

PEA ISLAND NATIONAL WILDLIFE REFUGE  
Manteo, North Carolina

ANNUAL NARATIVE REPORT  
Calendar Year 1977

NATIONAL WILDLIFE REFUGE SYSTEM  
Fish and Wildlife Service  
U. S. DEPARTMENT OF THE INTERIOR



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## I. General

### A. Introduction

Pea Island National Wildlife Refuge, established on April 8, 1938 is located in Dare County, North Carolina.

Occupying the northern most 13.5 miles of Hatteras Island, one of the barrier islands on the Outer Banks, the refuge contains 5,915 acres of ocean beach, barrier dunes, low sand ridges, sand flats, brackish and salt marshes, and brackish impoundments. Additionally 25,700 acres of Pamlico Sound waters are closed to migratory bird hunting by Presidential Proclamation.

In 1937, Congress passed an act authorizing the Cape Hatteras National Seashore. The Act provided the Pea Island Refuge would be a part of said Seashore, but would be managed as a National Wildlife Refuge by the Fish and Wildlife Service. There is a memorandum of agreement between the Fish and Wildlife Service and the National Park Service for the management of the Interpretive and Recreational programs on the refuge.

### B. Climatic and Habitat Conditions

Weather for 1977 was far from normal. In January the area was hit by an extreme cold wave of arctic air that plummeted temperatures to 7 degrees, with winds of 20-25 miles per hour. Temperatures remained below freezing for several days with lows in the teens and low 20's. Temperatures remained below normal through most of February.

When the weather finally warmed up, the area was in a drought condition. For the period of February through June, rainfall received was only 9.59 inches compared to the normal 19.17 inches. By the end of August, rainfall for the area was nearly 16 inches below normal. On September 8, the drought ended when 5.8 inches of rain fell. The remainder of the year was extremely wet. Rainfall for October, November, and December was 19.55 inches, 9.56 inches above normal. For the year, rainfall was 46.05 inches, 5.25 inches below normal.

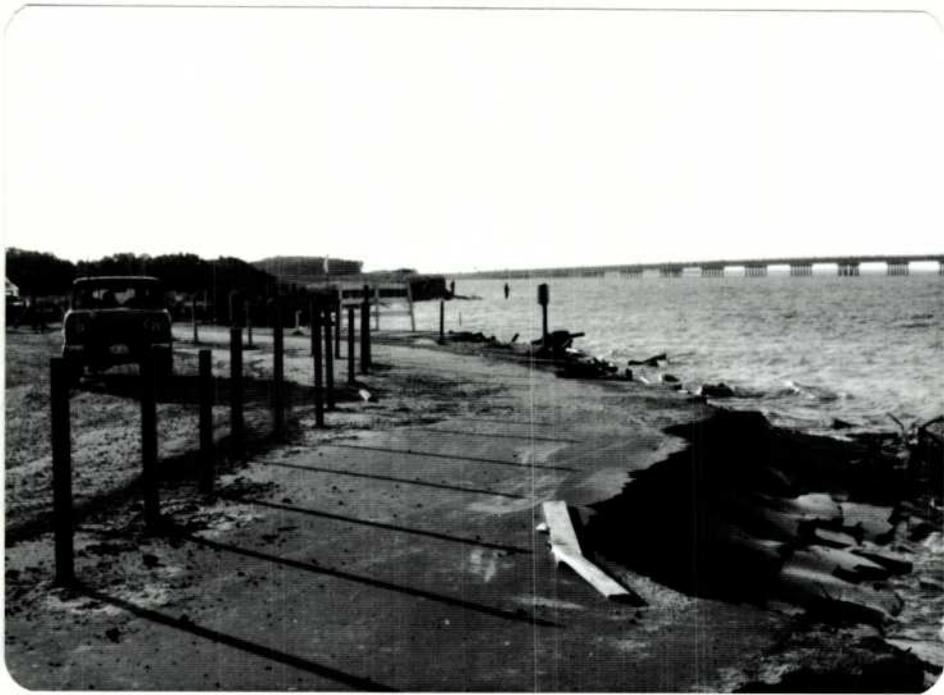


South Pond, one of the refuge's impoundments was completely dry in August. (Hartis 77)

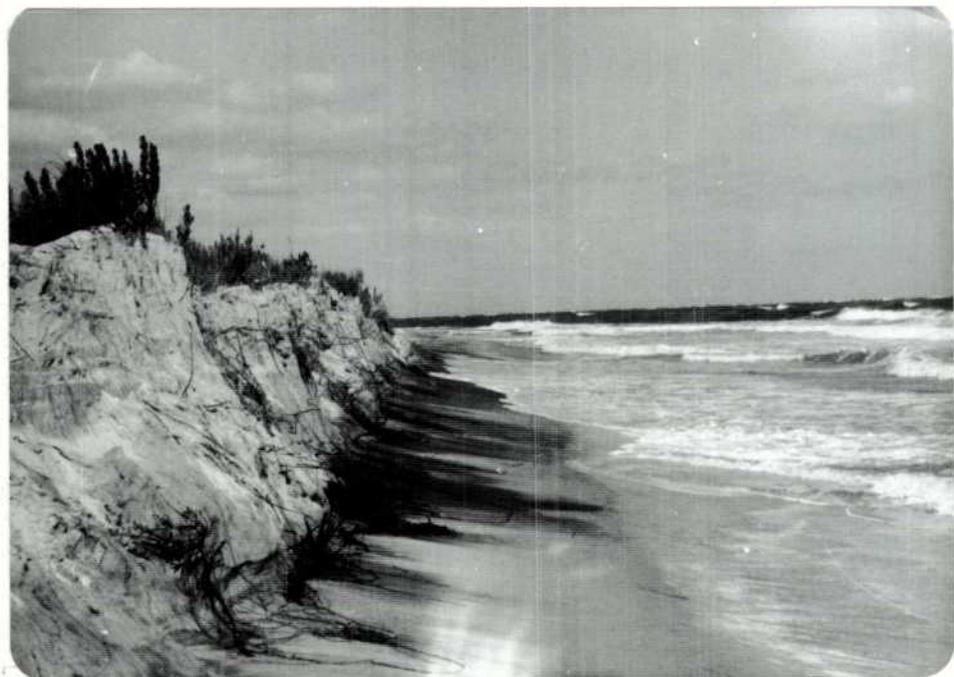
Periodic storms continued to erode the refuge beaches and dune system. The beach was impassable in places on high tides many times during the summer months. Conditions worsened in September and October when high tides coupled with very high winds completely washed out the north point beach access road twice. In October, 16 vehicles were stranded over night on the Pea Island campground. The road was repaired and all vehicles were safely off the area the following day.



Pea Island's north point beach access road was washed out twice in September and October by high tides and wave action at Oregon Inlet. (R4-13-77)



Second wash out at North Point in October. (R4-20-77)



Primary dune erosion on North end of Pea Island. Sea oats and beach grass roots are shown exposed. (R5-1-77)

C. Land Acquisition

1. Fee Title

N/A

2. Easement

N/A

3. Other

N/A

D. System Status

1. Objectives

Primarily set aside as a wintering area for greater snow geese, Pea Island has since broadened its objectives to encompass other aspects. The refuge currently provides wintering habitat, resting areas, food and protection for greater snow geese, canada geese, whistling swan, coots and twenty-five species of diving and dabbling ducks. Sufficient wintering habitat and sanctuary is provided to support between 3 and 4 million waterfowl use-days per year. Also nesting habitat and protection is available for two species of ducks; blacks and gadwall.

In addition special emphasis on nesting sites and protection is given to other migratory birds including shorebirds, gulls, terns and various marsh and water birds. Pea Island is also an important fall-winter nesting and feeding area for raptorial birds. The endangered peregrine falcon and other raptors migrate each fall along an established route upon which the refuge is located.

Protection of the Atlantic Loggerhead sea turtle beaches and nests on the refuge has become a necessary function. As a northern nesting beach for the Atlantic loggerhead, Pea Island has received less usage in recent years. Transplants were made on the refuge from Cape Romain during 1972-1975.

Recreations both wildlife and non-wildlife oriented, continue to be an ever increasing responsibility on the refuge. The bulk of these occurs on the refuge beach in the form of fishing, swimming, sunbathing, surfing and ORV use. Interpretation on the refuge is coordinated with the NPS by memorandum of agreement. Shortage of refuge personnel precludes all but a minimum of interpretation.

## 2. Funding

Increased funding for operation and maintenance has not kept up with inflation. Needed rehabilitation and new construction has not been completed because of lack of funds. The funding picture looks brighter than in past years.

	Habitat	Wildlife Resources		I&R 1500	FY Total
	Preservation 1120	Migratory Birds 1210	Endangered Species 1400		
FY - 77	\$2,500	\$50,000 (33,400)	\$1,000	\$10,000 (2,000)	\$63,500 (35,400) 4,200*
** FY- 76		<del>126,300</del> 115,400	1,000	9,900	126,300
FY - 75		45,500	1,000	5,000	51,500

\* Sale of equipment

\*\* Includes transition quarter and 52,000 rehab. (equipment purchase - D-6).

() 1977 BLHP Supplemented Fund.

## II. Construction and Maintenance

### A. Construction

No significant new construction or major maintenance was carried out on the refuge this period. One piece of major equipment was acquired late this year in the form of a new Caterpillar D-3 LGP tractor. It is to be used in mowing and maintaining dikes and access roads on the refuge waterfowl impoundments. An additional use will be in mowing and plowing undesirable vegetation. This will be much help in reclaiming some of our marsh which is slowly being taken over by undesirable brush and will enable us to be one step closer to satisfying our waterfowl maintenance objectives.

### B. Maintenance

The addition of the one TFT-700-hour employee to the refuge staff was a boost to our routine maintenance. Much time was spent in painting refuge headquarters, storage buildings, and residence and in replacing weathered portions of each. Due to the harsh weather and salt corrosion conditions of the area, much time has

to be spent on maintenance of vehicles, equipment and signs, etc. New porch rails were bought and installation begun at the refuge residence as the old rails were a safety hazard.

C. Wildfires

Lightning started a fire in the primary dune system about 4.5 miles north of refuge headquarters in August. The fire was contained shortly, but burned an estimated 1.5 acres. Damage was minor and the area is again covered with vegetation, primarily beach grass.

III. Habitat Management

A. Cropland

The refuge's cropland, consist of 50 acres of droughty sand in the new field area, generally planted with ryegrass each year, was planted with fescue in 1977. Hopefully, a permanent stand of browse can be established so that annual seeding will not have to be done each year. Although production is not very high, utilization by both Canada and snow geese is very good.

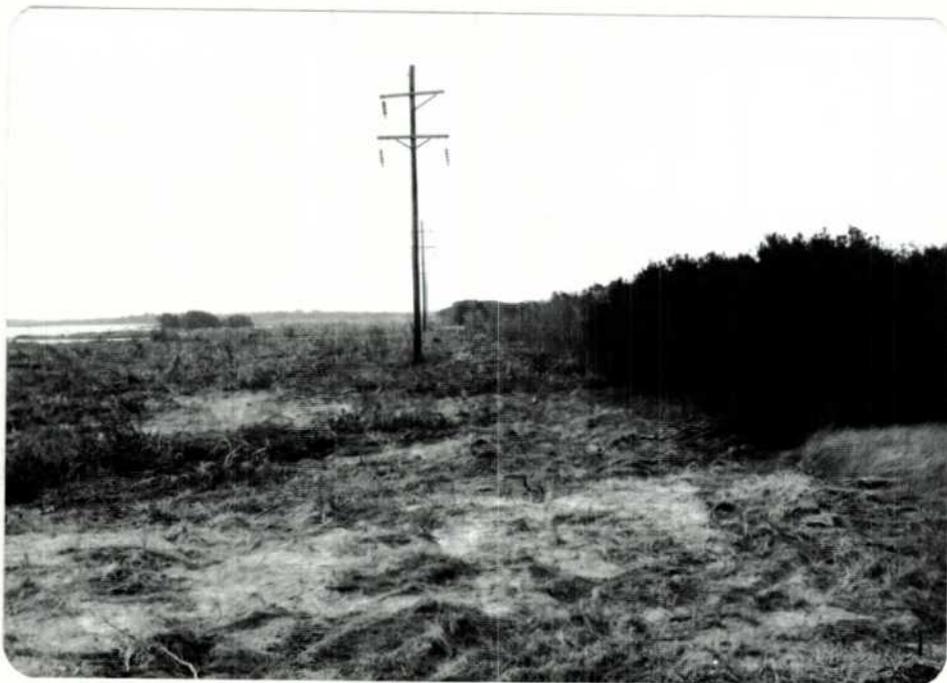
B. Grassland

N/A

C. Wetlands

Water level manipulation in the three refuge impoundments is essentially the same as in past years. The flow of water into or out of each impoundment is dependent entirely on weather conditions. Water is gained either from rainfall or windblown sound water. Water levels are lowered by removing stoplogs or manually opening flap gates which in either case has to be synchronized with the prevailing weather conditions. Such haphazard water level manipulation is not consistent with the production of aquatic waterfowl foods.

Encroachment by woody shrubs of the refuge's low lying areas and marshes has been sure and steady for several years. In reclaiming these marshes, two methods are used, control burning and plowing. Although no burning was done this year, much time was spent plowing with a D-6 tractor and off-set disk. After being plowed and allowed to dry out, much of the woody type shrubs will burn more thoroughly and again be disked in hopes that their roots will be killed. This method which incorporates both burning and plowing has proven to be the most effective in this part of our wetlands management. A total of approximately 200 acres were plowed this year.



Brush control of encroaching myrtles in Pea Island's south pond impoundment. Brush has been plowed here awaiting burning when practical. (R1-3-78)

D. Forestlands

N/A

E. Other Habitat

Roughly 2,000 acres of the refuge falls into this category. It consists of low sand ridges, ocean beaches and barrier sand dunes. No active management methods are employed here other than simply protecting the beach grasses and sea oats from illegal ORV use.

F. Wilderness and Special Areas

N/A

G. Easements for Waterfowl Management

N/A

#### IV. Wildlife

##### A. Endangered and/or Threatened Species

###### 1. Atlantic Loggerhead Sea Turtle

Although not considered endangered currently by the Federal Government, the loggerhead is included on the endangered list by the State of North Carolina. Pea Island's importance as the northern extent of the turtles nesting range has been fortified in recent years by transplants from Cape Romain, 1972-1975. Due to poaching activity and erosion the last two years 1976-77, no eggs were transplanted from Cape Romain.

As the number of natural nests on the refuge has been getting smaller in recent years (average of 5 per year since 1971), more effort has been expended to protect them. During the nesting season patrols are made in early morning to locate nesting activity on the beach. Nests are then relocated to a protective enclosure where the eggs are safe from heavy ORV usage, high tides, erosion, and poaching. This also aids in getting quantitative data on hatching and release.

This year, three nests were found on the refuge beaches. One nest was left in it's natural state and two were moved and placed in a protective enclosure in the dunes. Three additional nests were moved from the Cape Hatteras National Seashore beaches and placed in the enclosure. The five nests in the enclosure contained 547 eggs. From these, 323 young turtles were released to the ocean. The nest left on the beach was believed to have been lost to erosion. The markers were washed away and the nest could not be relocated.



Protective enclosure for transplanted Loggerhead turtle eggs away from ORV use on beach. (R2-14-78)



Loggerheads immediately after hatching in wire cylinder enclosure. (Hartis 77)



Loggerheads are released into the Atlantic after hatching. (Hartis 77)

## 2. Brown Pelican

Approximately 30 brown pelicans were observed from June through October in and around the Oregon Inlet section of the refuge. Fifteen of these endangered birds were immature and probably hatched a few miles south of the refuge.

## 3. Peregrine Falcon, Merlin, Osprey

Pea Island is located on the flyway of both the Peregrine falcon (endangered) and the Merlin (threatened). Sightings for these two species were recorded and regular surveys made in the fall. Occasionally over-wintering birds were observed. A summary of the sightings by month are listed below.

<u>MONTH</u>	<u>PEREGRINE</u>	<u>MERLIN</u>	<u>MONTH</u>	<u>PEREGRINE</u>	<u>MERLIN</u>
January	1	0	July	0	0
February	1	0	August	0	0
March	0	0	September	2	8
April	0	1	October	8	20
May	0	1	November	6	4
June	0	0	December	1	5

The osprey is a regular visitor to the refuge during the spring, summer and fall months. Although they are frequently seen fishing in the refuge impoundments, they have not used the nesting platforms that were erected on the refuge in 1974. Nesting of this species occurs on the Outer Banks both to the north and south in wooded areas. The nearest active nests are on Roanoke Island, some 5 miles north of the refuge.

## 4. Bald Eagle

An immature Bald Eagle was observed several times in June and July around the ponds on the refuge. These sightings were the first for this species in several years. In past years, eagles have been seen to the north at Bodie Island, but not on the refuge.

## 5. Least Tern

The Least tern was listed as endangered on the State of North Carolina list in 1976. In 1977, the species was listed on the special concern list.

Over the past few years, nesting on the refuge beaches has met with only limited nesting success. Nesting activity and estimated production are summarized below. (see next page)

<u>Year</u>	<u>Number Colonies</u>	<u>Number Breeding Pairs</u>	<u>Number young to flight stage</u>
1971	1	35	15
1972	1	20	0
1973	2	35	0
1974	2	30	20
1975	4	200	80
1976	2	70	0
1977	2	50	0

## B. Migratory Birds

### 1. Waterfowl

Waterfowl surveys are conducted weekly. Ground counts are run weekly. Also, aerial surveys are run periodically, 2 to 3 week intervals. Surveys are run from mid-September to the end of March.

#### a. Canada Geese

A peak population of Canada's, 4,500, occurred in February. This was a decrease of 36% from the peak population in January 1976 of 7,000 birds. Probably due to the severe weather further north, the birds seemed to stay on longer this year, but by mid-April most of the birds had departed for the breeding grounds.

#### b. Snow geese

In mid-January, a peak population of 12,300 snows were on the refuge with another 8,000 on Cape Hatteras National Seashore, just across Oregon Inlet. This flock of birds moved back and forth between the seashore and the refuge. Therefore, in mid-January we had a peak population of about 20,300 snow geese in the area.

#### c. Whistling Swans

Peak swan populations are usually not very high. A high of 750 birds was recorded on November 11, 1977.

#### d. Ducks

The peak population for 1977 occurred during the last week of December with 19,400 birds. This is a 19% drop from 1976 when a peak of 24,000 birds occurred on December 28.

e. Coots

Coot populations were down considerably from 1976. On December 23, 1977, a peak of 2,800 birds were on the refuge. In 1976, a peak of 12,200 birds were here on October 30.

f. Banding

Banding during 1977 was not very successful. Refuge quotas were 50 mallards, and 200 black ducks of which 11 mallard and 93 blacks were banded. Extreme cold weather causing the ponds to freeze over and low waterfowl numbers hurt the banding effort.

Table I is a yearly summary of the waterfowl use days for the five year period 1973-1977. Total waterfowl use for 1977 was down 23% from 1976 and was 21% below the five year average. Whistling swan use was down from '76 and 36% above the five year average while Canadas increased 30% for the year but fell 21% below the five year level. Ducks dropped below the '76 mark by 32% and fell 29% short of the five year average. Coots dropped drastically from '76 with an 80% reduction in use days and also fell short of the five year average by 63%. On the use day basis for the five year span, trends are down for Canadas, ducks and coots, turning upward for snows, while the swans seem to be on a leveling-off trend.

Graphs 1 and 2 are a representation of the peak waterfowl populations for the refuge for the same five year period, 1973-77.

(See pages 14, - 16 for Table 1 and Graphs 1 and 2.)

TABLE 1

## WATERFOWL USE DAYS

<u>Calendar Year</u>	<u>Swan</u>	<u>Snow</u>	<u>Canada</u>	<u>Ducks</u>	<u>Coots</u>	<u>Total</u>
1973	25,000	448,300	410,300	1,692,600	229,900	2,806,100
1974	30,100	495,100	684,300	1,872,300	159,700	3,242,000
1975	50,600	716,500	554,500	2,581,300	410,100	4,313,000
1976	49,900	504,100	275,000	1,977,400	554,700	3,361,100
1977	44,000	741,000	357,500	1,340,500	108,200	2,591,200

GRAPH 1 - PEAK POPULATION

SNOW GEESE  
CANADA GEESE  
WHISTLING SWAN

14,000

12,000

SNOW

10,000

8,000

CANADA

6,000

4,000

2,000

SWAN

1973

1974

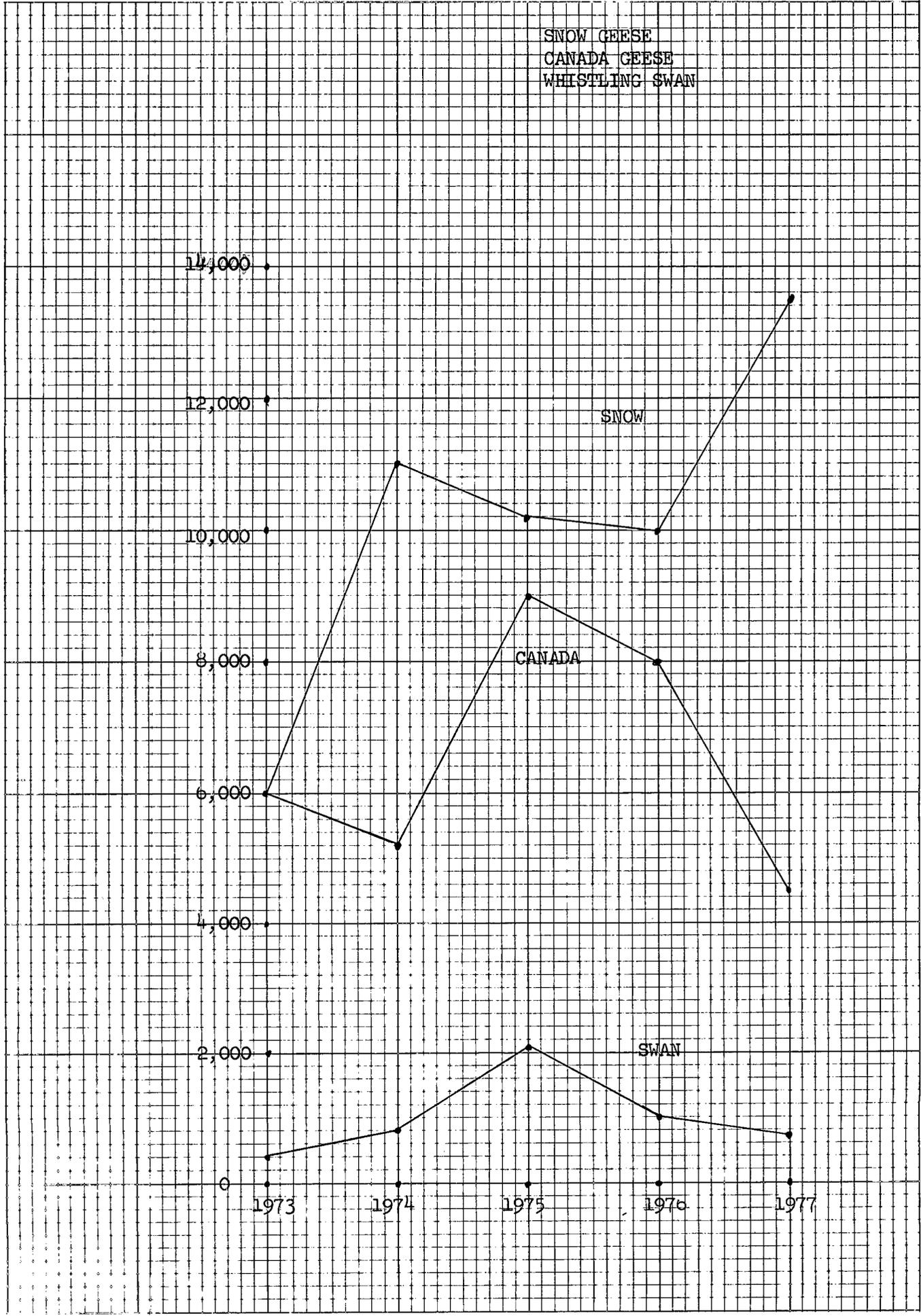
1975

1976

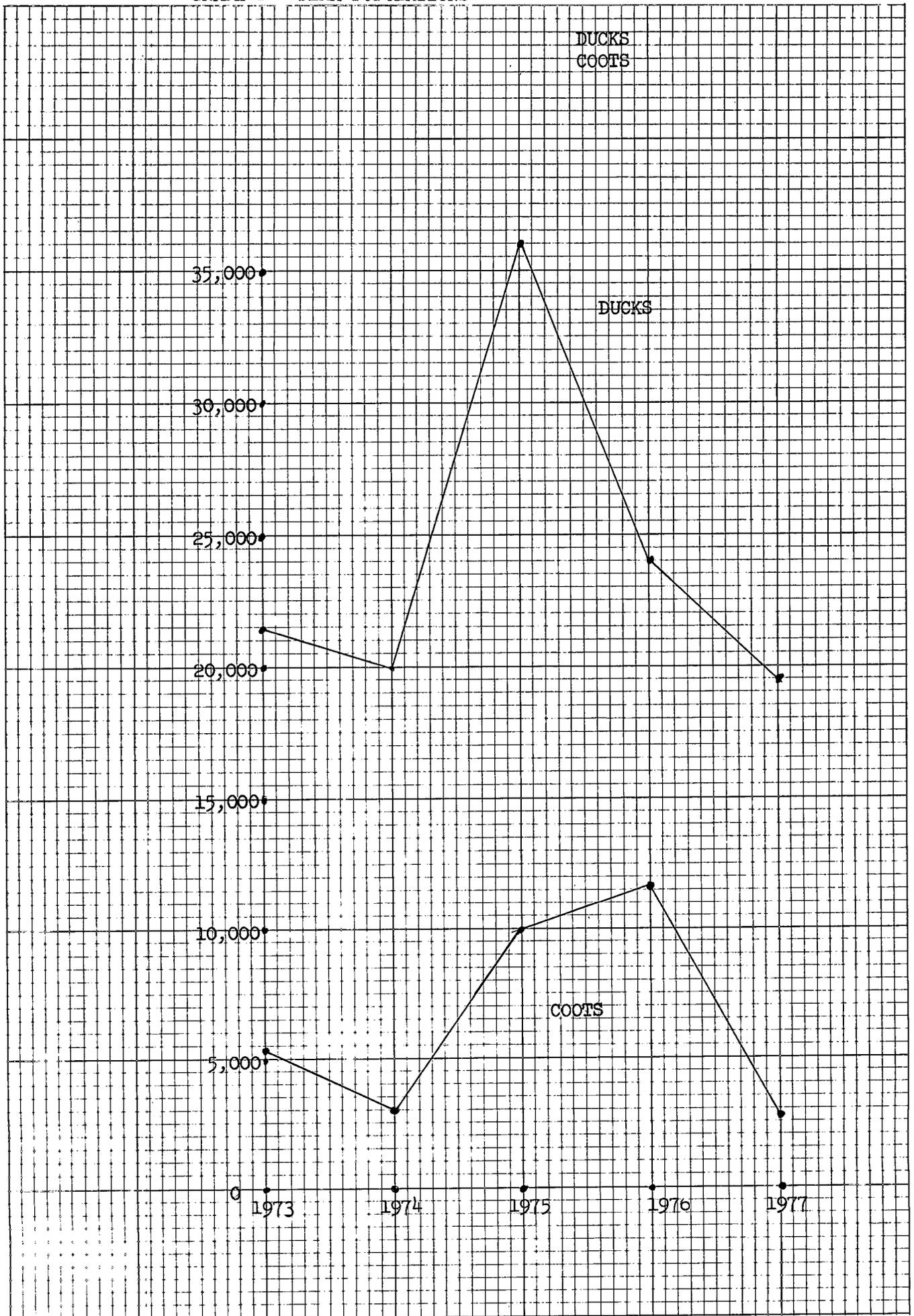
1977

EPSON-10 X 10 TO 1 INCH  
10TH LINE HEAVY

8



GRAPH 2 - PEAK POPULATIONS



FRONT: 10 X 10 TO 1 INCH  
10TH LINE HEAVY

g. Waterfowl Production

Waterfowl nesting on Pea Island consists of gadwall and black ducks. Black duck production was up 28% from last year's 125 to this year's 160. Gadwall went from 75 young in 1976 to 150 this year for a 100% increase. Production of both species on the refuge is as old as the refuge itself with fluctuations from year to year being quite erratic and unpredictable. Accuracy of the production counts depends to a great extent on the survey method, observers, and the thorough search of production areas.



Ohio type trap. (R1-9-78)

2. Marsh and Water Birds

<u>Year</u>	<u>Use Days</u>	<u>Peak Population</u>
1973	474,854	12,056
1974	235,525	6,951
1975	329,662	9,335
1976	339,362	9,942
1977	457,967	8,988
Five-year average	378,274	9,454

Total use days for marsh and water birds increased from last year by 35% and was 17% above the five year average. Peak populations for 1977 were 10% below last year and 5% below the five year period. Although peak populations were down slightly for '77 use days were up 35% meaning fewer birds stayed longer on the refuge.

No nesting data is available for the heron rookery in the North Pond impoundment but the spoil islands adjacent to the refuge were surveyed. Total breeding populations were estimated at: 80 glossy ibis, 200 great egrets, 100 snowy egrets, 400 Louisiana herons, 60 little blue herons, and 110 black-crowned night herons.

3. Shorebirds, Gulls, Terns, and Allied Species

<u>Year</u>	<u>Use Days</u>	<u>Peak Population</u>
1973	22,022,950	13,260
1974	1,928,580	15,540
1975	2,886,875	23,130
1976	5,981,225	146,329
1977	74,735,998	1,666,723
Five-year average	17,511,125	372,996

Use days for these species in 1977 was almost 13 times that of 1976 and 4 times the five year average. Peak populations this year were 11 times those of last year and 4 times the five year average. The sudden increases in 1977 can be attributed to very cold weather conditions for the winter of 1976-77 when large flocks of gulls were forced south to warmer conditions. Hugh flocks of ring-billed, laughing, herring, Bonaparte's, and great black-backed gulls remained on the refuge into February of 1977. Gulls alone in February numbered over 1.5 million.

Two least tern nesting attempts were made in different colonies on the refuge beach this year. As many as 50 nesting birds were observed on one of the sights. Before nesting was complete someone drove through the colony tearing down four posted signs while the other colony was abandoned for some unknown reason shortly after it was established. No young terns were observed to reach flight stage in either colony.

Tern colonies were counted on the spoil islands adjacent to the refuge in July. Breeding population estimates there were quite impressive. Seven out of the eleven islands surveyed had tern colonies established. Breeding populations on the islands were estimated as follows: 5,700 royal terns (with 2,250 immatures counted), 2,000 common terns, 100 least terns, 400 sandwich terns, 990 black skimmers, and 100 gull-billed terns.

#### 4. Raptors

<u>Year</u>	<u>Use Days</u>	<u>Peak Population</u>
1973	5,910	80
1974	8,650	135
1975	17,500	190
1976	8,585	85
1977	18,957	912
Five-year average	11,920	280

Raptor use days were up 120% from 1976 and 58% above the five year average. Peak populations for this year were also up by over 10 times that of 1976 and over 3 times the five year average. Apparent discrepancies in the data from year to year especially 1977 can be attributed to a great extent to one factor, methods of censusing. In past years surveys were done more or less at random but presently efforts are being made to conduct counts at periods of time when the fall migration is the highest. Raptor counts were best done here just ahead of storm fronts or between two fronts as the birds are moving south along their fall migration route.

Pea Island being a narrow strip of land in the fall migration path, makes it advantages to count the birds at the narrowest point on the refuge. David Lee, from the North Carolina Museum of Natural History in Raleigh, made raptor counts in October and November. On one day, he observed over 840 raptors including sharpshins, coopers, marsh hawks, ospreys, kestrels, merlins, and peregrine falcons.

#### 5. Other Migratory Birds

Other migratory birds have remained essentially the same for this year. Mourning dove populations increased over the past two years to peak in the 300-350 range. Savannah sparrow and prairie warblers were down slightly from 1976.

The 1977 Christmas bird count recorded 139 species with about 51,758 individuals as compared to 153 species and 84,644 individuals in 1976. The yellow-rumped warbler count was down from a high of 16,300 in 1976 to 8,600 in 1977. Lack of sufficient observers and boat coverage in the sounds and Atlantic contributed to the lower count.

## C. Mammals, Non-migratory birds and others

### 1. Game Mammals

Muskrat population has remained fairly stable. The Nutria population has increased over the past few years. Both the muskrat and nutria are causing some damage to the dikes and might need controlling in a few years by trapping.

Cottontail rabbit, river otter and opossum populations are very small. Otter are seen frequently, but rabbits and opossums are seldom seen.

### 2. Other Mammals

Ferrel cats continue to be a problem. Recently, people have been leaving dogs on the refuge. Both are eliminated whenever possible.

Occasionally marine mammals become beached or their carcasses wash up on the refuge beach. When this happens, Dr. Jim Mead, Smithsonian Institute, is notified and the mammals are salvaged. A small pilot whale and several porpoise were salvaged this year.

### 3. Resident Birds

The ring-necked pheasant appears to be healthy and fairly stable. Peak population in fall estimated at 500 birds. Production for 1977 estimated at 150 young.

### 4. Other Animals

No formal census were conducted nor population estimates made for any other species.

## V. Interpretation and Recreation

### A. Information and Interpretation

#### 1. On Refuge

In March of 1977, a new memorandum of agreement was approved for Pea Island National Wildlife Refuge (FWS) with the Cape Hatteras National Seashore (NPS). It was agreed that the National Park Service would be the lead agency for planning, management, and control of recreational activities not inconsistent with wildlife objectives of the refuge. The limited staff and facilities at Pea Island precludes any regularly scheduled interpretive programs. However, the Pea Island staff does present programs upon advance request to school, conservation, and other interested groups.

2. Off Refuge

One off-refuge presentation was made this year again to the Dunes of Dare Garden Club. There were approximately 35 women present at the program.

B. Recreation

1. Wildlife Oriented

Wildlife oriented recreational use on the refuge occurs in essentially two areas, that of fishing and wildlife observation. Fishing increased from 38.3% last year to 39.5% of the total public use for this year, 348,000 activity hours to 414,100 for 1977. Wildlife observation increased from 32.8% of total public use to 39.7% for this year while activity hours rose from 298,100 to 415,800 in 1977. Total public use amounted to 1,047,488 activity hours for the year. The rise in wildlife observation in 1977 is attributed to the overall increase in public use and better censusing techniques.

2. Non-Wildlife Oriented

Non-wildlife oriented recreation on Pea Island consists of off-road vehicling, swimming, picnicking, limited camping and other, which includes sunbathing and night travel through the refuge. These categories represent approximately 20% of the total recreation on the refuge with about 117,600 activity hours. Off-road vehicling in both non-wildlife and wildlife oriented recreation has steadily increased over the years to the point of being inconsistant with refuge wildlife management objectives. A public and wildlife use study was undertaken on the refuge beach this year to monitor the effects of ORV use. (See section VI, Field Investigations.)

C. Enforcement

Violations and Case Dispositions for 1977

<u>Violations</u>	<u>Forfeited Collateral</u>	<u>Outstanding</u>
Driving off designated roadway	15	3
Camping in closed area	7	1
Littering	1	1
Operating unlicensed vehicle	1	0
Operating vehicle in reckless manner	1	0
Other	<u>0</u>	<u>1</u>
Total	25	6

As seen from the preceeding chart, the bulk of violations on the refuge stem from ORV use, primarily "driving off the designated roadway" and "camping in closed area". In 1977, 58% and 26% respectively were attributed to these two violations.

Although driving on the refuge beach is allowed, driving on or through the dune system is not permitted. Access to the beach by vehicle is provided by three marked access ramps, one on each end of the refuge and one in the center. ORV's crossing the dune system in places where the dunes are low make up the bulk of the violations. For that reason standard regulatory signs are posted in appropriate locations to help curb these violations. However, signs are sometimes ignored or vandalized by knocking them down, shooting, painting, moving, or even stealing them on occasion.



ORV users on Pea Island often ignore regulatory signs and drive around them into the dunes as seen here by the vehicle tracks. (R3-14-77)



Vehicle tracks again give evidence of someone driving into the refuge dune system destroying the protective cover of beach grasses and sea oats. (R3-19-77)

## VI. Other Items

### A. Field Investigations

One wildlife management study was conducted in 1977 on the refuge entitled "Public and Wildlife Use on Beaches of the Pea Island National Wildlife Refuge". Objectives were to determine the composition, type and amount of wildlife use on the 13.2 miles of ocean beach there. Additional objectives were to determine and document conflict between wildlife use and both vehicular and non-vehicular public use. Daily public use surveys were made during each weekday and weekends on the beach on Pea Island National Wildlife Refuge. The survey period started on May 15, 1977 and ran through November 27, 1977.

During this period observations and records were made on the number of people, off-road vehicles (ORV's) plus avian species and abundance on predivided sections of the beach. High public use days (weekends and holidays) and lower public use days (weekdays) were compared. Numbers of birds and species were found to be consistently lower on high public use days and on high public use sections of the beach. Also, wildlife use surveys were made on weekends on a measured one mile stretch of beach on Pea Island and compared with those made on a one mile stretch of National Park Service beach on Bodie Island, a few miles north. The survey period was from June 4 through September 4, 1977,

a period during which no vehicles were allowed to drive the beach on the Bodie Island marked mile. Observations and records on the marked mile surveys included: avian species, total number of avians, ghost crab burrow counts, people, and ORV's. The ghost crab population on the undriven Bodie Island marked mile averaged almost 4 times higher than that of the driven Pea Island marked mile. Avian species richness and abundance were both found to be consistantly higher on the Bodie Island marked mile than on the Pea Island mile.

Date from both the general beach survey and the marked mile survey indicates that a definate conflict exists between wildlife use and public use (both vehicular and to a lesser extent non-vehicular) on the Pea Island NWR. A rough draft of the study has been completed and a final report is in progress.



ORV use on Pea Island NWR has increased in recent years to the point of conflict with our wildlife objectives. (R2-17-77)

B. Cooperative Programs

1. Caretta Research

Information on the Atlantic loggerhead sea turtle on Pea Island NWR is collected and sent to Caretta Research in Sanibel, Florida each fall when nesting activity is over. Data collected includes all sightings and nesting activity.

## 2. International Shorebird Survey

Data collected during regular shorebird surveys on the refuge is sent to Manomet Bird Observatory, Manomet Massachusetts. Any color-marked shorebird information gathered during this time is now sent to the Bird Banding Laboratory in Laurel, Maryland. From there notification is given to the banders who marked the bird if no USF&WS band applies.

## 3. Colonial Bird Register

Information concerning colonial nesting birds when available on the refuge or off is sent to Cornell University Laboratory of Ornithology.

## 4. Beached Bird Survey

Counts of dead or beached birds taken during regular beach surveys are supplied to Malcolm Simons of Port Charlotte, Florida. Information taken includes species, age, state of decomposition and amount of oil present on bird.

## C. Items of Interest

A study concerning the impacts of snow geese on salt marsh vegetation is being conducted on the refuge and on Bodie Island to the north of us. Tom Smith, a FWS employee on LWOP status, is conducting the research as a part of his masters degree. He has made several trips to the refuge for collecting birds and vegetation samples as well as monitoring several enclosures he has erected.

During the second week of November 1977, an asphalt barge ran aground a few miles south of the refuge. It was loaded with approximately 2 million gallons of liquid asphalt which quickly solidified. Exact leakage was unknown but minimal with an estimated 15,000 gallons picked up. Refuge Manager, N. F. Williamson responded to the incident. None of the asphalt spill reached the refuge and presented no hazard to the environment. The barge was refloated, at an estimated \$600,000.00. She was to be towed to deep water where she would not be a hazard to shipping and sank. While being towed to sea, she hit rough seas and sank in shallow water. No further attempts were made to get her into deep water.

## D. Safety

Staff and safety meetings were held monthly at Pea Island NWR. Meetings held at the refuge headquarters included films occasionally to supplement the discussion. Topics discussed include driving tips, eye protection, taking unnecessary chances, individual safety responsibility, power mower safety, and other safety procedures applicable to this station.