

ROUTING SLIP

DIVISION OF WILDLIFE REFUGES

DATE: 5-19 1941

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 MRS. WOODIN
 MR. ELMER
 MRS. GARVIN
 MR. DUMONT

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 Mr. Gustafson

WY
W

REMARKS:

Bombay Hawk Quarterly
 February - April '41

Return to:

Cook

R
Bombay Hook
H. I.

June 5, 1941

Mr. S. B. Locke, Regional Director,
1140 Park Square Building,
Boston, Massachusetts.

Dear Mr. Locke:

In reviewing Mr. Herholdt's very excellent quarterly narrative report for the period February-April, we note that 800 bushels of shelled corn were distributed on waterfowl concentration areas on the Bombay Hook Refuge, in carrying out a spring feeding program to induce additional nesting.

Undoubtedly such feeding helped to dispose of some of the surplus grain on hand which could not be readily utilized on other nearby areas; however, we do not feel that such a heavy spring feeding program should be continued where the primary purpose is to hold a greater breeding population on the refuge and request that in the future spring feeding be limited to distribution of grain during emergency periods and to that which is actually utilized by waterfowl.

Sincerely yours,

Robert H. Smith,
Acting in Charge,
Section of Habitat Improvement,
Division of Wildlife Refuges.

REG/go

Bombay Hook National Wildlife Refuge
Quarterly Narrative Report

February, March, and April, 1941

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W.W.

Bombay Hook National Wildlife Refuge
Quarterly Narrative Report

February, March and April, 1941

1. General

A. Weather Conditions:

The old "Ground Hog" legend was knocked into a cocked hat at Bombay Hook this spring. Ground Hog day was cloudy and foggy, and we had our only heavy snowfall on February 28th, and a howling blizzard lasted until March 2nd. It was quite severe for Delaware. We were snowbound from Friday noon until the following Monday night.

A typical mid-Atlantic winter prevailed throughout the month of February, until the last day. Average temperatures hovered slightly above freezing during the day, and slightly below during the night. Occasional light rains fell throughout the month, but this was not necessary to cause a continual muddy condition. Daily freezing and thawing kept the ground almost impassible for automobiles. The slag road leading to Headquarters was the cause of much loss of time. Other roads, although not travelled as frequently, under these conditions, also contributed to the high cost of truck repair, and time lost in transporting men and materials to and from nearby towns, and work sites.

Ground conditions in February were bad, but they were much worse during the first part of March, when a rapid thaw removed the heavy snowfall in a few days.

Despite the fact that the winter and spring thus far were characterized by generally warm days and cool nights, the marshes remained frozen until a hard rain on March 11, followed by a series of daily high tides, succeeded in removing all traces of frozen marsh. An early spring moved in with giant strides from then on. In fact this spring was the driest in many years. After the rain on March 11, every day was clear, or fairly so, and warm, until April 1 and 2, when the spell was broken. Rain fell again only on the 5, 6, and 24. As a result, the farmers have an early start this spring.

The spring equinox was ushered in by five days of terrifically strong wind, from the southwest, west, and northwest. Clear weather prevailed before, during and after the equinox.

The precipitation and temperature records for this quarterly period, shown in the table below, were obtained from the Dover station of the U.S. Weather Bureau, located about 7-3/4 miles southwest of Refuge Headquarters.

	Snowfall	Rainfall	Max. Temp.	Min. Temp.
February	7"	1.43	39	26
March		2.15	44	29
April		3.26	67	45
Total	7"	6.84	Extremes 90	16

The above tabulation shows average maximum and minimum temperatures.

B. Water Conditions:

In spite of an exceptionally dry spring, and with strong west equinoctial winds causing a prolonged period of dead-low tides, the water elevation in our two important areas, Raymond's Pool, and the Sheariness swamp, was not affected very greatly. Water in Raymond's Pool was at elevation 3.85' at the beginning of the period. After the melting of the March Snow, the water rose to 3.96'. The dry spring has caused the water in Raymond's to drop to elevation 3.57', on April 30th..

The water table in Finis, or Sheariness Swamp was at elevation 3.16' on March 12. This was the highest for this spring. Now on April 30, it has dropped to elevation 2.50'.

There have been no unusually high tides during this spring, but instead, an opposite situation prevailed. The strong west winds during the equinox caused extreme low tides for the week of March 17 to 23. Lowest water elevation at that time was elevation 5.0'. The highest tide during the period was elevation 3.16', on March 13.

11. Wildlife

A. Birds.

1. Populations and Behavior.

(a) Waterbirds.

Pied-billed Grebe. The winter population of Pied-billed Grebe's was consistantly two. These two were always seen on

Raymond's Pool, none elsewhere. On March 14, there were seven on Raymond's Pool. The highest count for this period occurred on March 28, with a total of 11 for the day, seven on Raymond's Pool, and four in the brackish pools east of Bear Swamp and Finis Swamp. The Grebes started sounding their weird note on April 9, and now at the close of the period, the notes indicate that there are three pairs either nesting, or preparing to, on Raymond's Pool, and two more farther north, in the East Dutch Neck Section. There seems to be 10 or 12 Pied-billed Grebes on the area at this time.

✓
Great Blue Heron. The lowest ebb in Great Blue numbers occurred during the snow storm on March 1 to 3. They couldn't be found. On March 4, two birds were seen one on an opening in Bear Swamp, and one flying over Raymond's Pool. They have not been abundant this spring, and their numbers seem much lower than last fall. Great Blue's are "Common" at present.

✓
Snowy Egret. There are ^{previous} no authentic spring records for the Snowy Egret, in this locality or northward to my knowledge. On April 19, while escorting a group of visitors along the pond, a Snowy Egret was identified. It was first seen at a distance, and I described it as an immature Little Blue Heron. While I was passing the field glasses from one person to the other, the bird arose and came much closer, lighting in a group of trees, which was filled with Black-crowned Night Herons. When the glasses came back to me, I watched it for the dusky wing-tips. Instead, I saw yellow feet. I immediately corrected the identification.

The bird was very obliging. It sat motionless until each member in the group had seen the yellow feet. Incidentally, this record is well substantiated by the fact that the observers were Mr. Harry Johnston, our rural mail carrier, and his family. The bird remained until April 22. No others were seen.

✓
Little Blue Heron. The only ¹⁹⁴¹ spring record for Little Blues was on April 11. One immature bird was seen in Finis Swamp. No others have been seen this period.

✓
Black-crowned Night Heron. This species was very rare during late February and the first week in March. They were seen again however, on March 5, the first day of thaw, after the March 1 blizzard. Slight increases were evidenced by the regularity with which the birds occurred thereafter. They are abundant at present, but not nesting.

✓
American Bittern. This species has been seen during each month of the year. In early March, when traces of snow and ice were still present, an American Bittern was seen on the salt marshes, near the Kent Island Well. A steady spring increase has been apparent, and a count of the notes, at night, on April 30, indicate that 16 Bitterns are present, along Raymond's dike, Finis Swamp, and Bear Swamp.

✓
Whistling Swans were conspicuous by their absence this spring. It is rather important to note that the fall and winter

2,400
20,380
12,210
4,120
39,070

movements of these birds are such that they occur on this refuge quite frequently during that period. Spring records are very scarce; two last year, with a total of seven birds, and none this spring.

✓
Canada Goose. Spring flocks of Snow Geese are usually accompanied by the first of the spring Canadas. This spring there were no Canadas with the Snows. In fact, migrating Canadas were not seen, until March 18. Many small flocks passed over all day, and a few alighted. The next day there were 17 on Raymond's Pool. This flock increased to 131, while other large flocks passed them without stopping. On April 1, the Canadas on Raymond's Pool had increased to 400. On April 12, the flock dropped to 64, and at the close of the period there were 44.

✓
Snow Geese. The spring migration of Snow Geese was very light. Small flocks were noticed flying through this vicinity on March 15. A flock of 2,000, arrived March 30, and remained until April 7. This flock was seen near the Bayshore continually. A maximum of 150 were seen on the new impoundment, Raymond's Pool. For a detailed report of the population and behavior of the Snow Geese on this refuge during this period, please refer to my paper entitled "Snow Geese at Bombay Hook, 1940-41", and submitted to the Regional office on May 1, 1941.

✓
Blue Goose. There were no Blue Geese in the 11,000 Snows that were here last fall, but the little flock of 2,000 Snows that came through this spring, contained four Blue Geese.

Mallard. The spring migration of wild Mallards is a very delicate subject. Locally reared birds drifted in last winter, and at present we have about 15. Any increase over and above 12, or the very wild birds, found on other sections of the refuge, are believed to be bona-fide wild Mallards. These birds were first noticed on March 6, when seven were seen. The peak for wild Mallards occurred on or about March 18, with an estimated total of 350. They departed soon afterward, and on April 20th there were no wild Mallards.

Black Ducks. This period started out with the lowest point in our Black Duck population. The first increase was noticed immediately after the first thaw in March. On March 8, the first huge rafts of Blacks started moving slowly through the refuge. On March 18, the peak was apparently reached, when the area was filled with Blacks. An estimated total on that day was around 20,000. The peak lasted for only a few days, and the decrease was slow and very gradual. There seem to be between two and three thousand Black Ducks on the refuge area now at the close of the period.

Black Ducks showed signs of "pairing", on February 25, and by April 1, the majority of ducks were moving in pairs. Now at the end of the period we still have many small flocks of what appear to be non-breeders.

Gadwall. At the beginning of the period, there were approximately 20 Gadwalls on the refuge. These birds were last seen

on February 25. The first Gadwalls to return, was one male, on March 23. They increased steadily thereafter, and on March 30, there were 18. The next thorough count was made on April 10, and a total of 52 birds were seen. On April 25, they had decreased to 21, and on April 30, 18 were recorded.

✓
Baldpate. Small flocks of Baldpates were here during February, and the first week in March, totaling around 40 to 60 birds. On March 15, the first big increase was noted, making about 200. This number remained quite consistent until April 17, when Baldpates seemed to drop off. The last record for Baldpate is four, on April 25.

✓
Pintails. During the first part of the period, there appeared to be about 500 Pintails on the pool, and in the marsh. On March 6, there was a tremendous increase, estimated at 5 or 6 thousand. Later, from March 18 to 21, there was an estimated 12,000 Pintails on the refuge. The decrease was very rapid after this wave, and during the rest of March and the first two weeks in April, there was an estimated 3,000 "Sprigs" on the area. There are about 50 here now at the close of the period.

✓
Green-winged Teal. During the month of February there was no noticeable change in the Green-wing population. There seemed to be about a thousand in this vicinity until late in March. Green-wings were all alone in their arrival and departure dates this spring. They arrived after the Pintails, and remained later than the majority of

Pintails. Our peak occurred about March 24, with an estimated three thousand on the entire area. Slow, gradual decreases, starting on April 12, characterized their departure, and now, on April 30, there are an estimated 300 Green-winged Teal on and near Raymond's Pool, and an additional 200 scattered throughout the remainder of the Refuge.

Blue-winged Teal. The first Blue-winged Teal was seen this spring on March 23. The increase was very slow until April 9, when they were very common throughout the entire area. It is quite apparent that Blue-winged Teal are not leaving the area. Their numbers are consistently increasing, and it seems that there are about twelve or fifteen hundred Blue-wings on the area at present. All birds are in pairs, and most of them are building nests.

Shoveller. Shovellers have been very numerous all period. During the short periods of freeze-up, they could always be flushed from the tidal streams. Shortly thereafter, they were concentrated both on the streams and in the marsh. The spring increase occurred on March 18, with an estimated total of 1,000 Shovellers. On April 10, the Shovellers were estimated at 3,400. Decreases have been noticed since April 10, and our population at present is about 500.

Wood Duck. One pair of Wood Ducks have been seen regularly. No increase or decrease.

Ring-necked Ducks. There were four Ring-necked

Ducks on Raymond's Pool until the storm on February 28. On March 3, they could not be found. None have been seen since.

✓
Scaup, Lesser. Lesser Scaup were present in small numbers during most of the period. Before the March 1 storm, they were seen in small numbers on the tidal streams, and along the bayshore. Their total at that time being an estimated 250 birds. After the storm, they also occurred on Raymond's Pool in flocks of from 20 to 50. Scaup were most numerous on or about March 23, and there appeared to be about 1,000 in this vicinity at that time. Rapid decreases occurred during the last week in March, and the first week in April. The last Scaup were seen on April 11.

✓
American Golden-eye. Two Golden-eyes were seen on Raymond's Pool on March 15, after a period of absence which started on January 24. On March 27, there were 6, and then only two again on April 12. None have been seen since.

✓
Buffle-head. Four Buffle-head occurred on Raymond's Pool on March 22, and increased to 7 on April 7. They were last seen on April 9.

✓
Ruddy Duck. There were about 200 Ruddy Ducks on the Refuge area until the storm on February 28. After the storm they had decreased to three, on Raymond's Pool. Rapid daily increases, were noted thereafter, starting on March 6, with 50, and 75 on March 8, and about 100

on March 21. The next change was another increase on April 7, resulting in a total of 122 Ruddies, and most of them were on Raymond's Pool. On April 12, the count of Ruddies was 86, and on April 16 there were 24. The last seen were two on April 19.

Hooded Mergansers, have been very abundant most of the period. Their numbers hovered between what appeared to be 250 and 400, until April 15 to 17, when a decrease was evident. The last Hooded Mergansers were seen on April 25.

American Mergansers were very rare this spring, with only an occasional single or pair, being identified during February and March. Last record is on April 7.

Red-breasted Merganser. This species was quite common throughout February and March, becoming scarce in early April. Three to four hundred birds can be said to have spent the early spring on the refuge. Last record for this species is on April 18. These birds were very numerous on the Brigantine Refuge in New Jersey, on April 23.

(a-1) Birds of Prey and Scavengers.

Turkey Vulture. Always very abundant. No seasonal movement noticable.

✓
Black Vulture. One Black Vulture was recorded this spring. It occurred on April 19 only.

✓
Sharp-shinned Hawk. Occasional throughout the entire period. No more than one Sharp-shinned has been seen during any one day.

✓
Cooper's Hawk. Occasional throughout the entire period. No more than one Cooper's Hawk has been seen during any one day.

✓
Red-tailed Hawk. This species has been very abundant during the entire period. Two pairs appear to be nesting now, and the highest number seen was eight, on February 27.

✓
Red-shouldered Hawk. The first Red-shouldered Hawk to be seen during this period was one bird on March 12. There were two on April 10, and there are still two.

✓
Rough-legged Hawk. Seven Rough-legs were on the refuge continually until March 12, when the count was four. The last Rough-leg was seen on April 8.

✓
Bald Eagle. There have been as many as four Eagles on the refuge at one time, all adults. In addition, immature birds have also been seen. One pair is nesting on Cat Island, and have three young,

as large as Muskovie ducks. We have a tower erected beside the nest, and a blind attached to the top. A few pictures have been taken, but due to the necessity of submitting this report by May 10, it will be necessary to include the eagle pictures in the next quarterly report.

✓
Marsh Hawk. Very abundant at all times.

✓
Osprey. The first record of Osprey occurring on the refuge proper, was on March 31. I recorded the Osprey on March 23, 18 miles north of the Refuge. There are three pairs on the refuge now, displaying amorous attitudes.

✓
Duck Hawk. Duck Hawks were quite common during the period of heaviest waterfowl migration. On March 22, there were six birds, and the last one seen occurred on April 17. Duck Hawks have never been seen anywhere but on the outer marshes. The heavy waterfowl concentrations on Raymond's Pool, have failed to lure the Duck Hawk.

✓
Sparrow Hawk. Always very abundant

(a-2) Game Birds and Shore Birds.

✓
Bob-White. During February the Quail population remained very consistant, although slightly below that of January. The maximum count for February was seven covies, containing 61 birds. During March there were still seven covies, with a total of 66 birds. Only one

check was made during April, and this time five covies were found, with a total of 53 birds.

Ring-necked Pheasant. The Ring-necks have remained close to home all winter and spring, the easily available food supply probably being the reason. Now, on April 30, it can be stated that four females and two males are on the Whitehall section, and three females and two males are on the Dutch Neck section, making a total of 11 Pheasants on the Refuge.

Rails, King and Clapper. On April 17, the first signs of Rails were noticed. The calls of both King and Clapper were heard during the evening. Any estimate of numbers would be purely guesswork. The Virginia Rail has not been seen or heard as yet.

Coot. There were approximately 20 Coots on Raymond's Pool until February 21, when they departed. Coots were next seen on March 6, but only 2. They had increased to 11 by March 27, and then to 41 on April 25. The last count was 17 on April 29.

Killdeer. The first Killdeer for this period were seen on March 12. They have been very common ever since. A farmer reported coming upon a Killdeer nest, while he was ploughing, on April 29. He moved the four eggs from his path, and placed them on ploughed ground. On his next trip around the field, all four eggs had hatched, and two of the young were seen running in the furrow. The farmer stated with certainty,

that none of the eggs were piped or cracked when he moved them, and about twenty minutes later, all eggs had hatched, and the young were scampering about like spiders. Fast work for old Dame Nature!

✓
Woodcock. Woodcocks were first flushed on March 9, when three were found. Two nights later, the first songs were heard. No nests were found, but we can be reasonably sure that three pairs nested on the Refuge area.

✓
Wilson's Snipe. The first Snipe were also seen this spring on March 9. Two were flushed on that day, and they increased rapidly thereafter. They were most numerous during early April, and the maximum number flushed has been 16. There are no indications that this might be a nesting species.

✓
Willetts. The first Willets seen this spring were 9, on April 20th. All birds were seen on the salt marsh, south of Leipsic River. They became very plentiful before they were seen north of Leipsic River, on April 29. Amorous relations are very evident.

✓
Yellow-Leggs. The first Yellow-Leggs were seen on March 15, and their numbers increased rapidly thereafter. The majority of these early arrivals appear to be "greater". They are very plentiful at present.

✓
Least and Semipalmated Sandpipers/ These species

(I assume they were both present) were first noticed on April 22, and are quite common now on April 30.

✓
Herring Gull. Very abundant all period.

✓
Ring Billed Gull. Occasional all period.

✓
Mourning Dove. Doves were very abundant during the winter period. In fact, an increase was noted during late February and early March. The peak of the Dove migration seemed to occur between March 7 and 25. An estimate made at that time was 250. The first Dove song was heard on March 22.

(a-3) Owls.

✓
Barn Owl. Barn Owls were first seen this spring on March 25, and occur with regularity at their customary haunts.

✓
Screech Owl. Seen regularly throughout the entire period, but heard only recently.

✓
Great Horned Owl. Always present. One pair reared two young on the refuge.

✓
Barred Owl. Always present, seen quite often, and

heard every night, and oftentimes during the day, recently.

(a-4) Passerine Birds.

Species Recorded this period

Date of arrival or abundance.

Chimney Swift

4/27

Abundant

Kingfisher

Resident

Common

Flicker

Resident

Common

Red-bellied Woodpecker

Resident

Common

Red-headed Woodpecker

This species is rare in the locality, and the first record for the refuge was obtained on March 15. The first bird seen was a male. There have been two here at various times, but only one stays continually. This bird is seen in the walnut tree, next to my house, and he is sitting there as this is being written.

Hairy Woodpecker

Resident

Abundant

Downy Woodpecker

Resident

Abundant

Eastern King Bird

4/29

Common

Wood Pewee

4/29

Common

Norther Horned Lark

Winter visitor. Last seen 4/20/41.

Tree Swallow

4/22

Abundant, nesting

Barn Swallow

4/15

Abundant, nesting

Blue Jay

Resident

Abundant

Common Crow

Resident

Abundant

Fish Crow

Resident

Abundant

Carolina Chickadee

Winter visitor 4/30/41

Species Recorded this Period	Date of arrival or abundance	
Tufted Titmouse	Migrant, winter visitor, occasional.	
House Wren	Resident	Common
Carolina Wren	Resident	Rare
Long Billed Marsh Wren	4/29	Common
Mocking Bird	Resident	Common
Catbird	4/26	Common
Brown Thrasher	4/11	Common
Robin	Resident	Abundant
Wood Thrush	4/30	Occasional
Blue Bird	Resident	Occasional
Golden Crowned Kinglet	Rare migrant	
American Pipit	Occasional until 3/20	
Northern Shrike	Occasional until 4/1	
Starling	Resident	Abundant
White-eyed Vireo	4/30	Occasional, spring
Parula Warbler	4/30	Occasional spring
Yellow Warbler	4/30	Breeder
Magnolia Warbler	Winter visitor	Common
Black Poll Warbler	4/30	Occasional, spring
Prairie Warbler	4/30	Occasional, spring
Yellow Palm Warbler	3/11	Occasional winter and spring.
Northern Yellow Throat	4/27	Breeder, abundant
English Sparrow	Always abundant	

Species Recorded this Period	Date of arrival or abundance	
Eastern Meadow Lark	Always abundant	
Red-winged Blackbird	Always abundant	
Purple Grackle	Always abundant	
Cow Bird	Always abundant	
Cardinal	Breeder, common in Winter	
Goldfinch	Always abundant	
Towhee	4/29	Common
Savannah Sparrow	Resident	Common
Henslow's Sparrow	4/22	Occasional
Sharp-tailed Sparrow	4/19	Breeder
Vesper Sparrow	3/20	Occasional
Slate Colored Junco	Plentiful until 4/20	
Tree Sparrow	Abundant in winter. Gone by 4/10	
Chipping Sparrow	Resident	Common
Field Sparrow	Resident	Common
White-Crowned Sparrow	Rare in winter. Last seen 3/20 to 30.	
White-Throated Sparrow	Winter and spring migrant.	
Fox Sparrow	Common in late winter and early spring.	
Song Sparrow	Always abundant, Breeder	

(b) Groups

(b-1) Waterbirds.

Again, the new 100-to-120-acre impoundment, Raymond's Pool takes all the "glory". The most spectacular sight during this period was a maximum of 150 Snow Geese on this new impoundment. It is the first time in the history of this locality that Snow Geese have been seen on fresh-water areas, and also the first time they have been seen within $\frac{1}{4}$ mile of habitation.

During, and shortly after a period of strong west wind, there was an estimated 12,000 ducks on this new impoundment. Most of these were Pintails, and this was another spectacular sight. There was very little open water left, hardly enough for another duck to alight.

The border of the impounded area, on all sides except that formed by the dike, is covered with a very rank, heavy stand of dead Panicum virgatum. This heavy screen cannot be expected to stand much longer, but as it now is, it affords an excellent cover for Gallinules, Rails, Grebes, and ducks. It is always well populated at any point. American Bitterns, and Herons are also very fond of this environment. These species can be seen working in and out of the dead Panicum, at any hour of the daylight, and at night the notes and calls of these species form a chorus that would be the envy of all Walt Disney's sound technicians. All joking aside, these sound form the perfect "Wildlife Symphony", with

plenty of double bass furnished by great numbers of huge Bull-frogs, and an occasional American Bittern; Crescendos are well executed by the Clapper Rails and Grebes; the cymbals are handled nicely by the Black-Crowned Night Herons; and the Sharp-tailed Sparrows and Marsh Wrens contribute with strings, flute and fife. Black Ducks, Blue-winged Teal and Canada Geese contribute for the allegro moderato, and pizzicato is rendered by the sleepy Red-winged Blackbirds and the Virginia Rails.

*Sounds like
Chamber music
from Lower
Basin Street*

Ducks, like humans, have habits which immediately identify the locality from which they came. For instance, on the spring migration, there was a particular "panel" of ducks and geese which possessed feeding habits which differed completely from our local ducks. Each evening a certain section of Black Ducks and Canada Geese would "take off" from Raymond's Pool, fly a short distance, and alight on the bare, dry ground, in soybean stubble. It is common to see ducks, and geese too, light on small puddles in a field, but never on the hard dry ground. This practice is indulged in only by barn-yard Mallards, etc., and rarely by wild birds, except under extreme conditions like a severe freeze-up. There were no unusual conditions present this year; those ducks just knew how to alight in a stubble field, and knew there was food there. Canada geese alighted in the corn field very often, this spring, for the first time. It is believed that these were central or western ducks and geese. However, they did not remain long enough to educate the eastern ducks, since this practice stopped, as the numbers of ducks decreased.

I have always been led to believe that Ruppia was a

very important food for surface feeding waterfowl. There are very excellent beds of Ruppia on two ponds, adjacent to Raymond's Pool, and some excellent beds now forming in Raymond's Pool. These beds are seldom used. Daytime feeding in these areas is extremely rare, and signs of night feeding are equally non-existent. However, signs of feeding in Ruppia are very prominent on all other sections of the marsh area. There are no other noticeable stands of aquatic plants in Raymond's Pool, and it is probably true that animal life is not comparatively abundant therein, at this period of the year. The great attraction that this area holds for waterfowl is somewhat of a phenomenon.

There is a gradual change taking place in the prominence of the various species of ducks, here at Bombay Hook. It has always been assumed that the Black Duck was the most prominent in this region. This spring, the Shoveller Duck has been running a close second. Blacks seem more numerous because of the flocks of non-breeders, but every Shoveller appears to be mated. After the departure of the Pintails, the mated Shovellers far outnumbered the mated Black Ducks on Raymond's Pool, and on the large mudflat and pond areas in the marsh.

All Canada Geese that spend more than one day in this locality, always show up on Raymond's Pool. One flock of 131, increased to 400, and then slowly dwindled to 44, at the end of the period.

Weather and water conditions have been quite favorable for waterfowl and shore birds during this period. There have

been no high storm tides, which usually occur during the spring equinox, and destroy 90% of the early duck nests. Tides have been sufficiently high to maintain a favorable water elevation on the salt marsh, and there have been sufficient early rains to promote a good Woodcock and Snipe migration. A rather serious condition may develop if the present drought is not ended during the first part of May, since the condition of all marsh vegetation depends largely upon an abundance of moisture at that time.

B. Upland Game Birds.

It is very gratifying to note that Quail and Pheasants can overlook the danger of foxes, and succumb to the attraction of an abundance of food and cover. During the winter months, when cover is at its poorest due to snow, the foxes took a heavy toll of upland game. In spite of this, birds kept working in from the outside, and filling the ranks of the departed. This spring, birds were found to frequent the more-open fields, rather than the heavy, dead-grass and brush areas.

Doves were in evidence everywhere this spring. Food patches along the edges of cultivated fields were very popular. Doves were continually flushed from the corners of soybean fields, where a sizeable area had been left unharvested, particularly if the corner was adjacent to tall woods, or a tall thick hedgerow, osage orange being preferred, and a large wild cherry tree is also very important. In fact, Doves made far more use of the food patches, than did Quail or Pheasants.

D. Fur Bearing Animals, Predators, and other Rodents.

The most important fur-bearer on this refuge is of course, the muskrat. Trapping was carried out by the former owners, on trapping reservations. The tracts which were trapped, and the number of muskrats taken from each tract, is as follows:

Tract Number	No. of Trappers	Muskrats Taken
11	2	1,057
11 a	1	580
11 b, d	3	477
11 c	2	395
11 k	3	1,539
12 and 13	1	118
10	3	409
14	1	85
Total muskrats taken		4,660

There were eleven different men trapping on the refuge this year, and in many cases, the trappers operated on different tracts during the season. For instance, Tracts 14, 11c, and a portion of 11b, were trapped by the same two men.

The trapping reservations on Tract 14, expired during this period, on December 19 to be exact. Reservations on all other tracts except Tract 10, expired with the close of this trapping season. The trapping

reservations on Tract 10 will expire on October 14, 1942, which leaves one full term of trapping thereon.

The adverse trapping conditions mentioned in the previous quarterly report, prevailed throughout most of the trapping season. The storm on March 1st was a serious blow to many trappers, since they often depend on the catch during the last 10 days of the season, to bolster up any losses occasioned during the season. Many trappers were able to gather more traps for the last few days, while others were unable to exert additional effort. One trapper was eager to make up for losses, and trapped over the time limit. He was apprehended, and fined in State Court.

✓
✓
✓
Grey Squirrels, Raccoons, and Opossums are quite plentiful, with no apparent change in behavior.

One adult female Raccoon, heavy with young, was observed for some time, as she was busily engaged in digging out a bumble-bee's nest. The bees, swarming about her, seemed not to bother her greatly. Her actions somewhat resembled ours, when mosquitoes are active.

There is a den of Raccoons in the one old maple tree, at the end of the lane leading to the boathouse. Strange that a Raccoon should come so far from wooded areas and water, to select a den sight. *site*

III. Refuge Development and Maintenance.

A. Physical Development

(a-1) CCC Program

The construction program on this refuge is being carried out by a CCC Camp, and all figures relative to man-days expended on the various projects, were supplied by the Project Superintendent, Camp FWS-1, Delaware.

The exteriors of the manager's residence, the patrolman's residence, the oil house, and the service building were repainted during the last part of April. 130 man-days were expended on this work.

The boathouse is rapidly nearing completion, and now at the end of the period two additional doors have been installed, one on each side leading from the wharf into the boathouse. Railings, ladders, guard piling, cleats and chocks are yet to be installed. The slips require additional deepening. 268 man-days were spent on the boathouse during this period.

During the month of February downspouts and raingutters were installed on the manager's residence on which 1 man-day of CCC labor was expended.

Work was started on the Patrolman's garage during the last week in April, and 3 man-days were expended thereon, excavating space for the footings.

The construction of the main dikes has been confined to dredging in the Whitehall Section across the mouth of Finis Swamp. No steps have been taken to complete the upland sections of dike which have been started, or to complete the Raymond's Pool dike. The Raymond's Pool dike now consists of 105,588 cubic yards of fill, which appears to be an average of about 30" below grade throughout. No final grading has been accomplished, and seeding and sodding therefore, has not been undertaken to date.

During this period the dredge has dug a borrow-pit from Raymond's dike northward to within 1,000' of Shearneck Gut. This is the outside borrow-pit of the dike, and has resulted in 22,363 cubic yards of marsh-muck being placed near the center line of the dike. To date there has been what appears to be an estimated 90% settlement in this material. A total of 344 man-days were expended on the Whitehall dike during this period.

There is one feature of this dike development which is worthy of note at this time. When daylight saving time went into effect in the northern section of the country, our CCC Camp began operating on daylight saving time. This entire community is on standard time. The dredge operator, who is a very aggressive and conscientious lad, arrives for work in the morning at 7:00 A.M. standard time, which is the time when CCC

crews leave camp for work. The crews leave headquarters at 10:40 A.M., which is 11:40 A.M. daylight saving time. The dredge operator leaves his seat for only a few moments for lunch. The boom stops swinging for about five minutes at noon. In the afternoon the CCC crews leave the headquarters site and all other jobs, at 2:45 P.M. standard time, and they are through work for the day. Shortly before 5:00 o'clock standard time, the dredge boom stops swinging, and the operator rolls past in his pick-up. This is the longest shift of skilled labor that has ever been produced on this area, and it is all voluntary. By using the size of the newly constructed borrow-pit as a basis for computation, it can be stated that this operator is moving an approximate average of 500 cubic yards per day, with a 3/4 yard bucket.

Two stone entrance-gate posts are being erected at headquarters site. This work was started late in April, and 31 man-days have been expended thereon.

Work on the truck trails and roads received a great amount of attention during this period. The roadway to the boathouse has received small amounts of fill and periodic leveling by hand. This also applies to the Finis Swamp Causeway, and that section of road leading from Finis Swamp to Dutch Neck Road. Work of this type will continue to re-occur until the final elevation has been reached and surface material applied.

During this period 2,904 man-days were spent on clearing and removing stumps and logs from a two-acre section of Finis Swamp, adjacent to the causeway. Most of this work was required to clean-up stumps and debris

which were lodged in the fill, as a result of the stump pulling operations of last period.

45 man-days were expended in repairing earthen plugs which hold water in the outside borrow-pit.

A total of 248 man-days were expended in fire presuppression work at the Camp and on the Refuge.

A total of 84 man-days were expended on general clean-up, sorting salvaged lumber, etc.

Landscaping work received considerable attention this period with a total of 486 man-days being expended thereon. During this period a total of 18 large trees were dug from the woodland sections of the refuge, balled and burlapped and transplanted on the headquarters area. These trees were: 6 Dogwoods, 8 Oaks, both red and white, and 4 Tulip Poplar.

During this period a total of 193 man-days were used on the parking areas at the headquarters site. Gravel was moved from one location to another and graded.

The Camp has completed a series of fish-rearing ponds for the Delaware Board of Game and Fish Commissioners. A total of 1,187 man-days were used on this work during the past period.

30 man-days were consumed in burning a small area of dense Panicum virgatum in an attempt to improve Snipe habitat.

Late in the month of April, work was resumed on the Experimental Mosquito Control Project on Bombay Hook Island. A total of 49 man-days were expended thereon during this period.

(a-2) NYA Program

Refuge machinery has been operated, repaired, maintained, and painted by NYA enrollees. The Farmall tractor was completely painted and received numerous minor repairs. The refuge double-disk was repaired and painted in certain places, and the Pick-up and Panel trucks were constantly being greased, washed, and repaired in minor ways. 35.5 man-days were expended on this work during the period.

A small patch of ground of about 1-acre in size was ploughed and prepared for seeding. This land will be used for growing small amounts of seed for use in food patch mixtures. 1 NYA man-day was used for this purpose.

Considerable landscaping was accomplished by NYA during this period. About 2,500 square feet of lawn area was filled, graded, and rolled and seeded, all by hand. Grass on this area was started under burlap, and is now growing very nicely.

The following is a list of shrubs and small trees which were moved from the wooded areas and from old building sites on the Dutch Neck road to the headquarters site: 4 large clumps of Lilacs, 4 large clumps of Spirea, 2 large clumps of Forsythia, 2 small Cedars, 4 clumps of Japonica, 12 small Ash seedlings (*F. pennsylvanica*), 7 large clumps of Roses, 26 large clumps of high-bush Huckleberry, 1 large and 1 small Bayberry bush, 3 small Norway Spruce seedlings, 3 fair sized clumps of *Ilex glabra*, and 7 small Magnolia trees. A total of 92 man-days was expended on this work.

During this period a total of 56-8 hour days were used in the office on various types of secretarial work.

The large walnut tree which grew close to the north wall of the manager's residence, was removed by NYA. This tree was situated in a well in the lawn terrace fill. It was necessary to excavate a hole about 7' wide and 8' deep in order to salvage the stump. This was done, and 14 man-days were used for this purpose.

Heat in the administration buildings was produced by burning wood. A total of 22 man-days were used during this period, to prepare wood for this purpose.

Parts of a knocked-down steel tower were used to erect a temporary tower and photography blind adjacent to the eagle's nest. A

total of 28.5 man-days were used in the erection of this tower, and in the construction of a small temporary boardwalk leading from firm ground, across soft mud, to the Island on which the nest is located.

9.5 man-days were used to construct three sand boxes, as part of our fire presuppression program.

A water guage was installed in Finis Swamp, and 7 man-days were used to prepare materials and complete the installation.

Considerable fencing was accomplished this period. A little less than $\frac{1}{4}$ -mile of four strand barbed wire fence was built along Whitehall road at our west boundary. A total of 60 man-days were required to cut the fence posts from the refuge woodlands, prepare them for use, transport them to the site, and erect the fence.

There are five old orchard sites on this refuge, which contain trees of some value. NYA were used to prune these fruit trees in order to prolong their life and equip them for the production of fruit. All brush resulting from this operation was piled for wildlife cover support. A total of 51.5 man-days were used for this purpose.

During this period a total of 148 man-days were expended on General clean-up. This involves moving stored materials, cleaning around buildings, sorting and restacking salvaged materials, and continual clean-up in and around the Service building.

A great amount of time was spent handling the approximate 830[✓] bushels of corn that were harvested on the refuge last fall. The corn was shelled by hand, and placed on the floor of the Service building for drying. As described in my letter of March 5th, bearing file reference "Farming Operations", this method did not produce the desired affect. 800 bushels of shelled corn were distributed throughout all parts of this refuge and fed on waterfowl concentration areas. This activity was our spring feeding program, the results of which are noticable increases in the numbers of spring-flight ducks, which appear to be preparing to stay for nesting. 30 bushels of this corn were used for emergency winter feeding on the Rehoboth Sanctuary. A total of 152.5 man-days were used in the numerous handlings of this corn.

The ditches leading from the water-control structures in the main dike, to low ground were certified completed by the CCC Project Superintendent. The slopes on these ditches were seeded by NYA, with a total of 9.5 man-days.

The duck banding traps on Kent Island were repaired and reconstructed after the ice had melted, and a total of 11 man-days were used for this purpose.

The interior of the work shop in the Service building has been greatly improved. The interior of this work shop was partly sealed and painting was started during the last quarterly period. During this period the sealing was completed and two coats of gray paint were applied

to the walls and ceiling. A work bench, with drawers and cabinets; four closed wall cabinets, with closed upper portions; and 1 large woodbox, with doors, were installed during this period. All are completed but the woodbox which requires a few more hinges. A total of 51 man-days were used on this work.

IV. Public Relations.

Public relations broke all bounds during the period with a total of 236 visitors. This number includes individuals, sightseers, Sunday drivers, and many bird Clubs and representatives of Natural History Societies. Word was spread quickly that there was an excellent opportunity to see large numbers of waterfowl on a new Lake near the Headquarters of this refuge. I feel that this factor was largely responsible for our great number of visitors.

During Wildlife Week I lectured to three service clubs, and participated in two Wildlife broadcasts.

The following Service officials and other important visitors spent time on the refuge during this period.

Mr. Abbatti was here for a few hours on the evening of February 10th.

Mr. Elmon Radway, District Attorney Stweart Lynch and Mr. Yost, of the Department of Justice, arrived in mid-forenoon on February 11th. These men discussed land acquisition problems and departed shortly thereafter. Mr. Radway and Mr. Yost returned on the following day, and I assisted them with work on the Snow and Rawley tracts until the evening of February 14th.

Regional Director Locke and Refuge Supervisor Sutherlin spent a few hours in the late afternoon and evening of February 14th, in my office.

Mr. Schaeffer and Mr. Sadosuk arrived at the office at about 11:00 o'clock on February 19th, and departed at about 2:30 P.M.

On February 20th, Mr. Sutherlin arrived in the forenoon and remained until late on February 21st. During this time Mr. Sutherlin inspected surplus property, buildings, refuge accounts, and discussed management plans in detail. Mr. Richard Griffith was present during the forenoon of February 21st, for a portion of this discussion.

On February 24th, Mr. Sutherlin stopped in late in the afternoon for a conference concerning the reconstruction of the equipment shed, and the construction of curbs, walks, and driveways.

On March 22nd, there was a conference of Game Management Agents at this Refuge. Agents Souder, Stadlemir, Hawley, McNamara, Shuffler and Buckalew arrived at noon, and left at approximately 4:30 P.M.

On March 24th, Mr. Sutherlin and Mr. Schaeffer stopped in for a short time in the afternoon. Mr. Sutherlin returned in the forenoon on March 31st, and discussed in detail, the farming program with its various ramifications, the proposed CCC program, muskrat conditions and equipment.

On April 14th, Mr. Stadlemir arrived in the forenoon, and Mr. Sutherlin arrived about noon. The transplanting of eel grass was discussed in great detail.

On the morning of April 21st, Mr. Stadlemir and Mr. Sutherlin arrived, and the details of eel grass transplanting were discussed. Mr. Stadlemir and I left for Hooper's Island at 10:15 A.M.

Other important visitors during this period were: Mr. Webb, Chief Warden, Delaware Board of Game and Fish Commissioners, and Mr. Ed. Barry, Wildlife Technician from the same office; and Mr. Pyle and Mr. Carson from the State Highway Department.

Submitted by:

WFB
gms.

J. F. Herholdt, Jr.
John F. Herholdt
Jr. Refuge Manager



"The Eagle's Nest"

This is the nest adjacent to which a tower and blind have been constructed. The above picture was taken from the top of the tower before it was completed. There are 3 young in the nest. A series of pictures taken from this blind will be included in the next narrative report. 4/29/41.



"Muskrats damaged by Marsh Hawks"

The muskrats shown above were attacked by Marsh Hawks, while held in a steel trap. The upper muskrat is affected the worst. The head and shoulders are completely gone. A Marsh Hawk was flushed from this kill. Other muskrats were damaged, but not as severely. 3/6/41.



"Lawn Grading"

This picture shows NYA enrollees putting the finishing touches on a small section of lawn, below the seeded terrace which surrounds the Manager's residence. 4/10/41.



"Marsh Burning"

A small plot of dense Panicum virgatum directly south of the headquarters site is being burned. The burning was to improve Snipe habitat. A maximum of four Snipe were flushed from this area before burning. 14 and 15 were flushed from this same area on days following burning. 4/4/41.



"Bird Students"

Yours truly has just pointed out a Red-shouldered Hawk. This group of bird students is checking on my identification. I took this picture while all eyes were focused on the Hawk. 4/11/41.



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