

PEA ISLAND NATIONAL WILDLIFE REFUGE

Rodanthe, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 1983

U.S. Department of the Interior  
Fish and Wildlife Service  
NATIONAL WILDLIFE REFUGE SYSTEM



Front Row: 3, 7, 5  
 Back Row: 6, 2, 9, 8, 10

Personnel

- |                       |   |
|-----------------------|---|
| 1. Albert R. Hight    | Refuge Manager, GS-11 PFT (Transferred to J. N. "Ding" Darling NWR 4/03/83) |
| 2. Mervin A. Dunaway  | Refuge Manager, GS-11 PFT (EOD 7/24/83)                                     |
| 3. James D. Browning  | Assistant Refuge Manager, GS-9 PFT (Transferred to Hillside NWR 12/11/83)   |
| 4. Charles E. Hebert  | Assistant Refuge Manager, GS-7 PFT (EOD 12/11/83)                           |
| 5. Bonnie W. Strawser | Outdoor Recreation Planner, GS-7 PFT  |
| 6. Beverly A. Midgett | Secretary (Typing), GS-4 PFT  |
| 7. Joseph B. Creef    | Maintenance Worker, WG-8 PFT  |
| 8. Angela J. Elmore   | Laborer, WG-2 PFT   |
| 9. Danny P. Deaton    | Laborer, WG-2 TFT (EOD 5/23/83 Terminated 8/12/83)                          |
| 10. Peggy A. Puett    | Recreation-Aid, GS-2 TFT (EOD 5/03/83 Terminated 9/16/83)                   |

Review and Approvals

*Mervin A. Dunaway* 3/19/84  
 Submitted by Date

*Dr. H. M. Daniel* 4-10-84  
 Regional Office Review Date



1                      4                      3

YCC Enrollees

- |    |                 |                 |
|----|-----------------|-----------------|
| 1. | Dianne O'Neal   | 6/20/83-8/12/83 |
| 2. | William Midgett | 6/20/83-7/08/83 |
| 3. | Tracy Payne     | 6/20/83-8/12/83 |
| 4. | Jimmy Bliven    | 7/18/83-8/12/83 |

## INTRODUCTION

### A. Location and General Description

Pea Island National Wildlife Refuge was established in 1938 by Executive Order 7864 as a wintering area for the greater snow goose and other migratory waterfowl. Presidential Proclamation # 2284 closed 25,700 acres of adjacent waters in the Pamlico Sound to migratory waterfowl hunting.

The Refuge is located on the north end of Hatteras Island, a coastal barrier island which is part of a chain of islands known as the "Outer Banks". These islands are separated from the mainland by a series of marshes and/or sounds which are up to 25 miles wide.

Located within the boundaries of Cape Hatteras National Seashore, Pea Island is approximately 175 miles east of Raleigh, N. C. and 225 miles southeast of Washington, D. C.

Pea Island's climate is generally moderated by the ocean, thus being cooler in the summer and warmer in the winter than the North Carolina mainland. The annual daily maximum is 69 degrees and the minimum is 56 degrees. Due to heavy and prolonged storms, the average rainfall is 55.6 inches, most of which occurs during the winter and summer. It is frequently windy during both day and night with 11 mph as the annual mean wind speed. The prevailing summer wind is from the southwest and from the northeast in the winter.

### B. Habitat

The Refuge itself contains 5,915 acres with an adjacent 25,700 acres of Proclamation Waters in Pamlico Sound. Habitat types and land uses follow:

#### Habitat Types

456 acres	Beach
518 acres	Barrier Dunes
630 acres	High Marsh and Dikes
3024 acres	Marsh (Irregularly Flooded Saltmarsh)
950 acres	Impoundments
9 acres	Pond
328 acres	Salt Flats

#### Land Use

79 acres	Right-of-way Cape Hatteras Electric Corp.
158 acres	Right-of-way N. C. Dept. of Transportation
10 acres	U. S. Coast Guard

TABLE OF CONTENTS

	<u>Page</u>
A. <u>HIGHLIGHTS</u>	1
B. <u>CLIMATIC CONDITIONS</u>	1
C. <u>LAND ACQUISITION</u>	1
1. Fee Title.....	"Nothing to Report"
2. Easements.....	"Nothing to Report"
3. Other.....	1
D. <u>PLANNING</u>	2
1. Master Plan.....	"Nothing to Report"
2. Management Plan.....	"Nothing to Report"
3. Public Participation.....	"Nothing to Report"
4. Compliance With Environmental Mandates.....	2
5. Research and Investigations.....	"Nothing to Report"
E. <u>ADMINISTRATION</u>	2
1. Personnel.....	2
2. Youth Programs.....	3
3. Other Manpower.....	"Nothing to Report"
4. Volunteer Programs.....	3
5. Funding.....	5
6. Safety.....	6
7. Technical Assistance.....	6
8. Other Items.....	"Nothing to Report"
F. <u>HABITAT MANAGEMENT</u>	7
1. General.....	7
2. Wetlands.....	9
3. Forests.....	"Nothing to Report"
4. Croplands.....	11
5. Grasslands.....	"Nothing to Report"
6. Other Habitats.....	11
7. Grazing.....	"Nothing to Report"
8. Haying.....	"Nothing to Report"
9. Fire Management.....	11
10. Pest Control.....	"Nothing to Report"
11. Water Rights.....	"Nothing to Report"
12. Wilderness and Special Areas.....	"Nothing to Report"
13. WPA Easement Monitoring.....	"Nothing to Report"

G. WILDLIFE

Page  
13

1.	Wildlife Diversity.....	13
2.	Endangered and/or Threatened Species.....	13
3.	Waterfowl.....	18
4.	Marsh and Water Birds.....	20
5.	Shorebirds, Gulls, Terns and Allied Species.....	20
6.	Raptors.....	22
7.	Other Migratory Birds.....	22
8.	Game Mammals.....	22
9.	Marine Mammals.....	"Nothing to Report"
10.	Other Resident Wildlife.....	23
11.	Fisheries Resources.....	"Nothing to Report"
12.	Wildlife Propagation and Stocking..	"Nothing to Report"
13.	Surplus Animal Disposal.....	"Nothing to Report"
14.	Scientific Collections.....	"Nothing to Report"
15.	Animal Control.....	23
16.	Marking and Banding.....	25
17.	Disease Prevention and Control.....	"Nothing to Report"

H. PUBLIC USE

26

1.	General.....	26
2.	Outdoor Classrooms - Students.....	30
3.	Outdoor Classrooms - Teachers.....	31
4.	Interpretive Foot Trails.....	32
5.	Interpretive Tour Routes.....	"Nothing to Report"
6.	Interpretive Exhibits/Demonstrations.....	32
7.	Other Interpretive Programs.....	36
8.	Hunting.....	37
9.	Fishing.....	37
10.	Trapping.....	38
11.	Wildlife Observation.....	38
12.	Other Wildlife Oriented Recreation.....	39
13.	Camping.....	"Nothing to Report"
14.	Picnicking.....	"Nothing to Report"
15.	Off-Road Vehicling.....	"Nothing to Report"
16.	Other Non-Wildlife Oriented Recreation.....	39
17.	Law Enforcement.....	40
18.	Cooperating Associations.....	"Nothing to Report"
19.	Concessions.....	"Nothing to Report"

I. EQUIPMENT AND FACILITIES

40

1.	New Construction.....	40
2.	Rehabilitation.....	43
3.	Major Maintenance.....	45
4.	Equipment Utilization and Replacement.....	46
5.	Communications Systems.....	47
6.	Energy Conservation.....	"Nothing to Report"
7.	Other.....	"Nothing to Report"

J. OTHER ITEMS

Page  
47

- 1. Cooperative Programs..... 47
- 2. Items of Interest..... 51
- 3. Credits..... 54

K. FEEDBACK

55

## A. HIGHLIGHTS

Oregon Inlet controversy still in headline. (Section J-1).

Repaving of N. C. Highway 12 was finally accomplished.  
(Section J-1).

Pea Island's first furbearer trapping program helped to control problem animals and educated elementary school students.  
(Sections H-2 and G-15).

Groundwork was laid for Pea Island Pheasant Hunt. (Section H-8).

New water level management plans for South Pond and New Field were developed. (Section F-2).

"Hawaii Five-0" star was filmed on Refuge. (Section H-1).

USFWS exhibit at "N. C. Outdoors" was visited by 40,000.  
(Section H-6).

## B. CLIMATIC CONDITIONS

The weather was relatively mild through most of 1983. On December 24-25 temperatures dropped to 9 degrees (Fahrenheit) with winds up to 30-35 mph. Pamlico Sound, as well as the impoundments and marsh, froze over. This is a relatively rare occurrence on the Outer Banks.

July 16 was the hottest day of the year with a temperature of 94 degrees (F). July recorded 5 days with temperatures above 90 degrees (F).

Precipitation totalled 56.39 inches compared to 49.55 inches in 1982. Total precipitation for 1983 was 1.34 inches above normal for the first time in recent years. January, February, and March each recorded more than 7 inches of rainfall. July (0.35 inches) and May (0.70 inches) were the driest months of 1983.

## C. LAND ACQUISITION

### 3. Other

In March, Manager Hight began the process of having 2 inholdings within the Proclamation Boundary Waters transferred to Pea Island. St. Clair Lump and part of Liza Lumps do not appear on the Dare County tax roles; therefore, the county has suggested that the USFWS make application to have ownership of these parcels transferred.

Also, Mrs. Doris Gard, deed holder of Cat Island (another inholding) has contacted the Refuge and wishes to donate the property to the USFWS. Realty is in the process of settling these transfers.

#### D. PLANNING

##### 4. Compliance with Environmental Mandates

An environmental assessment was completed in September on the proposal to construct 2 new drainage ditches and rehabilitate 5 existing ditches. The plan was proposed and implemented by the N. C. Department of Transportation. All 1983 Refuge activities and programs were in compliance with the Coastal Barrier Resources Act and other environmental mandates.

#### E. ADMINISTRATION

##### 1. Personnel

A number of personnel changes occurred at Pea Island during 1983. Both the manager and the assistant manager positions were vacated and refilled. In addition, one permanent, full-time laborer position was established and filled, and two temporary positions, a laborer and a recreational aid, filled out the staff during the summer.

Effective April 3, Manager Ron Hight was reassigned to J. N. "Ding" Darling NWR, Florida. Ron's contributions to the success of Pea Island will long be remembered and appreciated.

Alton Dunaway reported to Pea Island as the new refuge manager, effective July 24. Alton transferred from Noxubee NWR, Mississippi where he had been the primary assistant manager.

Assistant Manager Donny Browning was reassigned to Hillside NWR, and Charlie Hebert transferred from Hillside to Pea Island as the assistant manager, effective December 11.

Angela Elmore, laborer, was converted to a permanent full time TAPER appointment on April 17. This position brings the Refuge total to 6 permanent full time positions.

Danny Deaton was hired as a temporary laborer on May 23. Danny worked primarily with force account construction and as the YCC crew leader.

Peggy Puett began work on May 3 as a seasonal recreation aid (intermittent) as part of a summer intern program through the Parks, Recreation, and Conservation Department at East Carolina University. Her major responsibilities were I&R

programs. Though employed by the Refuge for much of her work time, Peggy volunteered 180 hours during her tour of duty.

A breakdown of Refuge staffing for the last six years follows:

<u>CY</u>	<u>Permanent</u>		<u>Temporary</u>
	<u>Full Time</u>	<u>Part Time</u>	
1983	6		2
1982	5		2
1981	5		1
1980	4	1	
1979	3	1	
1978	3	2	1

## 2. Youth Programs

Again during 1983, Pea Island hosted a non-residential YCC Camp consisting of 3 enrollees. Jack Hohmann, reporter for the Coastland Times, selected the enrollees by random drawing. The program began on June 20.

YCC work projects encompassed many different tasks and skills. Projects included brush removal around impoundment edges, construction of bulkheads, photo blind construction, minor building maintenance, painting trim on headquarters buildings, and brush removal along trails and around observation decks and boundary signs. Special projects included posting a least tern nesting area, assisting with loggerhead sea turtle nest relocation and assisting in royal and sandwich tern banding.

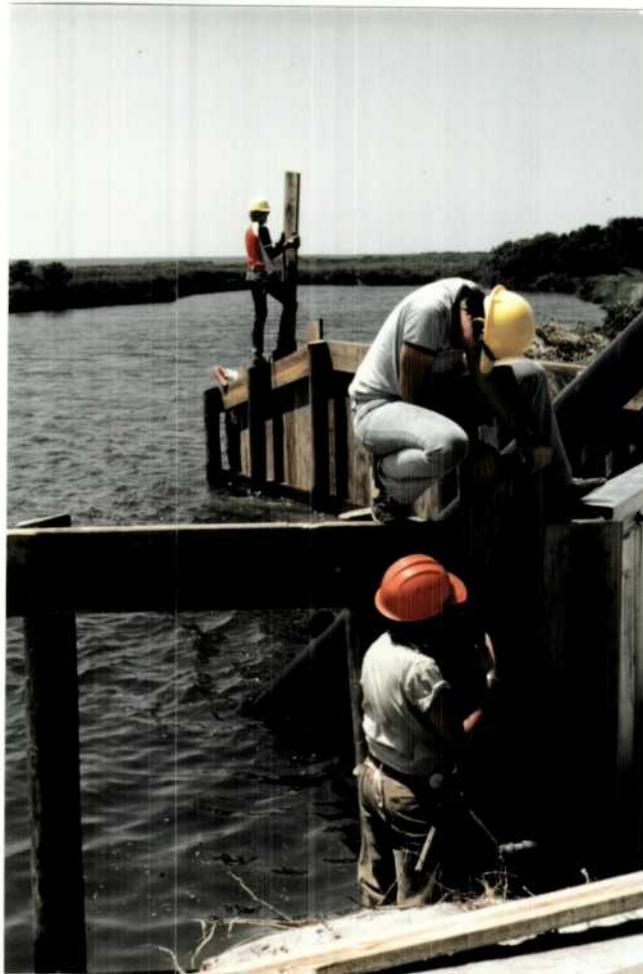
No specific environmental awareness programs were established for YCC; however, the enrollees learned a great deal about their surrounding environment through talks before and during work details and through the work itself. Helping with the sea turtle project and tern banding also were highlights of the camp. The enrollees visited Pungo NWR for a Refuge tour and, in turn, hosted Pungo's YCC Camp for a tour of Pea Island. (See photo of YCC at work on next page).

## 4. Volunteer Programs

Of Pea Island's 19 volunteers during 1983, only 3 volunteered time on a regular basis. Others participated in single activities which required extra man-power.

Pat Clayton, resident of Kill Devil Hills, N. C. conducted public use surveys regularly through the spring and early summer. Pat averaged 8-16 hours each month.

Peggy Puett, student at East Carolina University, was employed as a recreational aid during the summer and fall; however, Peggy's position was intermittent. She volunteered 180



YCC enrollees and Laborer Elmore installing bulkhead wings at South Pond pump. 7/83 BWS

hours during her tour of duty at Pea Island. Most of her time was spent with I&R programs and facility development.

During the winter months, Cliff Kevill, VIP (Volunteer In Park) with Cape Hatteras National Seashore, volunteered one day each week to work on the Refuge. Cliff participated primarily in the waterfowl banding effort. His volunteer work will continue into 1984.

A major project involving volunteers during 1983 was National Hunting and Fishing Day. Fourteen volunteers assisted with NHF Day activities ranging from running the youth fishing contest to showing films all afternoon. A total of 77 volunteer hours were spent directing NHF Day activities.

## 5. Funding

Pea Island's base funding for 1983 was \$159,500. Unlike previous years, Endangered Species (1400) received no funding during this year. All activities including endangered species were funded through Mammal and Non-Migratory Birds (1220) or Migratory Birds (1210).

The Refuge expended its Force Account Job Order monies carried over from FY 82 to install a 30" water pump in South Pond. An add-on allowed for the replacement of a storm damaged vehicle. The vehicle should arrive in April or May, 1984.

Jobs Bill monies of \$65,000 were allocated for repaving and expansion of the headquarters parking lot. In addition, right turn, deceleration lanes were constructed on N. C. Highway 12 at the headquarters building to allow for the safe entrance to and exit from the parking area.



New headquarters parking lot will accommodate 26 vehicles and still have room for Refuge use. An interpretive Kiosk will be added to the island in the center. Note right turn, deceleration lanes on N. C. Highway 12, also. 12/83 BWS

A breakdown of funding history follows:

	Migratory Birds <u>1210</u>	I&R <u>1240</u>	Endangered Species <u>1400</u>	Mammals & Non-Migratory Birds <u>1220</u>	1994	Fiscal Year Total
FY 83	124,000 (8,000)*** (65,000)****	31,000	0	2,000	2,500	159,500 (8,000) (65,000)
FY 82 (after cut)	123,000 (83,000)*	23,000	1,100	2,000	4,331	153,431 (83,000)
FY 81	100,000 (60,000)*	19,000	1,100	0	1,800	121,900 (60,000)
FY 80	100,000 (60,000)*	19,000	1,100	0	0	120,100 (60,000)
FY 79	77,000 (367,000)**	16,000	1,000	0	0	94,000 (367,000)

\* BLHP - Force Account Job Order to improve water management.

\*\* BLHP - Contract to replace bulkhead in New Field impoundment.  
Contract not awarded.

\*\*\* Storm Damage - Replace vehicle.

\*\*\*\* Jobs Bill - Rehab headquarters parking lot.

## 6. Safety

The Refuge experienced another year without a lost-time accident. The last lost-time accident occurred in 1959 -- 177,051 safe hours ago.

Regular safety meetings were held with major topics being personal fitness, hurricane and emergency preparedness, fire and use of fire equipment, driving safety, and wildlife related diseases. Maintenance Worker Bruce Creef and Rec-Aid Peggy Puett successfully completed a defensive driving course at Mattamuskeet NWR on August 4. An 8 hour American Heart Association CPR course was conducted on October 25 for Refuge staff by ORP Strawser. All staff members were certified. (See photo next page).

On August 8, Ken Cooper, Regional Office, conducted a safety inspection of the Refuge. Several safety hazards were found and discussed. Steps have been taken to correct the deficiencies listed in the inspection report.

## 7. Technical Assistance

ORP Strawser conducted a training program for the Dare County Rescue Squads on May 25. The training involved the identification of hazardous wildlife in the area.



All staff members certify in CPR annually.  
10/83 JDB

On November 9, Assistant Manager Browning, ORP Strawser, and Special Agents Curtis and Sommers conducted a 6 hour training session for Cape Hatteras National Seashore. The workshop was requested by the NPS to train rangers in waterfowl ID and techniques on safe hunter checks.

#### F. HABITAT MANAGEMENT

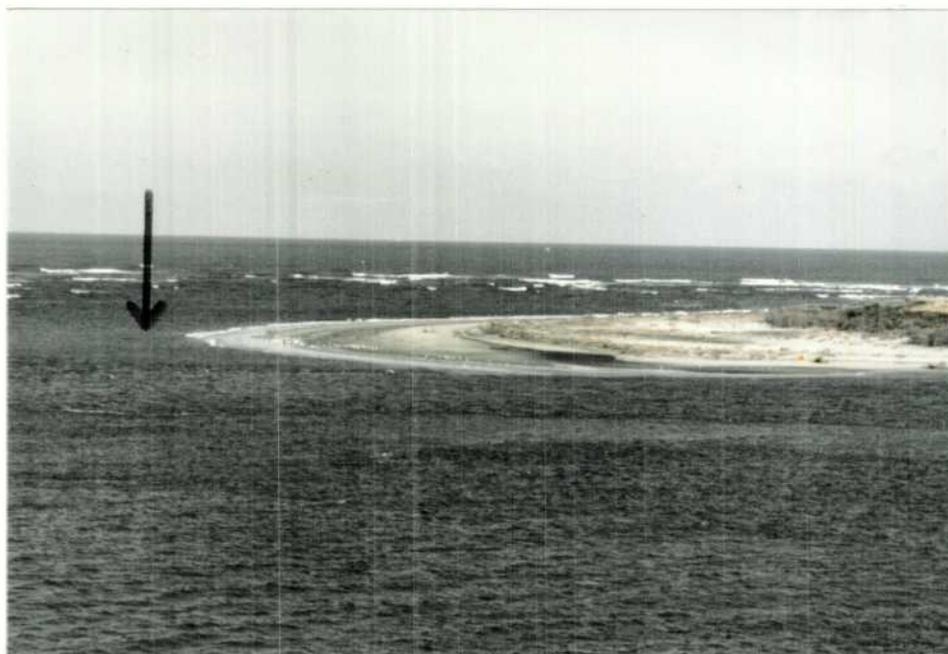
##### 1. General

Pea Island, according to all legal documents, is comprised of 5,915 acres of barrier island and 25,700 acres of Proclamation Waters in Pamlico Sound. The last survey revealed the habitat types on the Refuge included 456 acres of beach, 518 acres of barrier dunes, 630 acres of brush land, 3,024 acres of irregularly flooded salt marshes, 328 acres of salt flats, three brackish water impoundments totalling 950 acres, and one nine acre fresh water pond.

It must be noted, however, that the acreage of beach and barrier dunes has changed since the survey. Several intense northeast storms have hit the area within the past several years and caused moderate to severe erosion along the beach and dunes. The exact acreage lost has not been calculated.



North Point at Oregon Inlet during October storm in 1982. Note position of dune line. 10/82 ARH



North Point at Oregon Inlet at end of 1983.  
Arrow shows where dune line was in above photo.  
12/83 Staff

## 2. Wetlands

Refuge wetlands consist of irregularly flooded salt marsh, salt flats, impoundments, and one fresh water pond. The impoundments include North Pond (461 acres), New Field (266 acres), and South Pond (223 acres).

The 30" pump that was installed at North Pond in 1981 proved its value again this year. Over 200 hours of pumping barely managed to keep ahead of evaporation during dry summer months. As a result of pumping, muskgrasses (Chara spp.) dominated the vegetation present. Good stands of dwarf spikerush occurred on exposed mud flats; sago pondweed and wigeongrass disappeared from North Pond this year. This could be attributed to lower water levels in 1983. Hopefully, holding more water in 1984 will increase production of these two waterfowl food plants.

Water levels in New Field impoundment were maintained by rainfall and by opening the flap gate water control structure during high sound tides. As much water as possible was held in New Field throughout 1983. Even with the summer drought, New Field had excellent wigeongrass production. As the water level dropped, moist soil plants such as dwarf spikerush, wild millet, water hyssop and panic grasses were established.

Currently, there is no means of adding water to New Field except by opening the tidal flap gates during high sound tides. This limits management capability. Possible solutions were discussed among staff members and with East Coast Biologist, Otto Florschutz. These included installing a gravity flow structure to divert water from North Pond or installing a pump unit at New Field. Since the existing water control structure is rapidly deteriorating, some action will need to be taken in the not too distant future.

A 30" pump was installed in South Pond this year. The new pump will provide additional water and make South Pond a more productive unit. In addition, a good lesson in moist soil management was learned when South Pond was dewatered in the spring to install the new pump. The gradual and total drawdown resulted in excellent stands of emergent waterfowl food plants. Water hyssop (Bacopa), panic grasses (Panicum), dwarf spikerush (Eleocharis) and wild millet (Echinochloa) comprised two-thirds of the vegetation. (See Table 1). Production of such good emergent waterfowl food plants adds diversity to impoundment management on Pea Island. Recommendations for future management of South Pond include early drawdowns to encourage similar emergent food production. In general, New Field impoundment had more good submergent waterfowl food plants than North Pond, while South Pond had the best emergent waterfowl foods.

Table 1

South Pond Vegetation Transect Line Comparisons<sup>1</sup>

Plant Species	Percent Composition						
	1983	1982	1981	1980	1978	1977	1968-76
Water Hyssop	26.3	1.0	5.7	6.8	5.2	5.9	3.8
Panic Grasses* ( <u>Panicum</u> spp.)	20.6	0	0	2.3	1.4	2.5	0.1
Fleabane ( <u>Pluchea camphorata</u> )	12.6	0.2	0.5	0	0.8	1.5	tr.
Dwarf Spikerush	9.3	10.8	25.5	2.8	3.5	0	1.7
Wild Millet ( <u>Echinochloa crusgalli</u> )	6.4	1.0	0.6	0.2	0	1.9	tr.
Spikerushes	2.0	7.9	8.2	18.6	26.6	3.2	4.6
Flat Sedges ( <u>Cyperus</u> spp.)	1.3	0.4	0.6	0	0.3	0.3	tr.
Sandgrass ( <u>Triplasis purpurea</u> )	0.9	0	0	0.5	3.3	1.2	0
Three-square ( <u>Scirpus Americanus</u> )	0.4	2.1	1.4	2.8	3.5	0	0.2
Beakrush ( <u>Rhynchospora</u> sp.)	0.4	0	0	0	0	0	0
Climbing Hempweed ( <u>Mikania scandens</u> )	0.4	0.2	0	0	0	0	tr.
Muskgrasses	0	42.3	32.5	2.5	44.8	0	66.0
Sago Pondweed	0	18.5	22.3	0	0	0	6.9
Bare Ground	19.3	13.9	1.7	30.0	3.3	77.9	12.5
Totals	99.9	98.3	99.0	66.5	92.7	94.4	95.8
Plants per Point Sample	1.06	1.12	1.74	0.78	1.55	0.23	0.94

\*3 species including about one-third fall panicum (P. dichotomiflorum)

\*\*wideongrass = 33.5% not included

<sup>1</sup> adapted from 1983 Wetland Vegetation Survey Results, Otto Florschütz,  
East Coast Biologist

Wetlands in the Salt Flats are watered and dewatered by natural ebb and flow of wind and lunar tides and by rainfall and runoff. Vegetation has remained relatively unchanged for the past several years. The predominant vegetation is glasswort (Salicornia), while approximately one-half the area is bare ground.

In August, vegetation transects in the 3 impoundments and Salt Flats were completed by the Refuge staff and the East Coast Biologist. Biologist Florschutz compiled the results in a special report to the Refuge in September. Much of this discussion is based on his report.

#### 4. Croplands

Approximately 30 acres of fescue were planted for goose browse in New Field. The field was fertilized with 10-10-10 at a rate of 1,000 pounds per acre (very sandy soil) about 2 weeks before planting. It was broadcast seeded at the rate of 100 pounds per acre, then disked lightly. This combination, along with favorable weather, resulted in the best stand of winter browse ever produced. It looked great when the geese arrived but had almost disappeared by year's end in New Field.

#### 6. Other Habitats

The areas of ocean beach, barrier dunes, and high sand ridges (brushland) are not subject to active management. Other measures such as signing and patrol are taken to prevent vehicle trespass, camping, fires, and subsequent damages.

A dune erosion study was initiated in 1982 to document losses to the dune line from wave and wind erosion. The study indicates that severe winter storms cause the greatest amount of damage to the dune line. In the period January through March 1983, 381 feet of Refuge land disappeared from the northeast point of Pea Island at Oregon Inlet.

#### 9. Fire Management

Two wildfires occurred on the Refuge during 1983. A small fire was detected along Highway 12 on August 15. The fire was extinguished after 1/10 acre had burned. A passing motorist apparently started the fire.

A second wildfire occurred on September 27 on the south end of the Refuge near the S-curves. The fire was caused by a broken power line and burned approximately 50 acres. The burn occurred in an area of heavy wax myrtle and was effective in killing much of the woody vegetation. Part of the area was disked by year's end to encourage more desirable vegetation to become established. A similar burned area was treated in this manner last year and was heavily used by snow geese this winter.



Hot wildfire burned down to mineral soil. This area had been scheduled for prescribed burning later in 1983. 10/83 JDB



Refuge staff initiating prescribed burn. 1/83 JDB

G. WILDLIFE1. Wildlife Diversity

Pea Island exhibits a natural diversity of habitat types. Habitat management practices such as prescribed burning, disking, brush removal, and green browse plantings also serve to diversify habitat and thus enhance wildlife diversity. Pea Island exhibits a rich diversity of mammals, birds, fish, reptiles, amphibians, mollusks, and crustaceans. This diversity is especially evident in birds with over 315 species of birds having been identified in the area. The 1983 Christmas Bird Count, which was conducted in a rain storm, identified 96 species in one day.



Snow geese in dunes along roadside--always a pleasant sight. 12/83 MAD

2. Endangered and/or Threatened Speciesa. Federally Listed Endangered and Threatened Species

Brown Pelican (Endangered). Brown pelican numbers have increased steadily over the past few years. Once considered a rare sighting in the area, they are now quite common especially during the summer and fall months. This year was no exception with pelicans being sighted during every month. Total use days (11,700), however, were down considerably from last year's record high of 20,760.

On January 15, an adult brown pelican with a broken wing was brought to the Refuge by National Park Service personnel. Refuge staff and local veterinarians cared for the bird, which eventually required a wing amputation. Arrangements were then made to transfer the pelican to Suncoast Seabird Sanctuary in Indian Shores, Florida. On January 27, it was flown to Tampa courtesy of Eastern Airlines. There, the Suncoast Seabird Sanctuary picked up the bird and transported it to its new home. News of the bird's plight and its transfer was picked up by the Associated Press and distributed nationwide.

A mid-May flight over the dredge spoil islands in Oregon Inlet revealed 3 brown pelican nests. Mike Erwin, Patuxent Wildlife Research Center, found that 2 nests had 2 chicks each, while the third nest had 2 eggs on June 14. On June 24, Refuge staff found only one nest remaining. It contained one chick and one egg. The fate of the 2 lost nests is unknown. The remaining chick fledged in mid-August. These nests were the northern most nestings ever recorded for brown pelicans.



A face only a mother could love! This brown pelican chick fledged to become the northern most record for brown pelican nesting. 7/83 BWS

Peregrine Falcon (Endangered). As in the past few years, one peregrine falcon overwintered on Pea Island in 1982-83 and was sighted several times. The first peregrine of spring migration was observed on March 22.

On August 30, Gary Henry (Endangered Species, Asheville, NC) released a rehabilitated peregrine falcon on Pea Island. The bird had been at the Knoxville Zoological Park and the University of Tennessee, College of Veterinary Medicine for 2 years prior to its release. Arrangements for the release and press coverage were made by Refuge staff. The event was witnessed by USFWS personnel, Refuge visitors, and press representatives and received "front page" status in a number of regional newspapers. The falcon was recaptured on the Refuge on September 8. The bird was able to fly short distances but had lost 40 percent of its body weight. Emaciated and dehydrated, the peregrine was treated at the Refuge with instructions from the Knoxville Zoological Park and Endangered Species personnel. Despite all the efforts to revive it, the falcon died on September 10 and was sent to the Madison Health Laboratory for analysis.



Gary Henry, Endangered Species, preparing to release rehabilitated peregrine falcon. 9/83 BWS

The first fall migrant peregrines were sighted by Refuge staff in early September. A special use permit was issued to the Carolina Raptor Center to capture and band raptors on the Refuge through the fall. They operated a raptor banding and observation station on Pea Island for 32 days during the period September 23 to November 13, catching and banding 5 peregrines, catching 1 previously banded falcon and observing 27 other peregrines. The most peregrines sighted in 1 day was 7, on October 15.

This winter (1982-83) 1, and perhaps 2, peregrines overwintered on Pea Island. Reports of sightings indicated that 2 peregrines were present at the end of the year.

Atlantic Loggerhead Sea Turtle (Threatened). Loggerheads utilize Pea Island's beaches for nesting even though they are highly vulnerable to ocean overwash and severe erosion. A daily beach survey is performed from Memorial Day until August 31 to locate nests. Any nest found in an area subject to overwash or erosion is transferred to a protected nursery located in the dunes. Once the nests have incubated for 50 days, they are checked daily. When a nest hatches, the hatchlings are carried to the beach and released.

This year 16 nests were found on Pea Island beaches. The first nest was discovered June 18 and the last on August 6. All 16 nests were relocated to the nursery. A total of 1,255 hatchlings were produced from 1,838 eggs (68% hatch rate).

The National Park Service found 12 nests on non-refuge beaches of Cape Hatteras National Seashore that were relocated to the Pea Island hatchery. A total of 871 hatchlings were produced from 1,314 eggs (66% hatch rate).

An additional 50 turtles were hatched from 387 eggs picked up on private beaches in the area. The low hatch rate (13%) was attributed to nest tampering and delays in reporting nests to Refuge staff.

A total of 3,539 eggs were transplanted into the nursery with 2,176 hatchlings produced for an overall hatch rate of 61%. This was the best year on record for turtle hatching at Pea Island.

Several sea turtle strandings were recorded on Pea Island beaches. This year all sea turtle strandings were coordinated through the North Carolina Sea Turtle Stranding Network Coordinator. On November 2, Refuge staff transported an adult male loggerhead sea turtle to Hatteras N. C. and arranged for a local commercial fisherman to transport it out to warmer water.

On October 6, Hilda Bayliss, Education Coordinator for The Marine Resources Center, Roanoke Island, released 2 one-year-old loggerhead sea turtles on Pea Island beaches. The turtles were hatchlings from the 1982 season that the Refuge had provided to the Center for rearing and demonstration purposes.



Year old loggerhead sea turtles finally make it to the surf! These turtles hatched in the refuge hatchery in 1982 and were raised at the N. C. Marine Resources Center for public display.

10/83 BWS

b. State Listed Endangered and Threatened Species

Of the other animals that occur on the Refuge, the State of North Carolina lists 7 as threatened and 26 as species of Special Concern. Although Refuge management is not geared toward every one of these, they do benefit from present practices. The species specifically managed for are listed below:

Osprey (Special Concern). Three elevated platforms were constructed in 1981 to provide nest sites for ospreys. One platform had an active nest. Adult pair behavior indicated that young were in the nest; however, no young ospreys were ever sighted.

On August 17, a Colington resident reported an osprey wrapped in fishing line hanging from a tree. Refuge staff picked up the bird; however, it died the following day.

Least Tern (Special Concern). Least terns have nested at specific areas along the beach for many years. The primary management tool has been the exclusion of human disturbance from nesting areas. This has been accomplished by posting the nesting areas and excluding vehicular traffic on the beach.

Least terns nested in one area on the beach this year. The colony contained approximately 25 nests. The number of young produced is not known; however, several chicks and about 50 eggs were observed in the colony in June.

### 3. Waterfowl

Waterfowl populations continued to be down from previous years. The peak January populations included 1,800 tundra swans, 5,276 geese, and 11,275 ducks. Warm weather in February caused an earlier than normal migration from Pea Island. By the end of February numbers had dropped to 695 swans, 1,260 geese and 4,795 ducks. Populations continued to decline throughout March and all migrating waterfowl were gone from the Refuge by April.

In April, approximately 600 black ducks and 500 gadwalls remained on the Refuge and were assumed to be primarily breeding population ducks. The first black duck brood (10 ducklings) was observed on April 22. One black duck brood sighted during May had 15 ducklings. The estimated production on Pea Island was 350 black ducks, 225 gadwalls, and 8 mallards. As an interesting side note, 2 black duck and 1 gadwall broods were observed in the surf during one week of the summer.



Female black duck and brood out for a little body surfing in the Atlantic surf. 6/83 BWS

Fall migration began early this year with 150 teal being seen on August 1. Pintails began showing up by the end of August. Some swans arrived in September, and the first Canada geese arrived on October 11. Waterfowl populations steadily increased through November. The fall peak population came at the end of November with 32,995 waterfowl present on Pea Island.

Duck populations generally declined in December due to a warm spell early in the month. Redhead and canvasback numbers declined while black ducks increased. In early December swan numbers declined but increased by the end of the month. The number of geese increased slightly through December.

The following are the dates and peak numbers for different groups: Tundra swans peaked at 1,800 birds on January 18, snow geese peaked at 8,000 birds on December 31, and Canada geese peaked at 3,855 on December 18. The aggregate duck population peaked on November 15 at 22,190. Of these, 7,400 were pintail, 5,400 wigeon, and 1,275 black ducks. The remainder was an assortment of 14 different species. The coot population peaked at 1,310 birds on November 23. Below is a comparison of peak populations for the past five years:

<u>Year</u>	<u>Swan</u>	<u>Snow Geese</u>	<u>Canada Geese</u>	<u>Ducks</u>	<u>Coots</u>
1983	1,800	8,000	3,855	22,190	1,310
1982	1,650	8,250	4,030	15,675	1,130
1981	1,410	6,371	5,280	18,365	2,435
1980	2,900	7,900	5,800	24,400	3,500
1979	3,600	11,300	5,650	40,785	3,500

Waterfowl use days for the year totalled 2,685,179, a slight increase over 1982. Use days for snow geese, ducks, and coots increased over last year, while swan and Canada goose use declined. The following table provides a use day comparison for each group over the last five years:

<u>Year</u>	<u>Swan</u>	<u>Snow Geese</u>	<u>Canada Geese</u>	<u>Ducks</u>	<u>Coots</u>
1983	126,395	591,145	247,726	1,642,033	77,880
1982	145,577	390,095	340,045	1,519,053	56,974
1981	148,437	480,375	323,812	2,101,476	89,509
1980	150,456	444,050	295,515	1,771,105	98,789
1979	144,360	397,140	277,560	1,896,900	156,600

Minor waterfowl mortality resulted from a severe freeze on December 24-25. The impoundments, marsh, and sound froze over.

In November, Otto Florschutz (USFWS, East Coast Biologist) and Refuge staff members conducted snow goose and tundra swan productivity surveys on Pea Island. Results showed that 38.8% of all snow geese present were young of the year,

and the average snow goose family contained 3.2 young. Swan families averaged 2.1 young while 19.8% of swans at Pea Island were young of the year.

#### 4. Marsh and Water Birds

The beaches, marshes, and impoundments were heavily utilized by marsh and water birds for both feeding and nesting. A total of 1,155,338 use days were recorded for 21 species of marsh and water birds using the Refuge. Although no active management occurs exclusively for these birds, a steady increase in use days has been noticed over the past several years. It is believed that the increase is due in part to resource management practices used in other Refuge programs. For instance, there was a great increase in bird usage in South Pond when it was drained to install the new pump. The greater use may also be due to increased losses of habitat on adjacent lands. The following table shows increases in marsh and water bird use day over the past 6 years:

<u>Year</u>	<u>Use Days</u>
1983	1,155,338
1982	1,031,700
1981	1,009,075
1980	879,075
1979	584,635
1978	450,057

Numbers of marsh and water birds continued to increase through the spring. Summer and fall had the greatest diversity and number of birds.

Pea Island hosted a marsh and water bird rookery in North Pond. During a survey of the rookery in May, an estimated 250 nests were observed. Number of young produced is listed below:

<u>Species</u>	<u>Number of Young</u>
Great Egret	55
Snowy Egret	165
Tri-colored Heron	135
Little Blue Heron	90
Cattle Egret	5
Green Heron	25
Black-crowned Night Heron	40
Yellow-crowned Night Heron	15

#### 5. Shorebirds, Gulls, Terns, and Allied Species

Use days were down slightly from 1982. Total use days for 1983 were 3,826,207. Peak populations, again, occurred in mid-December. The most numerous species included 10,850 great black-backed gulls and 18,210 ring-billed gulls. The

complete draw down of South Pond this year seemed to increase the number of shorebirds using the Refuge. Over 18,000 of several species were estimated to be using South Pond in a single day in May.

Several nesting colonies of various species were observed on Pea Island. Nest counts were made, but final production estimates were not recorded. A mid-May flight over the dredge spoil islands in Oregon Inlet revealed a colony with approximately 3,000 pairs of royal terns, numerous great black-backed, herring, and laughing gulls, and some black skimmer nests.

The black skimmer colony along the Refuge beach south of headquarters was censused on August 2. It contained 82 eggs in 37 nests. Another survey at the end of the month showed most nests with skimmer chicks.



Black skimmers over nesting colony on Pea Island beach. 7/83 JDB

Mike Erwin, from Patuxent Wildlife Research Center, was on the Refuge on June 15 for a census of shorebird nests on the man-made finger islands in New Field impoundment. A total of 168 nests were observed. These consisted of 78 common tern nests, 54 gull-billed tern nests, 10 black skimmer nests, 25 black-necked stilt nests, and one caspian tern nest.

## 6. Raptors

The Carolina Raptor Center operated a banding/observation station on Pea Island for 32 days during the period September 23 to November 13. The greatest number of birds seen on any one day was on October 9, when 451 raptors were sighted. Of these, 431 were sharp-shinned hawks. Large numbers of raptors were sighted regularly up to the end of October. A total of 2,083 raptors were sighted during the 32 days of observations from their single stationary observation point.

## 7. Other Migratory Birds

The diversity of birdlife on Pea Island is so great that it is sometimes referred to as a "birders heaven". This is especially true when considering the passerines. One hundred and fifteen different species of song birds migrate through Pea Island. Though no data are kept, it is apparent that the brushy areas, especially along the impoundment dikes, are used heavily by these birds.



Avid birders flock to Pea Island for the warbler migration. Yellow-rumped warblers are here by the thousands!  
12/83 SH

## 8. Game Mammals

Rabbits are the only game mammals that occur on Pea Island. Cottontail and marsh rabbit numbers have been estimated at 1,200. They may make up the bulk of the diet for wintering raptors.

10. Other Resident Wildlife

Ring-necked pheasants are seen constantly in the salt marsh, brush land, the browse area, and in the dunes. It is estimated that the peak population during 1983 was 750 birds, with approximately 500-550 being present throughout the year. These numbers represent approximately one bird per eight acres of suitable habitat.

15. Animal Control

Muskrat and nutria continued to thrive on Pea Island. Fall populations were estimated at 5,000 muskrats and 900 nutria. Damage continued to occur on impoundment dikes and berms.



Furbearer damage on New Field impoundment dike.  
7/83 JDB

Fur trapping was opened for the first time on the Refuge in an effort to control populations and curtail the damage caused by muskrats and nutria. The trapping program started on February 1 and ended February 28. One trapper worked

South Pond and the north portion of North Pond for 13 days. A second trapper worked the entire month in New Field and in the south portion of North Pond. A total of 520 muskrats and 120 nutria were taken. Plans were made to continue the trapping program in 1984 with more strict restrictions on trapper access to the Refuge. Some problems were encountered in damage to Refuge roads by trappers.



Trapper Jimmy Berry setting 110 Conibear trap on muskrat house. 2/83 ARH



A days catch of nutria and muskrats. 2/83 ARH

16. Marking and Banding

Refuge staff were not as successful with waterfowl banding as they had been in recent past years. Warm weather dispersed ducks from the Refuge as soon as banding season started. Only the Canada goose quota was met. Banding accomplishments and quotas are presented below:

	<u># Banded</u>	<u>Quota</u>
Canada Geese	124	75
Black Duck	70	200
Mallard	26	100
Canvasback	7	50
Ring-neck Duck	1	50
Black/Mallard Hybrid	5	0
Non-quota Ducks	13	-

Pea Island participated in neck-collaring Canada geese for a special 3-year Atlantic Flyway study. A quota of 100 geese was set for the Outer Banks of North Carolina during the winter of 1983-84. Rocket net trapping was plagued by frustrations from technical problems and "tourists" scaring geese off net sites. The first successful net shot was on December 29 and resulted in 42 Canada geese being collared and banded. Hopefully, a refinement of techniques based on experiences thus far will improve capture success in 1984.



Canada geese were neck-collared and banded as part of a special study. 12/83 MAD

## H. PUBLIC USE

### 1. General

Pea Island had a total of 796,732 visitors during 1983. During the year, efforts for developing a comprehensive public use program continued, but with some change in direction. Programs from 1982 were carefully evaluated and scrutinized both for their value and cost effectiveness and for their degree of consistency with overall Service policy and direction.

In general, the decision was made to direct more effort toward developing self-guiding interpretive materials and facilities and less toward staff conducted programs. Emphasis was placed on creating more public opportunities for wildlife observation, interpretation and education, while involving less staff time.

Another point of emphasis for 1983 was the continuing evaluation of public use reporting on Pea Island. Public use figures were closely scrutinized and formulas and methods of estimating public use were revised.

The Refuge purchased several traffic counters to enable more accurate estimates of participation in refuge activities and use of Refuge facilities. In July, a pedestrian counter was installed at the overlook on North Pond Interpretive Trail. Figures to date have consistently been double the numbers reported by the old formula.

Vehicle traffic counters were not installed during 1983 due to large-scale paving projects. The two parking areas (North VCP area and Headquarters area) and the entire length of N. C. Highway 12 through the Refuge were scheduled to be repaved. Most of the repaving was completed late in 1983. Installation of the 3 vehicle counters is scheduled for early 1984.

Until the vehicle traffic counters are installed, overall public use figures will continue to be based almost totally on NPS figures from their counter on Bodie Island. The Refuge counters are expected to provide a much more realistic estimate of Refuge use.

To aid in accurate reporting of visitor participation in various sub-activities a public use survey was designed and conducted throughout much of 1983. The survey attempts to categorize visitor activities so that a seasonal formula may be established to better estimate visitor activity on the Refuge. The surveys were conducted primarily by Refuge volunteers. Results of the summer survey are contained in Table 2. The survey will be continued through 1984, as staff time allows and as volunteers are available.

Table 2

## Public Use Survey Results Summer, 1983

---

# Vehicle Surveyed	193
Ave. # People/Vehicle	2.58
Ave. Freq. Visits/Yr.	4.92

---

<u>Activity or Use of Facility</u>	<u>% of Surveyed Visitors Who Used Facilities or Participated in Activity</u>
Comfort Station	23%
Interp. Trail	7%
Overlook	10%
Wildlife Photography	16%
Wildlife Observation-Foot	24%
Wildlife Observation-Vehicle	42%
Headquarters/Visitor Info	9%
Fishing	49%
Clamming/Oystering/Crabbing	8%
Shelling/Beachcombing	30%
Swimming/Sunbathing/Surfing	30%
Picnicking	25%
Outdoor Classrooms	3%
Interpretive Programs	2%
Boating	3%

Note should be made that no vehicles were stopped on N. C. Highway 12; therefore, percentages apply only to people who actually stop on the Refuge.

Peggy Puett, an intern from East Carolina University (Recreational Aid GS-2) joined the Refuge staff for the summer months. Peggy's abilities were primarily utilized for I&R programs; however, she also provided man-power for Refuge maintenance and biological projects. This internship, as others with ECU, provided the intern with valuable work experience and university credits, while providing the Refuge with the much needed help for summer interpretive programs. Much of Peggy's time was volunteered.

Also during the year, Refuge staff responded to approximately 7,950 public inquiries. News releases were sent out or interviews arranged for 31 Refuge events or activities. Again this year, WOBR, a local radio station, did special "spots" on various Refuge programs.



The release of a rehabilitated 2 year old peregrine falcon on August 30, 1983 was an exciting event for media and amateur photographers. Publicizing such events gives Pea Island local and regional visibility.

8/83 BWS

No new pamphlets were completed during the year. The North Pond Interpretive Trail Guide is still pending editing and approval. Information was collected throughout 1983 for a revision of the Refuge bird list. As in previous years, Refuge staff served as judges for local science fairs.

In January, Cape Hatteras National Seashore received a grant from Eastern National Monuments Inc. to publish a 12 page tabloid newspaper to inform park visitors of recreational opportunities available on the Outer Banks and Roanoke Island.

Pea Island was allotted one page in the paper. Though some conflicts were generated by the cooperative effort, the end product served as an effective method for dispersing Refuge information. Approximately 125,000 copies were given out to the general public during 1983. It is expected that this will be an annual publication by the National Seashore.

On January 19, the Power Rector Productions Company, under a contract with Disney Production, filmed a series of wildlife footage on the Refuge. In the filming, Manager Ron Hight talked with James McArthur (known from "Hawaii Five-0") about Refuge wildlife. The film was scheduled to be shown on the special Disney cable network during April.



"Hawaii Five-0" star filmed at Pea Island for Disney Productions. Autographs, anyone??

1/83 JDB

Gary Richmond (Northeastern N. C. Tourism) filmed on-Refuge footage in June for a tourism promotional film and, in August, Gary Ford of Southern Living Magazine visited the Refuge to photograph wildlife for an article featuring the 400th celebration of the first English settlement in America.

During 1983, major steps were taken to improve existing Refuge I&R facilities and plan for new ones. The sign system was closely evaluated. Many new informational signs were ordered. Interpretive signs for the planned Kiosks were designed and ordered.

An agreement was made with the N. C. Department of Transportation (D.O.T.) to incorporate ferry schedules and information in the Kiosk on the north end of the Refuge. In return, the D.O.T. agreed to remove the existing ferry signs, which were an eye sore on N. C. Highway 12. In addition, the D.O.T. paved the parking pull-off at the site of the proposed Kiosk. The Refuge's responsibilities were to incorporate the ferry information in the Kiosk and provide and maintain a ferry schedule dispenser at the site. By the end of 1983, the D.O.T. had completed all facets of their responsibilities. The Refuge had ordered the interpretive signs for the Kiosk and purchased the dispenser; however, the Kiosk had not been constructed nor the dispenser installed. Estimated cost to the Refuge for the ferry information inclusion was \$500. Estimated cost for paving the parking pull-off was \$5,000.

All in all; 1983 was a year for evaluating and re-directing the I&R program of Pea Island. Next year should prove to be quite eventful, producing various "self-guiding" facilities. By directing efforts toward this goal, rather than toward staff-conducted programs, the "message of the Service" will reach more people here at Pea Island than ever before.

## 2. Outdoor Classrooms - Students

As a result of the re-direction of the I&R program at Pea Island, 1983 was the phase-down year for the Dare County Cooperative Environmental Education program. All commitments were completed by the Refuge staff before the program was ended. This entailed conducting the scheduled programs in the schools throughout the 1982-83 school year.

When the 1983-84 school year began, no off-Refuge programs were scheduled, but schools were encouraged to utilize the Refuge's outdoor classrooms for environmental activities. Orientation and some assistance was offered to visiting classes from the Refuge staff; however, emphasis was placed on the teachers role as the activity leader.

During 1983, the following programs were conducted:

January - An in-school program entitled "Mammals and Their Harvest" was conducted for over 400 students in three schools. This program was a preparatory program for February Refuge field trips to explore furbearer trapping. During February, Refuge trappers Jimmy Berry and Marco Gibbs met with approximately 140 students to explain and demonstrate furbearer trapping. (See photo next page).

February - Approximately 425 Dare County students participated in an in-school program on reptiles.



Trapper Jimmy Berry captivated Manteo Elementary School 4th graders with first hand experience with furbearer trapping. There's no better way to learn! 2/83 BWS

March - National Wildlife Week was celebrated throughout the county. Displays were set up in local banks. National Wildlife Week activity packets were provided for all elementary school and science teachers. Refuge staff conducted "This is Your Land" at assemblies throughout the school system. Approximately 1,600 students attended.

April - The final in-school program was entitled "How Pea Island Meets the Needs of Wildlife". Over 400 students learned the basics of general ecology and applied this knowledge to the systems at Pea Island.

May - Over 600 students visited the refuge to study beach or sound ecology or bird life.

Approximately 3,452 AH (2,267 visits) were spent in environmental education during 1983.

### 3. Outdoor Classrooms - Teachers

Santee NWR was contacted by the South Carolina Outdoor Education Association to provide training for teachers in the use of outdoor classrooms. Santee requested that ORP Strawser come to Santee to conduct the training. The request was approved and on March 11 and 12, ORP Strawser conducted the training program entitled "How to Utilize Refuge Outdoor Classrooms" for approximately 30 South Carolina teachers.

#### 4. Interpretive Foot Trails

Approximately 26,251 visitors (52,494 AH) utilized interpretive foot trails on Pea Island during 1983.

Though much time was spent during the year planning trail heads and interpretive pamphlets, neither became a reality in 1983. It is hoped that trail heads for both North Pond Trail and New Inlet Trail will be installed before the summer of 1984.



This North Pond overlook is a favorite spot for birding! Both New Field and North Ponds are clearly observable from here. 5/83 BWS

In July, 1983, a pedestrian counter was installed at the overlook on the North Pond Interpretive Trail. Overlook users were observed to determine the relationship between the actual number of users and the number recorded by the counter. The actual count was determined to be very accurate.

Prior to the installation of the counter, trail use was estimated by a formula. After the counter was installed, the actual use of the overlook was determined to be approximately twice the use estimated by the previously used formula.

#### 6. Interpretive Exhibits/Demonstrations

A number of exhibits and demonstrations were set up by Refuge staff during 1983. On Saturday, February 12, Pea Island's first "Noah's Ark for Waterfowl" was held. This on-Refuge activity was established to more closely acquaint the general

public with waterfowl ID, migration, and banding programs. Staffs from Mattamuskeet, Pungo, and Pea Island aided in capturing a hen and drake of a number of waterfowl species for this program. Though the day was quite cold and windy, over 200 people participated.



Refuge visitors congregate and patiently wait for activities to begin at the "Noah's Ark for Waterfowl".

2/83 BWS

In March, Pea Island staff manned a booth at Dare County's "Job Fair". Approximately 900 junior high and high school students participated in the fair. This has become an annual event and does much to establish rapport between the Refuge and the community and to recruit for the Refuge YCC program.

On March 24-27, the State of North Carolina sponsored an expo entitled "N. C. Outdoors". ORP Strawser served as the USFWS exhibit coordinator for this event. The Service exhibit was planned, constructed, transported, assembled, and manned by representatives from refuges, hatcheries, Ecological Services, and Wildlife Assistance. Approximately 40,000 people visited the expo. (See photo next page).

In May, Gary Woodyard of Wayne Community College conducted a public program on the Refuge entitled "Snakes and Their Friends - Fact and Fiction". The program featured live poisonous and non-poisonous snakes, turtles, and lizards. Approximately 150 people attended. (See photo next page).



The USFWS display at the "N. C. Outdoors" expo was a fine example of team spirit and pride in the Service. Representative from refuges, hatcheries, Ecological Services and Wildlife Assistance joined together to inform over 40,000 people about the USFWS. 3/83 BWS



Nothing spellbounds an audience like a "creepy crawly". Gary Woodyard explains the fact and fiction of reptiles and amphibians. 5/83 BWS

Again in 1983, a Refuge exhibit was displayed and manned at the annual "Dare Days" celebration in Manteo during June. Peggy Puett, volunteer for the Refuge, set up and manned the display. An estimated 3,000 people attended the celebration.

Dare County's second annual National Hunting and Fishing Day celebration was co-sponsored by Pea Island and the N. C. Marine Resources Center on Roanoke Island. The morning featured a youth salt water fishing tournament with 5 piers and over 150 youths involved. The afternoon expo was held at the Marine Resources Center on Roanoke Island. Approximately 30 exhibitors/demonstrators provided taste testing (frog legs and shark), archery, black powder, skeet shooting, punt gunning, wildlife art, and more to over 1,000 participants. A poster contest was also held with winning posters being sent off for national competition.

The winning poster in the senior level competition, by Karin Johnson, a freshman at Manteo High School, won a \$50 savings bond in the nationals.



"And you should have seen the ones that got away!" Over 150 youths and 5 piers took part in the fishing contest. 9/83 MAD



Assistant Manager Donny Browning assists with a young archer. The lines for this activity seemed to never end!  
9/83 BWS

#### 7. Other Interpretive Programs

The summer of 1983 offered conducted interpretive programs similar to the previous summer. The schedule consisted of a Tuesday morning Refuge Tour, Wednesday morning Birdwalk, and Thursday morning "Children's Wildlife Discovery".



One of the most popular summer refuge programs was the "Children's Wildlife Discovery". Here Peggy Puett explains reptilian characteristics.  
7/83 BWS

Participation in the summer programs was as follows:

<u>Program</u>	<u># Conducted</u>	<u>Total # Participants</u>
Refuge Tour	12	232
Bird Walk	12	277
Children's Wildlife Discovery	12	228

In addition, the following other special programs occurred:

<u>Program</u>	<u>Group</u>	<u># Participants</u>
Beach Study & Birdwalk	Dismal Swamp Student Conservation Corps	10
Refuge Tour	Mattamuskeet YCC	8
Lead Shot	N. C. Marine Resources Center	25
Management of Pea Island	Outer Banks Audubon	30
Wildlife	Eastern Council Boy Scouts	550
Wildlife Management	N. C. State University Wildlife	20
Waterfowl Banding	Hampton Mariner's Museum	20
Refuge Objectives and Management	National Audubon Society's Expedition Institute	30
Birds of Outer Banks	Roanoke Island Garden Club	35

#### 8. Hunting

On December 8, 1983, Refuge staff met with N. C. Small Game Biologist, Carl Betsill to discuss the feasibility of conducting a managed hunt for pheasants and rabbits on Pea Island. Attitudes were positive from regional office personnel and others previously contacted; therefore, a "green light" from the State set Refuge wheels in motion. A hunt plan package was completed shortly after the meeting in December. It is hoped that prompt approval will allow a Pea Island hunt in the fall of 1984.

#### 9. Fishing

As always, surf fishing continues to be the major wildlife related recreational activity on the Refuge. Beach erosion continues, talk of jetties surrounds the refuge, dredges cut in and out of Oregon Inlet...through it all, the surf fisherman abounds.

The fall migration of blue fish was one of the best in many years along the North Carolina Coast. During 1983, 181,610 visitors (726,437 AH) participated in pedestrian surf fishing on Pea Island



Though most recreational fishing occurs in the ocean at Pea Island, some folks prefer the tranquility of the sound. 2/83 JDB

#### 10. Trapping

1983 marked the beginning of furbearer trapping on Pea Island. A managed trapping program opened 4 units for bid. The highest bidders trapped for 4 weeks, the month of February.

At Pea Island, however, trapping, though recognized as a recreational activity, was developed as a management tool to help control the ever-rising numbers of muskrat and nutria. For this reason, the trapping program is discussed in detail in Section G of this narrative report.

#### 11. Wildlife Observation

Due to the location of the road (Highway 12) through Pea Island, it is difficult for a traveler to pass without observing wildlife. On most days of the year, the quality of observation is quite high. During the fall and winter, snow geese, Canada geese, and blue geese feed on the road shoulders. Often vehicles must pause to allow the birds to move out of their paths.



The Pea Island "road gang"

12/83 MAD

During the spring and summer, cattle egrets replace snow geese as the most easily observed wildlife. Various species of raptors utilize the dunes, power line poles, and boundary sign posts for resting and hunting, thus making them clearly observable from a vehicle. During 1983, an estimated 434,327 visitors spent time in association with vehicular wildlife observation.

The North Pond Trail and other access points are associated in such a way as to make wildlife observation (on foot) easy and enjoyable. Refuge visitors spent approximately 173,379 AH participating in this activity during 1983.

12. Other Wildlife Oriented Recreation

Wildlife photography continues to be a popular activity at Pea Island. In some cases, photographers erect temporary photo blinds, but more often, the photographers are refuge wanderers. Good photographs tend to be the result of being at the right place at the right time.

During 1983, several public photo blinds were constructed and utilized. Approximately 15,874 AH (3,968 visits) were spent with photography at Pea Island last year.

16. Other Non-Wildlife Oriented Recreation

Because Pea Island is associated with the "beach scene", non-wildlife related recreational activities will always occur on the Refuge. Swimming, surfing, and sunbathing are major summer activities.

No facilities have been constructed for these uses. Approximately 756,798 AH (222,761 visits) were spent in non-wildlife oriented recreation on Pea Island in 1983.

#### 17. Law Enforcement

Law enforcement at Pea Island is geared toward protecting the resource. Week-end and week-day patrols are conducted on the Refuge and in the adjacent Proclamation Waters. The Refuge staff continues to work closely with NPS rangers, the Dare County Sheriff's Department, N. C. Wildlife Resources Commission, N. C. Marine Fisheries and the N. C. Highway Patrol.

A breakdown of cases on Pea Island made by Refuge staff during 1983 follows:

<u>Violation</u>	<u>#</u>
Hunting on refuge	2
Disturbing wildlife	2
Shooting migratory birds from motor vehicle	2
Wanton waste	2
Transporting uncased firearm on refuge	4
Driving vehicle off designated roadway	5
Disturbing violations with boat	1

At the close of 1983, Pea Island's staff contained 3 commissioned law enforcement officers. All three attended FLETC for a 1 week refresher course during 1983 and qualified with firearms semi-annually.

### I. EQUIPMENT AND FACILITIES

#### 1. New Construction

Preparations began for the construction of a visitor contact point (Kiosk) on North Carolina Highway 12 at the north end of the Refuge. Foundation clay was purchased and spread at the site. The North Carolina Department of Transportation expanded and resurfaced the existing parking area for the VCP at no charge to the Refuge. In exchange, the Refuge included ferry information in the planned Kiosk panels. D.O.T.-operated ferries run back and forth between Hatteras and Ocracoke Islands on a rather complicated schedule. Before this cooperative effort, two large ferry schedule signs (eye sores) were maintained within the highway right-of-way by the D.O.T. Turn lanes were constructed on Highway 12 at the entrance to Refuge headquarters. Costs for the lanes were shared by the Refuge and the North Carolina Department of Transportation.

A force account job order provided funds for replacement of the South Pond water control structure. The old stop-log structure was replaced with a new 30" pump. Invaluable help was received from Mattamuskeet NWR, who provided technical advice, manpower, and equipment. The new pump increases water management capabilities in South Pond considerably. By the end of 1983, the pump was in place, although not yet functional. The pump house platform was constructed, and the motor, a 175 horsepower Caterpillar 3208 Industrial Engine, was installed.



Pea Island and Mattamuskeet staff constructing bulkhead for South Pond pump prior to digging ditch for outfall pipe. 6/83 JDB



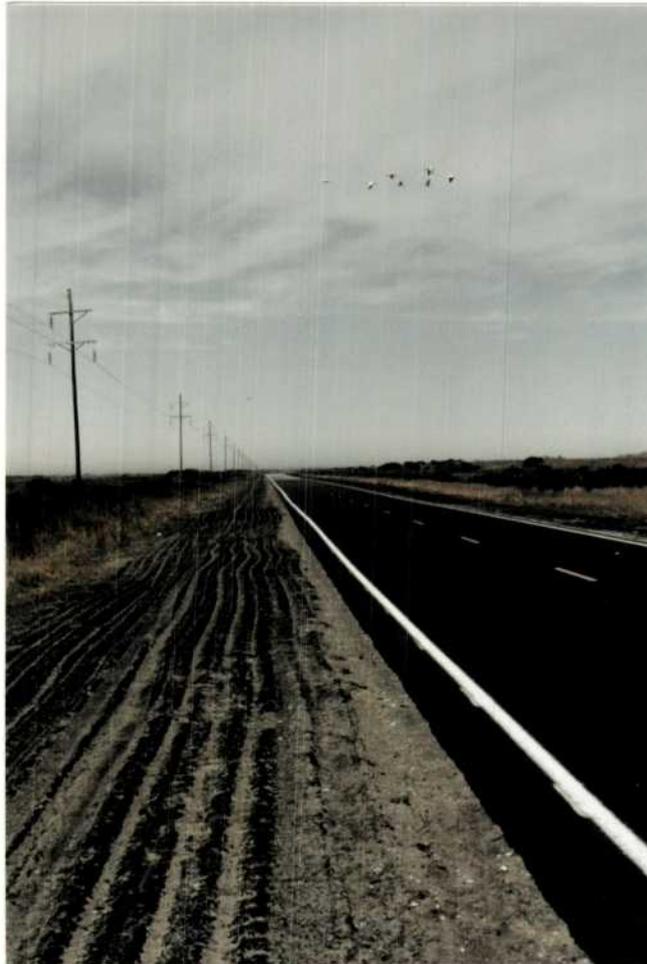
Mattamuskeet staff and dragline assisted in  
installing outfall pipe for South Pond pump.  
6/83 JDB



Diesel engine for South Pond pump loaded on Pea  
Island lowboy.  
12/83 MAD

## 2. Rehabilitation

North Carolina Department of Transportation completed the sorely needed rebuilding of Highway 12 through the Refuge in late December. The roadbed was reworked, potholes were filled, and low portions of roadbed were raised. The entire length of the highway from Oregon Inlet to Cape Hatteras was resurfaced, and the shoulders were seeded to cool season grasses.



North Carolina State Highway 12 after resurfacing.  
Deep-sand shoulders were seeded to cold weather  
grasses. 12/83 MAD



Lateral ditches designed to aid drainage from Highway 12. Seven ditches were constructed or rehabed during the year. 12/83 MAD

The Refuge headquarters parking lot was expanded from 8 parking spaces to 26 spaces. The contract for parking lot construction was awarded to Albemarle Asphalt who subcontracted the paving work to Dickerson, Inc.



During special programs or on busy days, the refuge parking area lacked enough spaces for the demand. Often vehicles had to park in the sand or block other vehicles. 2/83 BWS

The paving job on the parking lot left much to be desired. Problems included uneven joints and depressions that hold rain water. The poor paving was a result of applying the asphalt when the air temperature was too cold. The contractor has agreed to re-surface the lot next spring.



Rain water standing in depressions in new parking lot. Irregular surface was caused by laying asphalt during cold weather. The contractor is scheduled to re-surface to correct this early in 1984.

12/83 MAD

### 3. Major Maintenance

The road around the north end of South Pond was re-surfaced with clay to allow better access to the new pump site.

A sand shoal, which collected on the pond side of the North Pond pump, was removed. It is anticipated that the sand removal may be required on occasion, as pumping continues.

The D-6 Caterpillar was reconditioned during the winter months. Salt water damage occurred when the dozer became partially submerged in a marsh area while "mopping up" after a wildfire. (See pho



D-6 dozer after reconditioning. Salt water damage resulted when the dozer became stuck while disking wildfire damaged brushland.  
12/83 Staff

A turn-around area was constructed in front of the pole shed at South Pond to allow better access for heavy equipment. The area was covered with clay, then marl, and the shoulders seeded with cool season grasses.

National Park Service construction crews replaced the old restrooms at North Pond trailhead with a new, modern facility. The new building includes lights, heat, and flush toilets. The N. C. Department of Transportation added roadside parking and repaved the entrance to the existing parking lot. (See photo next page).

#### 4. Equipment Utilization and Replacement

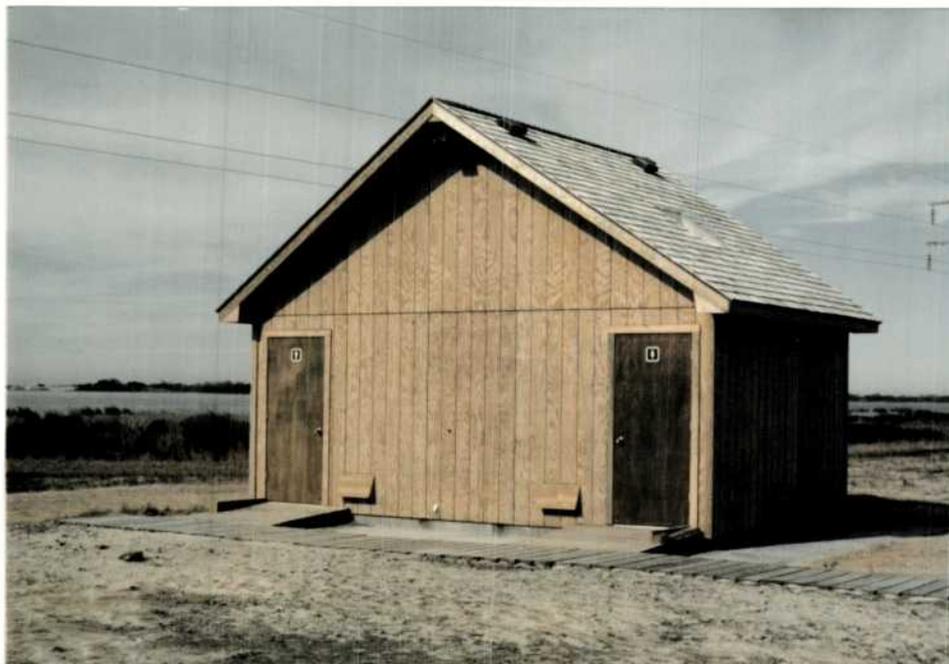
No new motor vehicles were acquired in 1983.

A new deck was installed in the Privateer boat by the manufacturer at no charge to the Refuge.

A new Yamaha 200 cc three-wheel all-terrain cycle was acquired for use on beach patrol.

A Honda Odyssey was transferred to Pea Island from Yazoo NWR.

Other items acquired included a 17 foot aluminum canoe, steam cleaner/pressure washer, and a chainsaw.



A new comfort station was constructed on Pea Island by National Park Service. Park staff also maintain this facility, which serves as a "rest stop" for countless local residents and visitors to the Outer Banks. 11/83 MAD

## 5. Communications Systems

A second line was added to the Refuge office telephone system. New telephones with hold buttons and a buzzer call system were installed at the same time.

## J. OTHER ITEMS

### 1. Cooperative Programs

- a. The Manteo (Shallowbag) Bay Project which was authorized by Congress in April of 1970 continues to draw a lot of attention. The U. S. Army Corps of Engineers applied for a permit from the Department of the Interior to construct a pair of jetties to stabilize Oregon Inlet, a navigable channel lying between Bodie Island and Hatteras Island. Land north of the inlet is a part of Cape Hatteras National Seashore. Pea Island NWR borders the inlet on the south. Initially, the project calls for \$100 million in funding and \$600 million over the 50 year life of the project. The basic design of the project as it affects the Refuge includes the construction of two rubble mound or concrete armor jetties and a sand bypass system that would require placement of dredge material on the

Refuge. The total length of the Pea Island jetty would be 8,700 feet with the shorewardmost 2,300 feet connected to the Refuge and permanently occupying 4.4 acres. During construction, another 41 acres of Refuge land would be required for sand bypassing, storage and access areas, and pipeline right-of-way. Sand bypass would include annually pumping sand from the accretion fillet behind the north jetty onto the Refuge beach. The Corps has not yet designed the sand transport system or shown that such a system will work.

The probable effects of the project were studied and a compatibility statement was prepared. The project was determined to be incompatible, and the permit request was denied.



Oregon Inlet opening into Atlantic Ocean. Note Corps of Engineers side-cast dredge in center of picture. 9/83 PAP

The Service's position has been to support the maintenance of a safe, navigable channel through Oregon Inlet by hopper dredging, a more cost-effective and environmentally acceptable alternative. In September, 1983, the Corps deployed the hopper dredge MERMENTAU, a modern shallow draft, split hull vessel with a hopper capacity of 1,300 cubic yards. Despite considerable "down time" due to the approach of winter storms, a channel approximately 300 feet wide and 20 feet deep was established. The success of the MERMENTAU is encouraging and is evidenced by increased use of the channel by fishing trawlers. Since

the termination of dredging in late December, the inlet channel has been maintained at near project dimensions by using sidecast dredges.

Legislation is currently before both the House and Senate that would transfer Interior lands needed for the jetty project to the Corps of Engineers.



The hopper-dredge MERMENTAU in Oregon Inlet. Dredge spoil is stored in the holds before being dumped off Pea Island's beaches.

9/83 PAP

- b. As discussed in Section I.2., the North Carolina Department of Transportation completed the rebuilding of Highway 12. For permission to use the New Inlet parking lot for marl storage, the Department added a top layer of marl to lot, graded the surface, and seeded and fertilized the shoulders.
- c. In December, the Department of Transportation excavated seven drainage ditches on the Refuge from N. C. Highway 12 to the edge of the sound side marsh. The work was authorized by C.O.E. Permit SAWC080-N-000-0291, N. C. Department of Natural Resources and Community Development and Coastal Resources Commission Permit No. 166-83, and a Refuge right-of-way permit issued by the Regional Director.

- d. Hal O'Connor (WO), Travis McDaniel (RO), Dave Rackley (ES, Raleigh), and Assistant Manager Browning met on-site with Coast Guard and Corps of Engineers officials at Oregon Inlet to discuss possible ways to prevent erosion of the land surrounding the Oregon Inlet Coast Guard Station. A decision on the course of action has not been made.
- e. February 20-28, oiled birds (mostly loons) were collected as they washed ashore. The oil source was a tanker wreckage offshore of Virginia. Most of the oil that washed ashore settled on Virginia's beaches; however, some oil was evident on the beaches in Currituck County. None was observed on Refuge or National Seashore beaches in North Carolina. Total strandings for the Outer Banks were loons 128, gannets 2, horned grebes 2, and common scoter 1. The N. C. Wildlife Resources assumed responsibility for clean-up, maintenance, and release of the birds.
- f. On July 20, Assistant Manager Browning met with Jim Wells of the U. S. Army Corps of Engineers to discuss pumping dredge spoil onto the islands in Oregon Inlet. An on-site investigation revealed that large numbers of young terns were still present on one of the islands. The Corps agreed to delay the dredging until the birds fledged. Dredging was resumed on August 31.
- g. Cape Hatteras Electric Membership Corporation was issued a Refuge special use permit to provide electrical service to the U. S. Army Corps of Engineers' dock facility at Oregon Inlet. The permit covers a five year period beginning in 1983 and allows the installation and maintenance of 640 feet of 34.5 Kv above-ground service line.
- h. Frank Schwartz, professor at the University of North Carolina at Chapel Hill, was issued a permit to sample fish and other fauna in the 9 acre fresh water pond near Oregon Inlet. The study was completed during the summer of 1983. No species that required special consideration were observed. (See photo next page).
- i. The Carolina Raptor Rehabilitation and Research Center, Department of Biology, University of North Carolina at Charlotte, was issued a special use permit to operate a raptor banding and observation station on Pea Island. The program was very successful and will most probably be continued next year. Results are on file at the Refuge office.
- j. A permit was also issued to the U. S. Army Corps of Engineers to conduct a beach profile study on the 5 miles of beach closest to Oregon Inlet. This study is still underway; no results have been received to date.



Only 15 feet remain between Oregon Inlet and this  
9 acre freshwater pond. 12/83 MAD

k. Again this year, Refuge staff, YCC and volunteers assisted John Weske of the Smithsonian Institute with the banding of terns on a spoil island in Oregon Inlet. Approximately 4,500 royal terns and 380 sandwich terns were banded. (See photo next page).

1. The Christmas Bird Count was conducted on December 28.

2. Items of Interest

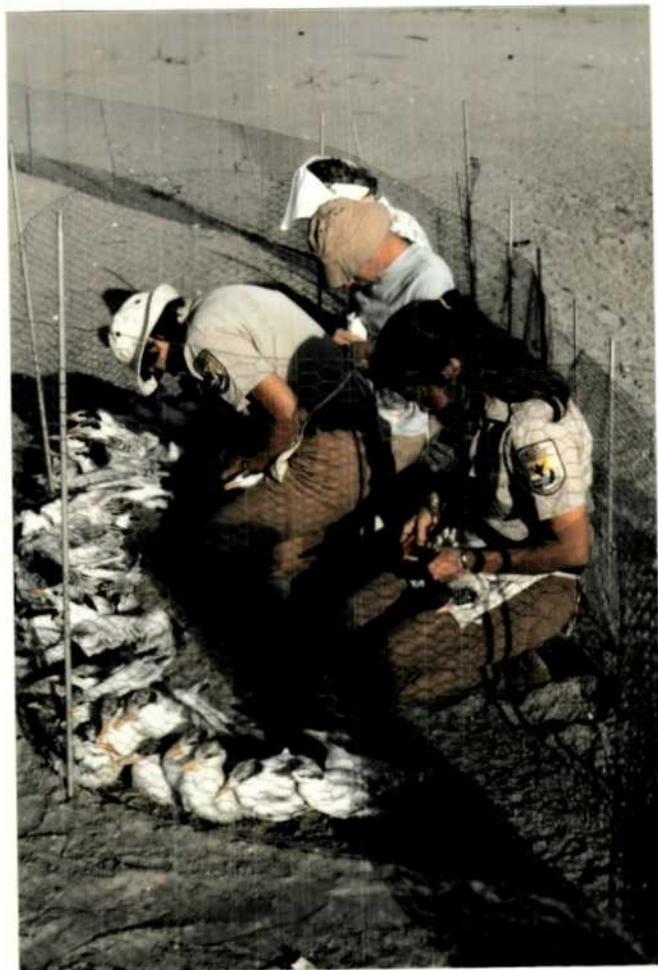
In the USFWS Annual Photo Contest, Assistant Manager Browning had 5 winning/placing color slides.

ORP Strawser won a cash award of \$50 for her safety slogan "Safety Saves Dollars...Makes Sense".

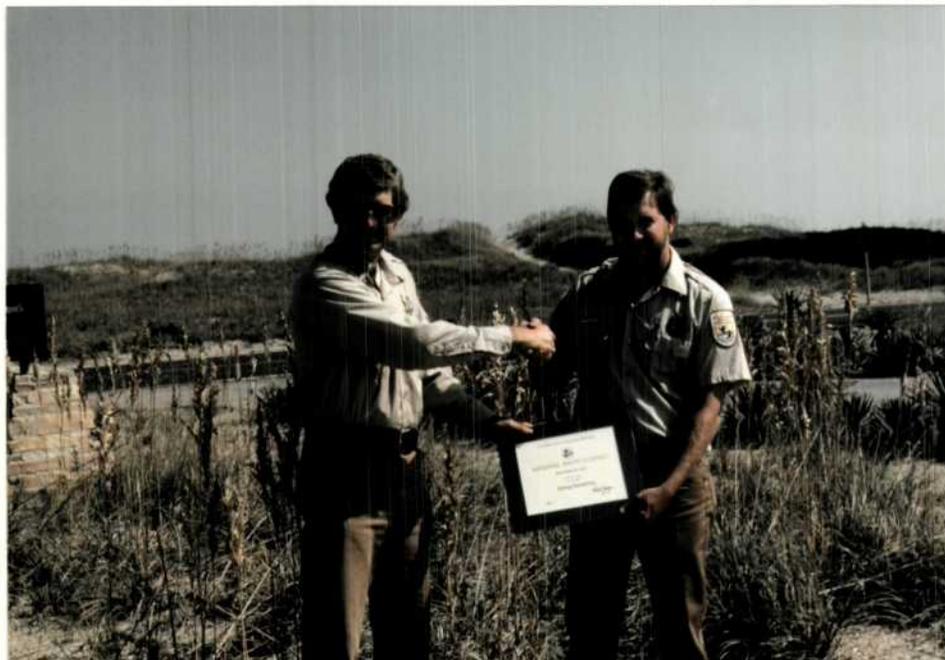
On February 21, an 80 ft. trawler ran aground at Oregon Inlet. The boat and its 30,000 lbs. of fish remained aground several days before a cooperative effort among several boats freed it. This sort of incident continues to add fuel to the jetty controversy.

The 1983 revenue sharing payment was \$78,183. This check was presented to County Commissioner Jack Cahoon in March.

On April 21 and 27, Acting Project Leader Browning and ORP Strawser attended a Coastal Wildlife Conference arranged by NPS. The conference covered sea turtles, shorebirds, marine mammals, oil spills, and cleaning oiled birds.



Refuge staff and volunteers assist Dr. Weske in  
tern banding. 6/84 JDB



Manager Dunaway congratulates Assistant Manager Browning on 5 winning color slides in the 1983 USFWS Annual Photo Contest. 11/83 BWS

On April 27 and 28, Howard Lubben (RO) visited Pea Island to conduct an administrative inspection.

During May, Virginia Hall (RO) and Les Cunningham (WO) visited the Refuge to discuss alternative energy sources for the Refuge and to evaluate the overall energy program.

Assistant Manager Browning attended an oil spill simulation exercise sponsored by the U. S. Coast Guard at Wilmington on July 12-14.

In August, the "Duke of Dare", a local charter boat, was crushed by a wave and sunk. Remains of the boat washed onto Refuge beaches shortly after. (See photo next page).

On August 1, Mike O'Bannon, USDI, Budget Planner; Ed Verburg, USFWS, Assistant Director Budget and Planning, and Phil Morgan, Regional Office, visited the Refuge to discuss reprogramming of Pea Island's BLHP funds and other aspects of the refuge's management. All seemed to be pleased with Refuge operations. The three also toured the areas proposed for acquisition in Currituck while in the area.

Refuge Division Supervisor Travis McDaniel conducted a Station Operations Inspection on August 17-19.



Remains of charter boat washed ashore on Refuge.  
 No injuries or deaths occurred when the boat  
 sank the day before. 8/83 AJE

On September 20, Manager Dunaway, Assistant Manager Browning, and ORP Strawser attended a workshop on "Oiled Birds". The workshop was held at the N. C. Marine Resources Center on Roanoke Island and was sponsored by the USFWS and the N. C. Wildlife Resources Commission.

On October 17, Ty Planz, (Refuges in WO) visited the Refuge for a first hand look at Pea Island facilities and operations.

### 3. Credits

The 1983 Annual Narrative was written by the following:

#### Section

A	Beverly Midgett, Bonnie Strawser
B	Beverly Midgett, Charlie Hebert
C&D	Bonnie Strawser
E	Charlie Hebert, Bonnie Strawser
F&G	Charlie Hebert
H	Bonnie Strawser
I	Charlie Hebert
J	Bonnie Strawser, Alton Dunaway
K	Alton Dunaway

The report was edited by Bonnie Strawser and Alton Dunaway and typed and compiled by Beverly Midgett.

K. FEEDBACK

Things were definitely on the upswing at Pea Island in 1983. The new parking lot complete with turn lanes along Highway 12, new restroom facility, new pump at South Pond, and resurfacing of Highway 12 by the N. C. Department of Transportation are but examples of progress made throughout the year. It has indeed been a pleasure to step in and work with such a fine and versatile staff. We are few in number but big in success.

Much of the groundwork has been laid for 1984, which promises to be an even greater year! Tune in next year folks.

S—March-May  
 S—June-August  
 F—September-November  
 W—December-February  
 °—nests locally

	S	S	F	W
Common Loon	c	o	c	c
Red-throated Loon	c	-	c	a
Red-necked Grebe	-	-	-	r
Horned Grebe	c	-	u	a
Pied-billed Grebe	c	o	c	a
Cory's Shearwater	-	u	u	-
Greater Shearwater	-	u	u	-
Sooty Shearwater	r	o	o	-
Audubon's Shearwater	-	u	u	-
Leach's Storm Petrel	-	r	r	-
Wilson's Storm Petrel	r	c	c	-
Brown Pelican	r	u	u	r
Gannet	c	r	c	a
Double-crested Cormorant	a	r	c	o
Great Blue Heron	u	u	u	u
*Green Heron	u	u	u	o
*Little Blue Heron	c	c	c	u
*Cattle Egret	u	c	c	r
*Great Egret (Common)	c	c	c	c
*Snowy Egret	c	c	c	u
*Louisiana Heron	c	c	c	u
*Black-crowned Night Heron	a	a	a	c
*Yellow-crowned Night Heron	r	u	u	r
*Least Bittern	u	u	o	-
American Bittern	c	o	c	c
*Glossy Ibis	c	c	c	r
White Ibis	-	o	o	r
Whistling Swan	c	r	c	c
Canada Goose	a	r	a	a
Brant	-	-	r	u
Barnacle Goose	-	-	r	r
White-fronted Goose	r	-	-	r
Snow Goose	a	r	a	a
Fulvous Tree Duck	r	-	r	u
*Mallard	u	o	u	u
*Black Duck	a	u	a	a
*Gadwall	c	c	c	u
Pintail	c	-	a	a
*Green-winged Teal	a	r	a	a
*Blue-winged Teal	a	o	a	r
American Wigeon	c	-	c	a
Northern Shoveler	c	-	c	c
Wood Duck	r	-	r	r

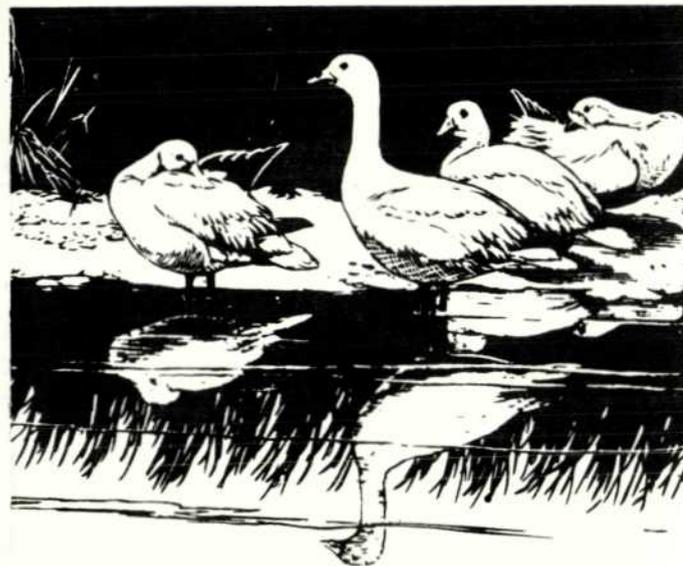
	S	S	F	W
Redhead	u	-	c	c
Ring-necked Duck	c	-	c	c
Canvasback	u	-	u	c
Greater Scaup	c	r	u	c
Lesser Scaup	c	-	u	c
Common Goldeneye	r	-	r	o
Bufflehead	c	r	c	c
Oldsquaw	u	-	r	u
White-winged Scoter	u	-	u	u
Surf Scoter	c	-	u	a
Black Scoter (Common)	c	-	u	c
Ruddy Duck	c	r	c	c
Hooded Merganser	u	-	u	c
Common Merganser	u	-	u	u
Red-breasted Merganser	a	r	c	a
Turkey Vulture	r	r	r	r
Black Vulture	r	r	r	r
Sharp-shinned Hawk	o	-	c	o
Cooper's Hawk	r	-	r	r
Red-tailed Hawk	r	-	r	r
Red-shouldered Hawk	r	-	r	r
Bald Eagle	r	r	r	r
Marsh Hawk	c	-	c	c
*Osprey	r	r	r	-
Peregrine Falcon	u	-	u	u
Merlin (Pigeon Hawk)	u	-	u	u
American Kestrel (Sparrow Hawk)	c	-	a	a
*Ring-necked Pheasant	c	c	c	c
*King Rail	c	c	c	c
*Clapper Rail	c	c	c	c
Virginia Rail	u	o	u	u
Sora	c	u	a	u
Black Rail	r	r	r	r
*Common Gallinule	u	u	u	r
American Coot	a	r	a	a
*American Oystercatcher	u	u	u	r
Semipalmated Plover	c	u	c	u
Piping Plover	u	u	u	u
Wilson's Plover	u	o	u	u
*Killdeer	u	u	u	u
American Golden Plover	r	-	o	r
Black-bellied Plover	a	u	a	c
Ruddy Turnstone	a	u	a	u
American Woodcock	r	-	r	r
Common Snipe	a	r	c	a
Whimbrel	o	r	u	o
Upland Sandpiper (Plover)	-	o	o	-
Spotted Sandpiper	c	u	c	o

	S	S	F	W
Solitary Sandpiper	u	o	u	o
*Willet	c	c	c	u
Greater Yellowlegs	a	c	a	u
Lesser Yellowlegs	a	c	a	u
Red Knot (Knot)	c	u	c	r
Pectoral Sandpiper	u	-	c	r
White-rumped Sandpiper	o	r	c	-
Baird's Sandpiper	-	u	u	-
Least Sandpiper	a	c	a	u
Dunlin	a	u	a	c
Short-billed Dowitcher	c	c	a	u
Long-billed Dowitcher	o	r	c	u
Stilt Sandpiper	u	u	c	-
Semipalmated Sandpiper	a	c	a	c
Western Sandpiper	c	u	a	u
Buff-breasted Sandpiper	-	-	r	-
Marbled Godwit	o	u	c	r
Hudsonian Godwit	r	r	u	-
Sanderling	a	c	a	c
*American Avocet	u	a	a	c
*Black-necked Stilt	u	c	c	-
Red Phalarope	u	-	r	-
Wilson's Phalarope	r	r	u	-
Northern Phalarope	r	-	r	-
Pomarine Jaeger	-	u	u	r
Parasitic Jaeger	r	u	u	r
Glaucous Gull	r	-	-	r
Great Black-backed Gull	c	o	c	a
Herring Gull	a	c	a	a
Ring-billed Gull	a	c	a	a
*Laughing Gull	a	a	a	u
Bonaparte's Gull	c	-	u	c
Black-legged Kittiwake	-	-	r	u
*Gull-billed Tern	c	c	u	-
Forster's Tern	c	c	a	c
*Common Tern	c	c	c	r
Roseate Tern	r	r	r	-
*Least Tern	c	c	c	-
Sandwich Tern	u	u	u	-
*Royal Tern	c	c	c	u
Caspian Tern	u	u	c	r
Black Tern	u	c	a	-
*Black Skimmer	c	c	c	u
Razorbill	-	-	-	r
Dovekie	u	-	r	u
*Mourning Dove	u	u	u	u
*Yellow-billed Cuckoo	u	u	c	-
Black-billed Cuckoo	r	r	r	-

	S	S	F	W
Barn Owl	o	o	o	o
Short-eared Owl	o	-	u	u
Chuck-will's-widow	r	r	-	-
*Common Nighthawk	o	o	o	-
Chimney Swift	o	o	o	-
Ruby-throated Hummingbird	o	u	u	-
Belted Kingfisher	u	u	c	c
*Common Flicker (Yellow-shafted)	u	u	a	c
Yellow-bellied Sapsucker	u	-	c	u
Hairy Woodpecker	r	-	r	r
*Downy Woodpecker	u	u	u	u
*Eastern Kingbird	c	c	c	-
Western Kingbird	-	-	u	-
*Great Crested Flycatcher	u	u	u	-
Eastern Phoebe	u	-	u	u
Yellow-bellied Flycatcher	-	-	r	-
Acadian Flycatcher	-	-	r	-
Eastern Wood Pewee	u	u	u	-
Olive-sided Flycatcher	-	-	r	-
Horned Lark	r	-	r	r
Tree Swallow	c	c	a	u
Bank Swallow	o	-	u	-
Rough-winged Swallow	-	-	r	-
*Barn Swallow	a	a	a	-
Cliff Swallow	-	-	r	-
Purple Martin	u	u	c	-
Blue Jay	r	r	r	-
Common Crow	u	u	u	u
*Fish Crow	c	c	c	u
*Carolina Chickadee	u	u	u	u
White-breasted Nuthatch	r	-	r	-
Red-breasted Nuthatch	c	-	c	-
Brown Creeper	o	-	c	u
House Wren	u	-	c	u
Winter Wren	o	-	u	o
*Carolina Wren	c	c	c	c
*Long-billed Marsh Wren	c	c	c	c
Short-billed Marsh Wren	c	-	c	c
*Mockingbird	u	u	u	u
*Gray Catbird	a	a	a	a
*Brown Thrasher	u	u	u	u
American Robin	u	u	u	u
Wood Thrush	-	-	r	-
Hermit Thrush	o	-	c	o
Swainson's Thrush	o	-	c	-
Gray-cheeked Thrush	o	-	u	-
Blue-gray Gnatcatcher	o	-	u	-
Golden-crowned Kinglet	u	-	c	u

	S	S	F	W
— Ruby-crowned Kinglet	c	-	c	c
— Water Pipit	u	-	u	u
— Cedar Waxwing	u	-	u	u
— Loggerhead Shrike	-	-	r	r
— *Starling	c	c	c	c
— *White-eyed Vireo	u	c	c	-
— *Red-eyed Vireo	u	u	u	-
— Philadelphia Vireo	-	-	o	-
— Black-and-white Warbler	u	-	c	-
— Prothonotary Warbler	o	-	o	-
— Tennessee Warbler	r	-	u	-
— Orange-crowned Warbler	u	-	u	u
— Nashville Warbler	-	-	u	u
— Northern Parula (Parula Warbler)	c	-	c	-
— *Yellow Warbler	u	u	c	-
— Magnolia Warbler	-	-	c	-
— Cape May Warbler	-	-	c	-
— Black-throated Blue Warbler	u	-	c	-
— Yellow-rumped Warbler (Myrtle)	a	-	a	a
— Black-throated Green Warbler	-	-	u	-
— Blackburnian Warbler	-	-	r	-
— Yellow-throated Warbler	-	-	r	-
— Chestnut-sided Warbler	-	-	r	-
— Bay-breasted Warbler	-	-	r	-
— Blackpoll Warbler	-	-	c	-
— Pine Warbler	-	-	u	-
— *Prairie Warbler	u	c	c	-
— Palm Warbler	c	-	a	c
— Ovenbird	r	-	r	-
— Northern Waterthrush	o	-	c	-
— Louisiana Waterthrush	u	-	u	-
— Connecticut Warbler	-	-	r	-
— *Common Yellowthroat	c	c	a	u
— *Yellow-breasted Chat	o	o	u	o
— Hooded Warbler	-	-	r	-
— Wilson's Warbler	-	-	r	-
— Canada Warbler	-	-	r	-
— American Redstart	c	-	a	-
— *House Sparrow	u	u	u	u
— Bobolink	c	-	c	-
— *Eastern Meadowlark	c	c	c	c
— *Red-winged Blackbird	a	a	a	a
— *Orchard Oriole	u	u	-	-
— Northern Oriole (Baltimore)	-	-	a	-
— Rusty Blackbird	-	-	r	-
— *Boat-tailed Grackle	a	a	a	a
— *Common Grackle	r	r	r	r
— Brown-headed Cowbird	u	-	u	u
— Scarlet Tanager	-	-	r	-
— Summer Tanager	o	-	r	-

	S	S	F	W
— *Cardinal	c	c	c	c
— Rose-breasted Grosbeak	-	-	u	-
— Blue Grosbeak	-	-	u	-
— Indigo Bunting	o	-	u	-
— Dickcissel	-	-	u	-
— Evening Grosbeak	-	-	r	-
— Purple Finch	-	-	u	u
— Pine Siskin	-	-	u	u
— American Goldfinch	u	-	c	u
— *Rufous-sided Towhee	a	a	a	a
— Savannah (Ipswich) Sparrow	a	-	a	a
— Grasshopper Sparrow	-	-	u	o
— Sharp-tailed Sparrow	a	-	a	a
— *Seaside Sparrow	a	c	a	a
— Vesper Sparrow	-	-	c	u
— Lark Sparrow	-	u	c	u
— Dark-eyed Junco (Slate-colored)	u	-	u	u
— Tree Sparrow	-	-	r	r
— Chipping Sparrow	o	-	c	o
— Clay-colored Sparrow	-	-	u	-
— *Field Sparrow	u	u	c	u
— White-crowned Sparrow	-	-	c	o
— White-throated Sparrow	u	-	a	u
— Fox Sparrow	o	-	u	o
— Lincoln's Sparrow	-	-	u	-
— Swamp Sparrow	o	-	a	a
— *Song Sparrow	a	a	a	a
— Snow Bunting	o	-	o	o



These additional 50 species are of accidental or rare occurrence and have been recorded on Pea Island only one to three times:

Eared Grebe	Bar-tailed Godwit
Western Grebe	Ruff
Northern Fulmar	Long-tailed Jaeger
White-faced Storm Petrel	Lesser Black-backed Gull
White-tailed Tropicbird	Iceland Gull
White Pelican	Black-headed Gull
Great Cormorant	Little Gull
Anhinga	Bridled Tern
Magnificent Frigatebird	Thick-billed Murre
Reddish Egret	White-winged Dove
White-faced Ibis	Snowy Owl
American Flamingo	Saw-whet Owl
Ross' Goose	Red-bellied Woodpecker
European Wigeon	Red-headed Woodpecker
Common Eider	Gray Kingbird
King Eider	Scissor-tailed Flycatcher
Swallow-tailed Kite	Bewick's Wren
Swainson's Hawk	Northern Shrike
Rough-legged Hawk	Sprague's Pipit
Golden Eagle	Blue-winged Warbler
Yellow Rail	Western Meadowlark
Purple Gallinule	Yellow-headed Blackbird
Snowy Plover	Common Redpoll
Long-billed Curlew	Lark Bunting
Curlew Sandpiper	Lapland Longspur

#### NOTES

LOCATION \_\_\_\_\_  
DATE \_\_\_\_\_ SPECIES \_\_\_\_\_  
TIME \_\_\_\_\_  
OBSERVERS \_\_\_\_\_  
WEATHER \_\_\_\_\_



DEPARTMENT OF THE INTERIOR  
U.S. FISH AND WILDLIFE SERVICE



RF-42540-2 MAY 1980



## BIRDS OF THE PEA ISLAND NATIONAL WILDLIFE REFUGE

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 was established in 1938, primarily as a wintering area for Greater Snow Geese.

The refuge is comprised of 5,915 acres of barrier sand dunes, ocean beaches, salt marshes, low sand ridges, freshwater ponds, tidal creeks and bays, and 25,700 acres of Proclamation waters in Pamlico Sound. The refuge occupies the northern tip of Hatteras Island and is separated from Bodie Island to the north by Oregon Inlet. North Carolina Highway 12 runs the full length of the refuge along the leeward side of the ocean dunes.

The refuge has a rich, diverse bird life. It is an important wintering ground for whistling swans, snow geese, Canada geese, and 25 species of ducks. Many other interesting species, such as the savannah (Ipswich) sparrow, migrant warblers, shorebirds, gulls, terns, herons, and egrets can be found here during the winter months and the spring and fall migrations. During the summer months several species of herons, egrets, and terns along with American avocets, willets, black-necked stilts, and a few species of ducks nest in the area. Oceanic species can be expected during most any season but are most common from late summer through the fall into late winter. Following storms many unusual species for this area have been observed on the refuge.

This folder lists 265 species of birds that have been identified on the refuge or over the inshore ocean several times. An additional 50 species are considered accidental and are listed separately. The bird list is in accordance with the fifth A.O.U. Check-List as amended. New names are used with the former name in parentheses.

a—abundant a common species which is very numerous;  
c—common certain to be seen in suitable habitat;  
u—uncommon present, but not certain to be seen;  
o—occasional seen only a few times during a season;  
r—rare seen at intervals of 2 to 5 years.

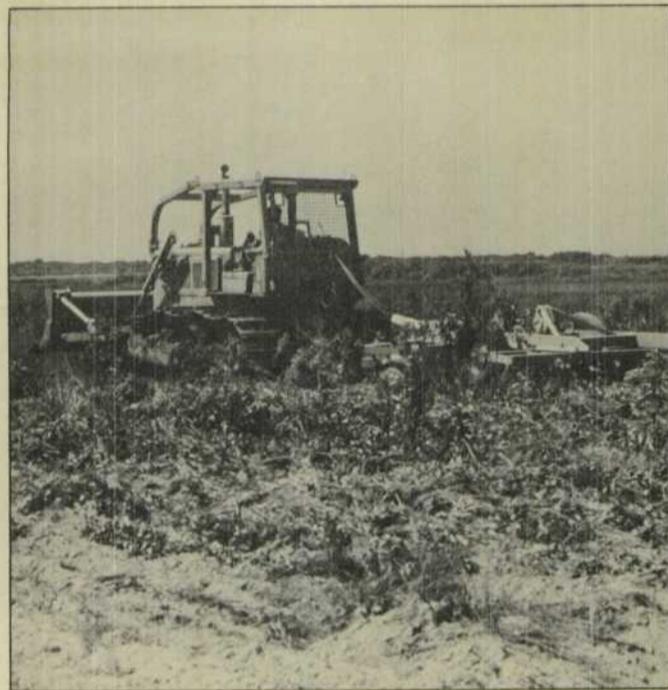
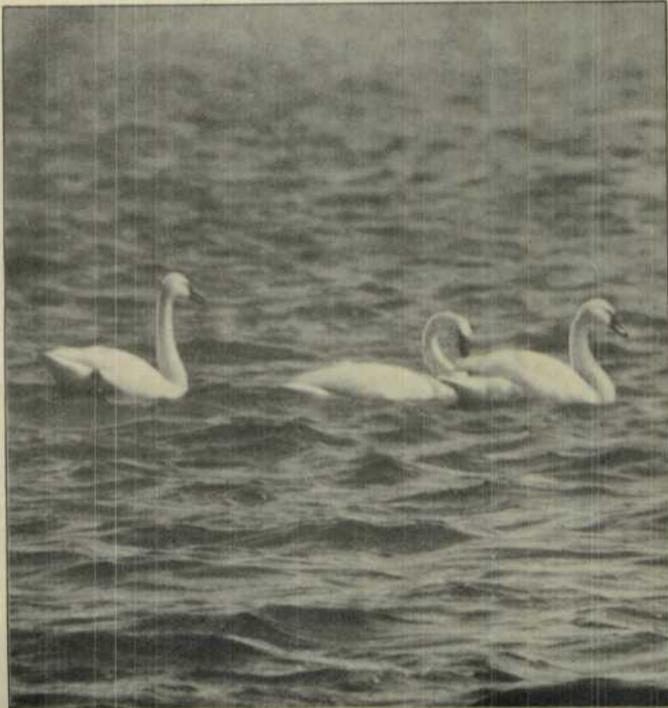
Pea Island National Wildlife Refuge is administered by the Fish and Wildlife Service on Cape Hatteras National Seashore. Pea Island is composed of 5,915 acres of coastal barrier island extending over 12 miles along North Carolina's "Outer Banks" from Oregon Inlet southward to the village of Rodanthe.

Pea Island and an adjacent 25,700 acres of Pamlico Sound waters on its western boundary was established in 1938 by Congressional Act and Presidential Proclamation. The island was named for dune peas which grow in the dunes. This area was set aside to provide safe wintering habitat for greater snow geese and other migratory waterfowl. Civilian Conservation Corps workers improved the low sandy island by the construction of barrier dunes to protect inland portions from storms. The CCC also built dikes and ponds for waterfowl and fields to grow wildlife foods. Pea Island's basic mission is the same today, providing a quality environment for wildlife.

#### WILDLIFE

Thousands of snow and Canada geese, whistling swans and 25 different species of ducks winter on the refuge each year.

Although the waterfowl numbers are greatest in January, a greater variety of birdlife may be observed in October and November during the fall migrations. The refuge's abundant bird life lists 265 species that occur with regularity and 50 species which are accidental visitors.



During the spring and summer months, several species of shore and wading birds nest on the refuge. Least terns, willets, black skimmers and oystercatchers raise their young in the dune and beach zone. Ibises, egrets, and herons find safety and suitable nesting cover in the impoundment and marsh areas on the Pamlico Sound side of the refuge.

Suitable habitat for several endangered species is found on the islands. Peregrine falcons are frequently observed as they move along the coast on their north and south migrations. Eastern brown pelicans feed in the impoundments and the waters offshore during the summer and fall. Bald eagles occasionally visit the refuge during warmer months. Loggerhead sea turtles lumber ashore on dark summer nights to lay their eggs in the warm beach sand.

Resident species such as the otter, create paths or slides between the fresh water impoundments and salt marsh. Muskrats and nutria build lodges or mounds of grass in the marshes. Colorful ring-necked pheasants feed along the dikes and highway.

Many species of aquatic life live in the marshes and tide flats along the sound. Speckled trout (weakfish), croaker, spot, menhaden, and flounder all spawn and spend their early stages of life in the protected creeks and bays of the refuge. Blue crabs, oysters, and clams also find this area ideal.

Along with the loggerhead sea turtle, reptiles such as the diamondback terrapin, common snapping turtle, hognosed snake, black racer and banded water snake make their homes on the refuge. There has never been a verified report of a poisonous snake on Pea Island.

#### MANAGEMENT

The harmonious blending of man's technical know-how and nature's processes is sought to provide natural cover and foods. The barrier dune system is no longer rebuilt to prevent overwash, but the potential overwash areas are identified and plans made to provide proper drainage. Grain crops are no longer planted but fields are sown with perennial grasses which will replenish themselves with minimal need for management.

The freshwater ponds are manipulated using the natural dry and wet seasons coupled with timely opening and closing of water control structures. Controlled burning removes the less desirable brush and allows the more productive grasses to dominate. However, many areas are left untouched to provide habitat diversity for all species of wildlife.

Endangered species utilization and critical habitat protection add a new dimension to present management. The refuge monitors the loggerhead sea turtle nesting population and provides a nursery for the safe hatching of young turtles.

Censusing and banding of waterfowl aids the entire Atlantic flyway in its management. Pea Island's data is compiled with that obtained from other refuges to determine the most effective approach for enhancing and protecting our waterfowl populations.

Law enforcement patrols are conducted to ensure the protection and safety of the refuge's natural resources.

#### RECREATIONAL OPPORTUNITIES

Bird watching, nature study, and photography are the most popular activities associated with wildlife on the refuge. Low observation platforms located on the dikes of North Pond provide excellent sites for observing waterfowl and other wildlife. The refuge is open to foot traffic and an interesting four mile walk may be taken around the North Pond Impoundment. However, portions of the refuge may be closed in the spring due to nesting birds. All pets are prohibited in the impoundment areas, but may be taken elsewhere on the refuge, if kept on a leash.

In the fall and winter, driving along Highway 12 can provide a chance to see many wildlife species. Care should be exercised in pulling off Highway 12 due to deep sand. Walking in the spring and fall is a good way to observe wildlife, but in the summer months populations of biting flies and mosquitoes make foot travel difficult.

The 12.2 miles of pristine beach provides the surf fishing enthusiast an excellent opportunity to take home a good catch. Speckled and gray trout, spot, flounder, blue fish, red drum and striped bass are some of the most sought after species. Swimmers, sunbathers, beachcombers, and surfers all find plenty of sea and sand.

The best opportunity for crabbing is the shore along Oregon Inlet.

Recreation vehicles are not allowed off the designated roadways on Pea Island. Beach driving is not allowed.

#### REGULATIONS

Visitors are requested to obey refuge signs to ensure that wildlife has a place to grow and survive for future generations to enjoy. It will be beneficial to inquire at the Refuge Office as to whether a specific activity is permitted or prohibited. Inquiries concerning the refuge should be directed to the:

Refuge Manager  
Pea Island National Wildlife Refuge  
P.O. Box 150  
Rodanthe, North Carolina 27968  
Telephone: 919-987-2394

The following list indicates some of the restricted activities on the refuge:

Fishing is allowed on the beach, not in the ponds.

Camping is prohibited. Check NPS camping areas on Bodie Island.

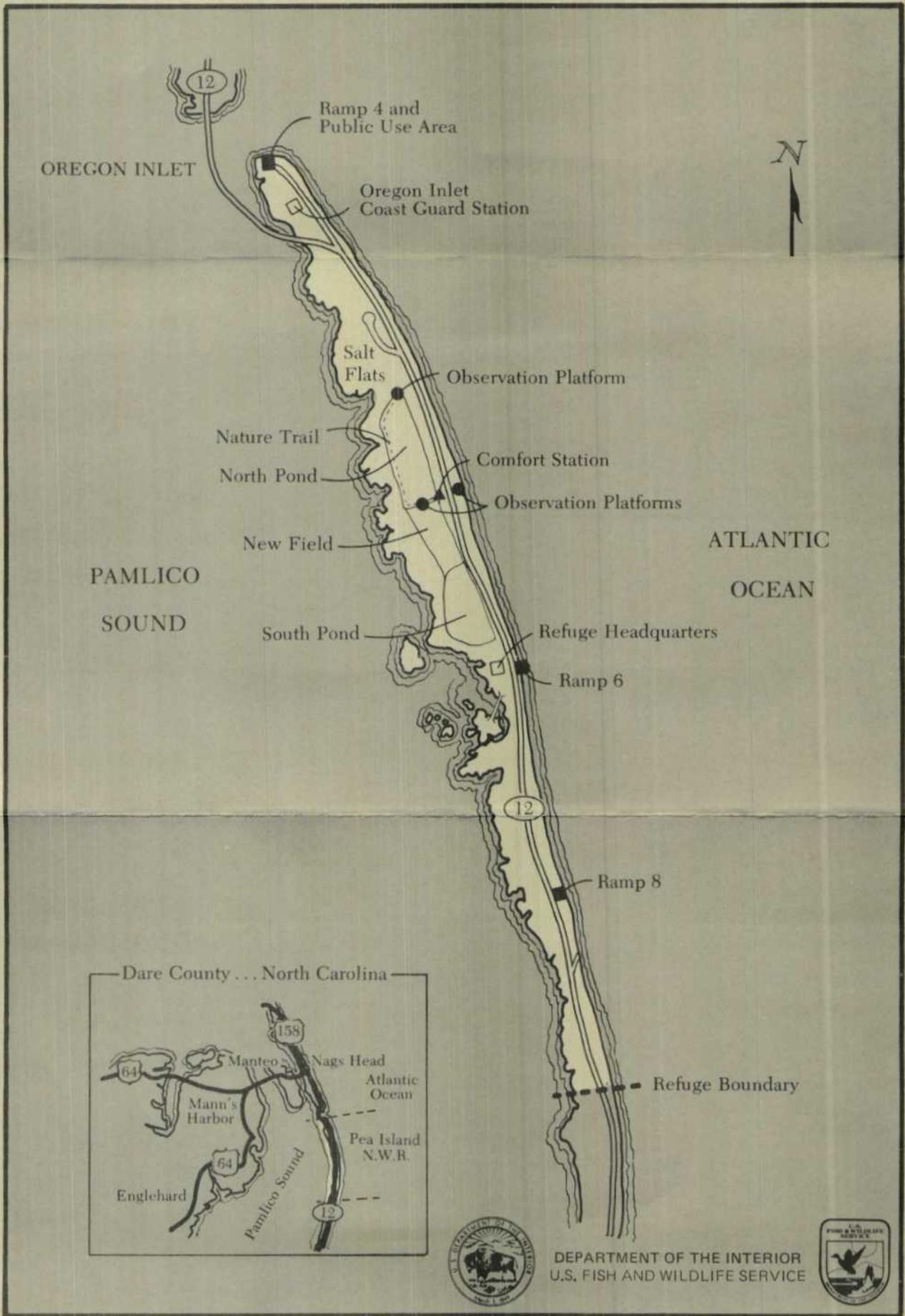
Fires are prohibited.

Pets on a leash are allowed on the beach. Pets are not allowed around the ponds.

Hunting is prohibited.

Weapons are prohibited.

Vehicles are allowed only in parking areas and on Highway 12.



# Pea Island National Wildlife Refuge



---

## CALENDAR OF WILDLIFE EVENTS

This calendar is meant to provide refuge visitors with a general guide to seasonal wildlife events. Weather may cause variations of one to two weeks.

**JANUARY.** . High concentrations of ducks and geese. Ducks are best observed in North Pond. Geese can easily be seen from Highway 12 in New Field. Marsh hawks and kestrels are fairly common. Herons, egrets, ibis and several species of shorebirds can be seen easily in the pond and salt flat areas. Barn owls can be seen searching the marsh for food at dusk.

**FEBRUARY.** Waterfowl populations continue to be high. Likewise, the January trends with raptors, waders, and shorebirds continue.

**MARCH.** . . . Spring shorebird migration causes numbers to increase. Brown pelicans congregate in the sound. Osprey are usually evident and begin nesting activity.

**APRIL.** . . . Shorebird migration continues in full force. Wading birds begin to establish rookery sites. The bounties of surf fishing include big blues, big croakers, trout, and an occasional red drum. Warm weather activities begin, including yellow-bellied sliders sunning themselves on pond banks, and mullet jumping in the ponds. Diamondback terrapins can be seen in the ponds as they surface to breathe.

**MAY.** . . . . A variety of terns return to the refuge and begin courtship and nesting activities. Of the many gulls, the laughing gull's courtship display is the most easily observed. Willets nest in dunes and high beach areas. Osprey hatching occurs. The first broods of black ducks and gadwalls appear, usually in the ponds. Occasionally, swallow-tailed kites can be seen. Surf fishing produces big blues, croakers, trout, flounder, sea mullet, and drum.

**JUNE.** . . . . Duck broods are abundant in North Pond area. Black-necked stilts feign injury to lure intruders from their nests. Least terns, oystercatchers, black skimmers, and other shorebirds nest in colonies on the beach and on islands in North Pond. Surf fishing continues to yield blues, flounder, and croaker, and spots begin to show up. Crabbing begins to pick up. Loggerhead sea turtle nesting begins.

**JULY.** . . . . Osprey fledglings leave the nest. Duck broods continue to be seen in North Pond. Surf fishing drops off with only smaller fish being caught. Fishing from the Bonner Bridge over Oregon Inlet at night produces large gray trout. Crabbing is excellent. Sea turtle nesting continues.

---

**AUGUST.** . . Brown pelican young (produced south of the refuge) begin to learn to fish and are evident off the beach and around Oregon Inlet. Bridge fishing continues to yield gray trout and small blues. Spanish mackerel and pompano begin to appear. Crabbing continues to be excellent. Sea turtle nesting drops off this month.

**SEPTEMBER.** Warbler and sparrow fall migrations begin with dikes providing the best observation areas. Raptor migration is evident with peregrine falcons being observed frequently. Teal migration begins through the refuge. Crabbing continues.

**OCTOBER.** . Songbird, teal, and raptor migrations continue. Trout begin to get larger. Blue fish, puppy drum, and larger drum can be expected. Canada and snow goose migration becomes evident. Clamming becomes quite good, especially at low tide after a strong northeaster. Large number of cormorants can be observed this month and next.

**NOVEMBER.** Winter populations of gulls are highest now. Black-bellied plovers and willets may be seen on the beach. Peregrine falcons and other migratory raptors including kestrels, merlins, and sharp-shinned hawks frequent the refuge. The peak of swan migration occurs now. Numbers of ducks, geese, and coots are increasing. Lucky fishermen catch big blues, drum, or an occasional flounder.

**DECEMBER.** Pelagic birds can be seen off the beach, especially after strong northeast winds. Barn owls are seen frequently over the marsh at dusk. Waterfowl numbers grow by leaps and bounds. Whistling swans, Canada and snow geese, and approximately 25 species of ducks congregate and settle in for the winter.

### YEAR-ROUND ON THE REFUGE

Muskrats, nutria, and otter can be seen scurrying over the dikes or swimming in the ponds. Colorful pheasants are abundant and can be seen almost anywhere on the refuge.

Beach combing is particularly productive after large storms and/or strong northeast winds.



---

---

## VISITOR INFORMATION

Headquarters for Pea Island National Wildlife Refuge is located 6½ miles south of Oregon Inlet on N.C. Highway 12. Refuge staff is usually available from 8 - 4:30 weekdays to answer visitor questions or give refuge information. The refuge offers a wide variety of quality outdoor experiences.

We invite you to enjoy Pea Island. In order to ensure that the refuge is protected for future generations to enjoy, we ask that you obey the following regulations:

- Drive only on designated roads. Refuge beaches are closed to vehicles.
- Camping is prohibited.
- Firearms are prohibited.
- Please do not litter.

Ask about the following opportunities:

- Wildlife photography/observation.
- Outdoor classrooms.
- Conducted programs.

**WARNING:** Insects are abundant during the months of May through September, and appear throughout the year following a warm rain. Insect repellent and appropriate protective clothing are recommended.

For more information contact the Refuge Manager, Pea Island National Wildlife Refuge, P.O. Box 150, Rodanthe, N.C. 27968 or call (919) 987-2394.

## NOTES

*DON'T LITTER, HELP KEEP OUR WILD AREAS CLEAN.*

DEPARTMENT OF THE INTERIOR  
U. S. Fish and Wildlife Service

---

---

---

---

# Calendar of Wildlife Events

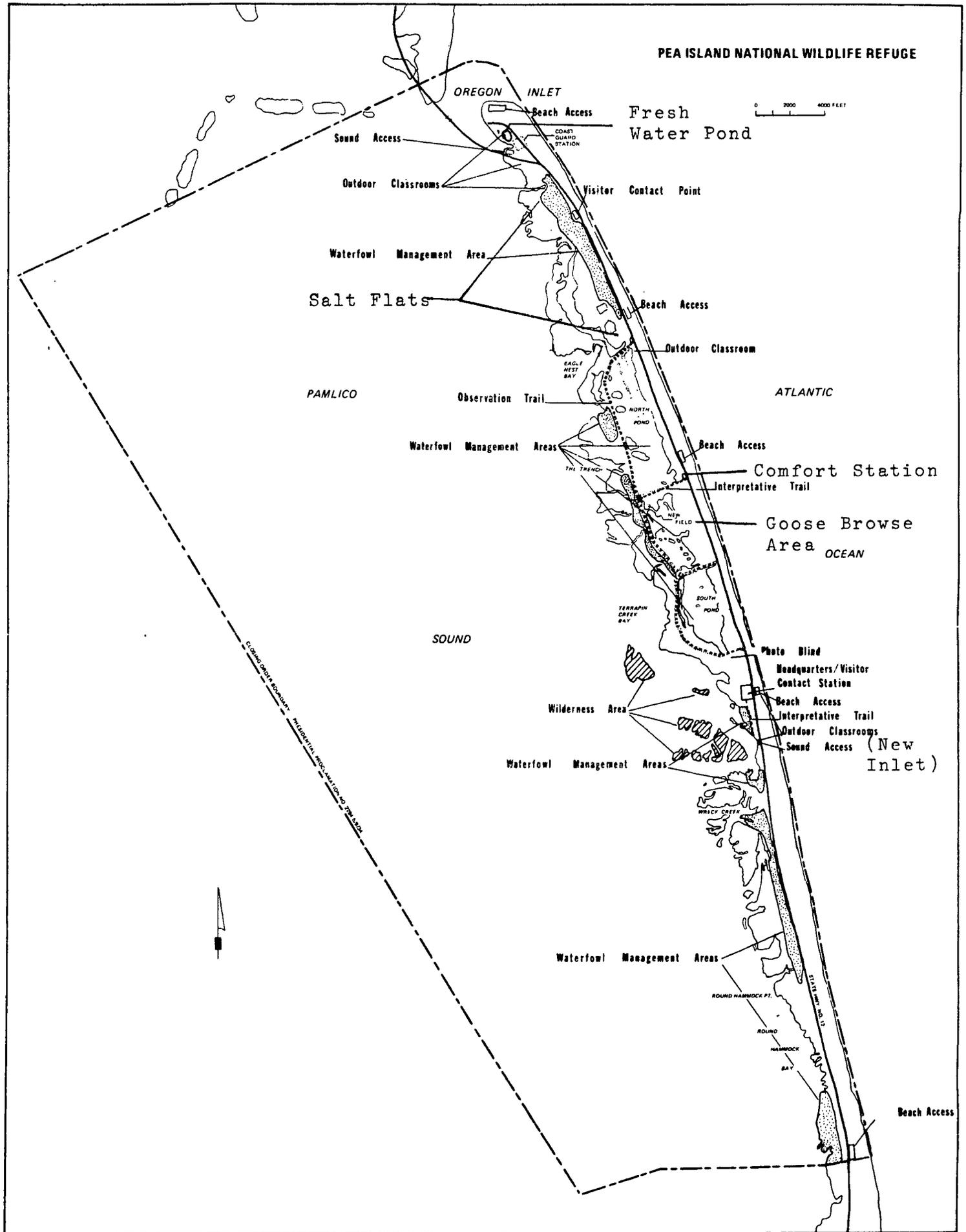


Pea Island  
National Wildlife Refuge

---

---

PEA ISLAND NATIONAL WILDLIFE REFUGE



COAST GUARD STATION  
EAGLE NEST BAY  
NORTH POND  
THE TRENCH  
HER FIELD  
SOUTH POND  
TERRAPIN CREEK BAY  
WILLY CREEK  
ROUND HAMMOCK PT.  
ROUND HAMMOCK BAY

PAMLICO

ATLANTIC

SOUND

OCEAN

Beach Access