

amount of potential damage to the habitats. Visitors should be careful to avoid wet depressions, which are very vulnerable to damage from foot traffic. Freshwater ponds within the site are good areas for education and research.

The nearshore waters of Currituck Sound contain dense beds of aquatic plants, such as widgeon grass, milfoil, tape grass and horned pondweed, which are typical of low-salinity estuaries. Visitors should avoid disrupting this fragile ecosystem.

Kitty Hawk Woods



Kitty Hawk Woods

The Setting

The Kitty Hawk Woods component is located on the Outer Banks, in the center of the village of Kitty Hawk. A series of ridges and swales gently rolls across this landscape – the relics of dunes left by the Atlantic Ocean as it receded during the Pleistocene epoch. The ridges support a mixed evergreen and deciduous maritime forest, while a swampier forest exists in the low, wet swales. The transition where these two habitats meet supports a great diversity of plants, birds, reptiles, and amphibians.

Kitty Hawk Woods encompasses a total of 1349.6 acres of maritime deciduous swamp forest and marsh. The town of Kitty Hawk, with a conservation easement with the state, owns 461.6 acres.

Like many of the small towns on the Outer Banks, Kitty Hawk's economy is based on tourism. Some local residents also run small independent commercial fishing and crabbing operations. Many of the families in Kitty Hawk have lived in the area for generations. They have a strong attachment to the lands that their ancestors fished,

hunted, timbered, and used for livestock, and view the woods as a piece of heritage that should be preserved.

The History

Kitty Hawk Woods are what is left from a larger maritime forest that once included Kitty Hawk village and Southern Shores. Long before the arrival of European explorers and colonists, the woods were home to Native Americans of Algonquian stock, who probably used the area intermittently to hunt, fish, trap and gather plants.

Although there were failed attempts by

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ABOUT KITTY HAWK WOODS:

Kitty Hawk Woods encompasses a total of 1349.6 acres of maritime deciduous swamp forest and marsh.

Sir Walter Raleigh to settle the area, the woods reverted to its Native American inhabitants for nearly a century. It was not until the mid 1700s that European settlement began in Kitty Hawk.

In 1874, the original Kitty Hawk lifesaving station was erected on the beach just east of Kitty Hawk village. During the next year, the federal government located a weather station nearby. In 1878 the first Kitty Hawk post office was established near the head of Kitty Hawk Bay, and a lifesaving station was built four miles south in Kill Devil Hills. This sudden growth in government facilities promised to increase communications with the outside world and provide more varied means of livelihood for area residents.

In the early 1900s, Kitty Hawk was a community of roughly sixty families. Due to extensive wetlands, no residences appear to have existed in the reserve. Residents subsisted largely from fishing, gardening, and tending livestock. Hunting in Kitty Hawk Woods provided an additional source of food and income. Also at this time, several short-lived lumber companies passed through Kitty Hawk to timber the woods, but the area remained largely one of "impassable swamps and sand dunes."

In the late 1900s, the Kitty Hawk Woods Partnership acquired 1,400 acres, which it planned to develop. In 1986, it offered to sell or donate a portion of the land to the State as a conservation easement, in exchange for a U.S. Army Corps of Engineers permit to fill the wetlands. At the same time, the Kitty Hawk Town Council asked to negotiate an agreement with the Kitty Hawk Woods Partnership to acquire title to a 462-acre tract. This would ensure that future generations of Kitty Hawk citizens would be able to enjoy it and have the right to participate in decisions concerning its use and management.

The final agreement, completed in 1992, resulted in four separate parcels being protected for conservation purposes. The town of Kitty Hawk acquired title to the 462-acre tract, along with conservation easements on three other tracts of undevelopable wetlands. The Division of Coastal Management was given a conservation easement on the tract, which

ABOUT KITTY HAWK WOODS:

Kitty Hawk Woods is one of the largest maritime forests on the Outer Banks and the only maritime forest in the state where bald cypress dominates.

was then dedicated as a state nature preserve. Soon afterwards, the Kitty Hawk Woods Partnership went bankrupt. The state continues to acquire land with the goal of linking the various tracts to create a wildlife corridor.

The Ecology

Several inlets created by storms once cut across the Currituck Banks, allowing tidal exchange of salty ocean and fresh sound waters. By 1828, the last of these inlets – New Currituck Inlet – closed, and the salinity in Currituck Sound dropped from salt brackish to fresh brackish water. The resulting estuaries now serve as primary nursery areas for fish. Currently, the closest inlet to Kitty Hawk Woods is Oregon Inlet, 23 miles to the south. Because of this distance, the movement (and therefore the salinity) of the waters around Kitty Hawk Woods are influenced by wind rather than by tide, and the surrounding marshes flood irregularly. Brackish marsh may be found along the coast of Currituck Sound, while both freshwater and brackish marsh may be found along the banks of High Bridge Creek.

The eastern edge of the forest is located a quarter-mile from the ocean, where a dune system runs parallel to the coast, ranging in elevation from 24-30 feet, and protecting the area from wind shear and salt spray. The forest itself is located on a series of low ridges and swales. A community of evergreen and deciduous hardwoods known as maritime deciduous forest is found on the upland ridges. The broad swales, many of which remain saturated with water year-round, support maritime swamp forests that are dominated by thick stands of bald cypress. Maritime deciduous swamp forests are known only to exist in fewer than five locations worldwide. Kitty Hawk Woods is one of the largest maritime forests on the Outer Banks, and the only maritime forest in the state where bald cypress dominates the swamp forest community.

Because of the location of Kitty Hawk Woods and the variety of habitats it supports, a great diversity of wildlife is found at this site. Upland areas support gray fox, raccoon, and white-tailed deer, while nutria, muskrat and river otter may be found in the marsh areas. The marshes also support a high density of reptiles and

ABOUT KITTY HAWK WOODS:

Herons, egrets, geese, ducks, swans, gulls and rails may be found in the marsh. Rare species observed in the area are peregrine falcons and sharp-shinned hawks.

amphibians, including green tree frogs, southern leopard frogs, diamondback terrapins, water moccasins, and eastern king snakes.

Both resident and seasonal birds thrive in the unfragmented forest cover of the reserve site. The woods are home to warblers, woodpeckers, hawks, wrens and other songbirds. Wood ducks inhabit the deeper swales and isolated portions of High Bridge Creek. Herons, egrets, geese, ducks, swans, gulls and rails may be found in the marsh. Rare species observed in the area are peregrine falcons and sharp-shinned hawks.

Rare plants are found on the reserve as well. The tree, hop hornbeam, is rare on the Outer Banks and only found in Kitty Hawk and Nags Head Woods. Southern twayblade and wooly beach heather are both considered imperiled in North Carolina.

Getting to the Site

The reserve is located in Kitty Hawk. It is bordered by U.S. 158 to the east, Kitty Hawk Road (SR 1208) to the south, Currituck Sound to the west, and U.S. 158 to the north. The forest is bisected in an east-west direction by Woods Road (SR 1206).

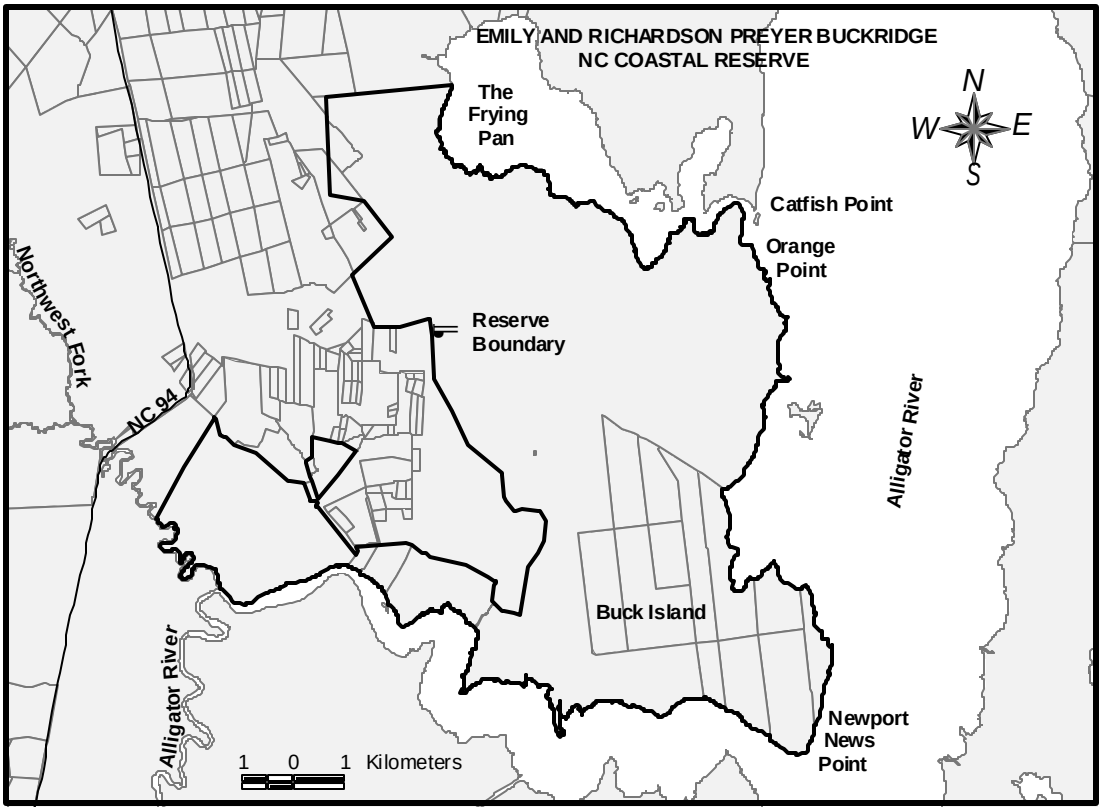
Public access is limited to an entrance to the power line cut on Eckner Street. The power line cut is open to foot and horse traffic. Visitors can walk on the interior ridges, which are accessible from the power line easement by crossing swales. High Bridge Creek is accessible by kayak, canoe, and other small boats on the west side of the easement from High Bridge Creek. This tract is only open to foot traffic.

Visiting the Site

The Kitty Hawk Woods site includes rare and delicate habitats. Visitors are asked to stay on the designated trails; unrestricted access to some sections of the woods has resulted in damage to portions of the natural communities by dumping, erosion, and compaction. Riders are asked to clean up after their horses. The reserve is closed to the public after sunset.

Emily and Richardson Preyer

Buckridge Reserve



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Emily and Richardson Preyer Buckridge Reserve

The Setting

At more than 18,000 acres, the Emily and Richardson Preyer Buckridge Reserve is both the largest single property in the Coastal Reserve and its first inland site. Located approximately 15 miles south of Columbia in Tyrrell County, Buckridge is situated between the Alligator River and Pocosin Lakes National Wildlife refuges.

The History

Tyrrell County was first explored and mapped in the 1580s by John White and the Roanoke Island Company. This vast coastal area, at the time referred to as "Albemarle," was granted to eight of the Lords Proprietors. Sir Ashley Cooper was granted the "South Shore," part of present day Tyrrell County. An Algonquian tribe, the Tramaskecoc, was the only group of inhabitants of the Buckridge area during this time period. This tribe lived along the Alligator River near the point it turns north, most likely in the vicinity of Grapevine Landing. There is very little known of these native Americans other than that they used the area for hunting.

The first European settlement in Tyrrell County, Fort Landing, was established in the early 1700s in an area north of the Buckridge Reserve. During this time, life in the "Great Alligator Swamp" — as the swamp forest of mainland Dare and Tyrrell Counties was known locally — centered on fishing, farming and logging.

Logging became especially important in eastern North Carolina between 1880 and 1920 after many of the old growth forests of New England were harvested. One mill town in particular, Buffalo City, thrived on the east shore of the Alligator River along Mill Tail Creek in Dare County. Between

ABOUT BUCKRIDGE:

At more than 18,000 acres, Buckridge is both the largest single property in the Coastal Reserve and its first inland site.

1885 and 1925, Buffalo City was the largest town in Dare County and the mill employed over 200 people. To keep up with the demand for logs by the mill, timber camps penetrated much of the Great Alligator Swamp, including the Buckridge area.

As the 1900s approached, railroads were making their way into Tyrrell County. In 1908 the Norfolk Southern Railroad bridged the Scuppernong River and routed their line to Columbia, where a depot was constructed and existed until 1948. The Branning Lumber Company moved in during this time and installed a private railroad running from Gum Neck, located just west of Buckridge, to Columbia. The railroad allowed Tyrrell County to prosper with schools, movie theaters and improved infrastructure.

According to the 1940 Federal Census, the population of Tyrrell County had reached 5,000 residents and by 1949 there were 10 sawmills in the county. Logging that took place after World War II required extensive drainage that made farming possible on some of the areas adjacent to Buckridge.

In 1960 the West Virginia Pulp and Paper Company employed over 200 people and eventually owned 150,000 acres of timber lands that encompassed approximately 50 percent of the Tyrell County. In the mid-1970's this land was sold to First Colony Farms, Inc. that attempted to develop an agro-business complex in Dare, Tyrrell and Washington counties. One aspect of this enterprise was the harvest and sale of Atlantic white cedar stands including those found south of the Frying Pan. However, First Colony was not successful and the property was sold off in the 1980s as numerous separate tracts, one of which was Buckridge. Tyrrell County area then began to see an economic decline and many residents left the area to find employment elsewhere.

Primland, Ltd. purchased the Buckridge property in the early 1980s with hopes of mining the deep peat soils to sell as a fuel alternative. Logging continued, including the cutting of remnant Atlantic white cedar, but the peat was never mined. Some farming does not occur on private tracts within the Buckridge site, but extensive agricultural operations exist in the

ABOUT BUCKRIDGE:

The majority of the Buckridge contains non-riverine swamp forest with patches of peatland Atlantic white cedar forests and pond pine woodlands.

surrounding areas where corn, soybeans and potatoes are major crops.

The Ecology

This Reserve site is part of the East Dismal Swamp, a wetlands complex that encompasses more than 320,000 acres in Dare, Tyrrell and Washington counties. The Buckridge site contains non-riverine swamp forest with patches of peatland Atlantic white cedar forests and pond pine woodlands. Both communities give way to a tidal cypress-gum swamps and brackish marshes along the Alligator River. The canopy of the site is co-dominated typically by swamp black gum *(Nyssa biflora)* and red maple *(Acer rubrum)* with loblolly pine *(Pinus taeda)* in some areas. Scattered remnant bald cypress *(Taxodium distichum)* and Atlantic white cedar *(Chamaecyparis thyoides)* stands occur in deep organic soils, while sweet gum *(Liquidambar styraciflua)* grows in the rare mineral soils. The understory of these forests is dominated by young swamp black gum and red maple as well as red bay *(Persea palustris)*. While most of the Atlantic white cedar has been cut in recent years, there is a large area (nearly 5,000 acres) present that may be the most extensive contiguous example in the state. Black needle rush *(Juncus roemerianus)* is the typical marsh grass found along river shoreline. Buckridge plays an important landscape role in connecting the Upper and Lower Alligator River wetland areas.

Both sides of the Alligator River have the greatest extent of peatland communities in North Carolina and possibly the whole eastern United States. These communities are quite rare outside of the Pasquotank River Basin. This site also maintains habitat for several animals listed by state and federal agencies as special concern, rare, threatened or endangered. These species include the red wolf, bald eagle, red-cockaded woodpecker, black bear, Atlantic and shortnose sturgeons and American alligator.

According to the U.S. Fish & Wildlife Service Office of Migratory Bird Management, the Buckridge Reserve supports three of the five highest priority neotropical migrants that are dependent on southeastern forested wetlands of the

ABOUT BUCKRIDGE:
This site maintains habitat for several animals listed by state and federal agencies as special concern, rare, threatened or endangered.

coastal plain — black-throated green warbler, Swainson's warbler and prothonotary warbler.

The Albemarle Sound and its tributaries are the state's most important and anadromous fish spawning areas. Also, the Alligator River is designated by the N.C. Wildlife Resource Commission and the N.C. Division of Marine Fisheries as a primary nursery area for striped bass, spot, croaker, American and hickory shad, weakfish and as a major spawning area for anadromous fish—principally river herring.

Getting to the Site

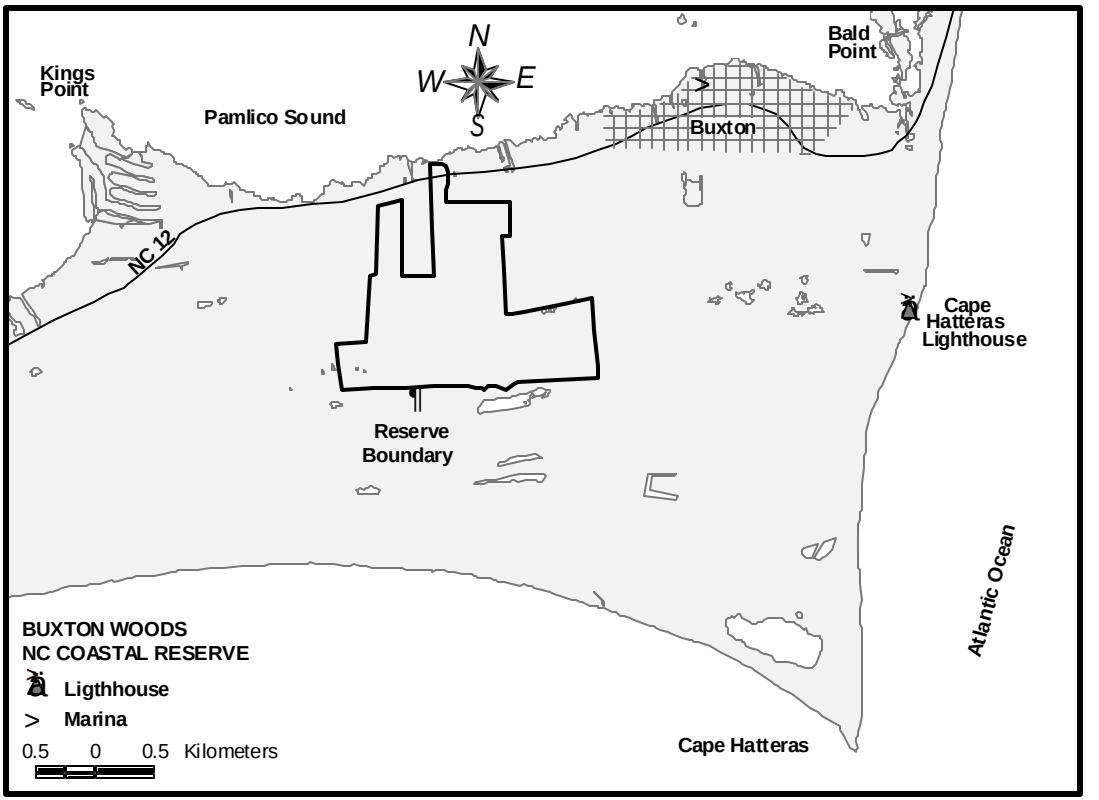
Buckridge Woods may be accessed by U.S. 64, which connects with N.C. 94 in Columbia. Traveling south on N.C. 94, there are three routes that will give a visitor access to different portions of the Reserve site, each terminating in a boat landing. Approximately 10 miles down N.C. 94 is the intersection with Frying Pan Road that leads to Frying Pan Landing. Five miles farther south on N.C. 94, the intersection with Gum Neck Road leads to a series of local roads. The western-most terminus of this

network is Grapevine Landing while the southern end is Gum Neck Landing. Both Frying Pan Landing and Gum Neck Landing are maintained by the N.C. Wildlife Resources Commission. Although there is no formal facility at Grapevine Landing, local residents do use the site for launching small boats. Buckridge may also be visited by boat from the Alligator River.

Visiting the Site

The site is very remote and no public facilities currently exist. Hiking along the existing roads and boating along the shoreline are the best ways to observe the natural features. Insect repellant is recommended during the warm months. Buckridge is closed to hiking during the hunting season – mid-October through December.

Buxton Woods



Buxton Woods

The Setting

The 825-acre Buxton Woods component is located on Hatteras Island, one of the barrier islands that form the Outer Banks. Housed within the largest tract of maritime forest left standing on the Carolina coast, this area of pine and oak-covered dune ridges is interspersed with maritime swamp forest and unique marshy wetlands. An aquifer beneath Buxton Woods provides the sole source of drinking water for the Hatteras Island communities.

The Buxton Woods component is bounded on the south by the Cape Hatteras National Seashore and on the north by N.C. 12. The adjacent towns of Buxton and Frisco comprise a typical barrier island community with a seasonal resort-based economy. Tens of thousands of tourists visit the area each year, and most of the locals earn their income through private and commercial development, service-related businesses, and commercial fishing.

The History

Buxton Woods is one of the few areas on

the Outer Banks that was inhabited year round by Native Americans. A group of Algonquians lived just east of present day Buxton, and sustained themselves with hunting and some agriculture. English colonists arrived in the early 18th century and the Algonquians dwelled harmoniously amongst them, although they dwindled to extinction by the end of the 18th century.

The English settlers made their livings primarily by fishing and raising livestock, and allowed hundreds of cattle, sheep, hogs, and goats to graze freely throughout the forest. They also timbered much of the live oak and red cedar to build boats. By the late 1800s the area had acquired a

ABOUT BUXTON WOODS:

The 825-acre Buxton Woods component is located on Hatteras Island, one of the barrier islands that form the Outer Banks.

lighthouse, lifesaving station, weather station and post office, increasing the amount of federal employment. In 1846, storms opened the present Hatteras and Oregon inlets and increased both trade and maritime traffic in the area.

In the 1930s, people became aware of the impacts of these human activities on Hatteras Island, and acted to preserve the island. In 1937, Congress authorized the establishment of the 70-mile Cape Hatteras National Seashore to protect the area. The National Park Service and the Civilian Conservation Corps worked to prevent beach erosion by erecting sand fences and planting sea oats. Open grazing of livestock was prohibited north of Hatteras Inlet, because it was believed to be the principal cause of localdeforestation.

In 1953, the Cape Hatteras National Seashore was officially recognized. The 1950s and '60s also saw the construction of N.C. 12 and the rise of the Herbert C. Bonner Bridge over Oregon Inlet, facilitating access from the mainland to Hatteras Island. As a result, the economy rapidly shifted toward the tourist industry.

When developers proposed to build a golf course in Buxton Woods in 1986, local residents formed a group called "Friends of Hatteras Island." Concerned that the proposed golf course threatened the maritime forest and local aquifer, they worked with the Sierra Club and the Coastal Resources Commission to have the woods designated as a special environmental district, subject to Dare County development regulations. The developers abandoned their golf course and sold the land to the State, which in turn continued to purchase tracts in the best remaining portion of the forest. The accumulated land was formally dedicated as the Buxton Woods Coastal Reserve Site in 1997.

The Ecology

The seaward edge of the forest is a shrub thicket community dominated by live oak and red cedar. Further inland, the forest consists of a series of dune ridges which are stabilized by a maritime evergreen forest community. Because of the heavy logging

ABOUT BUXTON WOODS:
Between the forested dune ridges, broad depressions support seasonally to permanently flooded freshwater marshes, called “sedges.”

of red cedar and live oak in the 1800s, the canopy is dominated by loblolly pine.

Between the forested dune ridges, broad depressions support seasonally to permanently flooded freshwater marshes, called “sedges” after the grasslike plants that grow there. Cattails, sawgrass, wild rice and spike rushes are also common plants in these ponds. Associated with the sedges are communities of woody plants, which are not quite tall enough to be considered true swamp forest, but too wet to be called shrub thicket. This community is called maritime shrub swamp and is characterized by shrubs like red bay, dogwood, willow and wax myrtle as well as small individuals of trees like red maple and loblolly pine.Non-woody plants that are able to tolerate the saturated soils include royal fern, cinnamon fern, lizard’s tail, and water dock. It is thought that, in the past, natural and manmade fires occasionally burned through the woods, inhibiting the encroachment of woody plants around the sedges. At present, the practices of fire control and draining surface water from the wetlands for mosquito control are allowing these species to grow.

The sound side of the woods is bordered by a zone of salt marshes. Dense stands of black needlerush dominate, while a thin intertidal border of smooth cordgrass parallels the shoreline. Sea ox-eye and salt meadow cordgrass grow in the areas furthest from the salt water, and above this “supratidal” zone, a small fringe of shrub thicket makes the transition from marsh to forest.

Since Hatteras Island is surrounded by seawater, the ground water is mostly saline; the island’s fresh water is derived solely from rain. Because fresh water is less dense than salt water, this lens-shaped body

ABOUT BUXTON WOODS:
Rare plants in the reserve include the winged seedbox, gulfcoast spikerush and savannah nutrush.

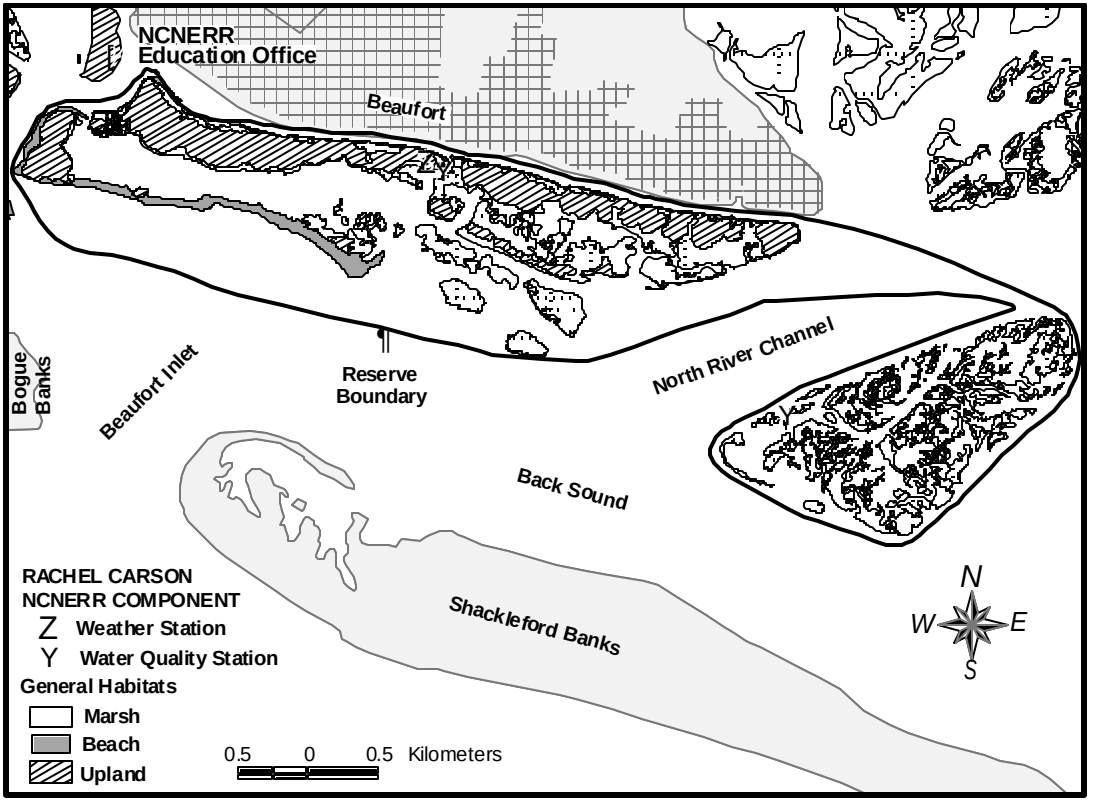
of rainwater (called an "aquifer") floats atop the seawater aquifer beneath Buxton Woods. A wellfield located in the woods taps the aquifer to provide drinking water for the towns of Avon, Buxton, Frisco, and Hatteras. It is thought that the sedges play an important role in "recharging" or replacing the fresh water in the aquifer; thus the future of the Hatteras communities depends on maintaining these marshes in good health.

Buxton Woods serves as an important resting place for migratory birds in the fall. More than 360 species, including bald eagles and peregrine falcons, have been recorded for the Cape Hatteras seashore area. Common mammals in the area include gray fox, mink, river otter, and white-tailed deer. Reptiles and amphibians include eastern box turtles, rat snakes, green anoles, southern toads, and southern dusky salamanders. Rare plants in the reserve include the winged seedbox, gulfcoast spikerush and savannah nutrush. Two rare butterflies (northern hairstreak, giant swallowtail) and a moth (messalina under-wing) are also found in the area.

Visiting the Site

From the north, Hatteras Island may be accessed by N.C. 12, which connects with U.S. 64 near Manteo (60 miles to the north). Visitors may also take the public ferry from either Cedar Island (Carteret County) or Swan Quarter (Hyde County) to Ocracoke Island. From Ocracoke, the Hatteras Inlet ferry serves as a link to N.C. 12 on Hatteras Island (the ferry terminal is located 8 miles southwest of the reserve). The reserve can be reached via Old Doctor's Road, Flowers Ridge Road, or Water Association Road, which all run into the forest from N.C. 12. Various walking trails also link the state property with the Cape Hatteras National Seashore.

Rachel Carson Reserve



Rachel Carson Reserve

The Setting

Across Taylor's Creek from the Beaufort waterfront and not far from the port at Morehead City is a complex of islands that compose the Rachel Carson site. The islands at the western end of the site - Carrot Island, Town Marsh, Bird Shoal, and Horse Island - are almost three-and-a-half miles long and three-quarters of a mile wide, covering 2,025 acres. Middle Marsh, separated from the rest of the site by the North River Channel, is almost two miles long and three-quarters of a mile wide, covering nearly 650 acres.

The Rachel Carson site is in the midst of one of the state's fastest growing areas. Both Beaufort and Morehead City are increasing in size, as are the resort and residential communities of Bogue Banks, a barrier island across Beaufort Inlet from the site. Traditionally the area's economy has depended on farming, commercial fishing, and boat building.

In recent years, tourism has become increasingly important. There are many outdoor recreation opportunities in the

area, and Beaufort's charm, history, and harbor attract visitors and boaters from across the country.

The area is also a center of marine research and education in North Carolina's coastal area. The marine laboratories of Duke University and the University of North Carolina are located here, as are the NOAA Southeast regional offices, the National Marine Fisheries Service and the North Carolina Division of Marine Fisheries. The North Carolina Maritime Museum , the North Carolina Aquarium at Pine Knoll Shores and the Cape Lookout National Seashore are excellent education centers. In fact, during the 1940s the late Rachel Carson did research at what is now the reserve site named in her honor.

ABOUT THE RACHEL CARSON RESERVE:
Carrot Island, Town Marsh, Bird Shoal and Horse Island are almost three-and-a-half miles long and three-quarters of a mile wide, covering 2,025 acres.

The History

Before the European colonization of America, Carrot Island and Middle Marsh may have been used intermittently by the Coree Indians. The Corees are thought to have spent considerable time on the nearby Outer Banks, especially in the vicinity of Cape Lookout.

European settlement of the Beaufort area began in the first two decades of the eighteenth century. In 1723, the town commissioners began to sell lots and Beaufort developed as a port. The early settlers built private wharves along the shores of the mainland and also, perhaps, on Carrot Island. They used the waters around the Rachel Carson site for shipping lumber, naval stores, and farm commodities.
As early as 1806, it was reported that mullet were being caught by a fishery on Carrot Island, then dressed, salted and taken to Beaufort to be sold. Other fish and shellfish were also taken in this area. The first processing plant in the state for menhaden, still a valuable commercial species, was established on nearby Harker's Island in 1865.

Beaufort began to decline as a port following the establishment of Morehead City in the 1850s. Improvements in the channel from Beaufort Inlet to the terminal facilities at Morehead City, especially those that have taken place during the twentieth century, completed this eclipse.

In 1782, a Revolutionary War skirmish near the mouth of Taylor's Creek involved townsmen and a small British-landing party. Following an initial exchange of fire, the British moved about one-half mile eastward and landed on Carrot Island, spending the night there. At sunrise, the British crossed Taylor's Creek to the mainland, overcame the local troops, and swept into Beaufort to begin a short-lived occupation of the town. It is also possible that the current Rachel Carson site was affected during the construction of Fort Macon on Bogue Banks in the 1830's and 30 years later, during the Civil War siege that led to the fort's fall.

A map of 1777 shows that, at that time, Carrot Island was the only island within what is now the Rachel Carson site. Town Marsh, then known as "Island Marsh," was only barely exposed. It was referred to in a

ABOUT THE RACHEL CARSON RESERVE:

During the 1940s, the late Rachel Carson did research at what is now the reserve site named in her honor.

deed of this period as merely a "bunch of bushes." Except for Carrot Island and the bushes that would one day become Town Marsh, there were no exposed areas, although the water in this area was extremely shallow.

In 1854, Town Marsh (then called Bird Shoal) was three-eighths of a mile long. By 1885, Town Marsh had more than doubled in length and its northern shoreline moved even closer to the Beaufort waterfront. The growth of Town Marsh had made the Taylor's Creek channel almost unusable, so in 1893 the citizens of Beaufort asked the federal government to build a breakwater on Town Marsh to protect the channel along the town's waterfront. Although that request was denied, in the early 1900s the U.S. Army Corps of Engineers began dredging the mouth of Taylor's Creek, using Carrot Island as a dredge material deposition area. Before the dredging, Carrot Island was essentially all tidal marsh with some elevated hammock land.

By the 1930s, the islands had been built up by the dredge material deposition to the point that they provided protection for the town of Beaufort from high winds, flooding and storm waves. In fact, the great hurricane of 1933 caused relatively little damage to the town. The Corps of Engineers continued to use Carrot Island and Town Marsh as deposition sites to maintain Bulkhead Channel, Gallant's Channel and Taylor's Creek.

One of the most distinctive aspects of the reserve site is a herd of feral horses, which are believed to have been placed on Carrot Island and Bird Shoal by a local resident in the 1940s. From the Beaufort waterfront, residents and visitors alike can watch the once domesticated animals graze and roam the reserve site. Feeding largely on saltmarsh cordgrass, the horse population is subject to vegetation limitations during the winter.

Except for the deposition of dredge material, the presence of the horses and foot traffic, the Rachel Carson site remains relatively undisturbed. Carrot Island, Town Marsh, and Bird Shoal have become popular with area residents and visitors alike for swimming, walking, shell collecting, bird watching and picnicking.

ABOUT THE RACHEL CARSON RESERVE:

The Rachel Carson site is particularly important for birds. More than 200 species of birds have been observed at the site.

Although a developer had planned to construct resort homes on Carrot Island in 1977, Beaufort residents, civic organizations and environmental groups worked together to prevent the development. The North Carolina Nature Conservancy purchased 474 acres of Carrot Island that year, and the State of North Carolina completed the acquisition of the area (including the Conservancy's tract) in 1985.

The Ecology

The islands and estuarine waters at the Rachel Carson site are strongly influenced by river and inlet dynamics and the twice-daily tides that range about three feet. Because it is close to Beaufort Inlet, the western part of the island complex has a salinity that is similar to that of the Atlantic Ocean. Middle Marsh, at the mouth of the North River, has less predictable salinity patterns that vary with the tides and river flow. The range of tidal changes at Middle Marsh, the low-salinity variation of the western section, and the topography of the entire site have created a diverse and productive estuarine system with a variety of habitats. The dredge material areas, in particular, have contributed to the ecological diversity of the reserve site by creating habitat that would not have occurred naturally. Habitats found within the site are tidal flats, regularly and irregularly flooded salt marshes, ocean beach, subtidal soft bottoms, hard surfaces, dredge spoil areas, sand dunes, shrub thicket and maritime forest. These are described in Chapter Three.

The Rachel carson site is particularly important for birds. More than 200 species have been observed at the site, which is

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ABOUT THE RACHEL CARSON RESERVE:

The Atlantic loggerhead sea turtle, nine other species of reptiles and ten species of mammals have been found in or near the reserve site.

located within the Atlantic Flyway. Twenty-three species of birds using Bird Shoal are considered rare or decreasing in number by state ornithologists. The site is an important feeding area for Wilson's plovers in the summer and piping plovers (threatened federal status) in the winter, both of which are listed by state biologists as species of special concern. Bird Shoal may have the largest wintering population of piping plovers along the entire East Coast based on the Audubon Society's Christmas bird counts. The shrub thicket of Middle Marsh supports an egret and heron rookery.

The Atlantic loggerhead sea turtle, a federally protected threatened species, nine other species of reptiles, and ten species of mammals have been found in or near the reserve site. In addition to the feral horses, the river otter, gray fox, Norway rat, raccoon and marsh rabbit inhabit the islands. The American bottlenose dolphin swims in the deep waters around the island, along with fifty-two species of fish. Forty-seven invertebrate species common to the Rachel Carson site include mollusks and worms. Of these, three whelks -- channeled, knobbed, and lightning -- and one polycheate, the parchment tubeworm, have been given special concern status by state biologists.

Getting to the Site

The Rachel Carson site can only be reached by boat. Visitors may use their own boat, or there are local boating concessions as well. Visitors usually land on the sandy beach at the west end of Town Marsh and cross the dredge material areas, marsh zones and mud flats. Carrot Island also has large spoil and marsh areas like Town Marsh, but few sandy spots where boats can land.

ABOUT THE RACHEL CARSON RESERVE:
The American bottlenose dolphin swims in the deep waters around the island, along with fifty-two species of fish.

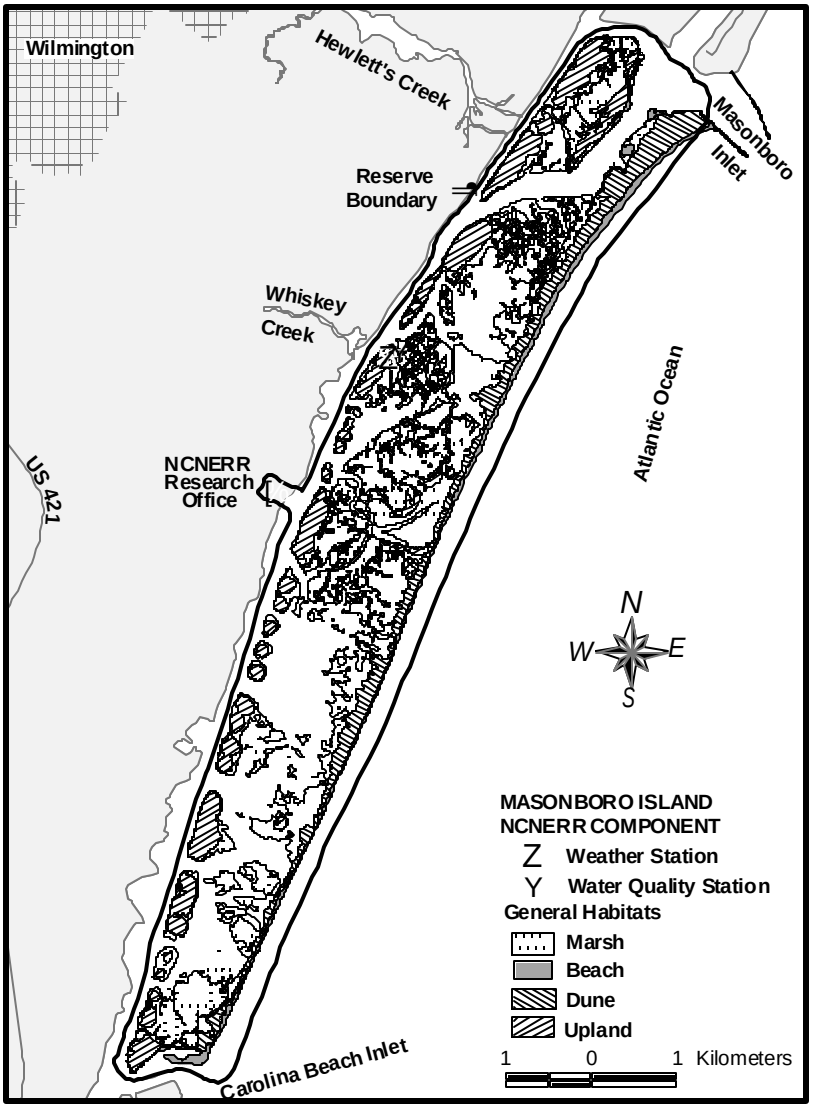
Visiting the Site

A trail guide for the Rachel Carson site is available free of charge over the internet or at the Reserve education office. Of the islands within the site, Town Marsh, Carrot Island and Bird Shoal receive the most use because of their easy access by boat from Beaufort and the Duke University Marine Laboratory. The islands' varied habitats can be used for hiking, fishing and other recreational activities.On Bird Shoal visitors can walk along the sandy beach for almost the entire length of the island. During low tide, it is possible to cross the shallow slough between Town Marsh and Bird Shoal.

The upland areas of the site - the shrub thicket, beach, and dredge material areas - will be the least affected by visitor use, except for the sea oats found on portions of Bird Shoal. Marsh communities, like those of Horse Island, are quite vulnerable to effects of use, and should be avoided. Selected eelgrass beds and intertidal flats may be used by groups of twenty or less on a limited basis for collecting or interpretive purposes if permission is received from the

North Carolina National Estuarine Research Reserve. Special habitat areas, such as the horses' watering holes and the shorebird nesting sites, are off limits to visitors.

Masonboro Island



Masonboro Island

The Setting

The largest undisturbed barrier island along the southern part of the North Carolina coast is Masonboro Island, located approximately five miles southeast of Wilmington. The 8.4-mile-long island encompasses approximately 5,046 acres, 87 percent of which are covered with marsh and tidal flats. The remaining 619 acres are composed of beach uplands and dredge material islands. The Masonboro Island site is bounded by the Atlantic Ocean to the east, the Atlantic Intracoastal Waterway to the west, Masonboro Inlet to the north and Carolina Beach Inlet to the south.

The island is located in the most populous part of the North Carolina coastal area. Wilmington, the state's largest coastal city, is nearby, as are two popular resort beach areas - Wrightsville Beach and Carolina Beach. Commercial fishing, shipping, commerce, and tourism are important to the economy of the region.

As natural barrier islands have been increasingly developed, relatively pristine island and sound complexes like

Masonboro Island have become more important for research, education, recreation, and fishing. Masonboro Island is a favorite local spot for sunbathing, fishing, boating, nature study, and hunting.

The History

It is possible that the stretch of beach now known as Masonboro Island was the first part of the American coastline to be seen and described by a European explorer. This initial sighting may have occurred in March 1524, when an Italian voyager, Giovanni da Verrazano, came within view of what is believed to have been the lower coastline of present-day North Carolina, several

ABOUT MASONBORO ISLAND:
Masonboro Island is the largest undisturbed barrier island along the southern part of the North Carolina coast.

miles above the point of Cape Fear.

Two years later, a Spanish explorer, Lucas Vasquez de Ayllon, entered the mouth of the Cape Fear River and established a temporary base along its west bank. From this base, Ayllon sent out men to explore the interior of the region and the nearby coastline. It seems likely that one or more of these exploratory parties along the coast would have come in contact with what is now Masonboro Island.

During the colonial period, Masonboro Sound was generally known as Cabbage Inlet Sound, taking its name from the inlet which existed at that time through the barrier beach. Cabbage Inlet was located somewhat south of today's Masonboro Inlet, just below the mouth of Purviance (now Whiskey) Creek on the opposite side of the sound. Until the opening of New Inlet in 1761, Cabbage Inlet was the first inlet along the coast north of Cape Fear. Cabbage Inlet was closed by a storm in 1783, and has not reappeared.

In the early 1700s, the mainland along Masonboro and Myrtle (now Myrtle Grove) sounds began to be sparsely settled. Some of the settlers, generally those of modest means, built permanent homes along the sound, making their livelihoods from farming and fishing. Other, more affluent landowners purchased property on the sound for speculation or for summer homes. This pattern of development continued throughout the antebellum period. It is of interest to note that several salt works were also operated in the area. As was the case during the 18th century, there is no indication that the barrier beach now known as Masonboro Island was put to any extensive or consistent use.

Masonboro Island and Masonboro Inlet were involved in the wrecks of at least four vessels during the Civil War. Three of these ships were blockade-runners which were forced ashore and destroyed while in route to or from Wilmington. The other lost vessel was part of the Union blockading fleet. Confederate troops were stationed at various points along the mainland shores of Myrtle Grove and Masonboro sounds during the war.

Farmers, craftsmen, and fishermen

ABOUT MASONBORO ISLAND:
Pristine island and sound complexes like Masonboro Island have become more important for research, education, recreation and fishing.

continued to live on the mainland side of the sounds during the late 19th and early 20th centuries. In autumn mullet were taken in large quantities along the ocean side of Masonboro Island. Lookouts were posted on dunes to signal boat crews of the approach of the mullet schools. Once netted, the fish were hauled up on the beach and often salted there. Catches are reported to have run as high as 20,000 pounds. In addition to this primary fishery, it is thought that an abundance of flounder, shrimp, clams, and oysters were taken from the waters of the sounds and nearby creeks and marshes.

During the latter part of the 19th century, Wrightsville Beach and Carolina Beach, two of the oldest coastal resorts in the state, began to develop. The town of Wrightsville Beach was incorporated in 1899. In about 1902, a railway was extended across Banks Channel, parallel to the footbridge. In 1935, a highway was constructed across Banks Channel to the beach, and construction began on the road that now extends along the entire length of the beach. In the late 1880s, the New Hanover Transit Company constructed a pier on the east bank of the Cape Fear and a railroad linking this pier to the seashore three miles to the east. This led to the development of Carolina Beach, which was incorporated in 1925.

Construction of the Atlantic Intracoastal Waterway between Beaufort and the Cape Fear River, by way of Masonboro and Myrtle Grove Sounds, was authorized in 1927 and completed in 1932. The waterway was linked to the Cape Fear River by the creation of Snow's Cut, at the lower end of Myrtle Grove Sound. Many local fishermen opposed the waterway because they feared that it would increase the depth of the

ABOUT MASONBORO ISLAND:
It is an unusual estuary because its fresh water comes primarily from upland runoff and mainland streams rather than a tidal river.

water, decrease salinity, disturb fishery breeding grounds, and cause reduced catches. Out of these concerns came a proposal several years later for the creation of an inlet through Masonboro Island at John's Creek. Although the U.S. Army Corps of Engineers refused the request, Carolina Beach Inlet was cut through the island in 1952 as a private venture.

Over the past three decades, the inlet's location and shape have changed considerably. In 1947, the Corps of Engineers began the first of several dredging projects to prevent Masonboro Inlet from migrating. In the 1960s, a massive, lengthy stone jetty was built near the north end of Masonboro Inlet, in yet another attempt to stabilize the inlet. A south jetty anchored to the tip of Masonboro Island was completed by the Corps of Engineers in the late 1970s.

At present, the area around Masonboro Island is developing rapidly. Boat traffic through Masonboro Inlet and Carolina Beach Inlet has swollen with mounting numbers of commercial fishing vessels and various pleasure craft.

The Ecology

Masonboro Island is an essentially pristine barrier island and estuarine system. It is an unusual estuary because its fresh water comes primarily from upland runoff and mainland streams rather than a tidal river; however, some freshwater flows from the Cape Fear river through Snow's Cut. The various salinity patterns found in the extensive subtidal and intertidal areas along the sound side of the island support a myriad of estuarine species in addition to the various communities typical of the island proper. The habitats found within the reserve site include subtidal soft

ABOUT MASONBORO ISLAND:
The nutrient-rich waters of Masonboro Sound are an important nursery area for commercial and sport marine species.

bottoms, tidal flats, hard surfaces, regularly and irregularly flooded salt marshes, shrub thicket, maritime forest, dredge spoil areas, grasslands, ocean beach, and sand dunes. These are described in Chapter Three.

Loggerhead and green sea turtles nest on the Masonboro beaches, where seabeach amaranth plants grow on the foredunes. All of these species are listed as threatened by the federal government.

Certain birds and estuarine worms found in the Masonboro complex have special status according to state biologists*. Black skimmers (special concern), Wilson's plovers (sigificantly rare) and least terns (watch list) nest on the island's beach/dune area. Sound sediments are home to two state watch list species — Hartman's Echiurid and a polycheate worm in the genus Notomastus.

Although colonies of terns and other shorebirds nest on Masonboro Island, there are fewer reptiles and amphibians compared with nearby barrier islands. The nutrient-rich waters of Masonboro Sound are an important nursery area for commercial and sport marine species

including spot, mullet, summer flounder, pompano, menhaden, and bluefish.

Getting to the Site

The Masonboro Island site can only be reached by boat. There are public and private ramps in and near Wrightsville Beach and Carolina Beach that can be used for launching. Visitors usually land on the sandy beaches along the north and south sound-side areas of the island.

SITES

ABOUT MASONBORO ISLAND:
Loggerhead and green sea turtles nest on the Masonboro beaches, where seabeach amaranth plants grow on the foredunes.

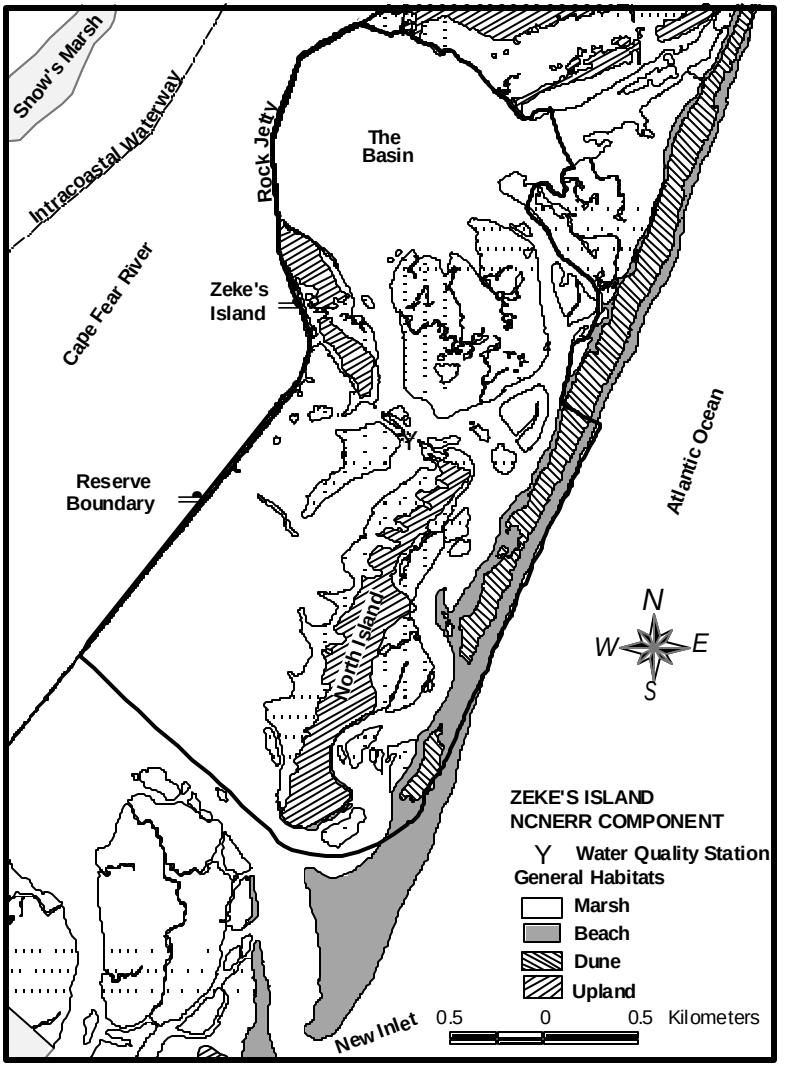
Visiting the Site

When landing on the beaches along the north and south sound side of the island, most visitors cross the dunes to the beach where sunbathing, picnicking, hiking, and sport fishing are popular activities. Visitors may also walk down the undisturbed ocean beach for miles.

The beach, maritime forest and shrub thicket are the habitats least vulnerable to disturbance by visitors. Dunes and grassy flats are more easily affected, as trampling may destroy the grass stems. It is also easy to damage the high and low marsh communities this way. The open tidal flats may be used by groups as long as the habitat is not altered, for example by extensive digging in search of invertebrates. The few eelgrass beds should only be used by classes that are careful to avoid damaging this delicate and locally significant community.

*LeGrand, H.E. and S.P. Hall. 1997. Natural Heritage Program List of the Rare Animals Species of North Carolina. N.C. Natural Heritage Program. DENR. Raleigh. 83 pp.

Zeke’s Island



SITES

Zeke's Island

The Setting

One of the most unusual areas of the North Carolina coast is the lagoon-like estuarine complex at the Zeke's Island site. The site is 22 miles south of Wilmington, bounded by Federal Point to the north, Smith Island to the south, the Atlantic Ocean to the east, and the Cape Fear River to the west. There are three main islands within the site: Zeke's Island, covering 42 acres of high ground; North Island, encompassing 138 upland acres; and No Name Island, covering about three acres and the beach barrier spit of 64 acres. The islands are fringed with extensive marshes and tidal flats.

Zeke's Island is part of the lower Cape Fear region, an area whose outstanding estuarine and ocean resources have long supported the important commercial fishing industry. In recent years, the area's beauty and climate have attracted thousands of tourists and sparked the growth of its communities. The economy of nearby resort towns – Kure Beach, Carolina Beach, Caswell Beach, Yaupon Beach, and Long Beach – depends on tourism. Southport, a town on the west bank of the Cape Fear River, is the sport fishing center of Brunswick County and one of the state's leading commercial seafood producers. The Smith Island/Bald Head Island complex is the site of a vacation and retirement development.

The History

It was not until the mid-1770s that the lower Cape Fear River was permanently settled by Europeans. More than a century earlier, a group of colonists from the Massachusetts Bay Colony attempted to settle there, but failed after a short time. Several attempts by Barbadians to maintain a colony along the river between 1664 and 1667 were also unsuccessful. Native

ABOUT ZEKE'S ISLAND:

One of the most unusual areas of the North Carolina coast is the lagoon-like estuarine complex at the Zeke's Island site.

Americans did live in the area, but it is not known if they fished and hunted in the Zeke's Island vicinity.

Permanent colonial settlement along the lower Cape Fear River began with the establishment of Brunswick Town on the west bank of the river - a short distance upstream from the present reserve site. Within a few years, plantations were built along the Cape Fear's lower reaches, and the area began to grow.

A violent storm in 1761 opened New Inlet, probably at the section of beach used as a "haul over" - a narrow part of the island where boats could be moved between the ocean and the sound. The inlet was created approximately two miles north of its present location. Vessels travelling between the ocean and the river used this and another inlet for more than a century.

A map of 1770 shows an extended shoal area within New Inlet, running north and south from the inlet, along the east bank of the river. There are indications that Zeke's Island slowly increased in size during the late 18th and early 19th centuries. Between 1852 and 1858, its configuration changed noticeably, extending northeastward to New Inlet channel. Wooden walkways traversed Zeke's Island at this time and a small wharf jutted outward from the northwest tip of the island into the Cape Fear.

The lower Cape Fear region was especially important during the Civil War. Fort Fisher, the "Gibraltar of the South," was just north of New Inlet and guarded its approaches. Many smaller batteries and forts were scattered around the lower Cape Fear, including a battery of three guns on Zeke's Island. The river was the principal lifeline of the Confederacy during the war, particularly during its latter stages. Despite vigilant patrolling of local inlets by as many as fifty federal ships, numerous blockade runners made their way stealthily into and up the Cape Fear to deliver essential supplies that were exchanged for cotton and other agricultural products in Wilmington.

Fort Fisher fell in January of 1865, following a massive amphibious assault by Union forces. Passing through New Inlet and continuing upriver, the troops captured

ABOUT ZEKE'S ISLAND:

The unusual characteristics of the site have created a variety of habitats, including tidal flats, salt marshes, shrub thicket, maritime forest, sand dunes, ocean beach and the hard surface of the Rocks.

Wilmington. Artifacts and sunken vessels from the 1800s can be found in and near the reserve site as a result of these military operations.

Between 1875 and 1881, a major engineering feat was accomplished when the U.S. Army Corps of Engineers constructed "The Rocks" – a massive breakwater running from Federal Point to Zeke's Island, and from Zeke's Island southward to Smith Island. Designed to reduce shoaling in the Cape Fear, the Rocks drastically reduced the flow of water through New Inlet and caused extensive changes in the landforms of the area. New Inlet migrated southward while Zeke's Island grew significantly in length. The island subsequently became the site for a turpentine factory, which was destroyed during the 1899 hurricane, and a center for gill net fishing.

"The Basin" – the area between the Rocks and the barrier spit – has been used by inhabitants for hunting and fishing. In recent years, it has been open for shellfishing. The spit has been used to some extent by off-road vehicles. Except for the Rocks and off-road vehicle use, the Zeke's Island site shows little evidence of human encroachment, although the lower Cape Fear region is continuing to grow.

The Ecology

An excellent example of how natural and human influences can affect the natural environment can be seen at the Zeke's Island site. The dynamics of the inlets in the area have changed the size and shape of the site's islands, and the rock jetty has blocked the flow of the Cape Fear River through the estuary, creating a lagoon with a salinity level similar to that of the Atlantic Ocean.

Although the changes in the area's inlets between the late 1800s and 1938 is unclear, it is probable that the inlets referred to in historical documents migrated southward and closed, perhaps with other inlets opening and closing in the narrow spit. A 1938 aerial photo shows only one inlet in the area, called Corncake Inlet, near the present New Inlet. In the late 1950s, Corncake Inlet closed because of shoaling.

After New Inlet opened it steadily migrated

ABOUT ZEKE'S ISLAND:

Fish, shrimp, crabs, clams and oysters use the estuary as a nursery ground where young organisms take advantage of shallow protected waters, abundant food and relative safety from predators.

southward, causing the growth of the beach spit south from Federal Point. North Island originally part of a barrier island, now runs north to south behind the beach spit, and between Zeke's Island and New Inlet. No Name Island has also recently taken shape off the southern tip of Zeke's Island. In general, the amount of exposed land within the reserve site has continued to increase during this century and the water depth has progressively decreased. While shoals and marshes have continued to appear and disappear in the Basin, the main islands of the site - Zeke's, No Name, and North – have remained stable relative to the sixty-six-acre barrier spit, even though their shorelines periodically increase and erode. In 1999 New Inlet closed resulting in a shift from oceanic to riverine influence within the Basin.

Zeke's and No Name Islands have elevations of only a few feet; North Island has several scattered dune systems, one of which reaches to twenty feet above sea level. High tides at the site occur twice a day and have a range of about three to four feet. The unusual characteristics of the site have created a variety of habitats, including tidal flats, regularly and irregularly flooded salt marshes, shrub thicket, maritime forest, sand dunes, ocean beach and the hard surface of the Rocks. These are described in Chapter Three. Seabeach amaranth (threatened federal status) has been found on the site's foredune areas.

The Zeke's Island site is important for several commercial seafood species found throughout the area. Fish, shrimp, crabs, clams and oysters use the estuary as a nursery ground where young organisms take advantage of the shallow protected waters, abundant food, and relative safety from predators.

ABOUT ZEKE'S ISLAND:

The Atlantic bottlenose dolphin, which swims in the waters near the site, is the most common local marine mammal.

Both the Atlantic loggerhead and green sea turtles, federally protected threatened species, occasionally nest on the site's ocean beach spit. Off-road vehicle traffic along the beach is regulated by the Division of Parks and Recreation to protect these species.

The Atlantic bottlenose dolphin, which swims in the waters near the site, is the most common local marine mammal. Humpback and pygmy sperm whales have been sighted in the Atlantic Ocean offshore from the site.

The expanse of intertidal flats in the Zeke's Island vicinity is the single most important shorebird habitat in southeastern North Carolina. A variety of species have been recorded there, among them dunlin, black-bellied plovers, short-billed dowitchers, white ibis, great blue herons, snowy egrets, and tri-colored herons, as well as black ducks, mallards, and pintails. Ferry Slip, a nearby island in the Cape Fear River, harbors 500 pairs of brown pelicans and is one of the few areas in southern North Carolina that provides habitat for them. This island also contains a heron

rookery. Another island near Zeke's, Battery Island, harbors 700 pairs of white ibis, hundreds of great egrets, and an assortment of other herons and egrets. Both Battery and Ferry Slip islands host a large wintering population of marbled godwit.

Getting to the Site

U.S. Route 421 from Wilmington, which provides easy access to all of the recreational areas north of the site, ends at Federal Point – adjacent to the Zeke's Island site and the N.C. Department of Transportation's ferry to Southport. The

ABOUT ZEKE'S ISLAND:

The expanse of intertidal flats in the Zeke's Island vicinity is the single most important shorebird habitat in southeastern North Carolina.

N.C.Wildlife Resources Commission maintains a public boat ramp at the northern shore of the Basin. In addition, the New Hanover County Parks and Recreation Department maintains a pedestrian beach access facility and vehicular dune crossovers on Federal Point. The entrance for these is on U.S. 421, just north of the North Carolina Aquarium at Fort Fisher. Access within the reserve is primarily by private boat while the barrier spit is accessible by foot or off-road vehicle

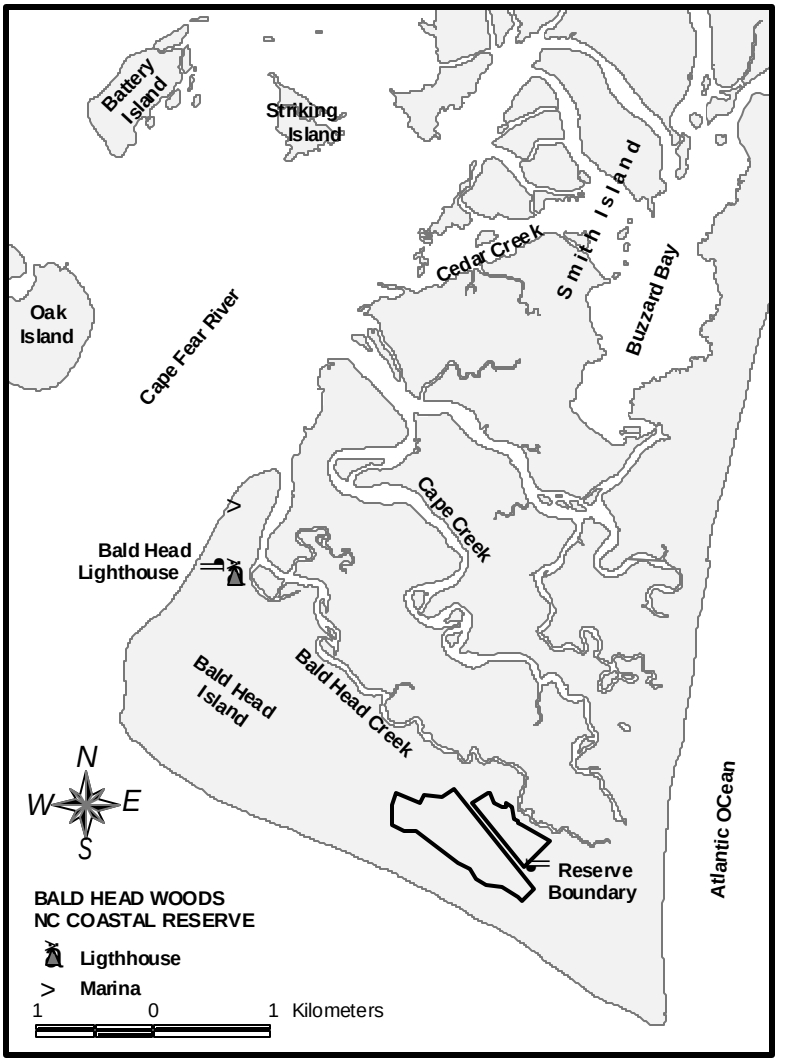
Visiting the Site

The North Beach of the "basin" is the primary educational area of the reserve site. This island contains representative examples of most of the area's plant and animal communities. The barrier spit portion of the reserve site is a popular spot for recreation as well as an excellent site for observation and research concerning inlet dynamics.

No Name Island should not be used by groups because it is totally covered by marsh. North Island is the largest and by far the most ecologically diverse island in the site. This

island can accommodate individuals or special groups that prefer a more wilderness-like experience for estuarine and upland habitat interpretation or research. In general, the beach and shrub thicket habitats are least vulnerable to disturbance by visitors. Dunes are more easily disrupted because of foot or vehicular traffic can destroy the stems of underground root systems of the sea oats. Both high and low marsh communities are very vulnerable to destruction by trampling. The open tidal flats may be used by groups as long as they are not disturbed significantly, such as by extensive digging for invertebrates.

Bald Head Woods



Bald Head Woods

The Setting

The 173-acre Bald Head Woods component is part of the Smith Island barrier island complex, located at the southernmost point of the state. Smith Island lies just east of the Cape Fear River, and is bounded on the south and east by the Atlantic Ocean, and on the north by the Zeke's Island site. The "highlands" of this complex consist of Bald Head, Middle and Bluff Islands. These are actually three forested dune ridges, separated by salt marshes. The name "Bald Head" originates from a sand dune near the western edge of the southernmost ridge, which resembles a bald man's head, and is the first land to be seen from the sea when approaching the Cape Fear River. The southeast extremity of Smith Island is an elbow of sand that juts far out into the ocean, earning it the name "Cape Fear" for the hazards it has long posed to ships. To the north of the highlands, vast expanses of low salt marsh make up three-quarters of the 12,000-acre complex.

Bald Head and Middle Islands, the two southernmost ridges of the Smith Island

complex, are steadily being developed with the ultimate goal of becoming an exclusive island resort area. The state owns the property north of Middle Island (10,000 acres), which includes the beaches and wetlands north of Bluff Island (East and Bay Beach), and a small separate island near the mouth of the Cape Fear River (Battery Island). Bluff Island is managed by the Division of Parks and Recreation, while Battery Island is leased to the National Audubon Society for stewardship of the large heronry. The Bald Head Woods component of the North Carolina Coastal Reserve is located in the central portion of Bald Head Island and is managed by the Division of Coastal Management.

SITES

ABOUT BALD HEAD WOODS:

The 173-acre Bald Head Woods component is part of the Smith Island barrier island complex, located at the southernmost point of the state.

The History

A substantial amount of Indian material has been found on Middle Island, indicating that small family groups used the island for hunting and fishing as early as 1500. The first European explorers in the region were the Spanish. In 1526, an unsuccessful expedition led by Lucas Vazquez de Ayllon attempted to settle the Cape Fear River. Similar attempts were made by French, New Englanders and Barbadians throughout the 17th century.

Because of its strategic location at the mouth of the Cape Fear River, Smith Island played an important part in the Civil War. Confederate blockade-runners used the inlets and channels around Bald Head to transport cotton from Wilmington past the lines of Union Blockade vessels that guarded the coast. They then proceeded to Europe, to trade their cargoes for provisions and munitions much needed by the South. In fact, this commerce was so important that the Cape Fear River became known as "the lifeline of the Confederacy." To protect this lifeline, the Confederates constructed Fort Holmes on the western side of Bald Head Island in 1863. Extensive remains of this earthwork fort still exist today. After a massive Union assault and the fall of nearby Fort Fisher, Fort Holmes was evacuated in 1865 and the lifeline of the Confederacy was broken.

The Civil War left behind the wreckage of at least 40 ships run aground by Union forces. In total, Cape Fear has been the site of at least 63 shipwrecks. Because of the danger to ships associated with this area, the federal government constructed a lighthouse on the island in 1796. This lighthouse was replaced by the lighthouse known as "Old Baldy" in 1816. Discontinued in 1935, Old Baldy is the oldest lighthouse still standing in North Carolina. The main lighthouse for the area now resides across the river on Oak Island.

From 1882 to 1937, the island also maintained a life-saving service station. A crew of nine men patrolled the beach daily to watch for distressed vessels, to signal those approaching danger areas, and to render aid to shipwreck victims.

Improvements in navigation aids made

ABOUT BALD HEAD WOODS:
The name "Bald Head" originates from a sand dune near the western edge of the southernmost ridge, which resembles a bald man's head.

rescues unnecessary, and the station was discontinued.

Throughout the 20th century, conservationists and developers have battled over the fate of Smith Island. Development finally started in the early 1970s, and has proceeded slowly but steadily. In 1978, the Carolina Cape Fear Corporation donated 10,000 acres to The Nature Conservancy in exchange for an Army Corps of Engineers permit to construct a marina. This conservation easement included Battery Island and the lands and marshes north of Middle Island. The Nature Conservancy subsequently transferred these lands to the State. The reserve property was acquired from Bald Head Island, Ltd. in 1997.

The Ecology

One of the significant features of Bald Head Woods is the extremely old, large trees in this maritime forest. Live oak and laurel oak are the major tree species, making up a canopy that shelters the plants beneath from salt spray. Because of the frequent storms in this area, treefalls and

limb breakage open many gaps in the canopy. The increased light conditions result in a thick undergrowth of smaller trees, shrubs, and vines, including wild olive, American holly, yaupon, and catbrier. So dense is this under-story layer that very little light penetrates to the forest floor, favoring a sparse groundcover of shade-tolerant plants like ebony spleenwort. Cabbage palmetto appears throughout the forest. This palm is in the northern limits of its range here, as are other species like the Carolina laurel cherry, and a thorny shrub called tough bumelia.

The forest contains a number of swales that may be wet or dry, depending upon the

ABOUT BALD HEAD WOODS:
Live oak and laurel oak are the major tree species, making up a canopy that shelters the plants beneath from salt spray.

precipitation. A freshwater pond provides habitat and breeding grounds for amphibians and reptiles such as the southern toad, squirrel tree frog, eastern mud turtle, and black racer. The pond also supports small populations of black ducks. Gray squirrels, raccoons and opossums inhabit the forest. Resident birds include the Carolina wren, cardinal and painted bunting. These are joined in the fall by migrating species such as catbirds, towhees, blue jays and twenty-two species of warblers. Twenty-five bird species over-winter on Bluff Island. The other migrants remain only a short time before passing on to wintering grounds further south.

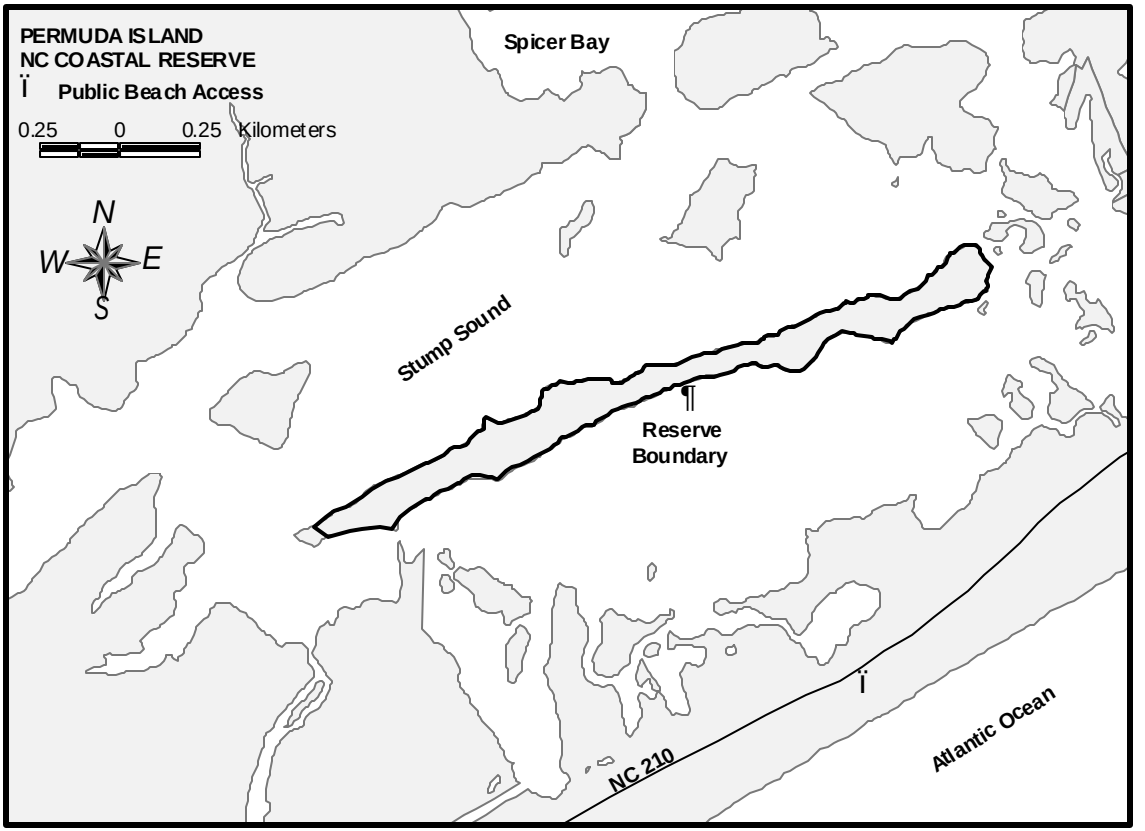
In addition to the maritime forest, Bald Head Woods is surrounded by high and low salt marsh to the north, south, and west. To the east, a zone of sand dune and open beach habitat buffers the forest from the wind. These habitats are described in chapter three..

Getting to/Visiting the Site

Bald Head Island may be accessed from the Southport marina by commercial ferry

(about $15 per person) to cross the Cape Fear River. Cars are not allowed on the island, but bicycles and golf carts may be rented, and maps are available to direct visitors to Bald Head Woods. An interpretive trail leads from the parking lot, and the first loop of the trail is wheelchair-accessible.

Permuda Island



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Permuda Island

The Setting

Permuda Island is a small narrow island situated in Stump Sound in the extreme south-western portion of Onslow County. It contains about 50 acres of upland and is approximately 1 1/2 miles in length. The island now lies protected behind Topsail Island, but it is believed to have once been part of a system of barrier islands.

The History

The island is virtually covered by a shell midden which reflects extensive aboriginal activity during the prehistoric period. The identification of these Indians and the precise nature of their activities on the island have yet to be determined. The land may have been part of a poorly defined patent granted to John Baptista Ashe in 1726. There were many deeds recorded between 1738 and 1865. The Stump Inlet had closed , at least temporarily by 1875 and then reopened several times until 1912 when it closed for good. That putany connection with the open sea 9 miles tothe southwest and 17 miles to the northeast The land was then cultivated up until recently.

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The Ecology

Permuda Island is situated on the sound side of Topsail Island. Now surrounded by the estuarine waters of Stump Sound, the component is protected from high energy ocean wave dynamics. The island is composed primarily of Holocene and Pleistocene sands with minor amounts of silts and clays. The waters of Stump Sound have semi-diurnal tidal fluctuations via the New River Inlet and the Topsail Inlet. The estuary receives fresh water from local creeks and from upland runoff. Although a major portion of the upland area of Permuda Island has been either farmed or disturbed in the past, typical estuarine and barrier island plant communities are found along its periphery. The central portion of the island contains former agriculture fields that now contain broomsedge, dog fennel, asters, goldenrods, Mexican tea, and young trees and shrubs invading from the shrub thickets. The shrub thicket community consists of live oak, red cedar, yaupon, silverling and greenbriar. Many of the birds that are seen on the island are

About Permuda Island

The island is virtually covered by a shell midden which refelects extensive aboriginal activity during the prehistoric period.

willets, American oystercatchers, egrets, herons, black skimmers, sandpipers and gulls. Brown pelicans patrol the sound and the upland portions are home to sparrows and warblers. Mammals found within the site include oppossums, raccoons, marsh rabbits cotton rats and an occasional river otter.

Getting to the Site

Permuda Island can be reached by boat or by a gated private road/causeway that runs northwest from North Carolina 210. Various public and private boat ramps are located along the south side of Topsail Island as well as the mainland shoreline.

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