

Pea Island National Wildlife Refuge

Narrative Report

September 1 to December 31, 1962

William C. Good	Refuge Manager
Houston C. Phillips	Wildlife Aid
Marvin C. Toler	Laborer

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## I. GENERAL

### A. Weather Conditions.

The Bodie Island Weather Station, (National Park Service) records indicate generally good weather throughout September and October with rain in November. Precipitation was below normal during this period until November 25 when a severe Northeaster struck the Outer Banks and lay off shore for 10 days. This storm deposited 9.24 inches of rain and carried winds up to 48 mph. Severe damage to the refuge dune system resulted from wave and wind action and resulted in a total loss to the newly established dune system extending southward from Pea Island Station to the south boundry. Sea water surged through the broken dune system to carry debris into the fence with resulting damage to it. On December 7 a Southwester of 5 days duration sent Pamlico Sound waters over all open pastures, the highway and carried additional debris into the fence. On December 11, the Southwester subsided and north winds brought a deep freeze to the Refuge which lasted for 10 days. Ponds and shallows were frozen. Pamlico Sound was filled with drift ice. A second deep freeze with 17 degree temperature and 30 mph NNW winds decended on the Banks on December 31 and again ponds and shallows became frozen and drift ice formed on Pamlico Sound. A trace of snow was recorded on December 12.

<u>Month</u>	<u>Precipitation</u>			<u>Temperatures</u>	
	<u>This Month</u>	<u>Normal</u>	<u>Dev. from Normal</u>	<u>Max.</u>	<u>Min.</u>
Sept.	4.98	6.96	-1.98	88	53
Oct.	1.65	4.80	-3.15	85	32
Nov.	8.87	3.03	+5.84	69	36
Dec.	<u>6.22</u>	<u>3.32</u>	<u>+2.90</u>	<u>62</u>	<u>17</u>
Totals	21.72	18.11	+3.61	Extremes	88 17

The above data taken from records furnished by the National Park Service reflect conditions at their Bodie Island Weather Station as well as weather conditions on the refuge since Bodie Island is only three miles north of Pea Island.

Precipitation measured 13.81 inches more from the September-December 1962 period than for the corresponding period of 1961. The maximum temperature was 8 degrees lower and the minimum temperature was 5 degrees lower than the corresponding 1961 period.

Precipitation in 1962	62.01 inches
Average Normal Annual Precipitation	<u>49.30</u> "
1962 Deviation from Normal	+12.71

B. Habitat Conditions.

1. Water

Staff gauge readings indicate adequate water in both ponds throughout the reporting period. The Northeaster of 11/25 raised both north and south Ponds 1.22 feet above the November 1 reading. Flooding of planted pastures and the highway r/w resulted. On December 14, both pond gates were opened to relieve this condition, remove water interfering with the bulkhead installation in both ponds and permit normal feeding on pond aquatics.

The Northeaster dewatered vast areas of Pamlico Sound and the associated Northwester caused excessive flooding and above normal high tides. The Sound waters remained roiled at the end of the reporting period.

Staff gauge readings for both ponds follow with 1961 readings for comparative purposes:

	<u>Gauge Readings</u>			
	<u>North Pond</u>		<u>South Pond</u>	
	<u>1961</u>	<u>1962</u>	<u>1961</u>	<u>1962</u>
September	4.26	4.28	4.12	4.18
October	3.98	4.18	3.90	4.28
November	3.82	4.96	3.96	5.04
December 14		5.40		5.50
December	3.92	5.04	3.90	4.64

Water salinity tests were carried out during the period to evaluate the sea water content in both ponds with reference to flooding from the March 7th storm. The silver nitrate titration method was used to determine the following readings:

Water Salinity Tests During Period  
(Readings in % of Sea Strength)

Date	<u>North Pond</u>			<u>South Pond</u>		
	<u>North End</u>	<u>At Gauge</u>	<u>Gauge Reading</u>	<u>North End</u>	<u>On West Side</u>	<u>Gauge Reading</u>
<u>7/28</u>	<u>19.55</u>	<u>16.92</u>	<u>4.28</u>	<u>10.10</u>	<u>9.97</u>	<u>4.58</u>
12/3	13.35	12.42	5.38	5.90	5.74	5.52

## 2. Food & Cover

Approximately 70 acres of common ryegrass was planted for winter pasture and started off with a good growth. The northeaster of 11/25 and the associated southwester of 12/7 spilled drifting sand over this field from 1" to 3" in depth. The North Pond filled to capacity and overflowed on the pasture with resulting serious "puddling" by both geese and ducks. Two periods of subfreezing weather (12/11 and 12/31) completed the destruction of this field for use as pasture.

Mixed native flora within both ponds was extensively used by all waterfowl and is now nearly gone. The South Pond had less dense growth of native plants and was less heavily used than the North Pond. Manager Noble, in the May-August '61 Narrative Report, lists the following acuatics available for food: mushgrasses, sago pondweed, widgeongrass, redhead grass, wild celery and smartweed.

Spartina alterniflora, American three-square, robust three square and wild millet in the marsh areas was undamaged by the storms and subfreezing weather and was heavily used by waterfowl. Heavy feeding on widgeongrass and shoalgrass in Pamlico Sound also occurred. Near the end of December, snowgeese moved into adjacent Bodie Island to continue feeding on marsh areas.

## II. WILDLIFE

### A. Migratory Birds.

#### Waterfowl

In late September the first of the wintering waterfowl started to arrive with 1750 ducks being counted on September 28. The buildup was gradual and the peak numbers for the season are as follows: 350 whistling swan, 7000 Canada Geese, 20 Blue Geese, 8500 Snow Geese and 4600 ducks. There was an approximate 80% increase in swan over the 1961 reporting period. The figures for other waterfowl correspond to the 1961 season. Many young, 3-5 per family, snow geese are present this season.

#### Other Migratory Birds

Herring and ring-billed Gulls were common. An occasional Wilson Snipe was seen on the ryegrass field as was an occasional Mourning Dove.

B. Upland Game Birds.

Ring-necked Pheasants are quite common on the Refuge and are found around the Ponds or in the wild pastures along the highway.

C. Fur Animals.

Muskrat, otter, nutria and mink comprise the refuge fur animal population and in sparse numbers. No predation has been noted. Food and cover for all species is adequate.

D. Hawks and Eagles.

Marsh, duck and sparrow hawks used the refuge in late Fall. No Eagles have been sighted. No predator pressure by Hawks has been noted.

E. Fish.

Only saltwater fishing is done on the ocean front. Poor catches by sportfishermen were reported due to severe weather conditions and roiled ocean water.

F. Diseases.

No dead Canada Geese have been found so far this season and as yet there is no indication of any disease problem.

### III. REFUGE DEVELOPMENT & MAINTENANCE

A. Physical Development.

A contract was let by the Regional Office for repair to the Pond dikes and the contractor started operations on December 13. This repair consists of installing a sheet piling bulkhead and backfilling to an elevation of 6.8 ft. above sea level.

2500 feet of copper wire was delivered relative to repair of the March 7 storm damage to the highway fence.

Maintenance of buildings and equipment, plowing of fire lines and farming rounded out the maintenance and operations program.

B. Plantings-Cultivated Crops.

Planting of approximately 60 acres of common ryegrass in the North Pond field and 10 additional areas in a strip between the two Ponds was carried out. Both pastures were top dressed with granular ammonium nitrate. Growth was good until the November 25 storm which covered the fields with sand and water. Heavy feeding and subfreezing weather has destroyed the usefulness of these pastures for this season.

C. Collections and Receipts.

Nothing to report.

D. Control of Vegetation.

25 acres of wax myrtle was plowed down during the year between the two impoundments. 3 acres of cattail in both impoundments were treated with dalapon at the rate of 185 lbs. acid equivalent per acre during the summer. *Typha domingensis* and *T. augustifolia*, in patches, were treated with gun jet equipment. Estimated material cost for cattail treatment is \$362.40.

E. Planned Burning.

To be reported in the Narrative Report ending April 30.

F. Fires.

One 10 acre brush fire occurred on September 14. It is believed to have been caused by sun's rays shining through a bottle. Cost: PAWS 23 man hours and \$45.00. Contributed: 18 hours man hours by N.P.S. and Coast Guard personnel. Controlled by fire flaps and back firing. No other damage.

#### IV. RESOURCES MANAGEMENT

No resource harvesting permits are in force and no financial income from refuge resources is obtained.

#### V. FIELD INVESTIGATIONS

Continued observations with reference to the March 7 storm damage to the fresh water ponds continued throughout the period and are reported elsewhere in this report.

#### VI. PUBLIC RELATIONS

Recreational uses of the refuge include sightseeing, wildlife observa-

tions, beachcombing, fishing and photography.

A. Recreational Uses.

Total recreational use days, as determined by occasional spot checks, will be found on Form NR-6

B. Refuge Visitors.

1. Registered Visitors.

Total registered visitors at Field Headquarters were 221, which was an increase over the corresponding period last year. Visitors registered this period were from the following states and Canadian Provinces: Connecticut, Virginia, North Carolina, Washington, D. C., New York, Ohio, Massachusetts, Indiana, Pennsylvania, Tennessee, Florida, Oklahoma, Delaware, New Jersey, Vancouver, British Columbia, California, South Carolina, New Hampshire, Ontario and Quebec, Rhode Island, Maryland and Illinois.

2. Official Visitors

<u>Date</u>	<u>Name and Organization</u>	<u>Address</u>
9/24	Mr. Wm. C. Goodale, RO Engineer	Atlanta, Ga.
9/27	Mr. Wed. E. Thurston, RO Engineer	" "
10/8	Mr. Wm. C. Good, Presquile N.W.R.	Chester, Va.
	Mr. Clark Webster, RO Biologist	Savannah, Ga.
10/18	Mr. Wm. C. Good, Presquile N.W.R.	Chester, Va.
12/14	Mr. Ed Nash, NPS Engineer	Manteo, N.C.
12/19	Mr. Billy F. Horton, RO Engineer	Atlanta, Ga.
	Mr. James A. Taylor, RO "	" "
	Mr. Leland H. Barrineau, RO Property Management	" "

C. Refuge Participation.

Nothing to report.

D. Violations.

Nothing to report.

E. Safety.

Four safety meetings were held during the period. Subjects covered were:

September: Danger involved in carrying extra gasoline in vehicles, spontaneous combustion in foam rubber, safety in use of boats and boat equipment.

October: Wire Prevention

November: Automotive seat belts and their use

December: Review of Cy 1962 Safety Program

There were no accidents during the period. 1775 calendar days have passed without an accident. Approximately 24,836 man hours of work have been performed without a lost time accident. The last accident on Pea Island occurred on January 21, 1958.

Seat belts were installed in refuge automotive equipment, fogged truck mirrors replaced and a building safety inspection was carried out.

VII. OTHER ITEMS

Items of Interest

1. On November 2, William C. Good relieved Charles F. Noble as Manager.
2. On November 19, Messrs. Horton, Taylor and Barrineau of the Regional Office, visited the Refuge with reference to Pond dike repair, survey of the November 25 storm damage and construction of the new headquarters unit.
3. The November 25 Northeaster, which caused loss of 4½ miles of Refuge Dune System also caused considerable damage to the National Park Service installations and to North Carolina Highway #1001. The bridge between Avon and Buxton was damaged and the approaches destroyed. The enlarged New Inlet cuts off the lower end of Hatteras Island and communication is now only by ferry. The Corp of Engineers, The National

Park Service and North Carolina Highway Department have agreed on filling New Inlet by means of dredging and work is to begin at once on this project.

4. The National Park Service have just now resumed grass planting and sand fence erection on Pea Island to conclude this phase of the March 7 storm repair.

B. Photographs.

There are no photographs for the period. Photographs taken on my personal camera were fogged and are not usable.

C. Signature.

Date Completed: January 16, 1963

Approval:



Acting Regional Wildlife Supervisor

Respectfully submitted,

  
William C. Good  
Refuge Manager

JAN 13 1962

After the Narrative Report was completed, we were able to arrange for copies of National Park Service pictures, through the courtesy of R. K. Rundell, Asst. Superintendent, Cape Hatteras National Seashore. These aerial pictures were taken by V. C. Gilbert of U.S.N.P.S. on November 30, 1962 which was approximately the mid point of the Northeaster.

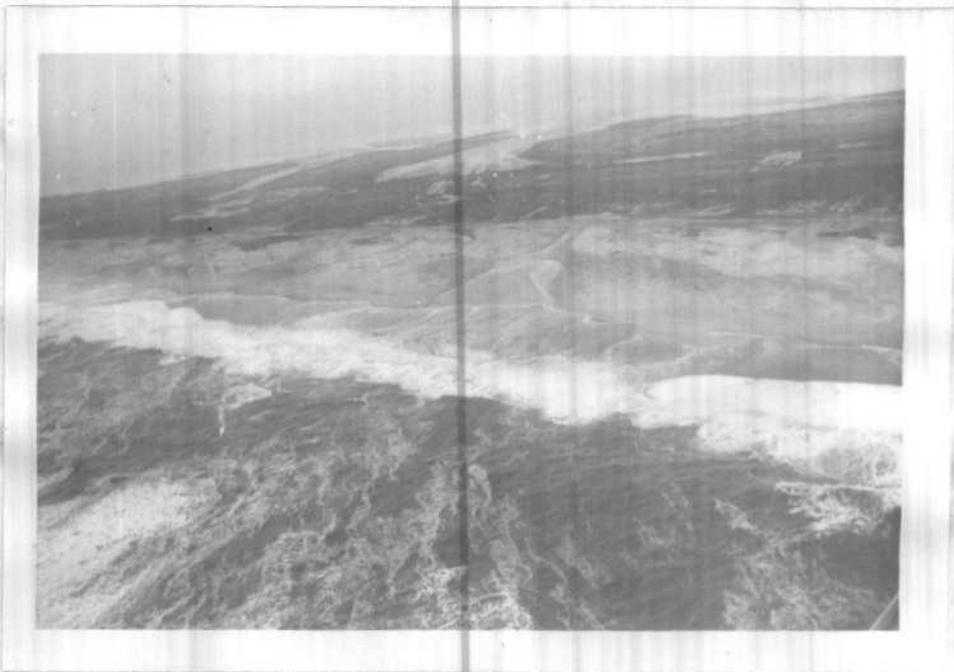
  
William C. Good



Flooded impoundment -- North Pond  
November 25 Northeaster



Pea Island Station & New Inlet Bridge  
November 25 Northeaster



Break through of Barrier Dunes, south of  
Pea Island Station and north of Rodanthe  
November 25 Northeaster

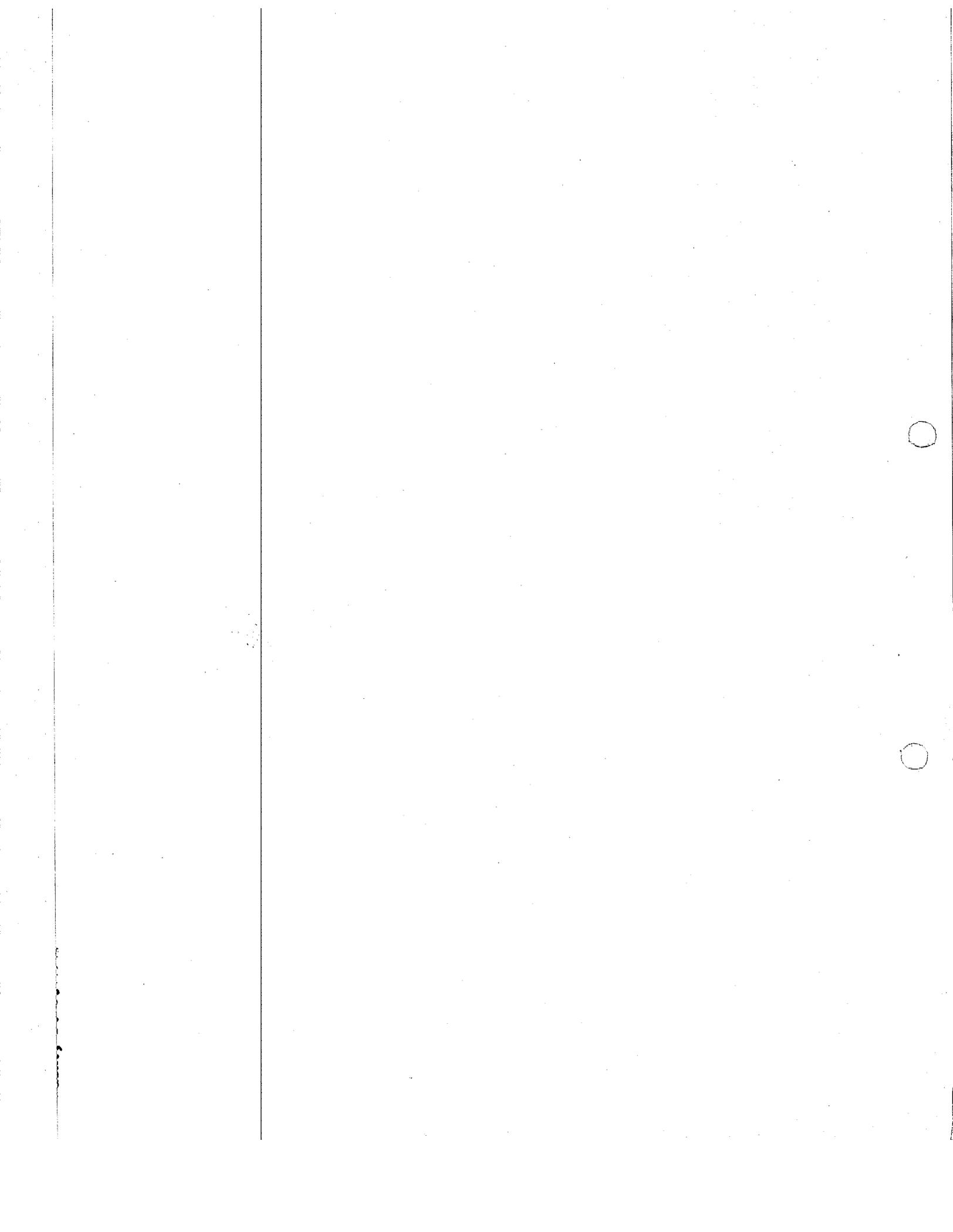
W A T E R F O W L

REFUGE Pea Island Refuge

MONTHS OF Sept. 1 TO Dec. 31, 1962

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
	<u>Swans:</u>									*
Whistling Trumpeter										
<u>Geese:</u>										
Canada						20	50	100	2200	2000
Cackling Brant										
White-fronted Snow										
Blue Other										
<u>Ducks:</u>										
Mallard										
Black					150	200	200	300	500	400
Gadwall					100	100	100	50	50	250
Baldpate					800	800	700	200	3500	3500
Pintail					500	600	300	400	1000	1100
Green-winged teal								50	200	100
Blue-winged teal					200	150	100	50		20
Cinnamon teal										
Shoveler										
Wood										
Redhead										
Ring-necked Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy									6	50
Other										
<u>Coot:</u>										
									150	600

\* Estimated, based on '61 census



3 -1750a

Cont. NR-1

(Rev. March 1953)

W A T E R F O W L  
(Continuation Sheet)

REFUGE Sea Island RefugeMONTHS OF Oct. 1 TO Dec. 31, 1962

(1) Species	(2) Weeks of reporting period								(3) Estimated	(4) Production	
	11	12	13	14	15	16	17	18	waterfowl days use	Broods: seen	Estimate total
<b>Swans:</b>											
Whistling	27	265	350	300	350	350	325	325	16,233		
Trumpeter											
<b>Geese:</b>											
Canada	2500	4780	6500	7000	7000	7000	7000	7000	374,150		
Cackling											
Brant											
White-fronted											
Snow	800	2500	5500	6500	500	6000	6000	6000	318,800		
Blue	12			20	20	20		20	644		
Other											
<b>Ducks:</b>											
Mallard		25	50	100	200	150	150	100	5,125		
Black	800	710	850	1000	1000	900	800	1000	57,470		
Gadwall	50								1,900		
Baldpate	3550	300	1500	1000	1000	800	800	1000	144,550		
Pintail	1300	415	800	600	500	100	100	600	58,905		
Green-winged teal	100		300	200	300	250	150	200	12,250		
Blue-winged teal	20								3,780		
Cinnamon teal											
Shoveler							50	50	700		
Wood											
Redhead											
Ring-necked				200		150	50	50	3,150		
Canvasback											
Scaup			150	50	500	300	200	200	2,200		
Goldeneye											
Bufflehead		265	250	200	600	450	300	300	16,625		
Ruddy	330	300	500	500	500	500	600	600	30,332		
Other											
Hooded Merganser						20	20	20	420		
Common Merganser		6				150	100	200	3,412		
<b>Coot:</b> American	1200		1400	1200	1200	500	500	1000	51,250		

(over)

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans	16,233	350	
Geese	720,594	15,520	
Ducks	352,149	5,750	
Coots	54,250	1,400	
Total Waterfowl use Days: 1,143,226			

**SUMMARY**  
 Wildlife Refuge, Rancho Conejo, Soledad  
 Principal feeding areas fresh water impoundments, salt  
 marshes, sand dune areas and ryegrass fields

Principal nesting areas None this period

Reported by William C. Ford  
 William C. Ford, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).



(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove			5 11/20		25
IV. <u>Predaceous Birds:</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow Sparrow Hawk			1 12/26  2 11/20		5  5

Reported by *William C. Ford*  
~~William C. Ford, Refuge Manager~~

**INSTRUCTIONS**

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)  
 II. Shorebirds, Gulls and Terns (Charadriiformes)  
 III. Doves and Pigeons (Columbiformes)  
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

UPLAND GAME BIRDS

Refuge Sea Island Months of Sept. 1 to Dec. 31, 19 62

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'vd.	Estimated Total		Hunting	For Re- stocking	For Research		
Common Name	Pertinent information not specifically requested. List introductions here.									
Ring-necked pheasant	Dikes, wax myrtle growths, uplands and marshes				1 m / 4 f				200	

## INSTRUCTIONS

### Form NR-2 - UPLAND GAME BIRDS.\*

- (1) SPECIES: Use correct common name.
  - (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
  - (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
  - (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
  - (5) REMOVALS: Indicate total number in each category removed during the report period.
  - (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
  - (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.
- 

\* Only columns applicable to the period covered should be used.

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
Common Name	Cover types, total Acreage of Habitat	Number												
	Pea Island has no big game animals													

Remarks:

Reported by William C. Good  
*William C. Good*  
 William C. Good, Refuge Manager

## INSTRUCTIONS

### Form NR-3 - BIG GAME

- (1) **SPECIES:** Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) **DENSITY:** Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) **YOUNG PRODUCED:** Estimated total number of young produced on refuge.
- (4) **REMOVALS:** Indicate total number in each category removed during the year.
- (5) **LOSSES:** On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) **INTRODUCTIONS:** Indicate the number and refuge or agency from which stock was secured.
- (7) **TOTAL REFUGE POPULATION:** Give the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.

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- (8) **SEX RATIO:** Indicate the percentage of males and females of each species as determined from field observations or through removals.

DISEASE

Refuge Pea Island Year 1962

Botulism

Lead Poisoning or other Disease

Period of outbreak \_\_\_\_\_

Period of heaviest losses \_\_\_\_\_

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) \_\_\_\_\_

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) \_\_\_\_\_

Condition of vegetation and invertebrate life \_\_\_\_\_

Remarks \_\_\_\_\_

Kind of disease \_\_\_\_\_

Species affected \_\_\_\_\_

Number Affected	Actual Count	Estimated
Species		
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered \_\_\_\_\_

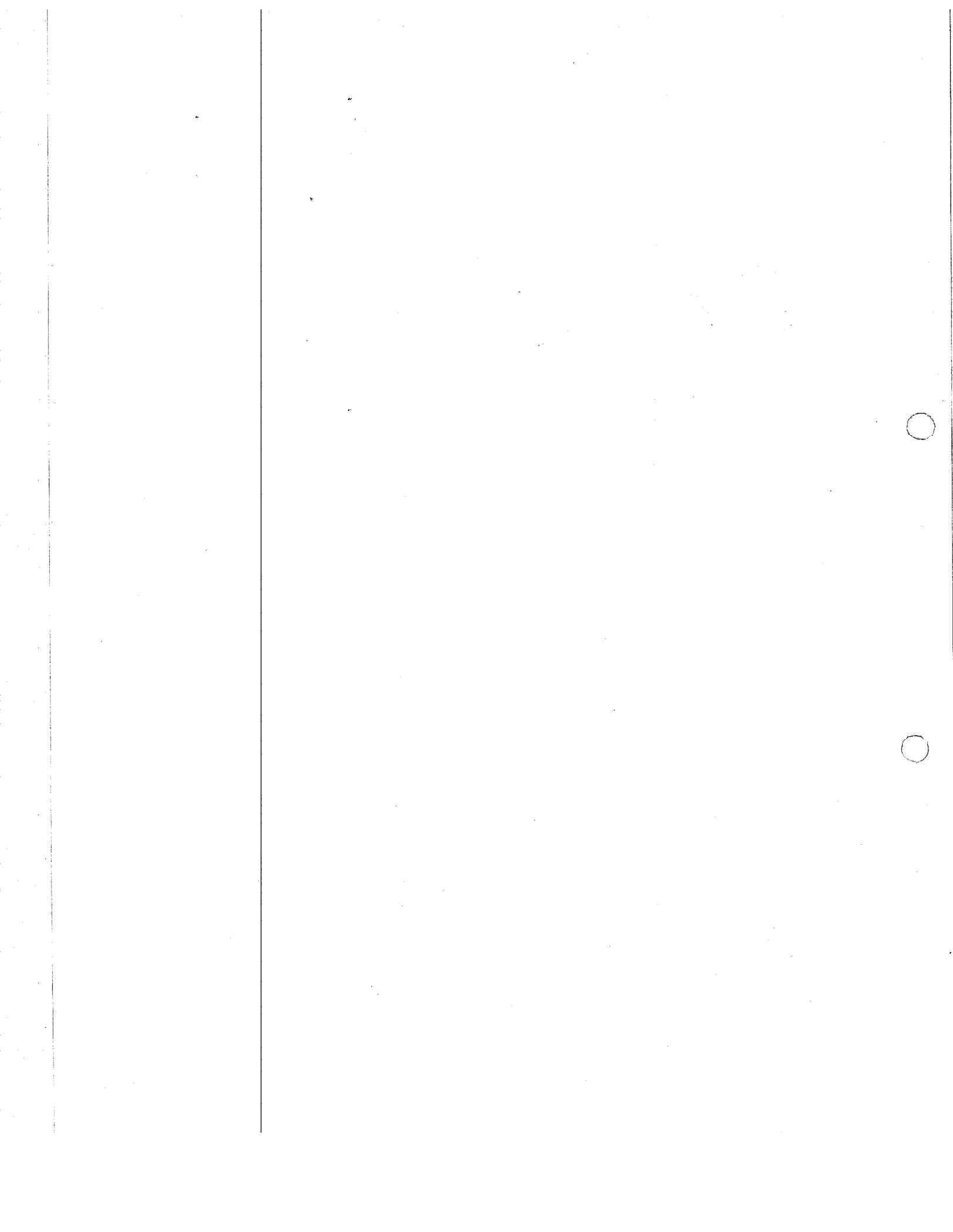
Number lost No losses to waterfowl from 11/2 to end of GY 1962.

Source of infection \_\_\_\_\_

Water conditions Adequate

Food conditions Ryegrass fields badly damaged by winter storms. Native foods virtually undamaged. Malnutrition losses may occur as native foods become exhausted on refuge and Bodie Island.

Remarks Report based on observations by Good following transfer to Pea Island as of 11/2/62.



PUBLIC USE

Refuge Pea Island

Calendar Year 1962

Total Use Visitor-Days	Hunting Use	Fishing Use	Miscellaneous Use
18,000	None	6,000	12,000

Where practical, by means of occasional spot checks, or other methods, show by percent and visitor-days the breakdown of the above figures and other related information:

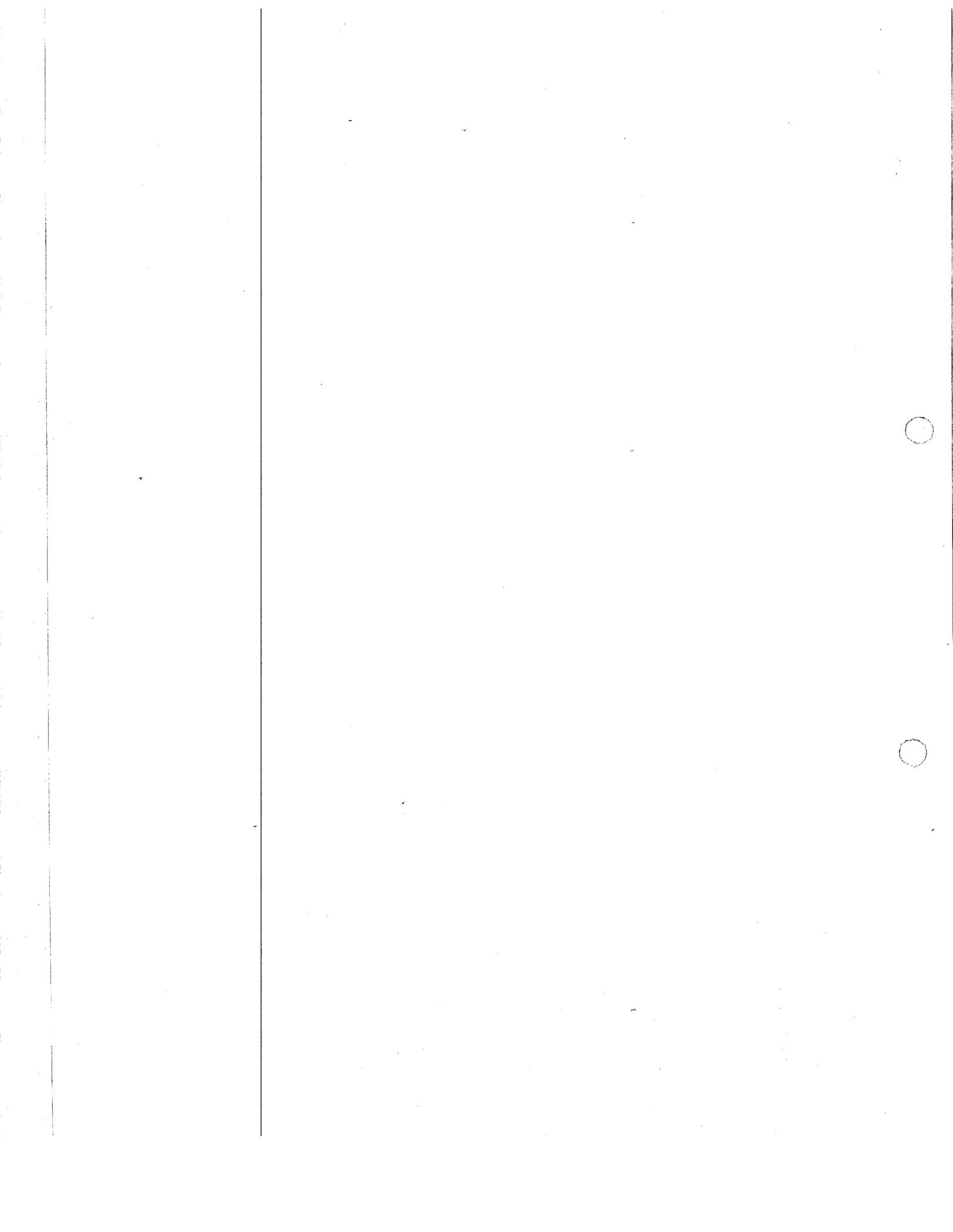
Hunting (on refuge lands):	Percent	Visitor-Days	Acres	Miscellaneous:	Percent	Visitor-Days
Waterfowl		None		Recreation *	25	4,500
Upland Game		None		Official		
Big Game		None		Economic Use		
Supervised by refuge		by State	No. of blinds	Other	75	18,500

Hunting (off  
refuge lands): Estimated man-days of hunting on lands  
 adjacent to the refuge 1,300 (These figures  
 should not be included in hunting-use totals above).

Fishing:

Acres of ponds or lakes \_\_\_\_\_ and miles of streams 13 mi. of ocean front and inlet shoreline  
 \_\_\_\_\_ open to fishing.

\*(including picnicking, swimming, boating,  
 camping, viewing wildlife, and photographing)



Refuge Sea Island

Calendar Year 1962

Facilities

Picnic areas: 1 tables 16 fireplaces 0 toilets 1  
drinking water 0 shelters 0

Swimming: designated areas 0 bathhouses 0

Boating: launching sites 0 rental facilities 0  
service facilities 0  
are motors allowed \_\_\_\_\_ maximum horsepower \_\_\_\_\_

Camping: permitted Yes or not permitted \_\_\_\_\_  
tent camps Yes total capacity 16 campsites  
group camps 0 total capacity \_\_\_\_\_  
hunter camps 0 total capacity \_\_\_\_\_  
trailer camps Yes  
lodges 0 capacity \_\_\_\_\_  
cabins 0 motels 0 total units \_\_\_\_\_

Tours: Season None frequency \_\_\_\_\_  
self-guided nature trails 0 is trail leaflet available? \_\_\_\_\_  
self-guided auto tour route 0 is tour leaflet available? \_\_\_\_\_  
All tours are pre-arranged and are usually limited to groups.

Access points: estimate number in public use 1

General - Brief statement of two to five lines on recreational opportunities available on refuge (suitable for inclusion in refuge leaflets or briefing reports). 13 miles of ocean front and inlet are available for surf fishing. Adequate opportunities prevail in winter for bird photography and observation. One overlook platform open to the public is situated on an impoundment dike; nearby there is a paved parking area.

(Over)

INSTRUCTIONS

Supply numbers wherever appropriate. These may be estimated if necessary.

Where operation and maintenance is supervised by this Bureau, but the responsibility of a concessioner, group, or agency, indicate by a single \*. Where supervision of such activities is by another Federal Bureau indicate by two \*\*.

(1)  
 NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

Refuge Pea Island Year 19 62

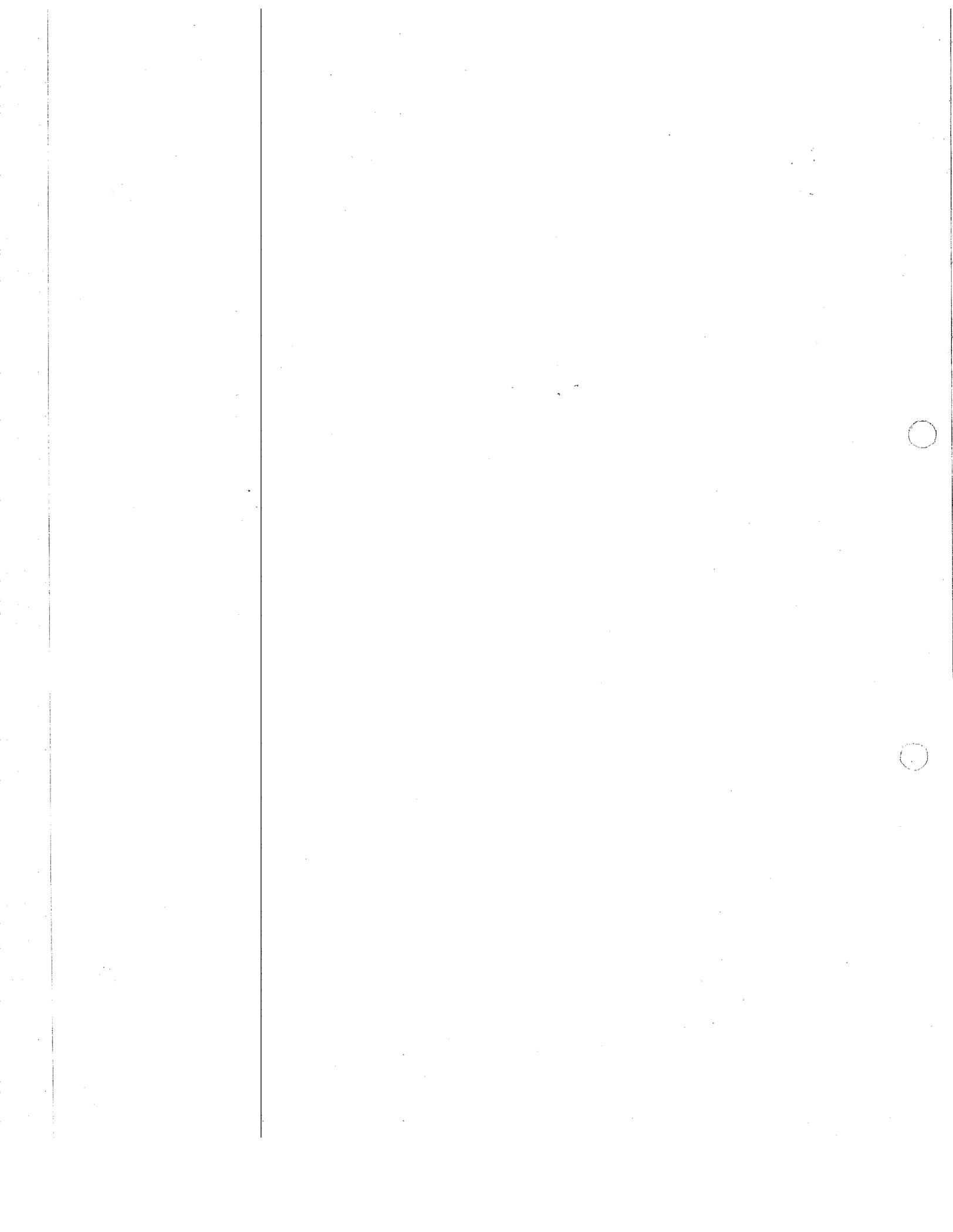
As of October 31, 1962

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
							Dunes		90 acres (433,040 sq. yd)	Beach grasses			

- (1) Report agronomic farm crops on Form NR-8
- (2) C = Collections and R = Receipts
- (3) Use "S" to denote surplus

Remarks: Plantings by US National Park Service on a reimbursable basis for Fish and Wildlife Service at Pea Island NWR and land identified by NIS as A/C 128.1 FW

Total acreage planted:  
 Marsh and aquatic \_\_\_\_\_  
 Hedgerows, cover patches \_\_\_\_\_  
 Food strips, food patches \_\_\_\_\_  
 Forest plantings \_\_\_\_\_



3-1758  
 Form NR-8  
 (Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Sea Island County Ware State North Carolina

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested		Unharvested				
			Acres	Bu./Tons	Acres	Bu./Tons			
Annual Ryegrass							70	Annual ryegrass for winter goose browse	70
(Harvesting accomplished by refuge personnel.)									
								Fallow Ag. Land	

No. of Permittees: Agricultural Operations 0 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle				
				2. Other				
				1. Total Refuge Acreage Under Cultivation				70
Hay - Wild				2. Acreage Cultivated as Service Operation				70

DIRECTIONS FOR PREPARING FORM NR-8  
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

## REFUGE GRAIN REPORT

Refuge Sea Island

Months of Jan. 1 through Dec. 31, 1952

(1) VARIETY*	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED OR SUITABLE USE*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
one											

(8) Indicate shipping or collection points \_\_\_\_\_

(9) Grain is stored at \_\_\_\_\_

(10) Remarks \_\_\_\_\_

\*See instructions on back.

## REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

**Report all grain in bushels.** For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
  - (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
  - (4) A total of columns 2 and 3.
  - (6) Column 4 less column 5.
  - (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
  - (8) Nearest railroad station for shipping and receiving.
  - (9) Where stored on refuge: "Headquarters granary," etc.
  - (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.
-

3-1759  
Form NR-9  
(April 1946)

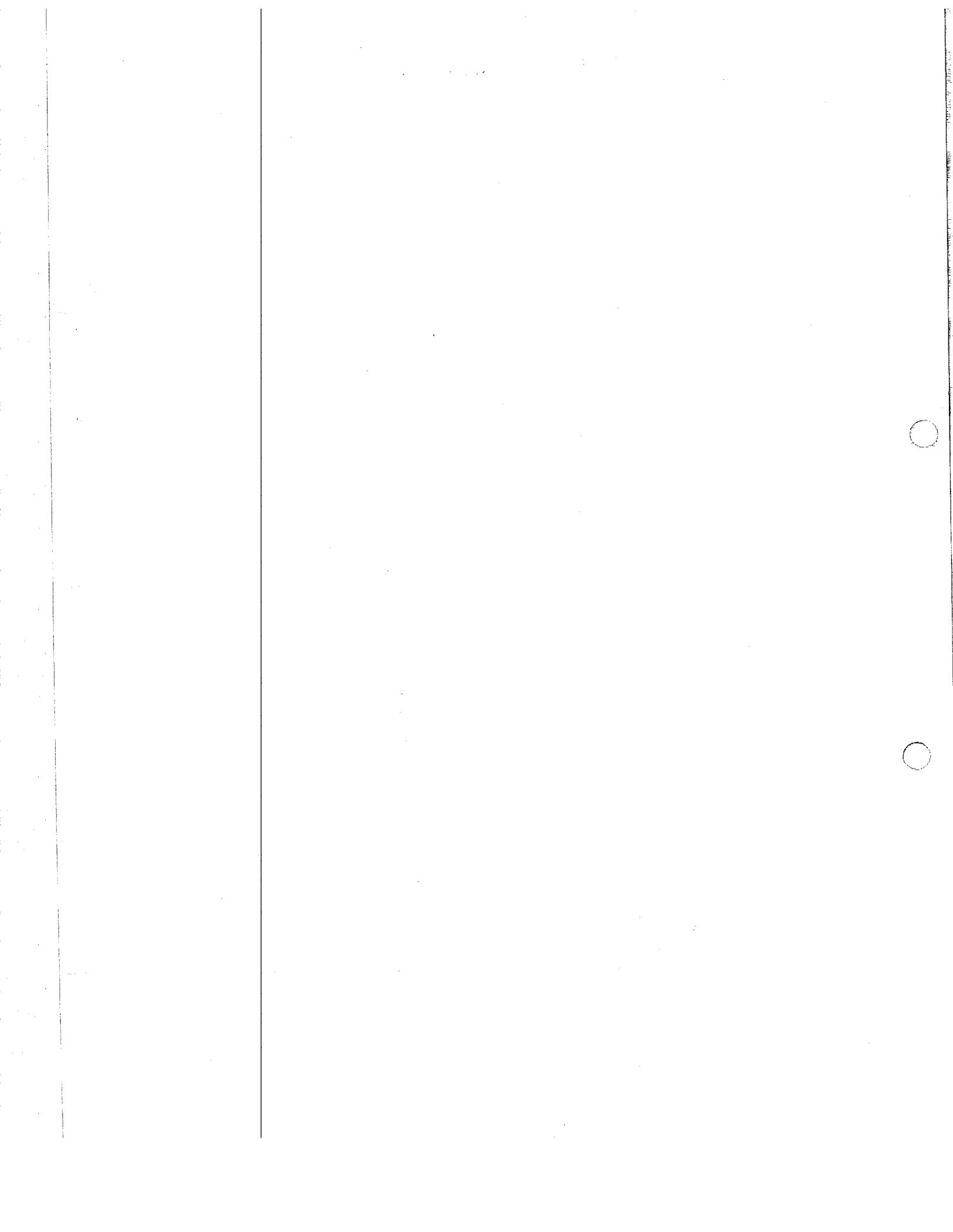
COLLECTIONS AND RECEIPTS OF PLANTING STOCK  
(Seeds, rootstocks, trees, shrubs)

Refuge Pea Island

Year 1952 62

Species	Collections				Receipts		Total Amounts on Hand	Amount Surplus
	Amount	Date or Period of Collection	Method	Unit Cost	Amount	Source		
None for the year								

Interior Duplicating Section,  
Washington 25, D.C. 17262



Refuge Dee Island

Year 1962

Permittee	Permit No.	Unit or Location	Actual Acreage Utilized	Animal Use Months	Tons of Hay Harvested	Period of Use From - To	Rate	Total Income	Remarks
<p>Nothing to report.</p>									

Totals:

Acreage grazed \_\_\_\_\_

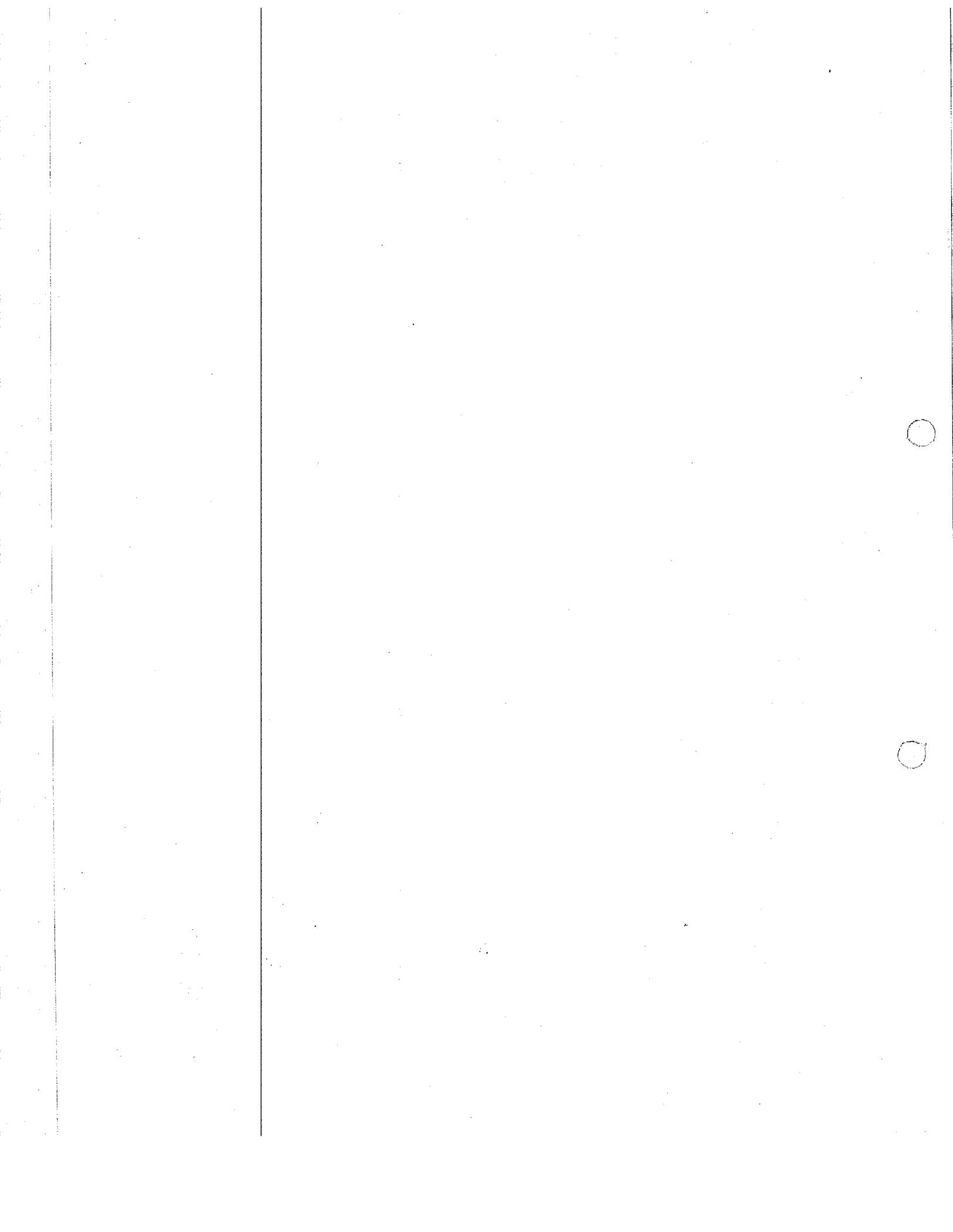
Animal use months \_\_\_\_\_

Total income Grazing \_\_\_\_\_

Acreage cut for hay \_\_\_\_\_

Tons of hay cut \_\_\_\_\_

Total income Haying \_\_\_\_\_



TIMBER REMOVAL

Refuge.....Waikanae Island..... Year 19452

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
one								

Total acreage cut over..... Total income.....

No. of units removed B. F. .... Method of slash disposal.....

Cords.....

Ties.....

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PEA ISLAND NATIONAL WILDLIFE REFUGE

Narrative Report for the Period May 1 through August 31, 1962

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PEA ISLAND NATIONAL WILDLIFE REFUGE

REFUGE NARRATIVE REPORT

May 1 through August 31, 1962

Charles F. Noble, Refuge Manager  
Houston C. Phillips, Wildlife Aid  
Marvin C. Toler, Laborer

I. GENERAL

A. Weather Conditions

Weather has been good. The temperatures, winds, and rain have been near that which can be expected during a normal summer period. Some heavy rains occurred during mid and late summer. One weak storm passed off the coast on Aug. 27 which influenced tides and brought rain; it was not large enough to do any damage in this area. Prior to June 29, May and June had been dry with only 3.70 inches of rain for almost a two month period. During the next six days the rains fell-10.12 inches; this was a very wet time, but Pea Island needed it.

Rainfall for the period was 5.25 inches above the six year average. Temperature extremes were a high of 94 degrees recorded on July 15 and a low of 50 degrees recorded on June 19.

The following table provides weather data from the Bodie Island weather station operated by the National Park Service. It is located 3 miles north of the refuge and reflects weather conditions on the refuge.

<u>Month</u>	<u>Precipitation</u>			<u>Temperatures</u>	
	<u>This Month</u>	<u>Normal</u>	<u>Dev. from Normal</u>	<u>Max.</u>	<u>Min.</u>
May -	1.66	2.91	-1.25	91	52
June -	7.38	2.90	+4.48	90	50
July -	7.39	4.36	+3.03	94	61
August -	6.20	7.21	-1.01	92	67
Totals -	22.63in.	17.38in.	+5.25	Extremes - 94	50

B. Habitat Conditions

1. Water Conditions

Neither the North or South Pond bottoms have been exposed this summer. The impoundment water levels dropped to their lowest point in the middle of June; the North Pond staff gauge reading was 3.74 feet and the South Pond was 3.62 feet. This condition occurred just prior to the heavy rains of late June and early July. Water levels of the ponds throughout the remainder of the summer were satisfactory and in some cases exceptionally high for the summer period. Following are staff gauge readings taken near the end of each month from both North and South Ponds. 1961 and 1962 readings are provided for comparative purposes.

Staff Gauge Readings

<u>End of Month</u>	<u>North Pond</u>		<u>South Pond</u>	
	<u>1961</u>	<u>1962</u>	<u>1961</u>	<u>1962</u>
May -	4.22	4.18	4.22	4.10
June -	4.32	3.74	4.38	3.62
July -	3.90	4.30	4.10	4.16
August -	4.56	4.20	4.40	4.42

No turbulent water conditions developed on the Pamlico Sound Shoals this summer. Normal fluxuations in water levels have existed throughout the period bringing about good Sound water conditions.

The change in water salinity content in the two impoundments since the March 7th storm has been the most important condition of water habitat to evaluate during this period. This condition has, of course, brought about significant changes in the ecology of the two impoundments. A frequent schedule of water salinity testing within the impoundments has been followed during the period. The silver nitrate titration method was used. A summary of the results of these tests will be found in the following table.

Water Salinity Tests During Period  
(Readings in % of Sea Strength)

<u>Date</u>	<u>North Pond</u>			<u>South Pond</u>		
	<u>North End</u>	<u>At Gauge</u>	<u>Gauge Reading</u>	<u>North End</u>	<u>On West Side</u>	<u>Gauge Reading</u>
5/4/62	32.9%	33.2%	4.68	33.9%	33.6%	4.70
5/11/62	33.8%	33.8%	4.50	33.4%	33.8%	4.50
5/18/62	33.8%	34.5%	4.44	33.1%	35 %	4.34
5/23/62	34.8%	33.8%	4.32	30.7%	33.6%	4.24
5/31/62	36.1%	36.1%	4.18	32.9%	31.6%	4.10

6/7/62	36.6%	39.2%	4.12	34.2%	34 %	3.88
6/20/62	38.7%	37.1%	3.86	32.6%	32.2%	3.70
7/5/62	19.5%	19.7%	4.66	11.6%	11.4%	4.48
7/17/62	22.35%	21.58%	4.54	14.12%	13.97%	4.30
8/1/62	25.14%	24.52%	4.28	16.61%	16.14%	4.08
8/20/62	31.83%	29.49%	3.86	19.24%	18.31%	3.96

## 2. Food and Cover

Food and cover are abundant during the summer for all species of birds and mammals which inhabit the refuge.

Prospects for a bumper crop of native waterfowl food plants within the impoundments are encouraging at this time. Accidental salting of the marshes and open water areas within the two impoundments by the March 7th storm has apparently provided a stimulus for seed germination and plant growth. Most of the marshes are covered by a dense and robust growth of American three-square with a lesser amount of robust three-square and wild millet. Roots of American three-square are a favorite food of Canada geese in this area when the marsh surface is covered by a few inches of water. The shallow open water areas of the impoundments have good submerged aquatic coverage although low quality plants are most prevalent. Some of the plants found in the ponds this summer are mushgrasses, sago pondweed, widgeongrass, redhead grass, and a small amount of wildcelery. The pond bottom of the South Pond has approximately 85% plant coverage this summer whereas it was 85% barren in the summer of 1961; approximately 80% of this plant coverage is by muskgrasses (*Chara* sp.); other plants found in South Pond are sago pondweed and widgeongrass. In the North Pond muskgrasses are also the prevalent species although they compose only 50 to 60% of the plant community. Sago pondweed and widgeon grass are more common with minor quantities of redheadgrass and wild celery. The impoundment areas should provide very good feeding habitat for waterfowl during the forthcoming winter.

Other changes in the plant community have been noted. Smartweed which was abundant last year in South Pond was reduced drastically. Annual flowering plants which were becoming far too abundant prior to the storm are practically non-existent. On the other side of the ledger, cattail seed germination developed late in the summer in localized areas. No flowering heads appeared on these plants by mid-August. Additional cattail seed may germinate next spring.

Some changes occurred in waterfowl food plants outside the impoundments which may or may not have resulted from the March storm. *Spartina alterniflora*, the primary food for snow geese which winter at Pea Island, has expanded its previous boundaries and produced a luxuriant growth throughout its marsh zone. Beach pea growths are

scattered and the plant is less abundant than in the previous four years.

Any effects of the storm are not indicated on the submerged aquatic beds in the Pamlico Sound. Widgeongrass and shoalgrass beds on the Proclamation Area of the refuge are equal to past years and should provide habitat as in past years.

## II. WILDLIFE

### A. Migratory Birds

#### 1. Waterfowl

Most waterfowl had migrated northward before the beginning of this narrative report period on May 1. Some few Canada geese remained on the refuge into this period; 12 were seen as late as the second week of July. Some blackducks, gadwalls, and blue-winged teal can be seen throughout the summer. All three of these species nest on the refuge. The first duck broods of the season observed were two broods of black ducks seen on May 25. Production of young by all species was greatly reduced this year. So many changes occurred in the environment and habitat that no specific reason can be determined for the poor production of ducklings. Plant species have changed considerably, most woody plants inside the impoundments are dead, the water has changed from fresh to brackish, and additional animal species occur in the pond water. Blue crabs came in the ponds by the thousands with developments in the March storm. Refuge personnel has observed predation on ducklings by blue crabs on two occasions during the summer. If nesting ducks respond to discouraging predicaments, the predation on ducklings by blue crabs may be a factor in the drastic reduction of ducklings produced at Pea Island this year. Time should alleviate the conditions which have produced poor duck nesting and eventually duck production will be at levels of previous years. Duck broods seen and production will be found on Form NR-1.

#### 2. Wading Birds and Gulls

A colonial bird rookery has been located in South Pond at Pea Island Refuge for many years. Locations used for nesting were primarily composed of large wax myrtle bushes. Most wax myrtle bushes within South and North Ponds were defoliated after the March storm; many plants died. Late in the spring, the colonial birds which nest at Pea Island began using the southernmost island in the North Pond which still had some green foliage; a rookery was established and all species which have nested at Pea Island in the past were represented. Nesting species include: glossy ibis, snowy egret, common egret, Louisiana heron, little blue heron, black-crowned night heron, and yellow-crowned night heron. Some nesting occurred early in the spring along the banks of the South Pond dike by common egrets and black-crowned night herons; all other species concentrated in their entirety on the island in the North Pond to build nest and hatch their young. Most species

nested in reduced numbers as compared with last year. One exception was the glossy ibis which was almost double the nesting population of last year.

No major concentration of gulls nested this year within the refuge boundaries. Major concentrations of laughing gulls nested near the refuge on islands in Oregon Inlet and frequented the refuge.

### B. Upland Game Birds

Other than an occasional mourning dove, ring-necked pheasants constitute the upland game birds found on the refuge. They continue on the increase. Surprisingly, the March storm, had little affect on pheasants which inhabit the refuge. Approximately 200 are now using the refuge. Two pheasant broods were seen on one trip around the North Pond jeep trail on June 27.

### C. Fur Animals

Fur animals found on the refuge in order of abundance are muskrats, nutria, other, and mink.

### D. Hawks and Eagles

No unusual conditions of hawk or eagle was occurred. One sight record of a bald eagle was made on May 6.

### E. Fish

All sport fishing in this area is for salt water species. Normal fishing activity occurred during the summer. It has been noted that small jumping mullets moved into the impoundments following the March storm. They are 7-8 inches long now and are abundant.

### F. Diseases

No bird or mammal diseases were observed during the period.

## III. REFUGE DEVELOPMENT AND MAINTENANCE

### A. Maintenance and Repairs

Necessary and preventive maintenance was performed on vehicles, light plants, water pumps, air-cooled engines, outboard motors, boats, tractors, farm equipment, and herbicide spraying equipment. All windows in the main headquarters buildings were puttied and painted; new wire was placed in all window screens; all facings and outside trim were painted. The domestic water tanks were cleaned and repaired and bad plumbing was replaced. A system of concrete walls were constructed at headquarters buildings; posts were placed beside all parking areas and walkways to avoid travel over the sand and add to the appearance of headquarters. Water control gates on the impoundments were repaired as necessary after

ponds had drained down following the March storm. Many usable creosote fence parts were pulled out where they had bent or been covered by sand in the March storm. Jeep trails around the ponds were repaired where washouts had occurred. All large refuge signs were repaired, re-stained, and lettering was re-painted. The Dodge pickup truck was re-painted in a commercial garage. An underground diesel tank and pump were installed since all tractor equipment being used is diesel.

On a reimbursable basis, the National Park Service has progressed well on repairs to the damaged sanddunes. The work is completed from Oregon Inlet through New Inlet. In conjunction with these repairs, all of the sand deposited by the storm in the North and South Pond fields was removed and used for re-establishing sand-dunes. In a meeting on August 31, it was agreed that the Bureau will reimburse the National Park Service in the amount of \$181,000; \$303,000 was allotted for storm damage repairs at Pea Island Refuge.

#### B. Plantings

No marsh plantings were made during the period. Summers when water level conditions are suitable, millet is planted in the South Pond field. Water levels were too high this summer to accomplish this job. Prior to millet planting time, soil samples from the South Pond field were analysed for salinity content. Samples ran well over, 3000 parts per million of soluble salts. The N. C. Department of Agriculture does not recommend that any crops be planted where salinity content exceeds 3000 parts per million.

#### C. Collection and Receipts

None

#### D. Control of Vegetation

25 acres of wax myrtle growth was plowed up in the area between the two impoundments. A few acres of this may be seeded to ryegrass this fall to determine the salt and soil tolerances of ryegrass for a goose browse crop.

8 acres of cattail within the impoundments were treated with dalapon. Much of this cattail which appeared late in the summer was apparently the result of cattail seed germination. Close observation should be made next spring for cattail seedlings. The cattail treated this summer appeared dead at the end of August.

#### E. Planned Burning

No marsh burning is done at Pea Island during the summer period. However, preparation for fall and winter burning is made during the summer. 11 miles of fire lane have been plowed with a new-ground disk plow to maintain a fire break 15 feet wide. The



fire lanes are now in better condition than they have ever been in the past at Pea Island.

#### F. Fires

No wildfires or building fires occurred.

#### IV. RESOURCES MANAGEMENT

No resource harvesting permits are in force, and no financial income is being obtained from the refuge resources at this time.

#### V. FIELD INVESTIGATION

Close observations have been made of the impoundments since the accidental introduction of salt water. These observations are recorded throughout this report. Frequent water salinity tests have been made during the period and are recorded in a table with this report.

#### VI. PUBLIC RELATIONS

##### A. Recreational Uses

Recreational uses of the refuge include sightseeing, fishing, beach combing, photography, and native and wildlife observation.

##### B. Refuge Visitors

###### 1. Registered Visitors

Registered visitors at the reception office located at field headquarters decreased 27% this period as compared with the same period last year. 926 registered this period as compared with 1,261 for the four month period last year.

###### 2. Official Visitors

<u>Date</u>	<u>Name and Organization</u>	<u>Address</u>
5/2	Mr. John Steenis, BSW	Laurel, Md.
5/2	Mr. Clark Webster, BSW	Savannah Refuge
5/2	Mr. Ted Ball, BSW, Regional Office	Atlanta, Ga.
6/15	Mr. Frank McGilvrey, BSW	Laurel, Md.
6/15	Mr. John Steenis, BSW	Laurel, Md.
6/16	Mr. Hugh Fields, N. C. Extension Service	Raleigh, N. C.
6/16	Dr. F. Eugene Hester, N. C. State College	Raleigh, N. C.

6/21	Dr. T. L. Quay, N. C. State College	Raleigh, N. C.
7/26	Mr. Wallace Wiest, BSW, River Basins	Raleigh, N. C.
8/13	Mr. E. R. Brumback, GAD	Washington, D. C.
8/13	Mr. W. L. Norton, Jr., GAD	Washington, D. C.
8/31	Mr. L. S. Givens, BSW, Regional Office	Atlanta, Ga.
8/31	Mr. James Taylor, BSW, Engineer	Atlanta, Ga.

### C. Refuge Participation

On July 25 a talk and a tour up the refuge was provided for 42 children from the Cherokee Indian School located at Robbinsville in south-western North Carolina. This program was provided in conjunction with their week at the Roanoke Island 4-H Camp near Manteo. Student Trainee Overby participated in this activity.

### D. Safety

A safety meeting was held each month of the period. No accidents occurred during the period. The last accident at Pea Island occurred on January 21, 1958. 1,674 calendar days have passed since the last accident. Approximately 23,148 man/hours of work have been performed since the last 'lost time' accident. Badly broken walkways used regularly by the public were replaced during the period to avoid stumbling and possible injuries. Safety in fuel use and storage was stressed.

## VII. OTHER ITEMS

### A. Summer Student Trainee

Mr. R. Donald Overby was assigned to Pea Island Refuge to participate in the National Wildlife Refuge trainee program this summer. His performance was excellent and his potential for a refuge manager position is very good.

### B. New Equipment

A small case 310E crawler tractor was purchased new during the period. It is performing its function at Pea Island well. A new turning disk plow was acquired to use with the crawler tractor and is proving to be good for fire lane maintenance and deep plowing.

### C. Photographs

Please find snapshots pertaining to the refuge on the following pages.

Date submitted: September 15, 1962 Respectfully submitted,

Approved: Lawrence S. Lee Charles F. Noble  
Regional Refuge Supervisor      Refuge Manager

SEP 17 1962

• SEP • 62 C



After the March 7th Storm some areas of sand dunes were completely flattened.

• SEP • 62 C



The public highway through the refuge was located along side the fence posts in this picture. A high sand dike with sand fence atop has been machine built down this same line.

• SEP • 62 • C



As in these pictures near refuge field headquarters, a sand dune line has been rebuilt using sand deposited during the March Storm to the west of the original dune line.

• SEP • 62 • C





Sand used to rebuild this dune was obtained from the sand deposited in the North Pond ryegrass field. Note the vegetation which came from roots off the field that inadvertently were scrapped up during the operation in a few places.



Sand fence has been placed atop most of the dunes that have been rebuilt. It appears to be doing a good job of holding sand but has not yet stood the test of a storm.





3 -1750a

Cont. NR-1  
(Rev. March 1953)

WATERFOWL  
(Continuation Sheet)

REFUGE Pea Island Refuge

MONTHS OF May 1 TO Aug. 31, 1962

(1) Species	(2) Weeks of reporting period								(3) Estimated 6 days-use waterfowl days use	(4) Production Broods: Estimated seen : total	
	11	12	13	14	15	16	17	18			
<u>Swans:</u>											
Whistling											
Trumpeter											
<u>Geese:</u>											
Canada	12								1,755		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
<u>Ducks:</u>											
Mallard											
Black	120	120	120	100	80	80	150	200	15,950	10	60
Gadwall	200	150	100	80	120	150	150	150	19,150	27	150
Baldpate											
Pintail											
Green-winged teal											
Blue-winged teal	40	30	30	30	40	150	200	300	7,900	3	20
Cinnamon teal											
Shoveler											
Wood											
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead									120		
Ruddy											
Other											
<u>Coot:</u> American									330		

(over)

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans			
Geese	1,755	50	
Ducks	43,120	650	
Coots	330	10	
<b>Total -</b>	<b>45,205</b>		<b>Waterfowl Days-use</b>

SUMMARY

Principal feeding areas Impoundment Areas.

Principal nesting areas Dikes, Marsh, and Islands within the impoundments used by gadwall & blue-winged teal. Entire refuge used by black ducks.

Reported by Charles F. Noble, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form NR-1A  
(Nov. 1945)

## MIGRATORY BIRDS

(other than waterfowl)

Refuge Pea Island Refuge

Months of May 1 to Aug. 31 1956

(1) Species Common Name	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total Estimated Number
	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	
<u>I. Water and Marsh Birds:</u>										
Little blue heron	48	5/11	150	7/11	32	8/28	1	25	65	200
Louisiana heron	62	5/11	325	7/11	85	8/28	1	60	175	400
Black-crowned night heron	58	5/11	250	7/11	100	8/28	2	40	125	350
Yellow-crowned night heron	2	5/11	6	7/11	4	8/15	1	2	2	6
Common egret	30	5/11	75	7/11	35	8/28	2	15	36	150
Snowy egret	90	5/11	375	7/11	125	8/28	1	50	155	500
Glossy ibis	60	5/11	150	7/11	25	8/28	1	40	100	200
Great blue heron	1	7/18	4	8/28	4	8/28				5
Clapper rail	1	5/22	3	7/18	1	8/15				200
 <u>II. Shorebirds, Gulls and Terns:</u>										
Black-backed gull	6	5/11	6	5/11	2	8/28				10
Herring gull	500	5/11	500	5/11	25	8/28				600
Ring-billed gull	600	5/11	600	5/11	15	8/28				700
Laughing gull	1,400	5/11	3,000	7/18	1,500	8/28				4,000
Bonapartes gull	12	5/11	12	5/11	12	5/11				200
Common tern	40	5/11	400	7/18	30	8/28				600
Royal tern	10	5/11	200	7/18	12	8/28				400
Least tern	50	5/11	500	7/18	80	8/28				800
Black skimmers	200	5/11	2,000	7/18	300	8/28				3,000
Willetts	160	5/11	800	7/18	30	8/28				1,000
Yellowlegs, great. & less.	150	5/11	900	7/18	400	8/28				1,200
Sandpipers, all species	1,200	5/11	4,000	7/18	200	8/28				6,000

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove			18	8/28	18	8/28				40
IV. <u>Predaceous Birds:</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow	1	5/11	1	5/11	1	5/11				1
	6	5/11	300	8/30	300	8/30				300
							Reported by <u>Charles F. Noble, Refuge Manager</u>			

#### INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)  
II. Shorebirds, Gulls and Terns (Charadriiformes)  
III. Doves and Pigeons (Columbiformes)  
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Pea Island Refuge For 12-month period ending August 31, 19<sup>62</sup>  
Reported by Charles F. Noble Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat		(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acreage			
UNIT 1: All unimpounded area from New Inlet north to Oregon Inlet.	Crops		Ducks	259,000	
	Upland	592	Geese	567,000	
	Marsh	2,664	Swans		
	Water	16,000	Coots		
	Total	19,256	Total	826,000	
UNIT 2: Pool No. 2 (North Pond) An Impoundment.	Crops	68	Ducks	226,700	96
	Upland	98	Geese	340,200	
	Marsh	74	Swans	9,060	
	Water	400	Coots	69,240	
	Total	640	Total	645,200	96
UNIT 3: Pool No. 1: (South Pond) An Impoundment.	Crops		Ducks	97,150	18
	Upland	50	Geese	170,100	
	Marsh	145	Swans	2,270	
	Water	180	Coots	17,320	
	Total	375	Total	286,840	18
UNIT 4: All area from New Inlet to the south boundary.	Crops		Ducks	64,760	
	Upland	393	Geese	56,850	
	Marsh	1,216	Swans		
	Water	9,700	Coots		
	Total	11,309	Total	121,610	
Sub-totals for the Refuge *	Crops	68	Ducks	647,610	114
	Upland	1,133	Geese	1,134,150	
	Marsh	4,099	Swans	11,330	
	Water	26,280	Coots	86,560	
	GRAND TOTALS - Total	31,580	Total	1,879,650	114
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		

(over)

## INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

- (1) **Area or Unit:** A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.
  
- (2) **Habitat:** Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas ~~inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries.~~ Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.
  
- (3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.
  
- (4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.
  
- (5) **Production:** Estimated total number of young raised to flight age.

3-1752  
Form NR-2  
(April 1946)

UPLAND GAME BIRDS

Refuge Pea Island Refuge Months of May 1 to Aug. 31, 19 62

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
			Number broods obs'v'd.	Estimated Total		Hunting	For Re- stocking	For Research		
Common Name	Cover types, total acreage of habitat	Acres per Bird			Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Dikes, wax myrtle thickets, uplands, and marshes	5.4	10	120					200	
	* Density figure based on habitat of 1080 acres.									

## INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.\*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

\* Only columns applicable to the period covered should be used.

PSA ISLAND NATIONAL WILDLIFE REFUGE

Narrative Report for the Period January 1 through April 30, 1962

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PEA ISLAND NATIONAL WILDLIFE REFUGE

REFUGE NARRATIVE REPORT

January 1 through April 30, 1962

Charles F. Noble, Refuge Manager  
Houston C. Phillips, Wildlife Aid  
Marvin C. Toler, Laborer

I. GENERAL

A. Weather Conditions

March 7th is a date that will long be remembered along this sea coast. The most destructive storm in the memory of most living people hit the coast. Tremendous waves washed and battered ocean front sand dunes and property. The ocean spilled over and broke through for the entire twelve mile length of the refuge. This was a freak 'North-easter' of tremendous ferocity. It came on a high spring tide which added to its flood damage potential. Sand dunes were washed down and broken at North and South Ponds; ocean waters flooded both impoundments. Erosion and breaks were common north of New Inlet, but from the New Inlet-Field Headquarters vicinity south to the refuge boundary there was scarcely a place where the ocean crest did not overflow the sand dunes. One third of a mile near the south end of the refuge was leveled, leaving the public highway and the refuge fence on the ocean beach. This March storm proves the great destructive potential of a strong north-easter along this Atlantic coast; its scars will be seen for a long time.

A beautiful fall and early winter ended when January arrived. Both January and February brought cloudy, cold winter weather with light, cold rains becoming commonplace. Rain was recorded on 18 days in January and 13 days in February although total rainfall for the two month period was near normal. The weather warmed near the end of February, but cold winds returned again in March. Spring weather came about a week later than normal, but by late April there was no doubt that spring was here. A high temperature for the four month period of 84 degrees was recorded on April 23rd and 27th while a low of 23 degrees was recorded on several dates in January and February. Precipitation for the four month period of 17.66 inches was 4.07 inches above normal.

Data recorded in the table at the top of the following page was taken from records furnished us by the Cape Hatteras Seashore Area from their weather station at Bodie Island. This weather station is located only three miles north of the refuge and reflects weather conditions on the refuge. Normal precipitation is based on a five year average.

<u>Month</u>	<u>Precipitation</u>			<u>Temperatures</u>	
	<u>This Month</u>	<u>Normal</u>	<u>Dev. from Normal</u>	<u>Max.</u>	<u>Min.</u>
Jan. -	5.76	3.26	+ 2.50	68	23
Feb. -	1.89	4.01	- 2.12	81	23
March -	4.87	4.03	+ 0.84	75	25
April -	5.14	2.29	+ 2.85	84	40
Totals -	17.66	13.59	+ 4.07	Extremes - 84	23

## B. Habitat Conditions

### 1. Water Conditions

Two impoundments, North and South Ponds, constitute the areas on which water level control can normally be practiced to some degree. These areas, with a combined acreage of 1020 acres, were flooded by ocean water in the March 7th Storm to about a 9 ft. level. Normal water levels at the first of March are from 4.5 ft. to 5 ft.; of course, that water depth is obtained by rainfall, providing fresh water habitat within the impoundments. The storm subsided on Thursday, March 8, and on March 9 the water control gates were approached by boat and opened. The ponds continued to drain the remainder of the period and by the last day of April North Pond had reached a gauge reading of 4.78 ft. and South Pond a reading of 4.84 ft. Salting of the ponds by ocean flooding is expected to make drastic changes in these previously fresh water areas. Close inspection will follow to determine the best means of management for maximum waterfowl food production.

Prior to 'The Storm', water levels were satisfactory for waterfowl feeding. The ponds were used extensively through January. Pond water level had remained good for ryegrass growth in the North Pond field; little of the area had been flooded by rain water which is normally a factor in the lower parts of the field.

Pamlico Sound water levels have stayed slightly above normal most of the late winter and spring. Levels were satisfactory for goose use. No extremely high Sound tides developed as often does in late winter. Canada geese made heavy use of the Sound shoals north of New Inlet.

Staff gauge readings taken near the end of each month from both North and South Ponds will be found in the table at the top of the next page. Readings were not taken from March 7 to March 21 since flood waters were above the staff gauges. 1961 readings are also provided for comparative purposes.

Staff Gauge Readings

<u>End of Month</u>	<u>North Pond</u>		<u>South Pond</u>	
	<u>1961</u>	<u>1962</u>	<u>1961</u>	<u>1962</u>
January -	4.00	4.46	4.16	4.46
February -	4.46	4.40	4.48	4.50
March 7th -	Impoundments flooded by ocean to 9 ft. level. Water control gates opened and impoundments began draining on March 9.			
March 30 -	4.44	5.28	4.60	5.70
April -	4.16	4.78	4.50	4.84

Water salinity tests have been made on North and South Ponds during the period. Following is a table providing results of salinity tests; one series of tests just prior to 'The Storm' is included. The silver nitrate titration method was used to determine percent of sea strength.

Water Salinity Tests During Period  
(Readings in % of Sea Strength)

<u>Date</u>	<u>North Pond</u>		<u>South Pond</u>	
	<u>North End</u>	<u>At Staff Gauge</u>	<u>North End</u>	<u>On West Side</u>
Before Flood:				
2/21/62 -	1.23%	1.23%	1.4%	1.23%
After Flood:				
3/27/62 -	45.8%	45.3%	54%	53.3%
4/3/62 -	42.8%	42.2%	48.9%	48.9%
4/12/62 -	33.4%	33.4%	37.8%	37.8%
4/20/62 -	32.4%	32%	34.5%	34.8%
4/25/62 -	32.6%	32.6%	34.3%	34.3%

2. Food and Cover

Available waterfowl food was more abundant throughout the wintering

season than is normal. Ducks found sufficient foods along the borrow pits of the North Pond and in the marshes of the South Pond through the end of January. By the end of January, rainfall had produced many puddles in the salt marshes to provide additional feeding habitat. The ryegrass field in North Pond provided good browse throughout the winter. Canada geese did not use the beach pea patches along the west side of the sand dunes to any extent; this is an indication that feeding conditions were better than normal for Canada geese. Beach pea is used extensively when other food supplies dwindle. All species of waterfowl found relatively good feeding conditions on Pea Island Refuge throughout the wintering season.

## II. WILDLIFE

### A. Migratory Birds

As usual, waterfowl dispersed soon after the close of waterfowl hunting season. This is true particularly of ducks and snow geese. Many of the birds move to the Bodie Island marshes north of Oregon Inlet. Canada geese do not disperse as rapidly as do the ducks and snow geese. Over half of the snow geese left the refuge immediately after the close of hunting season; they rapidly decreased and by the end of January a flock of only 200-300 continued using the refuge. The black ducks were more abundant on the refuge than normal with a count of 1700 in the last week of January; blacks used the North Pond until the last of January when they began using the salt marsh puddles and tidal creeks. A flock of 600-800 green-winged teal were seen several times and a sizeable number were present during most of the late winter period. The peak population of ducks this period was 4,130 as compared with 6,277 for the same period last year. Canada geese peaked at 6,800 this period as compared with 5,200 for the same period in 1961. The snow goose peak for this period was 3,000 as compared with 7,000 for the same period in 1961.

No flocks of redheads or canvasbacks were seen at Pea Island Refuge this winter. Five fulvous tree ducks were on the refuge during the first week of January. Blue-winged teal arrived early this spring, the first arriving at the last of February.

Notes on other migratory birds includes: first glossy ibises were seen on March 27; 4 black-necked stilts seen on April 27; double-crested cormorants blackened sand bars in Oregon Inlet during mid-April; common egrets began nesting on South Pond dike at the last of April; other egrets, herons, and glossy ibises first came to South Pond dike, but by the last of April it appeared that they were moving to an island in the North Pond for nesting and possible establishment of a rookery; laughing gulls are using islands in Oregon Inlet for nesting which lie near the ferry run but not within the Proclamation Boundary of the refuge.

## B. Upland Game Birds

Ring-necked pheasants withstood the recent storm very well. The winter carry-over is estimated at 100 birds. Courtship was observed in mid-April. The wooded dike around the South Pond is the most prime area on the refuge for observing this species.

## C. Fur Animals

Muskrats are the most abundant of the four species of fur animals found on the refuge. Some were lost during the March storm, but the species is still seen with regularity. Nutria and otter have been seen occasionally since the storm.

A small number of mink inhabit the refuge. At least one mink became a pest during duck trapping operations. Some portable welded wire duck traps were used; a few ducks were lost in these traps by predation which indicated that a mink was the culprit. This was the first time this had occurred at Pea Island; it is believed that one animal has learned to enter and leave the duck traps; this, of course, could become a nuisance if experienced during future banding programs.

The estimated population of fur animals will be found on Form NR-4 at the back of this report.

## D. Hawks and Eagles

Observations of bald eagles are of special significance recently. None have been seen at Pea Island during this four month period. Duck hawks, marsh hawks, and sparrow hawks were seen during the cold weather months.

## E. Fish

No fresh water species occur on the refuge. Salt water fishing had not begun at the end of April; there was practically no fishing in the area during this narrative report period. The salt water fishing usually begins in this area in May.

## F. Diseases

Losses of Canada geese have been extremely low throughout this winter. Good food conditions prevailed for the most part; the lack of goose losses is attributed to the 'better than normal' feeding conditions. Only eight dead geese have been found on the refuge thus far.

## III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Maintenance and Repairs

Preventive and necessary maintenance was performed on vehicles, light plants, water pumps, air-cooled engines, outboard motors, boats, waterfowl trapping equipment, etc. The body of the Chevrolet station wagon was reconditioned including patching of rusted out areas and painting. A 75,000 gal./hr. pump was brought from Back Bay Refuge and considerable work was done to this piece of equipment to get it in good operating condition. Surplus landing mats were laid for a work area. The reception office interior and exterior were scrapped and re-painted.

Following the March 7 storm, many cleanup jobs were performed including sand removal around buildings, cleanup of articles, tools, and equipment in a basement which was flooded, water control work, and trail debris clearing.

Sand dune repairs has begun under a National Park Service program. This is necessary due to the tremendous sand dune damage in the March storm. All funds for this repair work are being furnished by the National Park Service.

B. Plantings - Cultivated Crops

No plantings have been made during this period. However, an observation should be recorded. The 60 acres of ryegrass planted last fall and reported in the September-December report was inundated by salt water for 10 days following the March 7th storm. After the water was drained off the field, most of this grass came back and has looked in a strong and healthy condition up to the writing of this report.

C. Collections and Receipts

None.

D. Control of Vegetation

None during the period. However, the salt water flooding of the impoundments should have adverse effects on some species of undesirable plants including Eurasian watermilfoil.

E. Planned Burning

Attempts were made at burning two units of marsh, but neither would carry a fire; hence, no controlled burning was actually accomplished.

F. Fires

No building fires occurred. One small roadside grass fire was

quickly extinguished on April 27 which started either from a cigarette or by concentration of heat on dry grass through a bottle. This was of no consequence and did no damage.

#### IV. RESOURCES MANAGEMENT

No resources have been harvested and no concession exists on the refuge. Therefore, no financial income is being obtained from the refuge resources at this time.

#### V. FIELD INVESTIGATION

Records on water salinities in the two impoundments have been made weekly since the areas were flooded with salt water. This is an important factor at this time and the entire ecology of these impoundments is being watched closely. Water salinity records will be found under Water Conditions on Page 3.

Post season waterfowl banding was emphasized. However, results do not reflect the efforts made. Canada geese were unusually wary and would not come on bait with any regularity. Below please find listed the total winter records of waterfowl banding.

<u>Species</u>	<u>Birds Banded</u>	<u>Reportable Returns</u>	<u>Recoveries (Foreign Retraps)</u>	<u>Total Reported</u>
Canada geese -	55	4	1	- 60
Black ducks -	138	9	2	- 149
Mallards -	3	1		- 4
Pintails -	27			- 27
Scaup -	3			- 3
Ring-necked ducks -	2			- 2
American coots -	4			- 4
Totals -	232	14	3	

TOTAL RECORDS REPORTED IN WINTERING SEASON 1961-62 - 249  
(All banding done in Jan. & Feb.)

#### VI. PUBLIC RELATIONS

##### A. Recreational Uses

Bird watching and sightseeing constitute the recreational uses

during this period. Sport fishing, camping, beach combing, etc. were extremely limited through the last of April.

## B. Refuge Visitors

### 1. Registered Visitors

149 visitors registered at the reception office located at Refuge Field Headquarters as compared with 152 for the same period last year.

### 2. Official Visitors

<u>Date</u>	<u>Name and Organization</u>	<u>Address</u>
Jan.	Mr. Foster Forbes, Wild. Prot., N.C. Wild. Comm.	Manteo, N. C.
1/25	Mr. C. E. Addy, Flyway Biologist, BSW	Laurel, Md.
1/29	Mr. Al Noltmeir, Game Mgt. Agent, BSW	Washington, N. C.
2/28	Mr. Clark Webster, Management Biologist, BSW	Port Wentworth, Ga.
3/13	Mr. L. S. Givens, BSW, Regional Office	Atlanta, Ga.
3/13	Mr. James Taylor, Engineer, BSW, Regional Office	Atlanta, Ga.
4/2	Mr. Victor Kay, BSW, Regional Office	Atlanta, Ga.
4/16	Mr. Philip VanDyck, BSW, Regional Office	Atlanta, Ga.
4/16	Mr. Eugene Smith, Engineer, BSW, Regional Office	Atlanta, Ga.

## C. Refuge Participation

Dr. F. Eugene Hester and his class of 10 wildlife management students from N. C. State College were given a talk and tour of the refuge on February 23.

## D. Violations

Violations throughout the wintering season were very low. Few indications were seen of waterfowl violations.

## E. Safety

A safety meeting was held each month of this period. Subjects discussed were driving safety, a first aid booklet, Director Janzen's memo on safety objectives, 1961 Bureau accident statistics, precautions to take and communications during storm emergencies, use of pesticides, and the 1962 safety campaign catalog. The last acc-

ident at Pea Island Refuge was January 21, 1958. 1,559 calendar days have elapsed since the last accident. Approximately 20,772 man/hours of work have been performed since the last 'lost time' accident. For future protection of life and property, appeals have been made to establish a two-way radio system at Pea Island; consideration will probably be forthcoming.

## VII. OTHER ITEMS

### A. Oregon Inlet Bridge

A contract was let by the North Carolina Highway Commission in January, 1962 to McLean Contracting Company, Baltimore, Maryland for the construction of a bridge across Oregon Inlet. When this bridge is completed, it will eliminate all ferry rides between the mainland and Pea Island Refuge. A bridge across Alligator River on U. S. 64 was completed and opened in January of this year. Our Bureau, through the Bureau of Land Management, issued advance permission for the construction of a bridge approach on the south side of Oregon Inlet; this bridge approach crosses refuge lands. A hydraulic fill has been built on this right-of-way.

### B. Road Re-location

The March 7th storm played havoc with the state highway passing through the refuge. Three to four feet of sand covered the road in many places; it was undermined in other places. One section was completely destroyed; the shoreline came in at this point and the road right-of-way became the beach front. Our Bureau authorized relocation of 2,560 feet of the road right-of-way near the south end of the refuge where the previous road was completely destroyed.

### C. Sand Dune Repairs

\$308,000 has been requested by the Bureau for repairs to Pea Island Refuge as a result of the March Storm. \$220,000 of these funds was requested for sand dune repairs. Through agreement with the National Park Service, work has begun on repairs to the sand dunes at Pea Island. The Park Service is accomplishing the work with funds presently available to them, but it is possible that they will be reimbursed for work done on the refuge if and when the storm damage funds requested for Pea Island Refuge become available. A major sand dune rehabilitation job will be required to place the dunes back in the condition which existed prior to the storm.

### D. Regional Refuge Conference

Refuge Manager Noble attended the Regional Refuge Conference held in Atlanta from January 15 to January 19.



3-1750  
Form NR-1  
(Rev. March 1953)

WATERFOWL

REFUGE Pea Island Refuge

MONTHS OF Jan. 1 TO April 30, 1962

(1) Species	(2) Weeks of reporting period									
	6 days-use 1	2	3	4	5	6	7	8	9	10
<b>Swans:</b>										
Whistling	36	34	25	18	22	16	8	8	6	4
Trumpeter										
<b>Geese:</b>										
Canada	6,800	6,400	5,000	5,200	4,600	4,300	3,200	3,400	3,000	2,000
Cackling										
Brant										
White-fronted										
Snow	3,000	1,500	1,000	500	200	400	400	300	400	100
Blue	20	20	20							
Other										
<b>Ducks:</b>										
Mallard	100	100	100	100	100	100	50	50	50	20
Black	1,200	1,600	1,600	1,700	1,600	1,400	1,200	1,100	1,200	800
Gadwall	150	150	150	100	100	100	50	50	50	50
Baldpate	500	800	700	300	300	100	150	200	100	100
Pintail	500	400	700	400	500	100	200	200	300	200
Green-winged teal	300	350	300	800	700	400	500	400	500	400
Blue-winged teal								8	18	30
Cinnamon teal										
Shoveler	50	50	40	20	30	10		12	22	20
Wood										
Redhead										
Ring-necked	200	150	150	50	50	50	50	50	25	25
Canvasback										
Scaup	200	100	150	200	200	150	50	50	25	25
Goldeneye										
Bufflehead	200	200	200	200	200	200	200	200	200	200
Ruddy	20	20	20	20	10	10	10	10	10	
Other										
<b>Hooded Merganser</b>	50	30	20							
<b>Fulvous tree duck</b>	5									
<b>Coot: American</b>	700	500	500	400	400	400	300	300	300	300



3 -1750a

Cont. NR-1

(Rev. March 1953)

WATERFOWL  
(Continuation Sheet)

REFUGE Pea Island Refuge

MONTHS OF Jan. 1 TO April 30, 19 62

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl	(4) Production : Broods: Estimated : seen : total		
	11	12	13	14	15	16	17	18	2 days-use	18	days use	
<b>Swans:</b>												
Whistling Trumpeter	2											1,217
<b>Geese:</b>												
Canada	400	200	100	100	100	100	50	50				307,950
Cackling Brant												
White-fronted Snow												51,600
Blue Other												400
<b>Ducks:</b>												
Mallard	20	20	20	20	10	10						5,990
Black	300	300	200	200	200	250	150	150				103,400
Gadwall	50	50	50	50	50	100	100	150				9,950
Baldpate	50	20	20									22,880
Pintail	50	50	30	30								25,120
Green-winged teal	150	200	200	200	200	50						39,250
Blue-winged teal	50	100	200	400	200	200	100	100				9,342
Cinnamon teal												
Shoveler	30	50	50	50	20	20						3,268
Wood Redhead												
Ring-necked Canvasback	25	25	25	25								6,100
Scaup Goldeneye	25	25	25	25								8,550
Bufflehead	200	200	200	100	20	10	10	10				19,000
Ruddy Other												990
Hooded Merganser												650
Fulvous tree duck												30
<b>Coot:</b> American	200	50	50	50	50	10	10	10				30,960

(over)

	(5)	(6)	(7)	SUMMARY
	Total Days Use	Peak Number	Total Production	
Swans	1,217	36		Principal feeding areas <u>Impoundments, fresh marshes, salt marshes, ryegrass field, and Pamlico Sound shoals.</u>
Geese	359,950	9,820		
Ducks	254,520	4,130		Principal nesting areas _____
Coots	30,960	700		
646,647 - Total Waterfowl Days-Use				Reported by <u>Charles F. Noble, Refuge Manager</u>

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form NR-1A  
(Nov. 1945)

## MIGRATORY BIRDS

(other than waterfowl)

Refuge Pea Island RefugeMonths of Jan. 1 to April 301962

(1) Species Common Name	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total Estimated Number
	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	
<u>I. Water and Marsh Birds:</u>										
Little blue heron	3	2/23	20	4/30	20	4/30				50
Louisiana heron	8	1/29	70	4/30	70	4/30				120
Black-crowned night heron	8	1/29	90	4/30	90	4/30				150
Common egret	4	1/29	50	4/30	50	4/30				70
Snowy egret	6	1/29	100	4/30	100	4/30				170
Glossy ibis	3	3/27	25	4/30	25	4/30				30
Common loon	3	1/29	30	3/27	2	4/27				50
Double-crested cormorant	2	1/29	1,500	4/3	500	4/30				3,000
Clapper rail	No accurate data due to secretive nature of species.									
Gannet	10	1/29	400	3/27	3	4/3				800
<u>II. Shorebirds, Gulls and Terns:</u>										
Common tern	10	3/27	250	4/27	20	4/30				400
Royal tern	6	4/3	40	4/27	4	4/30				80
Least tern	6	3/27	50	4/27	10	4/30				150
Herring gull	300	1/4	2,000	1/29	12	4/30				3,000
Ring-billed gull	300	1/4	2,500	1/29	20	4/30				4,000
Laughing gull	2	1/29	2,000	4/30	2,000	4/30				3,000
Willetts	12	3/27	200	4/30	200	4/30				300
Black-necked stilts	4	4/27	4	4/27	4	4/27				4
American avocets	8	4/30	8	4/30	8	4/30				8
Oyster catcher	1	3/27	2	4/27	2	4/27				6
Yellowlegs, great. & less.	4	1/29	400	4/3	80	4/27				500
Sandpipers, all species	200	1/29	1,500	4/27	150	4/30				2,000

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove	4	3/27	18	4/27	18	4/27				30
IV. <u>Predaceous Birds:</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow	2	1/29	4	2/28	2	3/6				6
							Reported by <u>Charles F. Noble, Refuge Mgr.</u>			

#### INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)  
II. Shorebirds, Gulls and Terns (Charadriiformes)  
III. Doves and Pigeons (Columbiformes)  
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1752  
 Form NR-2  
 (April 1946)

UPLAND GAME BIRDS

Refuge Pea Island Refuge Months of Jan. 1 to April 30, 19 62

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'vd.	Estimated Total		Hunting	For Re- stocking	For Research		
Common Name					Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Dikes, wax myrtle thickets, uplands, and marshes	11							100	
	* Density figure based on habitat of 1080 acres.									

## INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.\*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

\* Only columns applicable to the period covered should be used.

3-1754  
Form NR-4  
(June 1945)

SMALL MAMMALS

Refuge Pea Island Refuge

Year ending April 30, 1962

(1) Species  Common Name	(2) Density		(3) Removals					(4) Disposition of Furs					(5) Total Popula- tion	
	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping			Total Refuge Furs Shipped	Furs Donated		Furs Destroyed
								Permit Number	Trappers Share	Refuge share				
Muskrats	Impoundments and adjacent area (1500 acres)	1.5												1,000
Otter	Range over all of the land and marsh area and tidal creeks (5880 acres).	392												15
Nutria	Impoundments and adjacent area (1500 acres)	20												75
Mink	Entire refuge area. (5880 acres)	588												10

\* List removals by Predator Animal Hunter

REMARKS:

2 Nutria destroyed during period.

Reported by Charles F. Noble

## INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- (1) **SPECIES:** Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)
  - (2) **DENSITY:** Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
  - (3) **REMOVALS:** Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.
  - (4) **DISPOSITION OF FUR:** On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprime-ness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.
  - (5) **TOTAL POPULATION:** Estimated total population of each species reported on as of April 30.
- REMARKS:** Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.



General condition of the dune line looking south from refuge field headquarters following the March 7th Storm.



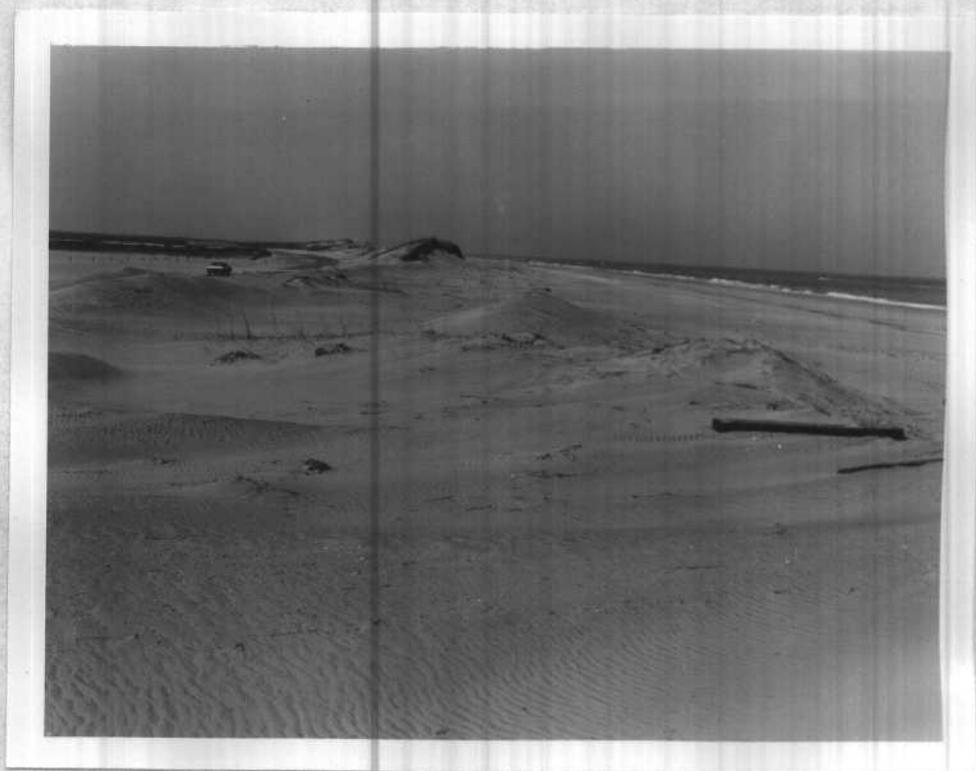
General condition of the dune line looking north from refuge field headquarters following the March 7th Storm.



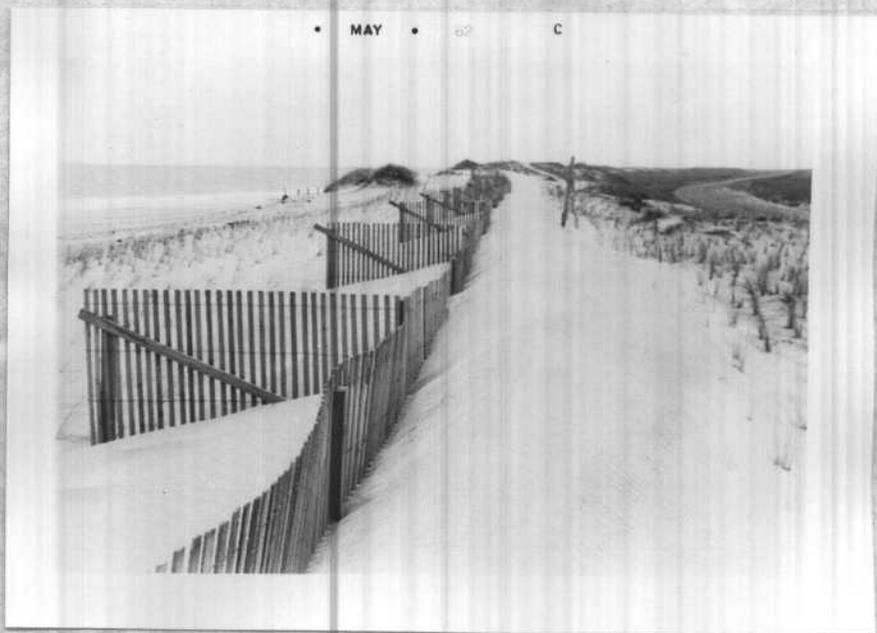
This is the profile of the ocean side of the sand dunes after the storm where the dunes were high and wide prior to the storm.



Picture shows the back or west side of the sand dunes. Note the breaks which are the places where these high dunes were flattened.

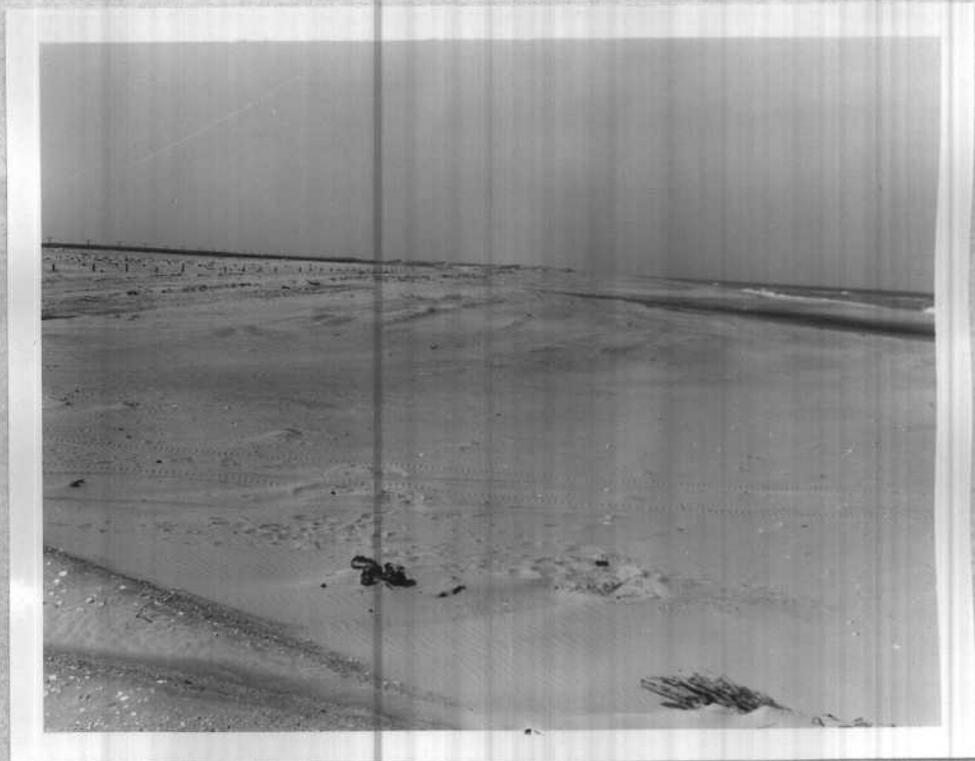


The sand dune line here had been repaired last fall (fall, 1961). It was dozed up from the ocean side, sand fenced, and planted to grass. Nevertheless, the ocean broke through and over and destroyed the work of last fall. Picture below is the same area prior to the storm.





Here the sand dunes were flattened completely, the public highway destroyed, and the fence which was located along the edge of the marsh destroyed. Picture above looking north to south. Picture below looking south to north.

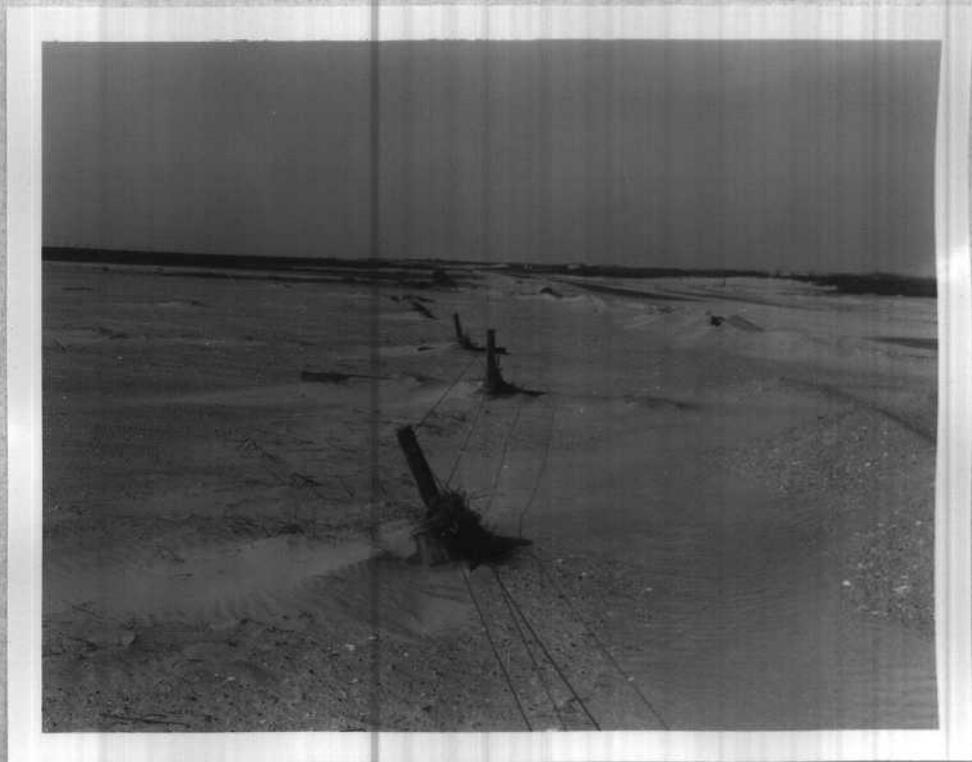




Field headquarters as seen from near the ocean water line. No protective sand dunes remain between the residence and the ocean.



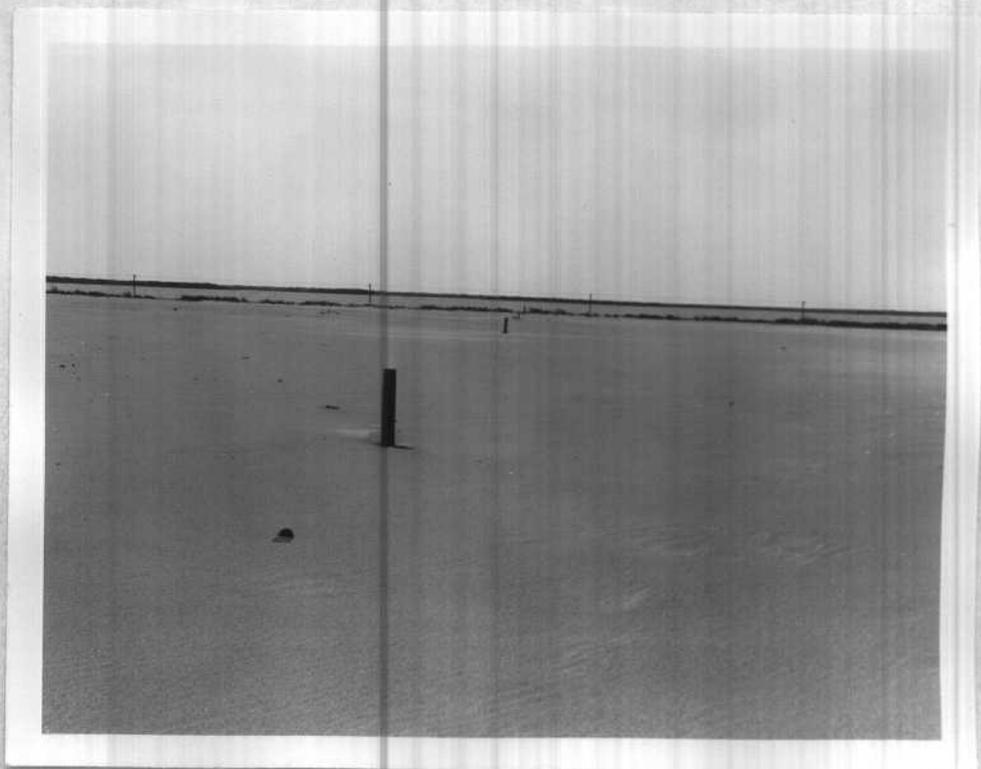
Some breakthroughs caused severe washing of the marsh vegetation beyond the area where sand was deposited as shown in this picture.



The fence line was badly damaged where the sand and water crossed from the east side of the public road to the west or marsh side of the road.



Sand was deposited along the fence line and in some cases completely over the fence posts.



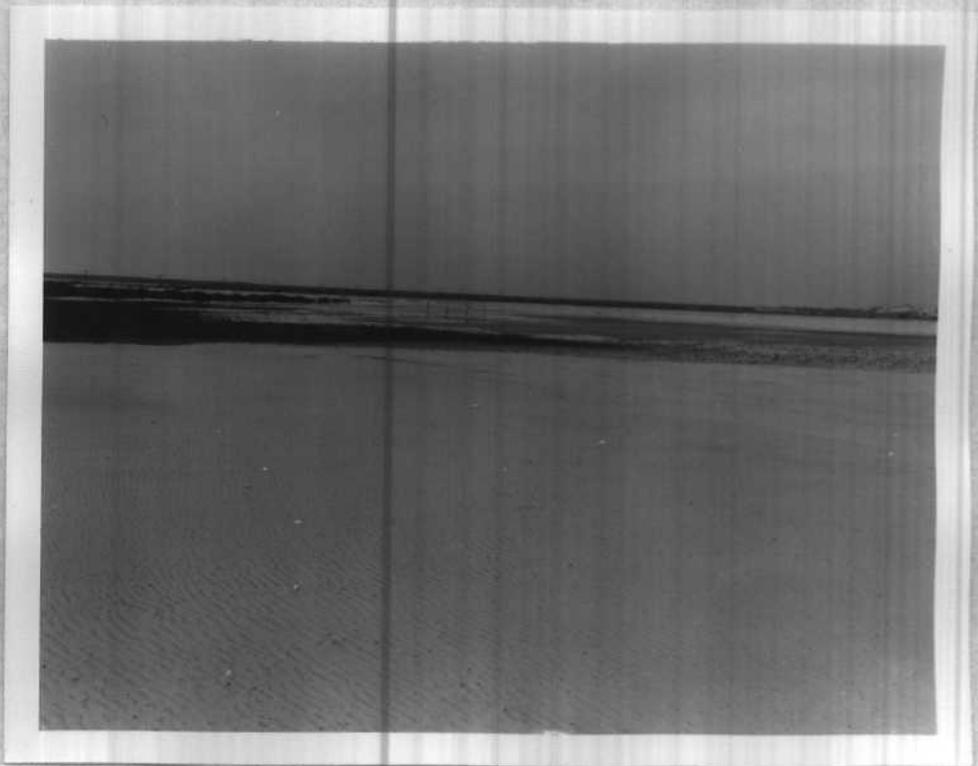
The posts in line were a vegetation transect across a ryegrass field and marsh to an open fresh water pond. Sand covered the field and marsh at this point. You are looking from east to west.



Fingers of sand were deposited in fresh and salt marshes over much of the refuge.



Sand deposited in a millet field and marsh.



Sand was deposited over about 20 acres of this ryegrass field which produces browse annually for the Canada goose flock.



This drift line indicates the level to which ocean water flooded the 640 acre North Pond.



A drift line can be seen as an extension along this jeep hood. The jeep is on a jeep trail which is usually over 2 feet above water level. This drift line indicates the water level from ocean flooding in the 375 acre South Pond.