PEA ISLAND NATIONAL WILDLIFE REFUGE

Narrative Report for the Period September 1 through December 31, 1961

Table of Contents

	Page
I. GENERAL	
A. Weather Conditions	1
B. Habitat Conditions	
1. Water Conditions	2
2. Food and Cover	3
II. WILDLIFE	
A. Migratory Birds	4
B. Upland Game Birds	4
C. Fur Animals	5
D. Hawks and Eagles	5
E. Fish	5
F. Diseases	5
III. REFUGE DEVELOPMENT AND MAINTENANCE	
A. Maintenance and Repairs	5
B. Plantings - Cultivated Crops	6
C. Collections and Receipts	6
D. Control of Vegetation	6
E. Planned Burning	7
F. Fires	7
IV. RESOURCES MANAGEMENT	7
V. FIELD INVESTIGATION	7
VI. PUBLIC RELATIONS	
A. Recreational Uses	8
B. Refuge Visitors	8
C. Violations	8
D. Safety	9
VII. MISC. ITEMS	
A. Appointment of Full Time Employee	9
B. Oregon Inlet Ferry Slip	9
C. Oregon Inlet Bridge	9
D. Photographs	10, 11, 12, 13, 14, and 15

PEA ISLAND NATIONAL WILDLIFE REFUGE

REFUGE NARRATIVE REPORT

September 1 through December 31, 1961

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

I. GENERAL

A. Weather Conditions

Fall months brought beautiful weather. The fall and early winter produced 'blue bird' weather much nicer than in many years passed. The temperatures were generally higher and no killing frost came until late December.

Only one serious hurricane threat developed along this section of the Atlantic seaboard. Hurricane Ester passed about 100 miles off Cape Hatteras in the early morning of September 20. This area received little rain and the winds hardly reached gale force. The ocean level was extremely high and rough for several days preceding the passing of this storm and for several days thereafter.

Precipitation was 10.20 inches below normal for this four month period. Each month of the period showed a deficiency. Rain was recorded on 5 days in September, 6 days in October, 5 days in November, and 10 days in December. The rainfall was light in most cases; rainfall for the period was only 7.91 inches.

The following data 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.

Month	Precipitation			Temperatures	
	This Month	Normal	Dev. from Normal	Max.	Min.
Sept. -	1.58	6.96	- 5.38	96	61
Oct. -	1.72	4.80	- 3.08	79	42
Nov. -	1.79	3.03	- 1.24	81	31
Dec. -	2.82	3.32	- 0.50	68	22
Totals -	7.91 in.	18.11 in.	- 10.20 in.	Extremes - 96	22

Precipitation in 1961 -	53.99 inches
Average Normal Annual Precipitation -	49.30 inches
Year 1961 Deviation from Normal -	+ 4.69 inches

B. Habitat Conditions

1. Water Conditions

Impoundments fed only by rainwater would be expected to be dry following an extended period of little rainfall as has been the case all fall. Such is not the case. The impoundments are not as high as expected for early winter, but on the other hand the levels have been satisfactory for plant growth and waterfowl feeding. Two factors have contributed to this satisfactory condition. Most important is the carry-over from heavy rains in August; rainfall in August was 13.29 inches; the pond levels were higher than normal in late summer. Also a contributing factor is that the ocean level was high during most of September and part of October; this condition helps to reduce seepage of pond water through the sandy soil. Both South and North Ponds have remained near a reading of 4.00 on the staff gauges through most of this period.

Water levels of the open Pamlico Sound have been good for plant growth and goose use. Sound tides have not been extremely low or high. The water has been clear and suitable for good plant growth on the grass beds.

Following are staff gauge readings taken near the end of each month from both North and South Ponds. 1960 and 1961 readings are provided for comparative purposes.

Staff Gauge Readings

End of Month	North Pond		South Pond	
	1960	1961	1960	1961
September -	4.00	4.26	3.84	4.12
October -	3.84	3.98	3.78	3.90
November -	3.68	3.82	3.82	3.96
December -	3.90	3.92	3.90	3.90

Water salinity tests were made in both the North and South Ponds at various times throughout the year and, particularly, during the plant growth season. A summary of the results of these tests will be found in the following table.

Water Salinity Tests During Year 1961

(Readings in % of Sea Strength)

	North Pond		South Pond	
Date	North End	At Staff Gauge	North End	At Foot Bridge
2/27/61	1.4%	1.58%	1.4%	1.4%
4/13/61	1.4	1.4%	1.23%	1.4%
6/23/61	1.9%	1.9%	1.9%	1.8%
8/25/61	1.23%	1.58%	1.58%	1.4%
9/22/61	1.4%	1.4%	1.4%	1.23%
10/29/61	1.76%	1.58%	1.58%	1.58%

2. Food and Cover

Waterfowl food conditions have been better at Pea Island than for many years. A good growth of most native emergent food plants developed. Production of submerged aquatics was far above the last several years in the North Pond. An especial heavy growth of sago pondweed was produced in the borrow pits and some other areas of the North Pond. The South Pond continues to remain devoid of vegetation in the open water area. Marshes in both the North and South Ponds produced better than normal growths of wild millet as well as many other food plants.

In the salt marshes, salt marsh cordgrass(Spartina alterniflora) made good growth and extended its boundaries along barren flats. Roots of this plants are the mainstay for the snow goose flock which winters at Pea Island.

The goose browse crop this fall was the best ever produced at Pea Island. This has provided the goose flock with many tons of supplemental food through the end of December.

Widgeongrass and shoalgrass beds on the Pamlico Sound shoals have provided Canada geese with substantial amounts of food stuffs. Cool weather came late. This prolonged continued growth of these submerged aquatics.

II. WILDLIFE

A. Migratory Birds

Blue-winged teal migration was underway when this report period began on September 1. The first pintails and American widgeon were seen on September 8 when about 50 pintails and about 100 widgeons were seen on the North Pond. On this same date, two broods of gadwalls which hatched at Pea Island and were still flightless were seen. The first Canada geese to arrive were seen on September 25; there were only 10 geese in the group. Within a couple of weeks the flock was increasing rapidly. 35 snow geese arrived October 24. The spectacular arrival of large flocks of snow geese within a short period of time came on November 12 and 13 this year when about 4,000 birds arrived at the refuge within a 24-hour period.

Peak populations of both snow and Canada geese were not recorded until the last week of December. The peak population of Canada geese using the refuge increased over last year's peak by 33%; the peak this period was 8,000 Canada geese. The snow goose peak population decreased by 35%. Observations indicate a low production for this species; only 3% of the population are young of the year. The peak population this year was 7,800. Duck populations have shown a decrease compared to last year. Peak population of ducks at Pea Island this year has been 4,320; this is a 33% decrease as compared to the wintering season of 1960-61. Pintails and widgeon were abundant on the North Pond during the early part of the season. But the North Pond was holding practically all of the duck population on the refuge at that time. Diving ducks are conspicuously few in number this year.

As has been reported from many areas along the Atlantic seaboard, the fulvous tree duck has been seen at Pea Island. One was seen clearly on December 12 north of the North Pond. Sight records of as many as 42 in one day were reported from Buxton, some 30 miles south of the refuge.

Some records of other migratory birds were made. 500 black skimmers were seen near Oregon Inlet on October 3. Wilson snipe were seen regularly in the North Pond field during ryegrass farming operations. Seven American avocets still remained on the refuge on November 16. Herring and ring-billed gulls were common. Many of the wading birds and shorebirds were common later this year due to the later fall experienced in this area.

B. Upland Game Birds

Ring-necked pheasants have become common on the refuge. Many days on a trip through the jeep roads around the dikes as many as 15 birds may be seen.

C. Fur Animals

Muskrats, otter, nutria, and an occasional mink are found on the refuge. It is a common occurrence to see muskrat and otter and not too uncommon to see a nutria. Mink are seldon seen on the refuge; however, one was seen on December 22 near the south end of the North Pond.

D. Hawks and Eagles

A watchful eye has been kept for any sight record of a bald eagle. None have been observed on the refuge. Marsh hawks, duck hawks, and sparrow hawks have been seen since late fall. Sparrow and duck hawks use the Coast Guard telephone line poles to perch on regularly.

E. Fish

Salt water species are caught from the ocean front on the refuge and in the Oregon Inlet area. Reports from sport fishermen during the early part of the season indicated poor fishing. Late in the fall reports of good fishing for puppy drum(small channel bass) and speckled trout(spotted weakfish) were common among the more experienced fishermen.

F. Diseases

Indications are that the 'die-offs' of Canada geese experienced in some years at Pea Island will not be severe this year. Through December 31 only one dead Canada goose had been found. Of course, the most critical period of the year comes in late winter and a definite prediction as to disease losses for the wintering season would be unwarranted. The only basis for a prediction is food conditions, and since good conditions have prevailed and food is now more abundant than usual at this time, the future for late winter feeding and flock conditions are good.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Maintenance and Repairs

An interior remodeling job on an apartment in the residence at Pea Island was completed, providing a building more suited for family living than has existed in the past. Considerable painting was accomplished on interior and exterior surfaces of the buildings. Repairs were made to the 12 mile fence line including some replacement of posts and repairs where wire had loosened or broken. Boundary signs were replaced where needed. Tractors and other small equipment were scrapped and painted. Repairs

were also made to goose trapping blinds and other waterfowl trapping and banding equipment. Maintenance schedules were kept on vehicles, tractors, farm equipment, light plants, air-cooled engines, boats, and outboard motors.

By a cooperative agreement, major repairs have been made to about 4 miles of sand dunes by the National Park Service. This work has been without expenditure by the Bureau for equipment operation or labor. Occasional inspection of the work progress has been made by refuge personnel.

F. Plantings - Cultivated Crops

About 60 acres of annual ryegrass was planted again this fall in the North Pond field. This job involved several operations and the practice for the last few years was altered to some extent. The result has been the production of a very good browse crop. Needless to say, good weather conditions were a determining factor. The entire field was mowed in mid-summer. Prior to planting, half of the field was disced just enough to cut up the un-decomposed plant litter; the other half was mowed. The field was seeded at 100 lbs. per acre, fertilized with 10-20-20 fertilizer, and top dressed with ammonium nitrate. The use by Canada geese has been tremendous. About an average use of 1500 Canada geese a day since mid-November has been made of this field. The geese keep it trimmed close, but the plant is well rooted and continued growth of shoots is expected.

G. Collections and Receipts

None.

H. Control of Vegetation

1. Mechanical Control

Wax myrtle and other woody plants were plowed under along the east side of the North Pond. This will provide for a continuation of the ryegrass field for the length of the North Pond when water level conditions permit. A part of this area was seeded to ryegrass this fall. Some woody vegetation was also cut along the dike berms to help encourage the growth of grass on the berm.

2. Herbicidal Control

Extensive efforts were made to treat all cattails existing on the refuge. A majority of the cattail was in the South Pond, but patches in the North Pond and outside impoundments were treated. All combined, 34 acres of cattail were treated with dalapon at a rate of 10.5 lbs. acid equivalent per acre. For

the operation, a gun jet nozzle with hose and pump mounted either in a boat or on a jeep was used; this type of operation is slow and runs the labor time and cost high. The cattail was treated over a period from June 8 to August 21. Patches were composed of Typha domingensis and T. angustifolia. The composition ran from 75% to 90% for T. domingensis and 10% to 25% for T. angustifolia. Material for all of the patches treated cost $859.00. 250 man/hrs. were required in the process. Initial indications are that about a 98% kill was obtained. Observations next spring will be more conclusive.

An effort was begun this summer to eradicate woody vegetation from the dike berms by chemical means. It is hoped that by retreating, a gradual kill will be obtained, allowing grass to come in on the berms. It is felt that grass will be a better sandy soil cover where exposed to wave action from the ponds. The interior berms in the North and South Ponds were treated with 2,4-D at the rate of 8 lbs. acid equivalent per acre. Water was used for the diluent in the North Pond and diesel fuel was used in the South Pond. Entire acreage was only 3 acres. The species composition was Myrica cerifera - 90%, M. pennsylvanica - 5%, and other species - 5%. The material costs were $19.20 while 4½ man/hrs. were required for the treatment. Spraying operations were conducted during the period July 10 to July 26.

E. Planned Burning

To be reported in the narrative report for the period ending April 30.

F. Fires

No building or wildfires have occurred.

IV. RESOURCES MANAGEMENT

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

V. FIELD INVESTIGATION

In cooperation with the wildlife management biologist for this District, submerged aquatic vegetation transects were established in the South and North Ponds on September 26 and 27. Apprasial of species and compositon and bottom coverage was made by the five-point system.

Other field observations have consisted of weekly waterfowl counts

waterfowl food condition checks, and routine observation for sick or dead geese. Water salinity tests on the fresh water impoundments were taken. Fertilizer test plots on the ryegrass field were established.

VI. PUBLIC RELATIONS

A. Recreational Uses

Total recreational use-days as determined by occasional spot checks will be found on Form NR-6. Recreational uses consist of general sight-seeing, fishing, bird watching, nature study, beach combing, and photography.

B. Refuge Visitors

1. Registered Visitors

Total visitors registering at Field Headquarters was below the comparable period last year. 196 registered during this four month period as compared with 223 last year.

2. Official Visitors

Date	Name and Organization	Address
9/26	Mr. Donald Hankla, BSFW	Savannah Refuge
10/3	Mr. James Taylor, Engineer, BSFW, R.O.	Atlanta, Ga.
10/3	Mr. Ed Nash, Engineer, NPS	Manteo, N. C.
12/6	Mr. Ted Ball, BSFW, Regional Office	Atlanta, Ga.
12/12	Miss Lunette Barber, N. C. Wildlife Comm.	Raleigh, N. C.
12/13	Mr. L. S. Givens, BSFW, Regional Office	Atlanta, Ga.
12/20	Mr. Buck Early, Wild. Prot., N. C. Wild. Comm.	Plymouth, N. C.

C. Violations

Violations on the refuge have been at an extreme minimum this year. Patrols have been set up at all hours and no indication of violations has been observed.

D. Safety

A safety meeting was held each month of the period. Subjects stressed were safety in operation of crawler tractors, fire prevention, safety record statistics, government directives, and safe driving. No accidents occurred during this report period. The last accident at Pea Island was January 21, 1958. 1439 calendar days have passed since the last accident. Approximately 18,756 man/hours of work have been performed since the last 'lost-time' accident. Plans are underway to acquire safer equipment and materials for the cannon net waterfowl traps used in waterfowl banding operations.

VII. OTHER ITEMS

A. Appointment of Full Time Employee

The effectiveness of the operation of Pea Island Refuge was greatly increased by the addition of a full-time employee to increase the staff to three members. Mr. Marvin C. Toler was appointed for full time employment as Laborer on December 26, 1961.

B. Oregon Inlet Ferry Slip

Under a letter permit from the Bureau, the North Carolina Highway Commission completed dredging a new ferry slip on the south side of Oregon Inlet.

C. Oregon Inlet Bridge

Definite plans have been announced for the construction of a bridge across Oregon Inlet. The North Carolina Highway Commission plans to ask for bids in January, 1962.

D. Photographs

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

Date completed: January 10, 1962

Respectfully submitted,

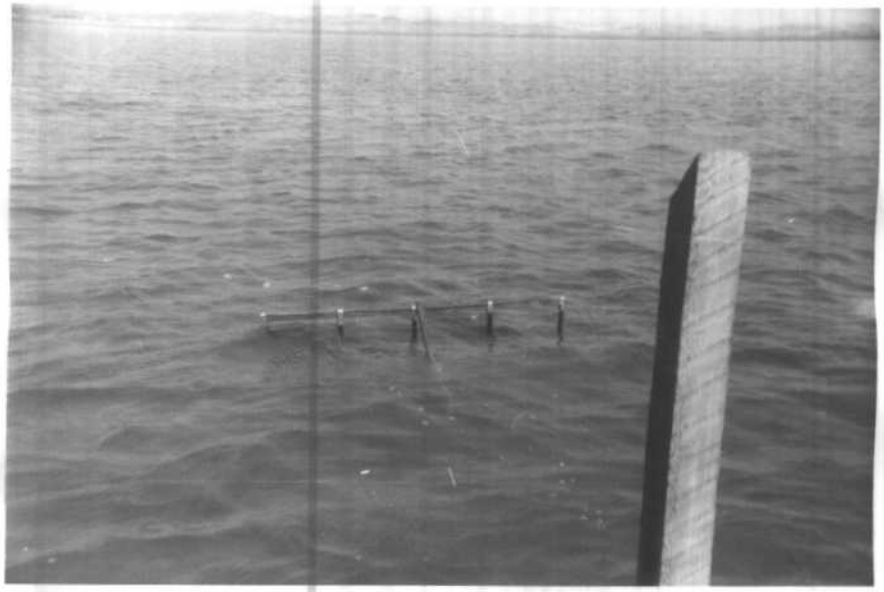
Charles F. Noble
Refuge Manager

Approved: Lawrence S. Giles
Regional Refuge Supervisor

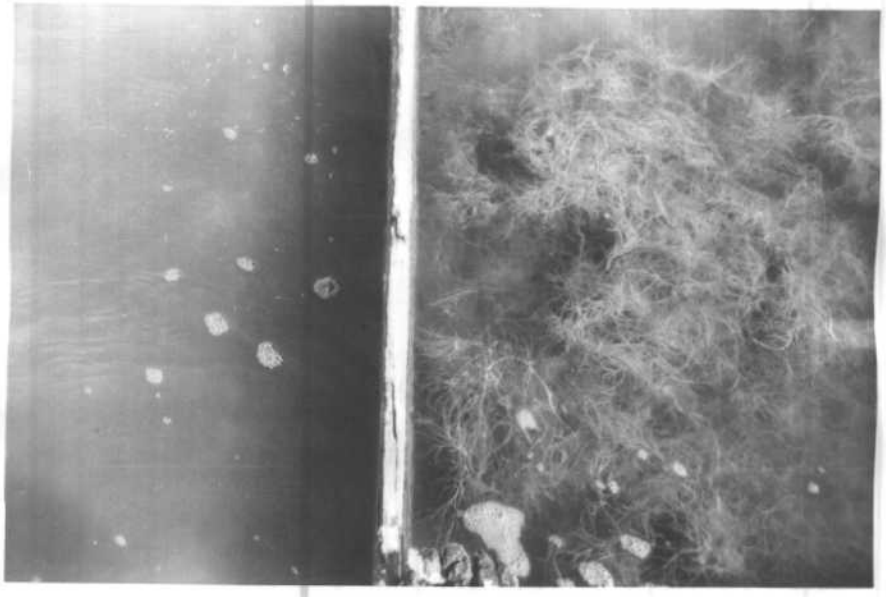
Jan. 17, 1962

Hurricane Ester did not hit shore, but the high, rough ocean produced by her cut away at the sand dunes.

Close-up of ocean front sand dunes with sea oats roots exposed after Hurricane Ester passed and the ocean subsided.

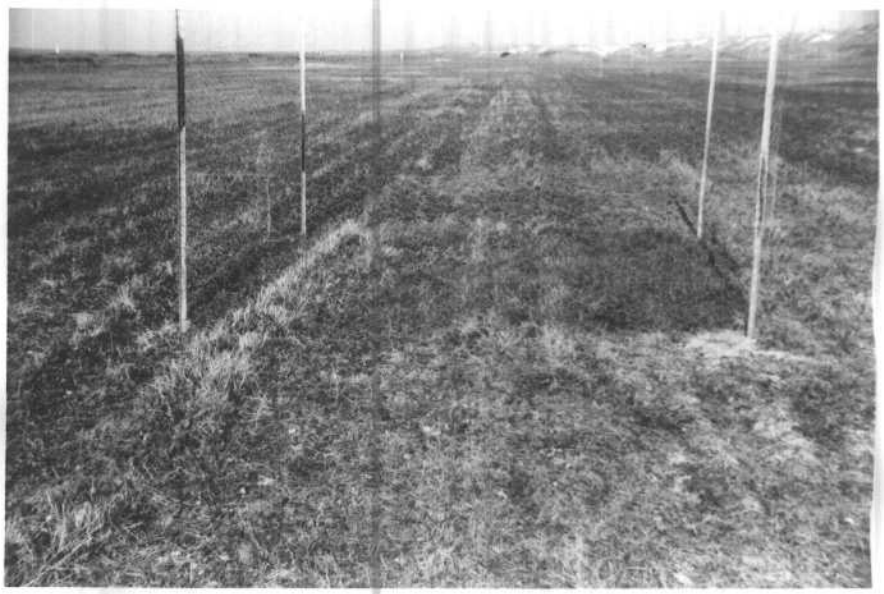


Submerged vegetation transects were established in North and South Ponds. Instrument shown in water was used to get sample of vegetaion by recording vegetation touching each prong of the rake at 15 foot intervals.

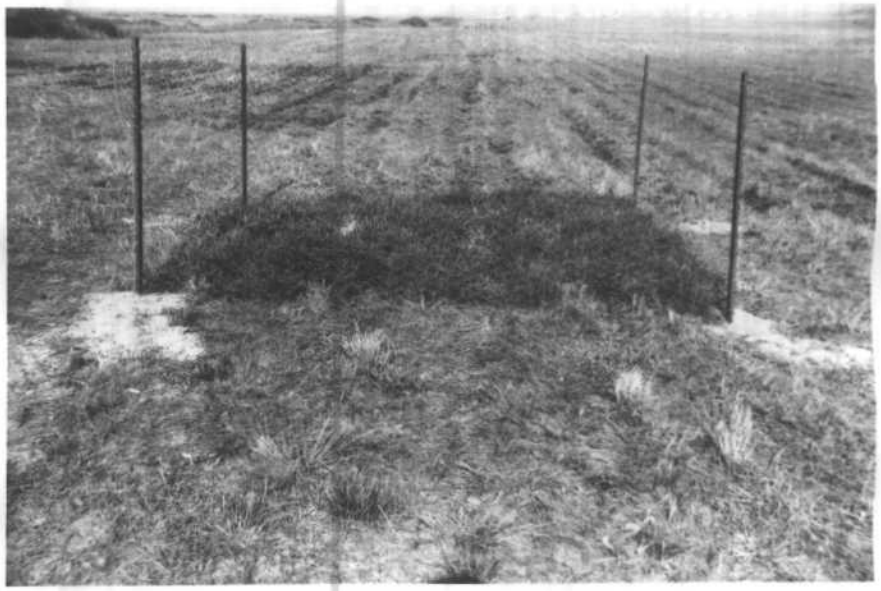


Above picture was taken looking straight down at the water's surface in South Pond. On the right an old box was lodged in the bottom and a heavy growth of sago developed. On left is the open pond.

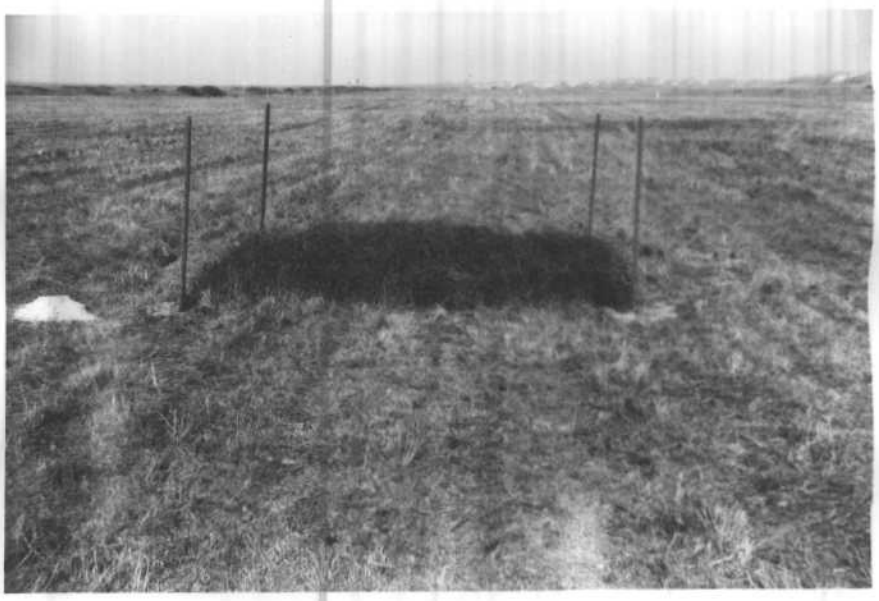
Following is a series of snapshots which show the results of fertilizer and seed test plots established in the North Pond ryegrass field this fall. Each plot established was one(1) acre in size. Within each of the five(5) plots, a 10 ft. x 10 ft. exclosure fence was built. This was done so that better determination could be made as to the effects of the various treatments. Please note that outside the fenced enclosure plots Canada geese have browsed the field heavily, keeping the ryegrass nipped off near ground surface. Under each snapshot is listed the plot number and applications of fertilizer and seed. These shots were taken at the last of December, 1961.



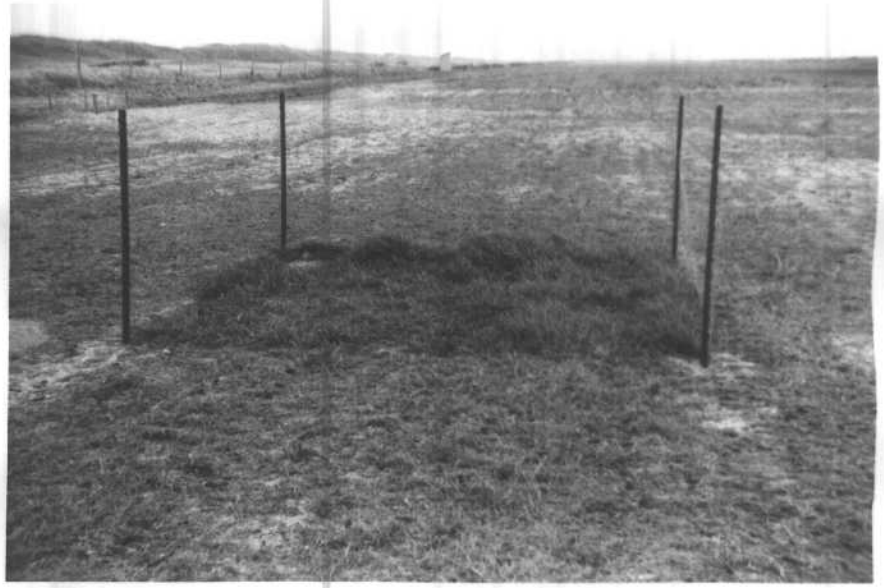
Plot # 1: Seeding reduced to 50 lbs. per acre.
100 lbs. Muriate of Potash per acre.
200 lbs. 10-20-20 per acre.
150 lbs. Ammonium Nitrate top-dressing.



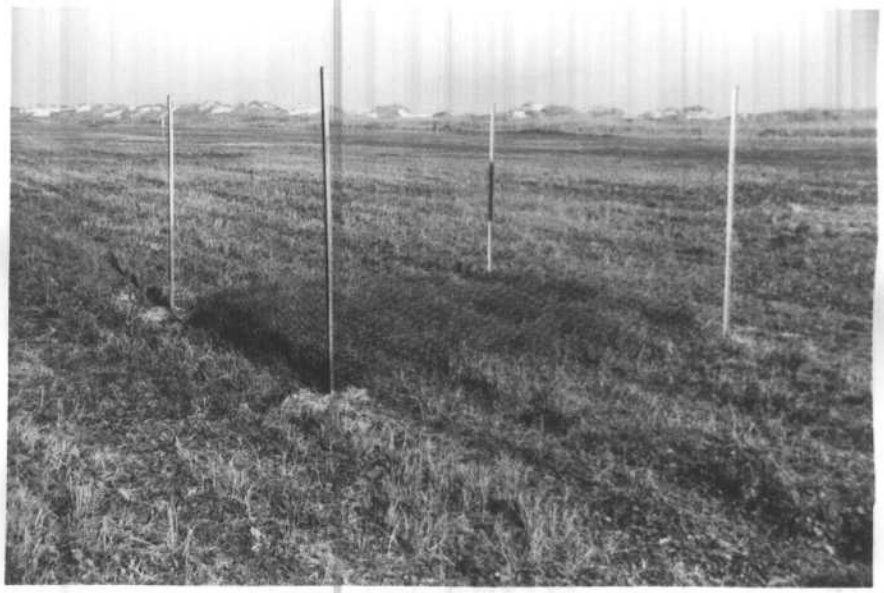
Plot # 2: 100 lbs. per acre ryegrass seed.
1500 lbs. Superphosate per acre.
200 lbs. Muriate of Potash per acre.
200 lbs. 10-20-20 per acre.
150 lbs. Ammonium Nitrate top-dressing per acre.



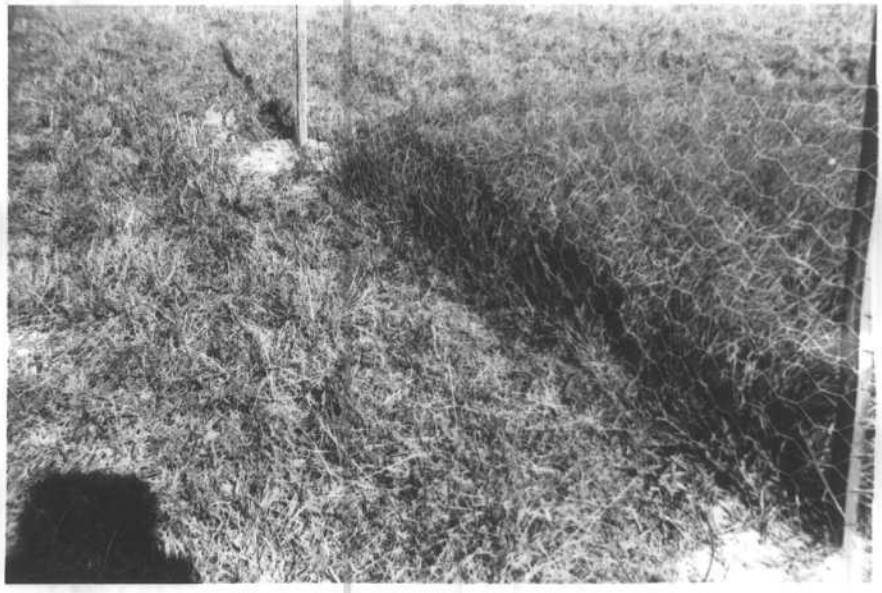
Plot # 3: 100 lbs. per acre ryegrass seed.
100 lbs. Muriate of Potash per acre.
200 lbs. 10-20-20 per acre.
150 lbs. Ammonium Nitrate top-dressing per acre.



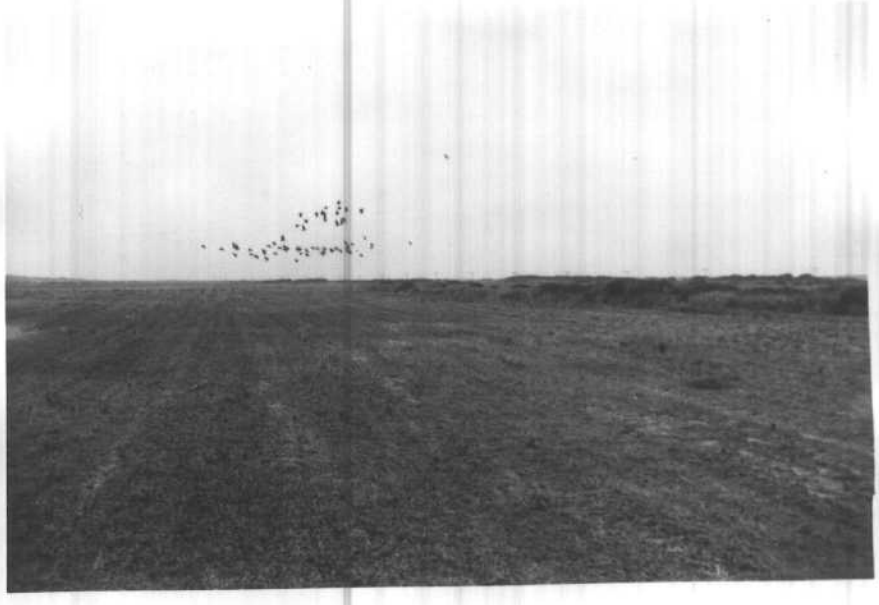
Plot # 4: 100 lbs. per acre ryegrass seed.
200 lbs. 10-20-20 per acre.
150 lbs. per acre Ammonium Nitrate immediately following seeding. No top-dressing later.



Plot # 5: Check Plot. Treated same as general field treatment.
100 lbs. per acre ryegrass seed.
200 lbs. 10-20-20 per acre.
150 lbs. Ammonium Nitrate top-dressing per acre.



Picture above is a close-up of exclosure pen in Plot # 5, the Check Plot. This picture shows the extensive browsing use made by Canada geese on the outside as compared with the un-browsed area inside. Some of the ryegrass blades in this picture are 12 inches long when stretched out.



This picture is of browsed field with Canada geese on ground and the air in the background.

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

WATERFOWL

REFUGE Pea Island Refuge MONTHS OF Sept. 1 TO Dec. 31, 19 61

(1) Species	(2) Weeks of reporting period: 2 days-use 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling									16	46
Trumpeter										
Geese:										
Canada					10	50	500	3,000	3,700	3,800
Cackling										
Brant										
White-fronted										
Snow									35	35
Blue										
Other										
Ducks:										
Mallard										
Black	400	400	400	400	400	400	400	400	400	400
Gadwall	300	300	300	300	300	300	300	300	250	200
Baldpate		100	100	200	700	400	400	500	900	800
Pintail		50	100	250	800	500	900	1,200	1,100	1,800
Green-winged teal					10			20	50	50
Blue-winged teal	125	300	400	500	400	300	150	50	25	25
Cinnamon teal										
Shoveler					10			10	10	
Wood										
Redhead										
Ring-necked									30	200
Canvasback										
Scaup										
Goldeneye										
Bufflehead									20	50
Ruddy									30	30
Other										
Coot: American								15	30	200	700

Int. Dup. Sec.,
Wash., D. C. 37944

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Pea Island Refuge MONTHS OF Sept. 1 TO Dec. 31, 19 61

(1) Species	(2) Weeks of reporting period 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production Broods seen	Estimate total
								8 days-use			
Swans:											
Whistling	188	176	194	180	176	160	156	134	10,116		
Trumpeter											
Geese:											
Canada	4,000	4,400	5,800	7,200	7,800	7,800	7,600	8,000	453,620		
Cackling											
Brant											
White-fronted											
Snow	35	3,700	4,600	6,400	6,800	7,400	7,500	7,800	317,935		
Blue						30	40	50	890		
Other											
Ducks:											
Mallard	10	8	50	100	100	100	100	100	4,076		
Black	400	700	800	1,200	1,400	1,400	1,400	1,200	86,700		
Gadwall	200	200	150	150	150	150	150	150	27,700		
Baldpate	1,600	1,500	1,700	700	400	400	400	500	79,600		
Pintail	1,300	750	900	600	400	300	400	600	84,250		
Green-winged teal	40	50	150	200	200	300	300	300	11,920		
Blue-winged teal									15,300		
Cinnamon teal											
Shoveler								20	370		
Wood											
Redhead											
Ring-necked	200	350	400	300	200	250	250	200	16,860		
Canvasback		2						2	30		
Scaup			50	50	50	50	50	200	3,350		
Goldeneye											
Bufflehead	50	50	100	200	300	300	350	300	12,340		
Ruddy	20	10	20	20	20	20	20	20	1,490		
Other Hooded Merganser		7				9		8	176		
Red-breasted Merganser					200	200	200	200	5,800		
Fulvous Tree duck						1			7		
Coot: American	800	1,000	1,100	1,100	900	600	650	700	55,265		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	10,116	194	
Geese	772,445	15,850	
Ducks	349,969	4,320	
Coots	55,265	1,100	

Total - 1,187,795 waterfowl days-use

SUMMARY

Principal feeding areas Entire refuge. Pamlico Sound shoals, fresh water impoundments, salt marshes, sand dune areas, and ryegrass field.

~~Principal nesting areas~~ ~~No nesting this period.~~

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).

Interior Duplicating Section, Washington, D. C. 37944
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Pea Island Months of Sept. 1 to Dec. 31 1961

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Little blue heron	42	9/21	42	9/21	4	12/22				200
Louisiana heron	54	9/21	54	9/21	16	12/22				300
Black-crowned night heron	60	9/21	60	9/21	18	12/22				300
Great blue heron	1	11/16	11	12/12	6	12/22				25
Common egret	12	9/21	12	9/21	8	12/22				150
Snowy egret	38	9/21	38	9/21	10	12/22				200
Glossy ibis	12	9/21	12	9/12	4	10/3				60
Clapper rail	1	10/10	Resident		1	10/10				200
Double-crested cormorant	300	10/10	1,000	11/16	400	12/22				2,000
Gannet	20	11/16	1,400	12/22	1,400	12/22				2,000
Common loon	2	10/10	50	11/16	6	12/22				60
II. Shorebirds, Gulls and Terns:										
Great black-backed gull	3	10/10	40	12/12	20	12/22				200
Herring gull	40	10/10	4,000	12/12	2,000	12/22				5,000
Ring-billed gull	50	10/10	4,000	12/12	2,000	12/22				4,000
Laughing gull	1,000	9/21	1,000	9/21	10	11/16				1,200
Common tern	300	9/21	300	10/3	2	11/16				500
Royal tern	150	9/21	150	10/10	4	11/16				200
Least tern	400	9/21	400	9/21	10	10/29				500
Black skimmers	500	10/3	1,500	11/16	300	12/22				3,000
Willets	25	9/21	300	10/3	4	11/16				400
Wilson snipe	6	10/10	40	12/12	20	12/22				60
American avocet	4	10/10	16	10/29	7	11/16				20
Yellowlegs, greater & lesser	600	9/21	700	10/3	60	12/22				1,000
Sandpipers, all species	1,000	9/21	1,000	10/3	400	12/22				1,500

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove	8	10/29	30	11/16	12	12/22				40
White-winged dove										
IV. Predaceous Birds:										
Golden eagle										
Duck hawk	1	11/16	3	12/22	3	12/22				4
Horned owl										
Magpie										
Raven										
Crow										
Sparrow hawk	1	11/16	5	12/12	2	12/22				6

Reported by Charles F. Noble, Refuge Mgr.

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 Gruiiformes
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 Months of Sept. 1 to Dec. 31, 19 61

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifioally requested. List introductions here.
Ring-necked pheasant	Dikes, wax myrtle growths, uplands, and marshes								150	

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.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Pea Island Calendar Year 1961

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

Remarks:

Reported by _____

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 <u>each species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

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

116008

3-1755
Form NR-5
60701

DISEASE

Refuge Pea Island Refuge Year 19 61

Botulism

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		

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 _____

Lead Poisoning or other Disease

Kind of disease Unknown. Probably malnutrition combined with too much salt ingestion.

Species affected Canada geese

Number Affected

Species	Actual Count	Estimated
Canada geese	59	300

Number Recovered None.

Number lost 58 Jan. 1 to 6/30; 1 July 1 to 12/31.

Source of infection -

Water conditions Suitable for use.

Food conditions Jan. 1 through spring migration available food was in very short supply. From fall migration through Dec. 31 food has been abundant.

Remarks Wintering season 1960-61 was bad. Prospects for the 1961-62 wintering season are good. Few sick birds have been observed through Dec. 31 and food conditions are much better than last year.

3-1756
Form NR-6
(Rev. August 1957)

PUBLIC USE

Refuge Pea Island

Calendar Year 1961

Total Use Visitor-Days	Hunting Use	Fishing Use	Miscellaneous Use
16,000	None.	4,000	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
Waterfowl		None	
Upland Game		None	
Big Game		None	

Supervised by refuge ____ by State ____ No. of blinds ____

Miscellaneous:	Percent	Visitor-Days
Recreation *	25%	3,000
Official		
Economic Use		
Other	75%	9,000

Comments:

Hunting (off refuge lands): Estimated man-days of hunting on lands adjacent to the refuge 900 (These figures should not be included in hunting-use totals above).

Fishing:

Acres of ponds or lakes ____ and miles of streams 13 miles of ocean front and inlet shoreline.

____ open to fishing.

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

INT.-DUP. SEC., WASH., D.C. 22919

Refuge Pea Island Calendar Year 1961

Facilities

Picnic areas: areas **1 tables **16 fireplaces No toilets **1

drinking water No shelters No

Swimming: designated areas No bathhouses No

Boating: launching sites No rental facilities No

service facilities No

are motors allowed _____ maximum horsepower _____

Camping: permitted Yes or not permitted _____

tent camps Yes total capacity **16 campsites

group camps No total capacity _____

hunter camps No total capacity _____

trailer camps Yes

lodges No capacity _____

cabins No motels No total units _____

Tours: Season None frequency _____

self-guided nature trails No is trail leaflet available? ____

self-guided auto tour route No 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 **.

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS (1)

Refuge Pea Island Refuge Year 19 61

	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
Species	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 Los
			None.				Dike berms behind bulkhead.	3 lbs. acre hulled seed	4 acres or 2,000 linear ft. of berm	Bermuda grass seed used.	April	50% germination	

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

Total acreage planted:
Marsh and aquatic
Hedgerows, cover patches 4 acres
Food strips, food patches
Forest plantings

Remarks: On this very sandy area where hand sprigging is usually required to establish cover, it is most fortunate that by seeding hulled Bermuda grass seed a good soil cover was produced the first season. This will greatly reduce wind erosion on the fill.

76148

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

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Pea Island County Dare State North Carolina

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Annual ryegrass							60 acres	Annual ryegrass for winter goose browse.	60
						(Farming 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				60
Hay - Wild				2. Acreage Cultivated as Service Operation				60

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.

INT.-DUP. SEC., WASH., D.C. 91767

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge ~~Pea Island~~ Months of Jan. 1 through Dec. 31, 1961

(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
Shelled corn	None	4100 lbs. or 75 bu.	75 bu.			75 bu.		None			
			(Used as bait on waterfowl banding program.)								

(8) Indicate shipping or collection points All corn purchased from commercial sources.

(9) Grain is stored at

(10) Remarks All grain was used in the annual waterfowl banding program.

*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 195~~5~~ 61

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

Interior Duplicating Section,
Washington 25, D.C. 17261

Form NR-10

HAYING AND GRAZING

Refuge Pea Island Year 19~~X~~ 61

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
No commercial haying or grazing at Pea Island Refuge.									

Totals:

Acreage grazed_____ Animal use months_____ Total income Grazing_____

Acreage cut for hay_____ Tons of hay cut_____ Total income Haying_____

1621

3-1761
Form NR-11

TIMBER REMOVAL

Refuge Pea Island Year 19~~4~~61

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
No timber on Pea Island Refuge.								

Total acreage cut over.....

Total income.....

No. of units removed B. F.....
Cords.....
Ties.....
.....

Method of slash disposal.....

PEA ISLAND NATIONAL WILDLIFE REFUGE

Narrative Report for the Period May 1 through August 31, 1961

Table of Contents

	Page
I. GENERAL	
A. Weather Conditions	1
B. Habitat Conditions	2
II. WILDLIFE	
A. Migratory Birds	3
B. Upland Game Birds	4
C. Fur Animals	4
D. Hawks, Eagles, and Crows	4
E. Fish	4
F. Reptiles	4
III. REFUGE DEVELOPMENT AND MAINTENANCE	
A. Maintenance and Repairs	4
B. Plantings	5
C. Collections and Receipts	5
D. Control of Vegetation	5
E. Planned Burning	5
F. Fires	5
IV. RESOURCES MANAGEMENT	
A. Commercial Fishing	5
B. Turtle Trapping	5
V. FIELD INVESTIGATION	5
VI. PUBLIC RELATIONS	
A. Recreational Uses	6
B. Refuge Visitors	6
C. Refuge Participation	6
D. Violations	7
E. Safety	7
VII. OTHER ITEMS	
A. Oregon Inlet Ferries	7
B. Oregon Inlet Bridge	7
C. Student Trainee-	7
D. Photographs	8, 9, 10, 11, and 12

PEA ISLAND NATIONAL WILDLIFE REFUGE

REFUGE NARRATIVE REPORT

May 1 through August 31, 1961

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

I. GENERAL

A. Weather Conditions

Rain, rain, rain, and hot weather, in general, relates weather conditions for most of this four-month period. July was the exception in the rain category, but the month fully met all requirements of a ' heat wave'. The temperature was in the 90's for 18 of its 31 days; most of the other days were in the high 80's. This may not sound hot compared to the Mississippi valley, but it certainly is a 'heat wave' along the Atlantic Ocean. Rainfall was above normal in May, June, and August. August with its 13.29 inches of rainfall was well above the 6-year average - 6.08 inches more than normal; that is quite high considering that no hurricane rains were involved. Rainfall for the entire period was 27.25 inches; this is 9.87 inches above the 6-year average. Temperature extremes were a high of 96 recorded on July 25 and a low of 45 recorded on May 28 and 29.

This area has been fortunate in that no hurricanes have developed which have come close to the Atlantic coast.

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.

Month	Precipitation				Temperatures	
	This Month	Normal	Dev. from Normal		Max.	Min.
May -	4.94	2.91	+ 2.03		84	45
June -	7.39	2.90	+ 4.49		92	54
July -	1.63	4.36	- 2.73		96	63
August -	13.29	7.21	+ 6.08		95	64
Totals -	27.25 in.	17.38 in.	+ 9.87 in.	Extremes -	96	45

B. Habitat Conditions

1. Water Conditions

Rainfall is the key to the water levels in the impoundments. With the exceptionally high rainfall of the summer, the impoundments have maintained a high water level. In fact, the water levels have been constantly higher through this summer than in any of the last seven years. Near the last of July the water levels were the lowest of the period, and even then no pond bottom became exposed.

No storms have developed. Hence, the Pamlico Sound waters have remained stable with only normal fluxations from wind blown tides.

Following is a table providing staff gauge readings taken near the end of each month from both the North and South Ponds. 1960 and 1961 readings are provided for comparative purposes.

Staff Gauge Readings

End of Month	North Pond		South Pond	
	1960	1961	1960	1961
May -	4.34	4.22	4.22	4.22
June -	3.88	4.32	3.78	4.38
July -	4.16	3.90	3.92	4.10
August -	4.16	4.56	4.16	4.40

2. Food and Cover

Both food and cover are abundant during the summer months for all wildlife species inhabiting the refuge.

Production of native waterfowl food crops is promising this summer. High water levels in the impoundments has brought on a good crop of both submergent and emergent aquatic vegetation. Borrow pits in both ponds contains lush growths of submergents. The North Pond has better than average growths of sago, redhead-grass, and celery in the main pond body. In both impoundments the marshes have produced extremely well; production of wild millet is greater than for the last several years. The major deficit which affects Canada geese more than other species is the lack of beach pea; particularly, this is true of areas south of New Inlet which were flooded by salt water during Hurricane Donna last fall.

The salt marshes have also benefited from the heavy rainfall of the summer. Salt-marsh cordgrass(Spartina alterniflora) has shown a definite increase and has extended its coverage along areas heretofor barren. An adequate food supply for the wintering snow geese is available from this source. Coverage on the wash flat north of North Pond by this plant has increased each year for the last few years.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

The latest Canada geese were seen on the refuge was June 18 when 12 still remained on the North Pond. None had arrived on migration by the end of August.

Production of young ducks dropped about 30% this year as compared with the summer of 1960. The reason for a decrease is unknown since most desirable water conditions prevailed. Those species nesting were black ducks, gadwalls, and blue-winged teal. Production of ducks on the refuge based on actual sight records was 472. Of course, some were produced which were not observed; black ducks are the most secretive and many are not seen until they are flight age. Production and broods by pond were as follows. North Pond: Gadwalls- 37 broods, 276 ducklings; black ducks - 15 broods, 95 ducklings; blue-winged teal - 7 broods, 42 ducklings. South Pond: Gadwalls - 4 broods, 33 ducklings; black ducks - 2 broods, 18 ducklings; blue-winged teal - 1 brood, 8 ducklings. Totals for the entire refuge of those actually observed are 41 broods, 309 young gadwalls; 17 broods, 113 young black ducks; and 8 broods, 50 young blue-winged teal. Most of the young ducks had reached flight age by mid-August. The first brood seen was black ducks on June 2.

2. Wading Birds, Gulls, Terns, and Shorebirds

Colonial birds which use the rookery on the South Pond dike were not as abundant this year as last. All of the six species which are common in this rookery were using it in reduced numbers. Especially, it should be noted that glossy ibises which have been on the increase in this area in each of the last few years were reduced by about 40%.

Green Island, located in the Pamlico Sound near the north end of the refuge, has for several years been a site used by a sizeable colony of nesting laughing gulls. This summer only a few nests were located on Green Island. The major nesting sites around Oregon Inlet this year have been two islands produced from dredging spoils farther out in the sound and to the north of the refuge.

B. Upland Game Birds

Ring-necked pheasants constitute the entire population of upland game birds on the refuge. Favorable conditions have existed for them, and a good hatch was produced. It has been quite common to see young broods this summer. The population is estimated at 150. The most common localities in which they are found are within and around the impoundments.

C. Fur Animals

Muskrats are the most abundant species on the refuge. Their population is less than a few years ago. An estimated 1,500 are now on the refuge. The reduction is population is attributed to the reduction in cattail which has come about through control work on cattails.

D. Hawks, Eagles, and Crows

No bald eagles have been seen on the refuge. National interest is high on the population and production trends in this species and special attention has been given to keeping a watchful eye for any sight records of the species.

E. Fish

Salt water sport fishing has been reported as good along this coastal area through much of the summer. Surf fishing is more commonly observed along the ocean front on the refuge in the fall months than at any other period of the year.

F. Reptiles

Snapping turtles are well known to be predaceous on young ducks and in some cases on adult ducks. They are found on the refuge. Efforts have been made during the period to control these undesirable turtles. Approximately 1,000 pounds of this species has been taken from the two impoundments.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Maintenance and Repairs

Maintenance schedules were kept on vehicles, tractors, farm equipment, light plants, air-cooled engines, boats, and outboard motors. Almost completed was a job of renovating an apartment in the residence, including replacing the ceilings, floors, adding a petition and closests, remodeling the kitchen, and interior painting; this residence has been occuppied for 12 years with few changes from its

original design for a Coast Guard station; some electrical and plumbing repairs were also accomplished in connection with this work. Roofs on all buildings were repaired. Repairs to the lookout tower were made. Wooden signs were repaired and refinished.

B. Plantings

The North Pond field was mowed in mid-summer in preparation for fall ryegrass seeding.

C. Collections and Receipts

None.

D. Control of Vegetation

34 acres of cattails were treated with dalapon by a ground operation. This was all of the cattails known to exist on the refuge at the time of spraying and was in patches scattered over a wide area. The berms of the dikes were treated for control of wax myrtle with 2,4-D. A more comprehensive report on chemical control operations will be made as scheduled in the narrative report for the period ending December 31.

E. Planned Burning

None during the summer months.

F. Fires

No wildfires or building fires occurred during the period.

IV. RESOURCES MANAGEMENT

A. Commercial Fishing

All commercial fishing in the area is done in navigable waters. No permits are required from the Bureau.

B. Turtle Trapping

A turtle trapping plan was approved. 451 pounds of snapping turtles were taken under Special Use Permit No. 22762 issued for this purpose.

V. FIELD INVESTIGATION

Water salinity tests in the fresh water impoundments have been taken each month. Brood counts and duckling population counts

have been made for production on the refuge. Thirteen flightless gadwall ducklings were banded. Efforts were made with bait traps to avoid any disturbance this was not successful, and later a drive type trap was set up which caught those banded. This is the first banding of ducklings produced at Pea Island and should provide some valuable information as to wintering range, etc.

VI. PUBLIC RELATIONS

A. Recreational Uses

Recreational uses of the refuge include sightseeing, fishing, beach combing, photograph, and nature and wildlife observation.

B. Refuge Visitors

1. Registered Visitors

Registered visitors at the reception office at field headquarters increased 37% as compared to the same four-month period last year. There were 1,261 from 32 states, Korea, Canada, and England.

2. Official Visitors

Date	Name and Organization	Address
5/24	Mr. E. A. Seaman, Natural Resource Advisor, U. S. Air Force	Washington, D. C.
7/24	Mr. F. C. Gillett, BSFW, Regional Office	Atlanta, Ga.
7/25	Mr. Carl Fermanich, BSFW, Central Office	Washington, D. C.
7/25	Mr. Kerns, BSFW, Central Office	Washington, D. C.
7/28	Mr. Donald Hankla, Biologist, BSFW	Savannah, Ga.
8/7	Mr. L. S. Givens, BSFW, Regional Office	Atlanta, Ga.
8/7	Mr. Edwin Ball, BSFW, Regional Office	Atlanta, Ga.
8/22	Mr. Philip VanDyck, BSFW, Regional Office	Atlanta, Ga.

C. Refuge Participation

The manager attended a meeting with other Bureau representatives and National Park Service representatives at Bodie Island in connection with the sand dune stabilization program.

D. Violations

No violations have been detected this period.

E. Safety

A safety meeting was held each month of the period. Subjects stressed were carelessness with moving equipment, fire hazards, boating safety,, vehicle safety, and farm equipment safety. No accidents or injuries occurred during the period. For protection of the public, the observation tower was closed; entrance up the ladder through a trap door is the reason for closing it. Plans are for the locations of the ladder to be moved and provide an extension of the platform fro a landing deck. Life preservers and other equipment was acquired for boating equipment to conform with Bureau boating regulations. No accident has occurred at Pea Island Refuge since January 21, 1958.

VII. OTHER ITEMS

A. Oregon Inlet Ferries

An impossible situation through much of the summer developed in crossing Oregon Inlet by the toll-free state ferries. This is illustrated by picture in the following pages.

B. Oregon Inlet Bridge

The North Carolina Highway Commission has announced its intention to begin construction on the Oregon Inlet Bridge within a year.

C. Student Trainee

As part of the National Wildlife Refuge trainee program, Pea Island Refuge was fortunate in obtaining Student Trainee Robert F. Koontz, jr. He is a rising Junior at North Carolina State College.

D. Photographs

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

Date submitted: September 18, 1961

Respectfully submitted,

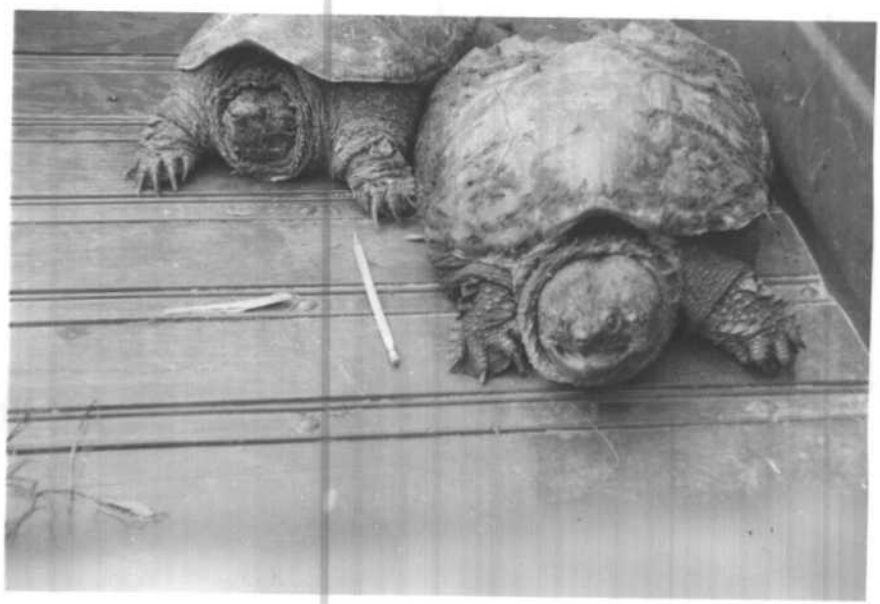
Charles F. Noble

Charles F. Noble
Refuge Manager

Approved: Victor W. Ray

Acting Regional Refuge Supervisor
Sept. 20, 1961

This was the type of trap used in the snapping turtle control program.

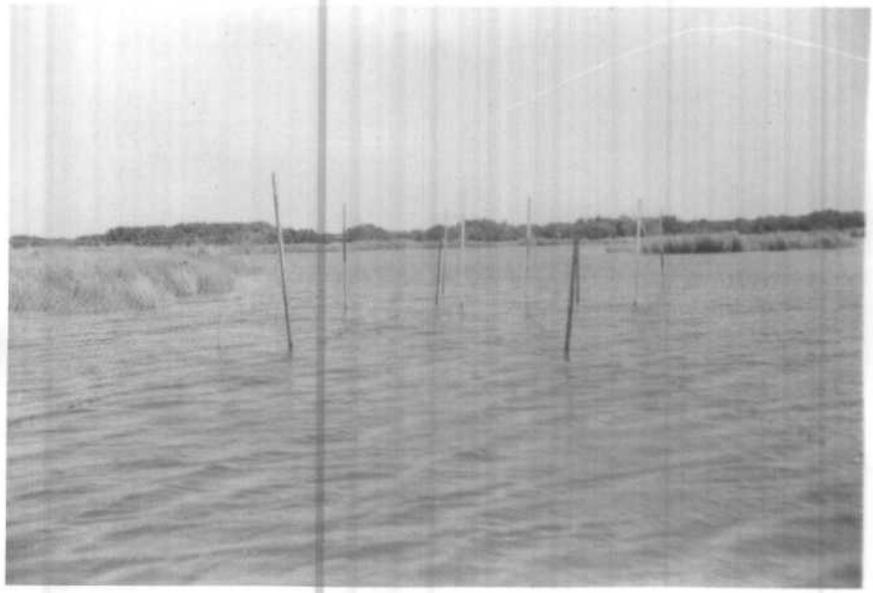


Picture above shows a sample of the snapping turtle catch.

34 acres of cattail were treated with dalapon; many scattered patches over a wide area were treated. These pictures illustrate the method of operation used on most of the operation.

Shown is a large patch of cattails about 1 week after treatment.

It's a long ways to the ferry. This is the way Oregon Inlet ferry lines looked much of July and August.



These pictures show parts of the drive trap set up to trap and band young gadwall ducks. Note the two young flightless gadwalls in the 'Pound' or enclosure built at the end of the 'leads'.

Young flightless gadwalls being leg banded at the trapping site.

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

WATERFOWL

REFUGE Pea Island Refuge MONTHS OF May 1 TO Aug. 31, 1961

(1) Species	(2) Weeks of reporting period: 6 days 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	150	100	100	50	25	25	15	15		
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard										
Black	300	200	200	100	100	125	125	150	200	225
Gadwall	200	100	200	300	200	200	200	250	300	350
Baldpate										
Pintail										
Green-winged teal	50									
Blue-winged teal	100	50	25	25	25	40	40	50	60	75
Cinnamon teal										
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coot:										

Int. Dup. Sec.,
Wash., D. C. 37900

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Pea Island Refuge MONTHS OF May 1 TO Aug. 31, 1961

(1) Species	(2) Weeks of reporting period: 11	12	13	14	15	16	17	5 days 18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimate total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada									3,140		
Cackling											
Brant										Actual sight records:	Estimated production:
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard											
Black	250	250	250	200	150	200	200	400	24,275	17	150
Gadwall	400	500	600	500	400	350	300	300	38,750	41	400
Baldpate											
Pintail											
Green-winged teal									300		
Blue-winged teal	75	75	50	50	50	75	100	125	7,280	8	50
Cinnamon teal											
Shoveler											
Wood											
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other											
Coot:											

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	3,140	150	0
Ducks	70,605	900	600
Coots			

73,745 - Total waterfowl days use.

SUMMARY

Principal feeding areas Fresh water impoundments.

Principal nesting areas Dikes, marsh, and islands within impoundments for gadwall and blue-winged teal; entire refuge used by blackducks.

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).

Interior Duplicating Section, Washington, D. C. 37944
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Pea Island Refuge Months of May 1 to Aug. 31 1961

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:	Census of 6/14									
Little blue heron	114	6/14	130	7/1	22	8/25	1	24	62	180
Louisiana heron	146	6/14	280	7/1	38	8/25	1	62	188	350
Black-crowned night heron	37	6/14	180	7/1	18	8/25	1	36	124	320
Yellow-crowned night heron	0	6/14	4	8/16	4	8/16		0	0	6
Common egret	87	6/14	95	7/1	28	8/25	1	20	56	160
Snowy egret	134	6/14	240	7/1	44	8/25	1	54	168	340
Glossy ibis	80	6/14	90	7/1	8	8/25	1	24	58	100
Clapper rail	1	5/18	200	8/1	1	8/12				200
Great blue heron	1	8/25	1	8/25	1	8/25				2
American bittern	Seldom seen due to its sedentary nature									30
II. Shorebirds, Gulls and Terns:										
Black-backed gull	8	5/5	8	5/5	2	8/25				15
Herring gull	600	5/5	600	5/5	12	8/25				700
Ring-billed gull	700	5/5	700	5/5	4	8/25				700
Laughing gull	1,000	5/5	2,000	8/16	500	8/25				3,000
Bonapartes gull	20	5/5	20	5/5	20	5/5				300
Common tern	30	5/5	350	6/18	14	8/25				400
Royal tern	6	5/5	200	6/18	4	8/25				450
Least tern	80	5/5	700	6/18	42	8/25				1,000
Black skimmers	300	5/5	1,000	7/28	50	8/25				600
Willets	150	5/5	500	7/28	22	8/25				800
Yellowlegs, great. & less.	75	5/5	700	7/28	150	8/25				800
Sandpipers, all species	1,000	5/5	4,000	7/28	600	8/25				5,000

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove			6	8/25	6	8/25				14
White-winged dove										
IV. Predaceous Birds:										
~~Golden eagle~~										
Duck hawk	1	5/5			1	5/5				1
Horned owl										
Magpie										
Raven										
Crow	10	5/5	40	8/25	40	8/25				60

Reported by Charles F. Noble

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 Gruiiformes
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.

3-1750b
Form NR-1B
(Rev. Nov. 1957)

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 61

Reported by: Charles F. Noble — Title: Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	(2) Habitat Acreage		(3) Use-days	(4) Breeding Population	(5) Production
UNIT 1: All unimpounded area from New Inlet north to Oregon Inlet.	Crops		Ducks	562,000		
	Upland	592	Geese	604,960		
	Marsh	2,664	Swans			
	Water	16,000	Coots			
	Total	19,256	Total	1,166,960		
UNIT 2: Pool No. 2 (North Pond) An Impoundment.	Crops	60	Ducks	187,700	264	528
	Upland	98	Geese	301,000		
	Marsh	82	Swans	6,720		
	Water	400	Coots	87,600		
	Total	640	Total	583,020	264	528
UNIT 3: Pool No. 1 (South Pond) An Impoundment.	Crops	25	Ducks	97,274	36	72
	Upland	50	Geese	120,796		
	Marsh	120	Swans	1,687		
	Water	180	Coots	21,960		
	Total	375	Total	241,717	36	72
UNIT 4: All unimpounded area from New Inlet to the south boundary.	Crops		Ducks	92,000		
	Upland	393	Geese	181,200		
	Marsh	1,216	Swans			
	Water	9,700	Coots			
	Total	11,309	Total	273,200		
Sub-Totals for the refuge	Crops	85	Ducks	938,974	300	600
	Upland	1,133	Geese	1,207,956		
	Marsh	4,082	Swans	5,407		
	Water	26,280	Coots	109,560		
GRAND TOTALS	Total	31,580	Total	2,264,897	300	600
	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.

Interior Duplicating Section, Washington, D. C. 27580

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Pea Island Refuge Months of May 1 to Aug. 31, 1961

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Dikes, wax myrtle growths, uplands, and marshes.		8	60					150	

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.

PEA ISLAND NATIONAL WILDLIFE REFUGE

Narrative Report for the Period January 1 through April 30, 1961

Table of Contents

	Page
I. GENERAL	
A. Weather Conditions	1
B. Habitat Conditions	2
II. WILDLIFE	
A. Migratory Birds	3
B. Upland Game Birds	4
C. Fur Animals, Rodents, and Other Mammals	4
D. Hawks and Eagles	4
E. Fish	5
F. Diseases	5
III. REFUGE DEVELOPMENT AND MAINTENANCE	
A. Maintenance	5
B. Plantings	5
C. Collections and Receipts	5
D. Control of Vegetation	5
E. Planned Burning	6
F. Fires	6
IV. RESOURCES MANAGEMENT	6
V. FIELD INVESTIGATION	6
VI. PUBLIC RELATIONS	
A. Recreational Uses	7
B. Refuge Visitors	7
C. Refuge Participation	8
D. Violations	8
VII. OTHER ITEMS	
A. Oregon Inlet Ferries	8
B. Photographs	8, 9, 10, and 11

PEA ISLAND NATIONAL WILDLIFE REFUGE

REFUGE NARRATIVE REPORT

January 1 through April 30, 1961

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

I. GENERAL

A. Weather Conditions

Winter lingered on this year until the last of April. The only mild, truly spring-like weather came for about three weeks at the last of February and first of March. Unseasonably cool weather prevailed throughout April with a frost occurring on April 19 in the Manteo area. January produced very cold weather with freezes recorded on 16 dates in that month on the beach front; continued freezing weather is uncommon next to the ocean along this coast line. From the 20th of January to the 4th of February, 16 days, minimum temperatures were below freezing, bringing the longest extended period of cold weather for the period. Strong winds accompanied much of the cold weather. The extremes in temperature were 17 degrees on January 26 and 88 degrees on April 24.

The Hatteras weather station reported a 70 mile per hour west wind on Sunday morning, February 26, before daybreak. This wind pushed water from Pamlico Sound over much of the refuge and across the state highway passing through the refuge.

Precipitation was 5.24 inches above normal for this four month period. The only month of the period showing a deficiency from normal was March; rain came on 12 days during that month so that precipitation was well distributed over the month. The total rainfall for the period was 18.83 inches.

Data recorded in the table at the top of the next page was taken from records furnished us by the Cape Hatteras Seashore Area from their weather station at Bodie Island. This 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.

Month	Precipitation				Temperatures	
	This Month	Normal	Dev. from Normal		Max.	Min.
Jan. -	3.35	3.26	+ 0.09		64	17
Feb. -	7.58	4.01	+ 3.57		70	30
March -	3.00	4.03	- 1.03		79	34
April -	4.90	2.29	+ 2.61		88	44
Totals -	18.83 in.	13.59 in.	+ 5.24 in.	Extremes -	88	17

B. Habitat Conditions

1. Water Conditions

The low rainfall and consequently the low impoundment water levels of the fall months have shown a carry-over effect on the impoundment water levels throughout the winter months. Heavy rainfall in February improved water level conditions in the two fresh water ponds, but these ponds never attained the levels generally experienced in the winter months. Most marshes along the marginal edge of the ponds did become inundated in late winter.

Water levels in the Pamlico Sound Proclamation Area are controlled for the most part by wind, normal changes in the ocean tide having little affect. In late winter many west and north-west winds prevailed; this produces a high water level over the shoals. One very strong west wind in late February piled Pamlico Sound water over most of the refuge; a storm tide level of only 3 feet below that produced by Hurricane Donna last fall developed. This water level was high enough to bring water over much of the jeep road on the outside of the South Pond dike.

Below are staff gauge readings from both impoundments taken near the end of each month. Readings in 1960 and 1961 are provided for comparative purposes.

Staff Gauge Readings

End of Month	North Pond		South Pond	
	1960	1961	1960	1961
January -	4.54	4.00	4.56	4.16
February -	5.16	4.46	5.12	4.48
March -	5.00	4.44	4.92	4.60
April -	4.78	4.16	4.60	4.50

2. Food and Cover

The waterfowl food supply was critical this winter. This condition is typical at Pea Island in any winter following a severe hurricane in the fall that inundates most of the refuge. A relatively large part of the beach pea crop was lost to the hurricane. Drought conditions in the fall months hurt the ryegrass browse crop. Then, winter was extremely cold. Geese found a low food supply and poor feeding conditions at Pea Island during the very cold weather of January. Most used of the areas were the salt marshes where the geese fed on salt meadow and salt marsh cordgrass. Vegetative growth was retarded by a cool spring, but some green-up occurred beginning with the first of March; this helped relieve some of the late winter distress.

Severe weather and high water combined left the sound shoals unattractive to feeding waterfowl. Some flocks did use this shallow water area, but they found poor feeding conditions.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

The waterfowl populations using the refuge regularly were comparable to those of last year. The peak population of the winter for Canada geese came in the fall, but a population of 5,200 was recorded in the first week of January this period; that was 800 less than the peak for the year and compares with 5,800 recorded last year as a peak in this period. Snow geese on the refuge decreased in January as compared with a peak of 12,000 in December; a peak population for this period of 7,000 was recorded the first week of January. Ducks also showed only a slight decrease with a peak for this period of 6,277 as compared with 6,950 for the same period last year.

A trend in waterfowl use within this locality should be recorded. That is, each winter for at least the last three years, waterfowl use of the Bodie Island marshes controlled by the Cape Hatteras Seashore Area has increased. For a period of two months this winter, approximately 12,000 snow geese remained in Dare County. The majority which were not on the refuge were in the Bodie Island marshes. The same is true of ducks. But Canada geese do not exhibit this trend noticeably until after the close of the waterfowl hunting season. Most of the Bodie Island marshes used by waterfowl are within a public hunting area. This area does have local affect on refuge waterfowl populations even during the open hunting season. Snow geese use marshes within this public hunting area throughout most of the hunting season. Most of the major

flock of Canada geese within this area stay on the refuge until after the close of hunting season. Ducks, of course, move back and forth depending on water, food, and weather conditions.

2. Wading Birds, Gulls, Terns, and Shorebirds

The influx of birds which use the heron rookery on the South Pond began about the first of April. On April 1, the first arrivals of glossy ibises were seen; there were 15 seen on that date. During the first week of April many of the nesting species which use the rookery increased rapidly. These include snowy and common egrets, black-crowned night herons, Louisiana herons, and little blue herons. It was April 23 before any yellow-crowned night herons were seen; at this time only two pairs were observed. By the end of April use of the rookery was well established.

Other birds of interest in this grouping were 3 American avocets seen on April 20, 3 black-necked stilts seen on April 23, and a pair of oyster catchers seen on April 24.

B. Upland Game Birds

Ring-necked pheasants are the only resident upland game birds found on Pea Island Refuge. Sight records of this species are common. An estimated 60 birds are found over the refuge. The major use areas for this species is in and around the two fresh water impoundments and the wax myrtle thickets on the north end of the refuge.

C. Fur Animals, Rodents, and Other Mammals

Four species of fur-bearing animals inhabit the refuge; these are muskrat, otter, nutria, and mink. Observations indicate that some changes should be made in the estimated populations as compared to last years report. Approximately 1800 muskrats are on the refuge; more nutria than previously realized are on the refuge - approximately 60 to 80. Two nutria were destroyed this period during walks in the marsh for other purposes. Otter and mink populations are estimated to be approximatley the same as last year.

Rabbits are definitely established on the refuge now. Their tracks have been seen regularly over much of the refuge in recent months. Some have been run over on the state highway.

D. Hawks and Eagles

During this winter special requests have been made to report data on bald eagles. Close observation was made for any records of this bird on the refuge this winter; not one was seen through the entire winter on the refuge. The regular variety of hawks were seen during the period including the marsh hawk, duck hawk, sparrow hawk, and sharp-shinned hawk.

E. Fish

No fishery management activities are practiced on the refuge since only salt water species occur. Sport fishing activities during the period were non-existent and commercial fishing efforts were practically nil.

F. Diseases

Periodic checks were made over the refuge during this period for sick and dead geese. 58 Canada geese which were sick beyond recovery or dead were counted. These 58 are in addition to the 24 counted during the fall months and reported in the previous narrative report. This makes a total actual count of 82 for the winter. Since those sick and dead birds found are only a sample, it would not be surprising if at least 300 Canada geese died on the refuge this winter. Observations through the years show that geese are affected most drastically during winters following a severe hurricane in the fall. Factors involved are probably malnutrition and excessive salt consumption.

III. PHYSICAL DEVELOPMENT AND MAINTENANCE

A. Maintenance

Usual maintenance schedules have been followed during the period. Preventive and necessary maintenance was performed on vehicles, light plants, air-colled engines, water pumps, boats, and outboard motors. Other routine work has included repainting, repairing, and replacing signs, repairs to doors and windows, and continued repairs to the 13 mile fence and gates.

B. Plantings

At the first of April, the exposed berm of the dike which was bulkheaded last fall was seeded with a variety of seeds. The purpose is to try to get a vegetative cover as cheaply as possible to control wind erosion. The seed used included Bermuda grass, fescue, rye, and Kobe lespedeza. Fertilizer was applied at the rate of 400 lbs. per acre of 5-10-10. It is too early to determine if any success can be expected although some of the seed have germinated. Bermuda grass, of course, is the species hoped to become established.

C. Collections and Receipts

None.

D. Control of Vegetation

Patuxent Research Center personnel established another test plot

this spring in the South Pond on Eurasian watermilfoil(Myriophyllum spicatum). Data on the progress of study on control of this plant was published by the Patuxent Research Center. Mr. John Steenis of Patuxent has headed up this project.

E. Planned Burning

Attempts at controlled burning of marshes this winter have failed. Due to excessive salt deposited on plants during Hurricane Donna and on other high tides, and due to lack of rainfall during early winter, and the lifting and placing of litter or'duff' in drifts, conditions were not favorable for marsh burning. The marsh grasses would not carry a fire.

F. Fires

No wildfires or building fires occurred during the period.

IV. RESOURCES MANAGEMENT

No enterprises are being conducted on the refuge which bring in financial compensation. The only source of income was received from the Pea Island Campground Store which burned to the ground last fall.

V. FIELD INVESTIGATION

Considerable efforts were made toward goose trapping and banding this period. Some duck banding was accomplished but emphasis was placed on the Canada goose banding project. For over two months, the major field project was focused on goose trapping and banding. No actual baiting or banding was attempted until after the close of the migratory waterfowl hunting season. The results of this winters banding activities are as follows:

Species	Birds Banded	Returns	Foreign Retraps	Repeats (Within 90 days)		Birds Trapped
Canada geese -	117	4	1	54	-	176
Mallards -	2	2		2	-	6
Black duck -	44	2		12	-	58
Pintail -	3				-	3
Ring-necked duck -	1				-	1
Totals - (All Species)	167	8	1	68	-	244

VI. PUBLIC RELATIONS

A. Recreational Uses

A cold spring has retarded sport fishing activity. None was observed along the ocean front by the end of April.

Recreational uses of the area are low during the late winter months. General sightseeing and bird watching are the main uses in late winter and early spring. Even in cold weather, it is not uncommon to see bird watchers at the overlook platform on the North Pond.

B. Refuge Visitors

1. Registered Visitors

152 visitors registered at the reception office located at refuge field headquarters.

One especially distinguished visitor was given a tour of the refuge by arrangement. On March 24, Sir Harold Caccia, British Ambassador to the United States and his Aide, Mr. Scot-Rankins of the British Embassy came to the 'Outer Banks' area for the particular purpose of seeing the birds at Pea Island Refuge. Sir Harold Caccia is an ardent bird watcher and seemed to enjoy his trip over the refuge very much. He came in the first 4-engine airplane to land at the Billy Mitchell Airport near Buxton.

2. Official Visitors

Date	Name and Organization	Address
Jan.	Mr. Donald Cross, Game Agent, BSFW	Elizabeth City, N. C.
3/24	Mr. Ted Ball, BSFW, Regional Office	Atlanta, Ga.
4/1	Mr. Taylor, Engineer, BSFW, Regional Office	Atlanta, Ga.
4/1	Mr. Joyner, Engineer, BSFW, Regional Office	Atlanta, Ga.
4/3	Mr. Otto Florschutz, N. C. Waterfowl Biologist	Washington, N. C.
4/14	Mr. John Steenis, BSFW, Patuxent Research C.	Patuxent, Md.
4/14	Mr. Gene Barrett, " " "	Patuxent, Md.
4/14	Mr. Frank McGilvery, BSFW Bio., Santee Refuge	Santee Refuge, S. C.
4/14	Mr. Ray Smith, SCS Wildlife Advisor	Raleigh, N. C.
4/25	Mr. Donald Hankla, Mgt. Bio., BSFW	Savannah Refuge, S. C.

C. Refuge Participation

On February 10, Dr. Gene Hester and a group of wildlife management students from North Carolina State College visited the refuge. They were given a short talk and orientation on the management history and present management practices on the refuge. They were then given a tour of the refuge and various management activities were described in the field.

A group of about 30 members of the Middle Atlantic States Audubon Society visited the refuge on Sunday, April 23rd. Most of the group were from the Washington, D. C. vicinity. After a short orientation talk, a half day tour was conducted for the primary purpose of bird watching. A walk for song bird observation was also included in the schedule.

D. Violations

After apprehending two violators at the last of December, waterfowl violations were not apparent for the remainder of the winter. A good amount of patrol work was done which probably helped to discourage attempts to violate.

VII. OTHER ITEMS

A. Oregon Inlet Ferries

Crossing Oregon Inlet has consumed many hours this period. The ferry route was changed involving a 1 hour ferry ride. This means that with ideal ferry connections, 1 ½ hours is consumed each way from Manteo to the refuge. With ferries operating at the rate of one per hour most of this period, the ferries are often loaded, requiring an additional hour wait at the ferry landing. Chances are good for an improvement soon since the State Highway Commission has announced plans to either dredge out the short ferry route or procure additional ferries.

B. Photographs

Please find pictures pertaining to the refuge on the following pages. It is regretted that no good pictures were gotten of one of the main activities, goose trapping and banding. With only two people on the operation, all hands were needed to carry on operations of the actual trapping activity.

Date submitted: May 16, 1961

Respectfully submitted,

Charles F. Noble

Charles F. Noble
Refuge Manager

Approved: (Sgd) Victor W. Kay
Acting Regional Refuge Supervisor
May 18, 1961

The bulkhead built in the fall of 1960 on the North Pond held up well through its first winter. The following series of pictures are arranged in chronological order and were taken from approximately the same location.

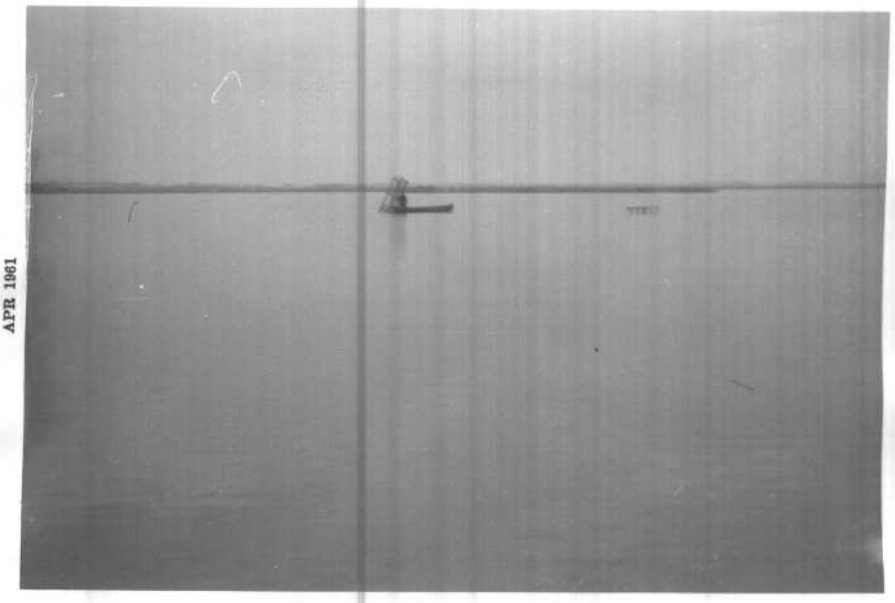
1. Dike berm, North Pond, Spring of 1960

2. Same location as above, Summer of 1960 after dragline rebuilding.

3. Last of the series showing bulkhead. Picture taken from near the same location as pictures on page 9, showing bulkhead after completion of construction. This structure may have saved the dike from washing out this winter; it would have washed badly with the strong north winds that were frequent in mid-winter.

Drift bulldozed off jeep roads after high water of Feb. 26. It had previously been bulldozed off following Hurricane Donna.

APR 1961



Tending stilt-legged duck traps in the South Pond.

APR 1961

Sir Harold Caccia, British Ambassador to the U. S. visited the refuge on March 24, 1961.

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

WATERFOWL

REFUGE [illegible] Island

MONTHS OF Jan. 1 TO April 30, 1961

(1) Species	(2) Weeks of reporting period 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling	50	20	16	10	21	30	32	30	22	15
Trumpeter										
Geese:										
Canada	5200	4600	4200	3900	4200	4100	3900	3200	2400	1600
Cackling										
Brant										
White-fronted										
Snow	7000	3000	2000	3000	3300	4000	3500	500	10	12
Blue			2	6						
Other										
Ducks:										
Mallard	40	30	30	30	50	70	80	60	30	30
Black	1300	900	900	1100	1200	1200	900	800	600	700
Gadwall	150	150	150	150	150	150	150	150	100	50
Baldpate	600	400	200	300	400	500	300	400	200	200
Pintail	1400	900	600	700	900	700	600	600	300	100
Green-winged teal	900	600	500	600	700	600	500	400	400	50
Blue-winged teal										
Cinnamon teal										
Shoveler	20	20	20	30	20	30	40	30	20	10
Wood										
Redhead	2		2	4						
Ring-necked	25					25	25	30	30	20
Canvasback		2	2	2	2	2	2			
Scaup	600	400	400	400	400	400	350	300	200	200
Goldeneye										
Bufflehead	900	1000	900	900	900	800	800	700	600	500
Ruddy	20	25	30	20	20	50	50	50	30	10
Other										
Mergansers	220	200	200	300	300	300	400	500	500	500
Unidentified	100	200	300	200	200	100	200	100	100	
Coot: American	600	200	100	100	150	200	150	100	40	40

Int. Dup. Sec.,
Wash., D. C. 37944

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Island MONTHS OF Jan. 1 TO April 30, 1961

(1) Species	(2) Weeks of reporting period: 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimate total
Swans:											
Whistling	17								1,[illegible]		
Trumpeter											
Geese:											
Canada	1400	800	500	700	300	200	150	150	293,[illegible]		
Cackling		1	1	1	1	1	1	1	43		
Brant											
White-fronted											
Snow	10	4	0	25	30	40	40		135,277		
Blue									70		
Other											
Ducks:											
Mallard	10	6	10	10					3,402		
Black	600	500	500	500	400	400	300	300	89,900		
Gadwall	50	100	100	100	100	150	200	200	15,250		
Baldpate	200	100	150	200	50				29,450		
Pintail	50	20	50	10					46,510		
Green-winged teal	200	150	200	100	300	400	50	50	46,600		
Blue-winged teal	10	30	50	200	300	200	100	100	6,330		
Cinnamon teal											
Shoveler		50	20	10	10				2,310		
Wood											
Redhead									56		
Ring-necked		10							1,155		
Canvasback									84		
Scaup	150	100	100	100					20,700		
Goldeneye											
Bufflehead	300	100	100	100	100	100			61,600		
Ruddy	10	10	10	10	10	10			2,555		
Other											
Mergansers	500	500	500	400	400	300	300	300	44,540		
Unidentified									10,500		
Coot: American	40	20	20	20	20	10	10	10	12,750		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	1,939	50	
Geese	479,210	12,200	
Ducks	390,892	6,277	
Coots	12,750	600	

884,791 - Total Waterfowl Days Use

SUMMARY

Principal feeding areas Impoundments, fresh marsh, salt marsh, beach pea dunes, ryegrass field, and Pamlico Sound shoals.

Principal nesting areas

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).

Interior Duplicating Section, Washington, D. C. 37944
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge [illegible] Months of [illegible] to [illegible] 195[illegible]

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Little blue heron	5	2/27	30	4/23	Present End of period					50
Louisiana heron	6	1/6	60	4/23		"				100
Black-crowned night heron	10	1/6	70	4/23		"				110
Yellow-crowned night heron	4	4/23	4	4/23		"				6
Common egret	4	1/6	40	4/23		"				60
Snowy egret	10	1/6	80	4/23		"				140
Glossy ibis	15	4/1	35	4/23		"				45
Common loon	2	1/6	20	2/27		"				50
Double-crested cormorant	200	2/27	2,000	4/1						4,000
Clapper rail	No accurate data due to secretive nature of bird.									150
II. Shorebirds, Gulls and Terns:										
Common tern	6	4/1	200	4/24	Present End of Period					400
Royal tern	4	4/10	20	4/24		"				50
Least tern	8	4/1	70	4/24		"				200
Herring gull	500	1/6	2,000	2/27		"				4,000
Ring-billed gull	500	1/6	2,500	2/27		"				5,000
Bonapartes gull	30	4/2	90	4/10	6	4/27				200
Laughing gull	8	4/1	2,500	4/24	Present End of Period					4,000
Willets	12	4/10	120	4/23		"				200
Black-necked stilts	3	4/23	3	4/23		"				3
American avocet	3	4/20	3	4/20		"				3
Oyster catcher	2	4/24	2	4/24		"				8
Yellowlegs, great. & less.	Res.		300	4/24						500
Sandpipers, all species	All year		2,000	4/24						3,000

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove		April	12	April					Transient	
White-winged dove										
IV. Predaceous Birds:										
~~Golden eagle~~										
Duck hawk	1	1/6	2	2/27	1	4/23				4
Horned owl										
Magpie										
Raven										
Crow										

Reported by Charles F. Noble

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 Gruiiformes
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 Tom Island Months of Jan. 1 to April 30, 1941

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	Dikes, wax myrtle thickets, salt-meadow cordgrass, and other high marshes. (This bird uses about 1/3 of the high marsh and upland refuge acreage - and estimated 1,000 acres.)	17							(6)	Well established from New Inlet to Pagan Inlet.

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 [illegible] Year ending April 30, 1941

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5) Total Population
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
Muskrats	Cutgrass, three-square, cordgrass, and fresh water impoundments. (1500 acres)	0.3												1,500
Otter	Range overall of the land area and tidal creeks (5000 acres).	1.6												30
Nutria	Same as muskrat area listed above. (1500 acres)	20												70

* List removals by Predator Animal Hunter

REMARKS:

Reported by Charles F. Noble, Refuge Manager

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 headingslisted.

(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 unprimeness 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.

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