

**MANAGEMENT PLAN**  
**for**  
**the PERMUDA ISLAND COMPONENT**  
**of the**  
**NORTH CAROLINA COASTAL RESERVE**  
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**North Carolina Department of Environment, Health  
and Natural Resources  
Division of Coastal Management  
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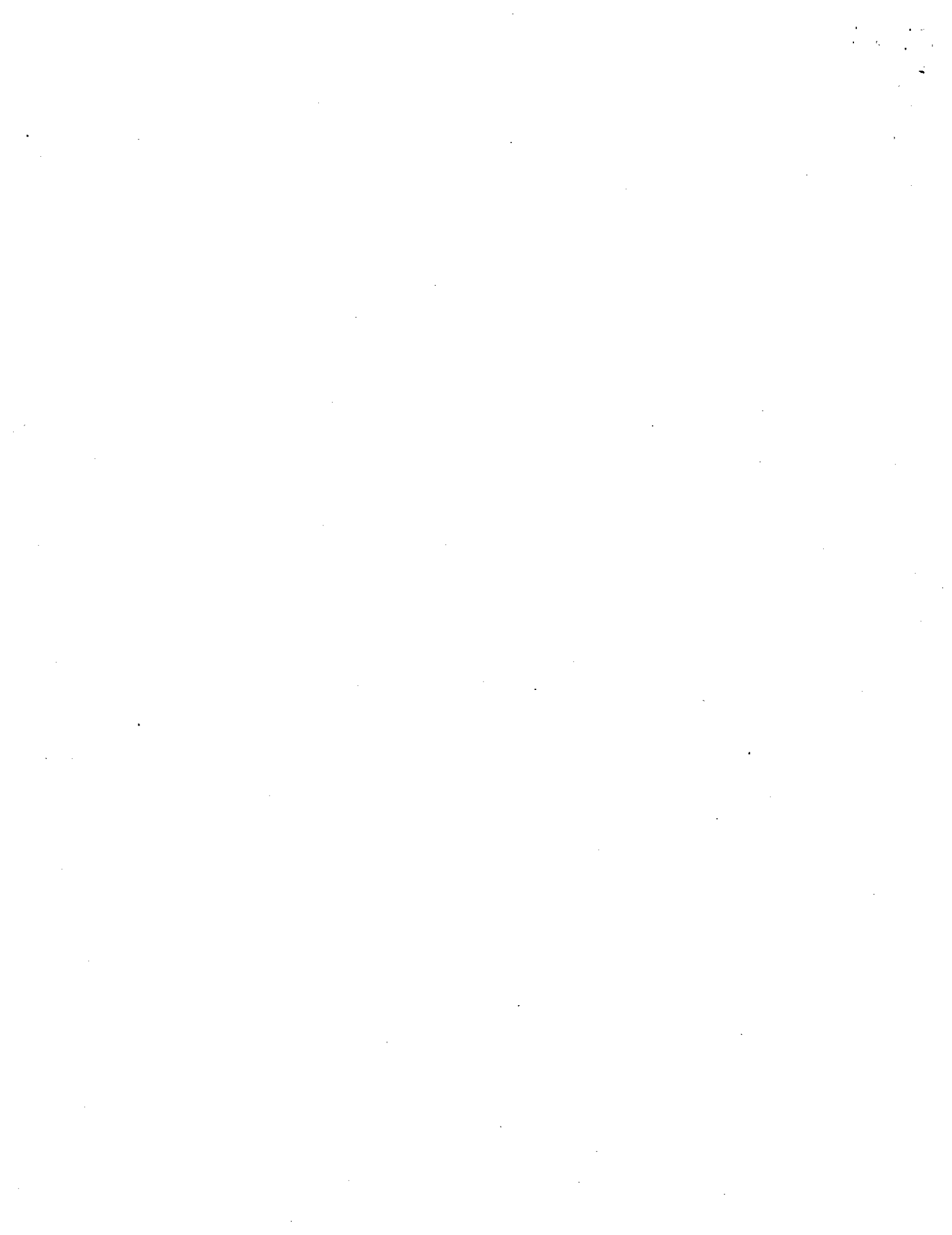
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## I. EXECUTIVE SUMMARY

The North Carolina Coastal Reserve includes over 10,000 acres of lands and waters associated with barrier islands along the 320 miles of the state's ocean shoreline. The reserve includes six components: 1) Currituck Banks, 2) Buxton Woods, 3) Rachel Carson, 4) Permuda Island, 5) Masonboro Island and 6) Zeke's Island (Figure 1). Four of these components (Currituck Banks, Rachel Carson, Masonboro Island and Zeke's Island) also represent the North Carolina National Estuarine Research Reserve, a federal-state program that manages the sites for estuarine research, education and compatible traditional uses. Though Permuda Island and Buxton Woods are not components of the Estuarine Reserve, they are managed for the same purposes by the state Division of Coastal Management.

The concept of governmental protection of coastal natural areas for research and education 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 N.C. Division of Coastal Management 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 six components for research, education and compatible traditional uses (e.g., fishing, hunting, passive recreation). 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 process and research to improve our knowledge and, hence, management of the coast. Additional components may be added to the Reserve as funding and protection needs are evaluated by the state.

Permuda Island was acquired by the state in 1987, funded by state appropriations and a grant from the U.S. Department of Commerce. The state acquired fee simple title to the 50-acre island from the North Carolina Nature Conservancy, a private non-profit conservation group that purchased the Permuda Island from an attorney. Preservation of the island concluded a lengthy public debate pitting development interests versus local conservationists and fishermen.

The island will be managed for use as a natural outdoor laboratory for research, education and traditional uses. Preservation of the island's nationally significant archaeological resources shall be 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 Center for Marine Science Research in Wilmington plus the Education Specialist located at the North Carolina Maritime Museum in Beaufort. The Coordinator oversees administrative functions, the 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

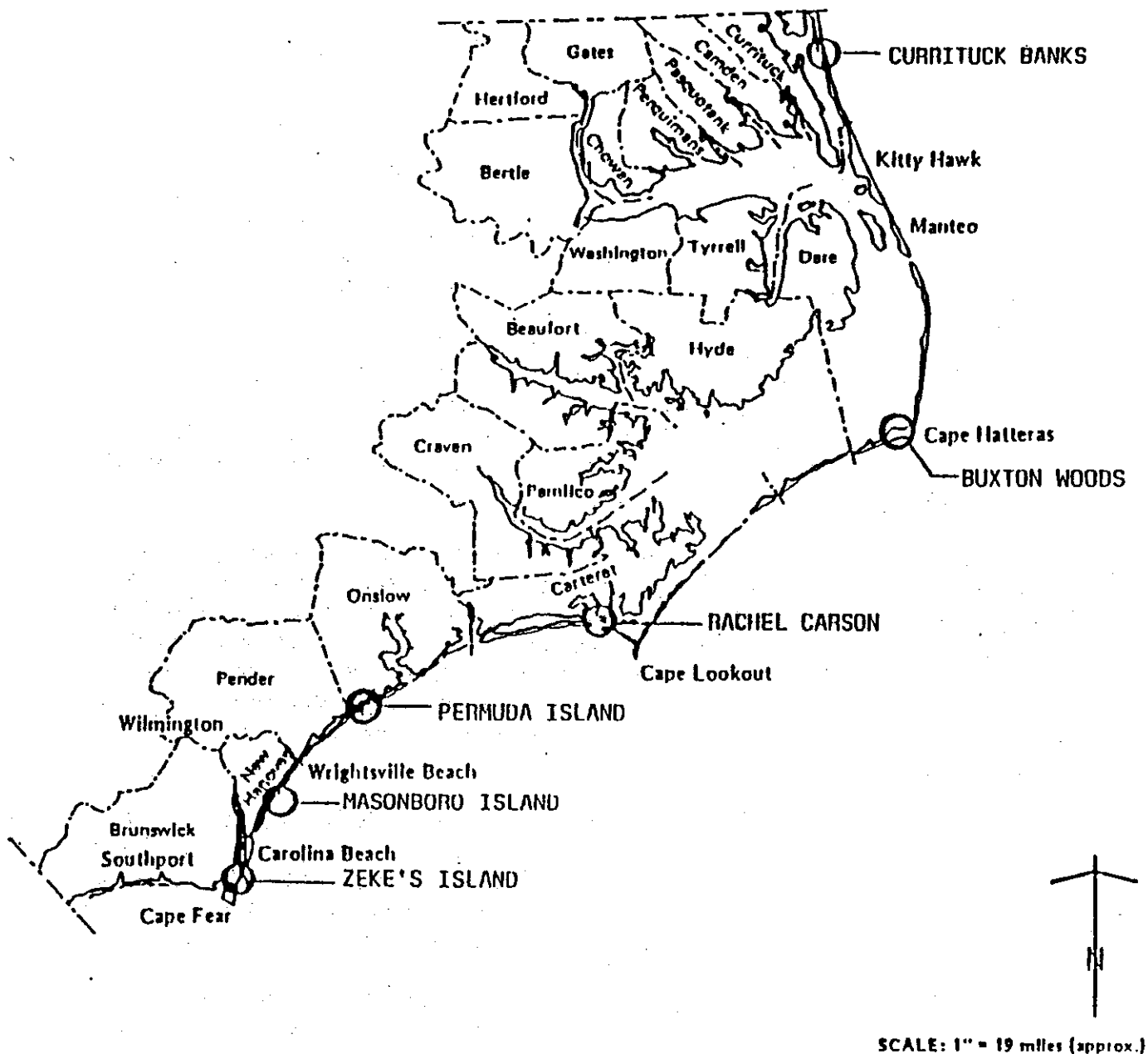


FIGURE 1. NORTH CAROLINA COASTAL RESERVE



universities, marine science facilities, public schools) as well as any interested individuals. Management of the island is facilitated by cooperative agreements, volunteer efforts and direct staff involvement. Component use requirements (Appendix A) are enforced to protect the natural integrity of the island.

Permuda Island encompasses significant archaeological elements and coastal habitats--subtidal flats, tidal marshes, shrub thickets and successional areas. The surrounding estuarine waters of Stump Sound and provide a rich annual harvest of finfish and shellfish. A dense shell midden contains fragments of pottery believed to indicate occupations during both the Middle Woodland (300 B.C. - 800 A.D.) and Late Woodland (800 - 1650 A.D.) periods of prehistory. Historic occupations in evidence predate the Revolutionary War period and extended well into the 20th Century.

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 island. 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 1986 Onslow 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 Permuda Island component and activities that will be conducted. 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 six state properties managed as coastal natural areas. Four of these sites are included in 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 these Estuarine Reserve sites.

In 1987 the state had an opportunity to acquire Permuda Island and avert its development using state appropriations and federal 306A grant funds. To allow the Division of Coastal Management to acquire and manage various coastal natural areas (not just estuaries), the Coastal Reserve statutes (Appendix A) and regulations (Appendix B) were established in 1988 and 1989, respectively. The Coastal Reserve includes the four Estuarine Reserve components plus other coastal areas acquired by the state and allocated to the Division for management. Currently, there are two sites managed by the Division that are not Estuarine Reserve components--Permuda Island and Buxton Woods. Thus, the Coastal Reserve acts as an "umbrella" to encompass all six of the DCM-managed natural areas. Management will be very similar throughout all of the components, the main difference being that Permuda Island and Buxton Woods will not be eligible for additional federal funds.

### **III. PERMUDA ISLAND ACQUISITION**

The acquisition of Permuda Island was the culmination of several years of controversy and dedicated work by various individuals and groups. The island and surrounding estuarine waters of Stump Sound were a focus of debate beginning in 1983 because of a proposed large-scale development on the island. Generations of local fishermen depended upon these waters for their livelihoods and were understandably fearful that development of the island would damage their shellfish harvests irreparably. In addition, Permuda Island is of national archaeological significance because it contains remains from various periods of early habitation by native Americans.

Following months of local controversy concerning a proposed development plan for the Island, the Coastal Resources Commission officially designated Permuda Island as an Area of Environmental Concern (AEC) for its significant archaeological resources on January 1, 1985. The AEC designation required that the Coastal Resources Commission regulate the uses of the island to ensure that the archaeological resources were protected. Under this AEC designation development would be allowed, but only if it did not impact the archaeological resources of the island. Thus, the North Carolina Division of Archives and History was the primary agency to comment on the proposed development of Permuda Island.

However, local residents were still not convinced that the adjacent estuarine waters would be adequately protected by existing regulations. Mrs. Lena Ritter, a resident of Holly Ridge, spent innumerable hours of unpaid time over several years to talk to the Onslow County Board of Commissioners, the Environmental Management Commission, the Coastal Resources Commission and other agencies about how development of Permuda Island would destroy the livelihoods of local fishermen. She successfully forced the decisionmakers to consider the

complicated effects of the project. Others who contributed to the effort to save the island were, in alphabetical order: the Coastal Federation, Representative Bruce Etheridge, Senator A.D. Guy, the Onslow Conservation Group, David Owens (Director of the Division of Coastal Management), Bill and Bernice Rice (Stump Sound residents), Katherine Skinner (Director of the North Carolina Nature Conservancy), and Paul Starzynski (Chairman of the Onslow County Commission). These combined efforts resulted in the purchase of the island by the State of North Carolina.

In January, 1987 the State purchased half of the island from The Nature Conservancy, a conservation group that had purchased the entire island for \$1.7 million from Mr. Hal Kinlaw, a Lumberton attorney who had proposed development of the site. The remaining half of the island was purchased by the State from the Conservancy in September of 1987.

#### **IV. GOALS OF MANAGEMENT**

The management goals of the North Carolina Coastal Reserve shall 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**

The management plan establishes procedures by which research will be permitted in the Reserve. Though a very wide range of research can take place, priorities are given for projects depending upon the amount of previous work done within a given component. Briefly, priority research topics include:

1. *Baseline measurements of chemical, physical, biological, and ecological characteristics;*
2. *Monitoring changes in these characteristics over various time frames; and*
3. *Research to help improve coastal decisionmaking.*

This sequence of research priorities is in the best interest of the Reserve--protecting it from adverse impacts and guaranteeing its long-term value and suitability for research, education, and other compatible human activities. The ultimate goal of the research program is the third priority--to provide information to improve coastal decisionmaking.

The management plan also provides procedures for permitting and monitoring research activities and procedures for disseminating research results to educate scientists, coastal 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**

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 Maritime Museum, 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 Program.

#### **C. Other Uses**

In this plan policies addressing traditional uses of the Reserve have been presented to maintain a harmonious balance between them and research and educational activities (Section VIII, F-G). Standards for recreational activities have been defined. Guidelines for commercial fishing operations, and vehicular access have been developed. The policies are designed to ensure minimal disruption to research projects and to the Reserve's biotic and abiotic features.

#### **D. Enforcement and Surveillance**

Protection of the site will be achieved through various cooperative arrangements with state and local agencies and individuals. The national archaeological significance of the site is a unique resource which must be preserved. Likewise, the surrounding pristine estuarine waters are an important source of shellfish and, hence, income for local residents.

## V. HISTORY (Angley, 1984)

Permuda Island (sometimes referred to in the past as Permudas or Bermuda Island) is a small narrow island situated in Stump Sound in the extreme southwestern portion of Onslow County. It contains about 50 acres of upland and is approximately 1 1/2 miles in length. The island now lies protected behind Topsail Island, but it is believed to have once been part of a system of barrier islands.

The island is virtually covered by a shell midden which reflects extensive aboriginal activity during the prehistoric period. The identification of these Indians and the precise nature of their activities on the island have yet to be determined.

The shoreline along Stump Sound in the vicinity of Permuda Island was apparently settled during the second quarter of the eighteenth century. The James Wimble Map of 1738 recorded the existence of two identified plantations on the mainland just opposite the island. By 1760 several prominent families had established plantations in this general area. These families (some of whose descendants remained for generations) included the Spicers, the Waltons (or Waltoms), the Dixons, the Costens (or Costons), and the Kings. Dixon Point, Kings Creek, and Spicers Bay and Landing are among the local landmarks and natural features which still bear the names of these mid-eighteenth century settlers.

The earliest identifiable owner of Permuda Island appears to have been Samuel Clegg. Clegg came to Onslow County after the Revolution and purchased considerable land along the coast, including waterfront property, islands and marshlands. One island in the mouth of the New River came to be called Clegg's Island and contained a house and landing. He also owned a salt works near Queens Creek and another piece of property on Gillett's Creek, which may have been the site of a late 1770 salt works operated by William Hadnot.

It is uncertain how or when Clegg acquired Permuda Island, but the island may have been included in the lands along Stump Sound which he purchased from John Spicer, Sr. in 1784. The island may have been owned at an earlier date by Stokely Bishop, who acquired nearby Arrington and Bullet islands (near the mouth of Kings Creek) in 1759. Also, it may have been embraced within the large and poorly defined patent granted to John Baptista Ashe in 1726.

In 1791 certain heirs of Samuel Clegg, residing in South Carolina, sold to Jesse Clegg (formerly Jesse Commander) of Onslow County their half of Permuda Island. The recited consideration was 70 pounds. Jesse Clegg had apparently inherited the other half of the island already, although the will of Samuel Clegg contained no specific reference to this property.

Jesse Clegg retained ownership of Permuda Island only until 1794, at which time he sold it to John Fullwood (or Fullard) for 200 pounds. Although it is by no means certain, a price of 200 pounds at this time for an eighty-acre (upland and marsh at that time) island would seem to indicate the presence of improvements. Clegg's continued interest in the Stump Sound area is reflected in the fact that three years after this sale he received a grant for 4,000 acres of "surplus lands" from the 1726 patent to John Baptista Ashe for the seashore between New River

and Stump inlets.

John Fullwood's ownership of Permuda Island was later referred to in deeds of 1795 and 1806 conveying title to other property in the Stump Sound area, including Arrington and Bullet islands. It is interesting to note that while Permuda Island, comprising eighty acres, has sold for 200 pounds in 1794; Arrington and Bullet islands, together comprising forty acres, brought a combined price of only \$50.00 in 1806.

In 1807 John Fullwood sold Permuda Island and numerous other tracts on Stump Sound to John Lovett. In 1811 Lovett, in turn, sold most if not all of these lands, including Permuda Island, to Edward Williams, who already owned a plantation on Stump Sound at the time of this purchase.

When Williams sold Permuda Island to Margaret Mason in 1818, the recited consideration had increased to \$1,500. At this time the island was said to contain 100 acres rather than eighty, but the amount received seems to indicate that substantial improvements had been made. Margaret Mason was apparently the widow of John Mason, who died about 1814. At the time of her purchase of Permuda Island, she was owner of property on the mainland directly opposite Permuda Island.

The date of Margaret Mason's death has not been determined, but at her death Permuda Island descended through the terms of her 1823 will to several daughters and grandchildren. In August of 1839, however, the island once again came into the possession of a single owner when Jesse Hardison purchased the property in 1/6th and 1/12th shares from the Margaret Mason heirs. The total price paid by Hardison for the island was \$1,200--some \$300 less than it had sold for two decades earlier.

In 1854, after holding ownership of Permuda Island for fifteen years, Jesse Hardison sold the property to John F. Spicer for a recited consideration of \$1,500. Spicer was to hold title to the island until just after the close of the Civil War. The 1860 census for Onslow County reveals that John F. Spicer was a fifty-nine-year-old planter with an extensive plantation on Stump Sound. His real estate was valued at \$15,000 and his personal estate was valued at a very impressive \$65,500. His household included his wife Catharine, a daughter, and two sons. He was the owner of seventy-six slaves. His plantation included 400 acres of improved land and 1,300 acres of land which was unimproved. He raised cattle and sheep and was engaged primarily in the cultivation of wheat, rye, corn, peas, beans and sweet potatoes. The records make no specific reference to Spicer's use of Permuda Island, but it is quite possible that he farmed the island or allowed some of his livestock to graze there. In October of 1865, while residing in New Hanover County, Spicer sold half of his Stump Sound plantation to John D. Spicer of Duplin County. Included in this sale was the western half of nearby Permuda Island. Long after this 1865 transaction, the island remained potentially useful as farmland, but, with the closing of Stump Inlet, it was soon to lose much of its potential as a center of local trade.

The Moseley Map of 1733 and the Wimble Map of 1738 clearly indicate that Permuda Island (not identified) lay directly within or only slightly northeast of Stump (or Stumpy) Inlet. Later maps reveal that the island and inlet remained in approximately the same relative positions

until late in the nineteenth century. The presence of Stump Inlet in such close proximity to Permuda Island throughout the eighteenth and most of the nineteenth centuries presents the very real possibility that the island was once used as a local trade center of at least some importance, although Stump Inlet itself was never a major artery of commerce.

The sources indicate that Stump Inlet had closed at least temporarily by 1875. The inlet apparently reopened late in the nineteenth and early twentieth centuries, but by 1912 it had closed again and has remained closed ever since.

With the closing of Stump Inlet, Permuda Island and the Stump Sound area were cut off from a direct passageway to and from the Atlantic. Thereafter, the nearest connection with the open sea was New Topsail Inlet, some nine miles to the southwest, or New River Inlet, approximately seventeen miles northeast.

A ninety-three mile section of the Intracoastal Waterway between Beaufort and the Cape Fear south of Wilmington was completed in 1932. The channel, initially twelve feet deep and ninety feet wide, extends to this day through Stump Sound and between Permuda Island and the mainland. Vessel traffic on the Beaufort to Cape Fear section increased from 33,710 tons in 1932 to 243,000 tons in 1939. In 1938 this traffic consisted of approximately 8,500 motor vessels, 200 barges, and 300 tugs--a total of about 9,000 vessel trips. Cargo consisted primarily of seafood, fertilizer, agricultural commodities, lumber, petroleum products, and general merchandise. Also making use of the waterway from the time of its completion were yachts and various other pleasure craft.

There are indications that some development occurred on Permuda Island about the time of the construction of the Intracoastal Waterway through the Stump Sound area. A soil survey map of 1921 recorded the presence of no structures of any kind on the island. An aerial photograph of 1938, however, shows that at least three and possibly five small structures were aligned at that time from east to west near the center of the island, at nearly its narrowest point. Extending outward from the north shore, midway the length of this line of buildings, was a short pier extending outward into Stump Sound. This same photograph shows that the island was laid off into cultivated fields, especially on its eastern half. Although it is not known how long farming has been carried out on the island, it is possible that the practice dates back to the nineteenth or even the eighteenth century. It has continued until the very recent past.

The pertinent United States Geological Survey maps of (1952 photorevised to 1971) shows that three structures were standing on the island at that time in the same locations as those shown in the 1938 photographs. The maps also include the presence of a pier in the same location as the one formerly recorded as being on the north shore of the island. Since 1970 a privately constructed bridge has connected Permuda Island with the heavily-developed Topsail Island to the east.

## **VI. REGIONAL PERSPECTIVE AND ACCESS**

Topsail Island and the adjacent mainland region consists of various resort communities

and small neighborhoods dependent upon local fishing, timber and agriculture. The productivity of the ocean and estuarine waters have traditionally supported a significant commercial fishing industry. In more recent years the beach area has attracted thousands of tourists, seasonal residents and retirees.

Oceanfront development and outdoor recreation are the prominent features of Topsail Island. The ocean beach area is regularly used for swimming, surfing, boating, sun bathing, walking, shell collecting and fishing. Three regional beach access areas (at Surf City, West Onslow Beach and New Inlet) are available for public use. State-maintained roads (NC 50, NC 210 and SR 1568) run the northeast-southwest length of the approximately twenty-two mile-long island. Like most resort areas, population levels fluctuate dramatically with the seasons--thousands of summer visitors while the main island towns of Topsail Beach and Surf City only have a total of approximately 800 year-round residents. Permuda Island is included in the town of North Topsail Beach.

By contrast, the adjacent mainland consists of sparsely populated areas dissected by N.C. 210, N.C. 172, U.S. 17 and various secondary roads dissecting extensive areas of coastal wetlands including pocosins and pine flatwoods. Small towns (e.g., Holly Shelter--population 500) and villages (e.g., Sneads Ferry, Folkstone, Bethea, Morris Landing and Thomas Landing) are scattered between the intracoastal waterway and the 60,000-acre Holly Shelter Gameland west of U.S. 17-NC 210. The local economy is dependent upon local natural resources for timber, agricultural and seafood production.

Permuda Island may be reached either by boat or by a gated private road/causeway which runs northwest from NC 210 (see Figure 2). Various public and private boat ramps are found along the sound side of Topsail Island as well as the mainland shoreline.

## **VII. RESOURCE INVENTORY**

### **A. Physical Characteristics**

Permuda Island is situated on the sound side of Topsail Island, a barrier island located on the southeastern fringe of the North Carolina coastal plain (Figure 2). Permuda Island is thought to represent a remnant of a former barrier island that was gradually separated from the ocean by the geological development of Topsail Island. Now surrounded by the estuarine waters of Stump Sound, the component is protected from high energy ocean wave dynamics.

The island is composed primarily of Holocene and Pleistocene sands with minor amounts of silts and clays. The soil series found above mean high tide is the Newhan-Corolla, an excessively-drained, sandy profile (with variable amounts of shell fragments) that ranges from 2 to 30 percent slopes. This soil is associated with the shrub thicket and old field communities of the island. In contrast, local tidal marshes and flats are underlain by the very poorly-drained sands of the Carteret series.



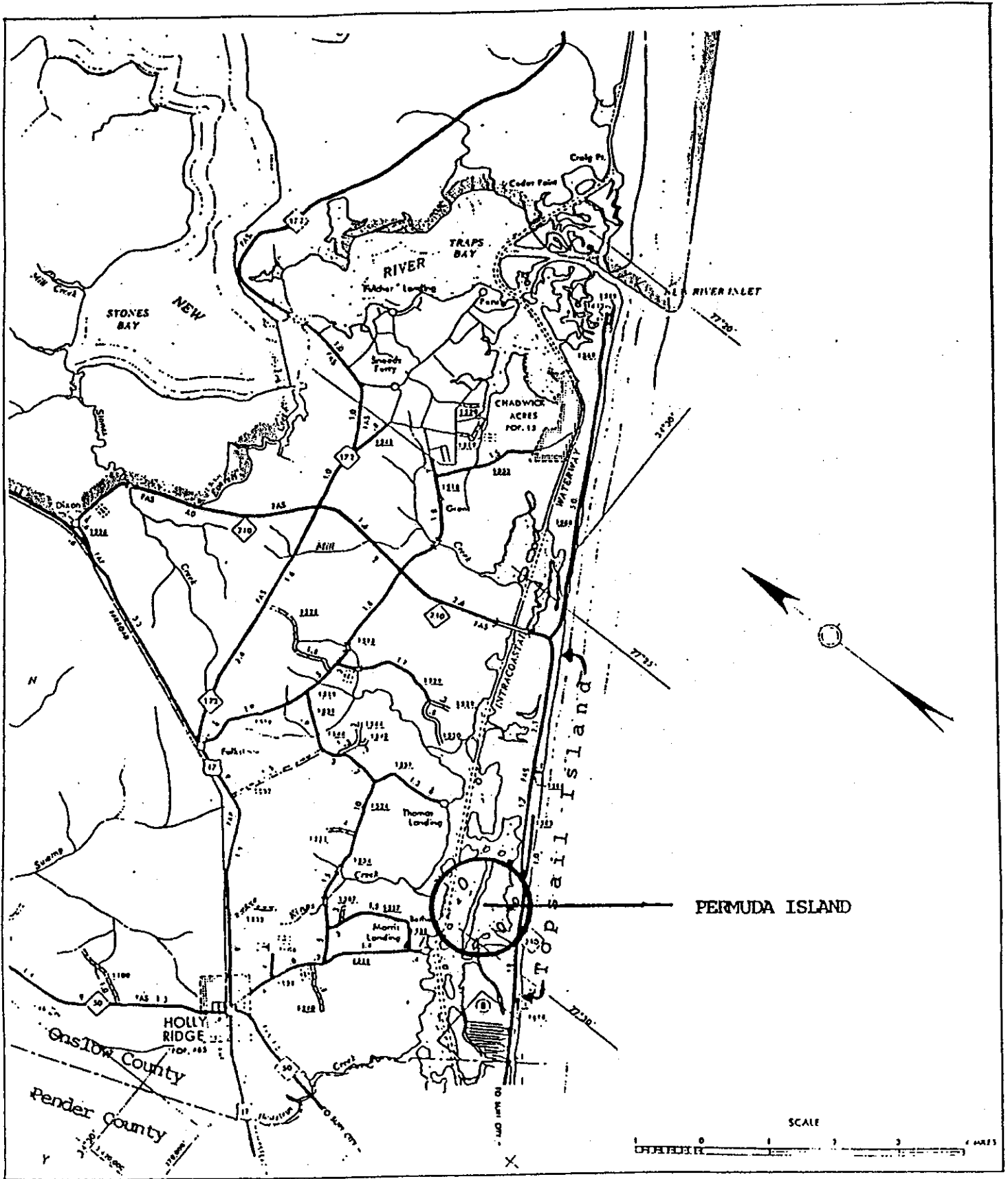


Figure 2. PERMUDA ISLAND VICINITY

The waters of Stump Sound have semi-diurnal tidal fluctuations of approximately three feet via New River Inlet (ca. 12 miles to the northeast) and Topsail Inlet (ca. 8 miles to the southeast). The estuary receives fresh water from local creeks (e.g., King Creek, Turkey Creek) and from upland runoff. Water quality within this area is classified by the state Division of Environmental Management (DEM) as SA. This category permits collection of shellfish, swimming and other water-based activities. Stump Sound has also been designated as an Outstanding Resource Water by DEM. This designation restricts adjacent activities to maintain the high water quality of the sound.

There is no weather station in the vicinity of the component, but general climatic information is available from Wilmington. The mean annual air temperature is 63.7°F with extremes of 104°F and -2°F. Normal annual precipitation is approximately 53 inches. The annual probability of a hurricane is approximately seven percent (NOAA, 1951-81; U.S. Dept. of Interior, 1980).

## **B. Plant Communities**

Although a major portion of the upland area of Permuda Island has been either farmed or disturbed in the past, typical estuarine and barrier island plant communities are found along its periphery. The habitat map of the Permuda Island component (Figure 3) depicts three major plant communities:

- Sporadic, fringing salt marshes are composed of:
  1. *regularly-flooded (low) marshes dominated by smooth cordgrass are a primary source of rich organic detritus which is flushed into the surrounding estuarine nursery waters to serve as food for benthic organisms and juvenile fishes and*
  2. *irregularly-flooded (high) marshes contain a mixture of black needlerush, sea ox-eye, saltmeadow cordgrass, glasswort, and sea lavender.*
- Above the spring tide limit of the supratidal salt marsh, the shrub thicket community consists of sporadic clumps of stunted trees, shrubs, and vines such as: live oak, red cedar, yaupon, silverling, and greenbrier.
- The central portion of the island contains a series of former agriculture fields partitioned by strands of shrub thicket. Within these old fields are successional communities of broomsedge, dog fennel, asters, goldenrods, Mexican tea and young trees and shrubs invading from the shrub thickets.

No species of threatened or endangered plants have been recorded from the component.

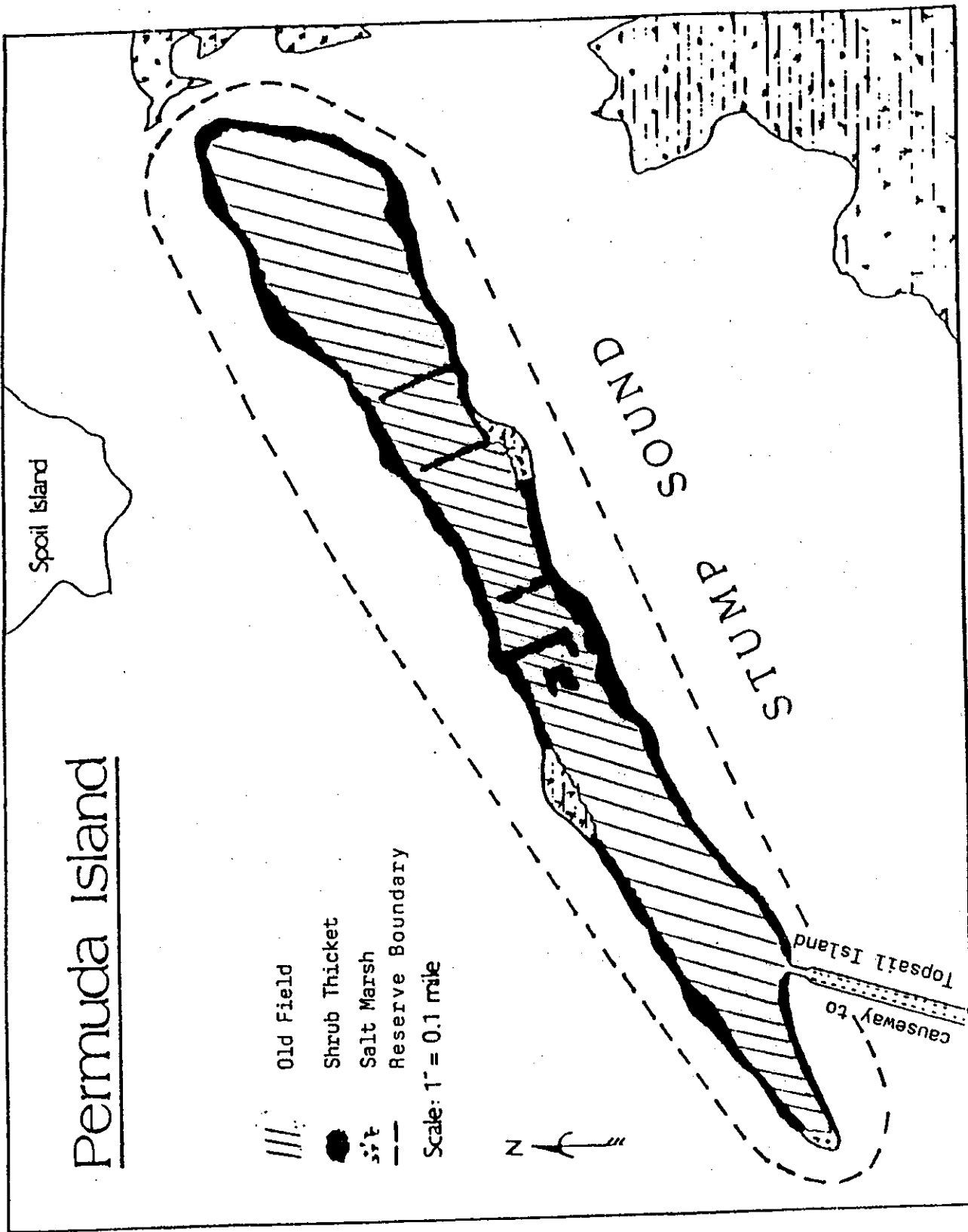


Figure 3. Plant Communities of Permuda Island

C. **Fauna**

Fishes, shrimp, crabs, clams, and oysters utilize the Stump Sound estuary as a nursery ground where young organisms are found in the shallow protected waters that contain abundant food. The Permuda Island site is important to a large number of commercial species found throughout the area. No threatened or endangered species have been observed at the Reserve site.

Bird species are found throughout the various island habitats. Shorebirds frequent local marshes and mudflats, particularly during low tide. Willetts, American oystercatchers, egrets, herons, black skimmers, sandpipers and gulls are commonly observed. Brown pelicans patrol the sound and nearby beach areas. Upland portions of the island are home to sparrows, warblers and other songbirds.

Mammals found within the Permuda Island site include opossums, raccoons, marsh rabbits and cotton rats. River otters are occasionally found in marsh and sound areas.

D. **Archaeological Significance**

Prehistoric Native Americans exploited marine resources (e.g., oysters, clams, scallops, crabs and whelks) from the waters of Stump Sound surrounding Permuda Island and left thick deposits of shell refuse or pits filled with discarded shells, bones and ceramics. Archaeological evidence collected since 1969 indicates the earliest occupation occurred during the Middle Woodland period (300 B.C. - 800 A.D.) and continued through the Late Woodland period (800 A.D. - 1650 A.D.). Historic occupations in evidence predate the Revolutionary War and extend into the 20th century.

Archaeological remains on the island consist of discrete shell heaps, broad and thick layers of shell midden, prehistoric refuse pits and postholes, plus numerous ceramic vessel fragments and well-preserved animal bone remains. Because of the diversity of remains and range of time represented, Permuda Island has been nominated to the Keeper of the National Register of Historic Places as an archaeological resource of state significance (McCullough, 1985).

The archaeological resources of Permuda Island are considered significant in that the site possesses potential for yielding new knowledge about the prehistoric adaptations of the Middle Woodland and Late Woodland aboriginals who occupied the southern coastal region of North Carolina. These resources afford an excellent opportunity for the investigation of a broad range of general and specific research problems, including:

1. **Settlement patterns and site function.** *Because of the limited professional research which has been conducted on Middle Woodland and Late Woodland sites in the southern coastal region of North Carolina, little existing knowledge of the settlement patterns and site function identified with phases of these periods is available. Physical isolation and limited*

public access have preserved much of the archaeological record from destruction. The abundant and substantially undisturbed remains found on Permuda Island hold the potential to clarify and build an interpretive framework for studying prehistoric activities, site function and within-site activity patterns of this region for these time periods.

2. **Cultural and chronological definition.** Currently, phase identifications (phases being a period subunit) are based on the presence of certain ceramic types assumed to indicate a relative period of time. The clay-tempered and shell-tempered ceramics found on Permuda Island are considered indicative of the Cape Fear phase of the Middle Woodland period and the Oak Island phase of the Late Woodland period. Identification of subsurface artifact layers and undisturbed shell deposits, believed to be associated with each of these phases, present opportunities to firmly recognize distinctive cultural traits. Ceramic types, stone tools, subsurface features, postholes and within-site activity patterns could establish characteristic traits on which to base comparisons between sites.
3. **Seasonality.** Information concerning seasonal settlement patterns and adaptations of the Cape Fear and Oak Island phases is practically non-existent. Only one excavation to date, the Uniflite site--Oak Island phase, has provided any information on these subjects. The extensive, undisturbed shell remains and subsurface layers found on Permuda Island contain materials which may enhance determinations of seasonality. For example, a surprising number of motile shellfish remains (e.g., whelk, scallop) were observed on and beneath the surface. These predatory shellfish live primarily in deep water, but are found in shallow water (e.g., oyster and clam beds) during warm periods of the year. Their presence may indicate spring, summer and/or fall occupation of the island. Preserved plant remains may clarify the exact seasons of occupation.
4. **Subsistence.** Well-preserved floral and faunal remains found at the site can greatly increase the existing knowledge of the subsistence practices of the Cape Fear and Oak Island phases. The discovery of shell hoes may indicate that cultivation was practiced by the islands prehistoric occupants.
5. **Lithic procurement and stone tool use.** Local outcrops of rock do not occur naturally in the vicinity of Permuda Island, though small quartz pebbles occur at various spots on Topsail

*Island. A number of hammerstones, projectile points and other stone subjects have been found on Permuda Island. No substantial knowledge exists as to the original source(s) of these stones. Similarly, no substantial edge-wear studies have been conducted to determine the function of the prevalent stone "bifaces" and "unifaces" commonly identified as "oyster knives". Research into these topics would greatly increase knowledge of Middle and Late Woodland stone technologies along the southern North Carolina coast.*

6. *Shell tool use. The relatively large number of welk shells recovered and subsequently determined to have been modified for use as tools presents an opportunity to investigate substitution of shell as a resource material. Specific areas of study could include: determination of tool function through edge-wear analysis and comparison of shell tool functions to stone counterparts (McCullough, 1985).*

#### **E. Local Activities That May Affect the Component**

The primary use of Stump Sound is traditional commercial and recreational fishing, activities very compatible with the basic reserve concept. Residences, small farms and timber areas are found on the adjacent mainland. However, the continuing development and associated changes in land use along the sound side of Topsail Island poses a long-term potential threat to Stump Sound local water quality and, thus, future fish and shellfish harvests.

### **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 the 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 the 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 position is located within the University of North Carolina*

Center for Marine Science Research (UNCW/CMSR) in Wilmington. The 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 MOUs with other governmental programs.

**Research Responsibilities:** The Reserve Coordinator oversees the implementation of research and monitoring programs within the components through the supervision of the Reserve Research Specialist. These activities will be performed with the cooperation and advice of the Research Review Panel, applicable governmental agencies, and estuarine researchers. Duties include identifying research funding sources, overseeing the grant proposal process, facilitating research and monitoring at Reserve components and communicating with the estuarine research community.

**Education Responsibilities:** The Reserve coordinator has overall responsibility for coordination and facilitation of education programs in the Reserve, including supervision of the Reserve Education Specialist. The programs will be undertaken with the cooperation and advice of the Local Advisory Committee and the environmental education community. Duties include coordination of development of on-site and outreach programs, preparation and solicitation of grant proposals and contact with estuarine educators.

**Other Responsibilities:** The position also involves the total administration of the Coastal Reserve program, particularly those required under state and federal procedures and award conditions. These duties include preparation of required documents and budget management. The coordinator is also responsible for working with the Reserve staff, volunteers, advisory committees, DCM officials plus those of other state agencies, local officials, and other interested parties on issues involving reserve policy, planning and operations.

## 2. **Research Specialist**

The Research Specialist is the primary person in charge of the research and monitoring within the Coastal Reserve program. This position is located within the UNCW/CMSR and encompasses the prime mission of the Reserve program --

*to facilitate and participate in estuarine research 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 with the Research Review panel, development and coordination of Reserve monitoring regimes, and assisting the Reserve Coordinator with management of the Zeke's Island and Masonboro Island components.*

3. **Education Specialist**

*This position functions as a combination of education coordinator for the Coastal Reserve and manager of the Rachel Carson Component. The office for this position is located in the Harborside annex of the North Carolina Maritime Museum in Beaufort, just across Taylor's Creek from the component.*

*The education and interpretation functions of the program are invaluable for increasing the awareness and understanding of estuaries. Teaching school groups and the general public about the importance of estuaries and augmenting that knowledge with results from reserve research and monitoring projects will ultimately improve coastal management.*

**General job duties include:**

- Provide verbal and written information about the Coastal Reserve to the public;
- Coordinate and conduct field trips to Reserve components;
- Organize and give presentations (e.g., slide shows, lectures, workshops) concerning the Coastal Reserve;
- Organize and coordinate volunteer activities (e.g., litter pick-up, monitoring of visitor use);
- Organize and coordinate activities pertaining to National Estuaries Day and Coast Week;
- Maintain regular (at least weekly) contact with the Reserve Coordinator.

The Reserve staff will periodically require assistance from other staff members within the DCM. These staff positions include: Assistant Director for Policy/Planning and Public Information Officer.



**B. Local Advisory Committee**

An Advisory committee will be created to assist the Division of Coastal Management in implementation and review of management at Permuda Island. The committee provides a unique familiarity with the Reserve's individual sites -- the resources present there, their problems and ways of managing them to meet program goals. Individuals representing state and local government, education, research, commercial fishing, wildlife resources and other interests were asked to participate by letter of invitation from the Secretary of the North Carolina Department of Environment, Health and Natural Resources. The final composition of the committee will be determined by the positive responses received. Committee members are appointed to serve until they choose to resign.

The committee will meet at least annually. The 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 a committee may be called when the Reserve Coordinator or committee members feel that a management problem has arisen that calls for discussion and action.

**C. Proposal Review**

Proposals that are received by the Reserve Research Specialist will be screened by the Reserve staff and selected technical experts. Proposals will be evaluated on the basis of feasibility, scientific and technical merit, and whether or not they meet component objectives, policies as defined in the management plan. Only research that complies with the management plan and the established research priorities will be permitted. The Reserve staff may also submit grant applications to funding agencies to request funds for research projects.

**D. Plan Review and Modification**

The management plan for the Reserve will be reviewed and updated annually by the Division of Coastal Management staff in consultation with the Local Advisory Committee. This 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 of the Reserve.

**E. Existing State and Local Regulations/Jurisdictions Affecting Permuda Island**

**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 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. Management of the Coastal Reserve shall "...be carried out in coordination with National Estuarine Research Reserve System."

3. **North Carolina Coastal Reserve Rules (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 the four Estuarine Reserve components plus two other sites (Permuda Island and Buxton Woods). The Reserve Use Requirements (T15: 070.0200) specify general management standards within the component boundaries.

4. **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 Department of Environment, Health and Natural Resources. 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 the majority of a given component consists of 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.

5. Division of Marine Fisheries

*This agency has the primary charge of regulating commercial and recreational taking of fish and shellfish within the state, including the reserve components. Marine Fisheries enforcement officers patrol the Reserve components as part of their jurisdictions and may assist Reserve staff with enforcement matters.*

6. Wildlife Resources Commission

*The Wildlife Resources Commission has enforcement responsibility concerning the taking of game animals (including inland fishes) and enforcement of boating regulations. Their enforcement officers also patrol the Reserve components as part of their duties.*

7. Cultural Resources

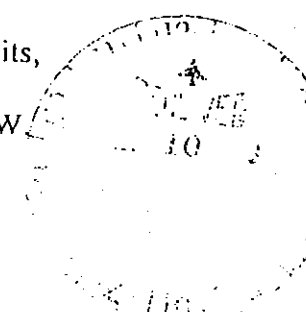
*All archaeological historic property located on or recovered from state-controlled lands is state property. Applicable statutes and regulations include: the Archaeological Resources Protection Act (G.S., Article 2; NCAC T07: 04R .0700) and portions of the Archives and History Act dealing with responsibilities 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.*

8. Land Use and Zoning

*Permuda Island is currently zoned R-8 (single family/duplex) by Onslow County. The land use plan classifies the area as "conservation."*

9. Outstanding Resource Waters

*The Stump Sound area including Permuda Island has been designated as an Outstanding Resource Water (ORW) according to N.C. Division of Environmental Management regulations (T15A: 02B.0216 [e]). These regulations specify various means (e.g., low density development, non-discharge permits, no dredge or fill in shellfish/submerged aquatic vegetation areas) to maintain and protect the water quality of this ORW*



**F. Research/Monitoring Objectives and Policies**

Two 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 provide new information on coastal processes to decisionmakers as a basis for the promotion of sound 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 to be carried out in the Reserve;
- establish procedures for permitting and monitoring research activities; and
- establish procedures for disseminating research results.

To properly manage coastal resources, a better understanding of the complex interrelationships and functions of the ecosystems 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 and 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 long-term usefulness 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 Permuda Island as an undisturbed research site will be maintained. This requirement is of primary importance and will be the basis of all decisionmaking*

*establishing the 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 island.

**Policy:** *Research and monitoring will be encouraged when it addresses a needed research priority. The order of general research priorities are as follows:*

- (a) Baseline measurements of estuarine chemical, physical, biological, and ecological characteristics;
- (b) Monitoring changes in these characteristics over various time frames; and
- (c) Research to help 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.

**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 and will be restored to its original condition.*

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.

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

North Carolina's coastal fisheries regulations require a scientific collecting permit from the Director of the Division of Marine Fisheries for anyone wishing to take any marine or estuarine species which is out of season or otherwise protected. For other 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. The National Marine Fisheries Service requires permits for studies related to endangered or threatened marine fishes and mammals.

**Policy:** *A research permit must be issued by the Reserve Research Specialist before initiation of 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. The agency must notify the Specialist either by telephone or in writing and will submit an annual summary of the activity and the results of the studies to the Reserve Coordinator for inclusion in the annual report and for review by the Local Advisory Committee.

Proposals received by the Research Specialist will be screened by the Reserve staff and peer-reviewed by selected technical experts. 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 technical project reports, project progress reports, and related abstracts to the Research Specialist for the program files.*

The abstract and copy of the project report or other publication shall be kept with the Reserve Program files along with the research proposal and progress report(s).

#### **G. Educational Objectives and Policies**

The educational goal of the North Carolina Coastal Reserve is:

- To provide a focal point for educational activities that increase the public's awareness and understanding of coastal ecosystems, the effects of man on them and the importance of coastal ecosystems to the state and the nation.

To accomplish this goal, the management plan contains the following educational objectives:

- establish procedures for developing and supporting educational programs at the site;
- establish procedures for coordinating educational activities; and
- establish procedures for transferring scientific information generated from the Reserve Research Program into non-technical terms for 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. 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 public schools, the North Carolina Aquariums, the North Carolina Maritime Museum, the Sea Grant Program, colleges and universities, museums and other educational organizations.

**Policy:** *Off-site educational programs will be provided in conjunction with the DCM, North Carolina Aquariums, the North Carolina*

*Maritime Museum, the public schools, 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., those of the Aquariums, Maritime Museum, U.N.C. 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 can 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 Permuda Island will be arranged for supervised groups.*

Because of the highly significant archaeological resources on the island, tours will be offered only to special groups upon request. Each group shall be carefully supervised by a leader who will be responsible for seeing the artifacts and natural integrity at the island are not disturbed.

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 equipment design, protocol and raw data. The Reserve Coordinator 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 archaeologically 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 and archaeological features of Permuda Island. Consultation with the Division of Archives and History will be performed to delineate sensitive archaeological areas.



The map will be distributed to participating institutions and will be updated according to the research proposals approved by the Research Specialist in consultation with the selected peer reviewers. Baseline studies and aerial surveys will be needed to determine the areas best suited for public access. Until the map is developed, the Reserve Coordinator will work closely with educators to ensure protection of habitats and artifacts.

**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. Rules and regulations will be clearly outlined so that visitors will be familiar with the Reserve's management policies. Signs indicating that the area is a state-owned Coastal Reserve will be placed at access points.

**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 and data, 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 island is located in the town of North Topsail Shores, officials and other interested residents of the town will be a primary target of this information.

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

The Reserve Coordinator 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 Activities**

Research and educational programs at the North Carolina Coastal Reserve take place within the context of a number of traditional uses of the Permuda Island area. The management plan recognizes the value of these uses and strives to maintain a harmonious balance between them and research and educational activities. In particular, the waters of Stump Sound have traditionally been used for commercial seafood harvest as well as

sport fishing. The research/educational potential of the estuarine area and the archaeological relics of the island is high.

The Permuda Island Coastal Reserve can accommodate all of the concerns described above: research, education, and commercial fishing. In order for them to take place in harmony with the research and educational uses of the Reserve, however, a series of clear objectives and policies tailored to each Reserve component are needed to manage them. Through proper management, these traditional activities can continue within the Reserve and can contribute to its value as a place for learning and enjoyment.

One goal of the North Carolina Coastal Reserve is:

- To accommodate traditional commercial fishing and other uses of the Reserve as long as they do not disturb the Reserve environment and 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 historical and natural features of the area; and
- establish guidelines for fishing and hunting operations within the Reserve.

The policies governing commercial fishing and hunting allows the full range of traditional activities to continue in the Reserve. The policies are designed to ensure minimal disruption to research projects and to the plants, animals, and habitats of the Reserve.

### 1. General Use

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

Research is a priority use and must receive absolute 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. All users must pack up their own trash. All pets must be under control at all times.*

Removing and destroying vegetation can lead to serious long-term damage to the habitats found in the Reserve by promoting erosion and sedimentation. Disturbing 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. Artifacts must not be removed unless approved in writing by the Reserve Coordinator.

**Policy:** *Camping or fires are only allowed by permit on areas designated in the Reserve for research activities requiring an overnight stay.*

Restricting camping and fires protects the Reserve's delicate habitats from disturbance and destruction. Only wilderness camping (i.e. pack in/pack out) will be permitted by written permission from the Reserve Coordinator.

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

Dumping or 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.

**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 coastal ecosystems; and 2. discharge of liquids other than uncontaminated estuarine water.*

Protection of estuarine water quality via ORW designation is essential for research and commercial fishing use of Permuda Island and the surrounding estuary. 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, disturbances of the soil, mining, commercial or industrial uses, timber harvesting, ditching and draining, deposition of waste materials.*

Like the other Coastal Reserve components, Permuda Island was acquired to protect its natural features and estuarine integrity. Such special areas require strong safeguards to ensure their perpetual stewardship.

## **2. Vehicular Access**

**Policy:** *Vehicles may only use the access road after securing permission and the gate key from the Reserve Coordinator.*

Unrestricted road access to Permuda Island will not be allowed because of the potential problems with potential damage to cultural resources, vandalism, dumping of trash and poaching of oyster lease areas. The Reserve Coordinator must approve entry through the gate for the purpose of visiting the island. No vehicles will be allowed on the island unless approved in writing by the Reserve Coordinator.

## **3. Fishing and Hunting**

**Policy:** *Fishing, hunting and trapping may occur within the limits of local and state laws. Hydraulic dredging or "clam kicking" is prohibited within the Reserve boundary (see Figure 3).*

Commercial and sport fishing will be allowed to continue within the Reserve, subject to existing regulations. In order to maintain ecosystem diversity and protect the natural integrity of the site, hunting and trapping on upland portions of the site may be necessary.

Hydraulic dredging to harvest shellfish can easily destroy underwater habitats by scraping up sediments and vegetation and blanketing shellfish beds and vegetation with sediment. Hydraulic dredging is prohibited within the Reserve boundary (see Figure 3) according to existing Division of Marine Fisheries Regulations (N.C. Administrative Code, Title 15, Subchapter 3B, Section .0900 -- "Clams", Section .1000 -- "Scallops").

**Policy:** *Certain limited areas of the Reserve may be closed to commercial and recreational fishing and shellfishing to provide undisturbed sites for research and fisheries reproduction.*

Once research better documents the Reserve's submerged habitats and the species they support, certain areas may be closed to shellfishing and fishing. Such closings might benefit commercial fisheries by providing pristine nursery area and spawning areas. Similarly, a researcher might propose a project that called for an undisturbed, submerged habitat to study fish, shellfish, plants, and their ecological relationships. Authority to close certain areas of the Reserve rests in the Division of Marine Fisheries. When the Reserve Coordinator and the Local Advisory Committee find such a closing to be warranted, the Division of Coastal Management will petition the appropriate agencies to put such a closing into effect in accordance with existing regulations (for example, N.C. Administrative Code, Title 15, Subchapter 3B, Section .0111 -- "Research Sanctuaries").

## **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 staff and enforcement personnel from other state and local agencies periodically visit the site to identify and investigate possible violations of Reserve policies. The Reserve will rely heavily, but not solely, on researchers, educators, and other users of the site to report any violations and to cooperate in any investigations.*

Time and budget limitations keep the Division of Coastal Management, state and local enforcement agencies from maintaining a continuous presence at Permuda Island. Therefore, all users of the Reserve must exercise responsibility for obeying the management policies stated in this plan, for reporting any violations of the management policies, and for cooperating with the Reserve staff and state and local enforcement personnel.

**Policy:** *The Division of Coastal Management, local law enforcement agencies, the Division of Marine Fisheries, and the Wildlife Resources Commission can cooperate in enforcing Reserve policies as well as all state and local laws applying to the Reserve.*

Cooperation of state and local agencies has been and will continue to be a prime ingredient in the management of the Reserve sites. Assistance from law enforcement agencies (e.g., local police or county sheriff) will be on a request basis from the Reserve staff.

**Policy:** *At the present time, the North Carolina Coastal Reserve shall rely on volunteer efforts to maintain the quality of the Reserve. The Reserve staff will coordinate periodic litter collections using local volunteers. All users of the Reserve shall respect the litter control and habitat protection policies of the state regulations (Appendix A).*

Because the Reserve site has traditionally been treated with respect by their users and has not been subject to high levels of use, maintenance of Permuda Island does not present a difficult task. If necessary, specific memoranda of understanding between the

DCM and other agencies can be developed to provide additional site protection.

## **J. Volunteer Program**

Volunteers will have important roles at the Coastal Reserve components, particularly in the dissemination of information to the public and scheduled groups. Opinions that people create about an area are often formed by the first contact that is made. Therefore, initial contact between a Reserve volunteer and the public is very important. Because of the limited number of on-site Reserve staff (based in Wilmington and Beaufort), the presence of volunteers living near Permuda Island is also valuable from a management standpoint. Volunteers can assist Reserve staff via liaison with local officials concerning Reserve projects and management efforts.

### **1. Goals**

- To educate the local community through volunteer participation;
- To gain local community support and interaction;
- To promote public appreciation of the natural and historical/archaeological significance of the island; and
- To create a sense of responsibility for wise use of natural resources.

### **2. Proposed Program**

To solicit interested volunteers, the Reserve staff will work through the Local Advisory Committee, media, and educational institutions. For example, articles in local newspapers will notify the public about the need for volunteers.

Volunteers must be well trained to be effective and successful. Information will be available to educate volunteers about the history, archaeology and natural processes of Permuda Island. On-site training will also be provided. Sessions may be general for new volunteers, or they may cover specific topics to help expand the information available to the experienced volunteers. Instruction of volunteers may be coordinated and conducted by Reserve staff, area scientists, educators, or other knowledgeable persons.

The Reserve representative (either the Coordinator or Education Specialist) in charge of the volunteer program at the component will arrange for special events and coordinate these activities with the volunteer staff. All interested volunteers will be contacted for duty at least one week prior to the scheduled program or event. If, after commitment, the volunteer cannot make the scheduled event, they must find a replacement. The Reserve representative in charge of the volunteer program should have local replacements in emergency situations.

A volunteer list will be developed and updated yearly. This list will contain phone numbers, addresses, and areas of interest or special talents. Volunteers will take part in all aspects of site use. They may share their ideas in rule and policy making, planning, and maintenance. They will be able to reap personal satisfaction from becoming part of a team dedicated to helping and educating others while expanding their own knowledge.

## **IX. REFERENCES**

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- National Oceanic and Atmospheric Administration. 1951-1981. Annual weather station summaries for Wilmington, N.C. U.S. Weather Bureau. Asheville, N.C.
- United States Department of the Interior. 1980. Final environmental impact statement, proposed National Wildlife Refuge on the Currituck Outer Banks. U.S. Fish and Wildlife Service, Region 5. Newton Corner, Mass.





**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,

**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.*

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.*

**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) 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 Dep't of Natural & Economic Resources, 295 N.C. 683, 249 S.E.2d 402 (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 amendment, effective July 1, 1989, substituted "Environment, Health, and Natural Resources" for "Natural Resources and Community Development" 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 amendment, effective August 12, 1989, substituted "G.S. 113A-164.11" for "G.S. 164.11" in subsection (b).

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

