# PEA ISLAND NATIONAL WILDLIFE REFUGE
## NARRATIVE REPORT
Period September 1- December 31,1944

### 1. General

A. Weather conditions. Data for this report is taken from the Co-operative Meteorological record of Mrs. Rosa Drinkwater, Manteo, N. C. which is the nearest weather station.Rainfall for the beginning of the period was slight,comparable with last year.

Following are some tables for comparison with the corresponding period for last year:

| | Precipitation | Max. temp. | Min. temp. |
|---|---|---|---|
| September 1944 | .96 in. | 94 degrees | 50 degrees |
| October " | 2.58 " | 85 " | 38 " |
| November " | 1.92 " | 73 " | 36 " |
| December " | 1.34 " | 68 " | 27 " |
| Total | 6.80 " | | |

Corresponding period:

| | | | |
|---|---|---|---|
| September 1943 | .58 " | 96 " | 40 " |
| October " | 1.50 " | 76 " | 40 " |
| November " | 1.04 " | 71 " | 26 " |
| December " | 2.36 " | 71 " | 20 " |
| Total | 5.68 " | | |

B. Water conditions. With little rain the water conditions were as bad as last year in the impoundments,water being only in the borrow pits. During the September hurricane the North dike at #1 impoundment was breached in three places,flooding it with salt water. Conditions at # 2 pond improved with October rains: beds were covered some, sufficent water to take gauge readings.

### II Wildlife

A. Migratory birds. Waterfowl show considerable decrease for the corre sponding of 1943. Observation and figures on all the refuge waters were not available pending the installation of engine parts in FWS 186; "Red Head" II. In spite of this fact there appeared to be a decrease, repeated observation from the shore line failed to reveal large concentrations.

2.Water birds appear not to concentrate here,how ever observations compare with past records. Whistling Swan showed an increase of 146 % for the corresponding period.

Marsh birds compared favorably with past records,excepttcoot which use the fresh water pond, showed an increase of 60 % over the previous year. This was probably due to better water conditions during October and November

Gulls, Terns and Black Skimmers, common in September probably suffered from the storm. Several dead birds were observed in the debris and it is possible some were blown into the ocean.

2. Food and Cover. Unfavorable water conditions again retarded the proper development of acquatic plants in the impoundments. The entrance of salt water in #1 impoundment stopped the growth of fresh water plants. Considerable use however was made of this area until available food was exhausted eventually by Snow Geese. Therefore the food supply in # 2 pond was exhausted by the middle of December. Most birds have been feeding in the grass areas particularly where water settles; also much use has been made of the areas burned in this period. Scirpus Robustus and Scirpus Americanus apparantly were damaged by the storm and did not develop properly. In refuge waters of the sound previous observation revealed a fair growth of widgeon grass, Rupia maritima, which was available on low tides this period. At this date no investigation has been made concerning eel grass, Zosteria mariana, but reports from fisherman reveal small patches only.

Disease. A total of six Canada geese have been found dead. The carcasses were light and there was no evidence of injury.

Fur Animals. Muskrats were active before cold weather and may show a small increase. Seven mounds are visable in the #2 impoundment. Otters show activity where trails cross the dike, none has been seen.

III Refuge Development

The maintenance work on the refuge cosisted of some storm damage repair to the storage shed and minor repairs to the over night cabin. A special project for engine parts repair was made for "Red Head II", FWS 186 and the job was 95 % completed as of December 31. Considerable maintenance and repair was carried out on refuge trucks, (pickups). A collection of 22 impounded Canada Geese was transferred by personnel from the Cape Romain Refuge, McClellanville, S. C. via Government truck to the Santee Refuge, Manning, S. C. in September. A collection of 23 quarts of Beach Pea seed was made. The crop was damaged considerably by high water during the storm, but the dikes afforded a supply.

Dike and Sand fence. The hurricane tore away considerable material from the North dike and breached it in three places, flooding the #1 impoundment; some 600 feet of magor dike repair will have to be made, this will entail considerable turfing and planting of grass. The sand fence along the beach front was heavily damaged in places. Temporary repairs are expected to be made. Apost war program for developing the dikes and sand fence is contemplated.

## IV. Public Relations

There were no visitors at this station during this period. However there was correspondence with prospective visitors.

William L. Hills
Refuge Manager

January 12, 1945

Form NR-1

MIGRATORY BIRDS

Refuge Pea Island Months of September 1 to December 31, 1944



| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Esti-mated Total | Number Using Refuge |
| Teal green-winged | 6 | 10/17 | 10/24 | 200 | 11/7 | | | | | | |
| Teal blue-winged | 25 | 10/17 | 10/24 | 150 | 10/24 | | | | | | |
| Shoveler | 28 | 10/17 | 10/24 | 150 | 11/7 | | | | | | |
| Canvasback | 10 | 11/17 | 12/23 | 20 | | 8 | 12/30 | | | | |
| Scaup lesser | 12 | 11/17 | 11/24 | 500 | 12/23 | | | | | | |
| American Golden-eye | 2 | 11/28 | | | | | | | | | |
| Buffle-head | 10 | 11/17 | 11/28 | | | | | | | | |
| Ruddy-duck | 4 | 11/4 | 11/24 | 30 | | | | | | | |
| Mergenser redbreasted | 14 | 10/17 | | 5000 | 12/5 | | | | | | |
| Eagle bald | 2 | 11/28 | | 4 | 12/23 | | | | | | |
| Marsh hawk | 2 | 9/27 | 10/17 | | | | | | | | |
| Osprey | 1 | 10/24 | | | | | | | | | |
| Hawk duck | 1 | 10/24 | | | | | | | | | |
| Hawk pigeon | 1 | 11/7 | | | | | | | | | |
| Gallinule Florida | 2 | 9/27 | | | | | | | | | |
| Coot | 8 | 9/27 | 10/24 | 800 | 11/28 | | | | | | |
| Plover black-bellied | 4 | 10/16 | 10/24 | 12 | 11/28 | | | | | | |
| Snipe Wilsons | 2 | 10/24 | | | | | | | | | |
| Willet | 3 | | | | | | 10/27 | | | | |
| Yellow-legs grater | 4 | 10/24 | | | | 3 | 12/23 | | | | |
| Yellow-legs lesser | | | | | | 2 | 12/5 | | | | |

REMARKS: (Pertinent information not specifically requested)

INSTRUCTIONS

Form NR-1 - MIGRATORY BIRDS (Include species in families Gaviidae through Strigidae; also doves and woodcocks)*

In case a resident form occurs, such as mottled duck on the Gulf Coast, use only the columns that apply.

(1) SPECIES: Use correct common names as found in the A.O.U. Check List, 1931 Edition, and list in A.O.U. order. General terms are to be avoided, such as "scaup", "teal", etc.; use "green-winged teal" or "lesser scaup".

(2) FIRST OBSERVED: The first refuge record for the species during spring migration, fall migration, wintering, or summering, and the number observed. In the case of resident species this column may be disregarded.

(3) BECAME COMMON: The date the species became common on the refuge.

(4) PEAK CONCENTRATION: The greatest number of the species present on any one date or limited interval of time.

(5) LAST OBSERVED: The last refuge record for the species during the spring or fall migration, wintering, or summering, and the numbers observed exclusive of obvious cripples or non-migrants.

(6) YOUNG PRODUCED: Estimated number of young produced based upon 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 are to be omitted.

(7) TOTAL: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the manner in which birds come through; i.e., in waves or all at once. On refuges representing the terminus of the flight lane, the figures would probably be the same in many cases.

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

Form NR-1

# MIGRATORY BIRDS

Refuge Pea Island Months of September 1 to December 31, 1944

161:

| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Esti-mated Total | Number Using Refuge |
| Sandpiper least | | observed occasionally thruugh entire period | | | | | | | | | |
| Sandpiper red-backed | 8 | 10/24 | | | | | | | | | |
| Dowitcher | 10 | | | 25 | | | | | | | |
| Sanderling | | | fairly common during period | | | | | | | | |
| Gull herring | | 9/27 | 10/17 | | | | | | | | |
| Gull ring-billed | | 9/27 | 11/28 | | | | | | | | |
| Tern common | | | common through period | | | | | | | | |
| Tern Royal | | | common through period | | | | | | | | |
| Black skimmer | | 10/17 | | 5000 | 11/7 | | | | | | |

REMARKS: (Pertinent information not specifically requested)

Form NR-1

# MIGRATORY BIRDS

Refuge Pea Island Months of September 1 to December 31, 1944



| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Esti-mated Total | Number Using Refuge |
| Loon common | 1 | 11/2 | 12/23 | | | | | | | | |
| Grebe Horned | 4 | 10/17 | 12/23 | | | | | | | | |
| Grebe Pied-billed | 16 | 10/17 | ~~11/12~~x | 200 | 11/12 | | | | | | |
| Gannet | 14 | 11/17 | | 800 | 12/23 | | | | | | |
| Cormorant | | | 9/27 | | | | | | | | |
| Heron Great blue | 1 | 11/28 | 12/23 | 8 | 12/23 | | | | | | |
| Egret American | 12 | 9/27 | 9/27 | | | | | | | | |
| Egret Snowy | 16 | 9/27 | | | | | | | | | |
| Louisiana heron | | | | | | 1 | 9/27 | | | | |
| Heron Black C-night | | | | 20 | resident | | 12/23 | | | | |
| Bittern American | 1 | 11/28 | | | | 2 | 12/23 | | | | |
| Swan Whistling | 16 | 11/28 | 11/30 | 32 | 12/5 | 6 | 12/23 | | | | |
| Goose Canada | 16 | 10/17 | 10/24 | 8000 | 12/5 | | | | | | 8000 |
| Goose Snow | 8 | 10/17 | 11/7 | 4000 | 12/5 | | | | | | 4000 |
| Brant American | 100 | 11/24 | | | | | | | | | |
| Mallard | 4 | 11/28 | | ~~200~~ 26 | 12/23 | | | | | | |
| Black duck | 6 | 11/27 | 11/28 | 800 | 12/23 | | | | | | |
| Gadwall | 4 | 11/17 | 11/28 | 125 | 12/5 | | | | | | |
| Baldpate | 16 | 10/17 | 11/17 | 150 | 12/5 | | | | | | |
| Red head | 150 | 11/24 | | 150 | | | | | | | |
| Pintail | 20 | 11/17 | 11/28 | 300 | | | | | | | |

REMARKS: (Pertinent information not specifically requested)

INSTRUCTIONS

Form NR-1 - MIGRATORY BIRDS (Include species in families Gaviidae through Strigidae; also doves and woodcocks)*

In case a resident form occurs, such as mottled duck on the Gulf Coast, use only the columns that apply.

(1) SPECIES: Use correct common names as found in the A.O.U. Check List, 1931 Edition, and list in A.O.U. order. General terms are to be avoided, such as "scaup", "teal", etc.; use "green-winged teal" or "lesser scaup".

(2) FIRST OBSERVED: The first refuge record for the species during spring migration, fall migration, wintering, or summering, and the number observed. In the case of resident species this column may be disregarded.

(3) BECAME COMMON: The date the species became common on the refuge.

(4) PEAK CONCENTRATION: The greatest number of the species present on any one date or limited interval of time.

(5) LAST OBSERVED: The last refuge record for the species during the spring or fall migration, wintering, or summering, and the numbers observed exclusive of obvious cripples or non-migrants.

(6) YOUNG PRODUCED: Estimated number of young produced based upon 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 are to be omitted.

(7) TOTAL: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the manner in which birds come through; i.e., in waves or all at once. On refuges representing the terminus of the flight lane, the figures would probably be the same in many cases.

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

Form NR-1

MIGRATORY BIRDS

Refuge Pea Island Months of September 1 to December 31, 1944



| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Esti-mated Total | Number Using Refuge |
| Sandpiper least | | observed occasionally thruugh entire period | | | | | | | | | |
| Sandpiper red-backed | 8 | 10/24 | | | | | | | | | |
| Dowitcher | 10 | | | 25 | | | | | | | |
| Sanderling | | | fairly common during period | | | | | | | | |
| Gull herring | | 9/27 | 10/17 | | | | | | | | |
| Gull ring-billed | | 9/27 | 11/28 | | | | | | | | |
| Tern common | | | common through period | | | | | | | | |
| Tern Royal | | | common through period | | | | | | | | |
| Black skimmer | | 10/17 | | 5000 | 11/7 | | | | | | |

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| (3) | BECAME COMMON: | The date the species became common on the refuge. |
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| (6) | YOUNG PRODUCED: | Estimated number of young produced based upon 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 are to be omitted. |
| (7) | TOTAL: | Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the manner in which birds come through; i.e., in waves or all at once. On refuges representing the terminus of the flight lane, the figures would probably be the same in many cases. |

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

Form NR-5

DISEASE

1616

Refuge Pea Island Year 194 4

## Botulism

Period of outbreak December

Period of heaviest losses

Losses:

| | Actual Count | Estimated |
|---|---|---|
| (a) Waterfowl | 6 | |
| (b) Shorebirds | | |
| (c) Other | | |

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

Areas affected (location and approximate acreage) all

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

Condition of vegetation and invertebrate life good

Remarks Annual occurence

## Lead Poisoning or other Disease

Kind of disease

Species affected ~~Geese Canada~~

| Number Affected Species | Actual Count | Estimated |
|---|---|---|
| | | |
| | | |
| | | |

Number Recovered

Number lost

Source of infection

Water conditions good

Food conditions ~~not sufficent food~~

Remarks Annual occurence

Form NR-9

1620

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

Refuge Pea Island Manteo, N. C. Year 1944

| Species | Collections | | | | Receipts | | Total Amounts on Hand | Amount Surplus |
|---|---|---|---|---|---|---|---|---|
| | Amount | Date or Period or Collection | Method | Unit Cost | Amount | Source | | |
| Beach Peas | 25 qts | November | hand | | 9.60 | field | 25 qts | none |

# I. GENERAL

**A. Weather Conditions.** There being no weather station on the refuge the weather data for this report is taken from the Cooperative Meteorological record of Mrs. Rosa Drinkwater, Manteo, N. C. which is the nearest weather station. This being approximately 20 miles from the central part of the refuge does not represent the rainfall accurately on the refuge , particularly during the summer months when thunder showers are local. Rainfall has been heavier in Manteo than on the refuge.

Following are some tables for comparison with the corresponding period for last year:

| | Precipitation | | Max. temp. | | Min. temp. | |
|---|---|---|---|---|---|---|
| May 1944 | 1.94 | in. | 97 | degrees | 53 | degrees |
| June " | .58 | " | 97 | " | 61 | " |
| July " | 2.74 | " | 94 | " | 66 | " |
| August " | 4.10 | " | 97 | " | 57 | " |
| Total | 9.36 | " | | | | |
| May 1943 | 2.50 | " | 90 | " | 48 | " |
| June " | 1.78 | " | 97 | " | 63 | " |
| July " | 5.13 | " | 97 | " | 62 | " |
| August " | 1.14 | " | 92 | " | 60 | " |
| Total | 10.45 | | | | | |

**B. Water Conditions.** Due to the light rainfall water conditions have been bad. During the early part of June the water levels in the fresh water impoundments dropped until water remained only in the borrow pits. In No. 1 impoundment the water became very stagnant and very little wildlife continued to use there. Although the water level was low at No. 2 pond conditions were not as bad as at No. 1 pond. Conditions at both impoundments were improved by the rains during the latter part of July and first of August.

# II. WILDLIFE

**A. Waterbirds.** All species in this group have been very scarce since the first part of May. Being winter visitors most of them left the refuge before the beginning of this period. There was a second record established on May 23 when a Man-O-War bird was seen flying over the sound shore near the overnight cabin. The only other record of this species for the refuge was recorded Jan. 30, 1939.

**Wading Birds.** Not species have been here in their usual numbers, several of which nested here. This is the first time snowy egrets and Louisiana herons have been known to breed on the refuge. Seven snowy egret nests were counted on Green Island, near Oregon Inlet, and 10 were noted at the black-crowned night heron rookery near the overnight cabin, making a total of 17 nests. Two Louisiana heron nests were found with

young birds in them, also on Green Island near Oregon Inlet. One new record was established on May 1 when 1 white ibis was identified. This bird was seen at close range, approximately 35 yds. distant. There was an excellent chance to observe it standing in the shallow water and flying overhead and I am positive of the identification. It was seen only once.

Waterfowl. Most of the waterfowl which had been using the area had migrated before the beginning of this period. There were however a small number of Canada geese, black duck, gadwall and blue-winged teal that used the area through the entire period. In spite of the poor water conditions some of the ducks nested and produced young. The geese that remained were recovering from parasitism and at the end of the period they appeared to be strong and healthy.

Hawks and Eagles. Ospreys have been very abundant but other species have been scarce.

Shorebirds. Although many birds had passed through during the preceeding period there was a good flight of several species with fairly heavy concentrations during May. There had been a good flight of greater yellow-legs, red-backed sandpipers, semipalmated sandpipers, dowitchers, black-bellied and semipalmated plovers. Sanderling did not do so well. Willet and curlew were scarce.

Gulls and Terns. Laughing gulls continue to use the outer islands on the sound for nesting and have been here in their usual numbers. There appears to have been fewer of some species, viz; common and least terns and black skimmers, nesting here than in former years. This is probably due to the vegetation becoming so dense that some of the nesting areas do not appeal to the birds any more as nesting sites. Royal terns have not nested here at all.

2. Food and Cover. Due to the ponds being dry most of the time submerged aquatic plants could not thrive. Scirpus robustus is doing well in the marsh along the ponds. Scirpus americanus not as abundant as in former years is growing on some of the flats and will provide much food. Some of the areas which were producing heavy stands a few years ago are now producing Spartina patens, Andropogon glomeratus and Salidago sempervirens. There is an excellent growth of ground beans, Strophystiles helvola and S. umbelata. Spartina alterniflora will not be very plentiful during the coming winter due to the heavy concentration of snow geese last winter on some of the marsh areas. Some of the areas which were covered with a good growth of this plant last year are completely barren now. Of course there will be some food available from this plant during high tides or extremely rainy weather but nothing to compare with last winter. On the sound there is an unusually good growth of wigeon grass Ruppia maratima, which should provide sufficient food for the birds. Zostera marina far from being abundant is fairly well established in the Oregon Inlet vicinity and seems to be making a come-back, with conditions improved as compared with last year.

Disease. There has not been much disease during this period. Through May occasionally geese were seen affected with parasitism. Dr. Don Coburn, from the Patuxent Wildlife Disease Research Laboratory, came here during the first part of May to check up on conditions in this area concerning disease. He covered the feeding areas of the refuge thoroughly, also examined a diseased goose on the refuge and took another diseased bird with him for examination. The specimen which he examined here was found to have an intestinal infestation of two species of tapeworm and gizzard worm.

## III. REFUGE DEVELOPMENT

Being short of help due to the transfer of Mr. Thomas G. Dowdy, Laborer patrolman, from this refuge to Sabine Refuge, there has not been much done in the way of refuge development. Approximately 10 bu. of aquatic plants were collected on Currituck Sound and planted on No. 2 pond. This station also collected approximately 20 bu. of aquatic plants for planting on Lake Mattamuskeet. In the No. 1 impoundment cattails were cut on approximately 15 acres. 20 geese have been impounded and are now being cared for pending transfer to the Santee Refuge. Attempts have been made to collect geese for the Patuxent Research Laboratory but have been unsuccessful.

## IV. PUBLIC RELATIONS

Officials visiting this station during this period included Messrs. James Silver, Roy Moore, Arthur Miller and Dr. Don Coburn. Sixteen other people have visited the refuge for the purpose of studying the wildlife.

Sam A. Wacker
Refuge Mgr.

Sept. 11, 1944

Form NR-1

# MIGRATORY BIRDS

Refuge Pea Island Months of May 1st to August 31st 1944

| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Observd. | Avg. Size | Estimated Total | Number Using Refuge |
| Loon Common | | | | | | 1 | 6-16 | | | | |
| Grebe Horned | | | | | | 3 | 5-12 | | | | |
| Grebe Pied-billed | 1 | 8-16 | | | | | | | | | |
| Gannet | | | | | | 50 | 5-1 | | | | |
| Cormorant | | | | 200 | 5-1 | | | | | | 200 |
| Man-O-War-Bird | 1 | 5-23 | | | | | | | | | |
| Heron Great blue | | | | Resident | | | | | | | 10 |
| Egret American | | | | | | | | | | | 50 |
| Egret Snowy | | | | | | | | 10 | 4 | 25 | 150 |
| Heron Louisiana | | | | | | | | 2 | 4 | 8 | 25 |
| Heron Little blue | 1 | 5-1 | | | | | | | | | 25 |
| Heron Green | | | | | | | | | | | 15 |
| Heron Black-crowned night | | | | | | | | 50 | 4 | 120 | 250 |
| Heron Yellow-crowned night | 2 | 5-1 | | | | | | | | | 2 |
| Bittern Least | 1 | 5-24 | | | | | | | | | 25 |
| Ibis White | 1 | 5-1 | | | | | | | | | |
| Goose Canada | | | | 800 | 5-1 | | | | | | 1500 |
| Duck Black | | | | 200 | 5-1 | | | 20 | 8 | 100 | 400 |
| Gadwall | | | | 50 | 5-1 | | | 8 | 11 | 50 | 200 |
| Baldpate | | | | | | 2 | 5-24 | | | | 100 |
| Pintail | 7 | 8-25 | | | | | | | | | |
| Teal Green-winged | | | | 125 | 5-1 | | | | | | 400 |

Form NR-1

# MIGRATORY BIRDS

Refuge Pea Island Month of May 1st to August 31 1944

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Estimated Total | Number Using Refuge |
| eal Blue-winged | | | | 300 | 5-1 | | | 6 | 10 | 30 | 500 |
| hoveller | | | | | | 3 | 5-1 | | | | |
| uck Lesser Scaup | | | | 1 | 5-24 | | | | | | 50 |
| scoter Surf | | | | 3000 | 5-1 | 1 | 5-24 | | | | 3000 |
| scoter American | | | | | | 2 | 5-24 | | | | 25 |
| uck Ruddy | | | | | | 3 | 6-16 | | | | 6 |
| er anser Red-breasted | | | | 300 | 5-1 | | | | | | 2000 |
| awk Cooper's | 1 | 8-26 | | | | | | | | | 1 |
| awk Marsh | 1 | 8-26 | | | | | | | | | |
| sprey | | | | 20 | 5-24 | | | | | | 50 |
| ora | 1 | 5-1 | | | | 1 | 5-1 | | | | |
| oot | | | | 50 | -8 | 1 | 6-1 | | | | 100 |
| lover Piping | | | | | | | | | | | 25 |
| lover Semi-palmated | | | | 500 | 5-24 | | | | | | 5000 |
| lover Wilson's | | | | | | | | 6 | 3 | 15 | 25 |
| lover Black-bellied | | | | 150 | 5-24 | | | | | | 2000 |
| urnstone Ruddy | 1 | 5-4 | | 100 | 5-13 | 1 | 6-12 | | | | 500 |
| urlew Hudsonian | | | | 4 | 5-24 | | | | | | 25 |
| andpiper Spotted | | | | 8 | 8-31 | | | | | | 50 |
| illet | | | | 25 | 8-16 | | | | | | 100 |
| ellow-legs Greater | | | | 1500 | 5-1 | | | | | | 10000 |
| ellow-legs Lesser | 1 | 5-1 | | | | | | | | | |

Form NR-1

# MIGRATORY BIRDS

Refuge Pea Island Months of May 1st to August 31 1944

| (1) Species | (2) First Observed | | (3) Became Common | (4) Pea Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Observd. | Avg. Size | Estimated Total | Number Using Refuge |
| Knot | | | | 100 | 5-24 | | | | | | 1000 |
| Sandpiper Pectoral | | | | 10 | 5-1 | | | | | | 100 |
| Sandpiper White-rumped | | | | 6 | 5-24 | | | | | | |
| Sandpiper Least | | | | 100 | 5-1 | | | | | | 2000 |
| Sandpiper Red-backed | 1 | 3-28 | | 3000 | 5-1 | 25 | 6-16 | | | | 10000 |
| Dowitcher | | | | 800 | 5-1 | | | | | | 2000 |
| Sandpiper Stilt | 1 | 3-26 | | | | | | | | | |
| Sandpiper Semi-palmated | | | | 3000 | 5-24 | | | | | | 30000 |
| Sandpiper Western | 5 | 3-28 | | | | | | | | | |
| Godwit Marbled | | | | 30 | 6-24 | | | | | | |
| Sanderling | | | | 200 | 5-1 | | | | | | 3000 |
| Avocet | 1 | 3-26 | | | | | | | | | |
| Phalarope Northern | 2 | 6-24 | | | | | 5-24 | | | | |
| Gull Herring | | | | 50 | 5-1 | | | | | | 200 |
| Gull Ring-billed | | | | 12 | 6-6 | | | | | | 50 |
| Gull Laughing | | | | 1500 | 6-16 | | | 500 | 3 | 1000 | 2500 |
| Tern Gull-billed | 1 | 5-1 | | 25 | 6-12 | | | | | | 25 |
| Tern Forster's | | | | 25 | 6-16 | | | | | | 25 |
| Tern Common | | | | 500 | 6-12 | | | 100 | 2 | 150 | 1000 |
| Tern Least | | | | 300 | 6-12 | | | 50 | 2 | 75 | 500 |
| Tern Royal | | | | 100 | | | | | | | 200 |
| Tern Caspian | | | | 3 | 6-24 | | | | | | |

Form NR-1

MIGRATORY BIRDS

Refuge Pea Island Months of May 1st to August 31 1944

| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Observ. | Avg. Size | Estimated Total | Number Using Refuge |
| Tern Black | | | | 200 | 8-10 | | | | | | 500 |
| Skimmer Black | | | | 1000 | 8-24 | | | 50 | 3 | 100 | 1500 |

Pea Island National Wildlife Refuge
Narrative Report
Period January 1-April 30, 1944

## I GENERAL

A. Weather Conditions. The weather was generally cold throughout the entire period. A cold wave extending from January 6 through January 17 with temperatures below the freezing point much of the time caused a considerable amount of ice in the marshes and shallow water adjacent to the marshes. Rainfall was abundant with a total of 14.62 " during the period, 5.76" of which fell during March. This data is taken from the Cooperative Observer's Meteorological Record of Mrs. Rosa Drinkwater at Manteo, N. C., nearest observer to the refuge.

Following are some tables for comparison with the corresponding for last year;

| | | Precipitation | Max. temp. | Min. temp. |
|---|---|---|---|---|
| January | 1944 | 2.24" | 73 degrees | 21 degrees |
| February | " | 3.56" | 74 " | 22 " |
| March | " | 5.76 " | 81 " | 23 " |
| April | " | 3.06" | 82 " | 35 " |
| | Total | 14.62" | | |

Corresponding period 1943;

| | | | | |
|---|---|---|---|---|
| January | 1943 | 3.95" | 61 " | 25 " |
| February | " | 1.81" | 70 " | 17 " |
| March | " | 4.60" | 82 " | 26 " |
| April | " | 2.80" | 82 " | 34 " |
| | Total | 13.16" | | |

B. Water Conditions: Due to the abundant rainfall water levels stayed 2-4" above normal most of the time. Towards the end of the period rains were much lighter and the levels had dropped back to normal.

## II WILDLIFE

A. Waterbirds; This group, most of which are winter visitors, did not indicate any change in numbers as compared with last year. The spring migrations during April left very few birds here. One new record for the refuge was established on April 2 when 8 white pelican, Pelecanus erythrorynchos, was seen on the sound near New Inlet. They were first seen on the wing about 3/4 of a mile away. They soon alighted on the water and accompanied by Messrs. Cecil Williams, Bear River Refuge, and Thomas G. Dowdy, Laborer Patrolman located here, we ran near enough to them with the motor boat to observe them and be sure of the identity.

Wading Birds: Excepting great blue heron, black-crowned night heron, which are resident, and bittern, winter visitor, this group is summer summer visitors. Se eral species had already reached the refuge before the end of the period.

Waterfowl: This group, chiefly winter visitors, on the whole have shown an increase of 88% in the January inventory. This was due mainly to the heavy population of snow geese which was on the refuge at that time. Due to the cold weather a record number of 20,000 birds were recorded. Usually 6000-10000 birds feed on the area during December and the early part of January but most of them have been leaving here too early to report in the January inventory. The Canada goose population was about the same as last year. Diving ducks, particularly lesser scaup, showed an increase of 50% over last year. This was also due to the cold weather freezing over much of the feeding area north of here, driving them south to open water. The shallow water feeders or marsh varieties have shown very little change in numbers as compared with last year. There seems to have been a very good spring flight of both green and blue-winged teal with more birds stopping on the ponds, which is probably a result of the improved water conditions. Most of the shovellers left the last week of April, which is a week to ten days earlier than the usual migration. During April there was a heavy concentration of surf scoters here. On April 24, 6000 were estimated and although they were migrating , about 3000 were estimated using the area at the end of the period. Red-breasted mergansers remain quite plentiful. Although 25000 were estimated on April 11, they do not seem to have been here in such heavy concentrations as they were five years ago.

Hawks and Eagles: All of this group except osprey are winter visitors and do not show any change in numbers.

Marsh Birds: Several species including clapper rail, Virginia rail and sora are seen seldom because of their habits, ~~that~~ there are no figures for comparison. Coot have shown an 80% decrease as compared with last year.

Shorebirds: At the end of the period the spring migration, which started in March, was well underway, and several species had become quite common before the end of the period. There has been a good flight of greater yellow-legs, red-backed sandpipers, least sandpipers and dowitcher. Yellow-legs and dowitcher show a 50% increase. The salt marshes in which much of the vegetation has been removed by the snow geese has made an excellent feeding area for most species. Sanderling still prefer the seashore to the tidal flats through the marshes.

Gulls and Terns: Most of the winter population, including herring, ring-billed and great black-backed gulls had left here at the end of the period leaving only a small number of immature birds behind. Several species of the summer population viz; laughing gull, least and common tern had come in for nesting. No nests had been seen at the end of the period.

2. Food : Through the marshes and in the fresh water impoundments there has not been much food available from submerged aquatic plants. During April sago pondweed and muskgrass was beginning to grow in the No. 1 impoundment but had not grown sufficiently before most of the waterfowl left to provide much food. The No. 2 pond has been dry so much of the time since completion that submerged aquatic plants have not grown on it. With the improved water conditions we are attempting to establish sago pondweed, Potamogeton pectinatus there this summer. Through the marshes Spartina alterniflora, Scirpus americanus and Scirpus robustus have been the main source of food. There was also much green food provided through the controlled burning programs. On the sound wigeon grass was available on low tides and has provided much food. On the whole there seems to have been sufficient food for the birds at all times.

3. Lead Poisoning and Other Diseases. As yet there has been no evidence of lead poisoning noted but parasitism which is an annual occurance was on the refuge during January, February, March and April. While dead and diseased birds were frequently seen, I do not believe the total number of birds dying from this cause would exceed 200-250 for this period. Four to eight years ago it was much more prevalent than it has been during the last two years.

B. Fur Animals: Muskrats are still found along the edges of No. 1 impoundments but show little indication that they are increasing. Several otters also stay in the No. 1 impoundment and as yet, there is no evidence that they have increased any in the last two years.

## III. REFUGE DEVELOPMENT AND MAINTENANCE

In addition to patrol of the area which has required much time of the refuge personnel. The equipment has been kept up, including two trucks and motor boat; the two row boats have been painted and the motor boat was painted from the waterline up. The two stall garage was also painted. Gutters were built and put up around the overnight cabin. Extra stop logs were installed at No. 2 pond in order to hold as much water for the summer as we could. Reposting of much of the area along the public road and seashore has been necessary. Replanting Spartina patens on the dykes around the fresh water impoundments has been continued. Planting aquatic plants on No. 2 impoundment was started. One trip was made to Currituck Sound for sago pondweed Potamogeton pectinatus and approximately 5 bu. was collected and planted. Some of the collecting was done from beds which had a fair amount of wild celery Vallisneria spiralis on them. It is planned to do as much planting as we can early in order that the plants will have the advantage of a full growing season. By doing this we hope to have aquatic plants well established in the No. 2 pond when the waterfowl arrives next fall.

## IV. PUBLIC RELATIONS

Two officials from the Regional office, Messrs, M. E. Markwood and John Blosz visited this station during February. Four other people visited the refuge to study the wildlife.

Arthur Fmiser 5/13/44

May 11, 1944

Sam A. Walker
Refuge Mgr.

Form NR-1

MIGRATORY BIRDS

Refuge ~~Pea Island~~ Months of ~~January 1~~ to ~~April 30~~, 194~~4~~

1612

| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Esti-mated Total | Number Using Refuge |
| Loon, common | | | | 25 | Common through the entire period | | | | | | 200 |
| Loon, Redthroated | | | | | | 1 | 3-24 | | | | |
| Grebe, Horned | | | | 100 | 3-4 | | | | | | 500 |
| Grebe. Pied-billed | | | | | | | | | | | 50 |
| Pelican, White | 8 | 4-2 | | | | 8 | 4-2 | | | | |
| Gannet | 8 | 1-8 | | | | | | | | | |
| Cormorant | | | | 100 | 4-11 | | | | | | 500 |
| Heron, Great Blue | | | | Resident | | | | | | | 12 |
| Egret, American | 1 | 3-20 | | | | | | | | | |
| Egret, Snowy | 2 | 4-2 | | Remains Scarce | | | | | | | 8 |
| Heron, Louisiana | 1 | 4-24 | | Remains Scarce | | | | | | | 12 |
| Heron, Green | 1 | 4-18 | | | | | | | | | 25 |
| Heron, Black-crowned Night | | | | Resident | | | | | | | 75 |
| Bittern, American | | | | | | 1 | 4-12 | | | | |
| Swan, Whistling | | | | | | 7 | 1-10 | | | | 7 |
| Goose, Canada | | | | 12,000 | 1-1 | | | | | | 20,000 |
| Goose, Snow | | | | 20,000 | 1-10 | 400 | 1-28 | | | | 20,000 |
| Goose, Blue | | | | | | 1 | 1-19 | | | | |
| Duck, Black | | | | 2,000 | 1-29 | | | | | | 3,000 |
| Mallard | | | | | | 2 | 1-10 | | | | |
| Gadwall | | | | 300 | 4-12 | | | | | | 300 |
| Baldpate | | | | 400 | 1-19 | | | | | | 3000 |

REMARKS: (Pertinent information not specifically requested)

## INSTRUCTIONS

Form NR-1 - MIGRATORY BIRDS (Include species in families Gaviidae through Strigidae; also doves and woodcocks)*

In case a resident form occurs, such as mottled duck on the Gulf Coast, use only the columns that apply.

| | | |
|---|---|---|
| (1) | SPECIES: | Use correct common names as found in the A.O.U. Check List, 1931 Edition, and list in A.O.U. order. General terms are to be avoided, such as "scaup", "teal", etc.; use "green-winged teal" or "lesser scaup". |
| (2) | FIRST OBSERVED: | The first refuge record for the species during spring migration, fall migration, wintering, or summering, and the number observed. In the case of resident species this column may be disregarded. |
| (3) | BECAME COMMON: | The date the species became common on the refuge. |
| (4) | PEAK CONCENTRATION: | The greatest number of the species present on any one date or limited interval of time. |
| (5) | LAST OBSERVED: | The last refuge record for the species during the spring or fall migration, wintering, or summering, and the numbers observed exclusive of obvious cripples or non-migrants. |
| (6) | YOUNG PRODUCED: | Estimated number of young produced based upon 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 are to be omitted. |
| (7) | TOTAL: | Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the manner in which birds come through; i.e., in waves or all at once. On refuges representing the terminus of the flight lane, the figures would probably be the same in many cases. |

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

Form NR-1

MIGRATORY BIRDS

Refuge Pea Island Months of January1 to April 30, 1944

161:

| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Esti-mated Total | Number Using Refuge |
| Pintail | | | | 2500 | 1-1 | | | | | | 8000 |
| Teal, Green-winged | 2 | | | 1500 | 4-12 | | | | | | 3000 |
| Teal, Blue-winged | 2 | 3-8 | | 300 | 4-29 | | | | | | 1500 |
| Shoveller | | | | 700 | 4-12 | | | | | | 700 |
| Duck, Ring-necked | | Very rare | | | | 2 | 4-29 | | | | |
| Canvas-back | | | | 50 | 1-1 | | | | | | 50 |
| Duck, Lesser Scaup | | | | 6000 | 1-19 | | | | | | 20000 |
| Golden-eye, American | | | | 50 | 1-1 | | | | | | 50 |
| Buffle-head | | | | 500 | 1-19 | | | | | | 1000 |
| Old Squaw | | | | | | 1 | 3-24 | | | | 25 |
| Scoter, White-winged | | | | 20 | 1-15 | | | | | | 100 |
| Scoter, Surf | | | | 6000 | 4-24 | | | | | | 10000 |
| Duck, Ruddy | | | | 100 | 2-8 | 1 | 4-18 | | | | 100 |
| Merganser, Hooded | | | | 8 | 1-1 | | | | | | 25 |
| Merganser, Red-breasted | | | | 25000 | 4-11 | | | | | | 100000 |
| Vulture Turkey | | | | | | 1 | 4-11 | | | | |
| Hawk, Sharp-shinned | | | | | | 1 | 3-30 | | | | |
| Eagle, Bald | | | | | | 1 | 3-17 | | | | 6 |
| Hawk, Marsh | | | | 5 | 1-10 | 2- | 4-29 | | | | |
| Osprey | 2 | 3-18 | 4-24 | | | | | | | | 12 |
| Hawk, Duck | | | | | | 1 | 4-2 | | | | |
| Hawk, Pigeon | | | | | | 1 | 3-6 | | | | |

REMARKS: (Pertinent information not specifically requested)

## INSTRUCTIONS

Form NR-1 - MIGRATORY BIRDS (Include species in families Gaviidae through Strigidae; also doves and woodcocks)*

In case a resident form occurs, such as mottled duck on the Gulf Coast, use only the columns that apply.

| | | |
|---|---|---|
| (1) | SPECIES: | Use correct common names as found in the A.O.U. Check List, 1931 Edition, and list in A.O.U. order. General terms are to be avoided, such as "scaup", "teal", etc.; use "green-winged teal" or "lesser scaup". |
| (2) | FIRST OBSERVED: | The first refuge record for the species during spring migration, fall migration, wintering, or summering, and the number observed. In the case of resident species this column may be disregarded. |
| (3) | BECAME COMMON: | The date the species became common on the refuge. |
| (4) | PEAK CONCENTRATION: | The greatest number of the species present on any one date or limited interval of time. |
| (5) | LAST OBSERVED: | The last refuge record for the species during the spring or fall migration, wintering, or summering, and the numbers observed exclusive of obvious cripples or non-migrants. |
| (6) | YOUNG PRODUCED: | Estimated number of young produced based upon 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 are to be omitted. |
| (7) | TOTAL: | Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the manner in which birds come through; i.e., in waves or all at once. On refuges representing the terminus of the flight lane, the figures would probably be the same in many cases. |

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

Form NR-1

MIGRATORY BIRDS

Refuge Pea Island Months of January, 1 to April 30, 1944

1612

| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Estimated Total | Number Using Refuge |
| Hawk, Sparrow | | | | | | 1 | 4-6 | | | | |
| Coot | | | | 200 | 1-19 | | | | | | 200 |
| Plover, Piping | 3 | 4-2 | | Remain Scarce | | | | | | | |
| Plover, Semipalmated | 2 | 4-2 | | Remain Scarce | | | | | | | |
| Plover, Silson's | 2 | 4-12 | | Remain Scarce | | | | | | | |
| Plover, Black-bellied | | | | 25 | 4-29 | | | | | | 500 |
| Snipe, Wilson's | | | | Rare | | 1 | 4-12 | | | | |
| Sandpiper, Spotted | 1 | 4-28 | | Scarce | | | | | | | |
| Willet | 1 | 4-19 | | Remains Scarce | | | | | | | |
| Yellow-legs, Greater | 6 | 3-2 | 3-18 | 1000 | 4-29 | | | | | | 2000 |
| Yellow-legs, Lesser | 1 | 4-28 | | Rare | | | | | | | |
| Sandpiper, Least | 3 | 4-12 | 4-28 | 2000 | 4-28 | | | | | | 4000 |
| Sandpiper, Red-backed | | | | 10000 | 4-12 | | | | | | 25000 |
| Dowitcher | 8 | 3-18 | | 500 | 2-29 | | | | | | 1000 |
| Sandpiper, Semipalmated | 3 | 4-2 | | Remain Scarce | | | | | | | |
| Godwit, Marbled | 30 | 1-19 | | | | 1 | 1-23 | | | | |
| Sanderling | | | | 200 | 4-29 | | | | | | 1000 |
| Avocet | | | | | | 1 | 3-24 | | | | |
| Gull, Great Black-backed | | | | 75 | 1-1 | | | | | | 200 |
| Gull, Herring | | | | 5000 | 1-1 | | | | | | 10000 |
| Gull, Ring-billed | | | | 500 | 1-1 | | | | | | 500 |
| Gull, Laughing | 1 | 4-1 | 4-12 | 1500 | 4-29 | | | | | | 1500 |

REMARKS: (Pertinent information not specifically requested)

INSTRUCTIONS

Form NR-1 - MIGRATORY BIRDS (Include species in families Gaviidae through Strigidae; also doves and woodcocks)*

In case a resident form occurs, such as mottled duck on the Gulf Coast, use only the columns that apply.

| | | |
|---|---|---|
| (1) | SPECIES: | Use correct common names as found in the A.O.U. Check List, 1931 Edition, and list in A.O.U. order. General terms are to be avoided, such as "scaup", "teal", etc.; use "green-winged teal" or "lesser scaup". |
| (2) | FIRST OBSERVED: | The first refuge record for the species during spring migration, fall migration, wintering, or summering, and the number observed. In the case of resident species this column may be disregarded. |
| (3) | BECAME COMMON: | The date the species became common on the refuge. |
| (4) | PEAK CONCENTRATION: | The greatest number of the species present on any one date or limited interval of time. |
| (5) | LAST OBSERVED: | The last refuge record for the species during the spring or fall migration, wintering, or summering, and the numbers observed exclusive of obvious cripples or non-migrants. |
| (6) | YOUNG PRODUCED: | Estimated number of young produced based upon 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 are to be omitted. |
| (7) | TOTAL: | Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the manner in which birds come through; i.e., in waves or all at once. On refuges representing the terminus of the flight lane, the figures would probably be the same in many cases. |

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

Form NR-1

MIGRATORY BIRDS

Refuge Pea Island Months of January 1 to April 30, 1944

161:

| (1) Species | (2) First Observed | | (3) Became Common | (4) Peak Concentration | | (5) Last Observed | | (6) Young Produced | | | (7) Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name | Number | Date | Date | Number | Date | Number | Date | No. Broods Obsvd. | Avg. Size | Esti-mated Total | Number Using Refuge |
| Tern, Common | 6 | 4-11 | | | | | | | | | 100 |
| Tern, Least | 1 | 4-24 | 4-29 | | | | | | | | 1000 |
| Tern, Royal | 2 | 3-31 | 4-12 | | | | | | | | 100 |
| Tern, Caspian | 1 | 4-1 | | | Scarce | | | | | | |

REMARKS: (Pertinent information not specifically requested)

INSTRUCTIONS

Form NR-1 - MIGRATORY BIRDS (Include species in families Gaviidae through Strigidae; also doves and woodcocks)*

In case a resident form occurs, such as mottled duck on the Gulf Coast, use only the columns that apply.

| | | |
|---|---|---|
| (1) | SPECIES: | Use correct common names as found in the A.O.U. Check List, 1931 Edition, and list in A.O.U. order. General terms are to be avoided, such as "scaup", "teal", etc.; use "green-winged teal" or "lesser scaup". |
| (2) | FIRST OBSERVED: | The first refuge record for the species during spring migration, fall migration, wintering, or summering, and the number observed. In the case of resident species this column may be disregarded. |
| (3) | BECAME COMMON: | The date the species became common on the refuge. |
| (4) | PEAK CONCENTRATION: | The greatest number of the species present on any one date or limited interval of time. |
| (5) | LAST OBSERVED: | The last refuge record for the species during the spring or fall migration, wintering, or summering, and the numbers observed exclusive of obvious cripples or non-migrants. |
| (6) | YOUNG PRODUCED: | Estimated number of young produced based upon 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 are to be omitted. |
| (7) | TOTAL: | Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the manner in which birds come through; i.e., in waves or all at once. On refuges representing the terminus of the flight lane, the figures would probably be the same in many cases. |

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

Form NR-4

# SMALL MAMMALS

Refuge Pea Island April 30, 1944

| (1) Species | (2) Density | | (3) Removals | | | | | (4) Disposition of Fur | | | | | | | (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Share Trapping | | | | | | | |
| Common Name | Cover Types & Total Acreage of Habitat | Acres Per Animal | Hunting | Fur Harvest | Predator Control | For Re-stocking | For Research | Permit Number | Trappers' Share | Refuge Share | Total Refuge Furs Shipped | Refuge Income | Furs Donated | Furs Destroyed | Total Population |
| Muskrat | Scirpus robustus marsh | 1 | no removals | | | | | no disposition of fur | | | | | | | 30 |
| Otter | | | no removals | | | | | no disposition of fur | | | | | | | 4 |

REMARKS:

## 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. "List of North American Recent Mammals" by G. S. Miller, Jr., a very good reference, is now out of print, although a revision is scheduled for publication in the near future.)

(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, 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. Also show any removals not falling under heading listed.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market and the total income to the refuge by species, including share-trapped furs and furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimness 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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11-40

# RECORD OF GAUGE READINGS

Refuge: Pea Island

Gauge Location: north end of No.1 impoundment

Month: January Year 1944

Observer:

Heights relative to Sea Level:

0.0 on Gauge mean low water

Bottom of Outlet

Crest of Spillway

| DATE | TIME AM | TIME PM | Gauge Reading | Quantity C.P.S. Est.( ) Calib.( ) | Precipitation inches | TEMP. Max. | TEMP. Min. | REMARKS: Position of Gates; Wind Direction, Velocity; Relative Humidity; Etc. |
|---|---|---|---|---|---|---|---|---|
| 1 | | | 4.08 | | | 45 | 29 | |
| 2 | | | | | | 49 | 36 | |
| 3 | | | | | 1.02 | 48 | 30 | |
| 4 | | | | | .12 | 45 | 38 | |
| 5 | | | | | | 48 | 39 | |
| 6 | | | | | | 47 | 34 | |
| 7 | | | | | .08 | 40 | 29 | |
| 8 | | | | | .14 | 40 | 29 | |
| 9 | | | | | .08 | 39 | 28 | |
| 10 | | | 4.56 | | | 38 | 27 | |
| 11 | | | | | | 50 | 28 | |
| 12 | | | | | | 47 | 35 | |
| 13 | | | | | | 37 | 30 | |
| 14 | | | | | | 46 | 28 | |
| 15 | | | | | | 48 | 32 | |
| 16 | | | | | | 38 | 35 | |
| 17 | | | | | | 42 | 36 | |
| 18 | | | | | | 46 | 37 | |
| 19 | | | 4.48 | | | 44 | 37 | |
| 20 | | | | | | 52 | 35 | |
| 21 | | | | | | 57 | 34 | |
| 22 | | | | | | 58 | 40 | |
| 23 | | | | | | 57 | 41 | |
| 24 | | | 4.46 | | | 52 | 37 | |
| 25 | | | | | | 65 | 38 | |
| 26 | | | | | | 68 | 45 | |
| 27 | | | | | | 73 | 47 | |
| 28 | | | | | | 72 | 54 | |
| 29 | | | 4.48 | | | 68 | 44 | |
| 30 | | | | | | 55 | 35 | |
| 31 | | | | | | 56 | 36 | |
| | | | Max. Dev. | Total Ft. | Total In. | Max. | Min. | |
| TOTALS: | | | .40 | | 2.24 | 73 | 27 | |

## INSTRUCTIONS

1. Daily gauge readings should be taken, if possible, during the spring run-off period and at times when the water levels are changing rapidly. At other times gauge readings should be taken once a week at all stations.

2. Always read the gauge when the gate opening is changed. If water is being run from one unit to another, the gauge should be read on all units that will be affected. Show time of observation and of all changes in operating the gates under "Remarks".

3. Show the 0.0 equivalent in feet above sea level for each gauge. Sea level elevations should be indicated for the bottom of the opening as well as the crest of the spillway. If gauges are on rivers, bays or lakes, not a part of a control structure, information on the last two items is unnecessary.

4. When more than one report is submitted from the same refuge, detailed weather observation need be furnished on only one report. If possible, snowfall should be converted into inches of precipitation.

5. The "Remarks" column should give a complete record of all pertinent conditions that affect the water level, such as the position of the gates, excessive or continuous winds, with direction and velocity, relative humidity, if known, spring breakup, etc. A page of additional remarks or supplementary reading, if made more frequently than once a day during times of rapidly rising waters, may be attached to this report.

6. Unless refuge managers have definite figures on quantitative flow of water released from a station, the column headed "Quantity C.F.S." (cubic feet per second) may be left blank.

7. In the preparation of these forms, the original should be forwarded to the Central office by the tenth of the following month, a carbon should be furnished the Regional Director, and one copy of each report should be retained for the Refuge files. All refuges in Regions 1 and 2, and those refuges in North Dakota, South Dakota, Nebraska, Minnesota, and Seney Refuge in Michigan, should forward a carbon of each report to Mr. Brice McPride, 437 Federal Building, Salt Lake City, Utah.

3-1547
11-40

# RECORD OF GAUGE READINGS

Refuge: Pea Island

Gauge Location: north end of No.1 impoundment

Month: February Year 1944

Observer:

Heights relative to Sea Level:

0.0 on Gauge mean low water

Bottom of Outlet

Crest of Spillway

| DATE | TIME AM | TIME PM | Gauge Reading | Quantity C.P.S. Est. ( ) Calib. ( ) | Precipitation inches | TEMP. Max. | TEMP. Min. | REMARKS: Position of Gates; Wind Direction, Velocity; Relative Humidity; Etc. |
|---|---|---|---|---|---|---|---|---|
| 1 | | | 4.45 | | | 46 | 36 | |
| 2 | | | | | | 49 | 34 | |
| 3 | | | | | | 54 | 39 | |
| 4 | | | 4.50 | | | 58 | 37 | |
| 5 | | | | | | 61 | 37 | |
| 6 | | | | | .16 | 53 | 36 | |
| 7 | | | | | | 55 | 35 | |
| 8 | | | | | | 50 | 36 | |
| 9 | | | | | .58 | 45 | 35 | |
| 10 | | | 4.54 | | | 42 | 32 | |
| 11 | | | | | | 47 | 30 | |
| 12 | | | | | | 39 | 22 | |
| 13 | | | | | | 56 | 26 | |
| 14 | | | | | .62 | 61 | 34 | |
| 15 | | | 4.60 | | | 59 | 36 | |
| 16 | | | | | | 58 | 37 | |
| 17 | | | | | | 50 | 39 | |
| 18 | | | | | .58 | 61 | 45 | |
| 19 | | | [illegible] | | | 48 | 34 | |
| 20 | | | | | .18 | 42 | 36 | |
| 21 | | | 4.62 | | | 49 | 39 | |
| 22 | | | | | | 57 | 39 | |
| 23 | | | | | | 71 | 52 | |
| 24 | | | | | | 74 | 48 | |
| 25 | | | | | | 56 | 43 | |
| 26 | | | 4.74 | | 1.26 | 59 | 44 | |
| 27 | | | | | | 62 | 45 | |
| 28 | | | | | | 51 | 44 | |
| 29 | | | | | .18 | 45 | 36 | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| | | | Max. Dev. | Total Ft. | Total In. | Max. | Min. | |
| TOTALS: | | | .29' | | 3.66 | 74 | 22 | |

## INSTRUCTIONS

1. Daily gauge readings should be taken, if possible, during the spring run-off period and at times when the water levels are changing rapidly. At other times gauge readings should be taken once a week at all stations.

2. Always read the gauge when the gate opening is changed. If water is being run from one unit to another, the gauge should be read on all units that will be affected. Show time of observation and of all changes in operating the gates under "Remarks".

3. Show the 0.0 equivalent in feet above sea level for each gauge. Sea level elevations should be indicated for the bottom of the opening as well as the crest of the spillway. If gauges are on rivers, bays or lakes, not a part of a control structure, information on the last two items is unnecessary.

4. When more than one report is submitted from the same refuge, detailed weather observation need be furnished on only one report. If possible, snowfall should be converted into inches of precipitation.

5. The "Remarks" column should give a complete record of all pertinent conditions that affect the water level, such as the position of the gates, excessive or continuous winds, with direction and velocity, relative humidity, if known, spring breakup, etc. A page of additional remarks or supplementary reading, if made more frequently than once a day during times of rapidly rising waters, may be attached to this report.

6. Unless refuge managers have definite figures on quantitative flow of water released from a station, the column headed "Quantity C.P.S." (cubic feet per second) may be left blank.

7. In the preparation of these forms, the original should be forwarded to the Central office by the tenth of the following month, a carbon should be furnished the Regional Director, and one copy of each report should be retained for the Refuge files. All refuges in Regions 1 and 2, and those refuges in North Dakota, South Dakota, Nebraska, Minnesota, and Seney Refuge in Michigan, should forward a carbon of each report to Mr. Brice McBride, 437 Federal Building, Salt Lake City, Utah.

3-1547
11-40

# RECORD OF GAUGE READINGS

Refuge: Fox Island

Gauge Location: north end of No.1 impoundment

Month: March Year 1944

Observer:

Heights relative to Sea Level:

0.0 on Gauge near low water

Bottom of Outlet

Crest of Spillway

| DATE | TIME AM | TIME PM | Gauge Reading | Quantity C.P.S. Est.( ) Calib.( ) | Precipitation inches | TEMP. Max. | TEMP. Min. | REMARKS: Position of Gates; Wind Direction, Velocity; Relative Humidity; Etc. |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | 47 | 32 | |
| 2 | | | | | | 41 | 30 | |
| 3 | | | | | | 60 | 25 | |
| 4 | | | 4.70 | | .24 | 57 | 40 | |
| 5 | | | | | | 45 | 34 | |
| 6 | | | | | | 62 | 34 | |
| 7 | | | 4.74 | | .38 | 62 | 48 | |
| 8 | | | | | | 59 | 35 | |
| 9 | | | | | | 42 | 30 | |
| 10 | | | | | | 45 | 31 | |
| 11 | | | 4.72 | | | 55 | 33 | |
| 12 | | | | | 1.48 | 61 | 38 | |
| 13 | | | | | | 69 | 46 | |
| 14 | | | | | | 52 | 40 | |
| 15 | | | | | | 72 | 41 | |
| 16 | | | 4.74 | | | 75 | 54 | |
| 17 | | | | | | 71 | 52 | |
| 18 | | | | | | 74 | 40 | |
| 19 | | | | | 1.04 | 57 | 36 | |
| 20 | | | | | .56 | 45 | 35 | |
| 21 | | | | | | 44 | 35 | |
| 22 | | | | | | 43 | 37 | |
| 23 | | | | | | 65 | 44 | |
| 24 | | | 4.82 | | .54 | 59 | 45 | |
| 25 | | | | | | 76 | 46 | |
| 26 | | | | | | 67 | 54 | |
| 27 | | | | | | 51- | 35 | |
| 28 | | | | | .42 | 59 | 45 | |
| 29 | | | | | .38 | 51 | 44 | |
| 30 | | | | | .22 | 55 | 40 | |
| 31 | | | 4.76 | | | 57 | 38 | |
| | | | Max. Dev. | Total Ft. | Total In. | Max. | Min. | |
| TOTALS: | | | .12' | | 5.76 | 61 | 25 | |

## INSTRUCTIONS

1. Daily gauge readings should be taken, if possible, during the spring run-off period and at times when the water levels are changing rapidly. At other times gauge readings should be taken once a week at all stations.

2. Always read the gauge when the gate opening is changed. If water is being run from one unit to another, the gauge should be read on all units that will be affected. Show time of observation and of all changes in operating the gates under "Remarks".

3. Show the 0.0 equivalent in feet above sea level for each gauge. Sea level elevations should be indicated for the bottom of the opening as well as the crest of the spillway. If gauges are on rivers, bays or lakes, not a part of a control structure, information on the last two items is unnecessary.

4. When more than one report is submitted from the same refuge, detailed weather observation need be furnished on only one report. If possible, snowfall should be converted into inches of precipitation.

5. The "Remarks" column should give a complete record of all pertinent conditions that affect the water level, such as the position of the gates, excessive or continuous winds, with direction and velocity, relative humidity, if known, spring breakup, etc. A page of additional remarks or supplementary reading, if made more frequently than once a day during times of rapidly rising waters, may be attached to this report.

6. Unless refuge managers have definite figures on quantitative flow of water released from a station, the column headed "Quantity C.F.S." (cubic feet per second) may be left blank.

7. In the preparation of these forms, the original should be forwarded to the Central office by the tenth of the following month, a carbon should be furnished the Regional Director, and one copy of each report should be retained for the Refuge files. All refuges in Regions 1 and 2, and those refuges in North Dakota, South Dakota, Nebraska, Minnesota, and Seney Refuge in Michigan, should forward a carbon of each report to Mr. Brice McBride, 437 Federal Building, Salt Lake City, Utah.

3-1547
11-40

# RECORD OF GAUGE READINGS

Refuge: Fox Island

Gauge Location: north end of No. 1 impoundment

Month: April Year 1944

Observer:

Heights relative to Sea Level:

0.0 on Gauge

Bottom of Outlet

Crest of Spillway

| DATE | TIME AM | TIME PM | Gauge Reading | Quantity C.P.S. Est. ( ) Calib. ( ) | Precipitation inches | TEMP. Max. | TEMP. Min. | REMARKS: Position of Gates; Wind Direction, Velocity; Relative Humidity; Etc. |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | 75 | 45 | |
| 2 | | | | | | 75 | 46 | |
| 3 | | | | | | 49 | 39 | |
| 4 | | | 4.70 | | | 63 | 38 | |
| 5 | | | | | | 45 | 76 | |
| 6 | | | | | | 57 | 55 | |
| 7 | | | | | | 68 | 46 | |
| 8 | | | | | | 70 | 55 | |
| 9 | | | | | | 76 | 57 | |
| 10 | | | | | | 76 | 60 | |
| 11 | | | 4.60 | | .20 | 65 | 51 | |
| 12 | | | | | 2.54 | 76 | 50 | |
| 13 | | | | | | 76 | 45 | |
| 14 | | | | | | 72 | 51 | |
| 15 | | | | | .24 | 76 | 56 | |
| 16 | | | | | | 62 | 62 | |
| 17 | | | 4.80 | | | 68 | 55 | |
| 18 | | | | | | 64 | 50 | |
| 19 | | | | | | 58 | 48 | |
| 20 | | | | | | 66 | 50 | |
| 21 | | | | | | 61 | 52 | |
| 22 | | | 4.50 | | | 68 | 46 | |
| 23 | | | | | | 66 | 51 | |
| 24 | | | | | | 70 | 57 | |
| 25 | | | | | | 76 | 61 | |
| 26 | | | | | | 77 | 54 | |
| 27 | | | | | | 65 | 56 | |
| 28 | | | | | .28 | 58 | 48 | |
| 29 | | | 4.40 | | | 61 | 44 | |
| 30 | | | | | | 76 | 48 | |
| 31 | | | | | | | | |
| | | | Max. Dev. | Total Ft. | Total In. | Max. | Min. | |
| TOTALS: | | | .30 | | 3.06 | 82 | 38 | |