

FINAL MANAGEMENT PLAN
for the
BUXTON WOODS COMPONENT
of the
NORTH CAROLINA COASTAL RESERVE

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and Natural Resources
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I. EXECUTIVE SUMMARY

The North Carolina Coastal Reserve Program is part of the State Division of Coastal Management (DCM), an agency within the Department of Environment, Health and Natural Resources (DEH&NR). The Reserve includes over 12,000 acres of lands and waters situated along the 320 miles of the state's ocean shoreline and is comprised of eight sites or components (see Figure 1): 1. Currituck Banks (Currituck County); 2. Kitty Hawk Woods (Dare County); 3. Buxton Woods (Dare County); 4. Rachel Carson (Carteret County); 5. Permuda Island (Onslow County); 6. Masonboro Island (New Hanover County); 7. Zeke's Island (Brunswick/New Hanover counties); and 8. Bald Head Island (Brunswick County). Four components (Currituck Banks, Rachel Carson, Masonboro Island and Zeke's Island) also constitute the North Carolina National Estuarine Research Reserve, a federal-state program that manages the sites for research, education and compatible traditional uses. Though Buxton Woods, Kitty Hawk Woods, Permuda Island and Bald Head Island are not components of the Estuarine Reserve, they are managed for the same purposes.

The concept of governmental protection of coastal natural areas was created in Section 315 of the federal Coastal Zone Management Act of 1972. This section of the Act created the National Estuarine Research Reserve System, a program that includes sites in 16 other states plus Puerto Rico. However, in 1987 the DCM felt that other state-owned coastal tracts not included in the Estuarine Reserve should be protected in a similar manner.

The Coastal Reserve Program protects and manages the eight components for research, education and compatible traditional uses. As coastal development continues to convert large portions of natural ecosystems to alternative land uses, the public needs to have access to areas that maintain our natural heritage and allow traditional uses. These sites also serve as natural outdoor laboratories for education -- to enhance awareness of coastal processes -- and research -- to improve our knowledge and, hence, management of the coast. The sites have been used by generations of local residents for hunting, fishing and recreation. These activities will continue as long as they do not interfere with the primary goals of research and education. Additional components may be added to the Reserve as funding and protection needs are evaluated by the State.

Various tracts in Buxton Woods have been acquired by the State beginning in 1987. Acquisitions have been funded by: state appropriations; various awards from the Natural Heritage Trust Fund; and a grant from the U.S. Department of Commerce/National Oceanic and Atmospheric Administration. The State currently has title to approximately 818 acres acquired in fee simple title.

Preservation of the nationally significant natural resources of the site shall be a priority. A coordinated management approach will be used, involving the Reserve staff; a local advisory committee; and a network of federal, state, county and local agencies and individuals.

The Reserve staff consists of the Program Coordinator and Research Specialist based at the University of North Carolina at Wilmington/Center for Marine Science Research (UNCW/CMSR) in Wilmington plus the Education Specialist in Beaufort. A Site Manager

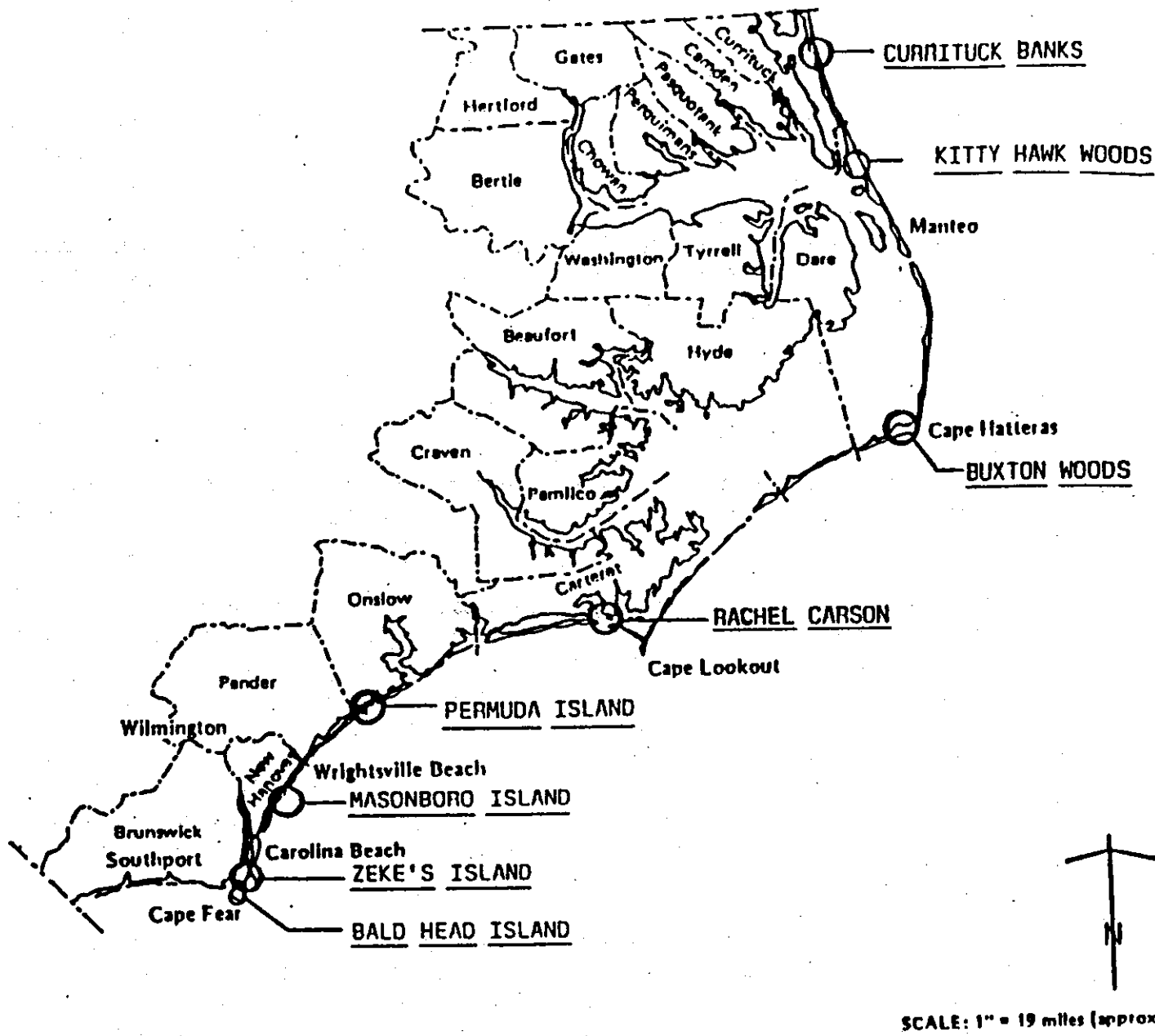


FIGURE 1. NORTH CAROLINA COASTAL RESERVE

position will be filled during 1996. The Coordinator oversees administrative functions; research and educational programs; and interacts with public and private agencies/individuals concerning management of the island. The specialists coordinate their respective activities with various organizations (e.g., governmental agencies, state/private universities, marine science facilities, public schools) as well as any interested individuals. Management of the woods will be performed by the Site Manager, but is currently facilitated by cooperative agreements, volunteer efforts and coordinated staff involvement. Component use requirements (Appendix A) are enforced to protect the natural integrity of the site.

Buxton Woods encompasses the largest remaining area of maritime forest in North Carolina. The greater woods area includes approximately one-fifth of the total acreage of this ecosystem remaining in the state. The site contains a unique series of freshwater marshes and ponds, which, in combination with the extensive maritime forest and proximity of Cape Hatteras, provides vital habitats for numerous animal species. Four species and three plant communities found on the property are considered significant by state agencies.

It is the responsibility of the Reserve staff to be knowledgeable and involved with land use issues in the vicinity of the component that could impact the woods. An essential part of this task is regular monitoring, by the staff and concerned citizens, of adjacent development and other nearby land uses.

This plan is in accordance with all relevant federal, state and local regulations and is consistent with the 1994 Dare County Land Use Plan and the North Carolina Coastal Area Management Act.

II. INTRODUCTION

A. Purpose and Scope of Plan

The State of North Carolina established the North Carolina Coastal Reserve to manage representative natural areas for long-term research, monitoring, education and compatible traditional uses. The ultimate goal of the Reserve is to provide useful information to coastal decisionmakers and the public.

The purpose of this management plan is to inform interested parties about the Buxton Woods component and activities that will be conducted both on- and off-site. Though it is long-term in scope, the plan will be reviewed annually by the Local Advisory Committee and revised by the State every five years.

B. Creation of the Coastal Reserve

The Coastal Reserve was created to encompass various state properties managed as coastal natural areas. Four of these sites comprise the North Carolina National Estuarine Research Reserve, a state-federal program to protect selected estuarine sites for research, education and compatible traditional uses. The Estuarine Reserve Program was created

by Section 315 of the federal Coastal Zone Management Act of 1972. This section of the Act allows states to apply for matching federal funds to acquire and manage selected areas. North Carolina received federal grants to begin estuarine reserve land acquisition in 1982. Federal criteria, funding and subsequent evaluations allowed North Carolina to have a total of four components (Zeke's Island, Masonboro Island, Rachel Carson and Currituck Banks--see Figure 1) in the Estuarine Reserve. However, acquisition, operations, research, development and education funding limits were only enough to cover establishment and management of these four sites.

In 1987 the State had an opportunity to purchase a portion of Buxton Woods and, thus, to protect this maritime forest from development. This spawned an effort to acquire a majority of the remaining woods as an additional (non-estuarine) component of the Reserve.

C. Values of Preservation

One obvious question that needs to be addressed is why this site is being protected. One answer, discussed later, is the natural significance of Buxton Woods in terms of rare plant and animal species within a large tract of diverse maritime forest communities. However, there also needs to be a brief overview of the practical and societal benefits of acquisition and management of the property.

Bennett (1995) characterized wilderness areas in terms of ecological and psychological values. The most tangible reason for natural area protection is preservation of evolutionary processes and genetic diversity which, thus, gives us an opportunity to learn more about our world, especially relative to prediction of the consequences of human impacts on our environment. That is, an undisturbed maritime forest can serve as a scientific "control" for comparison to developed areas. Issues such as water quality, barrier island hydrology, storm damage and exotic species invasion can be compared and contrasted between the Reserve and developed maritime forest areas. Thus, the site serves as an irreplaceable laboratory for education and management-oriented research.

The psychological benefit of the property will vary from individual to individual. Each person's concept of wilderness or natural conditions is founded upon previous life experiences and expectations. Relative to Buxton Woods, the 818-acre tract offers different levels of use from areas accessible via vehicular trails to some tracts that are quite remote. Also, the local Outer Banks culture is closely tied to Buxton Woods. The Hatteras Indians lived in the area and early settlers relied on the forest for boat building resources, hunting and cattle grazing. Finally, the visitor may also gain a greater understanding of just how the world is changing by visually contrasting the development elsewhere on the Banks to this tract of maritime forest. Thus, over time, as the Reserve component becomes more and more of a "natural island" surrounded by human uses, there will be a remnant of the original landscape permanently available for public visitation and enjoyment.

III. BUXTON WOODS RESERVE CREATION AND ACQUISITION HISTORY

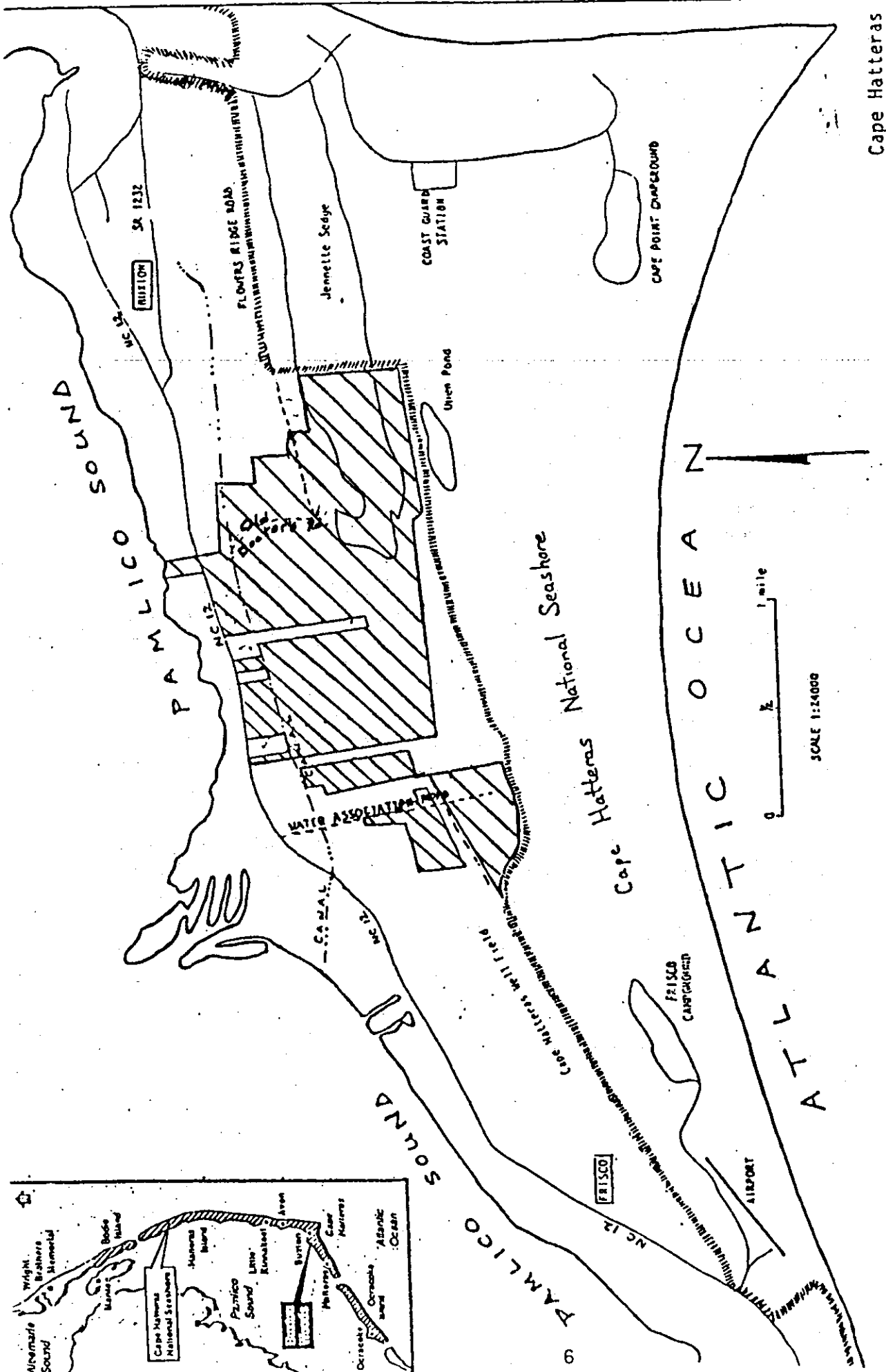
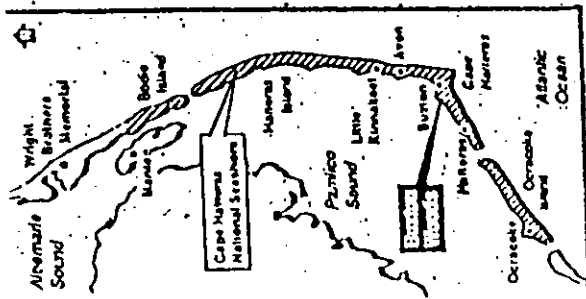
In 1986 a group of developers proposed to construct a golf course on a tract in Buxton Woods. Since Hatteras Island had no zoning laws, there were virtually no restrictions on such local development. Motivated by concern for the maritime forest she loved and valued as an irreplaceable natural resource, Ms. Shay Clayton wrote a letter to the State. She learned that within the Coastal Area Management Act was a provision to designate Areas of Environmental Concern (AEC) and, thus, the Coastal Resources Commission could impose controls on development.

With support from Ms. Clanton, Carol Anderson, Roy Johnson and other local residents, the North Carolina Chapter of the Sierra Club petitioned the Coastal Resources Commission (CRC) to nominate portions of the woods as a maritime forest AEC that would restrict development. This was justified by potential threats to the unique forest ecosystem and to the local aquifer that serves as the island's only source of fresh water. In 1987 the CRC expanded the existing Cape Hatteras Wellfield AEC, originally established through the efforts of the Cape Hatteras Water Association, to include that portion of the woods slated for development. However, this action did not affect the plans for development.

Local support for protection of the woods resulted in the creation of a group known as the Friends of Hatteras Island. The Friends first attempted to postpone the golf course development until a decision was made on the maritime forest AEC. The Dare County planning board agreed. Following a public hearing and extensive review of the matter, the CRC found that the woods did qualify as an AEC. However, they postponed a final decision on designation to give the County an opportunity to regulate such development locally. Dare County acquiesced by the creation of an Special Environmental District (see page 23) for the Buxton Woods area. This zoning change satisfied the concerns of the CRC and, thus, they tabled the Buxton Woods AEC proposal (Shaw, 1988).

During the process of AEC nomination and implementation of county development regulations for the woods, the developers abandoned their plans for the golf course. In January of 1988 the State purchased a 152-acre tract using state and federal funds. Thus, Buxton Woods became a component of the Coastal Reserve. Since then state and federal funds have acquired additional tracts to protect the woods. To date, 818 acres (see Figure 2) have been purchased for a total of \$ 5,896,004 (\$ 3,409,142 - federal; \$ 2,486,862 - state).

The events leading to the acquisition and protection of Buxton Woods have catalyzed concern over preservation of other maritime forest areas in the state. A study by Lopazanski et al. (1988) inventoried the remaining communities along the coast. Regulation of maritime forest development was reviewed by the Coastal Resources Commission. Subsequently, portions of the Bald Head Island and Kitty Hawk Woods forests were acquired. These sites will involve management by the Coastal Reserve Program.



||| Nat. Park Service Boundary

▨ Buxton Woods Coastal Reserve (State of N.C.)

Cape Hatteras

IV. GOALS OF MANAGEMENT

The management goals of the North Carolina Coastal Reserve are:

1. *To preserve coastal ecosystems representative of the biogeographic regions and typologies in North Carolina and to make them available for continuous future study of processes, functions and influences which shape and sustain the coastal area;*
2. *To provide new information on coastal ecosystem processes to decisionmakers as a basis for the promotion of sound management of coastal resources;*
3. *To provide a focal point for educational activities that increase the public awareness and understanding of coastal ecosystems; effects of man on them; and their importance to the state and the nation; and*
4. *To accommodate traditional recreational activities, commercial fishing and other uses of the Reserve as long as they do not disturb the Reserve environment and are compatible with the research and educational activities taking place there.*

General policies for protection and use of the Reserve's resources are summarized as follows:

A. Research Activities (page 23)

The management plan establishes procedures by which research will be permitted in the Reserve. A very wide range of research may take place within the Reserve. Research that fills major gaps in our knowledge of the extant ecosystems and cultural resources is especially encouraged. Monitoring of basic environmental characteristics and the change in these characteristics over various temporal and spatial scales is also important to the Reserve. Priority will be given to any research that improves or facilitates management of coastal resources.

The management plan also provides procedures for permitting and monitoring research activities and procedures for disseminating research results to educate scientists, resource managers and the general public. Research in the Reserve will enhance awareness and understanding of natural processes in the coastal region and human effects on the associated ecosystems.

B. Educational Activities (page 26)

Publications, lectures, slide shows, field trips and other related programs will actively draw on and be coordinated with the activities of the public schools; the North Carolina Aquariums; colleges and universities; and other educational organizations. Policies related to on-site interpretive programs for students and other groups have been

developed. On-site educational programs will not disturb research activities. Off-site educational programs will be coordinated with various marine science programs such as the University of North Carolina Sea Grant College and the North Carolina Aquariums.

C. Other Uses (page 29)

In this plan policies addressing traditional uses of the Reserve have been presented to maintain a balance between these activities and research/educational activities (Section VIII, F-G). Standards for recreational activities and vehicular access have been developed. The policies are designed to ensure minimal disruption to research projects and to the Reserve's physical and biological features.

D. Enforcement, Surveillance and Maintenance (page 32)

Protection of the site will be achieved through the Reserve staff and via cooperative arrangements with state and local agencies and individuals. This maritime forest complex is a unique resource which must be preserved.

V. HISTORY (Anglely, 1993)

The Buxton Woods area of Dare County is one of richly varied maritime forest stretching westward from Cape Hatteras to Frisco. Unusual or even unique in some ways, it represents a transition area for species distributions characteristic of northern and southern maritime forest ecosystems. Just offshore, the Gulf Stream and Labrador Current collide over Diamond Shoals, creating the most treacherous portion of the "Graveyard of the Atlantic."

Though understandably feared by mariners, this area off the North Carolina coast has been heavily and constantly traveled since the earliest days of exploration and settlement. It is estimated that upwards of forty English vessels passed nearby during 1580-90, while ill-fated attempts were made to plant an enduring colony on Roanoke Island.

Even before the arrival of Europeans, the Buxton Woods area was home to the Croatoan group of the Carolina Algonquians. Their chief town is believed to have been located just east of present-day Buxton, near an inlet known in the late sixteenth century as Chacandepeco. Here the maritime forest offered protection and game, and soil conditions permitted at least some degree of agriculture. The Croatoan (later Hatteras) Indians maintained friendly relations with the English colonists on Roanoke Island; their descendants would prove friendly with later European settlers as well.

Cartographic and documentary evidence indicates that the Hatteras Indians remained centered in the present Buxton area well into the eighteenth century, though in progressively smaller numbers. During the early years of that century John Lawson (1667) stated that their town, called "Sand Banks," had only sixteen fighting men. Later, in 1733, cartographer Edward Moseley showed the continued presence of their settlement near the present Buxton, but noted that the only remaining tribesmen were "about six or eight . . . who dwell among the English."

Significantly, Moseley's map also noted that "the Cape [Hatteras] land" was "full of low trees."

By the end of the colonial period the Hatteras Indians had all but vanished, the Buxton Woods area having been increasingly settled by Europeans. The last known reference to these Native Americans dates from 1788, when an Indian woman conveyed title to the Indian Town of her ancestors.

The movement of European settlers into the middle portions of the Outer Banks began in the first quarter of the eighteenth century. Predominantly of English extraction, they came to the area primarily from the Albemarle region of North Carolina and from tidewater Virginia. Many of these early settlers were stockmen, who came to Hatteras Island and other areas of the Outer Banks to raise and maintain their herds of free-roaming cattle, hogs and sheep. Others were mariners, fisherman, hunters and small-scale farmers, who managed somehow to wrest a livelihood from the scattered patches of arable soil, maritime forest and nearby waters of sound and sea. Almost invariably, the favored locations of settlement were in the wooded "hammocks" along the shore of Pamlico Sound, where they were protected from storms, winds and high seas. Only rarely, as in the cases of beached whales or shipwrecks, would there be occasion to visit the ocean shore. Names of some of these earliest European settlers of the Cape Hatteras and Buxton Woods areas are still in evidence today among their descendants.

Throughout the American Revolution, scattered British raids occurred along the Outer Banks against both settlements and shipping. The raids on shoreline locations were primarily for the purpose of obtaining fresh meat and were directed against the Bankers' roving herds of livestock. By the spring of 1776 independent militia companies were stationed along the Banks to guard against these depredations, with each company assigned responsibility for a certain area. Only a few months later, militiamen on Hatteras Island repulsed an enemy incursion just above Cape Hatteras.

During the decades following the Revolution, settlement of the Buxton Woods area and of the Outer Banks in general continued at a measured pace, with few changes in locales or occupations. Residents of the Buxton Woods vicinity continued to gain their livelihoods from the land and water as mariners, fishermen, stockmen, carpenters, boatbuilders and hunters. As had been the case in the colonial period, scattered settlements along the Banks were located in the wooded hammocks on the sound side, where communities such as Buxton and Frisco remain today. House types, too, had achieved a certain uniformity, commonly featuring one-and-a-half or two stories, with outside chimneys, central hallways and detached kitchens. When federal surveyor William Tatham visited Cape Hatteras in 1806, he remarked on the "two story houses, and comfortable living" in the nearby woods. He also commented on the general good health and longevity of area residents.

After many unfortunate vessels came to grief off Cape Hatteras, the federal government authorized construction of the location's first lighthouse. Completed in 1802 it was an octagonal structure rising more than 100 feet above ground level. Modifications during 1850-59 increased its height to 150 feet and incorporated a new lens and lantern for greater visibility.

Patterns of local trade and maritime traffic changed in 1846, when a powerful storm opened

the present Hatteras and Oregon inlets. Within a decade Hatteras Inlet had surpassed Ocracoke Inlet as an artery of trade while the present town of Hatteras had begun to develop as a center of pilotage and general maritime activity.

By 1850 some 103 families were residing in the Buxton Woods and Cape Hatteras areas. The total population of 661 included 577 whites and 84 slaves. Ten years later, on the eve of the Civil War, Hatteras Island as a whole had a population of approximately 1,200 persons, including just under 100 slaves. The number of recorded dwellings on the island had increased during the preceding decade from 205 to 256, with the principal settlements located much where they are today. The names of these settlements, however, had not yet assumed their modern forms. Buxton was known simply as The Cape, while nearby Frisco was known as Trent. Only the rising community of Hatteras was called by its modern name and had the only local post office.

When the Civil War began only three fortifications were available to the Confederacy along the entire coast of North Carolina. The Outer Banks themselves were virtually defenseless. To alleviate this situation, forts were quickly thrown up at each of the principal inlets: Fort Ocracoke or Morgan at Ocracoke Inlet; Fort Oregon at Oregon Inlet; and Forts Hatteras and Clark at Hatteras Inlet. However, the ultimate fall of forts Hatteras and Clark led to the abandonment of Confederate installations at Ocracoke and Oregon inlets as well, setting the stage for a successful attack on Roanoke Island in February 1862. This event established Union control over the Outer Banks and sound regions of northeastern North Carolina.

Shortly after the Civil War, plans were developed to replace the lighthouse at Hatteras with the structure standing today. This lighthouse was begun in 1868 and completed two years later. With a total height of 208 feet, it still ranks as the tallest brick lighthouse in the United States. The older lighthouse, located some 600 feet southwest, was demolished.

Construction of the Cape Hatteras Lighthouse from 1868 to 1870 provided employment for many residents of the general area, and doubtless contributed significantly to the local economy. Principal places of residence, however, remained confined primarily to the shoreline along Pamlico Sound. An 1872 survey recorded many of the existing homesites, as well as features in the central and western portions of Buxton Woods. The interior and easternmost section of the woods were considered by the government surveyor to be all but impenetrable, and were actually omitted from the survey. By way of explanation, he inserted a brief notation in the area left otherwise conspicuously blank: "This Pond (near Brooks Point) leads into Cape Hatteras Ponds: it was impossible for me to get through, as the unsurveyed portion is nothing but thick swamp and woods."

Construction of the lighthouse was followed by other government projects which contributed greatly to the economy of the Cape Hatteras-Buxton Woods area. The decades following the Civil War saw large-scale involvement by the federal government in the establishment of lifesaving stations, a weather station and post offices.

Apart from the increases in federal employment, the occupations and ways of life in and around Buxton Woods changed little during the late nineteenth and early twentieth centuries.

Residents still subsisted very largely on farming, hunting, fishing and boatbuilding. Many of the timbers used in the construction of vessels came from oaks and other forest trees. Most of the woods was also grazed by free-roaming livestock. Yaupon was gathered for tea and eel grass, taken from the sound, was used in the manufacture of bedding and furniture. Some residents served as guides for waterfowl hunting, which enjoyed widespread popularity during this period.

The years following World War I were characterized by considerable dislocation and difficulty for Outer Banks residents in general. Stock raising had declined markedly, as had the number of shipwrecks and the need for surfmen. Moreover, maritime traffic through the inlets was increasingly restricted to small fishing vessels while the markets for yaupon and eel grass were shrinking. These and other conditions produced a significant exodus of young men and women to seek job opportunities and more promising futures elsewhere.

It was while the upper portions of the Outer Banks were beginning to develop that measures were adopted to protect some of the areas to the south. In 1937 Congress authorized establishment of the Cape Hatteras National Seashore, the first such coastal area in the nation to be set aside for recreational use. Eventually, this area would include the southern portion of Bodie Island and all of Hatteras and Ocracoke islands, except for existing communities and their immediate environs. More than seventy miles of ocean frontage would be preserved and protected. It was to be many years, however, before this ambitious proposal could become a reality.

Much sooner came concerted efforts by the federal government to protect the future Cape Hatteras National Seashore and, indeed, much of the entire banks against progressive shoreline erosion. For several years, beginning in 1935, the National Park Service and the Civilian Conservation Corps (CCC) endeavored to accomplish that goal with endless miles of sand fencing and abundant plantings of sea oats and other hardy grasses. One of the several CCC camps along the Outer Banks was located at Buxton and much of the work in the Cape Hatteras area was directed toward protecting the lighthouse and the shoreline fronting Buxton Woods. In a related development, open grazing of livestock was prohibited in 1937 on all areas of the banks north of Hatteras inlet. This traditional practice was felt to be a principal cause of local deforestation.

Buxton Woods became accessible by automobile during 1950-69 with construction of a hardsurfaced highway (NC 12) along the middle portion of the Outer Banks; building of the Bonner Bridge over Oregon Inlet; and establishment of regular ferry service. Rapid and dramatic social and economic changes have occurred in the ensuing years with burgeoning residential and commercial development strongly oriented toward the tourist industry.

VI. REGIONAL PERSPECTIVE AND ACCESS

Buxton Woods and the adjacent towns of Buxton and Frisco comprise a barrier island community with a primarily seasonal (April - November), resort-based economy. This portion of the Outer Banks attracts tens of thousands of tourists, seasonal residents and retirees every

year. Private and commercial development employs many local residents. Other local activities include various service businesses (e.g., restaurants, gas stations, gift shops, recreational enterprises), commercial fishing and private charter boats for sportfishing.

Public access to Buxton Woods is via: 1. NC 12 that connects with US 64 near Manteo (60 miles north) or 2. public ferries (from Cedar Island, Carteret County and Swanquarter, Hyde County) that run to Ocracoke, 28 miles southwest of the site; from Ocracoke the Hatteras Inlet ferry serves as a link to NC 12 on Hatteras Island (the ferry terminal is located 8 miles southwest of the property). The state-owned portion of Buxton Woods is reached via paved and unpaved roads (e.g., Old Doctor's Road, Flowers Ridge Road, Water Association Road) that run into the forest from NC 12 as depicted on Figure 2. Various walking trails link the state property with the Cape Hatteras National Seashore.

VII. RESOURCE INVENTORY

A. Physical Characteristics

Physiography and Geology (Shaw, 1988; Horton and Zullo, 1991)

Buxton Woods is located on Hatteras Island, one of the chain of barrier islands that form the Outer Banks of North Carolina within the Albemarle Embayment. The origin of barrier islands is controversial and complex, involving such factors as drowned beach ridges, changes in sea level and site-specific dynamics of sediment transport.

Hatteras Island is 56 miles long and entirely within the Cape Hatteras National Seashore except for seven enclave villages of about 200-600 acres each. The widest segment of this island occurs at Cape Hatteras, where conditions were suitable for a large forested area to develop on relict Holocene sand dunes. These dunes, some as high as 60 feet, form parallel ridges that represent the ancient shoreline of Cape Hatteras. Between the ridges are various freshwater wetlands (locally known as "sedges") at ground or near sea level. These topographic features, combined with historical land use patterns and geographic isolation, have resulted in a unique island habitat.

Encompassing approximately 3,000 acres of dense maritime forest and associated communities, Buxton Woods is from one to two miles wide and six miles long, totalling approximately five square miles. Over one-half of the forest area is within the Cape Hatteras National Seashore (900 acres) and the adjacent Buxton Woods Coastal Reserve (818 acres). The remaining forest is divided into hundreds of privately-owned parcels ranging from small lots to tracts of over 100 acres.

Soils (Tant, 1992)

The woods is underlain by Holocene and Pleistocene sands with local accumulations of silt, clay and organic matter. The soil associated with the relict dune ridges is the Fripp series consisting of excessively-drained sands comprising slopes ranging from 2 to 30 percent. Slightly

lower dunes of moderately well-drained sands characterize the Ousley series. Occurring locally on poorly-drained flats, Osier sands are found along the edge of freshwater marshes and ponds (sedges) within the woods. The Conaby series, a very poorly-drained mucky sand of interdune depressions, is also associated with these wetlands and may be saturated for significant periods, but is rarely flooded. Ponds and seasonally-flooded depressions are underlain by Currituck mucky peat. The small portion of marsh in the Reserve that borders Pamlico sound is underlain by very poorly-drained sands of the Carteret series.

Hydrology (Winner, 1975; Heath, 1988; Anonymous, 1993)

The fresh water reservoir in the Cape Hatteras area consists of two types of aquifers: 1. an unconfined, or water table aquifer that extends from the land surface to the first confining beds of silt and clay (80 to 100 feet below land surface) and 2. a confined aquifer between and beneath the silt and clay beds. The unconfined aquifer consists of a complex mixture of layers of fine to medium-grained sand; silty clay shell beds; and organic matter. The first confined aquifer is found at a depth of approximately 110 to 130 feet where this artesian water source is composed of interbedded sand and silt layers which overlay a second confining bed at depth of about 140 to 160 feet.

Permanent and intermittent freshwater ponds (sedges) are found in the woods, typically associated with the interdune troughs. These swales may provide aquifer recharge and discharge zones for the island, though the dynamics of interchange between surface and groundwater in these wetlands have not been determined. Strong storms (e.g., Hurricane Emily - 1993) can force sound water into the sedges.

Maintenance of fresh groundwater on the Outer Banks depends on the amount of rainfall (approximately 55 inches per year). This groundwater may best be described as a lens-shaped mass floating on top of denser salt water. The quantity of water in this lens changes depending on the amount of recharge and discharge. Below the freshwater lens a zone of diffusion occurs indicating the fresh water-salt water interface. This transition periodically changes in response to flooding, tidal movement, precipitation, surface water drainage and pumping rates of local wells.

Though the majority of the Reserve is upland, there is a small portion of land that borders Pamlico Sound. Local salinity is complex being influenced by ocean tides, via Hatteras Inlet to the south and Oregon Inlet to the north, plus the considerable volume of freshwater drainage into the sound from local creeks, canals and wetlands plus mainland drainage. Fluctuations and mixing of these waters are affected by oceanic lunar tides and winds blowing across the large sound area.

Though no comprehensive water quality study has been performed on the freshwater wetlands of the Reserve, the effects of Hurricane Emily on local water quality were investigated by Heath, Mew and Evans (1993). Cole and Brattan (1995) evaluated water quality for the adjacent portion of the Cape Hatteras National Seashore. They found that the wetlands of Buxton Woods are not receiving any notable amounts of septic effluent, but the presence of optical brighteners in two samples indicated that some effluent was present. Also, fecal coliform

counts exceeded North Carolina water quality standards, but the authors suggested that this was the result of nonhuman sources (e.g., raccoons, deer).

Climate (U.S. FWS, 1980; NOAA, 1951-95)

The proximity to Buxton Woods to the Atlantic Ocean and surrounding estuarine waters results in a decidedly maritime climate. The mean winter temperatures are on the average milder than those of mainland stations while summer readings are relatively cooler. Mean number of freeze-free days per year is 332 at Cape Hatteras versus 282 days per year in Raleigh. Normal annual precipitation is approximately 55 inches including approximately one inch of snow/ice pellets at Cape Hatteras compared to 43 inches with seven inches of snow/ice in Raleigh.

The Reserve component is located along a coastline with a long history of ocean storm activity. Two basic storm types present a significant threat to the area--hurricanes and "northeasters." Hurricanes, created over the tropical waters of the Atlantic Ocean and Gulf of Mexico, have struck the Outer Banks periodically over the decades. These storms, characterized by winds greater than 75 miles per hour and accompanied by intense rainfall, occur from mid-summer to late autumn. During 1950-59 nine storms affected the north Carolina coast. Recent storms in the Cape Hatteras area include Donna (1960), Gloria (1985), Bob (1992), Emily (1993) and Gordon (1994). According to the National Oceanic and Atmospheric Administration, the Cape Hatteras area has the highest probability of hurricane incidence along the North Carolina coast in a given year.

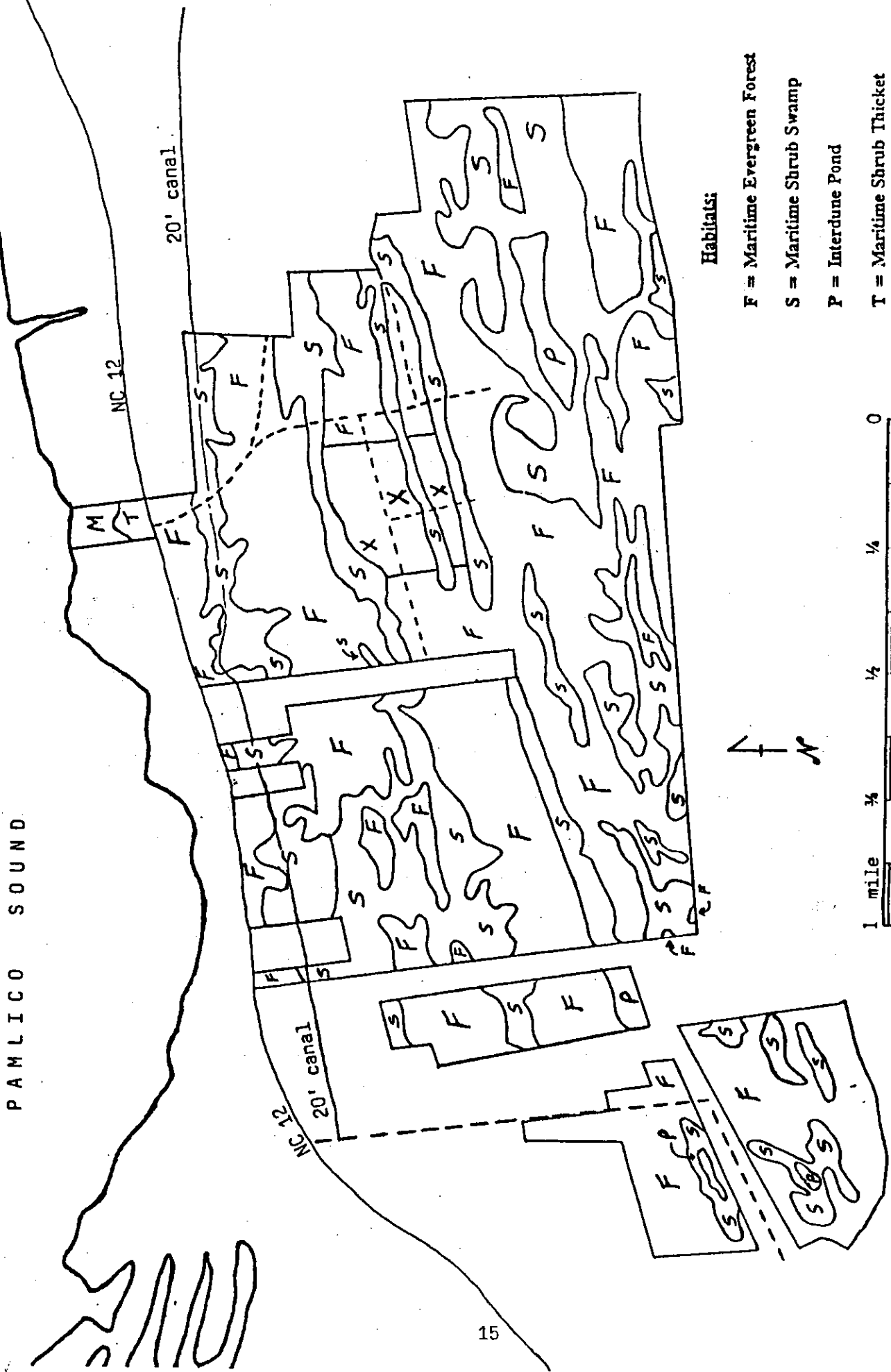
Extratropical storms or "northeasters" present a more frequent problem to the Outer Banks. Such storms may develop as strong low pressure areas on the mainland and then move slowly offshore. The winds, sometimes reaching hurricane force, flow onshore from a northerly or easterly direction for sustained periods of time. Such storms can cause as much damage as the violent, but relatively short-lived, hurricanes. For example, the March 1962 "Ash Wednesday Storm" had flood heights comparable to past hurricanes. Recent "northeasters" have washed across portions of NC 12 on Hatteras Island necessitating emergency sandbagging and relocation of a section of the highway by the state Department of Transportation.

B. Vegetation

The greater Buxton Woods area (macrosite) is a mosaic of maritime forest and wetlands cover types that have been subjected to varying degrees of past disturbance (e.g., storms, timbering, farming, burning, grazing). The total woods area (approximately 3,000 acres) has been characterized by Weakley and Schafely (1987) as a series of forested dunes and wet swales that exhibit a considerable amount of diversity in a maritime setting. Primary plant communities found on the Reserve property include maritime evergreen forest, maritime shrub swamp, interdune ponds, salt marsh, maritime shrub thicket and successional communities (see Figure 3).

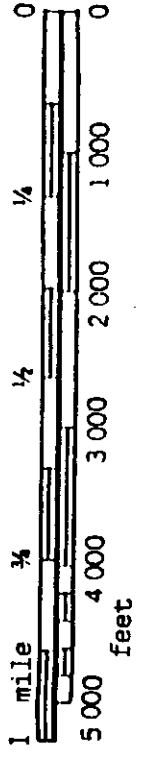
Maritime Evergreen Forest. Most of the Reserve forest consists of mixed pine-hardwoods with local domination by loblolly pine (*Pinus taeda*), live oak

PAMLICO SOUND



Habitats:

- F = Maritime Evergreen Forest
- S = Maritime Shrub Swamp
- P = Interdune Pond
- T = Maritime Shrub Thicket
- M = Salt Marsh
- X = Successional Area



(Quercus virginiana) or laurel oak (Q. hemisphaerica). Understory species include saplings of the canopy species plus yaupon (Ilex vomitoria), flowering dogwood (Cornus florida), American holly (Ilex opaca), ironwood (Carpinus caroliniana) and red cedar (Juniperus silicicola). Woody vines such as poison ivy (Rhus radicans), grape (Vitis spp.), catbriers (Smilax spp.) and Virginia creeper (Parthenocissus quinquefolia) occur throughout the area. Scattered shrubs (e.g., blueberries (Vaccinium spp.) and herbs (e.g., partridge berry (Mitchella repens) plus seedlings of the previous species occur in the lower strata. Maritime evergreen forest is given the highest global and state ranks by the North Carolina Natural Heritage program (see Appendix D).

Maritime Shrub Swamp. Occurring in seasonally flooded swales and around permanently flooded sedges, this wetland community is also very significant, receiving the highest global and state ranks. Though no true swamp forest occurs on the Reserve, scattered trees of red maple (Acer rubrum), sweet gum (Liquidambar styraciflua), pond cypress (Taxodium ascendens), loblolly pine and red bay (Persea borbonia) are found around and in some of the sedges. However, these sites are dominated by closed subcanopy and shrub layers with saplings of the preceding tree species plus wax myrtle (Myrica cerifera), dogwood (Cornus stricta), red bay (Persea borbonia) and willow (Salix caroliniana). Dwarf palmetto (Sabal minor) is near its northern range limit in these low areas. Herbs able to tolerate the typically flooded to saturated conditions in these communities are represented by lizard's tail (Saururus cernuus), royal fern (Osmunda regalis var. spectabilis), cinnamon fern (Osmunda cinnamomea), pennyworts (Hydrocotyle spp.) and water dock (Rumex verticillatus).

Interdune Ponds (Sedges). These swale habitats are named for the various graminoid species found in the intermittently wet to permanently flooded depressions (e.g., Jeannette Sedge on the Reserve). Saw grass (Cladium jamaicense), cattails (Typha spp.), wild rice (Zizania aquatica) and spike rushes (Eleocharis spp.) are typical dominants with lesser amounts of pennyworts, bedstraw (Galium obtusum), false nettle (Boehmeria cylindrica) and smart weeds (Polygonum spp.). Trees and shrubs mentioned under the maritime shrub swamp community are also found within and around the sedges. Past fires in the woods, both natural and human-caused, occasionally burned into the sedges and presumably inhibited woody plant invasion. Relative to future management, Jernigan and Carter (1995) concluded that: "... elimination of the natural fire cycle and widespread surface water drainage are likely to be adversely affecting the successional stability and vegetational diversity of the herbaceous/graminoid sedges in Buxton Woods." The sedges also serve as critical habitats for numerous resident and transient animals. Thus, the community rank is quite high--second globally, first state-wide (Appendix D).

Maritime Shrub Thicket. A small fringe of this cover type is found between NC 12 and the salt marshes along Pamlico Sound. This vegetation consists primarily of medium to small trees, shrubs and vines that grow just above the supratidal limit of the salt marsh complex. Though the canopy of this community does not exhibit the classic "salt-sheared" beveling observed in ocean side shrub thickets, woody plant

height is less than forests to the west and, thus, represents a transition from marsh to maritime evergreen forest. Typical species include loblolly pine, red cedar, yaupon, wax myrtle, silverling and live oak mixed with catbriers, Virginia creeper and peppervine (Ampelopsis arborea).

Salt Marsh. Reserve land bordering Pamlico Sound contains a mixture of coastal marsh species, some occurring in distinct zones. The most prevalent species is black needlerush (Juncus roemerianus) which forms a dense colony within this community. A thin intertidal border of smooth cordgrass (Spartina alterniflora) parallels the sound shoreline while sea ox-eye (Borrichia frutescens) and salt meadow cordgrass (Spartina patens) are found in supratidal areas. The upper edge of this complex includes maritime salt shrubs such as marsh elder (Iva frutescens), sea ox-eye, wax myrtle and silverling.

Successional/Disturbance Areas. Several tracts within the Reserve that were timbered approximately 20-30 years ago have regenerated with dense stands of young trees. Some areas are dominated by a closed canopy of loblolly pine while other sites have thickets of stump-sprouted live and laurel oaks. Roadsides and open patches within the forest (e.g., trash dumps and gaps created by Hurricane Emily) are dominated by a variable mixture of herbs and vines such as broom sedge, dog fennel (Eupatorium capillifolium), asters (Aster spp.), Virginia creeper, Japanese honeysuckle (Lonicera japonica) and catbriers.

Rare Species. According to the North Carolina Natural Heritage Program (1993) Buxton Woods contains a number of rare plant species (see Appendix D). Of those, the following have been found on the Reserve: winged seedbox (Ludwigia alata), gulfcoast spikerush (Eleocharis cellulosa) and savanna nutrush (Scleria verticillata). Rare plants documented from adjacent tracts include Carolina grasswort (Lilaeopsis carolinensis), dune bluecurls (Trichostema sp. 1), winged seedbox, lanceleaf seedbox (L. lanceolata), four-angled flatsedge (Cyperus tetragonus) and Florida adder's mouth (Malaxis spicata).

C. Fauna

Though a site-specific faunal survey of the Reserve site has yet to be done, the adjacent Cape Hatteras National Seashore is home to a considerable array of vertebrates. Parnell et al. (1992) list 27 mammalian species including: gray fox (Urocyon cinereoargenteus), mink (Mustela vison), river otter (Lutra canadensis), and white-tailed deer (Odocoileus virginianus). Feral house cats (Felis silvestris) are now common in the Reserve area while hispid cotton rats (Sigmidon hispidus) have been extirpated from Hatteras Island with the nearest populations found north of Oregon Inlet. Over 360 bird species have been recorded from the Seashore area and nearby inshore waters (Quay, 1958; Parnell et al., 1992) including endangered bald eagles (Haliaeetus leucocephalus) and peregrine falcons (Falco peregrinus). Buxton Woods serves as an important resting place for migratory birds, primarily in the fall. The National Seashore area is also populated by various reptiles and amphibians (Quay, 1959) such as: eastern box turtles (Terrepenne carolina), eastern mud turtles (Kinosternon subrubrum), rat snakes (Elaphe

spp.), green anoles (Anolis carolinensis), southern toads (Bufo terrestris) and southern dusky salamanders (Desmognanthus auriculatus). Fishes of interdune ponds have been surveyed by Schwartz (1983).

Past research on local invertebrate species is limited; however, two rare butterflies and a moth have been documented by the N.C. Carolina Natural Heritage Program (1993) from the Buxton Woods macrosite: giant swallowtail (Papilio cresphontes), northern hairstreak (Fixsenia favonius ontario)--also found within the Reserve--and messalina underwing (Catocala messalina) (Appendix D). Along Pamlico Sound there are typical salt and brackish marsh invertebrates such as marsh periwinkles (Littorina irrorata), ribbed mussels (Modiolus demissus) and fiddler crabs (Uca spp.).

D. Natural Area Significance

Buxton Woods (including the Coastal Reserve component) is considered nationally significant by the Natural Heritage Program (1979; 1993) because it represents the largest remaining area of maritime forest associated with eolian dunes. Four state-listed species and three plant communities of global significance are found on the Reserve property. Bellis (1995) notes that Buxton Woods "is near the area of maximum plant diversity among Atlantic coast maritime forests."

E. Archaeological Resources

A review by the Department of Cultural Resources, Division of Archives and History, found no known areas of archaeological or historical value within the Buxton Woods Coastal Reserve component. However, no comprehensive surveys have been performed on the property. There are several prehistoric sites located along the sound north of the property, possibly associated with the Native American Village of Croatoan (Brook, 1995).

F. Local Activities That May Affect the Component.

Buxton Woods is an area deemed highly desirable for development because of its extensive upland area with dense forest cover. Thus, the Reserve will, over time, experience peripheral construction and removal of vegetation. Use and management of adjacent water resources will need to be studied and monitored because of the relationship with the Reserve's wetlands.

VIII. THE PLAN

A. Administration

The Secretary of the Department of Environment, Health and Natural Resources has assigned lead management responsibility for the North Carolina Coastal Reserve to the Division of Coastal Management (DCM). Since management and use of the Reserve will likely involve other state divisions, the DCM will carefully and cooperatively work with all affected agencies. The DCM staff serves as liaison between federal, state, and local agencies and assists all participants in the program to carry out the following responsibilities:

1. Reserve Coordinator

This position coordinates administrative functions, research and education programs, and acts as liaison with the National Oceanic and Atmospheric Administration (NOAA). The office for this staff person is housed within the University of North Carolina Center for Marine Science Research (UNCW/CMSR) in Wilmington. Job priorities of the Coordinator are to meet the general Coastal Reserve goals and objectives, as well as the specific goals and objectives as defined in this management plan. To better meet component user needs; assure Reserve resource protection; and secure long-term operation funding, the Reserve Coordinator develops memoranda of understanding (MOUs) with other governmental programs.

2. Research Specialist

The Research Specialist is the primary person in charge of research and monitoring within the Coastal Reserve program and maintains liaison with NOAA concerning national projects with the Estuarine Research Reserve program. This office is also located within the UNCW/CMSR (at the Myrtle Grove property). The primary goal of this position is to facilitate and participate in research and monitoring within the components so that the results may be utilized to improve coastal management decisionmaking. Job duties include: compilation and maintenance of a computer database of previous reserve research; solicitation of research grant proposals; coordination of proposal review; development and coordination of Reserve monitoring regimes; and assisting the Reserve Coordinator with management of the components.

3. Education Specialist

Functioning both as Reserve education coordinator and manager of the Rachel Carson component, this position is located in Beaufort. The educational and interpretive responsibilities of this job are vital to increasing awareness of coastal processes. In particular, Reserve research and monitoring information is translated and conveyed to decision-makers and the public. Regular tasks include: presentation of Reserve field trips

and outreach programs; dissemination of written and verbal information to the public; development of Reserve educational materials and programs; performance of regular site patrols; informing users of management policies as necessary ; and organization of volunteers for stewardship activities.

4. Site Manager

During 1996 a Reserve employee will be staffed on the Outer Banks to oversee stewardship, education and monitoring/research at the Buxton Woods, Currituck Banks and Kitty Hawk Woods components. Approximately 50% of the employee's time will be spent on duties pertaining to the Buxton Woods component. This staff person will work closely with other Reserve staff, county officials and the local advisory committee to implement educational and monitoring programs, while following the policies and guidelines of the Reserve management plan and regulations. The Site Manager will also develop a local volunteer network to assist with various management projects (e.g., cleanups, habitat restoration).

B. Local Advisory Committee

An advisory committee will be created to assist the Division of Coastal Management with implementation and review of management at Buxton Woods. The committee provides a unique familiarity with the Reserve's individual sites -- the resources present there and local concerns. Individuals representing state and county government, education, research, wildlife resources and other interests will be asked to participate by letter of invitation from the Secretary of the North Carolina Department of Environment, Health and Natural Resources. Committee members will be appointed to serve until they choose to resign.

The committee will meet at least annually. Reserve staff will maintain contact with committee members and make available to them appropriate reports and data pertaining to research programs, educational programs and the management of Reserve resources. Additional meetings of the committee may be called when the Reserve Coordinator or committee members feel that a management problem has arisen that merits discussion and action.

C. Research Proposal Review

Research projects will be reviewed by the Reserve Research Specialist and, if necessary, by other technical experts. As previously mentioned, the Reserve encourages any research that adds to our knowledge of the site. However, the proposed work must be consistent with the management plan research policies. A research permit must be granted by the Research Specialist before a project can be initiated within the Buxton Woods component.

D. Plan Review and Modification

This management plan will be reviewed annually and revised every five years by the Division of Coastal Management staff in consultation with the Local Advisory Committee. The review will include an on-site evaluation of the condition of the site; an assessment of research and educational programs; and an assessment of other uses within the component.

E. Existing State and Local Regulations/Jurisdictions Affecting Buxton Woods

1. North Carolina Coastal Area Management Act

The North Carolina Coastal Area Management Act or CAMA (G.S. 113A-100 et seq.; NCAC - DEH&NR/DCM - T15: 07) was passed in 1974 and established an agency (DCM) and governor-appointed commission (Coastal Resources Commission or CRC) to regulate development and certify locally-adopted land use plans in 20 coastal counties of North Carolina. Thus, any development (e.g., boardwalks or interpretive facilities) done within the Reserve will be carefully coordinated with the planning and permit review staff of DCM so as to conform to CAMA. The activities described in this plan are consistent with the goals and objectives of the North Carolina Coastal Management Program.

2. North Carolina Coastal Reserve Regulations (see Appendix A)

These departmental rules (NCAC - DEH&NR/DCM - T15: 70) were established in 1988 to define the purpose, responsibilities, functions, components and use requirements of the Coastal Reserve. The Coastal Reserve includes four Estuarine Reserve components (i.e., Currituck Banks, Rachel Carson, Masonboro Island and Zeke's Island) plus three other sites (i.e., Permuda Island Buxton Woods and Bald Head Island). The Reserve Use Requirements (T15: 070.0200) specify general management standards within the component boundaries.

3. North Carolina Coastal Reserve Act (see Appendix B)

The Coastal Reserve Act (G.S. 113A-129.1 - 129.3) was passed in 1989 and formally established a state program to preserve certain coastal areas for research, education and other consistent public uses.

4. Nature Preserves Act (see Appendix C)

This act was passed in 1985 (Article 9A of NCGS Chapter 113A) and, in conjunction with associated administrative rules (15 NCAC 12H .0300), gives the State authority to dedicate outstanding state natural areas (deemed so by the Secretary of DEH&NR) as nature preserves. Articles of dedication specify acceptable and unacceptable uses, management purposes and custodial responsibilities. Buxton Woods was formally dedicated as a State Nature Preserve by the Council of State on August

2, 1992.

5. Public Trust Doctrine

This general doctrine is derived from case and common law, but is referred to in the state general statutes (G.S. 113-131A-E; 145.1) pertaining to the DEH&NR. In essence, marine and estuarine resources are part of the public domain and therefore owned by the state (except for certain situations such as valid state Board of Education grants) for the benefit of all. This principle is important relative to Reserve acquisition since many of the components include intertidal/subtidal lands which, according to public trust, are already in state ownership. As a consequence, acquisition efforts have only been focused on upland tracts within each component.

6. Division of Marine Fisheries

This agency has the primary charge of regulating commercial and recreational taking of fish and shellfish within the state's marine waters. Marine Fisheries enforcement officers patrol the marine and estuarine portions of Reserve components as part of their jurisdictions and may assist Reserve staff with enforcement matters. Though the vast majority of the Buxton Woods Reserve component is terrestrial, the site also includes a small portion of Pamlico Sound shoreline.

7. Wildlife Resources Commission

The Wildlife Resources Commission has enforcement responsibility concerning the taking of game animals and enforcement of boating regulations. The Nongame and Endangered Species Program has jurisdiction over listed animal species.

8. Cultural Resources

All archaeological historic property located on or recovered from state-controlled lands is state property. Applicable statutes and regulations include: the Archaeological Resources Protection Act (G.S., Article 2; NCAC T07: 04R .0700) and portions of the Archives and History Act dealing with responsibilities of the N.C. Historical Commission (G.S. 121-12 [a]; NCAC T07: 04R 0.0200) and protection of underwater archaeological sites (G.S. 121, Article 3; NCAC T07 04R .1000). Any proposed development or collection of artifacts within the Reserve will involve consultation with this department.

9. Land Use and Zoning

Buxton woods is currently zoned SED-1 (Special Environmental District) by Dare County. This zoning ordinance prescribes restrictions on allowable uses -- lot size, tree/vegetation removal, wetland alteration, building height and road widths. The county land use plan also classifies the area as a limited conservation class which,

among other restrictions, prohibits dredging and filling of wetlands in the woods.

F. Research/Monitoring Objectives and Policies

The research and monitoring goals of the North Carolina Coastal Reserve are:

- to preserve coastal ecosystems representative of the biogeographic regions and typologies in North Carolina and to make them available for continuous future study of processes, functions and influences which shape and sustain the ecosystems; and
- to encourage and perform research and monitoring activities that will provide information on coastal processes as a basis for the promotion of thoughtful management of coastal resources.

To meet these goals, the management plan contains the following research and monitoring objectives:

- establish priorities and operational procedures for the different types of research and monitoring to be carried out in the Reserve;
- evaluate prospective research projects according to a permitting and technical review process; and
- disseminate results to coastal decisionmakers and the public.

To properly manage coastal resources, a better understanding of the complex interrelationships and functions of the ecosystem is necessary. To achieve this goal, Reserve research will focus on the natural functions and influences, and effects of human use and abuse on coastal ecosystems. A thorough understanding of coastal ecosystems will allow more ecologically-sound management decisions to be made, assuring the long-term availability of the Reserve for future research, education, while facilitating the enjoyment and productivity of the coastal areas of North Carolina and the nation.

The management plan establishes guidelines under which research will be permitted in the Reserve. Nearly all types of research may be conducted, but some will have higher priority or be more actively encouraged than others. This selectivity is done to protect the natural integrity of the Reserve and to address particular research topics.

The plan also establishes procedures by which results of research studies will be assembled and disseminated to educate scientists, coastal resource managers and the public about coastal ecosystems.

The following policies have been developed from the Coastal Reserve statutes and

regulations (Appendices A and B) and will be implemented by the Reserve staff to ensure proper protection and management of the component:

Policy: *The long-term integrity of Buxton Woods as an undisturbed research site with minimal human disturbance will be maintained. This requirement is of primary importance and will be the basis of all decisionmaking concerning use of the Reserve.*

The goal to protect the Reserve in its present state is extremely important. To support long-term research, the site must retain its integrity as a valid representative of natural North Carolina coastal ecosystems. Any improvements to facilitate access, research or education will be allowed only if, following review by the Local Advisory Committee, Reserve staff and other interested parties, construction and operation will cause negligible impacts to the component.

Policy: *Research and monitoring will be encouraged when it addresses a needed research priority. The order of general research priorities ("c" being the highest) are as follows:*

- (a) Baseline measurements of maritime forest archaeological, chemical, physical, biological and ecological characteristics;
- (b) Monitoring changes in basic parameters over various time frames; and
- (c) Research to improve coastal management decisionmaking.

All types of research are encouraged at the North Carolina Coastal Reserve -- it has been preserved to foster scientific study. However, for the long-term good of the Reserve and coastal resource management in general, research applicable to resource management will be favored over other research if conflicts arise in the allocation of study sites or funds.

Policy: *Research involving manipulation of the Reserve environment will be permitted on a limited basis for specified periods, provided that upon completion of research tasks, the study site can be restored to its original condition. All applicable federal, state and local permits will be obtained before research is initiated.*

Manipulative studies are defined as activities that involve creating physical, biological, geological, or chemical changes in the environment and observing their effects. Such studies have the capacity to alter natural processes of the Reserve and undermine its ability to serve as a subject for baseline studies or as a control for comparative studies. Manipulative research will be allowed if it benefits the management

of the Reserve and coastal resources. Proposals for manipulative research will be strictly evaluated on a case-by-case basis as to the types, extent, and reversibility of environmental changes; the duration of the project; its impact on the long-term stability of the Reserve environment; and its potential for improving coastal resource management strategies. Proper permit(s) (e.g., for placement of fill) must be obtained prior to commencement of a given study.

Policy: *No research involving collection of out-of-season species or studies of protected species will be approved until all necessary research or collection permits are obtained.*

For wildlife and inland fish species, including endangered or threatened species, a researcher must obtain a scientific collection permit from the Director of the Wildlife Resources Commission Non-Game Program. The U.S. Fish and Wildlife Service requires a scientific collecting permit for taking, transporting, or possessing migratory birds, their parts, nests or eggs for scientific research or educational purposes. Researchers are also expected to consult with the Plant Protection Program (N.C. Dept. of Agriculture) and the N.C. Natural Heritage Program (N.C. Dept. of EH&NR) concerning rare plant species and communities. General collecting permits for the taking of certain marine fishes may be required from the Division of Marine Fisheries.

Policy: *A research permit must be issued by the Reserve Research Specialist before initiation of any proposed research.*

A written proposal must be submitted to and approved by the Research Specialist in consultation with selected technical and scientific experts. Routine wildlife management activities, such as bird banding, fish sampling, and water quality sampling conducted by state and federal agencies will be coordinated through the Reserve Research Specialist, but will not require a proposal. However, the agency must notify the Specialist either by telephone or in writing prior to initiation of field work. A copy of final results from any such study shall be submitted to the Reserve Specialist.

Proposals received by the Research Specialist will be screened by the Reserve staff and peer-reviewed by selected technical experts when appropriate. Proposals will be evaluated on the basis of feasibility; scientific and technical merit; whether or not they meet component objectives and policies as defined in the management plan; and relevance to component research priorities. Proposed research will be reviewed with an eye toward its affects on other ongoing or proposed research projects being conducted within the Reserve.

Field work may not begin until the principal investigator receives a signed research permit from the Research Specialist. Major changes in the original research objectives, materials, or methods must be submitted in writing to the Research Specialist who may consult the peer reviewers. Variations from the original research proposal will only be

allowed following written notification from the Research Specialist.

Policy: *Research activities must comply with the Reserve objectives and policies and with the approved research proposal.*

Research that deviates from the objectives and policies of the Management Plan or the original proposal will not be allowed to continue.

Policy: *The principal investigator for each project is responsible for maintaining and removing any human-made objects (field equipment, trash, etc.) that they bring into the Reserve.*

Just as researchers bear sole responsibility for maintaining their field equipment, they also bear sole responsibility for removing it when ending the project.

Policy: *The principal investigator for each project is responsible for the timely submission of reports, project progress reports and other information to the Research Specialist for the program files.*

Copies of the project reports (e.g., progress reports, final reports) or other publications will be kept by the Site Manager and will be made available to interested parties with the understanding that proper credit shall be given to the original researcher(s).

Policy: *The Division of Coastal Management will actively encourage the dissemination of scientific information from the Reserve to the public.*

In addition to the avenues available to the scientific community for presenting new information (e.g., journals), media coverage, public presentations and newsletters will be used by the staff to disseminate information on the Reserve's research accomplishments and educational programs. Since the Reserve is located near Buxton, the proposed Environmental Science and Communications Center of the Dare County School Board shall be a primary repository for Reserve-related information. Materials will be also be distributed to county officials in Manteo.

G. Educational Objectives and Policies

The educational goals of the North Carolina Coastal Reserve are:

- to manage Reserve components for educational and interpretive activities to enhance awareness of coastal processes;

- to provide various opportunities and avenues for the public and decisionmakers to be better informed about coastal ecosystems and processes, particularly results derived from Reserve research and monitoring.

To accomplish these goals, the management plan contains the following educational objectives:

- establish procedures for developing and supporting educational programs at the site;
- coordinate educational activities among participating groups and agencies; and
- to translate scientific information generated from the Reserve Research Program into non-technical terms for transfer to the public and selected groups.

The establishment of the North Carolina Coastal Reserve focuses special attention on the need for long-term protection, wise use and proper management of coastal areas. Through effective interpretive programs, the Reserve environment is made more meaningful to the public. Learning more about coastal ecosystems from Reserve research will improve public understanding of how the system functions and will expand the resource base from which to develop interpretive programs. The program will also assist and support local conservation and land trust efforts.

Publications, lectures, slide shows, organized activities and other educational programs will actively draw on and be coordinated with the activities of the local public schools, the North Carolina Aquariums, the Sea Grant Program, colleges and universities, museums and other educational organizations.

Policy: *Off-site educational programs will be provided in conjunction with public schools, the DCM, North Carolina Aquariums, community colleges and other educational institutions in order to make the public aware of the Reserve and its importance at state and national levels.*

The Reserve staff will coordinate activities with existing off-site programs (e.g., N.C. Aquariums and Sea Grant) and will help develop instructional materials, slide shows and permanent displays. Cooperative educational programs will be developed to incorporate the information generated by Reserve research into existing school programs. Specialized workshops will be provided for people such as youth group leaders and science teachers to relay this information and other topics related to the Reserve's resources. Information on Coastal Area Management Act regulations and land use planning will also be presented through DCM speakers and literature.

The Division of Coastal Management may sponsor specific meetings and workshops

that are announced statewide. The events will be directed at the interested public and will utilize staff, scientists and volunteer experts. The DCM will also respond to, and encourage, speaking engagements by its Reserve staff. Audiences may include service organizations, youth groups, schools and conservation clubs. The staff will also participate in activities such as serving on various boards, advisory groups and public programs.

Policy: *On-site programs at Buxton Woods will be arranged for supervised groups.*

Field trips lead by the Site Manager, other Reserve staff or a qualified volunteer will be performed on request. However, a nature trail will be established to allow self-guided tours. Research site tours for college students and other groups are encouraged. It would be appropriate to have one or more of the researchers present during the tour in order to provide the participants with an explanation of research purpose, methods, and data collection. The Site Manager and other Reserve staff will coordinate such activities with participating research institutions.

Policy: *On-site activities shall stay within the areas of the site designated for public access, and shall not in any way interfere with research projects or other sensitive areas.*

A location map, developed by the Reserve Staff and based upon inventories and aerial surveys, will be developed to highlight access areas and will indicate research projects within this area, if any exist. A nature trail will be routed to show visitors the natural features of Buxton Woods. Baseline studies and aerial surveys will be needed to determine the areas best suited for public access. Until the map is developed, the Site Manager and Education Specialist will work closely with educators to ensure protection of habitats.

Policy: *Literature, visual aids, and related materials will be developed, distributed and routinely updated in order to convey to the general public and specialized groups the goals, objectives and accomplishments of the North Carolina Coastal Reserve.*

Maps, brochures, and related information will be developed to guide visitors through the Reserve. A checklist of plant and animal species will be developed on the basis of research and observations. Pertinent rules and regulations will be published so that visitors will be familiar with the Reserve's management policies. Signs indicating that the area is a state-owned Coastal Reserve and a dedicated State Nature Preserve will be placed at access points.

Policy: *The Site Manager and Education Specialist will oversee the educational program and will coordinate activities between participating institutions.*

The Site Manager and Education Specialist will address the special needs of the program on a case-by-case basis. These needs may include: securing media coverage; acquiring or obtaining equipment; providing staff support and funding; and scheduling events and meetings. Lines of communication will be established through informal conversations, annual meetings and newsletters.

H. Objectives and Policies for Other Uses

Research and educational programs at the North Carolina Coastal Reserve will take place within the context of traditional uses of the Buxton Woods area. The management plan recognizes the value of public use and strives to maintain a harmonious balance between compatible activities and research and education.

The Coastal Reserve can accommodate a number of recreational activities. However, in order for them to occur in concert with the primary research and educational uses of the Reserve, a series of clear management policies tailored to each Reserve component are needed. Only through reasonable and consistent management can compatible traditional activities continue within the Reserve and, thus, contribute to its value as a place for learning and enjoyment.

✓ Hiking, natural study, hunting (according to state and local regulations) with designated access trails (for walking, horseriding and vehicles) will be the primary activities available to visitors. Dumping of trash and target shooting will be not be allowed. Camping will be on a permit basis for scientists requiring an overnight stay to perform site-specific research.

The compatible use goal of the North Carolina Coastal Reserve is:

- To accommodate traditional recreational activities and other uses of the Reserve as long as: 1. they do not disturb the natural integrity of the site and safety of other users of the Reserve environment and 2. are compatible with research and educational activities taking place there.

The Management Plan employs the following objectives to refine this goal and to set a context for managing special concerns of the Reserve:

- protect the natural and historical features of the area; and
- establish guidelines for various activities within the Reserve.

1. General Use

Policy: *Littering and dumping of trash is prohibited within the Buxton Woods Reserve.*

Unfortunately, Buxton Woods has been used as a dumping site for decades even though a county dump is located nearby. This in violation of: state laws (G.S. 14-399 & 14-399.1), the Reserve regulations (Appendix A) and dedication of the site as a State Nature Preserve (Appendix C).

Policy: *Target shooting is prohibited within the boundaries of the Reserve.*

Broken bottles and bullets stuck in trees are the undesirable results of target shooting on the property. In addition, stray bullets shot through the woods may strike other visitors. Such hazardous activity is prohibited by Reserve regulations.

Policy: *No user shall disturb research projects or research equipment in place at the Reserve component.*

Research is a priority use and must receive protection. Disrupting research would adversely impact the long-term management of the Reserve and other coastal resources that would benefit from the results. Also, damaged or stolen equipment could cost considerable amounts of money.

Policy: *Users of the Reserve shall not disturb or remove any live animals (except for fish, shellfish, game animals, furbearers and waterfowl; see fishing policies) vegetation, or artifacts from the site unless it is part of an approved research or educational project. Fallen timber or other vegetative materials may be removed from and along established roads or paths if the wood or brush blocks access or poses a safety/fire hazard. Danger trees (dead or diseased trees) along roads which pose a fire hazard may also be removed. However, wood and vegetative debris will not be removed from the interior of the property.*

As a general policy, removing and destroying vegetation can lead to serious long-term damage to the habitats found in the Reserve by promoting erosion and sedimentation as well as alteration of established plant and animal communities. However, the threat of fire does exist within the property owing to the large volume of downed timber and brush caused by Hurricane Emily (1993). Reserve staff shall consult with the Dare County Forester and take appropriate action to ensure that roads within the property are accessible to fire fighting equipment. Danger trees along these roads may also be removed to preclude fire hazards.

Disturbance of nesting birds and other animals can interfere with their natural habits, possibly cause them to leave the site, and thus diminish the Reserve's diversity of species. Any interpretive/educational trails eventually established within the Reserve will be compatible with this policy of respecting the integrity of the site. Also, artifacts must not be removed unless approved in writing by the Reserve Coordinator and the Department of Cultural Resources.

Policy: *Camping is only allowed by permit on areas designated in the Reserve for research activities requiring an overnight stay. Fires are not allowed within the Reserve, except for management or research purposes.*

Restricting camping protects the Reserve's delicate habitats from disturbance and destruction. Only wilderness camping (i.e., pack in/pack out) for researchers will be allowed by written permission from the Reserve Coordinator. Wildfire within the woods can do considerable damage to the plants and animals of this ecosystem. Thus, the use of fire is allowed by permit only from the Reserve Coordinator.

Policy: *Personal property not authorized by the Reserve Program shall not be placed within the boundaries of the Reserve for more than two consecutive days.*

Storing of unauthorized property will not be allowed. Violators will be asked to remove any such materials or a fine may be imposed under G.S. 14-399-399.1. If the owner is not able to be found, the materials will be removed.

Policy: *No activity shall be allowed which might pollute any stream or body of water in the Reserve. Acts of pollution shall include: 1. deposition of solid materials not indigenous to the local ecosystems and 2. discharge of liquids other than uncontaminated fresh water.*

Protection of surface waters in the woods essential for research and educational use of Buxton Woods. When appropriate, the Reserve program shall review and comment on plans for development and other activities in the Reserve vicinity.

Policy: *No other acts or uses which are detrimental to the maintenance of the property in its natural condition shall be allowed including, but not limited to, disturbance of the soil, mining, commercial or industrial uses, timber harvesting, ditching and draining, deposition of waste materials.*

Like the other Coastal Reserve components, Buxton Woods was acquired to protect its natural integrity. Such special areas require strong safeguards

to ensure their perpetual stewardship.

2. Vehicular Access/Horse Riding

Policy: *Vehicles and horses may only travel on roads or trails designated for public access. Other corridors may be gated to allow pedestrian use only or abandoned to protect natural features. Road improvements (e.g., NC 12 widening) may be needed and will be considered on a case by case basis.*

Unrestricted road access at Buxton Woods has resulted in damage to portions of natural communities by dumping, erosion and compaction. Visitors will be encouraged to follow walking trails routed through the area.

3. Hunting and Trapping

Policy: *Fishing, hunting and trapping may occur within the limits of local and state laws.*

These activities are allowed according to the applicable guidelines set forth by the Wildlife Resources Commission and Dare County.

4. Groundwater Removal

Policy: *The natural watertable of the Reserve will be maintained. Monitoring wells will be allowed as long as their location, installation and maintenance do not cause any negative impact(s) to the site.*

The Buxton Woods component may not be used as a source of water for local communities per the Coastal Reserve regulations and statues (Appendices A and B). A 1994 ruling by the State Court of Appeals upheld the Superior Court decision to revoke a permit issued by the DCM to The Cape Hatteras Water Association to drill and maintain nine water wells within the component. However, previously installed monitoring wells are an allowable use since no water is withdrawn and valuable hydrological information is obtained.

I. Surveillance, Enforcement, and Maintenance

Maintenance and protection of the resources of the North Carolina Coastal Reserve is essential to its long-term survival and its value for education and scientific research. Policies stated in previous sections of the management plan and the Reserve regulations (see Appendix A) control manipulation of habitats by researchers and control other disruptions (habitat disturbance, littering, species removal, etc.) by all users of the

Reserve. This section of the plan presents policies for the overall maintenance of the Reserve, for reporting violations of the management plan's policies and for the enforcement of these policies.

Policy: *The Reserve Site Manager will patrol the site on regular basis and maintain contact with appropriate enforcement agencies.*

The Site Manager shall have primary responsibility for seeing that visitor uses are consistent with Reserve policies for protecting site quality. This person shall also consult with or request assistance from local and state enforcement personnel as needed to address problems.

Policy: *The North Carolina Coastal Reserve shall encourage volunteer efforts to maintain the quality of the Reserve. Reserve staff will coordinate periodic litter pickups and other projects using local volunteers.*

The Site Manager will develop a volunteer network to assist with management of the Buxton Woods Reserve component. If necessary, specific memoranda of understanding between the DCM and other agencies can be developed to provide additional site protection.

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APPENDIX A

Coastal Reserve Regulations

SUBCHAPTER 70 - NORTH CAROLINA COASTAL RESERVE

SECTION .0100 - GENERAL PROVISIONS

.0101 STATEMENT OF PURPOSE

The principal purposes of the North Carolina Coastal Reserve and supporting programs are to:

- (1) preserve coastal ecosystems representative of the various biogeographic regions and typologies in North Carolina and to make them available for continuous future study of the processes, functions, and influences which shape and sustain the coastal ecosystems;
- (2) provide new information on coastal ecosystem processes to decisionmakers as a basis for the promotion of sound management of coastal resources;
- (3) provide a focal point for educational activities that increase the public awareness and understanding of coastal ecosystems, effects of man on them, and the importance of the coastal systems to the state and the Nation;
- (4) accommodate traditional recreational activities, commercial fishing, and other uses of the Reserve as long as they do not disturb the Reserve environment and are compatible with the research and educational activities taking place there.

*History Note: Statutory Authority G.S. 113-3; 113-8; 143B-10;
Eff. July 1, 1986;
Amended Eff. April 1, 1988.*

.0102 DEFINITIONS AS USED IN THIS SUBCHAPTER

Definitions as used in this Subchapter are:

- (1) "Coastal Reserve" means those coastal land and water areas set aside to be maintained in their natural state for research, education and compatible recreation and enjoyment of natural and scenic beauty.
- (2) "Estuary" means that part of a river or stream or body of water having unimpaired connection with the open sea, where sea water is measurably diluted with fresh water derived from land drainage.
- (3) "Research Reserve" means a group of areas or components, each of which may include all or the key land and water portion of an estuary and adjacent transitional areas and uplands, constituting to the extent feasible a natural unit, set aside as a natural field laboratory to provide long-term opportunities for research, education, and interpretation of the ecological relationships within the area. The Coastal Reserve includes the Estuarine Research Reserve.
- (4) "Reserve" means any area designated pursuant to this Subchapter.

*History Note: Statutory Authority G.S. 113-3; 113-8; 143B-10;
Eff. July 1, 1986;
Amended Eff. April 1, 1988.*

.0103 RESPONSIBILITIES: DUTIES OF THE COASTAL RESERVE PROGRAM

The Coastal Reserve Program of the Division of Coastal Management shall be responsible for managing and protecting the North Carolina Coastal Reserve; for promoting and coordinating research and educational programs at the components while allowing for compatible traditional uses; for maintaining a management plan for the Reserve; for maintaining cooperative agreements with scientific, educational, and resource management agencies and private citizens that will assist in the management of the Reserve; and for providing new information on coastal processes to coastal management decisionmakers.

*History Note: Statutory Authority G.S. 113-3; 113-8; 143B-10;
Eff. July 1, 1986;
Amended Eff. April 1, 1988.*

.0104 STATE AND LOCAL COASTAL RESERVE ADVISORY COMMITTEES

Advisory committees shall be established for each individual Reserve component. The committees shall advise the Reserve coordinator. Members of the committees shall include researchers, educators,

managers, and citizens that use or are affected by the Reserve. The committees shall be appointed by the Secretary of the Department of Natural Resources and Community Development.

*History Note: Statutory Authority G.S. 113-3; 113-8; 143B-10;
Eff. July 1, 1986;
Amended Eff. April 1, 1988.*

.0105 RESERVE COMPONENTS

The North Carolina Coastal Reserve includes the following components:

- (1) Zeke's Island
- (2) Rachel Carson
- (3) Currituck Banks
- (4) Masonboro Island
- (5) Permuda Island
- (6) Buxton Woods

The North Carolina National Estuarine Research Reserve includes components (1)-(4). Detailed boundary maps for each component are maintained and available for inspection at the Division of Coastal Management, 512 North Salisbury Street, Raleigh, North Carolina.

*History Note: Statutory Authority G.S. 113-3; 113-8; 143B-10;
Eff. July 1, 1986;
Amended Eff. April 1, 1988.*

**SECTION .0200 - MANAGEMENT: USE AND PROTECTION OF THE
NORTH CAROLINA COASTAL RESERVE**

.0201 MANAGEMENT PLAN

The Division of Coastal Management shall prepare a management plan for the Reserve. The management plan shall contain specific policies for research, education, and traditional uses at each component. The Secretary of the Department of Natural Resources and Community Development shall approve the management plan and its revisions. The Division of Coastal Management shall monitor and manage the components and report to the secretary violations of the approved plan and any other situations that may be harmful to the natural resources of the Reserve.

*History Note: Statutory Authority G.S. 113-3; 113-8; 143-341; 143-342; 143B-10;
Eff. July 1, 1986;
Amended Eff. April 1, 1988.*

.0202 RESERVE USE REQUIREMENTS

The following use requirements shall apply to all of the components of the Reserve:

- (1) The essential natural character of the Reserve shall be maintained.
- (2) Traditional recreational uses within each component shall be allowed to continue as long as the activities do not disrupt the natural integrity of the Reserve or any research or educational projects. Incompatible traditional uses shall include:
 - (a) fishing, hunting, or trapping activities not allowed by state regulations;
 - (b) target shooting;
 - (c) hydraulic clam dredging within Reserve boundaries;
 - (d) use of vehicles off designated corridors at components where vehicles are allowed for upland transportation according to the management plan; and
 - (e) production of noise disruptive to local wildlife and the aesthetic enjoyment of the Reserve as a natural area.
- (3) No user shall disturb a research project or research equipment in place at the Reserve.
- (4) Camping or any form of habitation, whether on the uplands, wetlands, or waters within Reserve boundaries, shall not be allowed without the written permission of the Division of Coastal Management.
- (5) Personal property not authorized by the management agency may not be placed within the boundaries of the Reserve for more than two consecutive days.
- (6) Users of the Reserve shall not disturb or remove any live animals, except those allowed by state hunting and fishing regulations as they apply to the Reserve, or vegetation within the Reserve unless such action is part of a research or educational project approved by the management agency.
- (7) Persons wishing to engage in scientific research or collection of natural materials within the Reserve shall first secure written permission from the management agency.
- (8) No activity shall be allowed which might pollute any stream or body of water in the Reserve. Acts of pollution shall include:
 - (a) Deposition of solid materials not indigenous to the local coastal ecosystem; and
 - (b) Discharge of liquids other than uncontaminated estuarine water.
- (9) No other acts or uses which are detrimental to the maintenance of the property in its natural condition shall be allowed including, but not limited to, disturbances of the soil, mining, commercial or industrial uses, timber harvesting, ditching and draining, deposition of waste materials.

*History Note: Statutory Authority G.S. 143B-10;
Eff. July 1, 1986;
Amended Eff. April 1, 1988.*

APPENDIX B

Coastal Reserve Statutes

CASE NOTES

~~Trial Court without Jurisdiction. — The trial court was without jurisdiction in a declaratory judgment action to pass upon the question of whether subsection (d)(1)(c) of this section authorizes warrantless searches in violation of the Fourth Amendment where the plaintiffs~~

~~did not allege that they had been subject to actual searches or that they had been fined for refusing access to investigators. Adams v. North Carolina Dept of Natural & Economic Resources, 295 N.C. 683, 249 S.E.2d 407 (1978).~~

~~§ 113A-127. Coordination with the federal government.~~

~~All State agencies shall keep informed of federal and interstate agency plans, activities, and procedures within their area of expertise that affect the coastal area. Where federal or interstate agency plans, activities or procedures conflict with State policies, all reasonable steps shall be taken by the State to preserve the integrity of its policies. (1973, c. 1284, s. 1; 1975, c. 452, s. 5; 1981, c. 932, s. 2.1.)~~

~~§ 113A-128. Protection of landowners rights.~~

~~Nothing in this Article authorizes any governmental agency to adopt a rule or issue any order that constitutes a taking of property in violation of the Constitution of this State or of the United States. (1973, c. 1284, s. 1; 1975, c. 452, s. 5; 1981, c. 932, s. 2.1; 1987, c. 827, s. 144.)~~

~~§ 113A-129: Reserved for future codification purposes.~~

Part 5. Coastal Reserves.

§ 113A-129.1. Legislative findings and purposes.

(a) Findings. — It is hereby determined and declared as a matter of legislative finding that the coastal area of North Carolina contains a number of important undeveloped natural areas. These areas are vital to continued fishery and wildlife protection, water quality maintenance and improvement, preservation of unique and important coastal natural areas, aesthetic enjoyment, and public trust rights such as hunting, fishing, navigation, and recreation. Such land and water areas are necessary for the preservation of estuarine areas of the State, constitute important research facilities, and provide public access to waters of the State.

(b) Purposes. — Important public purposes will be served by the preservation of certain of these areas in an undeveloped state. Such areas would thereafter be available for research, education, and other consistent public uses. These areas would also continue to contribute perpetually to the natural productivity and biological, economic, and aesthetic values of North Carolina's coastal area. (1989, c. 344, s. 1.)

Editor's Note. — Session Laws 1989, upon ratification. The act was ratified c. 344, s. 3, makes this Part effective June 19, 1989.

§ 113A-129.2. Coastal Reserve Program.

(a) There is hereby created a North Carolina Coastal Reserve System for the purpose of acquiring, improving, and maintaining undeveloped coastal land and water areas in a natural state.

(b) This system shall be established and administered by the Department of Environment, Health, and Natural Resources. In so doing the Department shall consult with and seek the ongoing advice of the Coastal Resources Commission. The Department may by rule define the areas to be included in this system and set standards for its use.

(c) This system shall be established within the coastal area as defined by G.S. 113A-103(2).

(d) All acquisitions or dispositions of property for lands within this system shall be in accordance with the provisions of Chapter 146 of the General Statutes.

(e) All lands and waters within the system shall be used primarily for research and education. Other public uses, such as hunting, fishing, navigation, and recreation, shall be allowed to the extent consistent with these primary uses. Improvements and alterations to the lands shall be limited to those consistent with these uses. (1989, c. 344, s. 1; c. 727, s. 218(58).)

Effect of Amendments. — The 1989 Natural Resources" for "Natural Resources and Community Development" amendment, effective July 1, 1989, substituted "Environment, Health, and in subsection (b).

§ 113A-129.3. Coordination.

(a) To the extent feasible, this system shall be carried out in coordination with the National Estuarine Reserve Research System established by 16 U.S.C. § 1461.

(b) To the extent feasible, lands and waters within this system shall be dedicated as components of the "State Nature and Historic Preserve" as provided in Article XIV, Section 5, of the Constitution and as nature reserves pursuant to G.S. 113A-164.1 to G.S. 113A-164.11. (1989, c. 344, s. 1; c. 770, s. 47.)

Effect of Amendments. — The 1989 substituted "G.S. 113A-164.11" for "G.S. 164.11" in subsection (b). amendment, effective August 12, 1989.

§§ 113A-130 to 113A-134: Reserved for future codification purposes.

APPENDIX C

Natural Preserve Dedication



North Carolina Department of Administration

James G. Martin, Governor

James S. Lofton, Secretary

October 21, 1992

Mr. William W. Cobey, Secretary
N.C. Department of Environment, Health
and Natural Resources
512 N. Salisbury Street
Raleigh, North Carolina 27611

Re: Allocation of Property to the Department of Environment,
Health and Natural Resources
Dedication of the Buxton Woods Coastal Reserve

Dear Bill:

Pursuant to Article 9A, Chapter 113A of the North Carolina General Statutes and pursuant to the authority vested in me by the North Carolina Administrative Code approved by the Governor and Council of State on January 28, 1976, all the state-owned lands within the area hereinafter designated are hereby allocated to the Department of Environment, Health and Natural Resources:

Those State-owned properties on the Outer Banks of Dare County hereinafter collectively known as the Buxton Woods Coastal Reserve, more specifically described in Exhibit A.

THIS ALLOCATION IS MADE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:

1. As used in the Letter of Allocation the terms "natural area" and "nature preserve" shall have the same meaning as contained in North Carolina General Statutes 113A-164.3(3) (4), respectively.
2. Pursuant to North Carolina General Statutes 113A - 164.8 all State-owned lands lying within the above-designated area are hereby dedicated as a nature preserve to be known as the Buxton Woods Coastal Reserve (hereinafter the "reserve" and "preserve") for the purposes provided in the Nature Preserves Act, as amended, and other applicable law, and said State-owned land shall be held, maintained and used exclusively for said purpose.

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3. Primary Custodian. The primary Custodian of the preserve will be North Carolina Department of Environment, Health and Natural Resources, which will be responsible for managing the nature preserve in accordance with this letter of allocation (dedication) and the regulations set forth in 15 NCAC 12H.0301-.0403.

4. Primary Classification. The primary classification and purpose of the preserve shall be to preserve the maritime forest community for research, education and other such compatible uses as are allowed by law and the terms of this allocation.

5. Rules for Management

A. Character of Visitor Activity. The principal visitor activities in the preserve shall be research, education, walking and observing. These activities shall be regulated to prevent disturbance of the preserve beyond that which it can tolerate without significant environmental degradation. Use of vehicles is allowed only along designated corridors. Camping will be allowed only with the written permission of the Department of Environment, Health and Natural Resources.

Activities and uses which are unrelated to those mentioned above are prohibited except as provided for herein or unless necessary to carry out the purposes of the preserve. Prohibited activities include, but are not limited to, construction not related to the preserve, commercial activities and development, agriculture and grazing of domestic animals, mineral exploration and development, dumping or changes in topography except by existing easements, the gathering of plant products except as provided for in approved research projects, and the removal, disturbance, molestation, or defacement of minerals, archaeological features and natural features.

No exotic flora or fauna shall be introduced into the preserve. Hunting dogs, pets on leashes and riding horses (on designated corridors only) will be allowed, but owners must keep the animals under control to protect the natural integrity of the preserve and other visitors.

There will be no fires, except as specifically permitted by the Department of Environment, Health and Natural Resources, and there shall be no littering.

B. Groundwater Removal. Future use of small portions of the area as well sites for a community water supply system is possible, contingent upon approval of any required easements by the Council of State and the granting of those easements by the Department of Administration. Water production

and/or monitoring wells may be allowed provided there is no significant impact on the preserve which would be inconsistent with the primary classification and purposes of the preserve and provided they meet applicable Department rules and regulations. At the end of two years of monitoring and studies, the Department will determine the maximum withdrawal for the aquifer and for individual wells. The Department will advise all responsible parties regarding the allowable long-term withdrawal ceiling for the Buxton Woods Coastal Reserve. Prior to the conclusion and dissemination of these studies, no water production wells not currently permitted will be allowed in this preserve.

- C. Hunting. Hunting shall be permitted on the preserve subject to regulation and management by the Wildlife Resources Commission, such regulation and management to be consistent with protection of the natural diversity and primitive character of the preserve.
- D. Orientation and Guidance of Visitors. The Custodian may maintain parking and access areas including service roads for patrol, fire control, right-of-way maintenance and other management activities. Exhibits, programs and printed materials may be provided by the Custodian in service areas. Guide service and labeled nature trails may be provided by Custodian within the preserve.
- E. Water Level Control. The purpose of any water level control shall be to maintain the natural water regime of the preserve. Water levels which previously have been altered by man may be changed by the Custodian for the restoration of natural conditions.
- F. Disturbance of Natural Features. The cutting or removal of trees, dead or alive, or the disturbance of other natural features is prohibited, except that which is consistent with the Rules of Management of this dedication, or is required under the terms of certain right-of-way easements/permits between the State and public utility companies and other governmental agencies, or is necessary for public safety.
- G. Visitor Protection. Guardrails, fences, steps and bridges may be provided by the Custodian when essential to the safety of a reasonably alert and cautious visitor. The Custodian shall have the right to erect such structures as may be necessary to protect the preserve from unwanted or excessive visitor traffic.
- H. Control of Vegetational Succession. Control of vegetational succession may be undertaken if necessary to maintain or restore a particular ecosystem or the preservation of threatened, rare, endangered or usual species.

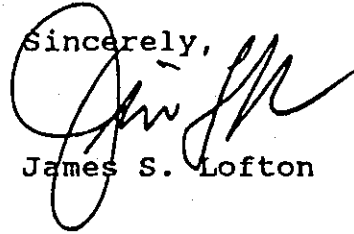
- I. Research and Collecting Permits. Any person wishing to engage in the scientific research requiring collecting or otherwise affecting anything within the preserve shall first secure written permission from the Department of Environment, Health and Natural Resources.
- J. Fences. Fences and barriers may be installed as necessary to further the purposes of the preserve.
- K. Trails. The Custodian shall locate, build and maintain trails which shall be adequate to provide for permitted use of the preserve, but otherwise such activities shall be kept to a minimum.
- L. Other Structures and Improvements. The Custodian shall have the right to erect structures or facilities within the preserve, insofar as the same are consistent with the purposes of the preserve as stated in this dedication.
- M. Management Plan. The North Carolina Department of Environment, Health and Natural Resources, as Primary Custodian for the preserve, shall be required to prepare and submit for approval to the Secretary of Environment, Health and Natural Resources a management plan for the preserve. This plan shall be subject to all the provisions of the dedication and shall additionally be consistent with the management principles set forth in the North Carolina Administrative Code 15 NCAC 12H.0403, 15 NCAC 70.0202 and other such regulations as may be established from time to time by the Secretary of Environment, Health and Natural Resources. In any case where contradictions may arise between this instrument of dedication and other management regulations, the terms of this dedication shall take precedence.
6. Amendment and Modification. The terms and conditions of this dedication may be amended or modified upon approval of the Governor and Council of State. The lands dedicated to the Buxton Woods Coastal Reserve pursuant to this instrument may be removed from dedication upon the approval of the Governor and Council of State.
7. Permanent Plaque. The Custodian shall erect and maintain a permanent plaque or other appropriate marker at a prominent location within the preserve. The plaque shall bear the following statement: "This area is dedicated as a State Nature Preserve."

The Governor and Council of State have approved the dedication of the State-owned land hereinabove described as the Buxton Woods Coastal Reserve to be held in trust by the Custodian for the uses and purposes expressed in the Nature Preserves Act at a meeting held in the City of Raleigh, North Carolina, on the 6th day of October, 1992.

This allocation is made at no cost or consideration to the Department of Environment, Health and Natural Resources.

Best regards.

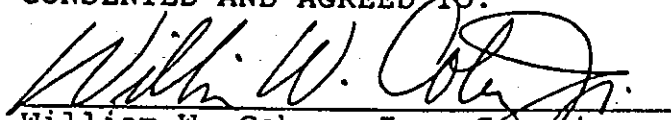
Sincerely,



James S. Lofton

JSL:scn

CONSENTED AND AGREED TO:



William W. Cobey, Jr., Secretary
Department of Environment, Health
and Natural Resources

APPENDIX D

**Buxton Woods Site Basic Record
(excerpted from: N.C. Natural Heritage Program, 1993)**

BUXTON WOODS SITE BASIC RECORD

I. Site Description/Design

- A. Site Description: Extensive area of relict dunes stabilized by maritime evergreen Forest of mixed hardwoods and pines, interspersed with maritime swamp forest and maritime shrub swamp, open water interdune ponds and unique marshy wetlands know as sedges. Over a dozen rare plant and animal species occur here, some at their northern range limit.
- B. Site Comments: Some of the privately owned lands have been developed. A hurricane hit the island in 1993 and blew down an estimated 20-30% of the canopy trees. Patches of pines up to 2 acres were broken off, but the rest of the blowdown was apparently in small patches.

II. Site Significance

- A. Priority: A -- Nationally Significant
Comments: Most extensive maritime forest remaining in the state; exemplary communities, rare species, wildlife habitat
- B. Biodiversity Significance: B1 -- Outstanding Significance
Comments: One of the best examples of maritime shrub swamp (G1,S1); extensive maritime evergreen forest; extensive, unusual interdune ponds
- C. Other Values: V1 -- Outstanding Value
Comments: scientific, geologic; the area also protects the freshwater aquifer of the island
- D. Protection Urgency: P1 -- Immediate Threat/Outstanding Opportunity
Comments: private portions imminently threatened by development; some area have already been developed; excessive ground water pumping is a threat to the wetlands.
- H. Management Urgency: M2 -- Management Essential Within Five Years To Prevent Loss
Comments: control excessive pumping of ground water

III. Stewardship

- A. Landuse: Domestic animals grazed the area heavily until 1937. The woods were logged for hardwood during the late 1800s, increasing the amount of loblolly pine.

- B. Offsite: Buxton Woods is a primary recharge area for the Hatteras Island fresh water lens, the primary water source for nearby towns.
- C. Information Needs: Ideal site to study ecology and geology of maritime forests because of its extent and diversity of habitats. Hydrological information is critical to know how much groundwater can be supplies without damaging the area. Groundwater monitoring wells were established in spring 1991.
- D. Management Needs: Monitor hydrology, control access and destructive activities. Follow local decisions regarding well drilling and pumping.
- E. Management Comments: Part of the area is in the Cape Hatteras National Seashore. Several tracts are managed by the N.C. Division of Coastal Management as a Coastal Reserve.

IV. Rare Species and Communities

A. Occurrences within the Buxton Woods Coastal Reserve Component:

<u>Community/Species</u>	<u>Global Rank¹</u>	<u>State Rank²</u>	<u>F/S Status³</u>
Maritime Evergreen Forest.....	G2,G3.....	S1	
Maritime Shrub Swamp.....	G1.....	S1	
Interdune Pond.....	G2?.....	S1	
Northern Hairstreak (<u>Fixsenia favonius ontario</u>).....	G4T4.....	S3?.....	-/SR
Winged Seedbox (<u>Ludwigia alata</u>).....	G3,G4.....	S2.....	-/SR
Gulfcoast Spikerush (<u>Eleocharis cellulosa</u>).....	G4,G5.....	S1.....	-/SR
Savanna Nutrush (<u>Scleria verticillata</u>).....	G5.....	S1.....	-/C

B. Occurrences within the Buxton Woods macrosite:

<u>Community</u>	<u>Global Rank</u>	<u>State Rank</u>	<u>F/S Status</u>
Maritime Evergreen Forest.....	G2,G3.....	S1	
Maritime Swamp Forest.....	G1.....	S1	
Maritime Shrub Swamp.....	G1.....	S1	
Interdune Pond.....	G2?.....	S1	

<u>Species</u>	<u>Global Rank</u>	<u>State Rank</u>	<u>F/S Status</u>
Bald Eagle (<u>Haliaeetus leucocephalus</u>).....	G1.....	S1.....	E/E
Giant Swallowtail (<u>Papilio cresphontes</u>).....	G5.....	S2?.....	-/SR

Northern Hairstreak (<i>Fixensia favonius</i> ontario).....	G4T4.....	S3?.....	-/SR
Messalina Underwing (<i>Catocala messalina</i>).....	G4.....	S1,S3.....	-/SR
Carolina Grasswort (<i>Lilaeopsis carolinensis</i>).....	G3.....	S3.....	3C/T
Dune Bluecurls (<i>Trichostema</i> sp. 1).....	G2.....	S2.....	C2/C
Winged Seedbox (<i>Ludwigia alata</i>).....	G3,G4.....	S2.....	-/SR
Lanceleaf Seedbox (<i>Ludwigia lanceolata</i>).....	G3.....	S1.....	-/C
Four-Angled Flatsedge (<i>Cyperus tetragonus</i>).....	G4?.....	S2.....	-/SR
Gulfcoast Spikerush (<i>Eleocharis cellulosa</i>).....	G4,G5.....	S1.....	-/SR
Savanna Nutrush (<i>Scleria verticillata</i>).....	G5.....	S1.....	-/C
Florida Adder's Mouth (<i>Malaxis spicata</i>).....	G3,G4.....	S1.....	-/SR

1 - Global Rank:

- G1** = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to extinction.
- G2** = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- G3** = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., physiographic region) or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
- G4** = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- G5** = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- T** = The rank of a subspecies or variety. As an example, G4T1 would apply to a subspecies of a species with an overall rank of G4, but the subspecies warrants a rank of G1.

2 - State Rank:

- S1** = Critically imperiled in North Carolina because of extreme rarity (5 or fewer occurrences or very few individuals) or because of some factor(s) making it especially vulnerable to extirpation from North Carolina.

S2 = Imperiled in North Carolina because of rarity (6 to 20 occurrences or few remaining individuals) or because of some factor(s) making it very vulnerable to extirpation from North Carolina.

S3 = Rare or uncommon in North Carolina (on the order of 21 to 100 occurrences).

S4 = Apparently secure in North Carolina with many occurrences.

S5 = Demonstrably secure in North Carolina and essentially ineradicable under present conditions.

3 - Federal and State Status:

A. Federal (as designated by the U.S. Fish and Wildlife Service)

E = Endangered. A taxon that is threatened with extinction throughout all or a significant portion of its range.

C2 = Candidate 2. A taxon for which there is some evidence of vulnerability, but for which there are not enough data to support listing as endangered or threatened at this time.

B. North Carolina

1. Animals (according to the N.C. Wildlife Resources Commission: 15A NCAC 10I .0003-.0005)

E = Endangered.

2. Plants (according to the N.C. Natural Heritage Program and the N.C. Plant Conservation Program)

T = Threatened. Any resident (native to North Carolina) species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant part of its range, or one that is designated as threatened by the Federal Fish and Wildlife Service (Plant Protection and Conservation Act).

C = Candidate. Any species for which there is not evidence of declining numbers or threats to the species in North Carolina, but which, because of small numbers of populations, rare habitats, or distribution, may become threatened in the future; or a species suspected of being endangered or threatened, but for which sufficient information is not currently available to support such a status classification.

3C = Category 3. A previous Candidate no longer under consideration because:
(1) there is persuasive evidence of extinction, (2) it is not considered a distinct taxon, or (3) it is more abundant than previously believed and/or not subject to any identifiable threat.

SR = Significantly Rare. Any other species which has not determined as an Endangered, Threatened, Special Concern or Candidate species, but which has been determined to need monitoring.