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DEPARTMENT OF THE INTERIOR  
ENVIRONMENTAL ASSESSMENT

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PROPOSED  
RESTRICTION OF MOTORIZED VEHICLE USE  
ON THE BEACHES OF  
PEA ISLAND NATIONAL WILDLIFE REFUGE  
NORTH CAROLINA

Prepared by:  
Region IV  
FISH AND WILDLIFE SERVICE  
U. S. Department of the Interior  
Atlanta, Georgia 30329

ENVIRONMENTAL ASSESSMENT  
PROPOSED RESTRICTION OF MOTORIZED VEHICLE USE  
ON THE BEACHES OF  
PEA ISLAND NATIONAL WILDLIFE REFUGE, NORTH CAROLINA

SUMMARY

( ) Draft

(X) Final

ENVIRONMENTAL ASSESSMENT

Department of the Interior, Fish and Wildlife Service

1. TYPE OF ACTION: (X) Administrative ( ) Legislative
2. BRIEF DESCRIPTION OF ACTION: Proposal recommends the closure of approximately 13½ miles of Pea Island National Wildlife Refuge beach to unauthorized motorized vehicle use from May 15 through September 30 each year beginning in 1976.
3. SUMMARY OF ENVIRONMENTAL IMPACT OF PROPOSED ACTION: The proposed action would result in: (1) reduced destruction of shorebirds and sea turtles nests and young, (2) reduced disturbance to feeding and resting beach wildlife, (3) reduced "dune busting" resulting in a more stabilized barrier dune system, (4) reduced conflict between ORV and other beach users, (5) displacement of ORV use to other beaches, and (6) possible minor impact on local seasonal economy.
4. ALTERNATIVES CONSIDERED: (a) No action, (b) Year-round closure, and (c) Summer closure of a portion of the beach.
5. COMMENTS HAVE BEEN REQUESTED FROM THE FOLLOWING AGENCIES:

DEPARTMENT OF THE INTERIOR

National Park Service

Bureau of Outdoor Recreation

ENVIRONMENTAL ASSESSMENT  
PROPOSED RESTRICTION OF MOTORIZED VEHICLE USE  
ON THE BEACHES OF  
PEA ISLAND NATIONAL WILDLIFE REFUGE, NORTH CAROLINA

TABLE OF CONTENTS

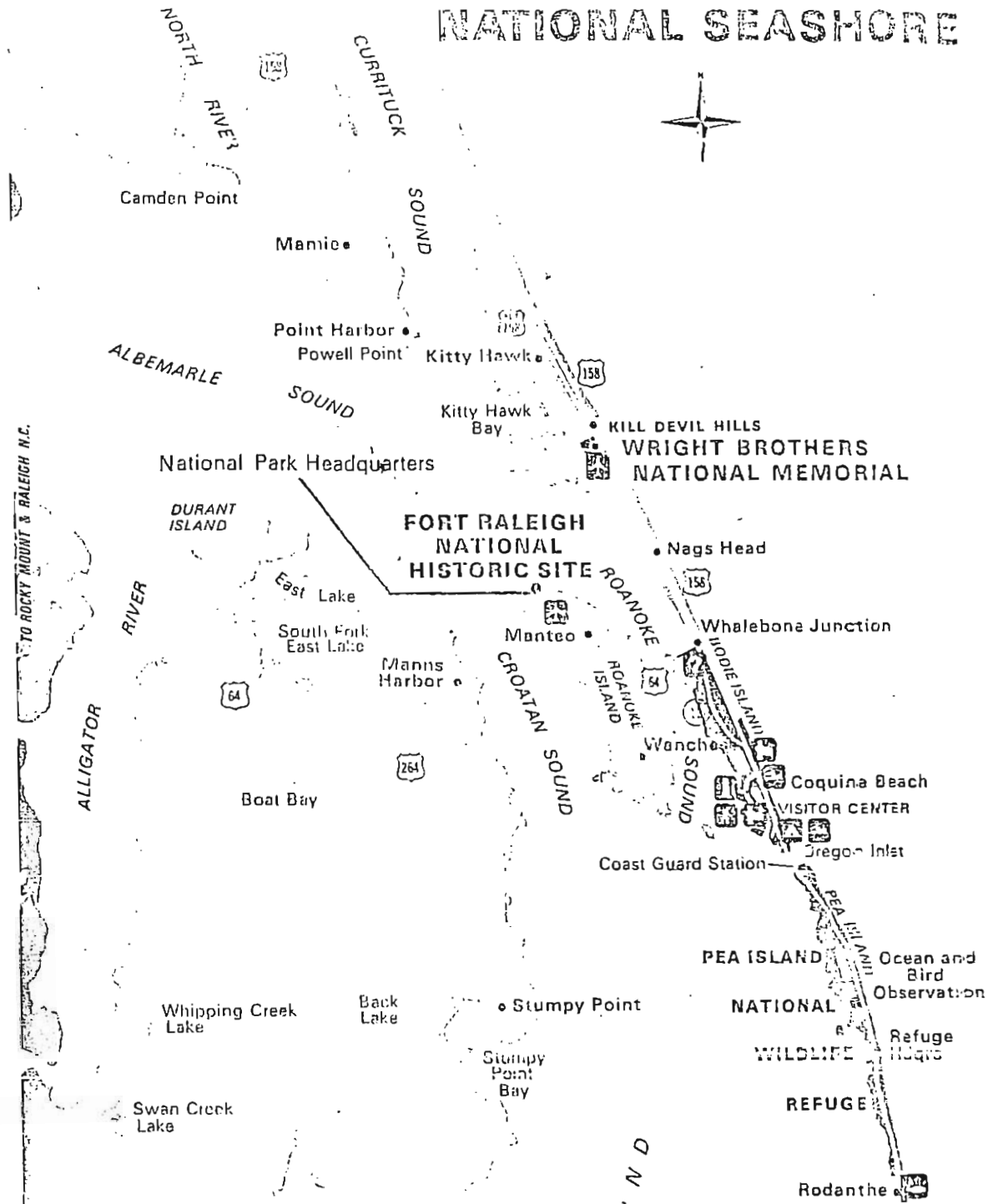
	<u>Page</u>
PROJECT LOCATION	
Map, Cape Hatteras National Seashore	i
Map, Pea Island National Wildlife Refuge	ii
I. DESCRIPTION OF THE PROPOSED ACTION	1
Refuge Objectives	4
Policies	4
Authority	5
Interrelationship with National Seashore	6
History of the Problem	6
II. DESCRIPTION OF THE ENVIRONMENT	7
Weather and Climate	8
Geomorphology	9
Soils	10
Hydrology	12
Wildlife and Habitat	14
Air Quality	19
Aesthetics	19
Noise	20
Historical and Archeological Features	20
Socioeconomic Environment	20
Public Use	21
Probable Future Environment Without the Proposal	23
III. ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION	26
Impact on Wildlife	26
Impact on Barrier Dunes	27
Impact on Public Use	28
Impact on Aesthetic, Historical and Archeological Values	29
Impact on the Economy	29
IV. MITIGATING MEASURES INCLUDED IN THE PROPOSED ACTION	29
V. UNAVOIDABLE ADVERSE IMPACTS	30
VI. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY	30

	<u>Page</u>
VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES	31
VIII. ALTERNATIVES TO THE PROPOSED ACTION	31
A. No Action	31
Impacts	31
B. Year-Round Closure	32
Impacts	32
C. Summer Closure on Portion of Refuge Beach	33
IX. CONSULTATION AND COORDINATION WITH OTHERS	33
Consultation and Coordination in Development of Proposal and Preparation of Environmental Assessment	33

#### APPENDICES

- A. Executive Order 11644
- B. Letters and News Articles Concerning the Proposal
- C. Photographs Showing Adverse Effects of ORV Use of the Beach

# NATIONAL SEASHORE





NATIONAL SEASHORE • NORTH CAROLINA

**ATTENTION FISHERMEN:**

The congressional law creating Cape Hatteras National Seashore protects the right of local, commercial, net fishermen to pursue their livelihood from the beaches within the park. At the same time, this national seashore was set aside to provide high-quality recreational experiences for all people, and sports fishing and fishermen are considered highly appropriate.

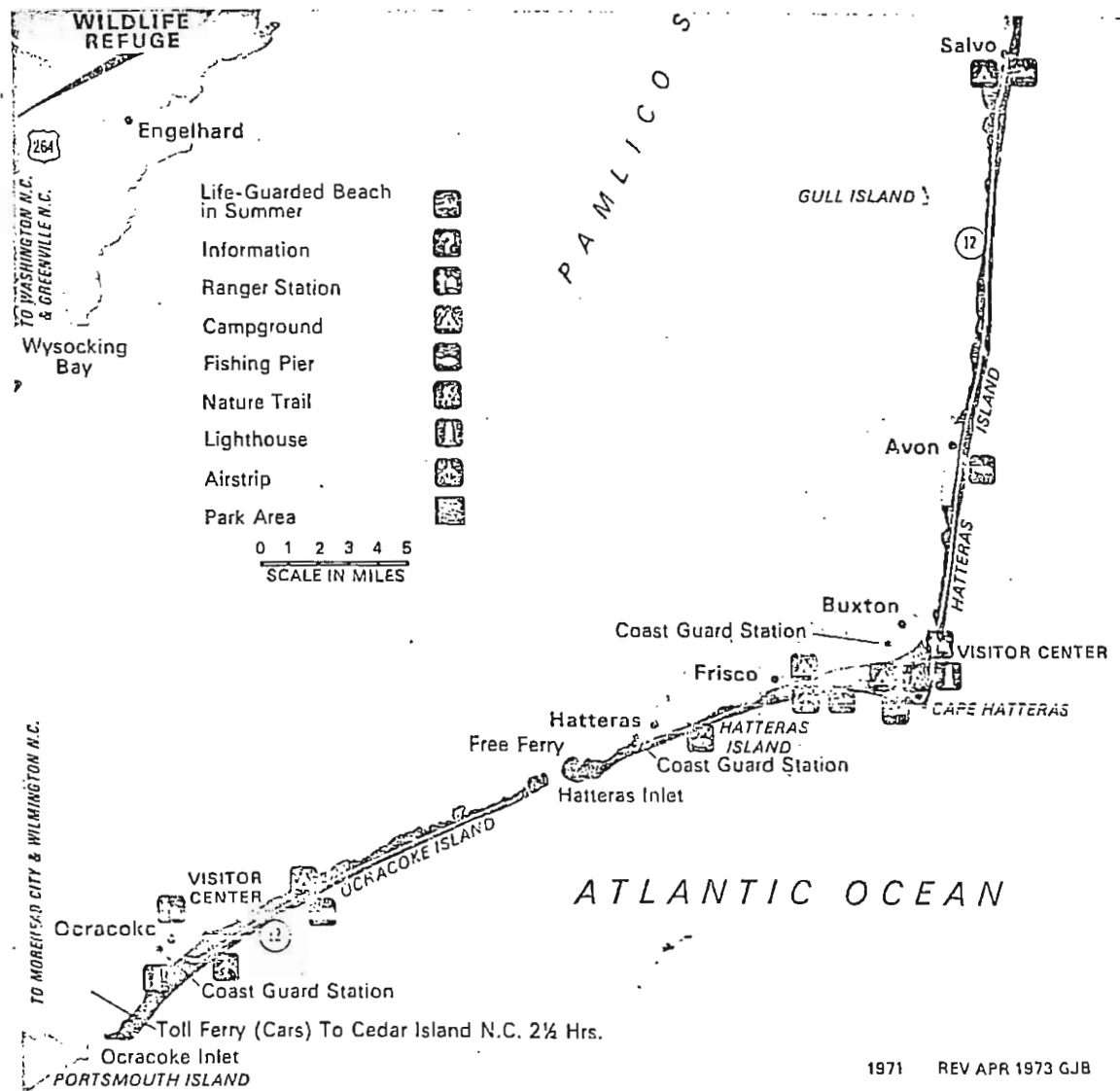
It is the sincere wish of the National Park Service that both groups use this resource harmoniously, cooperatively, and with respect for each other as well as for all park visitors.

**INFORMATION**

You can obtain information at National Park Service headquarters at Fort Raleigh and during the summer season at visitor centers near Bodie Island Lighthouse, Cape Hatteras Lighthouse, and the village of Ocracoke.

National Park Service  
U.S. DEPARTMENT OF THE INTERIOR

main elements of the Hatteras story have been



#### ACCOMMODATIONS

Meals, lodging, groceries, camping supplies, and gasoline are available in the villages on Hatteras and Ocracoke Islands, in the resorts just north of the national seashore, and on Roanoke Island and the adjacent mainland. Prices are lower after September.

A hard-surfaced road runs the length of the national seashore, except at Hatteras Inlet where a free ferry, operating in daylight hours, connects Hatteras and Ocracoke Islands. A toll ferry runs between Ocracoke and Cedar Island where a road connects with the mainland. Schedules of both ferries are subject to change, so inquire locally.

#### ADMINISTRATION

Cape Hatteras National Seashore is administered by the National Park Service, U.S. Department of the Interior. A superintendent, whose address is Box 457, Manteo, NC 27954, is in immediate charge.

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources." The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States—now and in the future.



From Whalebone Junction southward and southwestward to Ocracoke Inlet, Cape Hatteras National Seashore preserves 45 square miles of beach land. It is divided into four sections: Bodie, Hatteras, and Ocracoke Islands and Pea Island National Wildlife Refuge. Pea Island formerly was separated from Hatteras Island by New Inlet.

Eight villages are within the natural boundaries of the park. They are excluded from the national seashore with room around them for expansion as tourist centers. Congressional legislation restricts development within the national seashore to those parts especially suitable for recreational use and sets aside the remainder to preserve the plant and animal life and the shoreline.

#### PIONEERS, PIRATES, AND SEAMEN

In 1585, Roanoke Island was the scene of the short-lived first English settlement in the New World, and in 1903, on the sand flat at the base of Kill Devil Hill, the Wright brothers made the first successful flight in a powered airplane. These events, commemorated in National Park System areas near the national seashore, are just part of the diverse history of this land off the North Carolina coast.

In colonial times, Virginia and Maryland families of British descent settled these isolated sand banks. They were attracted by opportunities for raising stock on the land, but many of them soon turned to the water for a living. Since then, the main elements of the Hatteras story have been shipwrecks, pirates, lighthouses, the Life-Saving Service and its successor, the Coast Guard.

Storms and vandals have carried away most of the remains of wrecked ships, but bits still remain partly buried in the sands or submerged in the water. Blackbeard, the most notorious of the pirates on this coast, was killed near Ocracoke Island in 1718. The present Cape Hatteras Lighthouse, the third in the vicinity, was built in 1870, and is the only one open to the public. A few modern Coast Guard stations carry on the vigilance which saved many lives on this dangerous coast in past decades, including action in two World Wars.

#### FOR YOUR ENJOYMENT

On this long strip of barrier islands, the sea, the winds, and the land have contended for many human lifetimes, reshaping shore and landscape in a pattern of never-ending change.

Recreational activities at the national seashore include beachcombing, surf bathing, boating, sailing, fishing, history and nature study, bird watching, attending interpretive programs in summer, photography, watching the ocean surf, and simply loafing on the beach.

Wildflowers grow profusely in the humid climate and bloom in the spring and summer months. Other

kinds of vegetation on the Outer Banks include the mixed shrubbery of yaupon, bayberry, silverling, and gallberry, and the live oak and loblolly pine in locations like the Buxton Woods. The marsh grasses and the beach grasses used in dune stabilization interest many.

More than 300 species of birds have been recorded in Cape Hatteras National Seashore. Snow geese winter here and on Pea Island National Wildlife Refuge, as do Canada geese and all species of ducks of the North Carolina coast. Large numbers of whistling swans spend the winter on the ponds.

The waters around this national seashore provide a wide variety of sport and commercial fishing. With "fisherman's luck," which prevails here as elsewhere, in season you can catch channel bass, bluefish, marlin, dolphin, mackerel, tuna, and others. Congressional legislation protects the right of local, commercial, net fishermen to pursue their occupation from the park beaches.

#### FOR YOUR PROTECTION

When you cross the barrier dune to the sand beaches, be sure to walk—never drive—across. Park your car only in designated parking areas to avoid getting stuck in the soft sands of the road shoulder and general area. Ramps are provided only for vehicles properly equipped to drive on the soft sand.

Camp only at designated campgrounds. Tent campers should have long tent stakes for proper holding in sand. Awnings for shade and netting for insect protection will make camping more enjoyable.

For more information on the national seashore, contact the nearest National Park Service office or the nearest National Park Service ranger station. For more information on the national seashore, contact the nearest National Park Service office or the nearest National Park Service ranger station.

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Lightweight clothing in summer should be adequate to protect you from the sun and cool evening breezes. High humidity and northerly winds make winter weather seem much colder than temperatures indicate. Warm, wind-resistant garments are needed. Hurricanes occur infrequently, usually in August or September; you should be warned in time to leave low-lying places.

Sensible precautions on your part will do much to

# PEA ISLAND NATIONAL WILDLIFE REFUGE

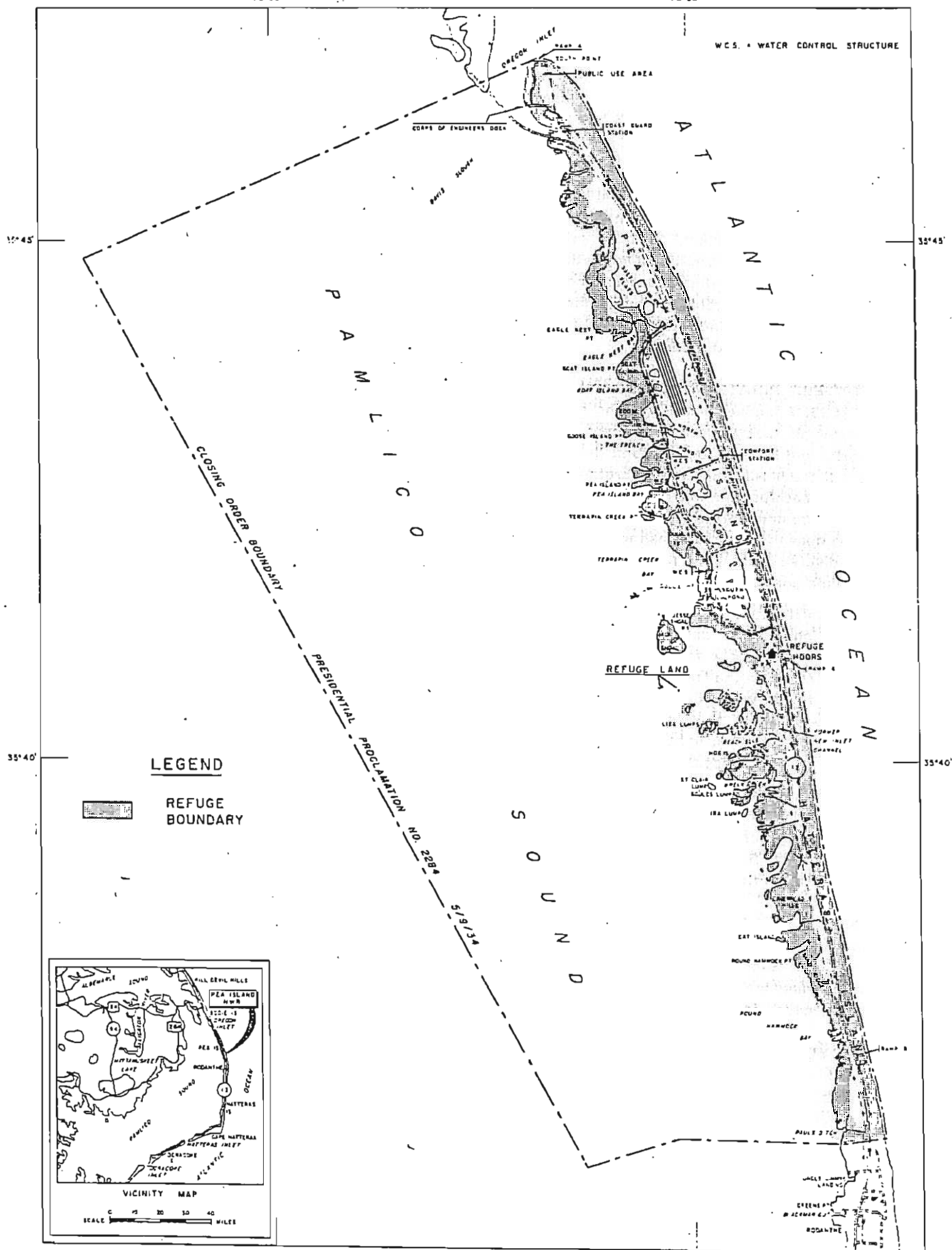
UNITED STATES  
DEPARTMENT OF THE INTERIOR

DARE COUNTY, NORTH CAROLINA

UNITED STATES  
FISH AND WILDLIFE SERVICE

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COMPILED IN THE DIVISION OF REALTY FROM  
SURVEYS BY U.S.G.S. AND AERIAL  
PHOTOGRAPHS

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MEAN  
DECLINATION  
1974

ENVIRONMENTAL ASSESSMENT  
PROPOSED RESTRICTION OF MOTORIZED VEHICLE USE  
ON THE BEACHES OF  
PEA ISLAND NATIONAL WILDLIFE REFUGE  
NORTH CAROLINA

I. DESCRIPTION OF THE PROPOSED ACTION

The U. S. Fish and Wildlife Service proposes to close approximately 13.5 miles of beach at the Pea Island National Wildlife Refuge to unauthorized motor vehicles during the period from May 15 through September 30 annually for the purpose of reducing disturbance to beach nesting birds, avoiding destruction of loggerhead sea turtle nests, reducing damage to barrier dunes and reducing conflicts with other recreational uses.

In order to initiate the proposed action, the U. S. Fish and Wildlife Service will publish in the Federal Register the following notice relating to special regulations for controlling off-road vehicles on Pea Island National Wildlife Refuge.

DEPARTMENT OF THE INTERIOR  
Fish and Wildlife Service

(50 CFR Part 26)

Notice of Proposed Rulemaking

Use of Off-Road Vehicles on Public Lands

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by the National

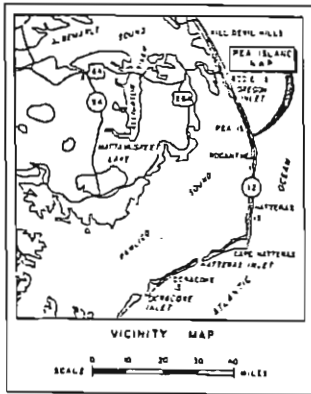
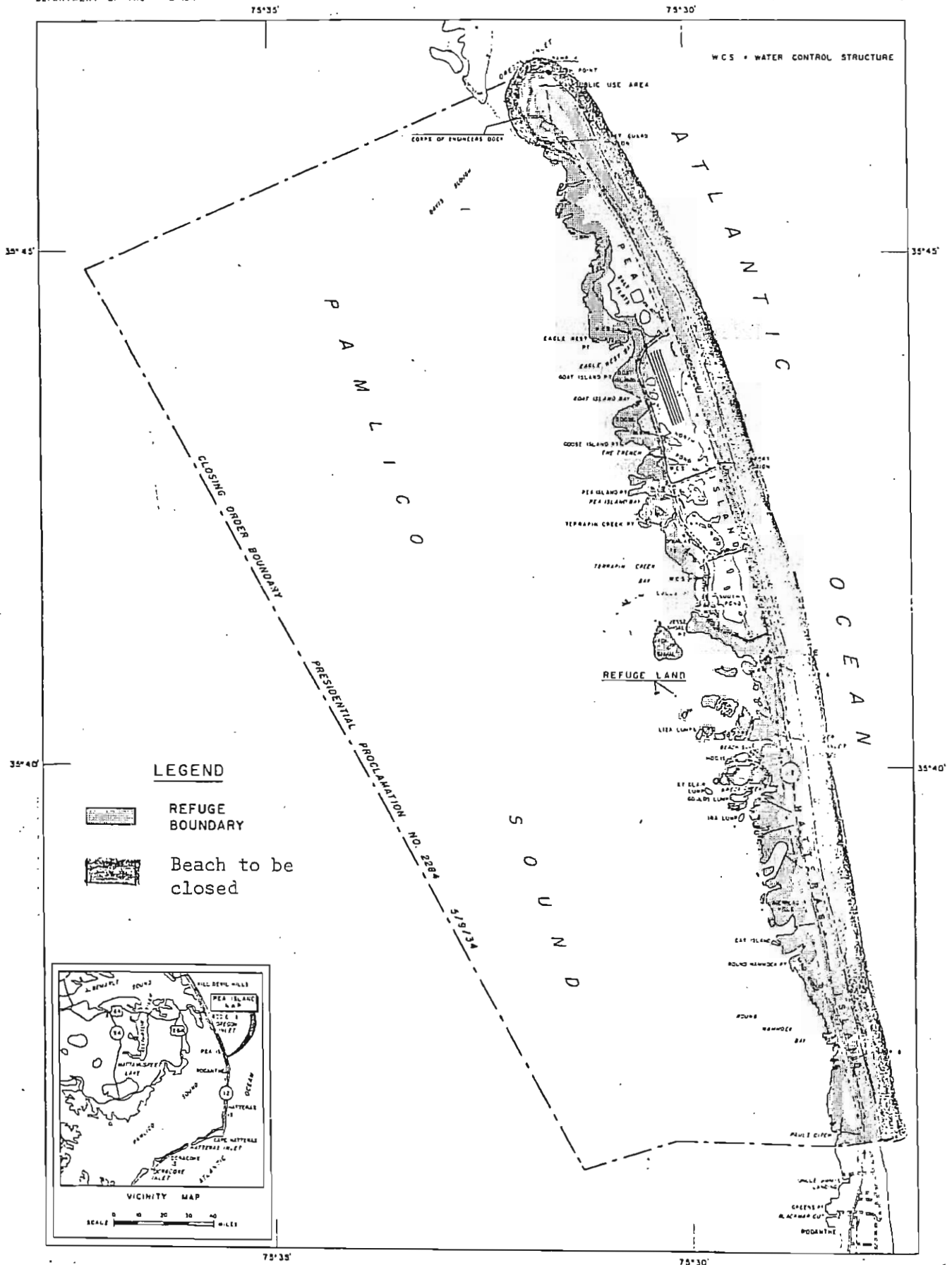
# PEA ISLAND NATIONAL WILDLIFE REFUGE

MAP #3

DARE COUNTY, NORTH CAROLINA

UNITED STATES  
DEPARTMENT OF THE INTERIOR

UNITED STATES  
FISH AND WILDLIFE SERVICE



COMPILED IN THE DIVISION OF REALTY FROM  
SURVEYS BY U.S.G.S. AND AERIAL  
PHOTOGRAPHS

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DECLINATION  
1974

Wildlife Refuge System Administration Act of 1966  
(30 Stat. 927 as amended; 16 U.S.C. 668 dd), as  
delegated to the Director, Fish and Wildlife Service  
by Chapter 2, Part 242 of the Departmental Manual,  
it is proposed to issue special regulations under  
50 CFR 26 to provide additional needed control over  
the use of off-road vehicles on the Pea Island National  
Wildlife Refuge, North Carolina.

It has been determined, in accordance with Section 3(a), Zones  
of Use, and Section 8, Monitoring of Effects and Review, of  
Executive Order 11644, Use of Off-Road Vehicles on the Public  
Lands, that special regulations are necessary to supplement the  
general regulations contained in 50 CFR 26, in order to minimize  
disturbance and destruction of nesting colonies of least terns  
and other shorebirds, avoid destruction of loggerhead sea turtle  
nests, reduce conflicts with other recreational uses and protect  
the fragile barrier dunes.

Accordingly, the following special regulations are proposed:

§ Special regulations; public access, use and recreation;  
for individual wildlife refuge areas.

#### NORTH CAROLINA

#### PEA ISLAND NATIONAL WILDLIFE REFUGE

The use of off-road vehicles on designated beach  
areas within the Pea Island National Wildlife Refuge

is permitted during specified times of the year. Additional information concerning off-road vehicle use may be obtained at the refuge headquarters located south of Oregon Inlet on State Highway 12 or by writing the Refuge Manager, P. O. Box 1026, Manteo, North Carolina 27954 or the Regional Director, U. S. Fish and Wildlife Service, 17 Executive Park Drive, N. E., Atlanta, Georgia 30329. The operation of approved off-road vehicles within the refuge shall be in accordance with all applicable Federal and State laws, subject to the following special conditions:

(1) Use Areas: Off-road vehicles may be used only on that portion of the refuge beach within 150 feet of the waters edge or, if the beach is narrower than 150 feet, only on that portion seaward of the foot (bottom) of the barrier dunes. It will be unlawful to operate a vehicle on the dunes or on other vegetated areas. During periods of extreme high tide, the beach will be closed by signs posted at cross-over ramps.

(2) Restricted Period: During the period from May 15 through September 30 each year, the entire refuge beach shall be closed to all motorized vehicles except official and emergency vehicles.

(3) Access Points: Off-road vehicles may gain access to the designated beach area during open periods of use only at the three designated dune cross-over ramps.

It is the policy of the Department of the Interior, whenever practicable, to afford the public an opportunity to participate in the rulemaking process. Accordingly, interested persons may submit written comments, suggestions or objections, with respect to the proposed regulations to the Director, Fish and Wildlife Service, Washington, D. C. 20240, within a period of 30 days.

### Background

#### Refuge Objectives

The Refuge was established April 8, 1938 by Executive Order 7864, primarily as a wintering area for greater snow geese and other waterfowl. Refuge objectives also include management of refuge lands for a full spectrum of wildlife common to the area, provision of habitat and protection for threatened and endangered species and provision of high quality fish and wildlife oriented recreation which is compatible with fish and wildlife objectives. Quantified detailed objectives for the refuge are contained in the Pea Island National Wildlife Refuge Objectives Statement dated 1971 and amended periodically to reflect Service priorities.

#### Policies

Fish and Wildlife Service policy concerning recreational uses that are not fish and wildlife oriented (such as water skiing, off-road vehicling, swimming, boating, camping, and picnicking) is that such uses must be adequately funded and they must not conflict with the area's primary objectives.

The House Appropriations Committee on Department of Interior and Related Agencies has directed the Service ". . . to continue to provide adequate recreation use where it is not inconsistent with wildlife protection."

Detailed Service policies affecting the refuge are contained in current Program Advice documents and the Region 4 Annual Work Plan Advice.

#### Authority

Pea Island National Wildlife Refuge was established under authority of the Migratory Bird Conservation Act (45 Stat. 1222) and is administered under the National Wildlife Refuge System Administration Act of 1966 (30 Stat. 927 as amended).

Executive Order 11644, Use of Off-Road Vehicles on the Public Lands was signed into law by President Richard Nixon on February 8, 1972 (Appendix A). The Executive Order furthered the purpose and policy of the National Environmental Policy Act of 1969 (42 U.S.C. 4321). The purpose of this order is to establish policies and provide for procedures that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands. The proposed action is intended to comply with the directives contained in Executive Order 11644.



### Interrelationship with National Seashore

The Migratory Bird Conservation Commission approved the purchase of lands for Pea Island National Wildlife Refuge August 20, 1935. Lands were purchased beginning in 1937, and the refuge was formally activated on April 8, 1938.

The Enabling Act of 1937 authorized the establishment of the Cape Hatteras National Seashore. The Act identified the Refuge and made it a part of the Seashore, to be managed as a wildlife refuge. Land acquisition for the Seashore began in the 1950's and it was activated in 1953. A Memorandum of Agreement between the Fish and Wildlife Service and the National Park Service relating to administration of the Pea Island National Wildlife Refuge portion of the Seashore provides for the Fish and Wildlife Service to administer the wildlife protection and management programs. The National Park Service is responsible for certain recreational activities and facilities that are compatible with the primary mission Refuge programs. The National Park Service is also responsible for constructing and maintaining the protective dune system for the entire Seashore.

### History of the Problem

In the early years access to the Refuge was by ferry across Oregon Inlet and public use was very light. In 1952, the last link of a hard surface road on the Outer Banks was completed when the 13.5 mile section from Rodanthe to Oregon Inlet was paved. Traffic

through the Refuge increased by 600% the first year following completion. Still the amount of traffic was considered light and the number of beach vehicles small. Although 4-wheel drive vehicles were becoming more popular and easier to acquire, few were used on the Pea Island beaches and there was very little adverse impact on the beach using wildlife and the environment. With the activation of Cape Hatteras National Seashore, tourist traffic increased rapidly as recreation activities and facilities were developed by the National Park Service.

In 1963, the State of North Carolina constructed a bridge across Oregon Inlet to replace the ferry. The Refuge was no longer isolated. Easy access, the booming economy of the late 60's and early 70's, and the increased popularity and availability of the 4-wheel drive vehicle, resulted in increased public use, particularly the use of off-road vehicles (ORV) on the beaches. The significant increase in ORV use resulted in increased disturbance to nesting, feeding and resting wildlife, conflicted with other recreation and education oriented beach users, and caused damage to the barrier dune system.

## II. DESCRIPTION OF THE ENVIRONMENT

Pea Island National Wildlife Refuge is located on a narrow sand island lying between the Atlantic Ocean and Pamlico Sound on the Outer Banks of North Carolina. The Refuge is comprised of 5,915 acres of barrier sand dunes, ocean beaches, salt marshes, low sand ridges, fresh water ponds, tidal creeks and bays. In addition,

25,700 acres of adjacent waters in Pamlico Sound are closed to hunting, taking, capturing, and killing of migratory birds under Presidential Proclamation No. 2284.

Uncrowded beaches, high sand dunes, and grasslands characterize the Refuge. The forces associated with wind and waves have created and maintain this environment, while the vegetation helps to stabilize the shifting sands. The marshes along the sound side of the islands contribute to the productivity of the estuarine area, and several ponds of varying salinities are found within the Refuge.

#### Weather and Climate

Pea Island has a maritime climate with an average monthly temperature of 61 degrees and a normal yearly rainfall of 55 inches. The high average rainfall is to a large extent due to heavy and prolonged rains falling in connection with offshore storms. Maximum rainfall occurs during the winter and summer, with spring and fall rain being rather light. Snowfall is rare; and when it occurs, usually light in amount, if often melts as it falls. Hail is much less frequent than at inland points in North Carolina. Summer days are cooler than the mainland with a 90 degree temperature a rarity.

Hurricanes moving up the Atlantic Coast occasionally pass offshore within a few miles of the Refuge, causing high tides and strong winds over the island. The vegetation of the area shows the effect of frequent gales. Two general categories of storms strike the Outer Banks region of North Carolina: tropical storms (hurricanes) and extratropical storms (commonly called northeasters).

On the average a hurricane strikes the North Carolina coast once every two years. Of the hurricanes which have struck the Outer Banks since 1900, over three-fourths have occurred during the months of August and September. An average of 34 extratropical storms hit the Outer Banks each year.

#### Geomorphology

In general aspect, the barrier islands are long, narrow islands standing only a few feet above sea level. Pea Island varies in width from  $1/4$  to  $1-1/4$  miles and is separated from the mainland by a shallow sound almost 28 miles wide.

The beach on the ocean side of the Refuge is bordered by an almost continuous ridge of sand, the crest of which stands as much as 20 feet above sea level. This ridge, which serves to prevent overwash of the banks from the ocean during storms, is partly of natural origin, having been formed by storm waves and wind, and partly manmade. West of the beach ridge, the island generally consists of sand flats up to a thousand feet wide that slope gently toward the sounds. The elevation of these flats ranges from about 3 or 4 feet to about 10 feet above sea level. Along the sound the islands are bordered almost continuously by salt marshes. The marshes and the sand flats are subject to periodic storm surge overwash from the sound, particularly those areas standing less than 5 feet above mean sea level. Scattered along the banks, and particularly adjacent to the salt marshes, are isolated, irregular sand ridges, some of which reach altitudes up to 10 feet.

Pea Island, now part of Hatteras Island, is part of "The Coastal Plain" which comprises the low and partially submerged area confined between the Piedmont Plateau on the west and Continental Shelf on the east.

A series of marine deposits originating from several cycles of uplift and submergence were laid upon the ancient rocks of the area. The source of these materials was probably adjacent portions of the Piedmont Plateau.

The fluctuations in sea level can be correlated with the Pleistocene glacial and interglacial stages during which great quantities of water were alternately withdrawn and returned to the ocean by the freezing and melting of the continental icecap. This development is still going on, and at present sea level is rising.

Along the emergent coast of North Carolina with its gentle sloping shore covered by Pleistocene sand, barrier beaches have been formed under the action of waves and currents in geologically recent time. These islands were formed during the post-Wisconsin rise in sea level some 5,000 years ago and are a complex deposit of sand, perhaps as thick as 50 feet in places, resting on the older Pamlico Terrace surface.

### Soils

The sediments composing the Outer Banks were deposited in a marine or near-marine environment. Sand is the dominant sediment composing the barrier islands and is the chief aquifer-forming

material. Less permeable silt and clay, which act as confining beds, are generally interlayered between sand beds. Silt and clay may also be mixed with the sand forming a heterogeneous bed of low permeability. The sand is generally of medium size, with medium diameters varying between about 0.3mm and 0.5mm. Shell content is usually less than 5 percent.

The soil materials appear to be composed mainly of sand-sized mineral particles admixed with sea shells and shell fragments in various stages of decomposition. The unconsolidated mineral particles are mixed also with small quantities of organic debris originating either from life in the ocean or from plant and animal remnants on the land. The specific composition of these materials varies markedly from place to place and among deposition strata. The profiles of the Outer Banks land areas are diverse. The soil profile features, however, are largely the result of deposition.

The soil materials comprising the surface beach layers are without visible genetic profile development. The upper sand layers have been continuously disturbed by wind and wave action, allowing little time for the soil-forming processes to develop genetic horizons. Some of the deposits are actually only a few days to several months old. Fertility of the Outer Banks soils is low.

The beach materials, however, exhibit typical deposition strata. A typical dune profile at the ocean side of the islands consists of a top layer of grayish wind-transported fine sand, underlain with some strata high in finely polished shell fragments. Beneath the shell strata another layer of sand is often found which is of a more yellowish color and of coarser texture than the aeolian deposits.

In areas inland from the ocean front, or which at some time had been inland, peat deposits have been formed and occupy the surface part of the soil profile. Tides and wave action are much less severe on the sound coasts than on the ocean surf.

#### Hydrology

The fresh ground-water reservoir in the area consists of a water-table aquifer which extends from the land surface to the first confining beds of silt and clay, and confined or semi-confined aquifers ranging in thickness from 10 to 50 feet and averaging about 15 feet. The water table itself averages about 3 feet above mean sea level along the narrow parts of the sea-shore, and is as high as 10 feet above mean sea level at Cape Hatteras.

Rainfall is responsible for the occurrence and maintenance of a fresh ground-water reservoir on the Outer Banks, and most of it is absorbed directly into the water-table aquifer with little or no surface runoff. Although, after the ground has become saturated during very heavy rainstorms, some runoff can be detected

in roadside ditches and in drainage canals. A small amount of fresh water occurs in a few ponds at Cape Hatteras where the water table stands above land surface in depressions; however, these usually disappear during dry periods.

The deeper confined aquifers are as much as 30 feet thick and extend below the first confining beds whose thickness ranges from about 5 to 20 feet. Exact limits of confined aquifers are difficult to define because of the gradational nature of the sediments below the water-table aquifer.

The size of the fresh water lens is continually varying, depending on the rate of recharge entering the lens and the rate of discharge from it. At the boundary between the fresh and salty water, a zone of brackish water occurs due to the mixing effect of the fresh water circulation and the tides in the adjoining ocean and sound.

Movement of fresh ground water through the system is downward and outward from the central part of the island toward the ocean and the sounds at an average rate of about one foot per day. The confining beds of silt and clay underlying the water-table aquifer generally restrict the major part of the circulation of fresh water to this aquifer. However, in the higher and wider island areas, such as at Cape Hatteras and the southern part of Bodie Island, there is sufficient head to enable fresh water to circulate through the confining beds into the deeper confined aquifers. The maximum depth to which fresh water occurs along the seashore is about 120



feet below land surface in the central part of the island at Cape Hatteras. Below this depth the confined aquifer grades into silt and clay, restricting deeper circulation of fresh water.

#### Wildlife and Habitat

Pea Island is a midpoint in the Atlantic Flyway and is a much used and valuable feeding and resting area for numerous species of wintering waterfowl. Thousands of snow and Canada geese, whistling swans, coots, and more than 25 species of ducks winter on the refuge. In addition to waterfowl, large numbers of shorebirds, gulls, terns, ibises, hawks, owls and numerous species of passerine birds may be seen. The refuge also provides habitat for the endangered peregrine falcon and the brown pelican in addition to animals such as otter, mink, and nutria.

During the summer, another group of birds--royal terns, least terns, black skimmers, willets, black-necked stilts, laughing gulls, and others--are seen in smaller breeding populations. Many wading birds such as glossy ibises, snowy and great egrets, little blue, Louisiana, green and black-crowned night herons, American avocets, black-necked stilts and others are also present. Because of the refuge's location, an interesting variety of song birds are present throughout the year. There are some 265 species of birds that visit the refuge regularly with an additional 50 species of birds that are considered accidental visitors.

There are four major ecological zones on a typical barrier island in this region. These include the beach, dunes, sandflats, and tidal marshes. In addition, on several areas shrub thickets and maritime forests are developed.

The active beach occupies that portion of the island between the low- and high-tide zone. Because of the shifting substrate, the beach zone is usually devoid of plantlife. The intratidal zone is the habitat of several species of crabs and mollusks as well as the feeding and resting zone for numerous species of shore birds.

Extending inland from the active beach to the dune line is the ridge of ocean deposition known as the berm, a zone continually worked by storm tides. Dead seaweed, blown onto the berm by winds or deposited by overwashing waters, is important in forming a seedbed for plant species such as sea rocket, seaside spurge, cordgrass, and sea oats which germinate on the berm. Several species of birds, primarily terns, skimmers and oyster catchers, use the berm zone for nesting sites.

The dune area begins a variable distance back from the beach, and forms ridges parallel to the beach, protecting the land behind the dunes. The dunes serve as a nesting site for birds such as the seaside sparrow and mourning dove. Because of the very hot, dry habitat, amphibians are scarce; however, insects such as ants, ant lions, grasshoppers, spiders and dipteran pests are important links in the system. Normally beach build-up occurs

during the summer and fall months. Heaviest erosion occurs during the winter and early spring months associated with a northeaster.

The grasslands are located behind the dunes and are usually at a lower elevation than the dunes where the water table is close to the surface. The vegetation consists primarily of grasses and sedges with occasional shrubs. The grasslands are only occasionally flooded by tidal water. Either high spring tides or wind tides may flood from the soundside, while storm surge may cause flooding from the oceanside. Thus, most plant species which occur here are able to survive short periods of salt water flooding. The grasslands are bounded on the soundside by either shrub or high marsh vegetation, depending upon the frequency of salt water flooding and elevation. When the elevation behind the grasslands is lower, marsh vegetation will be present, but where the area is higher and further back from the ocean, a dense shrub zone may occur.

The grasslands are important to birds not only for feeding but also for nesting. Meadowlarks, sparrows, willets, and mourning doves often nest in the dense grasslands of the seashore. Barn swallows, marsh hawks, and nighthawks utilize the grassland for food.

Where the grasslands have been stabilized for a lengthy period of time, shrub species usually invade. Eventually, these areas may form a dense thicket of shrubs, or, if the area colonized by the shrubs is more than a meter above sea level, the climax maritime forest may develop.

In the dense shrub thickets, the ground is nearly barren of herbaceous vegetation due to the lack of light penetration through the dense canopy. Within the more open thickets, grassland vegetation or black needlerush marsh is interspersed among the shrub patches.

On higher elevations, where salt-water flooding is absent, and where salt spray is minimal due to the distance from the ocean or protection by high dunes, the maritime forest may occur.

The forest is in the climax of the successional process and is the stage following the shrub thicket. The maritime forest is composed of tree species which are relatively resistant to salt spray. However, those not protected from salty winds do suffer some damage as exhibited by their contorted shapes. Live oak is the dominant tree as it is one of the most salt-spray resistant species along the seashore. Maritime forest does not occur within the refuge.

Marshes are found on the soundsides of the islands. The rise and fall of the tides with the resulting submergence and exposure of

the vegetation is the primary factor determining the distribution of species in these marshes.

Their extent and productivity depend upon the tidal influence and salinity in the waters they adjoin. Lunar tides do not produce as great an influx here as on most east coast salt marshes. Wind tides, however, do frequently occur driving water into the marshes.

Of the 47 species of mammals that occur in the lower coastal plain of North Carolina, 17 of these plus the feral house cat are recorded for Pea Island Refuge. The land mammals do not play an important role in the energy flow within the biotic communities of the seashore and are not of great economic importance. There are 16 species of reptiles recorded for the Refuge. The marine turtles listed are all migratory with only the loggerhead present in winter. There are relatively few permanent fresh water habitats within the Refuge which produce a correspondingly small amount of amphibian species, (5).

There are no known endangered plant species in the Refuge area. There are four faunal species which are on the threatened or endangered species list: Brown pelican, Atlantic Ridley sea turtle, bald eagle, and peregrine falcon. The loggerhead sea turtle is currently being considered for threatened status.

Since the refuge was established, much development work has been undertaken to stabilize the dunes. Dikes have been built to

provide both fresh and brackish water ponds and marshes for food production. Green browse for Canada and snow geese is provided by controlled burning and yearly plantings of approximately 50 acres of ryegrass.

The impounded areas, with rain as the only source of water, have produced an abundance of food plants such as sago pondweed, widgeongrass, bulrush and spikerush. These ponds remain relatively fresh throughout the year, making the refuge attractive to a great number of waterfowl.

#### Air Quality

The primary source of air pollution within the Refuge originates from the automobile exhausts of the close to 1.25 million annual visitors. No major industries which have associated air pollution problems are located in or near the seashore.

#### Aesthetics

The Outer Banks of North Carolina, designated as America's first national seashore, have an abundant share of unspoiled aesthetic landscapes. These landscapes have caught the eyes and ears not only of the artist and poet but also of the millions of visitors the area has had since its inception. The natural vista of surf, sun, sand, sound, and dune combined with the wind blowing through the sea oats, the graceful flight of the laughing gulls and terns, and large flocks of wintering waterfowl and shore birds, shipwrecks and hurricanes make for a place containing diverse aesthetic values.

### Noise

Wind and waves are major sources of noise within the Refuge, both of natural origin, and to many people they represent amenities of the area. Occasional sonic booms are heard in the area from military aircraft from Norfolk, Virginia or Cherry Point, North Carolina. Automobiles are another main source of noise along the seashore, primarily from heavy highway use, but also from ORV use.

### Historical and Archeological Features

The old Oregon Inlet Coast Guard Station was recently nominated by archeologists from the State of North Carolina for listing in the National Register of Historic Places. The old Pea Island Coast Guard Station buildings, which would be historically significant according to present selection criteria, were sold in 1966 and removed from the area. One of them is now located just south of the refuge boundary at Rodanthe, North Carolina--the other is located in Salvo, North Carolina.

### Socioeconomic Environment

There are no villages or towns located within the Refuge; however, there are a number on the Outer Banks including Rodanthe, just south of the Refuge boundary, and Waves, Salvo, Avon, Buxton, Frisco, Hatteras and Ocracoke to the south. To the north are Whalebone Junction, Nags Head, Kill Devil Hills and Kitty Hawk. Manteo, on nearby Roanoke Island, is the county seat and largest town near the Refuge.

The economy of the Outer Banks is based primarily on the tourist industry and commercial fishshing.

#### Public Use

Refuge visitation has increased drastically in the last few years. In 1962, 16,000 people visited Pea Island. Completion of the Herbert C. Bonner Bridge connecting Hatteras Island (Pea Island) with Bodie Island resulted in a rapid increase in the number of visitors. In 1975, the total had risen to 1,252,184 visits. (see Table 1).



Table 1. Annual Visits to Pea Island NWR by Activity

<u>Activity</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
Self-Guided Trails	2,399	3,427	5,567	3,373	8,715
Education	25	57	138	36	149
Fishing--Salt Water	116,988	147,239	141,391	129,148	102,996
Fishing--Clams, Crabs, Oysters	1,169	1,261	1,122	1,179	1,296
Other Consumptive Uses (Shelling)	23,397	39,705	16,346	20,184	18,143
Wildlife Observation--Foot	5,849	9,424	9,493	7,635	11,420
Wildlife Observation--Auto	292,472	368,818	288,372	295,499	325,198
Wildlands Appreciation--Foot	11,698	43,906	22,182	11,817	13,002
Wildlands Appreciation--Auto	467,955	587,076	462,679	472,798	520,304
Photography	136	229	470	134	70
Camping	2,200	2,859	3,442	5,099	5,900
Picnicking	2,705	3,172	1,156	3,731	5,372
Swimming	19,041	20,620	24,846	24,017	25,271
Off-Road Vehicling	16,930	17,368	15,850	26,400	18,275
Other	<u>175,483</u>	<u>140,405</u>	<u>177,280</u>	<u>177,296</u>	<u>195,073</u>
TOTALS	1,138,447	1,387,566	1,170,334	1,178,346	1,252,184

The number of visitors to Pea Island varies considerably during the year primarily because of seasonal changes and the normal summer vacation period. In February of 1975 there were only 17,882 visitors whereas in August the number increased to over 218,407 (see Table 2).

In 1975 the number of visitors using the beaches for various recreational pursuits ranged from a low of 1,483 in March to a high of 28,489 in August. Approximately 1,600 motorized vehicles (ORV's) used the refuge beach during the proposed closed period-- (May 15 through September 30 each year). (see Table 3).

#### Probable Future Environment Without the Proposal

Without the proposal, it is reasonable to assume that off-road vehicles will continue to use the refuge beach in greater numbers annually. The success of nesting sea turtles and shore birds, gulls and terns would be expected to decrease. Damage to barrier dunes would be expected to increase, as would conflicts with other beach visitors.

Table 2. Monthly Visits to Pea Island NWR by Activity

Activity	JAN	FEB	MAR	APR	MAY	JUNE
Self-Guided Trails	40	32	73	90	234	348
Education	0	30	37	0	0	44
Fishing--Salt Water	2,048	1,610	170	7,200	8,500	10,000
Fishing--Clams, Crabs, Oysters	20	16	36	45	115	174
Other Consumptive Uses (Shelling)	204	161	369	450	2,304	3,486
Wildlife Observation--Foot	204	161	369	225	576	871
Wildlife Observation--Auto	5,121	4,026	9,245	11,268	28,807	43,573
Wildlands Appreciation--Foot	204	161	369	450	1,152	1,742
Wildlands Appreciation--Auto	8,194	6,442	14,776	18,030	46,091	69,717
Photography	3	15	10	3	0	10
Camping	48	276	718	935	596	886
Picnicking	20	16	10	45	115	174
Swimming	0	0	0	0	3,456	5,228
Off-Road Vehicling	2,790	2,520	180	1,395	800	600
Other	3,073	2,415	5,541	6,761	17,284	26,144
TOTALS	21,969	17,881	31,903	46,896	110,030	162,997

Activity

Camping

Picnicking

Swimming

(Number Vehicles)

Off-Road Vehicling

Fishing--Salt Water

Fishing--Clams, Crabs,

Other Consumptive Uses-

TOTALS

Table 3. Monthly Visits to Pea Island NWR Beach Areas by Activity for 1975

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
	48	276	718	935	596	886	914	436	559	229	101	202
	20	16	10	45	115	174	2,245	2,324	90	166	137	30
	0	0	0	0	3,456	5,228	6,735	6,973	2,879	0	0	0
	(930) 2,790	(840) 2,520	(60) 180	(465) 1,395	(267) 800	(200) 600	(200) 600	(400) 1,200	(700) 2,100	(930) 2,790	(900) 2,700	(200) 600
	2,048	1,610	170	7,200	8,500	10,000	10,000	15,000	14,500	16,633	13,710	3,625
s	20	16	36	45	115	174	224	232	95	166	137	36
ing	204	161	369	450	2,304	3,486	4,490	2,324	959	1,653	1,371	362
	5,130	4,599	1,483	10,070	15,886	20,548	35,208	28,489	21,182	21,647	18,156	4,855

### III. ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

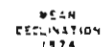
#### Impact on Wildlife

Refuge records show least tern nesting has occurred in up to four colonies on the beach totaling as many as 900 adults. During the last 20 years the number of nests has been as high as 120 in the late 1950's. In recent years the number of adult least terns using the beach area has decreased to approximately 100 to 200--nests have decreased to around 30. (Map #3 shows shore bird nesting areas on the Refuge from 1970 through 1975).

Another important beach-using species on Pea Island is the black skimmer, which peaked at 2,000 in mid-summer 1962, and has averaged 500 during the past 20 years. Skimmers peaked at only 200 in mid-summer 1975. Sandpipers, sanderlings, knots, dunlins, and turnstones peaked at approximately 11,000 in 1957 and averaged 4,300 for the past 20 years. This group has numbered no more than 3,000 for the past six years.

Loggerhead sea turtles have traditionally used Pea Island National Wildlife Refuge beaches for nesting purposes; however, accurate data on crawls and nesting is not available prior to 1970. An egg transplant and hatchling release study was begun in 1972. Since 1970, approximately 66 crawls and 24 natural nests have been found on the Refuge beach. (Map #4 shows the location of loggerhead turtle crawls on Pea Island in 1975). Since 1972, an additional 41 nests have been transplanted from Cape Romain National Wildlife Refuge resulting in 3,090 hatchlings.

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Off-road vehicle traffic on the Refuge beaches disturbs nesting colonies of terns and the loggerhead sea turtle. Occasionally young birds and turtles are killed by vehicles using the beach. Deep vehicle ruts often prevent young turtles from reaching the ocean. Continuous travel adjacent to the nesting colonies causes stress on incubating adults and non-flying young.

In summary, the proposed closure from May 15 through September 30 of the Refuge beach will have the following impacts on wildlife populations:

- (1) Vehicle disturbance of the nests and young of shore birds and turtles will be essentially eliminated.
- (2) Reduced disturbance to 46 species of feeding and resting shore birds and the endangered peregrine falcon which uses the beach area in September while on its southern migration.
- (3) Hatching loggerhead turtles will have easy access to the ocean with the elimination of deep tire furrows.

#### Impact on Barrier Dunes

The proposal will reduce vehicular intrusion into the barrier dune system during the period May 15 through September 30 annually. Dune vegetation will be protected and erosion will be reduced, resulting in greater protection from storm flooding of island habitats to the west (Pamlico Sound side) of the dune system.

## MAP #5

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75°30'



0	1050	4750	1000	1000	4000
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MEAN  
DECLINATION  
1974



### Impact on Public Use

The proposal will significantly reduce the number of vehicles using the Refuge beach. Total Refuge beach-oriented public use will be reduced by approximately 4,900 visits annually (Table 3). From 200 to 700 vehicle visits per month will be eliminated. (See Tables 2 and 3).

While the Refuge beach represents only about 19% of the total Seashore beach, closure of the Refuge beach, coupled with National Park Service closure of 14.5 miles of their beach during the summer months, represents a loss of 40% of Seashore beach for the off-road vehicle user.

Beach vehicles traditionally using the Refuge during the summer months will be displaced to other areas resulting in possible crowding and inconvenience.

Vehicle-pedestrian conflicts on the beach will be essentially eliminated resulting in a safer, more aesthetically pleasing visit.

Reduced disturbance will benefit those wishing to observe and photograph wildlife on the beach.

Litter on the beach should be reduced resulting in a more pleasing experience for visitors.

Public use of the beach will tend to concentrate at points where dune cross-over facilities are provided.

Persons desiring solitude and willing to do the necessary walking will be reasonably assured that they will be able to get away from crowded areas and will not be disturbed by vehicles.

Surf fishermen who rely upon beach vehicles to carry their equipment and gain rapid access to favored sites will be inconvenienced and may choose to fish elsewhere.

#### Impact on Aesthetic, Historical and Archeological Values

The elimination of vehicular traffic will significantly improve the natural beauty of the beach area. A deeply rutted beach will become a smooth, natural area more pleasant to look at and much easier to walk on.

There are no historical or archeological sites that will be affected by the proposed action.

#### Impact on the Economy

The proposed action is not expected to have an adverse impact on the economy of the local area. Although Refuge public use will be reduced by about 4,900 visits, this use is expected to shift to other beaches on the Outer Banks, resulting in little if any effect on the economy.

#### IV. MITIGATING MEASURES INCLUDED IN THE PROPOSED ACTION

In order to maintain an optimum level of public use, the Fish and Wildlife Service and National Park Service will jointly

develop plans for vehicle parking areas to be located adjacent to State Highway 12. These additional parking areas, along with needed walkways and dune cross-overs, will be constructed as soon as the necessary funds become available. Some destruction of vegetation and aesthetics will result from facility construction.

V. UNAVOIDABLE ADVERSE IMPACTS

Off-road vehicle enthusiasts will be forced to seek other beaches which may be more crowded because of the proposed action.

Surf-fishermen traditionally using beach vehicles will have more difficulty reaching certain favored sites and carrying equipment.

Mitigating measures (new parking and dune walk-over facilities) will destroy some vegetation and will be aesthetically displeasing.

VI. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Continued short-term use in response to demands will result in significant long-term adverse effects on the beach environment. The proposed action will enhance the environment over the long-term in that (1) shore birds and sea turtle populations will increase because of decreased disturbance and destruction of nest, young and habitat, (2) a more stable beach and dune system will occur when motorized recreational vehicles are removed from the beach and (3) reduced vehicular use on the beach will result in a safer and more aesthetically pleasing experience for the beach-using public. The proposal will enhance the long-term environmental

productivity of the area.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

None.

VIII. ALTERNATIVES TO THE PROPOSED ACTION

The alternatives to the proposed action are:

A. No Action

A No Action alternative would continue the present management of the beach. No new restrictions would be placed on beach vehicle use.

Refuge public use, though somewhat erratic, has generally been increasing over the past 5 years. (10% increase since 1971). (See Table #1). Off-road vehicle use of the Refuge beach has been more erratic in its trend than total public use, with an 8% increase since 1971. These trends would be expected to continue.

Impacts

Vehicular disturbance of wildlife would continue. Physical damage to nesting colonies of birds and to loggerhead turtle nests would continue. Vehicle ruts would continue to trap young turtles emerging from nests and seeking the water.

Damage to the upper beach and the barrier dunes would continue.

Conflicts with other beach-oriented public uses would continue.

The safety hazard to pedestrians would remain.

B. Year-round Closure

This alternative would close the entire 13.5 mile Refuge beach to off-road vehicles on a year-round basis.

Impacts

This alternative would have the same impacts identified for the proposed action with the following additions:

All impacts will be extended over the entire year.

When combined with National Park Service closures (one mile), this alternative would remove 14.5 miles of the 70 miles (21%) of National Seashore beach from use by off-road vehicles on a year-round basis.

Beach and dune protection from vehicular damage would be increased to the maximum. As a result, erosion would be reduced significantly which in turn would reduce the possibility of overwash and flooding during storms.

Conflicts between off-road vehicles and other beach users would be reduced to the minimum on a year-round basis.

Approximately 4,500 additional off-road vehicle visits (averaging three persons per vehicle per visit) would be displaced to other beaches during the October through May 14 period annually. (Tables 2 and 3).

Vehicular disturbance to migrating and wintering wildlife species on Refuge beaches will be virtually eliminated.

C. Summer Closure on Portion of Refuge Beach

This alternative would close only 12 miles of Refuge beach to ORV use during the May 15 through September 30 period annually. The northernmost 1½ miles of Refuge beach, which is under National Park Service administration (for recreation only) would remain open to beach vehicles.

This alternative would have the same impacts as the proposed action with the following exceptions:

Vehicular damage to beach and dunes would continue and perhaps increase on the 1½ mile area unaffected by the closure.

An unknown portion of current Refuge off-road vehicle use would be displaced to the 1½ mile area remaining open, resulting in crowding and increased conflicts with other beach users and wildlife.

Beach vehicle users would still have a small area in which to operate on the Pea Island Refuge during the summer months.

IX. CONSULTATION AND COORDINATION WITH OTHERS

Consultation and Coordination in Development of Proposal and Preparation of Environmental Assessment

The proposal has been coordinated with the National Park Service. Beach closure has been discussed with Cape Hatteras National Seashore personnel for several years and was the subject of a special meeting in January 1976. The National Park Service was provided copies of the initial draft of the environmental assessment for review and comment.

A copy of the initial draft assessment was provided the Bureau of Outdoor Recreation for their review and comment. (See attached).

On April 6, 1975, Pea Island National Wildlife Refuge Manager N. F. Williamson advised the North Carolina Beach Buggy Association during their quarterly meeting of tentative plans to publish in the Federal Register on April 15, 1975 or as soon as possible thereafter the Fish and Wildlife Service's intent to close 12 miles of the Pea Island beach. Manager Williamson explained the reasons for closing the beach during the period from May 15 through September 30 each year. Some of the Association members voiced opposition to the planned action.

Several letters and news articles have been received concerning the proposed action. (See appendix).

As stated in Section I of this assessment, Proposed Rulemaking procedures will be used to implement the proposal and anyone desiring to comment on the proposal will have the opportunity to do so. A public hearing will be scheduled during the comment period to obtain further input.

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