PEA ISLAND NATIONAL WILDLIFE REFUGE

Narrative Report for Period September 1 through December 31, 1960

Table of Contents

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REFUGE NARRATIVE REPORT

September 1 through December 31, 1960

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

I. GENERAL

A. Weather Conditions

Two important weather factors developed during this four month period. First was Hurricane Donna in September; then, there was the semi-drought conditions which prevailed throughout the fall months and up to the present time.

Hurricane Donna passed through Dare County(in which Pea Island Refuge is located) on Sunday night, September 11 and Monday morning, September 12. By noon on Monday the clouds were clearing and the sun broke through. But in 'her' path she had left devastating destruction. 'Her' winds were fierce enough, but it was the 'piling up' of water, causing flood conditions on all low lying areas that brought about the greatest property damage. The high water caused by 'Donna' crested around 6:00 A.M. in the Manteo area; these were the highest tides known in Manteo for at least 40 years. Sound waters swelled higher on the refuge than in any previous hurricanes in the 11 years Wildlife Aid Phillips has lived on the refuge. Winds were sufficient to cause much damage to buildings; 110 mile per hour winds were clocked on the Nags Head beach.

Semi-drought conditions have prevailed on the refuge for this four month period. This has had a tremendous affect on fall plant growth and waterfowl utilization of the marshes. For four months only 7.93 inches of rain fell. This is a deficiency from normal of 10.18 inches in these four months.

Winter 'came on' slowly, but with December just a few days old some real winter weather arrived. It remained through most of December. Snow came on December 12 and by the following day, December 13, the temperature had fallen low enough for the fresh water impoundments to freeze over. Strong north-west winds accompanied this cold air. The following day, the 14th, the temperature fell to 16 degrees on the ocean front, which feels extremely cold.

The following weather data was furnished us by the National Park Service from their weather station located three miles north of the refuge. It reflects weather conditions as they actually are on the refuge. For normal precipitation, the five year average since this weather station has been operated is used.

Month	Precipitation				Temperatures	
	This Month	Normal	Dev. from Normal		Max.	Min.
Sept. -	2.70	6.96	- 4.26		94	64
Oct. -	0.93	4.80	- 3.87		84	42
Nov. -	2.20	3.03	- 0.83		74	35
Dec. -	2.10	3.32	- 1.22		65	16
Totals -	7.93 in.	18.11 in.	- 10.18	Extremes -	94	16

Precipitation for 1960 - 46.31 inches
Average Normal Annual Precipitation - 49.30 inches

Year 1960 Deviation from Normal - - 2.99 inches

B. Habitat Conditions

1. Water Conditions

Water levels in the North and South Ponds have been exceptionally low for late fall and early winter. A staff gauge reading of 3.90 was recorded on each pond on December 30. This produces a water level about one foot lower than is expected in mid-winter. Salt content of the water has been low, providing a fresh water habitat for all practical purposes.

The water conditions on the Pamlico Sound Proclamation Area have been satisfactory. High tides of Hurricane Donna did much less damage to the submerged aquatics than expected. Low water conditions often has allowed Canada geese to feed far out on the sound shoals.

At the top of the next page is a staff gauge reading table. Staff gauge readings entered were taken near the end of each month. Readings in 1959 and 1960 are provided for comparative purposes.

Staff Gauge Readings

End of Month	North Pond		South Pond	
	1959	1960	1959	1960
Sept. -	3.78	4.00	3.46	3.84
Oct. -	3.80	3.84	3.50	3.78
Nov. -	3.90	3.68	3.82	3.82
Dec. -	4.26	3.90	4.38	3.90

Water salinity tests were made in both the North and South Ponds at various times throughout the year. A summary of the results of these tests will be found in the table below.

Water Salinity Tests During Year 1960

(Readings in % of Sea Strength)

	North Pond		South Pond	
Date	North End	At Staff Gauge	North End	At Foot Bridge
1/27/60	1.2%	1.2%	1.0%	1.0%
3/29/60	0.88%	0.88%	0.88%	0.7%
5/24/60	1.2%	1.0%	1.2%	1.0%
7/1/60	1.06%	1.23%	1.23%	1.4%
9/28/60	1.76%	1.76%	1.94%	1.94%
11/25/60	2.1%	1.8%	2.3%	2.5%
12/30/60	2.1%	1.9%	2.5%	2.5%

2. Food and Cover

Available waterfowl foods are more critical this year than in recent years. After Hurricane Donna covered all of the refuge outside the impoundments except the ocean front sand dunes with salt water, many of the food sources were no longer available. Most of the beach pea crop, which produced abundantly this year, was destroyed. Inside the impoundments, water levels have been too low for water to cover the fresh marshes. Should future winter rains raise the water level, the impoundment marshes will provide a limited food source. The ryegrass browse crop has been the poorest for the last three years. The field received little rain in October when it was needed badly, and the effects are apparent.

It is doubtful that any burning units can be burned this year. To date, the salt deposited on plants during the hurricane along with the loss of litter or 'duff' to carry a fire makes marsh burning unsuccessful. Possibly, if heavy rains come to rinse the salt off plants, some might be accomplished later than normal.

Large patches of submerged aquatics remain on the Pamlico Sound shoals. On certain water conditions, this area will still provide a food source for the Canada goose flock.

II. WILDLIFE

A. Migratory Birds

Ducks began arriving, heralding the beginning of fall migration, in the third week of September. On September 13, there were 600 pintails, 800 blue-winged teal, and 400 black ducks on the North Pond. By the third week of October the fall migration was at its peak; pintail and widgeon which apparently travel farther south were concentrated on the North Pond. Approximately 2,000 of each of these species was present for a short time. The peak population came in the last week of December when a population of 6,475 was estimated on the refuge.

On October 3, the first Canada geese of the fall migration arrived. An estimated 500 were seen on the North Pond on this date. From 5,500 to 6,000 have used the refuge regularly since mid-November. A few snow geese began arriving with the first arrivals of Canada geese, but it was not until the second week in November that the influx of the major Dare County flock was noted. For short periods of time, more snow geese have been on Pea Island this winter than in any of the eleven winters Wildlife Aid Phillips has lived on Pea Island Refuge. On December 16, an estimated 12,000 were on the refuge. The snow goose flock in this area has definitely dispersed. Reports of large numbers have come from Hatteras. They have been seen regularly by the refuge staff coming from the south, past Rodanthe village. They have also used regularly north of Oregon Inlet almost to Whalebone junction.

The first whistling swan of the fall were seen on October 24. They increased rapidly to the peak population of 112 in the first week of November. They have shown a slight decline almost constantly since that week.

It is interesting to note that there was a tremendous increase in coots this year as compared to last year. From a peak population of 2,200, a constant decline in the refuge population has occurred until only an estimated 800 were present in the last week of December.

Some other interesting observations of non-game migratory birds were made. Hudsonian curlews and black-necked stilts were seen often in September and October. Glossy ibis were not seen after September 27. Though none have been seen on the refuge, it is interesting that at Bodie Island and near Buxton, several fulvous tree ducks have been seen this winter.

B. Upland Game Birds

The ring-necked pheasant has become common on the refuge. Some of these birds may have been destroyed by Hurricane Donna. Though seen quite often, the frequency with which they are seen has decreased since the passing of this devastating storm.

C. Fur Animals

Muskrat, otter, nutria, and an occasional mink inhabit the refuge. The only change from past records on these mammals is that there seems to be a decrease in the muskrat population using the South Pond. This is probably due to the reduction in cattails in this pond in recent years.

D. Hawks and Eagles

No bald eagles have been seen this winter. Marsh hawks, duck hawks, and sparrow hawks are seen during the winter months.

E. Fish

No fresh water game species are found on Pea Island Refuge. Surf fishing is common, but since there is no management for these fishes on the refuge, the sport fishing activity will be reported under the section on recreation.

F. Diseases

Many more sick and dead geese are being found at Pea Island this winter than in any of the last three winters. Considering habitat conditions this year, the higher disease rate can probably be attributed to malnutrition and excessive consumption of salt. 24 dead geese had been found through December 31 of this wintering season.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

On October 31, construction of 1900 feet of bulkhead was completed by refuge personnel. This was the major work project

during this period. The bulkhead is located inside the North Pond along the south shore and south-west corner of the pond. Photographs of this bulkhead will be found in the last pages of this report.

Hurricane Donna necessitated several items of maintenance. First, there was the cleanup of sand at all buildings, then window and door repairs. 13 miles of fence had to be cleared of debris, patched in many places, some posts replaced, and gates repaired. The refuge jeep roads had to be cleared of as much as 2 foot depths of debris including logs, drift wood, and grass. The patrol cabin was flooded by hurricane tide water, and a major cleaning job was necessary.

Other jobs were routine including maintenance to vehicles, light plants, tractors, farming equipment, and air cooled engines. The fill area behind the recently constructed bulkhead was leveled, graded, seeded, and fertilized. Plumbing and water tank repairs were accomplished at the residence. The annual project of farming 60 acres of goose browse crop was accomplished by refuge personnel.

B. Plantings - Cultivated Crops

Sixty acres of annual ryegrass was planted again this fall in the North Pond field. The field was mowed once in mid-summer and again prior to planting at the first of October. A close mowing was followed by seeding, fertilizing, and top dressing with ammonium nitrate except for 7 acres where sodium nitrate was used for top dressing. The purpose of this project is to produce a winter browse crop for Canada geese. Due to lack of rain for two months following planting, the browse crop was the poorest produced in the last three winters.

C. Collections and Receipts

None.

D. Control of Vegetation

No cattail spraying was undertaken this year. Patches of cattail are widely scattered and the plants are sparce. This pest plant should be held in check by spraying every other year as long as the encroachment is no greater than it was this year.

E. Planned Burning

Plans for marsh burning this year will have to be cancelled unless there is a change. So far, the marshes will not carry a fire. Heavy salt deposits were caused by Hurricane Donna, and the low

rainfall during the fall has not helped the situation. Hurricane flood waters lifted and moved most of the litter or 'duff' which is needed for marsh burning at Pea Island. Some may be tried later in the year if conditions look promising. If so, this will be reported in the narrative report for the period ending April 30.

F. Fires

The Pea Island Campground Store was completely destroyed by fire on the night of October 16, 1960. It was located at the Oregon Inlet ferry landing on the north end of Pea Island National Wildlife Refuge in a recreational area provided by the National Park Service and this Bureau cooperatively through a Memorandum of Understanding. This Bureau had no monetary investment in the building. It was owned by and fire protection was provided by the National Park Service.

IV. RESOURCES MANAGEMENT

Pea Island Campground Store was the only item to be entered in this section. Since this building no longer exists, no attempt to make a report on this section is necessary.

V. FIELD INVESTIGATION

No research project is established on Pea Island Refuge at this time. Minor investigational type work has included weekly waterfowl counts, one aerial count for Canada geese from Hatteras to the Virginia border, water salinity tests on the fresh water impoundments, and fertilizer test plots on the ryegrass field.

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 sight seeing, fishing, bird watching, nature study, beach combing, and photography.

Based on spot checks, sport fishing along the surf and Oregon Inlet was improved over last year. Especially, this is true of the fall months. In October, many sport fishing parties made good catches of flounder, speckled trout, and puppy drum from the surf in waters adjacent to Pea Island Refuge.

B. Refuge Visitors

1. Registered Visitors

223 visitors from 19 States, the District of Columbia, England, and West Germany registered during this period at the reception office located at field headquarters.

2. Official Visitors

Name and Organization	Date	Address
Mr. Victor Kay, BSFW, Regional Office	9/11,12&13	Atlanta, Ga.
Mr. R. R. Rudolph, BSFW, R.O.	10/14	Atlanta, Ga.
Mr. Charles Evans, BSFW, Patuxent	12/7	Laurel, Md.
Mr. Kenneth Wilson, N. C. Wild. Biologist	12/16	Greenville, N.C.

C. Refuge Participation

At the request of the Cape Hatteras Seashore Superintendent, the manager attended the pre-hunting season meeting on regulations on November 7 at the Bodie Island Visitor Center. The refuge manager was the only representative of the Bureau present and supplied information and literature on federal regulations applicable.

21 members of the Richmond Natural History Society visited the refuge on Saturday, December the 3rd. A short talk was provided by the manager, followed by a bird watching tour over the entire refuge. The National Park Service cooperated in this effort by providing a truck and a driver to help haul some of the group. Prior plans had been made before their arrival.

D. Violations

Two violators were apprehended on December 26 while shooting at geese in the North Pond ryegrass field from their car parked on the highway. Both men, Ellis Pugh of Salvo and Joseph "Mack" Midgett of Rodanthe, pleaded guilty before U. S. Commissioner Lloyd Sawyer in Elizabeth City. Both men received fines of $50, $25 suspended.

VII. OTHER ITEMS

A. Oregon Inlet Ferries

Ferry operation across Oregon Inlet is bad again this winter.

Operation difficulties were most prevalent in December. Many low tides have ruled. On November 4, there were 150 cars in line waiting to cross Oregon Inlet. Except on high tides, the ferry route has been changed, involving a 50 minute trip and no definite half-hour schedule. Many days, traveling back and forth has taken a toll of 3 to 4 hours.

B. Photographs

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

Date submitted: Jan. 18, 1961

Respectfully submitted,

Charles F. Noble

Charles F. Noble
Refuge Manager

Approved: Victor W. Ray

Act. Regional Refuge Supervisor

January 26, 1961

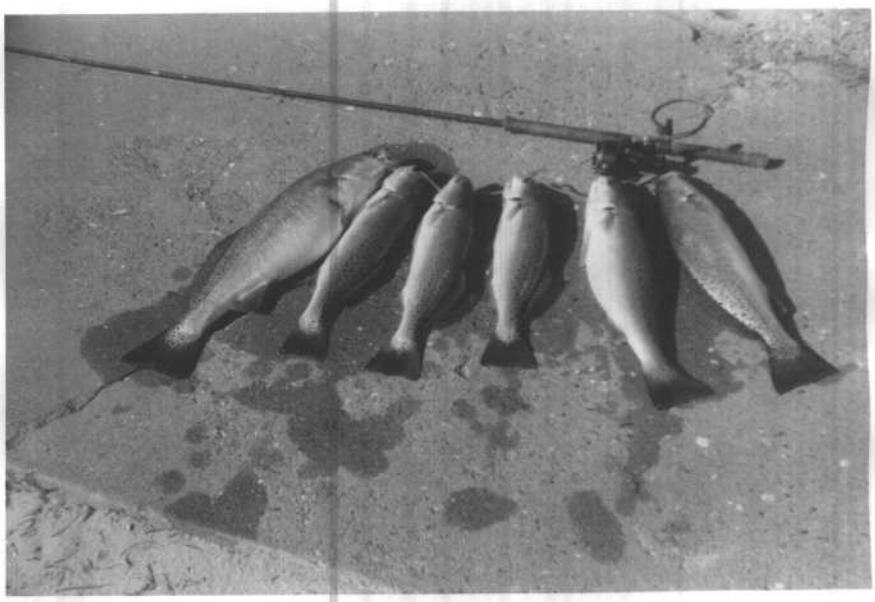
The pictures on this page show the condition of the 13 mile fence line after Hurricane Donna had passed. This fence is located along the west side of the highway-right-of- way passing through the refuge.

Some jeep roads on the refuge had 2 feet of litter covering them after Hurricane Donna. These pictures show the road around the outside of the South Pond piled deep with hurricane litter.

Grass at the top right is the top of the North Pond dike. Hurricane drift came to 1½ feet from the top of this dike.

Most drift deposited by the hurricane was along the east side of the highway. The drift in this picture was between the highway and the ocean front sand dunes.

Part of the Richmond Natural History Society group which visited the refuge is pictured after their return from a field trip over the refuge.



This is a November fisherman's catch from the surf along the Pea Island Refuge beach front. They are all speckled trout; the one on the far left weighed an even 5 lbs. and measured 2 ft. in length.

The Pea Island Campground Store located at the Oregon Inlet ferry landing was completely destroyed by fire on the night of October 16, 1960.

Planting operations on the 60 acre North Pond ryegrass field.

Both pictures on this page show the 1900 foot bulkhead constructed during this period. Both pictures were taken from one vantage point and show the entire length of the bulkhead. The one above was taken facing east and the lower one facing north-west. The structure is located on the south end of the North Pond.

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

WATERFOWL

REFUGE Pea Island MONTHS OF Sept. 1 TO Dec. 31, 1960

(1) Species	(2) Weeks of reporting period: 3 days-use 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling									70	112
Trumpeter										
Geese:										
Canada						700	900	1100	1100	3600
Cackling										
Brant										
White-fronted										
Snow						2	20	30	35	500
Blue										
Other										
Ducks:										
Mallard						10	10	50	50	50
Black	200	200	200	200	250	300	300	300	350	400
Gadwall	400	400	400	400	300	200	250	250	300	300
Baldpate						950	2000	800	300	1600
Pintail			600	400	400	800	2000	800	400	1200
Green-winged teal									20	300
Blue-winged teal	100	350	800	600	300	150	100			
Cinnamon teal										
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup										50
Goldeneye										
Bufflehead										50
Ruddy							14	10	10	25
Other										
Red-breasted Merganser							400	500	500	300
Unidentified										400
Coot:							30	400	700	2200

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

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

WATERFOWL
(Continuation Sheet)

REFUGE Pea Island MONTHS OF Sept. 1 TO Dec. 31, 19 60

(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	110	90	92	110	100	90	90	60	6,468		
Trumpeter											
Geese:											
Canada	4500	4800	5800	5900	6000	4800	5500	6000	354,900		
Cackling											
Brant											
White-fronted											
Snow	3500	3800	10,500	6500	6000	12,000	10,000	9000	370,209		
Blue	20	20	10	10				10	490		
Other -Richardson	1								7		
Ducks:											
Mallard	50	50	20	20	20	40	40	30	3,080		
Black	400	400	950	1100	1200	1000	1200	1100	69,550		
Gadwall	250	250	150	150	150	150	150	150	30,600		
Baldpate	1000	1000	850	600	700	600	500	350	78,750		
Pintail	1400	1200	2400	1200	1300	1500	1500	1300	128,800		
Green-winged teal	300	250	900	400	400	600	300	820	30,030		
Blue-winged teal									16,400		
Cinnamon teal											
Shoveler							20	10	210		
Wood											
Redhead											
Ring-necked					25	25	50		700		
Canvasback						2			14		
Scaup	100	200	175	500	600	400	600	500	21,875		
Goldeneye											
Bufflehead	300	400	500	1400	1200	1400	1200	1000	52,150		
Ruddy	25	25	10	10	10	10	10	15	1,218		
Other											
Red-breasted Merg.	300	300	200	200	200	200	200	200	24,500		
Unidentified	200	200	200	200	200	200	200	1000	19,600		
Coot:	2000	1800	1200	1200	1200	1200	1100	800	96,810		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	6,468	112	
Geese	725,606	16,800	
Ducks	477,477	6,475	
Coots	96,810	2,200	

Total - 1,306,361 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 during 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 1960

(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	Res.		90		8	12/30				100
Louisiana heron	"		100		22	12/30				110
Black-crowned night heron	"		120		16	12/30				200
Great blue heron	Winter Res.		8		8	12/30				10
Common egret	Res.		40		4	12/3				50
Snowy egret	"		200		30	12/30				300
Glossy ibis	Summer Res.		70		3	9/27				70
Clapper rail	Seen only occasionally due to birds habits.									200
Double-crested cormorant			800	11/4	30	12/27				2000
Gannet			60		2	12/30				100
Common loon			30		2	12/30				50
II. Shorebirds, Gulls and Terns:										
Common tern			400		20	11/4				500
Royal tern	Summer Res.		60	10/18	4	11/4				140
Herring gull			3000	12/13	200	12/30				4000
Ring-billed gull			2500	12/13	300	12/30				4000
Great black-backed gull			250	12/13	8	12/30				300
Laughing gull			2000	9/3	20	12/30				2500
American avocet			20	9/3	3	12/3				30
Black-necked stilt			4	9/22	2	12/3				4
Yellow legs, Great. & Less.			600		50	12/30				800
Sandpipers, All species			1000		300	12/30				1200

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove			8	11/5	(Occasionally a few doves are seen during the fall.)					
White-winged dove										
IV. Predaceous Birds:										
Golden eagle										
Duck hawk	1	11/4	4		1	12/30				4
Horned owl										
Magpie										
Raven										
Crow										
Sparrow hawk			5		2	12/30				6

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 Pea Island Months of Sept. 1 to Dec. 31, 19 60

(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, Spartina patens cover, and other marshes.								50	No good basic data is available on this species. However, sight observations have been less since Hurricane Donna in Sept.

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.

Form NR-3
(June 1945)

BIG GAME

Refuge Pea Island Calendar Year 1960

(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.

116000

3-1755
Form NR-5
60701

DISEASE

Refuge Pea Island Year 19 60

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 Candda geese

Number Affected

Species	Actual Count	Estimated
Canada geese	52	75

Number Recovered None

Number lost 52 (All birds counted were dead.)

Source of infection Probably salt marshes.

Water conditions Not Polluted.

Food conditions Fair from Jan. 1 through spring migration. Poor in late fall - December, 1960.

28 dead from Jan. 1, 1960 to spring migration.
24 dead from fall migration through Dec. 31, 1960

Remarks It is likely that an increased toll will be recorded in the late winter months of this wintering season since the fall toll was higher than normal.

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

PUBLIC USE

Refuge Pea Island Calendar Year 1960

Total Use Visitor-Days	Hunting Use	Fishing Use	Miscellaneous Use
14,000		4,000	10,000

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 *	60%	8,400
Official		
Economic Use		
Other	40%	5,600

Comments:

Hunting (off refuge lands): Estimated man-days of hunting on lands adjacent to the refuge 1080 (These figures should not be included in hunting-use totals above).

Fishing:

13 miles of ocean front and inlet shoreline.

Acres of ponds or lakes _____ and miles of streams _____ open to fishing.

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

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

Form NR-7

PLANTINGS
(Marsh - Aquatic - Upland)

Refuge Pea Island Year 1960

Species	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount & Nature of Propagules	Date of Planting	Survival	Cause of Loss	Remarks
No marsh planting accomplished this year.								

TOTAL ACREAGE PLANTED:

Marsh and aquatic_____
Hedgerows, cover patches_____
Food strips, food patches_____
Forest plantings_____

1618

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			
Japanese millet							25 acres for waterfowl seed crop		25
Annual ryegrass							60 acres for winter goose browse crop.		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				85
Hay - Wild				2. Acreage Cultivated as Service Operation				85

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.

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge Pea Island Months of Jan. 1 through Dec. 31, 1960

(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	60 bu.	None	60 bu.			60 bu.		0			
				(Used as bait on waterfowl banding program.)							

(8) Indicate shipping or collection points ~~Received from Carolina Sandhills Refuge in fall of 1959.~~

(9) Grain is stored at

(10) Remarks ~~All grain was used before spring migration.~~

*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.

INT.-DUP. SEC., WASH., D.C. 59323

Form NR-9

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

Refuge Red Island Year 1934-35

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

3-1761
Form NR-11

TIMBER REMOVAL

Refuge Pea Island Year 194 60

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, 1960

Table of Contents

PEA ISLAND NATIONAL WILDLIFE REFUGE

REFUGE NARRATIVE REPORT

May 1 through August 31, 1960

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

I. GENERAL

A. Weather Conditions

The four month period covered by this narrative report has brought near normal weather. The major deviation was the heavy rains in July which brought rainfall for July 3.53 inches above normal. Rainfall in May, June, and August was slightly below normal.

Through the end of August no hurricanes have passed through this area; hurricane season is only partially over. One tropical storm which did not develope hurricane force winds occurred on July 29-30. 3.86 inches of rain fell during this two day period. Sound tides rose about two feet above normal. This storm did little damage to vegetation and none to physical property.

August produced more unpleasantly hot weather than any other month of the period. This was due to the lack of wind on several successive hot days and nights.

The weather data below was furnished us by the National Park Service from their weather station located three miles north of the refuge. It reflects weather conditions on the refuge.

Month	Precipitation				Temperatures	
	This Month	Normal	Dev. from Normal		Max.	Min.
May -	2.86	3.26	- 0.40		90	50
June -	1.97	3.08	- 1.11		92	52
July -	7.30	3.77	+ 3.53		95	65
August -	5.80	7.49	- 1.69		95	69
Totals -	17.93	17.60	+ 0.33	Extremes -	95	50

B. Habitat Conditions

1. Water Conditions

Water levels in both fresh water impoundments have stayed up well this summer. At no time during the period has either the South or North Pond become critical; that is, neither has been in danger of the pond bottom becoming exposed. The South Pond is subject to more rapid fluxuation than the North Pond. The lowest staff gauge reading for the period in the South Pond was 3.70; this reading only remained for two days before the water level rose. The North Pond staff gauge reading was 3.80 at one time during the period. For the most part, the water level in the North Pond has stayed above 4.00; a water level maintained at 4.00 during hot summer months is good.

Pamlico Sound water levels have been satisfactory for production of aquatic vegetation. A few high tides have developed from strong south-west winds, and one tropical storm brought the water level about two feet above normal high tide. None of the winds and tides so far experienced this summer have been strong enough to cause much destruction of submerged vegetation.

Below are staff gauge readings taken near the end of each month for both impoundments. 1959 and 1960 readings are given for comparative purposes.

Staff Gauge Readings

End of Month	North Pond		South Pond	
	1959	1960	1959	1960
May -	4.20	4.34	3.98	4.22
June -	3.80	3.88	3.30	3.78
July -	4.24	4.16	4.10	3.92
August -	4.06	4.16	3.66	4.16

2. Food and Cover

The ducks remaining and nesting on the refuge during the summer months find an adequate food supply. Also, cover is sufficient for nesting.

Barring devastating storms or disasters, the waterfowl food crop for the coming winter is promising. The lack of any extended dry

2. Food and Cover - Continued

periods during the summer has brought forth lush growths of emergent plants over most of the marshes, both fresh and salt. Beach pea growth has been excellent and good production of peas which are used largely by Canada geese is expected. Much of the marsh burned last winter under the controlled burning program shows a distinct increase in three-square(Scirpus Americanus). Wild millet, smartweed, Bacopa, and other emergent aquatics have made good growth in the fresh water impoundments.

Some annual food sources are not quite so promising. The field in the South Pond planted to Jap millet and one acre of German foxtail millet has made poor growth and not much production is expected of it. Also, the submerged vegetative growth in both impoundments is much less than should be expected in these fresh water areas.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

A few Canada geese remained on the refuge until the first of June. None stayed in the area through the summer.

Black ducks, gadwalls, and blue-winged teal nested on the refuge. The concentration of nesting of all species is within the North Pond. This year black ducks and blue-winged teal broods showed a slight decrease while gadwall broods increased. The increase in gadwall ducklings was unmistakeable over the season of 1959. Actual sight records of broods were tabulated by species; 29 broods of blacks were seen - 23 in the North Pond and 6 in the South Pond; only 112 young blacks were counted which indicates small broods. 66 gadwalls broods were actually seen - of these, 64 broods were in the North Pond and 2 broods were in the South Pond; 463 young gadwalls were counted. Of the 15 broods of blue-winged teal counted, 14 were in the North Pond and 1 was in the South Pond; 91 young blue-winged teal were counted. The total ducklings actually counted on the refuge were 695. It is worth noting that a goodly portion of the nest sites were along the fresh marsh on the east side of the North Pond. Soon after hatching, the hens carried their broods to the borrow pit areas along the back or west side of the North Pond; here is where the ducklings were concentrated - groups of 100 ducklings were seen many times along this area of the borrow pit.

2. Wading Birds, Gulls, Terns, and Shorebirds

Wading birds using the heron and egret rookery in the South Pond changed location by about 200 yards. The island which had been used for several years previously was abandoned; disturbance was not the reason the herons and egrets changed location for there was no disturbance. This year they used the dike for about a 200 yard area north of the foot bridge on the South Pond. Species and population did not change too much except for the glossy ibis. Again this year the glossy ibis nests were double that of the previous year; approximately 45 ibises nests were located in the rookery.

The major nesting location for laughing gulls on the refuge and in the Oregon Inlet area is Green Island located off the Oregon Inlet ferry landing about half a mile. Laughing gull nests were adversely affected by tides which built up during south-west winds. During the prime period of nesting the island was completely covered by water. Not only did it destroy the nests, but the dead grasses and other loose material was washed away. After re-nesting, the water again came over most of the island. Therefore, laughing gull production was below that of last year.

B. Upland Game Birds

The only upland game bird of significance found on the refuge is the ring-necked pheasant. Young birds have been seen several times this summer. This bird continues to increase and is seen commonly over most of the refuge.

C. Fur Animals, Predators, Rodents, and Other Mammals

Fur animals found on the refuge include muskrat, otter, nutria, and a few mink. The population levels of all species seem to remain constant.

D. Hawks, Eagles, a nd Crows

Neither hawks, eagles, or crows are of significance on the refuge during the summer months. One bald eagle was seen in August.

E. Fish

All sport and commercial fish on the refuge are salt water species. This has been one of the poorest years on record for the sport fisherman fishing from shore or in small outboard boats.

F. Reptiles

The two fresh water impoundments hold some snapping turtles. One was observed taking a half grown duckling this summer. Refuge personnel plans to set a few traps soon to determine how abundant the snapping turtle is on the refuge.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Usual maintenance schedules on vehicles, tractors, plows, light plants, air-cooled engines, boats, and outboard motors were followed. Painting the interior of the reception office was completed. Boundary posting including sign repairs, replacements, and cutting brush where growth was obstructing the view of signs was accomplished. The flagpole was taken down and repaired. The 60 acre North Pond field was mowed in mid-summer to try to prevent mats of dead vegetation on the field when seeded. It will be mowed again prior to seeding. Several minor repairs were made to the buildings.

Repair work to the berm of the North Pond dike is being done due to erosion which threatened the dike proper. The berm inside the impoundment was rebuilt to its original width for a distance of 2100 feet. Work is in progress on the construction of a low bulkhead to protect that area of the dike most subject to erosion.

B. Plantings - Cultivated Crops

Millet was again planted along the east side of the South Pond. Soil conditions were wet at the proper time to plant and the plowing was delayed. At the time it was plowed the soil was still too wet. The field was plowed twice; 24 acres of Jap millet and 1 acre of German foxtail millet was planted. At the end of August, indications point to a poor crop in this field.

C. Collections and Receipts

None.

D. Control of Vegetation

To be reported in the narrative report for the period ending December 31.

E. Planned Burning

None during the summer months.

F. Fires

It is good to report that no wildfires have occurred during this four month period.

IV. RESOURCES MANAGEMENT

A. Commercial Fishing

All commercial fishing in the area is done in salt water. No special permits are required. Like sport fishing this summer, commercial fishing has been poor. Crabbing has been normal in the Pamlico Sound.

B. Concessions

Receipts from the only concession on the refuge, Pea Island Campground Store, are handled directly between the National Park Service which owns the building and our Regional Office.

V. FIELD INVESTIGATION

No special investigational work is being done on the refuge. Routine duck brood counts were made. Other observations of wildlife were made throughout the period.

VI. PUBLIC RELATIONS

A. Recreational Uses

The major recreational use of the refuge this period was by tourists sightseeing. Other uses include fishing, beach-combing, nature and widllife observation, and photography.

On the last day of the long Labor Day week-end over 200 cars were in line awaiting their turn to get on the ferry on the south side of Oregon Inlet.

B. Refuge Visitors

1. Registered Visitors

Registered visitors at the reception office at Refuge Field Headquarters dropped this summer as compared with last summer. 790 registered in the last four month period as compared to 1424 registered visitors during the same period last year.

2. Official Visitors

Name and Organization	Date	Address
Mr. Philip VanDyck, BSFW, R.O.	5/5 & 5/6	Atlanta, Ga.
Mr. Ted Ball, BSFW, R.D.	5/18	Atlanta, Ga.

2. Official Visitors - Continued

Name and Organization	Date	Address
Mr. Wade Register, N.C. Wildlife Protector	(Several)	Kitty Hawk, N.C.
Mr. Gus Hultman, Chief Ranger, NPS	(Several)	Nags Head, N. C.
Mr. Verde Watson, Naturalist, NPS	(Several)	Nags Head, N.C.
Mr. Rex Schmidt, FWS, Office of Info.	8/4	Washington, D. C.

C. Refuge Participation

At the request of the 4-H Camp Leader, the refuge manager met with a group of some 130 young people. A short walk and a talk was given at the Overlook Parking Area located near the south dike of the North Pond.

By request from Mr. Sturat Critcher, N. C. Wildlife Commission P-R Coordinator, the manager met with 20 of the technical staff of the N. C. Wildlife Commission. Refuge management practices were explained and a tour over the refuge was conducted for the entire group.

D. Violations

No violations have been detected during this period.

VII. OTHER ITEMS

A. Photographs

On the following pages please find pictures pertaining to the refuge.

Date submitted: September 17, 1960

Respectfully submitted,

Charles F. Noble

Charles F. Noble
Refuge Manager

Approved: Victor W. Ray

Act. Regional Refuge Supervisor

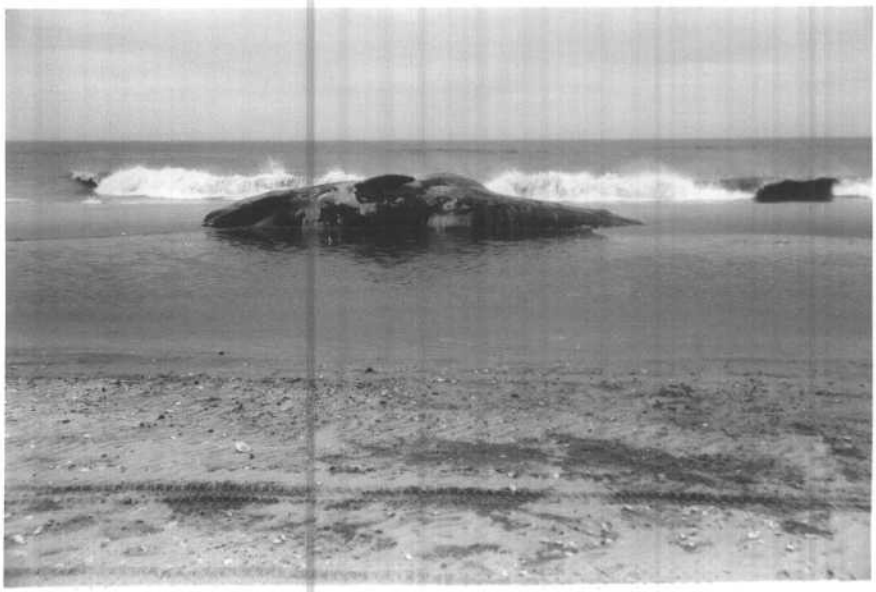
SEP 19 1960

The way the berm along the south and south-west corner of the North Pond looked by the end of the past winter.

This is the same dike after rebuilding the berm in the summer of 1960.

The North Pond field was mowed in mid-summer to allow more time for vegetation to decompose before fall planting. The field will be mowed again prior to planting ryegrass.

Plowing South Pond field in preparation for planting Jap millet.



A whale washed up on the beach in May. Decay had begun by the time it came ashore.

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

WATERFOWL

REFUGE Pea Island Refuge MONTHS OF May TO Aug., 19 60

(1) Species	(2) Weeks of reporting period 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	400	100	100	100	25					
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	350	300	250	200	200	200	200	225	250	250
Black	100	150	200	250	250	300	300	300	300	400
Gadwall										
Baldpate										
Pintail	200	50								
Green-winged teal	200	300	150	50	50	50	50	50	100	125
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead	100									
Ruddy										
Other										
Red-breasted Merganser	600	200								
Coot:										

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

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

WATERFOWL
(Continuation Sheet)

REFUGE Pea Island Refuge MONTHS OF May TO Aug., 1960

(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											
Trumpeter											
Geese:											
Canada									5,075		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard											
Black	300	300	300	250	200	200	200	200	30,625	29	40
Gadwall	500	600	700	700	600	500	400	400	48,650	66	75
Baldpate											
Pintail											
Green-winged teal									1,750		
Blue-winged teal	150	150	150	150	100	100	100	100	14,875	15	17
Cinnamon teal											
Shoveler											
Wood											
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead									700		
Ruddy											
Other											
Red-breasted Merganser									5,600		
Coot:											

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	5,075	400	0
Ducks	102,200	1,550	900
Coots			

SUMMARY

Principal feeding areas Fresh water impoundments

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

Reported by Charles F. Noble

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 to Aug. 1960

(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		5/1	160	7/1		8/30	1	30	86	200
Louisiana heron		5/1	320	7/1		8/30	1	64	150	450
Black-crowned night heron		5/1	360	7/1		8/30	1	68	164	500
Yellow-crowned night heron		5/20	6	7/1		8/30	1	1	2	12
Common egret		5/1	80	7/1		8/30	1	18	40	150
Snowy egret		5/1	450	7/1		8/30	1	102	250	600
American bittern	Seen only occasionally due to birds habits									30
Clapper rails	Resident									200
Glossy ibis		5/1	160	7/1		8/30	1	45	110	160
II. Shorebirds, Gulls and Terns:										
Black-backed gull			10	5/5						20
Herring gull			700	5/5						800
Ring-billed gull			700	5/5						800
Laughing gull			2,000	7/30						3,000
Bonapartes gull			300	5/1		6/6				350
Common tern			400	6/15						500
Royal tern			200	6/15						300
Least tern			600	6/15						900
Forsters tern			30	8/30						50
Black skimmers			400	7/30						700
Willets			600	7/30						800
Yellow-legs, great. & less.			700	7/30						800
Sandpipers, All species			4,000	7/30						5,000

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:					
Mourning dove	Occasional dove seen.				
White-winged dove					
IV. Predaceous Birds:					
~~Golden eagle~~					
Duck hawk					
Horned owl					
Magpie					
Raven					
Crow	A few crows are found on the refuge.				

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, 1960

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 Oregon Inlet.	Crops		Ducks	542,764		
	Upland	592	Geese	759,060		
	Marsh	2,664	Swans	0		
	Water	12,278	Coots	0		
	Total	15,534	Total	1,301,824		
UNIT 2: Pool 2 (North Pond) Impounded.	Crops	60	Ducks	271,382	360	840
	Upland	98	Geese	189,764		
	Marsh	82	Swans	6,736		
	Water	400	Coots	26,262		
	Total	640	Total	494,144		
UNIT 3: Pool 1 (South Pond) Impounded.	Crops	25	Ducks	162,828	40	60
	Upland	50	Geese	63,254		
	Marsh	120	Swans	748		
	Water	180	Coots	2,918		
	Total	375	Total	229,748		
UNIT 4: All unimpounded area on New Inlet to south boundary.	Crops		Ducks	108,552		
	Upland	393	Geese	253,018		
	Marsh	1,216	Swans	0		
	Water	8,720	Coots	0		
	Total	10,329	Total	361,570		
Total for refuge -	Crops	85	Ducks	1,085,526	400	900
	Upland	1,133	Geese	1,265,096		
	Marsh	4,082	Swans	7,484		
	Water	21,578	Coots	29,180		
Grand Total for Refuge -	Total	26,878	Total	2,387,286	400	900
	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.

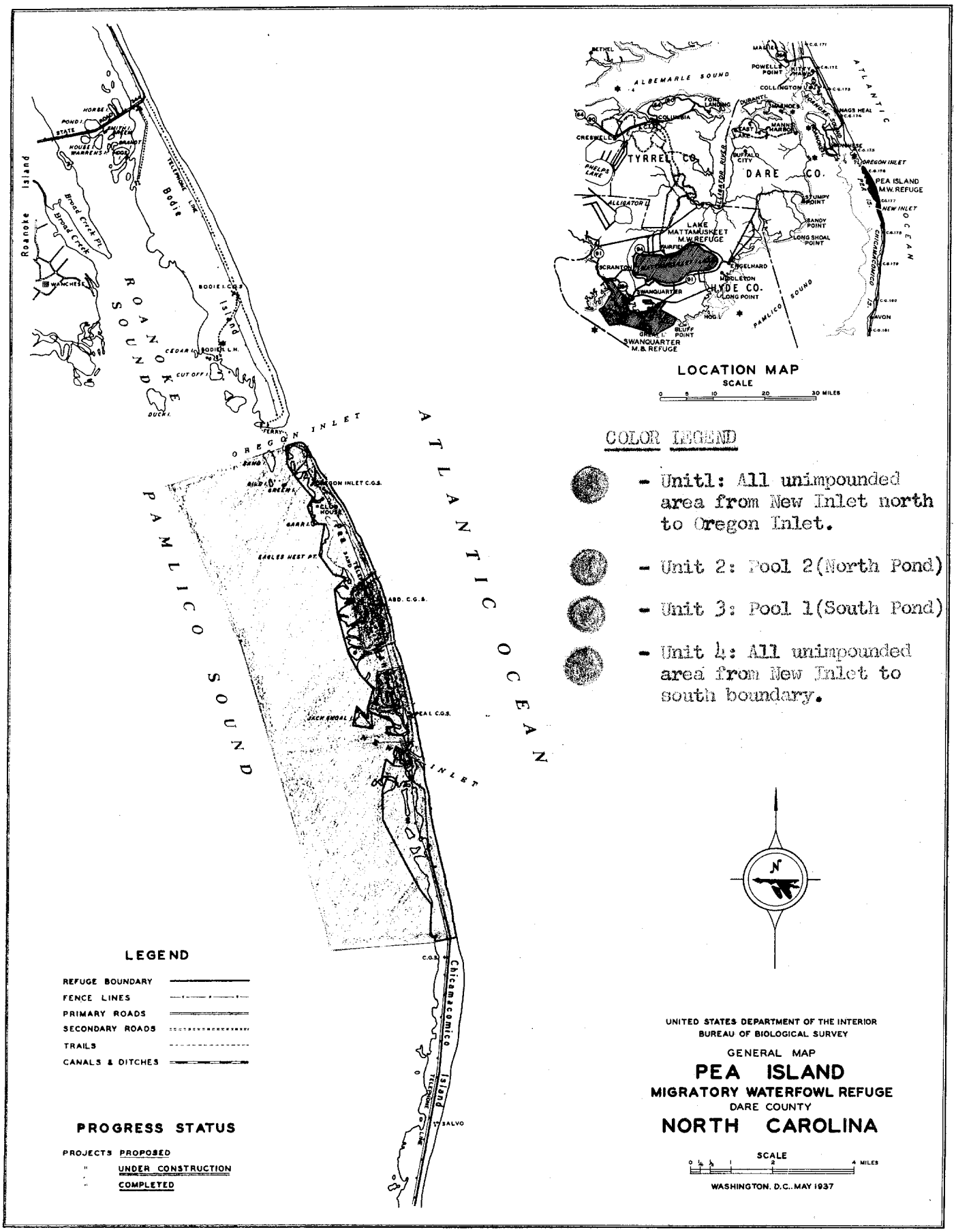
(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(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

WATERFOWL UTILIZATION MAP (Attach to Form MR-1B)



COLOR LEGEND

- Unit1: All unimpounded area from New Inlet north to Oregon Inlet.
- Unit 2: Pool 2(North Pond)
- Unit 3: Pool 1(South Pond)
- Unit 4: All unimpounded area from New Inlet to south boundary.

71 PEA 18

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Pea Island Refuge Months of May to Aug., 19 60

(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, and marshes		4	10					60	Little data available.

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, 1960

Table of Contents

PEA ISLAND NATIONAL WILDLIFE REFUGE

REFUGE NARRATIVE REPORT

January 1 through April 30, 1960

Charl[illegible] . Noble, Refuge Manager
Hou[illegible] C. Phillips, Refuge Aid

I. GENERAL

A. Weather Conditions

After a relatively mild winter was about past, March came in like a lion and remained that way for the better part of the month. Record breaking low temperatures were the rule rather than the exception. Winds accompanied low temperatures in most cases along this 'Outer Banks' area. Snows also came during March - about 8 inches covered the ground on March 12. Freezing temperatures were recorded on 19 days during March. The low temperature for the 4 month period was 22 degrees recorded on March 7 and January 24. The high temperature for the period was 86 degrees recorded on April 26. Due to the cold weather in March, spring growth has been retarded by about 2 weeks.

Precipitation was far above normal in January and February. During those two months 7.65 inches above normal was recorded. Rainfall was slightly below the five year normal during March and April. Rainfall for the period was 20.45 inches or 6.86 inches in excess of the normal rainfall for this period.

An extremely strong northeaster prevailed on the last two days of January. This rose ocean tides far above normal and caused some damage to the sand dune barrier along the ocean front.

Data recorded in the following table was taken from records furnished us by the National Park Service from their weather station at Bodie Island. This station is located only 3 miles north of the refuge and reflects weather conditions on the refuge. Normal precipitation is based on a five year average.

	Precipitation			Temperatures	
Month	This Month	Normal	Dev. from Normal	Max.	Min.
January -	7.01	3.26	+ 3.75	68	22
February -	7.91	4.01	+ 3.90	65	28
March -	3.51	4.03	- 0.52	70	22
April -	2.02	2.29	- 0.27	86	40
Totals -	20.45in.	13.59 in.	+ 6.86	Extremes-86	22

3. Habitat Conditions

1. Water Conditions

Above normal rainfall in January brought the water level in the two impoundments up to normal levels for mid-winter. Dry weather through the summer and fall had resulted in low water levels. The rains of January and February inundated marginal areas inside the impoundments.

Strong west winds on several days brought Pamlico Sound water levels much higher than normal. These high sound tides inundated most of the salt marshes on the refuge. At three different times sound water covered portions of the jeep road on the outside of the South Pond dike.

Below are some of the staff gauge readings from both impoundments. Readings for the same period in 1959 are given for comparative purposes.

Staff Gauge Readings

End of Month	North Pond		South Pond	
	1959	1960	1959	1960
January -	4.82	4.54	4.86	4.56
February -	4.88	5.16	4.80	5.12
March -	4.92	5.00	4.82	4.92
April -	4.86	4.78	4.60	4.60

2. Food and Cover

Late winter weather conditions had a direct effect on the available waterfowl food supply on Pea Island Refuge. The heavy rainfall in January and February inundated good acreages of fresh and salt marsh, making puddling conditions good. During the same period strong west winds and high sound tides caused turbulent conditions on the Pamlico Sound shoals. Most of the remaining widgeongrass was destroyed and most of the shoals were left barren.

The exceptionally cold weather in March retarded vegetative growth both in the marshes and on the ryegrass field. During March Canada geese showed signs of an inadequate food supply. They fed extensively on beach pea.

Two marsh units were burned in December. This area provided adequate feeding for the snow goose flock. However, the marsh did

2. Food and Cover - Continued

not green up until the first of April and Canada goose use was low.

II. WILDLIFE

A. Migratory Birds

The Canada goose population using the refuge decreased this year. The peak population for this winter recorded during the first week of January was 5800 as compared with 8200 in the same period last year. No explanation as to the reason for the decrease is offered - the Canada goose population generally recorded simply did not arrive this year. Reports of good numbers using the Pamlico Sound off Buxton were common, and possibly part of the geese which usually use the refuge went to the south of the refuge this year. Canada geese remained on the refuge later in the spring this year. At the end of April it was common to see 250 on the ryegrass field in the North Pond.

Snow geese also remained later than normal this year. The flock began to disperse after the close of hunting season, but at the first of February there remained about 3500 on the refuge. Much later in the year large flocks were seen in the Bodie Island marshes north of Oregon Inlet. Although a peak population of 8500 snow geese is shown on Form NR-1, the game management agents estimated the number at 11,000 on their January 4 annual inventory. Since the flock was bunched, it is possible that an estimate from the air was more accurate. Certainly, the snow goose flock was impressive against the black background of the controlled burned marsh.

The peak population of ducks for the period was 6950. This is slightly higher than for the same period last year. A flock of from 250 to 700 green-winged teal used the refuge most of the period; about 300 of these birds were seen on the North Pond at the end of April. Dabbling ducks continued to use the South Pond marshes more extensively than last year.

The first glossy ibis to arrive were extremely early. Three were seen on the South Pond on February 26. Probably, these birds died during the cold weather and snows in March; one was found dead on the South Pond soon after the heaviest snow of the winter. The nesting colony of egrets and herons began to arrive in mid-April. The first to begin nesting were American egrets.

Double-crested cormorants and red-breasted mergansers began increasing at the first of April. Around Oregon Inlet large numbers of both species were common throughout April.

B. Upland Game Birds

Ring-necked pheasants, the only upland game bird found on the refuge, are seen with more regularity than in the past. It is not uncommon to see a cock standing along the state highway passing through the refuge anywhere from Oregon Inlet to Rodanthe. However, pheasants are more abundant around the two impoundments.

C. Fur Animals, Predators, and Other Mammals

An estimated 2500 muskrats remain on the refuge. About 30 otter roam the refuge. It is estimated that 20 nutria still remain on the refuge.

Feral cats are common on the refuge. Although no indications have been found, these stray cats may destroy some birds and nests on the refuge.

D. Hawks and Eagles

The bald eagle has been seen on occasion during the winter. They do not remain on the refuge at all times, however. Marsh hawks are the most common winter hawk; duck hawks are seen with regularity. Osprey were not observed until April this year.

E. Fish

No fish kills have been observed. No fresh water fish are found in either of the two impoundments. No commercial fishing has been observed along the ocean front or on other parts of the refuge. This four month period provides little commercial or sport fishing in this area.

F. Diseases

Some Canada geese began to show signs of the condition typical of Pea Island geese some years ago. This condition was prevalent in March. Through the end of April, 28 dead Canada geese had been found on the refuge.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

No development work under a separate project number exists at Pea Island at this time. Usual maintenance schedules have been followed during the period. Preventive and necessary maintenance was performed on vehicles, tractors, plows, light plants, air cooled engines, boats, and outboard motor. Windows in the residence were repaired. Work on refinishing the inside of the reception office was almost completed. All waterfowl trapping equipment was brought in, cleaned, repaired, and stored. Drift material which had been deposited on jeep roads during high tides was cleared off.

B. Plantings

No planting or transplanting of marsh, aquatic, or cultivated plants was done during this period.

C. Collections and Receipts

None.

D. Control of Vegetation

Experimental plot work on the control of Eurasian watermilfoil (Myriophyllum spicatum) has been conducted this spring. Results are not available at this time. Mechanical and herbicidal vegetation control are scheduled to be reported in the narrative report for the period ending December 31.

E. Planned Burning

1. General

Following the marsh burning schedule, units 1 and 2 were burned in the winter of 1959-60. Unit No. 1 contains 80 acres; unit No. 2 contains 440 acres. Both units were burned on Sunday, December 20, 1959. The units had been prepared by plowing out fire lanes connecting them to natural fire breaks. The lanes were plowed in mid-summer and again two weeks prior to burning. Conditions for burning were ideal. Two days before burning a rain washed salt off the vegetation; salt had been deposited during high tides. The wind was northeast at about 25 m.p.h. and the air was dry; northeast winds lower the water level on Pea Island marshes. The purpose for marsh burning is to make the marsh accessible to waterfowl and to provide late winter and early spring browse for Canada geese. Unit 1 had not been burned since January 18, 1954. Unit 2 was last burned on January 9, 1956. Photographs of burned and unburned marsh will be found at the back of this report.

2. Conditions Prior to Burning

The only waterfowl use of the area prior to burning was in the open ponds and potholes; about 200 dabbling ducks used these ponds. Due to a heavy growth of vegetation the majority of the marsh was inaccessible to waterfowl. Unit 1 was approximately 50% wax myrtle(Myrica cerifera), 40% salt meadow cordgrass(Spartina patens), and 10% upland grasses. Unit 2 was composed of 15% wax myrtle, 50% S. patens, 25% salt marsh cordgrass(Spartina alterniflora), and 10% grasses and three-square(Scirpus americanus and S. robustus). The accumulation of litter was generally 2 to 3 inches deep, sufficient to provide a good burn. Soil moisture was from 4 or 5 inches below ground surface to 2 inches above ground surface.

3. Conditions Following Burning

The burn was successful in that it destroyed litter and provided conditions for an early green-up. At best, the value of winter burning for the control of wax myrtle is only to retard heavy growths from encroaching over much of the marsh.

Within two days after burning, the entire snow goose flock along this coastal area was using this marsh. By the end of hunting season, the snow geese dispersed, but most of the remaining snow geese on the refuge used this marsh until departure. Game management agents estimated that 11,000 snow geese were using this marsh at one time. Spring green-up did not come until April. Canada goose use of the burned marsh was much less than expected. The largest number of Canada geese using this marsh at one time was 400. Duck use of these tow marsh units increased from about 200 to 600 ducks.

F. Fires

No wild fires occurred on the refuge during this 4 month period.

IV. RESOURCES MANAGEMENT

A. Concessions

The Pea Island Campground Store located at Oregon Inlet is under permit from the National Park Service. Agreements concerning revenue are handled on the regional office level.

B. Commercial Fishing

Due to adverse weather, no commercial fishing along the ocean front has begun.

V. FIELD INVESTIGATION AND APPLIED RESEARCH

Mr. John Steenis of Patuxent Research Center is conducting preliminary control studies on Eurasian watermilfoil(Myriophyllum spicatum). The location of these studies is along the borrow pit of the South Pond.

Routine weekly waterfowl counts were made during the major wintering season. Searches were made to determine the magnitude of goose die-offs.

Waterfowl banding was continued with the cooperation of Game Management Agent Al Noltemeier. A total of 111 birds were banded. They were - 29 Canada geese, 67 blackducks, 6 mallards, 5 pintails, 2 baldpates, 1 redhead, and 1 ring-necked duck.

VI. PUBLIC RELATIONS

A. Recreational Uses

Sport fishing has not begun to any extent as far north as Pea Island Refuge. Sightseeing became noticeable at the first of April, but little tourists activity occurs before May.

B. Refuge Visitors

1. Registered Visitors

Visitors registering the reception office located at Field Headquarters increased over the same period last year. 204 registered from January 1 through April 30 this year whereas 132 registered during the same period last year.

2. Official Visitors

Noted below are some of the official visitors to the refuge during this narrative report period.

Date	Name and Organization	Address
Jan.	Mr. Al Woltemeier, BSFW	Washington, N. C.
Jan.	Mr. Wade Register, N. C. Wild. Prot.	Kitty Hawk, N. C.
3/9	Mr. Joe Lindsay, Pred. & Rod. Con., BSFW	Raleigh, N. C.
3/9	Mr. Rew V. Hanson, " "	Raleigh, N. C.
4/5	Dr. Tinker, U.S. Public Health Ser.	Atlanta, Ga.
4/5	Mr. Bouge, "	Atlanta, Ga.
4/19	Mr. John Steenis, BSFW	Patuxent, Md.
4/19	Mr. Gerald Townsend, BSFW	Patuxent, Md.

C. Refuge Participation

Seventeen wildlife management students from North Carolina State College accompanied by Dr. Eugene Hester visited the refuge on February 19. The manager gave a short talk on the refuge; this was followed by a tour to illustrate managemant practices.

On March 21, during National Wildlife Week, the manager was part of a panel at the Manteo Rotary Club program. The water resource in connection with wildlife was discussed. Also, the post-season duck stamp sale was brought to the attention of the audience.

Forty members of the Audobon Society from Washington, D. C. and surrounding areas visited the refuge on Saturday, April 23. Tours over the refuge were conducted in split groups until all had been over the refuge. Also, time was spent along the ocean front observing birds.

D. Violations

Fred O'Neal, Jr., one of the owners of cabins located in New Inlet, was convicted of taking waterfowl after the season had closed and hunting on Pea Island Refuge. He received a $100 fine.

Some of the copper fence wire has again been stolen. Approximately 100 lbs. has been taken. Theft activity occurred on only one night. A vigilant watch has been conducted, but the thieves have not returned. Pictures illustrating the method used by the thieves will be found at the back of the report.

VII. OTHER ITEMS

A. New Equipment

A new 4-wheel drive Dodge pickup was received to replace the five year old Willys jeep pickup. So far, the Dodge 4-wheel appears to be a good performer.

A boat trailer was purchased for use with the aluminum boat and 10 horse outboard motor.

B. North Pond Dike

The foot of the North Pond dike has eroded badly during the winter. This item is covered in special corrospondence, but some pictures are included in this report to record damage.

C. Photographs

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

Date submitted: May 16, 1960

Respectfully submitted,

Approved: Lawrence L. Gisse

Regional Refuge Supervisor

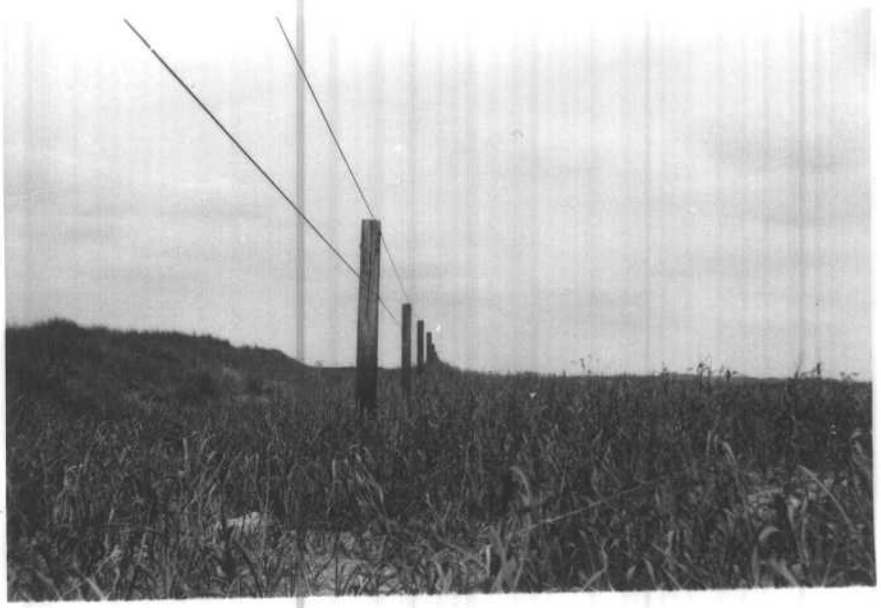
MAY 1 8 1960

Charles F. Noble
Refuge Manager

Marsh on north end of refuge before burning.

Same marsh area after controlled burning.

Typical fence line on cresote posts with 3 strands of wire.



Wooden post fence line after theft of lower strand of wire.