

BOMBAY HOOK - NARRATIVE REPORT - 1968

*NR Form 1  
Pulled for the Locker  
(Patricia) 8/27/69  
CM*

NARRATIVE REPORT

BOMBAY HOOK NATIONAL WILDLIFE REFUGE

JANUARY - DECEMBER 1968

REFUGE STAFF

Robert G. Nelson . . . . .	Refuge Manager
Arthur L. Tibbs (Transferred out 7/9/68) . . . . .	Asst. Refuge Manager
Richard F. Nugent (EOD 12/9/68). . . . .	Asst. Refuge Manager
Norman E. Holgersen . . . . .	Wildlife Biologist
Virginia E. Baughman . . . . .	Clerk-Stenographer
Louis Steller. . . . .	Foreman I
Henry S. Bush. . . . .	Maintenanceman
Kenneth C. Liehr . . . . .	Maintenanceman
John W. Parker . . . . .	Maintenanceman
Stephen A. Nesbitt (EOD 6/3/68 - Term. 9/6/68) . . . . .	Biological Technician (Wildlife)
Howard H. Cottman . . . . .	Maintenanceman (Temp.)
Robert E. Munro (EOD 9/9/68) . . . . .	Laborer (Intermittent)
Richard W. Goerger (EOD 11/2/68 - Term. 12/28/68). . . . .	Laborer (Intermittent)
John G. Connell (EOD 6/3/68 - Term. 9/6/68). . . . .	Student Laborer
Thomas E. Mitchell (EOD 6/3/68 - Term. 6/27/68). . . . .	Student Laborer

UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH & WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES & WILDLIFE  
SMYRNA, DELAWARE

The Prime Hook National Wildlife Refuge  
Administered By  
The Bombay Hook National Wildlife Refuge  
is reported under separate cover

TABLE OF CONTENTS

GENERAL . . . . .	1
WILDLIFE . . . . .	9
REFUGE DEVELOPMENT . . . . .	19
RESOURCE MANAGEMENT . . . . .	27
FIELD INVESTIGATIONS . . . . .	28
PUBLIC RELATIONS . . . . .	29
OTHER ITEMS . . . . .	63

NARRATIVE REPORT  
BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
JANUARY - DECEMBER 1968

I. GENERAL

A. Weather Conditions.

	Precipitation Inches		Snowfall Inches	Temperatures °F	
	1968	Normal		Max.	Min.
January	1.83	2.68	T	52	8
February	.10	3.29	1	49	10
March	4.61	3.42	3	77	19
April	1.49	3.47		73	30
May	4.13	1.98		84	37
June	3.21	3.40		95	52
July	1.45	4.39		98	58
August	1.85	5.44		99	48
September	.99	3.69		92	42
October	2.71	2.65		80	28
November	4.07	3.80		78	22
December	<u>2.18</u>	<u>2.61</u>	<u>2</u>	<u>66</u>	<u>6</u>
Total	28.62	40.82	6	Extremes 99	6

January experienced two severe wind storms on the 4th and 14th with gusts of 50 miles per hour. Damage was confined to a few downed trees, several missing roof shingles and minor erosion of public use roads. Tides were two to three feet above normal high, flooding all the marsh. No salt water intrusion into the fresh water pools was recorded.

The driest February in 25 years was recorded; however, March entered like a lion with strong, gusty winds, cold temperatures and snow. Heavy rains occurred throughout the first two weeks in March.

On April 22, there were high storm tides with little effect on the marsh. Flooding did occur again on May 27 and 28 with a heavy nesting loss recorded. It is the consensus of many that flooding by high tides could be the greatest limiting factor to nesting success at Bombay Hook.

The prevailing weather throughout the summer and fall months was heat, humidity and the lack of rain. Total precipitation for the year was more than 12 inches below normal with eight months showing a deficit.

A severe storm lashed the refuge November 12 and 13 with tides running three to five feet above normal. Winds of 75 miles per hour felled trees, destroyed hunting blinds and stripped a few more roof shingles from the buildings. Marsh debris prevented erosion of the dikes, with no significant salt water intrusion into the fresh water pools.

B. Habitat Conditions.

1. Water.

Finis Pool. The water supply was adequate to maintain Finis at objective levels until late in July. One-third the normal amount of rainfall in July through September resulted in a drop in water level to 1.84 feet below scheduled level in early November. Most of the pool dried up during this period. Late fall precipitation increased the water depth by 1.10 feet but the pool was still .74 feet below scheduled level at year's end.

Finis provided excellent aquatic habitat for migrant and nesting ducks in the spring. Major use was by mallards, pintails and wood ducks. There was ample water and brood cover for wood ducks.

Shearneck Pool was at or near the objective levels from January until July 15. Low summer rainfall resulted in a steady drop in water level to 1.32 feet below scheduled level on November 1. Late fall precipitation increased the water depth by only .42 feet and the pool was still .40 feet below scheduled level at year's end.

Water levels were adequate for resting use by waterfowl in all seasons. Shearneck was again the major resting area for Canada geese in the spring and fall. Resting use by ducks was good especially by pintails and mallards from the middle of February to mid-March and by mallards in December.

Water levels were relatively stable for breeding ducks throughout the nesting season. Production was good compared to previous years. Gadwalls were the principle breeders, followed by mallards and wood ducks. Brood cover was excellent in the western-half and around the inlands but continued to be deficient in the eastern-half.

Raymond Pool was at its scheduled level the first three months and the last six weeks of the year. Low summer rainfall caused the water level to drop steadily to a low of 1.24 feet in mid-October. Wide margins were exposed and dry, and the water depth

was only a few inches in the rest of the pool until 2.50 inches of rain fell the second week of November.

Nesting habitat was excellent for ducks early in the season but brood conditions were poor. A wide rim of mud separated brood cover and water. Several broods were known to have been led to Sheariness Pool and others were probably led to the salt marsh.

Bear Swamp Pool was at or near the objective level from January until the middle of July. The water level then dropped steadily because of low summer rainfall to a low of 1.98 on October 1. Except for a few areas of very shallow water and the borrow pit, the pool was dry from September 15 until November 15. Late fall rains replenished the pool to within .26 feet of the scheduled level.

Bear Swamp received only light use by ducks, chiefly pintails, mallards and green-winged teal, during the spring migration. Summer use was low. Cover and water conditions appeared suitable but there were few breeding ducks and fewer broods. Fall duck use was curtailed until November by lack of water and this use was terminated by the early freeze-up the first week of December. Spring use by Canada geese was light. Heavier use, mostly resting but some feeding, occurred in November and December.

Bear Swamp Paddy Field. There were no early fall rains or water in Bear Swamp Pool with which to flood the twelve acres of millet. The crop was 100% eaten by Canada geese before the field was partially flooded by November rains.

Salt Marsh. A high storm tide in late May was detrimental to the first nesting of ducks, willets and clapper rails. The low summer rainfall caused some ponds to dry up and the water levels to recede in others.

2. Food and Cover. The dry summer reduced corn yields in Delaware, drastically in some sections, but the average yield on Refuge fields was still good - 100 bushels per acre. The amount of waste corn in harvested fields on and off the Refuge was much less than last year because of the reduced crop and the lack of any stalk breakage from wind or other causes. In addition, an increased number of fields were harvested by picker-shelliers which are more efficient than the standard corn pickers. On the Refuge, 307.5 acres were harvested by picker-shelliers with an average waste of one bushel per acre. Standard pickers were used on 219.9 acres with an average waste of 1.9 bushels per acre.

TABLE 1

## PERCENT CROP UTILIZATION      JANUARY - APRIL, 1968

Crop	Acres	Jan.					Feb.	Mar.		Apr.		
		1-7	8-14	15-21	22-28	29-4	12-18	26-4	12-18	26-1	9-15	23-20
Browse (wheat)	285	75	85	100	-	-	-	50*	75	75	75	-
Corn Stubble (Cereal)	556.4	-	-	-	-	-	-	-	-	-	-	-
Corn Standing (Cereal)	14	35	50	60	75	75	75**	100	-	-	-	-
Millet (Cereal)	12	-	-	-	-	-	-	-	-	-	-	-
Buckwheat (Cereal)	9.5	-	-	-	-	-	-	-	-	-	-	-
Browse (Permanent grass)	243.6											

\* Regrowth started

\*\* Standing corn cut down

TABLE 2

## PERCENT CROP UTILIZATION    OCTOBER -- DECEMBER, 1968

Crop	Acres	Oct.				Nov.				Dec.				
		1-7	8-14	15-21	22-28	29-4	5-11	12-18	19-25	26-2	3-9	10-16	17-23	24-31
Corn Stubble (Cereal)	527.4	10	25	40	60	85	100	-	-	-	-	-	-	-
Corn Standing (Cereal)	59	-	-	-	-	-	x	x	x	30	40	50	65	75
Browse (Wheat)	254	5	15	15	25	40	60	70	75	75	85	90	93	97
Buckwheat (Cereal)	9.5	5	10	10	10	30	75	75	75	75	85	x	x	x
Millet (Cereal)	12	-	30	50	90	100	-	-	-	-	-	-	-	-
Browse (Permanent grass)	215	x	x	x	x	x	x	x	x	x	x	x	x	x

X Indicates use

The total food available for waterfowl this fall was:

<u>Crop</u>	<u>Acres</u>	<u>Bushels</u>
Corn (Cereal), Stubble	527.4	731
Corn (Cereal), Unharvested	59	5,900
Browse (Wheat)	254	--
Browse (Permanent grass)	215	--
Millet (Cereal)	12	180
Buckwheat (Cereal)	9.5	160

The scarcity of waste corn and an earlier corn harvest than in 1967 were reflected in the fall crop utilization figures (Table 2) which principally represent Canada goose use. Utilization of waste corn was 100% by early November, two weeks earlier than in 1967. Browse wheat was 50% consumed by early November, a month earlier than in 1967, and it was almost 100% eaten by December 31, two weeks earlier than the previous year.

Fifty-nine acres of corn were left standing in blocks of one to twelve acres. One block screened the cannon net site and the others screened one goose blind from another in the West Waterfowl Hunting Area. A northeaster with 50 miles per hour winds on November 11 and 12 blew down an estimated 50% of this corn. The breakage opened up the blocks and put much additional corn within reach of waterfowl. Canada geese began feeding heavily in this unharvested corn immediately after the storm and all the corn within their reach, 75% of the total available, was consumed by December 31. The heavy feeding on unharvested corn began the same week that the utilization of waste corn in stubble fields reached 100%.

Nine acres of alfalfa planted in three blocks (of three acres) in late August failed to become established because of the drought. These trial plantings were made to assess the value of alfalfa in attracting deer out of the headquarters area and reducing depredations on neighboring farms.

Acorn production by all oak species was poor and the nut crop on hickories was only fair. There was a heavy fruit crop on persimmon trees.

#### Natural Foods.

Finis Pool. The growth of smartweed was excellent again this year. The unscheduled drying of the pool in late summer resulted in reduced production of duckweed but good growth on sedges and wild millet on the exposed bottom. Despite the low water there was no noticeable spread of shrubs or cattails. Cover was abundant but water insufficient to

provide habitat for moulting ducks.

Most of the duck foods were unavailable until late fall because of the lack of water, and early freezing of the pool the first week in December further curtailed utilization.

The drying out of most of the pool concentrated fish and amphibians in a few areas of shallow water. This created ideal feeding conditions for great blue, little blue and green herons and for common and snowy egrets.

Sheariness Pool. There was a good growth of wild millet, bur marigold and sedges on the islands and pool margins exposed by the receding water level in the summer. An excellent but limited stand of wild rice grew in the coves in the southwestern section. The only submerged aquatic present in quantity was coontail. There were large beds of it in shallow, open water in the western-half and near the shore in the northeastern corner. A few small patches of sago pondweed were seen. Duckweed growth was about 50% of that in 1967 and was concentrated in the western-half, the southern coves and around the islands. There was increased growth of floating mats of primrose-willow along the eastern and southern margins. There was no significant spread of phragmites.

There was insufficient water in the pool to provide maximum utilization of the available waterfowl foods in the late summer and during the fall migration.

Raymond Pool. The growth of aquatic vegetation was excellent again this year. Dwarf spikerush grew extensively over most of the pool bottom and there were thick beds of common threesquare on three sides of the pool. The growth of softstem bulrush was more extensive than in 1967 especially in the north-end. There was also a better growth of wild millet, mostly in the western coves.

The spikerush was heavily utilized by green-winged teal and mallards from late August to mid-November. They fed on this plant both in shallow water and on exposed flats that were still moist. Canada geese and baldpates grazed on the spikerush on both moist and dry sites. Pintail populations were low this fall and their utilization of spikerush was one-third that of 1967. An estimated 10% of the spikerush was lost due to the drying of pool margins.

The water rose in time during November to provide suitable feeding conditions in the threesquare and bulrush beds for snow geese. Canada goose use was mainly for resting with some feeding on wild millet, threesquare and bulrush.

The shallow water and extensive exposed flats provided ideal feeding areas for shorebirds and their use of the pool was spectacular in the summer and fall. Feeding conditions were also excellent for glossy ibises, snowy egrets and black-crowned night herons.

Bear Swamp Pool. There was an extensive growth of wild millet and sedges but utilization of these and other waterfowl foods was limited by lack of water and early freeze-up. There was no significant spread of phragmites.

Receding water levels and concentrated aquatic life created ideal feeding conditions for shorebirds and long-legged wading birds. Greater yellowlegs again fed on a large concentrated population of killifish.

Salt Marsh. Food and feeding conditions were adequate for waterfowl and other water birds.

## II. WILDLIFE

A. Migratory Birds.1. Waterfowl.

Canada Geese. The most critical period for geese was the first half of January. The temperature remained low, browse crops were covered by crusted snow and the marshes were thickly frozen. The only readily available food was provided by small acreages of standing corn on adjacent private lands. The Refuge goose population decreased by 7,000 early in this period and remained relatively stable at 18,000 until the weather moderated. Despite the severe conditions there was no significant mortality.

Canada goose use days decreased again this year in comparison with the preceding year but were still almost double the objective use goal. There were 3.8 million use days in 1968 and 4.4 million in 1967. The decrease reflected the lower population in the winter and spring that was not offset by the slightly higher fall population.

The earliest fall migrants fed equally on wheat browse and on waste corn in the few fields that had been harvested. As the corn harvest progressed the geese concentrated in the stubble fields. When the supply of waste grain diminished, feeding on wheat increased and the geese began moving into the standing corn. The earlier, high percentage utilization of corn and wheat resulted in a pronounced increase of grassland feeding. Use was heavy in both the mowed goose pastures and in unmowed grass fields maintained as habitat for upland wildlife.

Snow Geese. A small number of snow geese remained through the winter, usually feeding with Canada geese in upland fields. By late March, 1,500 had arrived in the tidal marsh where hundreds fed through mid-April on Kent Island.

The major arrival of fall migrants was two weeks later than in 1967. By the middle of November, 1,500 were feeding on common threesquare and softstem bulrush in Raymond Pool. November snow goose use in Raymond was equal to that in 1967 but early freezing forced them from the pool before the threesquare was depleted. The geese continued to feed on the salt marsh for a week after that but continued cold weather moved them southward.

Based on sample counts, the adult/immature ratio was 2.5:1, the average number of immatures per family group was 2.7 and

TABLE 3

## CANADA GEESE

## STATUS OF MANAGEMENT OBJECTIVES AND ACTUAL USE

## GOOSE USE DAYS

\*

	Objective Goals	Actual 1968 Use	Ratio Goal to Use
Spring	300,000	723,196	1 to 2.4
Summer	10,000	9,123	1 to .9
Fall	1,490,000	2,113,800	1 to 1.4
Winter	200,000	978,155	1 to 4.9
TOTAL	2,000,000	3,824,274	1 to 1.9

## GOOSE PEAK POPULATION

	Objective Peaks	Actual 1968 Peak	Ratio Goal to Actual
Spring	-	20,000	-
Summer	-	110	-
Fall	20,000	30,000	1 to 1.5
Winter	Minimum	22,300	-

Goose production (not a primary objective) - ten

90% of the family groups contained two adult birds.

Blue Geese. A few blue geese over-wintered with the small snow goose flock. Migrants arrived with the snow geese in the fall and the peak of 45 was similar to highs the past several years. However, no immature blue geese were observed. There was an increase in the number of "white-bellied" blue geese with seven in a flock of 38 in late November.

Whistling Swan. Whistling swan use here is mainly during November and is usually limited to individuals or small flocks that stop briefly to rest in the impoundments. However, this year there was an excellent stopover of 104 swans, 92 adults and 12 immatures on November 22. These birds arrived in small flocks between 7:00 and 9:00 A.M., rested and fed in Raymond Pool most of the day and were gone by the following morning. There were three family groups with one immature each, and three family groups with two, three and four immatures, respectively.

Ducks. Total duck use declined about 10% compared with 1967 use, from 2.6 to 2.4 million use days. Spring and summer use remained about the same but the fall flight was poor. The spring peak was 18,000 in late February and early March, while the fall high was 12,000 in mid-November. Pintail numbers were excellent the first week in March with 4,000 on the Refuge and 10,000 on the Delaware Little Creek Wildlife Area just to the south.

The mallard, black duck and pintail populations were all low in the fall and no major flight of blue-winged teal was observed. The fall green-winged teal population was good and reached its peak of 3,500 during the northeast storm of November 11-12. While diving ducks are not common here any year, fewer were seen this fall than usual. The numbers of ruddy ducks, ring-necked ducks, hooded mergansers and common mergansers were all lower, probably because of low water levels in Shearness and Bear Swamp Pools.

Feeding by ducks was principally in aquatic habitats and on "off-refuge" croplands as Canada geese continued to utilize the bulk of the Refuge grain crops. The exceptions were: Up to 500 mallards and black ducks feeding on waste corn in Fields 4 and 13 in early October; 1,000 mallards and pintails feeding on waste corn in Field 13 in early November; and thousands of mallards and hundreds of black ducks feeding on unharvested corn in the Raymond Neck and Dutch Neck Farm units in mid-December. In all these situations except the last, the feeding site was adjacent to a fresh water impoundment for the tidal marsh.

TABLE 4

## DUCKS

## STATUS OF MANAGEMENT OBJECTIVES AND ACTUAL USE

## DUCK USE DAYS

	Objective Goals	Actual 1968 Use	Ratio Goal to Use
Spring	1,500,000	440,723	1 to .29
Summer	400,000	293,320	1 to .73
Fall	4,500,000	870,745	1 to .19
Winter	1,000,000	755,678	1 to .76
TOTAL	7,400,000	2,360,466	1 to .32

## DUCK PEAK POPULATIONS

	Objective Peaks	Actual 1968 Peak	Ratio Goal to Actual
Spring	37,000	17,136	1 to .46
Summer	-	3,245	-
Fall	65,000	12,225	1 to .19
Winter	-	17,804	-

## DUCK PRODUCTION

	Objective	Actual 1968 Production	Ratio Goal to Actual
Ducks	3,000	390	1 to .13

TABLE 5

## WATERFOWL DAYS OF USE PER ACRE OF WATERFOWL USE HABITAT

1.	$\frac{2,360,466}{\text{Duck Use Days, 1968}}$	÷	2.	$\frac{15,500}{\text{Acres of Duck Use Habitat}}$	=	3.	$\frac{152}{\text{Duck Use Per Acre of Waterfowl Habitat}}$
1.	$\frac{3,824,274}{\text{Goose Use Days, 1968}}$	÷	2.	$\frac{15,500}{\text{Acres of Goose Use Habitat}}$	=	3.	$\frac{247}{\text{Goose Use Per Acre Of Waterfowl Habitat}}$

Duck production per wetland acre 1968 - .027

Wintering and migrant duck use in the tidal marsh continued to be heaviest in the northern one-third where food plants such as threesquare and tidemarsch water hemp occur most commonly. During the severe cold and ice conditions in January, 4,000 black ducks and 1,000 mallards were concentrated in the remaining open water of Sluice Ditch.

It was generally only a fair duck production season on the salt marsh with many nests lost after the high tides and winds in late May. Production, especially of gadwalls, was better in the upland pools. Recently hatched gadwall and blue-winged teal broods were seen as late as the first week in August.

A partially albino shoveler was present from November 15 to December 31. It frequented a small pool north of Bear Swamp with up to 25 other shovelers. The plumage of this duck was uniformly light tan except for white wings and tail.

Coot. During the fall, coot concentrated in Shearness Pool where they fed primarily on coontail. The maximum number was 175 in late October.

2. Shorebirds and Other Waterbirds. The dry summer and fall and the steadily receding water levels in the Refuge impoundments resulted in excellent conditions for shorebirds and long-legged wading birds. Numbers of several species were all time Refuge highs. Completely dried out impoundments in surrounding areas, e.g., the Little Creek Wildlife Area, undoubtedly contributed to the number and variety here. Raymond Pool was especially conducive to shorebirds.

The avocet once again increased in numbers and stayed until December 5, eight days later than last year. The peak was 133 in mid-October compared to the previous Refuge high of 76 in 1967.

The twenty-two black-necked stilts observed on August 20 is the highest number counted on Bombay Hook since the species was first observed here in 1964.

The Wilson's phalarope which is usually seen only one to three at a time along the middle Atlantic Coast in fall reached a peak of twenty in Raymond Pool in late September.

A curlew sandpiper in full breeding plumage was observed in Raymond Pool on May 17 by Mr. and Mrs. George Wertz. It remained in the same cove of the pool through May 20 and was seen by numerous birders. This is the first Delaware record and the first Refuge record for this species which breeds principally in mainland Siberia. On July 28 to 30

a curlew sandpiper, still with much of its rusty breeding plumage, was present in Bear Swamp Pool.

The ruff, an European shorebird, was observed twice in the spring. The male seen on April 21 was directing displays toward pectoral sandpipers.

Other shorebirds of rare or accidental occurrence were observed in the late summer and fall. These included the buff-breasted sandpiper, the Baird's sandpiper, the golden plover and the northern phalarope.

An estimated 500 white egrets and herons were present by early August with many of them using the wooded island in Raymond Pool as a daytime roost. The snowy egret was the most abundant species followed by the immature little blue heron. The peak of glossy ibises was 110, more than double the 1967 high. By early September, Finis Pool was a major feeding ground and there were impressive evening departure flights of immature little blue, great blue and green herons, and common egrets. Later in the season Bear Swamp Pool became an important feeding area.

An immature white ibis was observed in Finis Pool on September 1 and was seen there and in Bear Swamp Pool at intervals until October 17. The first Delaware record for this species was an immature observed at the Little Creek Wildlife Area in 1962. Only a few have been observed subsequently and this is the first Refuge record.

3. Doves. Mourning doves had a normal nesting season. Fall flocks were small and the largest concentration was 150 in corn stubble on the Fischer Farm Unit in mid-October. During the early winter up to 100 roosted in the trees of a small island in the tidal marsh near the north end of Raymond Pool.

#### B. Upland Game Birds.

Bobwhite. Weather conditions during the nesting season were fair but heavy rains in May probably adversely affected some nests and broods. A nest with fifteen eggs was located on the grass border of a roadside on June 26.

Ring-necked Pheasant. The small refuge population had a successful breeding season. Pheasants were most abundant in the Whitehall Neck Farm Unit, especially in the unharvested wheat in Field 12 during the summer.

#### C. Big Game.

White-tailed Deer. The Refuge herd was in excellent physical

condition and reproduction was good. Fewer fawns were observed in the deer hunting area this summer than in the summer of 1967 which was followed by the first shotgun season in many years. However, the deer bag from the 1968 season indicated they were present in comparable numbers. Deer made good use of the unharvested corn in all farm units.

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

Muskrats. The bulk of the muskrat population occupies Hawkey Branch, Money Marsh, Leatherberry Flats, the northern half of Bombay Hook Island and the marsh west of Raymond Pool. The December house count in these tide marsh areas was 945 compared with 770 in 1967, a desirable increase.

Muskrat numbers were lower than normal in Sheariness and Bear Swamp Pools, probably as a result of the low water levels.

Raccoon. The estimated population was 150. The numbers on the tide marsh were low all year.

Otter, Weasel and Mink. Otter were observed in Finis, Sheariness, Bear Swamp and the tide marsh. There were three very active crossings on the Bear Swamp dike and one on the Parsons Point road. The Bear Swamp canal was used for travel between Sheariness and Bear Swamp.

The longtail weasel was observed only twice, and the mink was not observed.

Other Mammals. Swarthmore College student Richard Paul, during a study of the rice rat, recovered the skull of a least shrew (Cryptotis parva) from a barn owl pellet. While this shrew was a suspected inhabitant, this was the first refuge record.

On April 3 and 4, a harbor seal (Phoca vitulina), in apparent good health, was observed in the Sluice Ditch area of the tidal marsh and was photographed by Anthony Florio of the Delaware Game and Fish Commission. This was another first record for the refuge.

E. Hawks, Eagles, Owls and Crows. The commonly observed hawks were the red-tailed, sparrow, marsh and rough-legged. A few red-shouldered hawks were seen but there were only single sightings of the peregrine and Cooper's hawk. The owls recorded were the great horned, barred, barn and short-eared.

During the summers, only occasional marsh hawks are seen but a nest with four eggs was located in the tidal marsh this year. This species was once a more abundant breeder here as in 1938 twelve nests were found.

The osprey continued to fare poorly. There was only one active nest in Sheariness Pool and it did not produce any young. A nest was built on the Fischer Farm Unit too late for use this year and was blown down in the November storm.

Eagles. A pair of adult bald eagles occupied a nest high in a living red oak on the edge of Sheariness Pool, a nest built in the winter of 1966-67. Observations of activities and behavioral changes indicated that incubation started on February 19. From February 19 through April 4 the nest was never observed to be without an adult settled in the cavity except briefly when one eagle relieved the other. Food was observed carried to the nest only once, on March 24, 35 days after the suspected start of incubation. The length of the incubation period of the bald eagle is 35 days. Whether eggs hatched or not is unknown, but if they did the nestlings died at an early age as the eagles ceased close attendance at the nest on April 5. On April 26 the nest tree was climbed and fragments of egg shells were recovered but there were no other clues.

Crows. The common crow was present all year but the fish crows departed in the winter. In late fall and into the winter, milling flocks of 500 common crows were seen over the marsh and the uplands in the late afternoons.

- F. Other Birds. Fifteen bluebird boxes were constructed and erected in the early spring. While only a few bluebirds were seen this year, and none nested, the boxes received 100 per cent use. Eight were occupied by tree swallows, five by house wrens and two by house sparrows.

A singing male cerulean warbler observed on May 5 was the first Refuge record for this species which is rare here on the coastal plain. Another rare species on the coastal plain, the olive-sided flycatcher, was observed on May 25.

During the fall the red-headed woodpecker, an infrequent visitor, was observed twice. An adult was present in the dead trees in Finis Pool on October 31 and November 1 and an immature was feeding on waste corn grain on November 3.

This was a flight year for evening grosbeaks. A flock of twenty at headquarters on October 28 was an early forerunner of the large flocks found throughout Delaware by the end of the year.

The annual Christmas count which encompasses the Refuge was held on December 22 and tallied 133 species, the high for the five Delaware counts this year.

- G. Fish. There was a major run of mud minnows and brown bullheads into upper Shearness in late May and early June when water was discharging into this pool from Finis.

In August, Jerry Springer and a crew of two from Fishery Services sampled the impoundments to determine the species of fish present. A number of carp, all less than ten inches in length, were netted in Shearness Pool but none were collected in the other pools. The only other fish collected, other than minnow and sunfish species, were brown bullheads in Shearness and white perch in Shearness and Bear Swamp. The bullheads were the chief prey of the small population of double-crested cormorants that frequented Shearness in September and October.

- H. Reptiles. On August 31 a dead Atlantic Ridley (Lepidochelys kempfi) was found floating in the tide marsh near Marshall Island. This sea turtle is most common in the Gulf of Mexico but individuals, mostly juveniles, have been carried north to Massachusetts and to England and Ireland by the Gulf Stream. The Refuge specimen, a first record, had a carapace length of twelve inches and was judged to be immature. Sexually mature Ridelys are about twice that size.

The most commonly seen turtles were the painted turtle, basking in the impoundments during all the warm months, and the diamond-back terrapin, egg-laying on the dikes in June and July. Only a few red-bellied turtles were observed. They are apparently not as common here as in some of the ponds in Sussex County. Other species noted were the stinkpot and the mud, snapping and box turtles.

The snake species observed most frequently were the common water snake, black racer and black rat snake. A few ribbon snakes were encountered.

- I. Disease. There were no serious disease problems.

### III. REFUGE DEVELOPMENT AND MAINTENANCE

#### A. Physical Development.

Bid Invitation SFW5-425, submitted by Warren Brothers Company, was approved June 3. The \$13,000 contract covered the repair of Shearness dike by furnishing and placing 825 tons of stone rip-rap, hauling and grading to slope 4,475 cubic yards of soil fill and furnishing and placing 80 cubic yards of gravel.

This contract checked more than 90% of our erosion problem on Shearness dike. Approximately 495 tons of stone rip-rap was later purchased to complete the second segment of the improvement project. All stone rip-rap must be hauled from northern Delaware, Pennsylvania or Maryland resulting in an average bid price of \$7.00 per ton.

The above contract was the only formal bid issued during the year. However, nearly all work on Bombay Hook is programmed by open market procurement remaining within the limitations as set forth in the Davis-Bacon Act. This method of operating the refuge is excellent as we do not carry an inventory of construction or heavy duty equipment.

However, a serious fallacy to the open market procurement is the \$2,000 limitation which is as antiquated as the horse and buggy. The present purchasing power without exceeding the limitations is now much less than half the amount when the Davis-Bacon Act was passed. To continue to utilize the open market procurement for refuge maintenance the limitation must be increased to \$5,000.

#### B. Maintenance.

1. Dikes and Roads. Four hundred fifty cubic yards of gravel were spread and graded on the Bear Swamp dike road. Seeding of newly sloped fill on Raymond and Shearness dikes was accomplished in February and September, respectively. Routine maintenance was performed on all roadways by grading and spot gravelling as required. All refuge road surfaces are maintained with at least a one foot crown to facilitate drainage.
2. Parking Lots. The parking lot adjacent the public restrooms area was doubled in size to 45 by 130 feet to provide adequate space for tour groups, hunters and staff use. A 30-foot extension was made to the Bear Swamp Nature Trail parking lot to accommodate the increased use by visitors. The remaining three parking lots were graded and treated by chemicals for weed control as required.
3. Headquarters Service Area. Poor drainage and mud resulted in a complete renovation of the headquarters service yard.

Existing gravel was stripped and cuts to one foot were made to remove excess soil. The area was graded to provide adequate drainage, stripped gravel replaced and the entire yard covered with a three inch layer of stone chips. The first heavy rainfall proved our efforts to be approximately 90 per cent successful with minor corrections required.

4. Buildings.

The exterior of Quarters 1 garage, oil house, fur shed, tool shed and public restrooms were given a fresh coat of white paint with green trim.

Routine maintenance was carried out on all buildings with plumbing problems corrected in Quarters 1 and 11 and new window blinds installed in Quarters 1.

A new security light was installed at headquarters. The light was furnished by the local power company and installed by the refuge. It is a big improvement over the single bulb over the office door.

5. Equipment Maintenance. Preventative maintenance and routine mileage safety checks were performed on all vehicles with repairs made to correct deficiencies.

The Liston Mower, three bottom plow, utility trailer, several truck beds and miscellaneous equipment were repainted to check rust problems.

6. Fencing and Posting.

Boundary sign replacement was extensive due to the heavy ice movement in the creeks and bay shore. Many signs were wrapped around the steel posts in a mass only four inches across. Other signs and posts vanished and we assume they are now on the bottom of Delaware Bay.

Routing equipment, previously transferred to the Iroquois Job Corps Center, was returned. The Refuge continued routing redwood signs for control of visitor traffic and general information. No major sign construction was undertaken during this report period; however, restaining and general repairs were made on existing signs as needed.

A new wooden fence was constructed at the Dutch Neck entrance. The attractive fence flanks the roadway for approximately 90 feet on either side of the entrance.

7. Blind Construction and Maintenance.

A total of 62 blinds were used in the refuge hunting programs. Thirty-four permanent blinds were repaired and dressed on the South Public Hunting Area, with several new blinds required after the November storm. Sixteen temporary blinds were repaired, placed and dressed on the West Public Hunting Area. The newly created Young Waterfowlers Training Area required the construction of twelve new temporary blinds. Dressing and placement of the latter was accomplished by the youths and instructors in the training program.

8. Nature Trail.

Eighteen etched aluminum interpretative signs were placed along the 1,300-foot nature trail. The signs were designed by the refuge and manufactured by Federal Prisons at a cost of \$8.40 per sign. They were placed under 1/8 inch plastic to prevent damage by sharp objects. They were well received by the public with many compliments furnished this office.

C. Plantings.

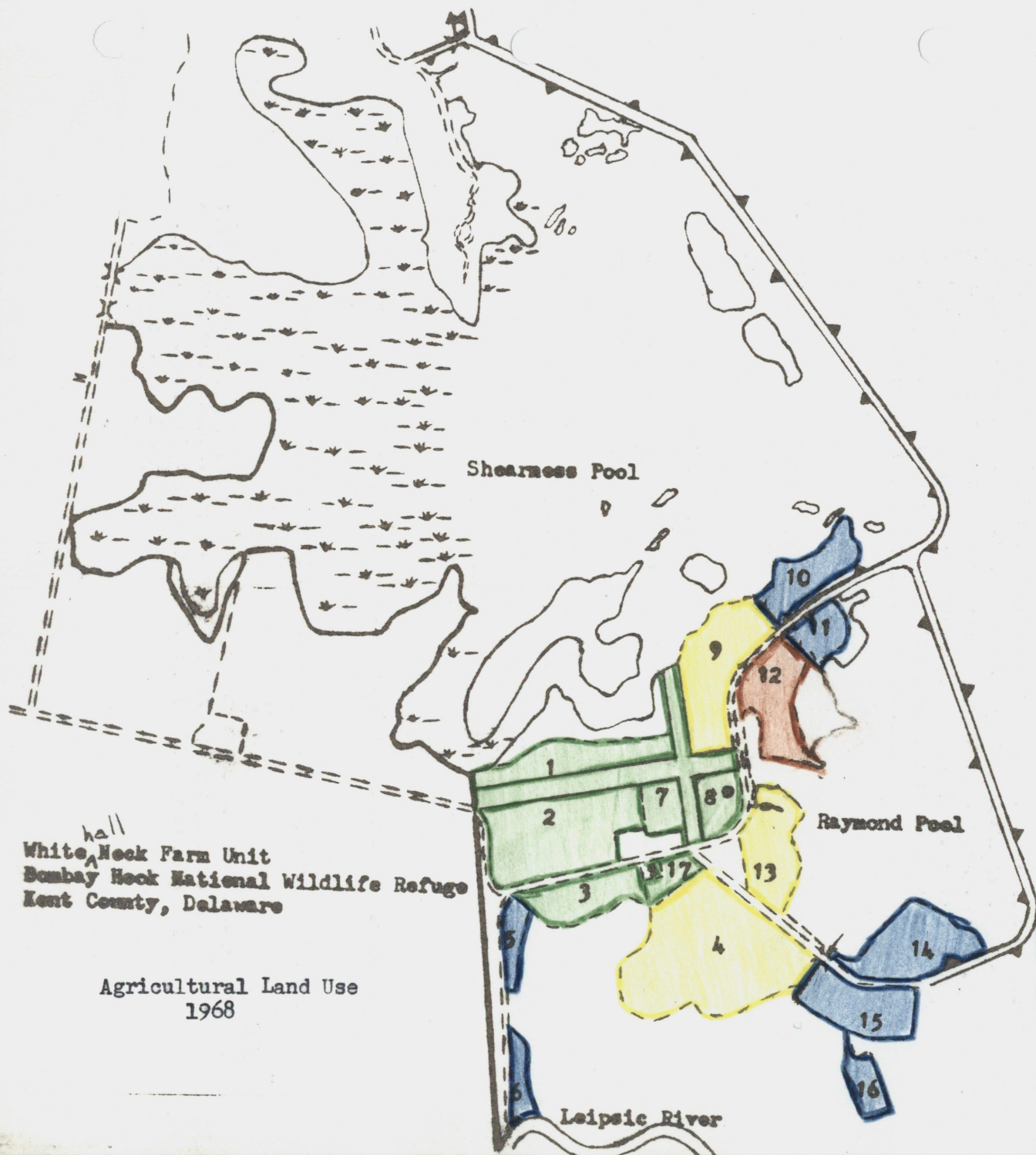
1. Aquatics and Marsh Plants. None
2. Trees and Shrubs. None
3. Upland Herbaceous Plants. None
4. Cultivated Crops. Four cooperative farmers planted the following acreages of crops:

Corn (cereal)	586.4 acres
Millet (cereal)	12.0 acres
Buckwheat (cereal)	9.0 acres
Browse (wheat)	254.0 acres
Browse (alfalfa)	<u>9.0 acres</u>
Total	870.4 acres

A cooperative farmer periodically mowed 215 acres of previously planted grass/clover goose pasture.

The locations of the crops are shown on the following farm unit maps.

- D. Collections and Receipts. The primary feathers from five banded Canada geese shot in the West Public Hunting Area were sent to Dr. Harold Hanson of the Illinois Natural History Survey for his study of feather minerals.



White Neck Farm Unit  
 Bombay Hook National Wildlife Refuge  
 Kent County, Delaware

Agricultural Land Use  
 1968

**LEGEND**

- Boundary line
- - - Field boundary
- ~ Stream flowing
- ⇄ Canal
- ⊙ Pond
- ▲ Existing dike and road
- ≡≡≡ Road, graveled
- - - Road, dirt
- ⌋ Bridge
- Building
- ↘ Marsh

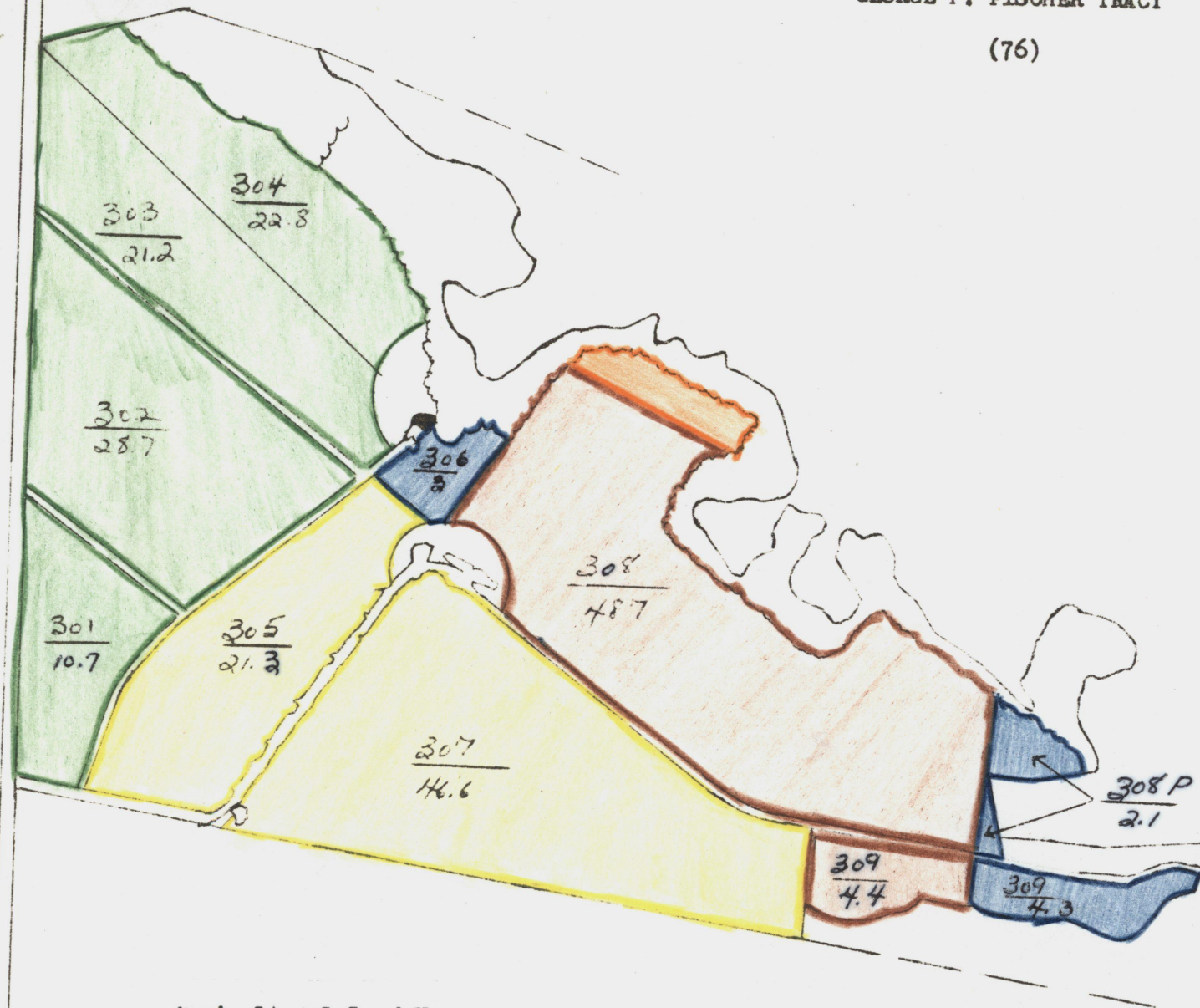
**AGRICULTURE**

#Field	#Acres
1	10.7
2	19
3	9
4	34
5	3
6	2
7	3
8	5
9	16
10	7
11	4
12	8
13	11
14	8.5
15	8.5
16	4
<hr/>	
	152.7

- Corn (cereal)
- Browse (wheat)
- Browse (grass/clover) - Mown six times.
- Semi-permanent grass-unmowed

GEORGE P. FISCHER TRACT

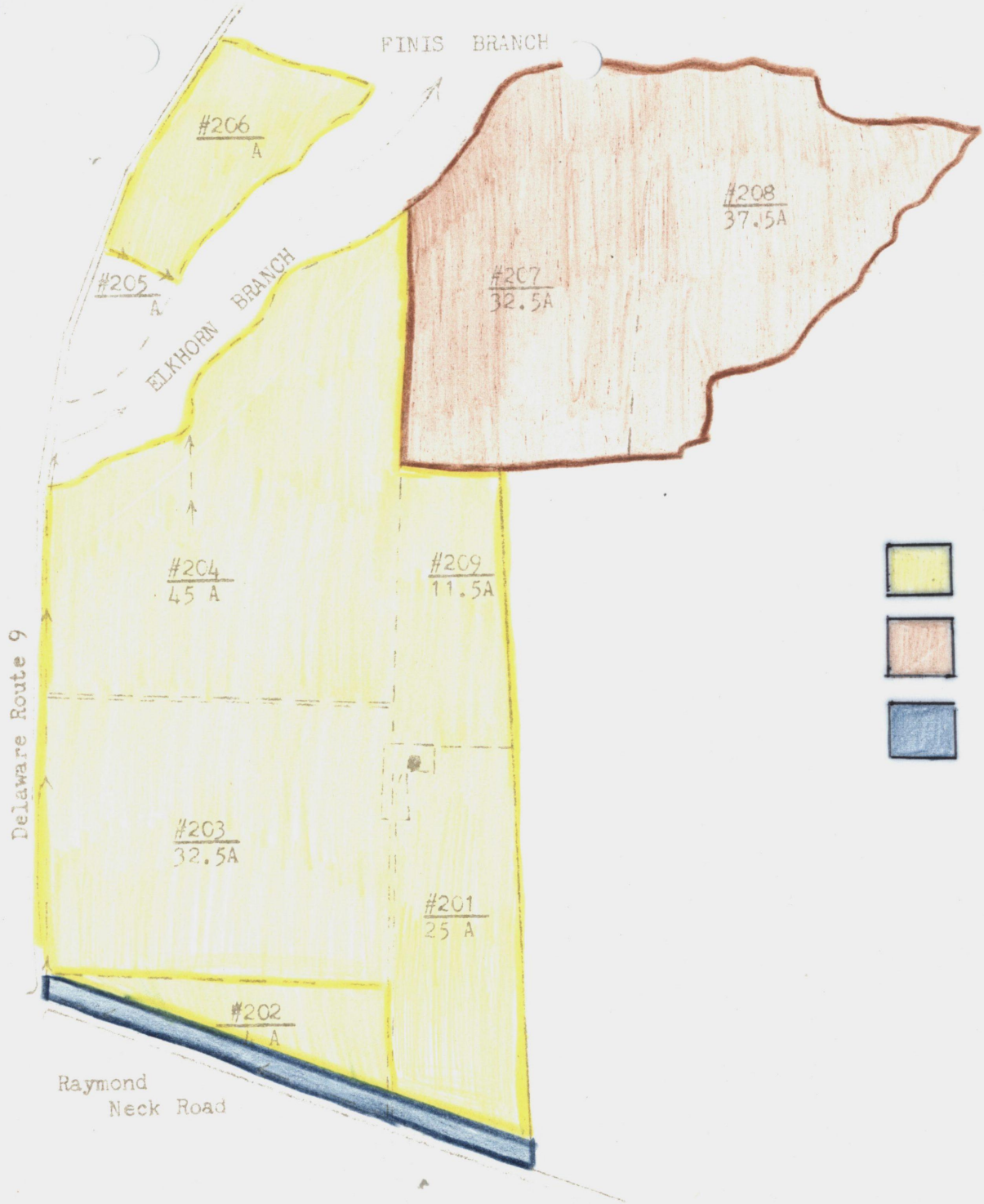
(76)






-  Corn (cereal)
-  Browse (wheat)
-  Browse (alfalfa)
-  Browse (grass/clover  
Mown twice.
-  Semi-permanent  
Grass-unmown

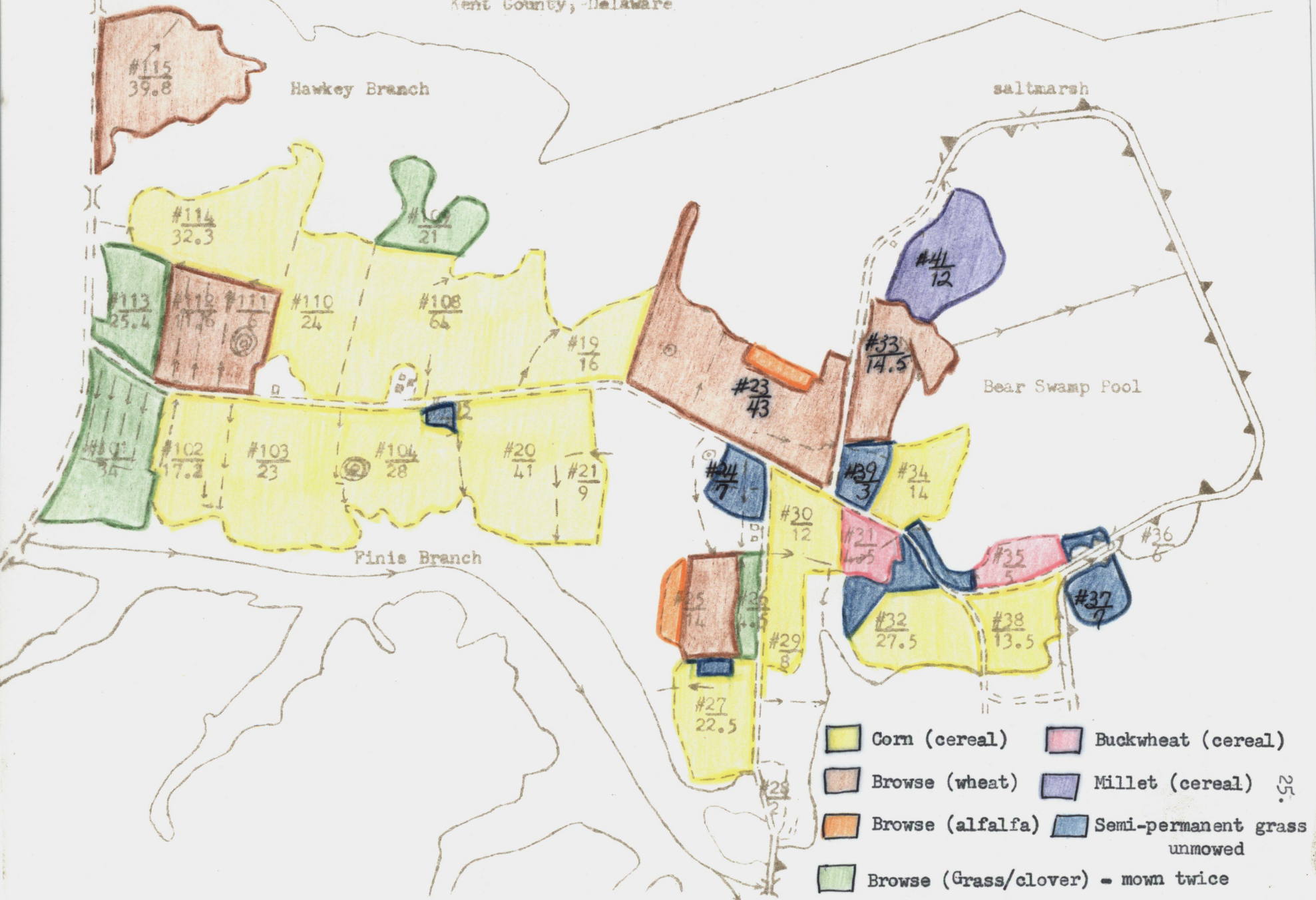
Agricultural Land Use  
1968

Agricultural Land Use  
1968



-  Corn (cereal)
-  Browse (wheat)
-  Semi-permanent grass - mown twice.

Du... Neek Farm Unit  
 Bombay Hook National Wildlife Refuge  
 Kent County, Delaware



- E. Control of Vegetation. Small scale applications of 2,4-D were made to control Canada thistle in agricultural fields and broad-leaved weeds and shrubs in agricultural drainage ditches. Undesired vegetation on dike slopes and roadsides was controlled by mowing. Encroaching brush in semi-permanent grass fields was also controlled by mowing. Cooperative farmers controlled weeds in corn cropland with 2,4-D and atrazine.
- F. Planned Burning. None
- G. Fires. None

## IV. RESOURCE MANAGEMENT

- A. Grazing. None
- B. Haying. None
- C. Fur Harvest: Three permittee fur trappers harvested 3,333 muskrats. The merchantable take was 3,232 as 101 pelts were damaged, primarily by other rodents. Muskrat prices were only fair with the trappers receiving \$1.00 per muskrat as the season closed.

The Government's share of the merchantable catch was 808 muskrats. These were sold to Michael Walsh of Smyrna, Delaware, the successful pre-season bidder, for \$.92 per muskrat in-the-round. Total revenue was \$743.36.

The muskrat trappers also trapped 21 raccoons and, incidental to this trapping, four red foxes, two grey foxes and three opossums.

- D. Timber Removal. None
- E. Commercial Fishing. There is a small amount of fishing for white perch, rock fish and crabs in the tidal waters within the Refuge boundaries.
- F. Other Uses. None

## V. FIELD INVESTIGATION AND APPLIED RESEARCH

### A. Wildlife Management Studies.

#### BH-5, Evaluation of Various Mosquito Abatement Practices.

This study is to determine the effects of several different types of environmental controls, primarily those concerned with water management in tidal areas, on mosquito production, vegetative succession and wildlife use. Mosquito production was measured, the vegetative transect lines were run and water level measurements were taken. There was little observed waterfowl use of the blasted potholes at any season. These potholes appeared to be too deep and too steep sided to provide much feeding opportunity for shorebirds or long-legged wading birds.

#### BH-6, The Effect of Raccoon Control on Duck Production in the Salt Marsh.

Duck production on Bombay Hook has declined drastically since the late 1940's. The present production level, the five year average of 1963 to 1967, is 432. The past production level, the eight year average from 1938 to 1948, was 3,680. The major wetland habitat is the 10,400 acres of brackish tidal marsh. A 1963 study (BH-1) of waterfowl nesting sites in this habitat recorded six of twenty-six duck nests destroyed by raccoons. Accordingly, the current study was initiated with the specific objective of determining if the reduction of the raccoon population with poisoned eggs will increase duck nesting success in brackish tidal marsh.

The study is being conducted by the Pennsylvania Cooperative Wildlife Research Unit and graduate student Robert Munro was assigned to the study this year. The findings were limited because of the apparently low raccoon population, the small number of waterfowl nests located and the lack of production data. A comparison of predation rates prior to and after the removal of predators was not conclusive. The poisoned egg program was of limited application due to the low raccoon population.

- B. Banding. Six hundred two Canada geese and 114 mallards and black ducks were captured by cannon net and banded in January and February. Twenty redwing nestlings were banded during the summer.
- C. Natural Areas. No field investigations or applied research were conducted on the 120 acre Marshall Island Natural Area.

## VI. PUBLIC RELATIONS

- A. Recreation. Golden Eagle Passport sales and entrance fee collection on the Honor System/Money Tree for the period January 1, 1968 through December 31, 1968 are as follows:

<u>Month</u>	<u>Honor System/Money Tree Daily Motor Vehicle Pedestrian Entry Fees</u>	<u>Golden Eagle Passport</u>	<u>Total</u>
January	\$ 192.45	\$	\$ 192.45
February	143.76		143.76
March	228.05		228.05
April	293.41	175.00	468.41
May	159.54	105.00	264.54
June	136.15	63.00	199.15
July	122.47	70.00	192.47
August	126.00	35.00	161.00
September	321.03	42.00	363.03
October	619.78	56.00	675.78
November	484.77	7.00	491.77
December	<u>344.63</u>		<u>344.63</u>
TOTALS	\$3,172.04	\$553.00	\$3,725.04

Field Trials. The Del-Bay Field Trial Club held two Retriever field trials here this year: March 22-24 and October 18-20, respectively. Approximately 600 participants and spectators were accommodated.

- B. Refuge Visitors.

The list of visitors to the refuge office is extremely long. Therefore, U. S. Game Management Agents, U. S. Deputy Game Wardens, State Game Wardens, cooperative farmers, special use permittees and the visiting public are omitted from this report. Distinguished or special visitors from the Regional Office, Central Office, and other Regions and Agencies are listed below:

1/29-31	Gordon T. Nightingale	Reg. Refuge Biologist	Mosquito Control
1/30	Warren Wheatley	Director, Mosq. Control Div., Delaware	Mosquito Control
1/30	Dr. Frank Murphey	Univ. of Delaware	Mosquito Control
2/1	Maurice Brown	Curator Emeritis, Hawk Mt. Sanctuary	Courtesy Call
2/8	N. R. Dumas	Dept. of Education, Ontario, Canada	Conservation Education
2/8	R. Hackett	"	"

2/8	B. B. Ayear	Dept. of Education Ontario, Canada	Conservation Education
2/8	A. E. Kirshner	Dept. of Education Philadelphia, Pa.	"
2/8	Robert VanAbel	Delaware ETV Network	"
2/12	Raymond W. Sundstrom	Univ. of Delaware	Water Wells
2/12	Kenneth D. Woodruff	Delaware Geo. Survey	"
2/12	Stu McKenzie	Delaware Water & Air Commission	"
2/21	Norman G. Wilder	Director, Del. Game & Fish Commission	Young Waterfowlers Program
2/21	Edmund H. Harvey	Delaware Wildlands, Inc.	"
2/21	Ted Horsey	Del. Wildlife Federation	"
2/21	Robert VanAbel	Delaware ETV Network	"
2/23	Norman G. Wilder	Director, Del. Game & Fish Commission	Mosquito Control Test Area
3/7	W. E. Ackerknecht	BSF&W, Wash., D.C.	Visit
3/7	Emerson Harper	U.S.D.I., Office of the Secy., Wash., D.C.	Visit
3/7	Gordon T. Nightingale	Reg. Refuge Biologist	Visit
3/7	E. R. Thompson	Delmarva Power & Light	Visit
3/7	Hensyl C. LeVan	Delmarva Power & Light	Visit
3/9, 23	Philip A. DuMont	BSF&W, Wash., D.C.	Visit
4/2	Tom Groutage	Fishery Services	Fish Survey
4/3	William E. Brey	Statistical Services, Comm. Fisheries	Snapping Turtles
4/23	Donald Bredernitz	Divn. of Realty, RO	Land Acquisition
4/24	John A. DuPree	BSF&W, Wash., D.C.	Administration
4/24	Bruce P. Stollberg	BSF&W, Wash., D.C.	Resources Mgt.
4/24	Thomas J. Harper	BSF&W, Wash., D.C.	Regulations
5/3	C. B. Kepler	Cornell University	Courtesy Call
5/13-17	Merton Radway	Asst. Reg. Refuge Supervisor	Inspection
5/13	Leonard V. Litman	GSA, New York	Excess Property
5/27	Charles A. Lesser	Del. Game & Fish Comm.	S.C.S. Seminar Tour
5/27	William Eisenbrey	Soil Conservation Ser.	"
5/27	Jerry Semans	"	"
5/27	Philip F. Allan	"	"
5/27	Ralph A. Timmons, Jr.	"	"
5/27	Fred T. Mott	"	"
6/4	Roger Tornstrom	Divn. of Engineering, Cadastral Surveyor	Boundary Surveys
6/18	Robert Bradshaw	Great Meadows NWR	Visit
6/24	Dr. Ira A. Gabrielson	Pres., Wildlife Mgt. Institute, Wash., D.C.	Visit
7/3	Malcolm Davis	National Wildlife Fed., Wash., D.C.	Visit
7/23-24	Thomas C. Horn	Reg. Refuge Supervisor	Film Project & Public Use Program
7/23-24	Edward Sherman	Conservation Education Coordinator	"
8/5	Thomas J. Bond	BSF&W, Wash., D.C.	Training

8/7	Alfred J. Godin	Wildlife Services	Courtesy Call
8/28	Robert Laser	Fishery Services	Fish Survey
8/28	Timmy B. Hess	Fishery Services	Fish Survey
8/28	Jerry Springer	Fishery Services	Fish Survey
9/21	Jack Waddell	Recreation Planner, Region 1	Courtesy Call
9/23	Charles D. Saults	Conservation Officer, CO, Wash., D.C.	Courtesy Call
9/30	M. G. "Red" Sheldon	BSF&W, Region 2	Courtesy Call
10/15	Paul Boswell	U.S. Dist. Comm., Dover, Delaware	Goose Blind & Deer Hunt Drawing
10/15	Hensyl LeVan	Delaware Wildlife Federation	"
10/15	Robert VanAbel	Delaware ETV Network	"
10/15	Holger Harvey	Delaware Wildlands	"
10/15	Richard Bailey	Delaware State News	"
10/19	August Belmont	National Retriever Field Trial Club, Inc.	Field Trials
10/19	A. K. Gottfried	"	"
10/22	Christopher Kieffer	U.S.G.S., Wash., D.C.	Visit
10/25	Douglas Mullen	Asst. Refuge Mgr., Brigantine NWR	Official visit
10/25	Milton J. Wilson	Maintenanceman, Brigantine NWR	Official visit
10/25	R. P. Yoder	U. S. Forest Service	Visit
10/26	Fred C. Swan	BOR	Visit
10/31	R. W. Richman	Former Consultant to Secretary Udall	Visit
10/31	Roy Hipple	U.S. Forest Service (Retired)	Visit
11/13-14	Louis Catalanatto	Divn. of Realty, RO	Quarters Re- appraisal
11/18-20	W. Lee Peterson	Budget & Finance Officer, RO	Adm. Inspection
11/20	Rex C. Tice	Reg. Supervisor, M&E, RO	Courtesy Call
11/29	Clayton M. Hardy	Refuge Manager, Montezuma	Courtesy Call
12/7	W. C. Reffalt	BSF&W, Region 2	Courtesy Call
12/9	Anthony Higgins	Assoc. Editor, News- Journal Co., Wilm., Del.	Courtesy Call
12/10-13	George Murray	Office of the Secretary Wash., D.C.	Audit
12/26, 28	Philip A. DuMont	BSF&W, Wash., D.C.	Bird Counts & Visit
Numerous	Edmund H. Harvey	Delaware Wildlands	Visit
"	Holger Harvey	"	Visit
"	Hensyl C. LeVan	Delaware Wildlife Federation	Young Waterfowlers Training Program
"	Ted Horsey	"	"
"	Dr. James Lindzey	Leader, Coop. Wildlife Research Unit, Penn State	Raccoon Study

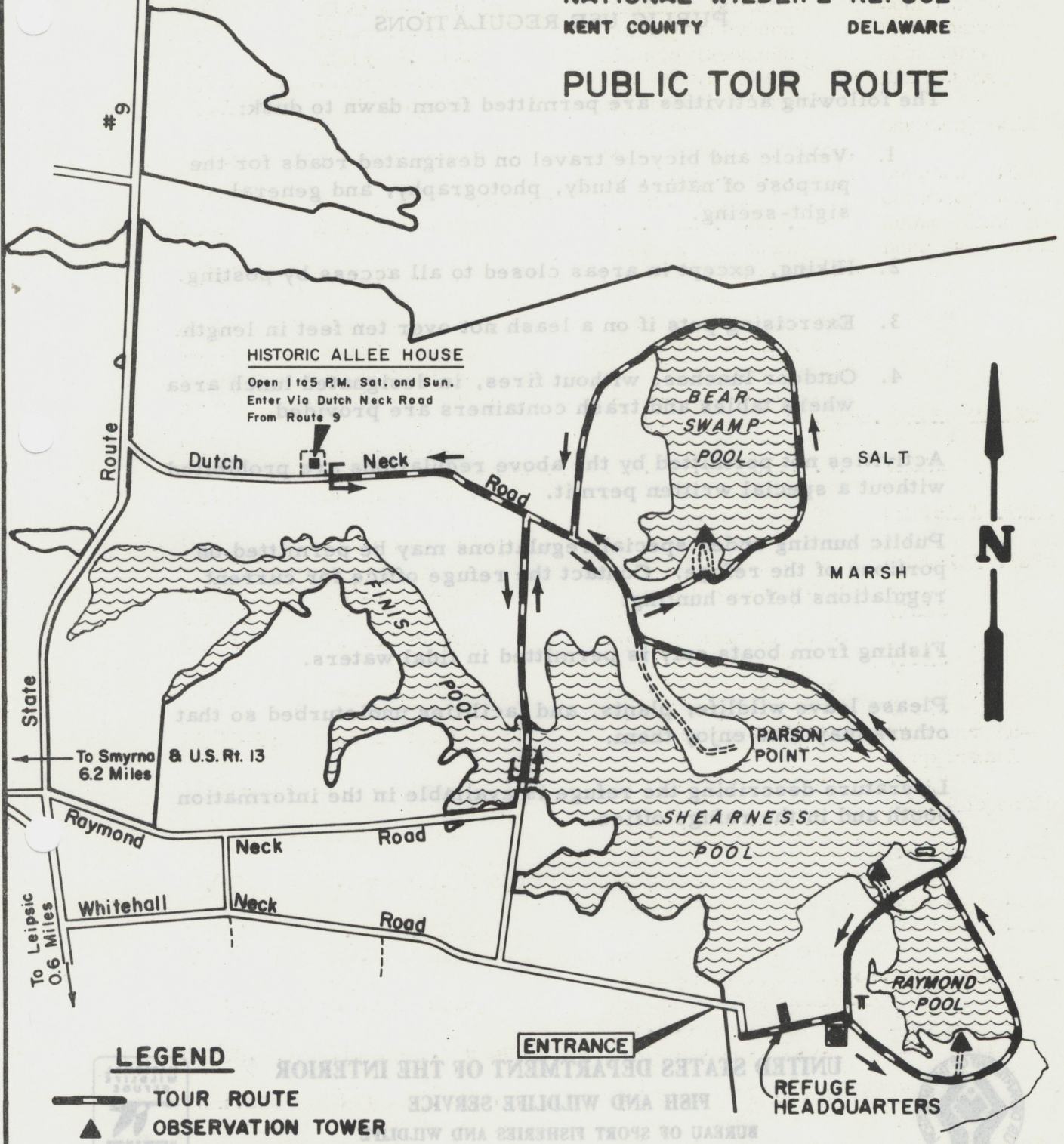
State Route #6  
To Woodland Beach →

# BOMBAY HOOK NATIONAL WILDLIFE REFUGE KENT COUNTY DELAWARE

## PUBLIC TOUR ROUTE

### HISTORIC ALLEE HOUSE

Open 1 to 5 P.M. Sat. and Sun.  
Enter Via Dutch Neck Road  
From Route 9

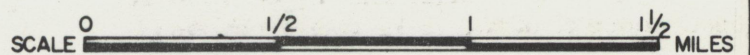


### LEGEND

- TOUR ROUTE
- OBSERVATION TOWER
- LUNCH AREA
- REST ROOM
- FOOT TRAIL
- TRAFFIC FLOW

ENTRANCE

REFUGE HEADQUARTERS



BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
PUBLIC USE REGULATIONS

The following activities are permitted from dawn to dusk:

1. Vehicle and bicycle travel on designated roads for the purpose of nature study, photography, and general sight-seeing.
2. Hiking, except in areas closed to all access by posting.
3. Exercising pets if on a leash not over ten feet in length.
4. Outdoor lunches, without fires, in designated lunch area where tables and trash containers are provided.

Activities not permitted by the above regulations are prohibited without a special written permit.

Public hunting under special regulations may be permitted on portions of the refuge. Contact the refuge office for current regulations before hunting.

Fishing from boats only is permitted in tidal waters.

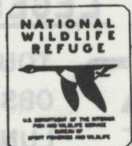
Please leave wildlife, plants, and facilities undisturbed so that others may also enjoy them.

Literature describing the refuge is available in the information booth and in the refuge office.



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

RL-41-A  
September 1968



SCALE 0 1/4 1/2 3/4 1 MILES

TRAFFIC FLOW

Numerous	Chet Stachecki	Mosq. Control Div., State of Delaware	Mosquito Control
"	Anthony Florio	Delaware Game & Fish Commission	Towers, Water- fowl Banding
"	James B. Jackson	Del-Bay Field Trial Club	Field Trials

Mosquito control work and related research required Dr. Frank Murphey and Mr. Robert Lake, University of Delaware to make frequent visits throughout the year.

C. Refuge Participation. Refuge personnel took part in the following activities:

<u>Date</u>	<u>Name of Group</u>	<u>Staff</u>	<u>Number Present</u>	<u>Activity</u>
4/2	Smyrna Kindergarten Assoc.	Liehr	30	On Refuge talk & tour
4/4	West Dover Elementary School	Tibbs	60	On Refuge talk & tour
4/5	Delaware Valley College of Science & Agric., Doylestown, Pa.	Holgerson	20	On Refuge talk & tour
4/8	Girl Scout Troop 557, Dover, Del.	Holgerson	32	On Refuge tour
4/16, 18	Field Ornithological Class, Ext. Course, Univ. of Del.	Holgerson	40	On Refuge talk
4/18	Lulu Ross School, Milford, Del.	Tibbs	35	On Refuge talk & tour
4/19	Lakeview Elementary School, Milford, Delaware	Liehr	35	On Refuge talk & tour
4/30	Christiana School, Wilmington, Delaware	Liehr	31	On Refuge talk & tour
5/6	Towne Point Elem. School, Dover, Delaware	Holgerson	33	On Refuge talk & tour
5/7	South Dover Elementary School, Dover, Delaware	Liehr	40	On Refuge talk & tour
5/27	Ellendale School, Ellendale, Delaware	Liehr	59	On Refuge talk & tour
6/1	Pilot Elementary School, Wilmington, Delaware	Liehr	25	On Refuge talk & tour
6/7	Bridge House & Farris Industrial School, Wilmington, Del.	Holgerson	15	On Refuge talk & tour
6/20	Delaware Science Day Camp	Tibbs	40	On Refuge talk & tour

7/17	W. B. Simpson School, Camden-Wyoming, Delaware	Holgerson	40	On Refuge talk & tour
7/26	W. B. Simpson School	Holgerson	34	On Refuge talk & tour
10/10	Wildlife Management Class, Delaware State College	Holgerson	15	Lecture and On Refuge tour
10/24	Girl Scout Troop, New Castle, Delaware	Holgerson	6	Refuge tour
10/25	Boy Scout Troop, Dover, Del.	Holgerson	8	On Refuge tour
10/28	Christiana-Salem School, Wilmington, Delaware	Liehr	32	On Refuge tour
10/29	Christiana-Salem School	Liehr	32	On Refuge tour
10/30	Rehoboth Special School Dist. (Ungraded Pupils) Rehoboth, Del.	Holgerson	45	On Refuge tour
11/2	Society of Natural History of Delaware	Holgerson	20	On Refuge talk & tour
11/4	Towne Point Elementary School, Dover, Delaware	Holgerson	36	On Refuge talk & tour
11/5	Girl Scout Troop 100, Dover, Delaware	Liehr	30	On Refuge tour
11/14	East Dover Elementary School Dover, Delaware	Liehr	29	On Refuge tour
11/21	Dover Kindergarten, Dover, Del.	Holgerson	63	On Refuge tour
11/22	Dover Kindergarten	Holgerson	68	On Refuge tour
11/25	N. Milford Elementary School, Milford, Delaware	Holgerson	47	On Refuge tour
11/27	Central Middle School, Dover, Delaware	Holgerson	34	On Refuge tour
12/3	David W. Harlan School, Wilmington, Delaware	Holgerson	36	On Refuge tour
12/6	Towne Point Elementary School, Dover, Delaware	Holgerson	30	On Refuge tour
12/11	David W. Harlan Elementary School, Wilmington, Delaware	Holgerson	29	On Refuge tour
12/30	Cub Scouts, Dover Air Force Base	Liehr	16	On Refuge tour

Refuge Manager Nelson served on the Board of Directors, Delaware Conservation Education Association, and attended all monthly meetings of the Delaware Wildlife Federation.

In addition, refuge participation was as follows:

- 1/4 Refuge Manager Nelson attended banding meeting at Delaware Game and Fish Commission.
- 1/18 Refuge Manager Nelson attended the Soil Conservation Service Supervisors District Meeting and served on the Recreation Planning Committee.

- 1/31 Wildlife Biologist Norman E. Holgersen attended the evening program on "Birds and Birding in Delaware" at the University of Delaware, this program being a part of Farm and Home Week.
- 2/28 Wildlife Biologist Holgersen acted as one of the judges at the Science Fair at John Bassett Moore High School, Smyrna, Delaware.
- 3/13 Refuge Manager Nelson visited the Duck Creek Sportsmens Club, Smyrna, Delaware to present the Young Waterfowlers Training Program.
- 3/27 Asst. Manager Tibbs and Maintenceman Parker attended the monthly meeting of the Delaware Federal Safety Council in Wilmington, Delaware.
- 4/1 Refuge Manager Nelson attended the Rehoboth Beach Sportsmens Club meeting, Rehoboth Beach, Delaware and presented the Young Waterfowlers Training Program.
- 4/17 Refuge Manager Nelson attended the Schaeffer Awards Dinner at the West End Rod and Gun Club, Wilmington, Delaware.
- 4/19 Manager Nelson attended public meeting held at Delaware Game and Fish Commission to discuss setting of hunting seasons. Also, Bombay Hook and Prime Hook Refuges hunting seasons and regulations were reviewed.
- 4/22 Wildlife Biologist Holgersen gave a talk and showed slides "Waterfowl at the Bombay Hook Refuge" at an evening program at the YMCA, Dover, Delaware. This program was sponsored by the Cooperative Extension Service, University of Delaware. There were 125 people in attendance.
- 5/7&  
5/9 Refuge Manager Nelson attended the West End Rod and Gun Club, and the Delmarva Power and Light Company Sportsmens Club, both located in Wilmington, Delaware to present the Young Waterfowlers Training Program.
- 6/5 Manager Nelson attended a meeting at Draper Canning Company, Milton, Delaware to discuss Declaration of Taking for Prime Hook Refuge.
- 7/10 Refuge Clerk Virginia E. Baughman, Foreman Louis Steller and Maintenceman John W. Parker attended the quarterly meeting of the Delaware Federal Safety Council at Dover Air Force Base, Dover, Delaware.
- 8/20-  
23 Refuge Manager Nelson participated in Pilot Program, Young Waterfowlers Training Program, Delaware ETV Station, Dover, Delaware.

- 8/29- Refuge Manager Nelson assisted in editing the film on Pilot 30 Program at the Delaware ETV Station, Dover, Delaware
- 10/18 Manager Nelson attended the Silver Lake Sportsmens Club meeting and presented the Young Waterfowlers Training Program.
- 11/25 Manager Nelson attended the annual Delaware Conservation Education Association dinner meeting in Newark, Delaware.
- 12/22 Wildlife Biologist Holgersen participated in the Christmas & Bird Counts at the Bombay Hook and Prime Hook Refuges. At 12/29 Prime Hook he served as leader of Section A.

D. Hunting. The refuge conducts six different hunting programs during the regular State hunting seasons. These are:

1. The South Upland Hunting Area which contains approximately 144 acres of wooded upland open to unrestricted hunting of all species within the framework of the State regulations. Permits and user fees are not applicable to this area. Cottontail rabbits, mourning doves and squirrels are the principal species hunted. A few quail and pheasants are also bagged by the estimated 100 hunters using the area.
2. The South Waterfowl Hunting Area is an open marsh comprising all of Kelly Island. The program is similar to previous years, however, a \$1.00 per hunter fee was charged this year. A part time employee was hired to operate the checking station, collect the fee and record kill data throughout the hunting season.

Thirty-four blinds were available at the opening of the season and thirty remained at the close. Four were damaged beyond use by storm tides and ice movement. There were a possible 1,462 blind days and 4,386 hunter days, but only 465 blind days and 953 hunter days were utilized. Factors limiting use of this area included storms, ice, tide conditions and bird movement.

The checking station was not staffed on a full time basis, however, spot checks during the season indicates our data is reasonably correct. The total kill was 214 geese and 734 ducks. Principal species taken were 297 black ducks, 256 mallards and 45 green-winged teal. Other species recorded in the bag were bufflehead, shoveler, pintail, hooded merganser, scaup, golden-eye, American widgeon, wood duck, ring-neck, redhead and ruddy. Some 60 birds were listed as unidentified. Hunter success was .99 birds/hunter day, a marked improvement over the .63 bird/hunter day kill recorded last year.

3. The Archery Deer Hunting Area was the same site used last year. Hunting by bow was permitted on Saturdays only, and a \$1.00

fee was assessed for the first time this year. The fee was collected at the gate prior to each hunting day with an honor system for late arrivals. To our knowledge, through routine random checks, all hunters paid the required \$1.00 fee.

Although there were 250 hunters on opening day, only three deer were taken. No other deer were taken during archery season. A total of 652 hunters participated in this program.

The deer harvested were:

Female	88 lbs. field dressed	1 yr., 4 mo.
Female	91 lbs. field dressed	1 yr., 4 mo.
Male	50 lbs. field dressed	5 mo.

4. Shotgun Deer Hunting was provided again this year in the same area as previous years. The season was split with four days in November and three days in January. To prevent confusion and duplication the January season will not be reported until the 1969 narrative report period. We had an excellent season with no problems in the management of the refuge herd.

Shotgun deer hunting was restricted to advance application, a public drawing, and no more than 50 hunters per day. There were more than 600 applications received for the 350 available hunter days; however, only 132 cardholders of the 350 successful applicants reported for the hunt, with the remaining vacancies filled by lot drawing each morning. A review of the current system will be made to possibly replace this method with a lot drawing, thereby eliminating the cost and manpower efforts required with the card reservation. A \$1.00 fee was charged each hunter.

The following table depicts the deer taken during the November portion of the hunting season. The second segment will be covered in the 1969 narrative report.

<u>Date</u>	<u>Sex</u>	<u>Age</u>		<u>Weight</u>	<u>Weapon</u> (Shotguns only)
		<u>Year</u>	<u>Month</u>		
11/15	M	3	6	197	Slug
11/15	F	1	4	77	Buckshot
11/15	F		7	49	SLUG
11/15	M	2	6	127	SLUG
11/15	M	2	6	132	SLUG
11/15	M	2	6	132	Buckshot
11/15	M	2	6	145	Buckshot
11/15	M		5	50	Slug
11/15	M	1	4	80	Slug
11/15	F		5	45	Slug

11/15	F	3	6	92	Slug
11/15	M	2	6	133	Slug
11/15	M	1	4	115	Slug
11/16	M	1	4	67	Buckshot
11/16	M	1	4	90	Buckshot
11/16	M	1		65	Buckshot
11/16	M	2	6	129	Slug
11/16	M	2	6	108	Buckshot
11/16	F	1	6	61	Slug
11/16	F	2	6	91	Slug
11/16	F	1	6	72	Slug
11/16	M	2	6	134	Slug
11/18	M		6	46	Slug
11/18	F	3	6	142	Buckshot
11/18	F	2	6	115	Slug
11/19	F	1	6	94	Buckshot

Averages                      1 Yr.   9 Mos.           99.5 Lbs.

5. The West Waterfowl Hunting Area was the same as previous years. Blinds were relocated on several areas, using standing corn as screens between blind positions. Aside from the relocation and renumbering of blinds, the only major change was the restriction to a 10 shell limit. This had proved very effective in reducing the "sky-busting" and crippling loss.

Some 1,250 applications were submitted for the 496 reservations available. There were 1,616 hunters to use 495 blinds, one blind was vacant due to bad weather. As in the past, all "no show" blinds were awarded by lot drawing the morning of the hunt. This year 179 card holders did not show up or were late and disqualified. The standby hunters waiting for the lot drawing each morning of the hunt is increasing each year. During one six hunter day period we had 400 "turnaways", with the greatest pressure at the opening and closing weeks of the season. Our overall average was 5.5 blinds available to the "standby" hunter per day.

A major change was made this year in the allocation of blinds. All blinds were reserved by number at the time of the public drawing eliminating the "bingo" type selection on the morning of the hunt. Only two complaints were received due to this change in procedure. To further eliminate the cry of "foul", all blinds were renumbered by an employee not present at the time of the public drawing. The new system will continue in the future.

A problem encountered the past several years was the applicant submitting more than one application. It was suggested by U.S. Commissioner Paul Boswell, a participant in the public drawing, that all application cards carry a space for a State

HUNTER HARVEST BY ESTIMATED POPULATION OF GEESE

Canada Goose Hunting Analysis Of The West Public  
Hunting Area

Week	Number of Hunters			Known Goose Kill Number			Kill-Hunter Ratio			Estimated Goose Population In Thousands		
	1966-67	1967-68	1968-69	1966-67	1967-68	1968-69	1966-67	1967-68	1968-69	1966-67	1967-68	1968-69
1	157	167	164	107	193	172	.68	1.16	1.05	46.5	24.5	30.0
2	160	158	165	73	46	121	.46	.29	.73	54.2	25.0	30.0
3	160	165	154	83	80	82	.52	.48	.53	49.0	28.2	30.0
4	151	149	156	23	75	63	.15	.50	.40	50.2	28.0	25.0
5	134	149	159	8	90	122	.06	.60	.77	40.5	21.0	23.5
6	135	144	164	28	63	93	.21	.44	.57	47.0	25.0	25.0
7	134	151	148	9	3	65	.07	.02	.44	52.8	26.1	15.0
8	136	154	150	44	43	72	.32	.28	.48	50.0	25.0	12.0
9	132	147	139	27	30	51	.20	.20	.37	50.0	25.0	15.0
10	135	132	159	7	64	38	.05	.48	.24	27.0	18.0	10.0
*11	50	49	58	15	19	1	.30	.39	.02	27.0	18.0	10.0
	—	—	—	—	—	—	<u>Avg.</u>	<u>Avg.</u>	<u>Avg.</u>	<u>Avg.</u>	<u>Avg.</u>	<u>Avg.</u>
Totals	1,484	1,565	1,615	422	664	890	.28	.44	.51	44.9	24.0	20.5

\* 11th week one day only.

hunting license number. An example of duplication was J. P. Smith, John Smith, J. Paul Smith and J. P. Smith, Jr., We believe Mr. Boswell had the answer.

The 1,616 hunters harvest 880 geese and 17 ducks this year as compared to 666 geese and 21 ducks during the 1967-68 season.

6. The Young Waterfowlers Training Program was initiated on Bombay Hook this year. The program was designed to promote good sportsmanship through the formal training of youths 10 to 16 years of age. Enthusiastic cooperation by U. S. Game Management Agent Robert Halstead, Delaware Game and Fish Commission, Delaware Wildlife Federation and various sportsmens clubs resulted in our program being a complete success.

A memorandum from the Regional Office on December 28, 1967 reading in part, "We are looking ahead to fully implementing this program on . . . Bombay Hook" led to the following calendar of events:

- a. A program suitable for Bombay Hook, patterned after the successful program at Parker River, was developed in cooperation with U.S. Game Management Agent Halstead and presented to the Delaware Wildlife Federation in January.
- b. February saw many personal telephone contacts with potential cooperators throughout the State. A call for ideas was also placed to Parker River and a fist full of information obtained via early mail. A meeting was called at the refuge and the first suggestion to used Educational Television was submitted by Robert VanAbel, Programs Director for Delaware Educational Television.
- c. March was the month of planning and the formation of the Delaware Wildlife Federation Committee, headed by Mr. Hensyl LeVan to act as sponsor of the project. Meetings with Delaware Educational Television resulted in approval of this Agency to tape three one-half hour programs.
- d. The first general meeting of the Wildlife Federation Committee was held in April. In addition to the Committee, Game Management Agent Halstead, Chief State Game Warden White and ETV Production Manager VanAbel were in attendance. It was then decided that the three television programs would cover Federal Law Enforcement by Agent Halstead, State Law Enforcement by Warden Sapp and Bird Identification by Refuge Biologist Holgersen and State Biologist Florio. Also, the refuge presented the first of many contacts to various sportsmens meetings throughout the State.

- e. Our program was presented to the Regional Office for final approval in May. The entire month was devoted to advanced planning, telephone contacts, trips to Delaware Educational Television, etc.
- f. June was devoted to the distribution of printed material, news releases, receiving applications, taped television series and frantic attempts to untangle the many minor problems that always develop.
- g. July, hot and humid, slowed the program to the meetings in air-conditioned offices and use of mail services.
- h. August was the turning point in our project when Game Management Agent Halstead and the Delaware Educational Television Station presented a pilot training session to 26 students. Most of the program was taped by the television station which we later edited into a one hour information film for training instructors. The pilot project was a complete success and included gun safety, waterfowl hunting techniques, Federal laws, State laws and good sportsmanship. The group of students included the underprivileged, those of "V.I.P." status, boys, girls and in general all segments of the Dover area.
- i. September was the month of making final plans for the climax hunt on Bombay Hook. Goose and duck decoys were purchased, material for blinds ordered and final approval received to open a new area for waterfowl hunting.
- j. The blind locations were selected in October by the refuge and Mr. LeVan of the Wildlife Federation. Dates were also assigned various clubs for their Young Waterfowlers to hunt these blinds.
- k. Sunday, November 17, all participating clubs and some 200 boys and girls grassed and placed the 12 blinds on the refuge. The refuge crew later placed all goose and duck decoys and made final preparations for the hunt. The first group to shoot was the pilot television program students on November 23, which was followed by 10 days of hunting by other groups. Four additional days were provided in January to allow unsuccessful students a second chance to shoot geese.

One hundred ninety-two youths hunted on the refuge and harvested 204 geese and 33 ducks. Some 100 instructors also participated in the actual hunting segment although they were not permitted to discharge the firearms.

U. S. DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
SMYRNA, DELAWARE

SOUTH WATERFOWL HUNTING AREA

The South Public Hunting Area as designated on the map on the reverse side and as posted by signs, will be open to hunting of migratory waterfowl by written permit subject to applicable current State and Federal Regulations and the following special regulations and provisions:

1. SEASON - Open only during duck season.
2. PERMITS - Required permits will be issued on a first-come, first-served basis from one hour before legal shooting time until 3:00 p.m. each hunting day at the checking station at Port Mahon. All persons must leave the hunting area and turn in their permits at the checking station prior to one-half hour after sunset each hunting day. Permits will not be issued to more than three persons to occupy one blind.
3. BLINDS - Hunting is permitted only from Government-constructed blinds, and possession of a loaded gun outside a blind is prohibited.
4. BOATS - A boat is necessary to reach the hunting area. Boats with motors are permitted. No shooting from motor boats is allowed.
5. SPECIES - Only waterfowl and coot may be taken.
6. CLOSURE - The area may be closed, completely or in part, without notice when wind, ice, abnormal tides, etc. make entry onto the hunting area hazardous.
7. FEES - A fee of \$1.00 per hunter will be charged.

UPLAND HUNTING AREA

The Upland Public Hunting Area as designated on the reverse side and as posted by signs, will be open to hunting without a permit in accordance with all applicable State and Federal Regulations.

Copies of current State and Federal Regulations are available at the checking station at Port Mahon and at Refuge Headquarters. For further information, contact Refuge Manager, Bombay Hook National Wildlife Refuge, R.D. #1, Box 147, Smyrna, Delaware 19977, telephone (Area Code 302) 653-9345.

BOMBAY HOOK  
NATIONAL WILDLIFE  
REFUGE  
PUBLIC HUNTING  
AREAS

⑥ BLIND SITE & NO.

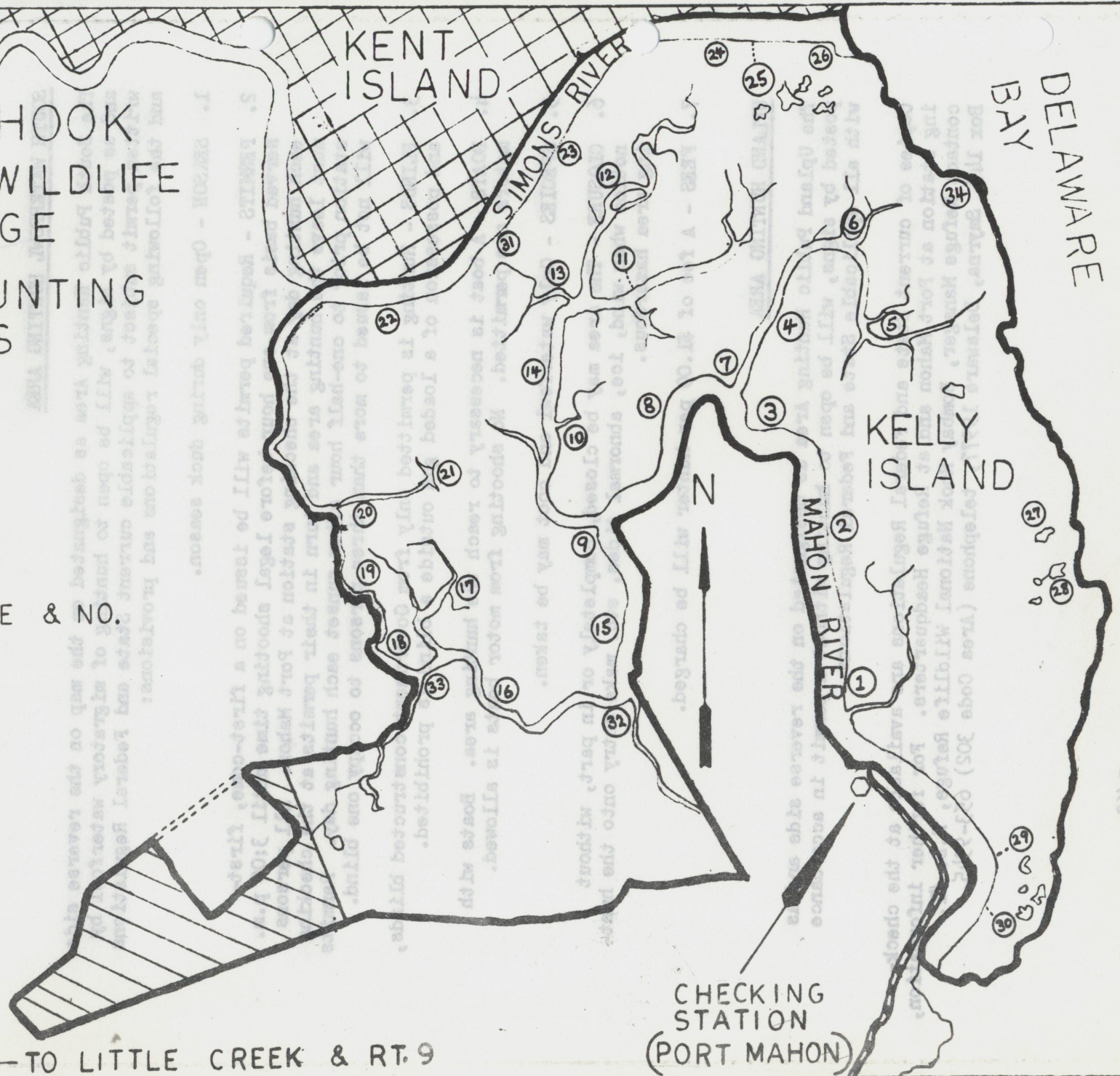
□ WATERFOWL  
HUNTING  
AREA

▨ CLOSED  
AREA

▨ UPLAND  
HUNTING  
AREA

TO LITTLE CREEK & RT. 9

CHECKING  
STATION  
(PORT MAHON)



U. S. DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
SMYRNA, DELAWARE

SOUTH WATERFOWL HUNTING AREA

The South Public Hunting Area as designated on the map on the reverse side and as posted by signs, will be open to hunting of migratory waterfowl by written permit subject to applicable current State and Federal Regulations and the following special regulations and provisions:

1. SEASON - Open only during duck season.
2. PERMITS - Required permits will be issued on a first-come, first-served basis from one hour before legal shooting time until 3:00 p.m. each hunting day at the checking station at Port Mahon. All persons must leave the hunting area and turn in their permits at the checking station prior to one-half hour after sunset each hunting day. Permits will not be issued to more than three persons to occupy one blind.
3. BLINDS - Hunting is permitted only from Government-constructed blinds, and possession of a loaded gun outside a blind is prohibited.
4. BOATS - A boat is necessary to reach the hunting area. Boats with motors are permitted. No shooting from motor boats is allowed.
5. SPECIES - Only waterfowl and coot may be taken.
6. CLOSURE - The area may be closed, completely or in part, without notice when wind, ice, abnormal tides, etc. make entry onto the hunting area hazardous.
7. FEES - A fee of \$1.00 per hunter will be charged.

UPLAND HUNTING AREA

The Upland Public Hunting Area as designated on the reverse side and as posted by signs, will be open to hunting without a permit in accordance with all applicable State and Federal Regulations.

Copies of current State and Federal Regulations are available at the checking station at Port Mahon and at Refuge Headquarters. For further information, contact Refuge Manager, Bombay Hook National Wildlife Refuge, R.D. #1, Box 147, Smyrna, Delaware 19977, telephone (Area Code 302) 653-9345.

BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
 APPLICATION FOR HUNTING PERMIT  
 (Please Print Names)

DATE \_\_\_\_\_

BLIND NUMBER \_\_\_\_\_

Names 1. \_\_\_\_\_

State License # \_\_\_\_\_

2. \_\_\_\_\_

# \_\_\_\_\_

3. \_\_\_\_\_

# \_\_\_\_\_

Dogs # \_\_\_\_\_

A valid State hunting license and signed duck stamp must be presented by each member of the party. Guns must conform with Federal and State laws and regulations.

Received \$1.00 per Hunter Fee: \_\_\_\_\_

Refuge Officer

-----

United States Department of the Interior  
 Fish and Wildlife Service  
 Bureau of Sport Fisheries and Wildlife

BOMBAY HOOK NATIONAL WILDLIFE REFUGE - SOUTH PUBLIC HUNTING AREA PERMIT

Pursuant to the regulations of the Secretary of the Interior for the administration of National Wildlife Refuges under the jurisdiction of the Fish and Wildlife Service, permission is hereby given to--

\_\_\_\_\_ and \_\_\_\_\_ others to be on the South Public Hunting Area, for the purpose of hunting waterfowl only.

Entrance and exit to be by way of the CHECKING STATION AT PORT MAHON.

The above-named hunter and party must check out at the checking station within 1/2 hour after the close of shooting hours.

The above-named party is permitted only the use of, and direct access to and from Blind # \_\_\_\_\_. Permittees will conform to applicable Federal and State laws and regulations.

Signed \_\_\_\_\_ Date \_\_\_\_\_ (only)

Received \$1.00 per Hunter Fee: \_\_\_\_\_

Refuge Officer

(Keep this permit on your person at all times and surrender it to the attendant at the checking station when leaving. Not valid until signed by Refuge Officer.)

UNITED STATES DEPARTMENT OF THE INTERIOR  
 FISH AND WILDLIFE SERVICE  
 BUREAU OF SPORT FISHERIES AND WILDLIFE  
 BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
 SOUTH PUBLIC WATERFOWL HUNTING AREA  
 BLIND AND HUNTING TIPS

This public waterfowl hunting area is administrated by the Bombay Hook National Wildlife Refuge as part of its multiple use program. Your use of this hunting area is a privilege not a right; use it accordingly.

The refuge has constructed 34 blinds for your convenience and hunting pleasure. The blinds have been placed to take advantage of the bay, pothole, and tidal stream hunting of this salt marsh area. Hunting success will be typical of other Delaware salt marshes: good in stormy weather; poorer on "bluebird" days; averaging fair hunter success. Black ducks and mallards will be the main species bagged with an occasional duck of some other species and an occasional Canada goose.

The use of a dog for retrieving downed waterfowl is encouraged. It will add interest to your sport and reduce the waterfowl crippling loss.

Some species of waterfowl are fully protected; others may be taken in special limited numbers. Know what species of bird you are shooting--if you don't know, don't shoot!

FOOTNOTES:

The South Public Waterfowl Hunting Area is surrounded by water and is accessible only by boat. The hunter is warned of the dangers inherent in boating on tidal waters. Do not overload or overpower your boat. Boats should be equipped with U.S. Coast Guard approved life preservers for each person, anchor and rope, and oars or paddles.

Warm dry clothing, hip boots, duck decoys, and flashlights are necessary. Duck or goose calls and a few goose decoys may be an advantage. During the early part of the season, insects may be a problem and insect repellent is recommended.

Westerly winds cause lower than normal tides and conversely easterly winds cause higher than normal tides. Plan your access and exit accordingly.

Do not shoot at birds beyond effective gun range; this results in cripples and also spoils your own and other hunters' chances of decoying these birds. Hunters near waterways should be particularly alert to avoid shooting near passing boats.

TIPS ON BLINDS. (For explanation of Roman numerals, please see FOOTNOTES.)

Blinds #1 through #10 (I, II, IV).

Blind #11 On pothole between the branches of Great Gut. Best access from right hand fork from access sign; leave boat at access sign (I, VI).

Blinds #12 through #19 and #32-33 (I, II, IV).

Blinds #20 and #21 (II, III, IV).

Blinds #22, #23 and #24 South side of Simons River. Refuge across river closed to all entry. (II, III, IV) If access via Delaware Bay, see V.

Blind #25 On pothole off Simons River. CAUTION - soft marsh between river and blind. Enter from access sign on Simons River. Keep your load light as it is quite a walk to the blind (II, III, IV, VI). If access is made via Delaware Bay, see V.

Blind #26 On south side of Simons River at Delaware Bay. The refuge on the north side of Simons River is closed to all entry (II, IV). For access via Delaware Bay, see V. For access via Old Women's Gut, see III.

Blinds #27 and #28 On potholes just in from the bay shore, access via Delaware Bay (II, IV, V, VI).

Blinds #29 and #30 On potholes near south end of Kelly Island. Access from Mahon River south of checking station. From access sign, walk to blind; leave boat at access sign (I, VI).

Blinds #31 and #34 Located on tidal guts. These guts may go dry at normal low tide. Keep an eye on your boat and move it with the tide to insure you a way to get back to the checking station (II, IV).

#### FOOTNOTES:

I. Blinds accessible by small boats at all normal tides and winds except when the creeks are frozen.

II. A boat may be hidden near the blind and is required to retrieve birds if a dog is not used.

III. Blinds so situated that safe access is normally via Old Women's Gut. During low tides, sections of Old Women's Gut may lack enough water to float your boat. Ingress and egress should be planned with full consideration for tides. Ice can close this gut completely.

IV. Decoys, normally set from a boat, may require moving as the tide rises or falls.

V. Blinds located on shore of Delaware Bay may be unsafe for access by small boats when moderate easterly winds are blowing. Hunters are advised to leave these blinds if the wind starts to blow from an easterly quarter with sufficient force to cause white cap waves.

VI. Blinds located on a pothole. Decoys may have to be set and retrieved from shore. The wind will generally blow dead birds to shore.

BE A SAFE HUNTER - GOOD LUCK AND GOOD SHOOTING!

APPLICATION TO HUNT ON SHOTGUN DEER HUNTING AREA  
Bombay Hook National Wildlife Refuge

1. Please fill in the card below completely.
2. Address the card to yourself by printing your name and address on the reverse side.
3. Tear off the card with your name on it and place it in an envelope addressed to:

Bombay Hook National Wildlife Refuge  
R.D. #1, Box 147  
Smyrna, Delaware 19977

Only one application may be submitted by each person.  
Applications must be postmarked not later than October 8.  
Shooting days will be the regular State hunting season.

- ONLY SUCCESSFUL APPLICANTS WILL BE NOTIFIED -

(Tear off here)

APPLICATION TO HUNT ON SHOTGUN DEER HUNTING AREA  
Bombay Hook National Wildlife Refuge

I prefer to hunt on these dates:			I will accept any other dates available. (Check)	Yes
1st Choice	2nd Choice	3rd Choice		No
Date	Date	Date	Signature of Applicant	

(Do not write in this space)

U. S. DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

46.

BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
SMYRNA, DELAWARE

SHOTGUN DEER HUNT AREA

The Shotgun Deer Hunting Area as shown on the reverse side and as posted will be open to deer hunting subject to applicable Federal and State Regulations and the following:

1. SEASON - This area will be open during the regular State hunting season. Entry and exit only via Refuge Headquarters.
2. BAG - One deer either sex. Deer taken must be checked out at Refuge Headquarters.
3. RESERVATIONS AND PERMITS - Required Federal permits will be reserved for successful mail applicants as chosen by a public drawing. All applications must be received by mail at Bombay Hook Refuge prior to October 8. The number of hunters admitted to the open area at one time will be restricted to 50. Hunting time will be from one-half hour before sunrise until one-half hour after sunset. Successful applicants must appear in person at the refuge office 1½ hours before sunrise on the date reserved. Reservations forfeited for non-appearance of applicants or not previously reserved will be made available by a drawing at the refuge office one hour before sunrise. Hunters must exit the hunting area by one-half hour after sunset.
4. FEES - There will be a user fee of \$1.00 per hunter for this hunting privilege.

ARCHERY DEER HUNT AREA

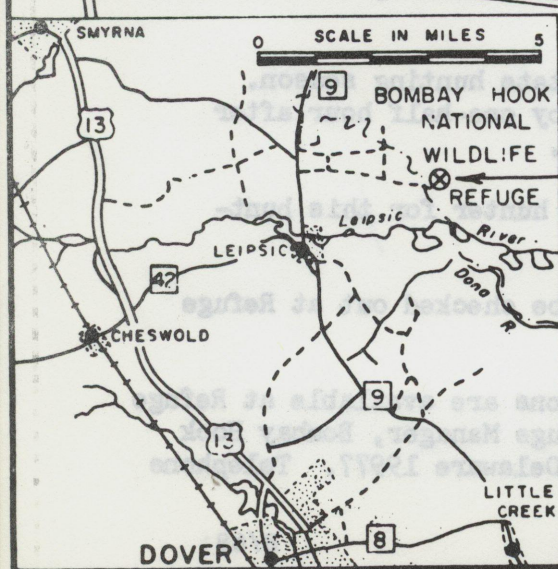
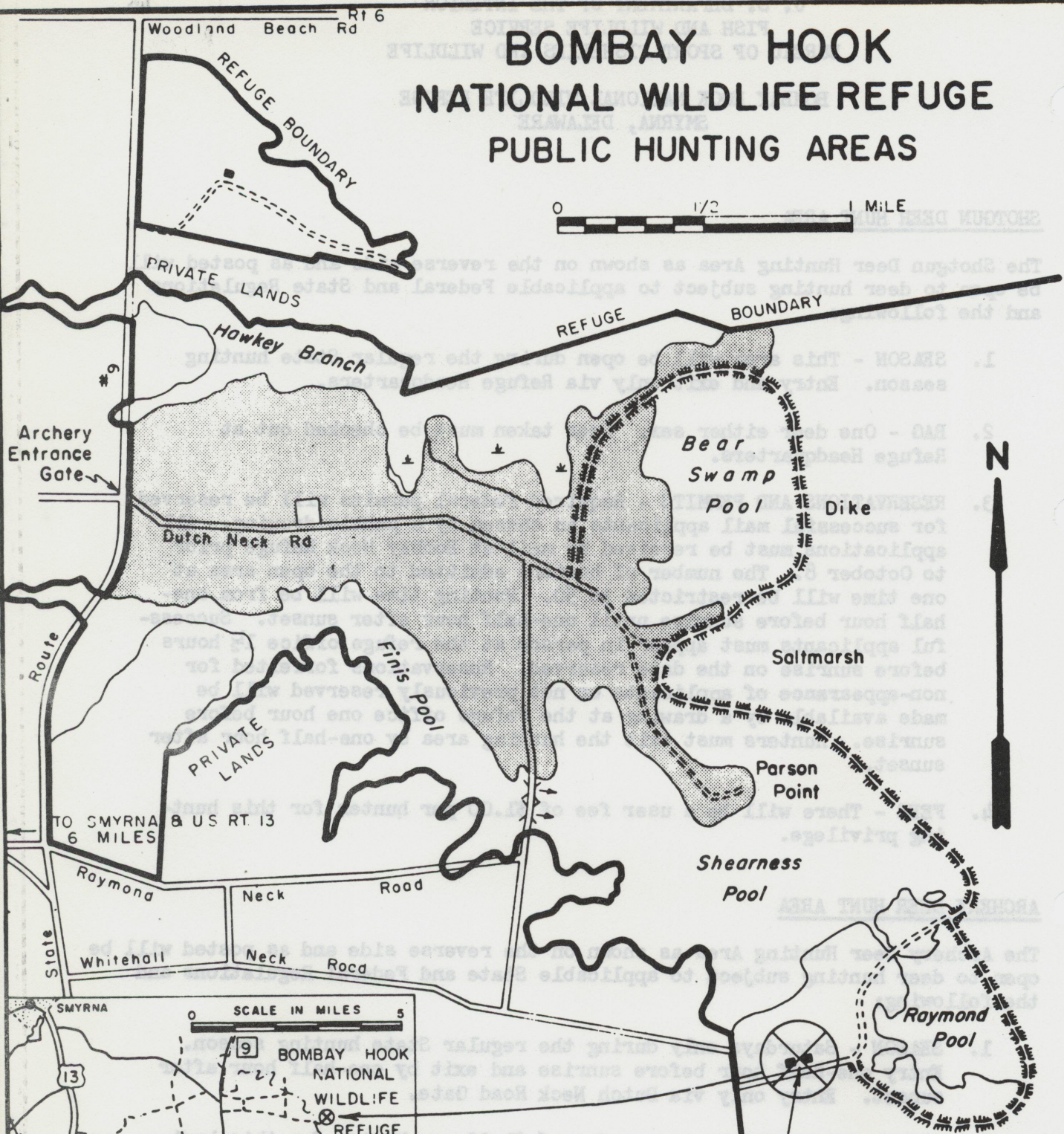
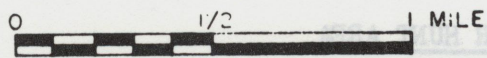
The Archery Deer Hunting Area as shown on the reverse side and as posted will be open to deer hunting subject to applicable State and Federal Regulations and the following:

1. SEASON - Saturdays only during the regular State hunting season. Entry one-half hour before sunrise and exit by one-half hour after sunset. Entry only via Dutch Neck Road Gate.
2. FEES - There will be a user fee of \$1.00 per hunter for this hunting privilege.
3. BAG - One deer either sex. Deer taken must be checked out at Refuge Headquarters.

Copies of current Federal and State Hunting Regulations are available at Refuge Headquarters. For further information contact: Refuge Manager, Bombay Hook National Wildlife Refuge, R.D. #1, Box 147, Smyrna, Delaware 19977. Telephone (Area Code 302) 653-9345.

# BOMBAY HOOK NATIONAL WILDLIFE REFUGE

## PUBLIC HUNTING AREAS



- Archery and Shotgun Deer Hunting Area
- Refuge Boundary

JM 670822

U.S. DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
SMYRNA, DELAWARE

PERMIT FOR SHOTGUN DEER HUNTING

Pursuant to the regulations of the Secretary of the Interior for the administration of National Wildlife Refuges under the jurisdiction of the Fish and Wildlife Service, permission is hereby given to

1. \_\_\_\_\_  
(Name) (State Hunting License Numbers)
2. \_\_\_\_\_  
(Address)
3. \_\_\_\_\_  
(Automobile License Number) (State)

to be on the Shotgun Deer Hunting Area on \_\_\_\_\_ only, for the purpose of hunting deer. Entrance and exit to be by way of the checking station at Refuge Headquarters. The above-named hunter must check out at Refuge Headquarters by one-half hour after sunset.

The permittee agrees to conform to all applicable State and Federal laws and regulations and is permitted only the use of, and direct access to and from, the Shotgun Deer Hunting Area.

\_\_\_\_\_  
Permittee

\_\_\_\_\_  
Refuge Officer

\_\_\_\_\_  
Date

This permit must be kept on the permittee at all times and be surrendered at the checking station at Refuge Headquarters to the attendant in charge when leaving.

GOOD LUCK AND SAFE HUNTING!  
TIPS ON DEER HUNTING ARE PRINTED ON THE BACK OF THIS PERMIT FOR YOUR CONVENIENCE. BE A SAFE HUNTER AND A TRUE SPORTSMAN.

## BOMBAY HOOK NATIONAL WILDLIFE REFUGE

### SHOTGUN DEER HUNTING INFORMATION

This hunting program is being conducted in accordance with the multiple use concept on Federal lands. The personnel of this refuge have gone to a considerable amount of extra work to make this program a success. You can help in making it a success simply by being considerate of others. Remember that others are hunting in the area around you and that people will be using the area after you.

1. Leave your automobile in the designated parking area.
2. Do not trample on or tamper with crops, decoys, or blinds.
3. Be sure of the range and the target before you shoot. Remember that a deer is a large animal and may appear to be in range long before he actually is. Indiscriminate shooting endangers other hunters and will result in high crippling losses and will only spoil the hunting for you and all other hunters.
4. A wounded deer should be trailed until it is killed, the trail is lost, or the animal leaves the hunting area. Should a wounded deer leave the designated hunting area or is not located by the close of shooting hours, contact a refuge officer for assistance.
5. For best meat care, the animal should be field dressed as soon as possible. Do not transport a deer on the hood of a vehicle as the heat from the engine will accelerate spoilage.
6. Take all deer killed to the checking station when you check out.
7. Fires are prohibited.
8. Deer of either sex may be taken.
9. Bright-colored clothing should be worn by all hunters.
10. The use of this public hunting area is a privilege, not a right; use it accordingly.

GOOD LUCK AND SAFE HUNTING!

TIPS ON DEER HUNTING ARE PRINTED ON THE BACK OF THIS PERMIT FOR YOUR CONVENIENCE. BE A SAFE HUNTER AND A TRUE SPORTSMAN.

APPLICATION TO HUNT ON THE WEST (CANADA GOOSE) PUBLIC HUNTING AREA  
Bombay Hook National Wildlife Refuge

1. PLEASE FILL IN THE CARD BELOW COMPLETELY.
2. ADDRESS THE CARD TO YOURSELF BY PRINTING YOUR NAME AND ADDRESS ON THE REVERSE SIDE.
3. TEAR OFF THE CARD WITH YOUR NAME ON IT AND PLACE IT IN AN ENVELOPE ADDRESSED TO: BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
RD #1, BOX 147  
SMYRNA, DELAWARE 19977

*Only one application may be submitted by each person. Applications must be postmarked not later than October 8. Shooting days are 1/2 days Tuesdays, Thursdays, and Saturdays.*

ONLY SUCCESSFUL APPLICANTS WILL BE NOTIFIED.

SEND NO MONEY NOW

PAY \$5.00 ON THE DAY OF THE HUNT

(Tear off here)

APPLICATION TO HUNT ON THE WEST (CANADA GOOSE) PUBLIC HUNTING AREA  
Bombay Hook National Wildlife Refuge

I prefer to hunt on these dates:						I will accept any other dates available. (Check)	Yes
1st CHOICE		2nd CHOICE		3rd CHOICE			No
MONTH	DAY	MONTH	DAY	MONTH	DAY	Signature of Applicant	

(Do not write in this space)

U. S. DEPARTMENT OF THE INTERIOR  
 FISH AND WILDLIFE SERVICE  
 BUREAU OF SPORT FISHERIES AND WILDLIFE  
 BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
 SMYRNA, DELAWARE

WEST WATERFOWL HUNTING AREA

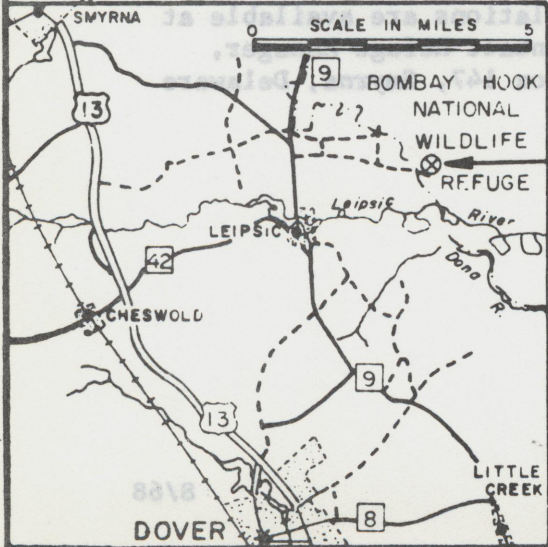
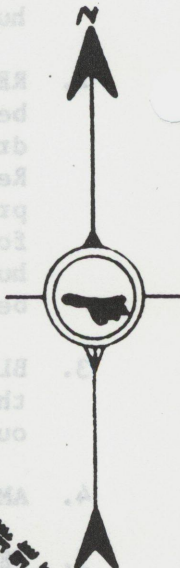
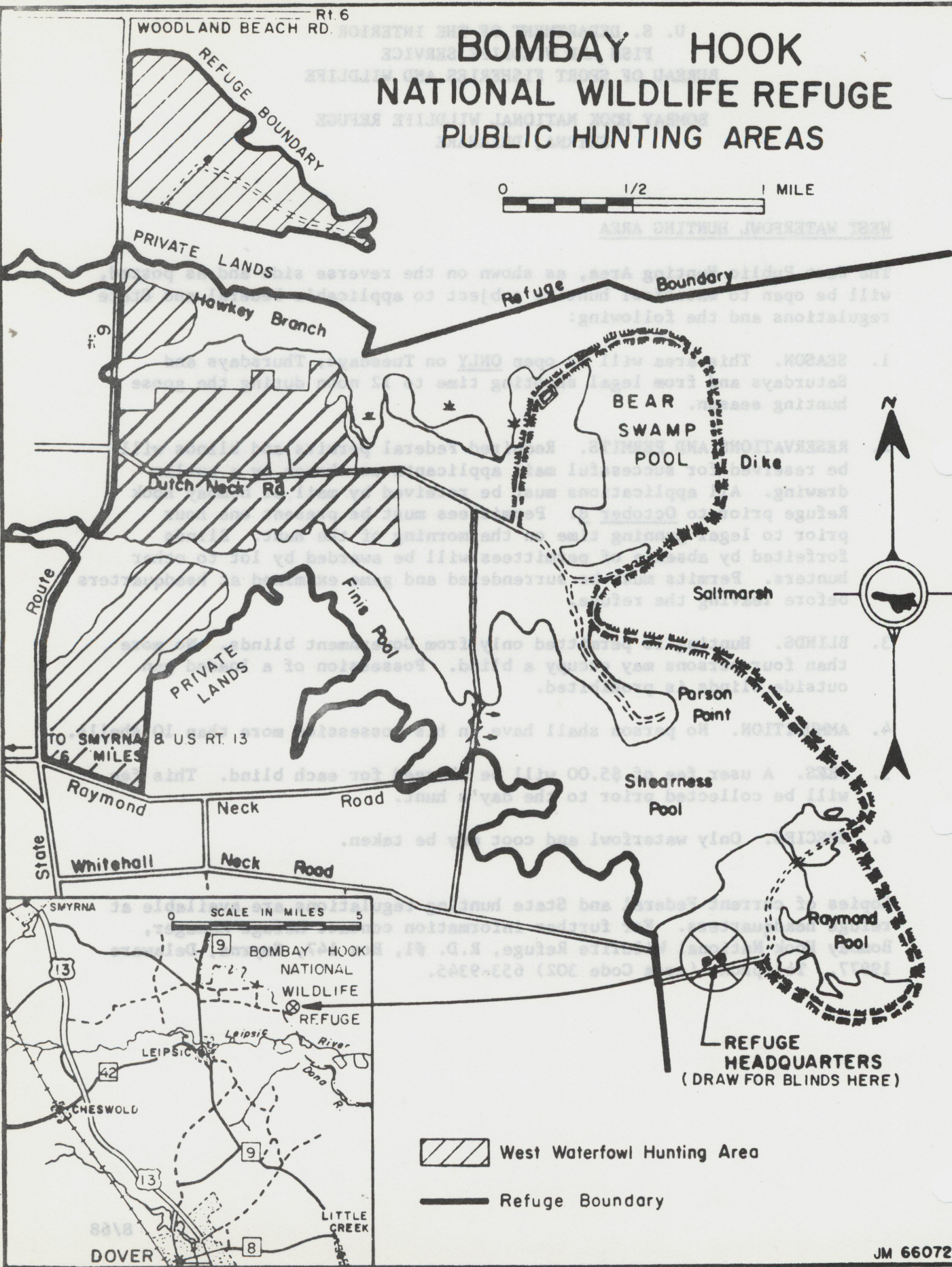
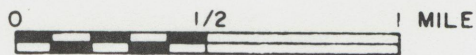
The West Public Hunting Area, as shown on the reverse side and as posted, will be open to waterfowl hunting subject to applicable Federal and State regulations and the following:

1. **SEASON.** This area will be open ONLY on Tuesdays, Thursdays and Saturdays and from legal shooting time to 12 noon during the goose hunting season.
2. **RESERVATIONS AND PERMITS.** Required Federal permits and blinds will be reserved for successful mail applicants as chosen by a public drawing. All applications must be received by mail at Bombay Hook Refuge prior to October 8. Permittees must be present one hour prior to legal gunning time on the morning of the hunt. Blinds forfeited by absence of permittees will be awarded by lot to other hunters. Permits must be surrendered and game examined at headquarters before leaving the refuge.
3. **BLINDS.** Hunting is permitted only from Government blinds. No more than four persons may occupy a blind. Possession of a loaded gun outside blinds is prohibited.
4. **AMMUNITION.** No person shall have in his possession more than 10 shells.
5. **FEES.** A user fee of \$5.00 will be charged for each blind. This fee will be collected prior to the day's hunt.
6. **SPECIES.** Only waterfowl and coot may be taken.

Copies of current Federal and State hunting regulations are available at refuge headquarters. For further information contact Refuge Manager, Bombay Hook National Wildlife Refuge, R.D. #1, Box 147, Smyrna, Delaware 19977. Telephone (Area Code 302) 653-9345.

# BOMBAY HOOK NATIONAL WILDLIFE REFUGE

## PUBLIC HUNTING AREAS



- West Waterfowl Hunting Area
- Refuge Boundary

UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE  
BOMBAY HOOK NATIONAL WILDLIFE REFUGE

PERMIT - WEST PUBLIC HUNTING AREA

Pursuant to the regulations of the Secretary of the Interior for the administration of National Wildlife Refuges under the jurisdiction of the Fish and Wildlife Service, permission is hereby given to:

1. \_\_\_\_\_ (Name) \_\_\_\_\_ (State License Number)
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

to be on the West Public Hunting Area, for the purpose of hunting waterfowl only. Entrance and exit to be by way of the checking station at Refuge Headquarters prior to 12:30 p.m.

The permittees agree to conform to all applicable State and Federal laws and regulations, and are permitted only the use of, and direct access to and from

BLIND NUMBER \_\_\_\_\_

Signed \_\_\_\_\_ Date \_\_\_\_\_ (Only)

Received \$5.00 Blind Fee: \_\_\_\_\_, Refuge Officer.

This permit must be kept in the party at all times and be surrendered at the Checking Station at Refuge Headquarters to the attendant in charge.

TIPS ON GOOSE HUNTING ARE PRINTED ON THE BACK OF THIS PERMIT FOR YOUR CONVENIENCE.

BE A SAFE HUNTER AND A TRUE SPORTSMAN.

BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
WEST PUBLIC HUNTING AREA

This hunting program is being conducted in accordance with the multiple use concept on Federal lands. The personnel of this refuge have gone to a considerable amount of extra work to make this program a success. You can help in making a success simply by being considerate of others. Remember that others are hunting in blinds around you, and that people will be using the blinds after you.

1. Leave your automobile in the designated parking area.
2. To locate your blind follow the stakes with your blind number on them.
3. Do not trample on or tamper with crops or move decoys. If the decoys are covered with frost or snow they should be cleaned off to make them look natural. Do it gently.
4. Be sure of the range. Remember that a goose is a large bird and may appear to be in range long before he actually is. If the bird is coming toward you head-on, wait until you can plainly see the white patch on his neck. When you can see this he is in range. On passing birds wait until you can see his eye to insure that he is within range. Use the proper lead. Let's try to keep crippling losses to a minimum. "Sky busting" will only spoil the hunting for you and all the other hunters.
5. A good goose hunter only shoots at geese which fly in small flocks. Shooting at large flocks of geese will serve only to "spook" the geese from approaching the decoys for a long time.
6. Make your retrieves as quickly as possible. Geese seldom come in when men are in the decoys.
7. Keep your blind clean--as clean as you would like to find it. Empty shell boxes, lunch wrappers, and other trash should be removed from the blind when you leave. Do not pick birds on the refuge.
8. Take all birds killed to the checking station when you check out.
9. Fires are prohibited.
10. The use of this public hunting area is a privilege not a right; use it accordingly.

SNOW GEESE ARE FULLY PROTECTED.

GOOD LUCK AND SAFE HUNTING!

BOMBAY HOOK NATIONAL WILDLIFE REFUGE  
WEST PUBLIC HUNTING AREA

This hunting program is being conducted in accordance with the multiple use concept on Federal lands. The personnel of this refuge have gone to a considerable amount of extra work to make this program a success. You can help in making a success simply by being considerate of others. Remember that others are hunting in blinds around you, and that people will be using the blinds after you.

1. Leave your automobile in the designated parking area.
2. To locate your blind follow the stakes with your blind number on them.
3. Do not trample on or tamper with crops or move decoys. If the decoys are covered with frost or snow they should be cleaned off to make them look natural. Do it gently.
4. Be sure of the range. Remember that a goose is a large bird and may appear to be in range long before he actually is. If the bird is coming toward you head-on, wait until you can plainly see the white patch on his neck. When you can see this he is in range. On passing birds wait until you can see his eye to insure that he is within range. Use the proper lead. Let's try to keep crippling losses to a minimum. "Sky busting" will only spoil the hunting for you and all the other hunters.
5. A good goose hunter only shoots at geese which fly in small flocks. Shooting at large flocks of geese will serve only to "spook" the geese from approaching the decoys for a long time.
6. Make your retrieves as quickly as possible. Geese seldom come in when men are in the decoys.
7. Keep your blind clean--as clean as you would like to find it. Empty shell boxes, lunch wrappers, and other trash should be removed from the blind when you leave. Do not pick birds on the refuge.
8. Take all birds killed to the checking station when you check out.
9. Fires are prohibited.
10. The use of this public hunting area is a privilege not a right; use it accordingly.

SNOW GEESE ARE FULLY PROTECTED.

GOOD LUCK AND SAFE HUNTING!

APPLICATION TO PARTICIPATE IN YOUNG WATERFOWLERS PROGRAM  
BOMBAY HOOK NATIONAL WILDLIFE REFUGE

---

1. Please complete all entries below.
2. Address the card to yourself by printing your name and address on the reverse side.
3. Tear off the card with your name on it and place it in an envelope addressed to:

BOMBAY HOOK N.W. REFUGE  
R.D. # 1, BOX 147  
SMYRNA, DELAWARE 19977

Only one application may be submitted by each youth between the ages of 10 and 16. Applications must be received before August 20. Shooting days will be Saturdays and holidays during the regular waterfowl season.

*(Tear off here)*

---

APPLICATION TO HUNT ON YOUNG WATERFOWLERS PROGRAM  
BOMBAY HOOK NATIONAL WILDLIFE REFUGE

---

Complete either A or B below:

A. I would like to participate in the Young Waterfowlers Program, my instructor is \_\_\_\_\_  
*(Name and Sportmen's Club)*

B.  I do not have an instructor and, if possible, would like to be assigned one near \_\_\_\_\_  
*(City)*

AGE \_\_\_\_\_ SIGNATURE \_\_\_\_\_

---

*(Do not write in this space)*

## YOUNG WATERFOWLERS TRAINING PROGRAM - 1968

## BOMBAY HOOK NATIONAL WILDLIFE REFUGE

The program will be open to any youth 10 through 16 years of age. Those 15 years of age and older must have a valid 1968 Delaware hunting license and youths 16 years of age will need a current migratory waterfowl hunting stamp. All trainees must complete an approved Gun Safety Course and Pre-hunt Training Program. Hunts will be held on Saturdays and holidays during the regular waterfowl season.

Applications should be mailed to the Refuge Manager, Bombay Hook N.W. Refuge, R.D. #1, Box 147, Smyrna, Delaware 19977. Training will be provided by various sportsmen's organizations and individuals throughout Delaware. Your application, as specified below, will be forwarded to the instructor in your area.

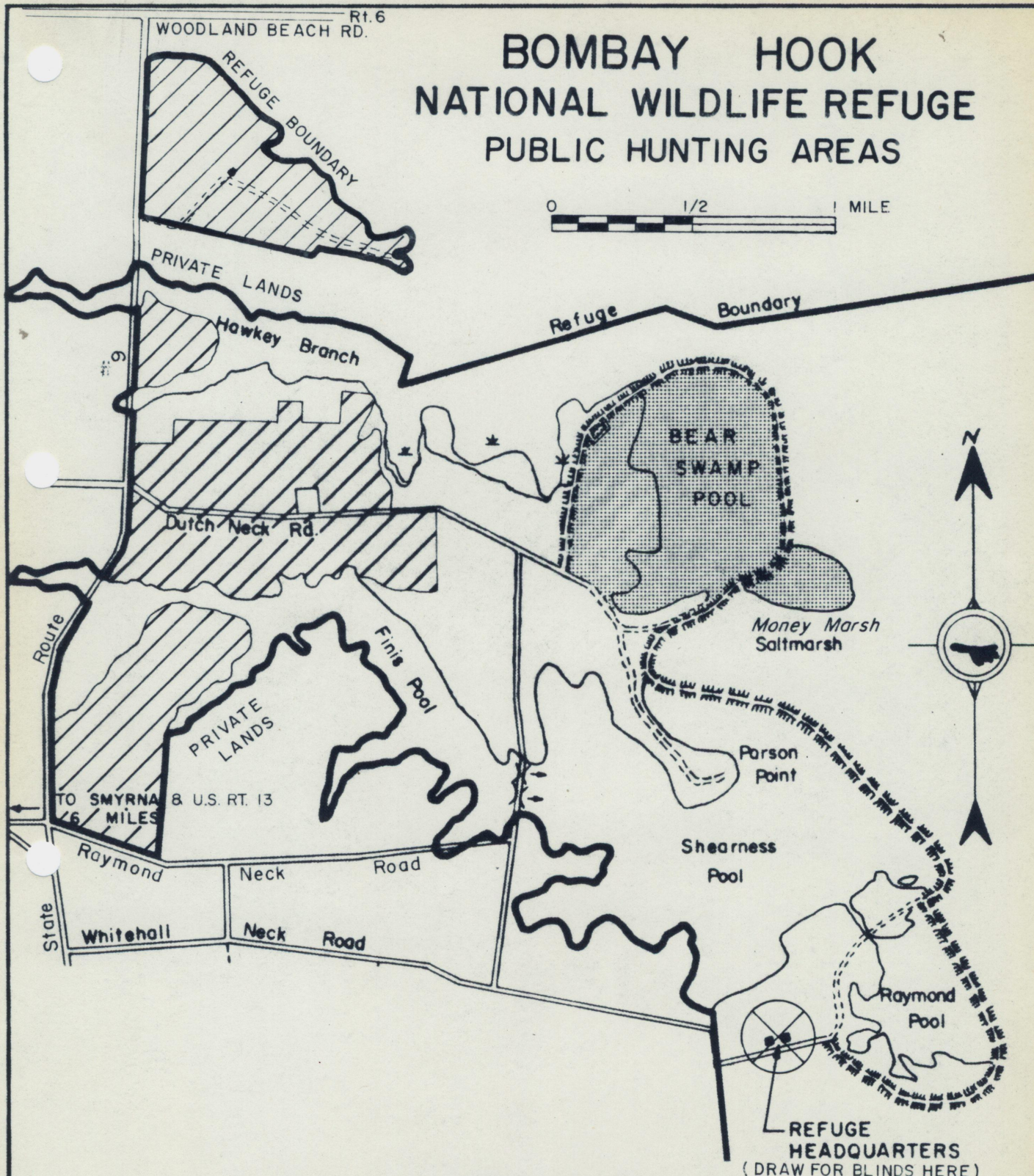
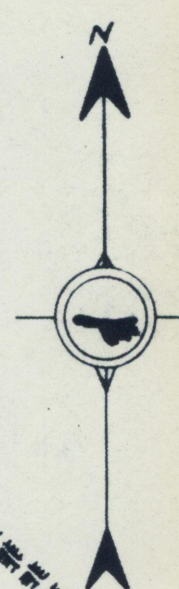
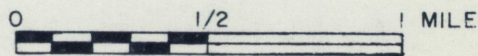
A proper application will consist of:



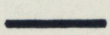
1. An Application Card available at Bombay Hook.
2. Complete card as indicated including the name of the instructor, if known. All applications must be received at the refuge prior to August 20.

To participate in the hunt at the refuge, the trainee will submit the following supporting papers:

1. A copy of a certificate of the trainee's successful completion of the National Riflemen's Association Gun Safety Course. This certificate will be returned to the trainee.
2. A certificate from a qualified instructor or sportsmen's club attesting to the trainee's age, training in waterfowl regulations, hunting equipment, and proper conduct or sportsmanship. A qualified instructor is an adult who is an experienced waterfowl hunter, who has passed the instructor's examination, and who is willing to volunteer the necessary time. During the hunt, the instructor must have his own license and duck stamp in his possession and will not be permitted to carry a gun or hunt.
3. A trainee examination sheet furnished by the Bureau or the club, completed by the trainee.
4. An instructor examination sheet furnished by the Bureau or club, completed by the instructor.
5. A certificate from the range captain or club secretary of a skeet or trap range stating that the trainee has broken at least five out of ten clay pigeons in 1968.

# BOMBAY HOOK NATIONAL WILDLIFE REFUGE PUBLIC HUNTING AREAS



-  Young Waterfowlers Area
-  West Waterfowl Hunting Area
-  Refuge Boundary

## Bombay Hook National Wildlife Refuge

## YOUNG WATERFOWLERS TRAINING PROGRAM

Instructors Guide

The following guidelines will assist the instructor for the Young Waterfowlers Training Program. We believe each instructor will want to present his own basic material, therefore, no formal text of instructions is necessary.

Each segment of the training program will be based on the judgment of the instructor and the required time to present the following:

1. State regulations. Supplemental with half-hour ETV series. Use State regulations booklet.
2. Federal regulations. Supplemental with half-hour ETV series. Use Federal Regulations Booklet #79.
3. Bird identification. Supplemental with half-hour ETV series. Use Ducks at a Distance booklet.
4. Hunting methods. Instructor's experience and personal guidance. Teach use of blinds, dogs, decoys, etc.
5. Gun Safety. NRA course required. Direct requests for group training to Delaware Game and Fish Commission.
6. Gun practice. Break 5 out of 10 clay pigeons at club range. Other public ranges are available in Delaware. Direct inquiry to the Delaware Wildlife Federation.

The Bombay Hook National Wildlife Refuge will furnish talks on various phases of the training on request of the instructors. However, the staff is limited and conflicts in schedules are possible. Other organizations furnishing services are the Delaware Game and Fish Commission and the Del-Bay Retriever Club.

The three half-hour programs will be televised during the fall (some-time after September 1). The schedule will be available and published at a later date. Permission will have to be obtained to use an elementary school room and ETV set for viewing. This will be arranged by the individual instructors through the local school districts.

Additional information may be obtained from the Bombay Hook Refuge Manager.

## YOUNG WATERFOWLERS TRAINING PROGRAM

## 1968 QUALIFICATION EXAMINATION FOR TRAINEES

The statements below can be verified by consulting the following: Federal Regulations governing the hunting-possession-transportation-importation of waterfowl, coots, and cranes 1967-68; any good waterfowl identification guide; or your personal instructor. The 1968-69 regulations must be closely examined for changes prior to hunting.

Mark only the false statements. A passing score is required to qualify.

FALSE

1. There are two major groups of ducks--puddle ducks and diving ducks.
2. Wild ducks, geese, brant, and swans belong to the family Anatidae.
3. It is legal to take migratory waterfowl over manipulated crops.
4. In the air, male and female black ducks look alike.
5. Camouflaged clothing is worn by duck hunters so that their movements are less likely to be noted by waterfowl.
6. Female mallards have a blue speculum with white borders.
7. Diving ducks generally patter along the water before becoming airborne.
8. High-base shells with No. 4 shot are considered good duck loads by many duck hunters.
9. It is unlawful to kill blue geese on the Atlantic Flyway.
10. A hen pintail looks something like a hen mallard in flight.
11. The canvasback duck has a distinctive profile.
12. Live waterfowl may not be used as decoys.
13. The male goldeneye has white cheek spots.
14. While they are molting, drake mallards resemble hens.
15. Green-winged teal are small ducks.
16. Magnum shells with No. 2 shot are recommended by many hunters for goose hunting.
17. If you cannot identify a bird, you shouldn't shoot it.

18. It is legal to take migratory game birds, including waterfowl, with a rifle.
19. The coots referred to in the Federal regulations are American coots--not scoter, eider, or old squaw.
20. Redhead ducks are classified as diving ducks.
21. The Bureau of Sport Fisheries and Wildlife has a Regional Office at the Post Office and Courthouse Building, Boston, Massachusetts.
22. The female wood duck has a white eye ring that can be seen under good light conditions at thirty yards.
23. Both male and female wood ducks have light-colored bellies.
24. Good sportsmen wait until birds are well within range before firing to increase their chances of making clean kills.
25. "Ducks at a Distance" is a useful identification guide which can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20240, for 25 cents a copy.
26. Yellowlegs were not legal game birds in 1967.
27. The male wood duck has a long square tail.
28. A hunter must read both State and Federal waterfowl regulations each year to be certain that no changes have been made.
29. Bufflehead usually are late migrants.
30. The hen ringneck can be confused with the hen redhead.
31. Guns capable of holding more than three shells are illegal for hunting snipe.
32. In Delaware, buck-shot may be used to hunt Canada geese.
33. The hen scaup has a white patch of feathers at the base of the bill.
34. State regulations may be more restrictive than Federal waterfowl regulations, but may not be more liberal.
35. A hunting license does not permit trespass on private lands.
36. Conservation law enforcement officers do not need the help and support of honest sportsmen.
37. Snow geese and blue geese are very similar except for color.
38. A waterfowl hunter must be 17 years of age before a hunting stamp is required.

39. The common hen goldeneye has a brownish head.
40. In Delaware it is unlawful to hunt from a boat within 1,500 feet of a legally established blind.
41. Because of their size, Canada geese seem to be flying at a slower speed than they are.
42. Use of well-trained retrievers will cut down on the number of crippled waterfowl that are not recovered.
43. A duck stamp is validated when the hunter signs his name in ink across the face of the stamp.
44. A good sportsman goes out of his way to avoid spoiling another hunter's chance at game.
45. "Sky busting" is shooting at birds that are beyond the effective range of the hunter's gun, and is the mark of a "greenhorn" hunter.

## BOMBAY HOOK NATIONAL WILDLIFE REFUGE

## YOUNG WATERFOWLERS TRAINING PROGRAM

## 1968 QUALIFICATION EXAMINATION FOR INSTRUCTORS

The statements below can be verified by consulting the following: Federal Regulations governing the hunting-possession-transportation-importation of waterfowl, coots, and cranes 1967-68; or any good waterfowl identification guide. The 1968-69 regulations must be closely examined for changes prior to hunting.

Mark only the false statements. A passing score is required to qualify.

FALSE

1. Puddle ducks launch themselves directly upward when rising.
2. 1967-68 Federal regulations permitted taking geese with a long bow and arrow.
3. Taking waterfowl by the aid of bait is prohibited.
4. Shotguns for taking waterfowl must not be capable of holding more than two shells in the magazine.
5. Blue-winged teal have green feathers on the trailing edge of the wing.
6. There is a special season on sea ducks.
7. Waterfowl left at a cleaning and picking plant must be tagged by the hunter.
8. A light ring around the bill distinguishes the ring-necked duck from the scaup.
9. The hooded merganser receives special protection.
10. A Delaware hunting license is required of all Delaware waterfowl hunters who have reached the age of 16.
11. If you can clearly see the eye of a duck, it is within shotgun range.
12. A hunter must make a reasonable effort to recover a downed waterfowl.
13. To hunt brant, persons 16 years of age or older must have an unexpired duck stamp properly validated.
14. Delaware does not have a special sea duck season.
15. Wood ducks do not quack.

16. State waterfowl regulations may be more restrictive than Federal regulations.
17. The snow goose has black wing tips.
18. A duck stamp is not required to hunt woodcock.
19. Shotguns larger than 10 gauge are prohibited for hunting snipe.
20. Under Federal Regulations, migratory game birds may not be taken with a trained hawk.
21. Wounded ducks may not be kept alive by the hunter.
22. In Delaware, buck-shot may be used to hunt Canada geese.
23. Oversized black duck decoys at times work better than life-sized decoys.
24. The drake widgeon has a white head patch.
25. The female black duck has white underwing coverts.
26. Puddle ducks may feed in grain fields.
27. The mallard, black duck, widgeon, gadwall, shoveler, all teal, pintail, wood duck, and greater scaup are all considered puddle ducks.
28. Shotguns smaller than 20 gauge are legal for waterfowl hunting, but are not considered to be adequate by most duck hunters.
29. Common, red-breasted, and hooded mergansers all have slender bills.
30. In Delaware, blue geese may be legally taken.
31. Uninjured waterfowl may not be taken from a boat under power or sail.
32. Woodcock may be hunted with a gun that holds not more than three shells, but no duck stamp is required.
33. Greater snow geese may be legally taken in Delaware and included in the daily bag of geese.
34. The hunter, not the manufacturer, is responsible for having a properly plugged gun while duck hunting.
35. Migratory birds, including waterfowl, may be taken with a rifle.
36. Many good duck hunters mark known distances from their blind to help them determine when birds are in range.

37. In 1967 there was a special season during which time there was a bonus bag limit for lesser scaup.
38. The drake pintail and the drake old squaw both have sharp pointed tails.
39. At times, a small number of good decoys can swing ducks within gun range that would otherwise pass by.
40. It is lawful to hunt waterfowl over a manipulated crop.

DELAWARE WILDLIFE FEDERATION  
YOUNG WATERFOWLERS TRAINING PROGRAM

Now that you have completed the Young Waterfowlers Training Program, please fill out the following:

- 1. Number of shots fired at ducks ..... \_\_\_\_\_
- 2. Number of shots fired at geese ..... \_\_\_\_\_
- 3. Number of birds hit but not recovered ..... \_\_\_\_\_
- 4. Number of geese killed ..... \_\_\_\_\_
- 5. Number of ducks killed ..... \_\_\_\_\_
- 6. Species of ducks killed ..... \_\_\_\_\_,  
 \_\_\_\_\_,

In the space below, write a statement of what you thought of the Young Waterfowlers Training Program:

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

NAME: \_\_\_\_\_

AGE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

SPONSORING CLUB: \_\_\_\_\_

Each blind was limited to two students and one instructor. Of the 192 youths, 178 were boys and 14 were girls. Each student was required to complete a questionnaire and write a short statement on the program. Awards are to be presented to the ten best youths as judged by Mr. Norman Wilder, Director of Delaware Game and Fish Commission and Mr. Ted Harvey, Director of Delaware Wildlands, Inc. Books entitled Waterfowl Tomorrow and Birds In Our Lives will be presented to the ten award winners at a special meeting of the Delaware Wildlife Federation. We look forward to a continuation of the program at Bombay Hook and the sponsorship by the Delaware Wildlife Federation.

#### E. Violations.

Four incidents of violations of Federal Laws were recorded on the refuge this past year involving eight hunters:

1. November 9, 1968. One hunter killed a pied-billed grebe while hunting within the South Public Hunting Area.
2. November 8, 1968. Two hunters apprehended hunting in a closed area of the refuge, one of whom had killed a green-winged teal.
3. December 5, 1968. Four hunters found with cob corn scattered within decoys while hunting from Blind #6, located in the West Public Hunting Area.
4. December 17, 1968. One man found to be using buckshot while hunting waterfowl from Blind #6 of the West Public Hunting Area.

A noticeable increase in hunter use of the refuge public hunting areas occurred this year requiring more time on routine patrol.

There are several factors which hinder in the carrying out of these patrols. Blinds in the South Public Hunting Area are scattered making accessibility to them difficult due to tides and weather. Also, in the line of Safety, it is necessary to place two men on all boat patrols.

The taking of protected species either through mistaken identity or on purpose is evident along with the practice of using buckshot to reach the higher flying geese.

In the West Public Hunting Area several of the blinds are located near public roads. This, in conjunction with browse food available near these roads, creates the problem of trespass hunting the refuge. Proper surveillance in this area is lacking due to the present manpower shortage. Although adequate posting of rules

and regulations is evident throughout the public hunting areas, there seem to be an ever increasing number of the hunters who appear to disregard these instructions.

- F. Safety. Monthly Staff Safety Meetings were conducted by chairmanship-rotation of the personnel. Topics discussed were as follows:

<u>Month</u>	<u>Chairman</u>	<u>Topic(s)</u>
January	H. S. Bush	Job Hazard Analysis
February	J. W. Parker	First Aid
March	H. H. Cottman	Defensive Driving
April	N. E. Holgersen	Boat Safety
May	M. Radway*	Reporting of Accidents
June	A. L. Tibbs	Debriefing of the Delaware Safety Council Meetings
July	V. E. Baughman	Young People and Safety
August	R. G. Nelson	1. Annual Safety Chairmanship Change 2. What To Do In Case Of An Accident
October	K. C. Liehr	Merits of Good Housekeeping re Safety
November	L. Steller	Safe Driving
December	R. F. Nugent	Accident Causes

\*Guest Chairman.

No "lost-time accidents" occurred in 1968. Bombay Hook National Wildlife Refuge had a 1,845 day buildup (as of December 31, 1968) since its last lost-time accident. The last reportable accident occurring within the confines of the Refuge was on November 18, 1968 when a shotgun deer hunter fell from his tree-perch, resulting in three fractured ribs and a broken collarbone.

The Explosive Ordinance Detonating Team from the Dover Air Force Base was called upon to defuse several World War II air-to-surface rockets found in the Bear Swamp Pool area. The Army had some of its heavy artillery training in the early 1940's on portions of the Refuge and dud bombs still present a potential danger.

Several safety structures and features were erected or maintained to provide for the safety of personnel and the public. They include:

- (1) Safety roll-bars welded onto the Super-A and John Deere 3010 farm tractors;
- (2) Handrails, fire extinguishers and first-aid kit were put aboard the Boston Whaler;
- (3) A chain-link fence placed under the boathouse handrails;
- (4) Elevated headlights were installed on the Dodge Power Wagon to facilitate night driving while the snowblade is attached;
- (5) Boat-launching hoist on wharf was rebuilt increasing its safety and lifting capacity; and
- (6) Removal of trees close to the north end of the runway.

Procurement of safety equipment included a crash helmet for flying, safety goggles, gloves, and life-jacket replacements.

Periodic checks were made on the buildings, fire extinguishers, and vehicles.

The refuge Safety Committee was reorganized in August. This annual reorganization, using a wage board employee as Station Safety Officer and Chairman of the Committee stimulates interest in the overall station Safety program. The present committee consists of:

Kenneth C. Liehr . . . Chairman  
 Louis Steller . . . . . Member  
 Virginia E. Baughman . Member  
 Richard F. Nugent . . . Member

## VII. OTHER ITEMS

A. Items of Interest.

1. Personnel Notes. Assistant Refuge Manager Arthur L. Tibbs transferred to Moosehorn National Wildlife Refuge on July 9, 1968. Mr. Tibbs began his career with the Bureau here at Bombay Hook on June 26, 1967.

Richard F. Nugent entered on duty December 9, 1968 to fill the Assistant Refuge Manager's position. Dick was not a stranger to some of us as he was employed as a Student Assistant at Prime Hook during the summer of 1965. We all wish him well and that he will enjoy his assignment to Bombay Hook.

Dr. and Mrs. Ira A. Gabrielson visited the refuge on several occasions to visit their grandson, Stephen A. Nesbitt, who was our Biological Technician (Wildlife) this summer. Dr. Gabrielson is President of the Wildlife Management Institute and World Wildlife Fund as well as being associated with many other conservation agencies.

Thomas E. Mitchell, Student Laborer, who had been employed the past two previous summers on our mosquito control project had to leave on June 27, 1968 to fulfill his Army ROTC commitment for the University of Delaware. However, he did consent to work three weeks this summer to orient another student, John G. Connell, a first year student on the project.

2. Training. Assistant Refuge Manager Arthur L. Tibbs attended the Refuge Managers Training Course, Arden Hills, Minnesota, April 22 to May 17, 1968.

Clerk-Stenographer Virginia E. Baughman attended the Clerical Workshop Conference in Boston, Massachusetts April 15-18, 1968. Mrs. Baughman also attended the Secretarial Techniques Seminar, Philadelphia, Pennsylvania June 4, 5, and 6, 1968.

Kenneth C. Liehr attended the Wildlife Management Course at Delaware State College, Dover, Delaware from September through December, 1968.

Foreman I Louis Steller attended the Civil Defense Radiological Monitoring School, Dover, Delaware on September 28, 1968.

3. Awards.

Superior Performance Awards were presented by Refuge Manager Nelson to ten employees of Bombay Hook and Prime Hook Refuges

for contributions toward carrying out the Bureau's refuge program during the period February 25, 1967 to August 28, 1967 when both stations were operating with only a minimum of help. Awards were presented to Virginia Baughman, Norman Holgersen, Lee Tibbs, George Gage, Henry Bush, Howard Cottman, Kenneth Liehr, John Parker, William Sipple, and Louis Steller. A monetary award was also presented to these employees.

Foreman Louis Steller and Prime Hook Maintencemanceman William H. Sipple received an award for their suggestion pertaining to new outboard motor boat trailer lights.

4. Revenue Sharing Act. At the regular meeting of the Kent County Levy Court, Dover, Delaware, on October 22, 1968, Refuge Manager Nelson presented a check in the amount of \$8,962.35 to the Board.
5. Publicity. The news media considered the refuge to be newsworthy in a total of 1,085 column inches of news articles.
6. Allee House. The Delaware State Archives Commission, under a Special Use Permit, restored this 215 year old house and opened it to the public June 25, 1966. Visiting hours are from 1:00 to 5:00 P.M. on Saturdays and Sundays. Tours are conducted by the resident caretakers during these hours and at other times by special arrangement. Total visitor use this year was 1,374.
7. Cooperation. The Delaware Conservation Education Association, a non-profit group interested in the teaching of conservation in Delaware, began an eight part film series and educational package covering the natural resources in Delaware. The refuge receipts to Kent County for the past three years of approximately \$20,000 was used to get the five year project off the ground. Additional funds totalling \$100,000 are now being solicited from private foundations, grants and other sources to complete the program.

We believe this is the first time refuge receipts to counties are being used by a group not affiliated with the public schools. It is food for thought as many areas of conservation education is lacking in the public school system.

We found the Kent County Levy Court members to be very attentive when we gave our "sales pitch" for the use of the receipts and monies; however, the Sussex County Levy Court agreed the project had considerable merit, but their refuge receipt fund had been obligated to the Milton and Milford School Districts. They have agreed to study their budget and possibly divert the other funds to the Delaware Conservation Education Association project. The need for money . . . a problem to all.

8. Rescue.

A near tragedy occurred the opening day of the duck hunting season at the South Waterfowl Hunting Area. Two young men and a five year old youngster were hunting from a blind along the shore of Delaware Bay. They were proceeding to the checking station and their vehicle when a combination of high, off-shore winds and a failing outboard motor set them adrift. Attempts to repair the motor were futile and the small boat continued further into the rough waters of the bay. To lighten the boat the men discarded the outboard motor, broken oars and useless anchor.

A search for the missing party was organized as darkness closed the blinds and they failed to return. The Little Creek Volunteer Fire Company, using the Delaware State Shell Fisheries Patrol boat, found the missing party four miles from the refuge at 9:00 P.M. Having spent over eight hours adrift, the group was tired, wet and cold. Much restraint was required to keep the search party from the young boy's father for taking him into the marsh under existing conditions.

9. Credits: Wildlife Biologist Norman E. Holgersen prepared Sections I, II, III-C thru G, IV, V and Narrative Report forms. Refuge Manager Nelson prepared Sections III-A and B, VI-D, and VII-7 and 8. Assistant Refuge Manager Richard F. Nugent prepared Sections VI-D.5. and F. Maintenceman Kenneth C. Liehr prepared Section VI-E. Clerk-Stenographer Virginia Baughman prepared Sections VI-A, B and C, and VII-A.1 thru A.6, who also with the assistance of Clerk-Stenographer Joan C. MacDonald (BOD 1/20/69) typed the report.

Photographs. The photographs included in this report were taken during the course of refuge activities. Development and printing was from commerial sources. Credits are as noted.

News articles concerning refuge activities are appended.

SIGNATURE PAGE

Reviewed by:

Thomas Carlson

Submitted by:

Robert S. Nelson

Date: 2/14

Date: 2/14/69

NR's Checked in R.O. by HC/Yw

3-175  
Form NR LA  
(Aug. 1952)

Refuge Bombay Hook

MIGRATORY BIRDS  
(Other than Waterfowl)

Months of January to April 1968

(1) Species Common Name	(2) First Seen		(3) Peak Concentration	(4) Last Seen		(5) Production			(6) Total	
	Number	Date	Number	Inclu- sive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
<b>I. Water and Marsh Birds:</b>										
Horned Grebe	1	3/19	2	3/28-4/14	2	4/14				60
Pied-billed Grebe	1	2/19	20	3/15-4/30	Still Present					950
Great Blue Heron	Previous Period		40	1/5-12	Still Present					1500
Green Heron	1	4/16	10	4/21-30	Still Present					100
Little Blue Heron	1	4/11	1	4/11	1	4/11				1
Cattle Egret	1	4/5	1	4/5	1	4/5				1
Common Egret	1	3/20	5	4/1-30	Still Present					200
Snowy Egret	1	4/1	10	4/21-30	Still Present					100
Black-crowned Night Heron	Previous Period		20	1/5-12	Still Present					300
Least Bittern	1	4/20	20	4/25-30	Still Present					175
American Bittern	1	3/31	25	4/15-30	Still Present					250
Glossy Ibis	21	4/27	21	4/27	21	4/27				21
Clapper Rail	Previous Period		400	4/1-30	Still Present					15,000
Virginia Rail	1	4/12	20	4/15-30	Still Present					450
Common Gallinule	1	4/20	1	4/20	1	4/20				1
<b>II. Shorebirds, Gulls and</b>										
<u>Terns:</u>										
Semipalmated Plover	1	4/21	1	4/21	1	4/21				1
Killdeer	1	2/17	6	4/6-30	Still Present					250
American Golden Plover	4	4/10	4	4/10	4	4/10				4
Black-bellied Plover	2	4/19	5	4/20	5	4/20				50
American Woodcock	10	3/15	25	3/18-4/30	Still Present					1150
Common Snipe	1	2/17	25	4/15-25	Still Present					900
Willet	3	4/5	150	4/15-30	Still Present					2300
Greater Yellowlegs	1	3/15	50	4/21-30	Still Present					1000
Lesser Yellowlegs	1	3/22	40	3/28-4/3	Still Present					700
Pectoral Sandpiper	1	3/28	45	4/19-4/26	Still Present					1000
Least Sandpiper	1	4/6	15	4/21	Still Present					50
Dunlin	15	3/23	30	3/28-4/3	Still Present					500

(over)

(1)	(2)	(3)	(4)	(5)	(6)		
III. Doves and Pigeons:	Previous Period	100	3/15-4/30	Still Present		7,500	
Mourning dove							
White-winged dove							
IV. Predaceous Birds:	Previous Period	3	1/5-2/4 3/25-26	Still Present	1	0	150
Bald Golden eagle							
Duck hawk	Previous Period	12	3/1-4/30	Still Present	3	6	700
Horned owl							
Magpie							
Raven							
Crow	Previous Period	500	1/1-1/31	Still Present			20,000
Common & Fish Red-tailed Hawk	Previous Period	20	1/1-2/15	Still Present			1,200
Red-shouldered Hawk	Previous Period	4	1/1-2/15	Still Present			250
Rough-legged Hawk	Previous Period	20	1/1-2/15	1	3/26		1,200
Marsh Hawk	Previous Period	50	1/1-2/15	Still Present			3,000
Osprey	1	3/20	4	4/14-16	Still Present		75
Sparrow Hawk	Previous Period	10	1/1-2/29	Still Present			800
Barn Owl	Previous Period	2	1/1-4/30	Still Present			240

INSTRUCTIONS

Reported by N. Holgersen

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing Species in Group I, X out heading for Group II and retype below or continue on second form.

Explanation of column headings:

- (1) Species: Use correct names as found in the A.O.U. Checklist.
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population no. days present) of refuge during the reporting period.

3-177  
Form NR-1A  
(Aug. 1952)

MIGRATORY BIRDS  
(Other than Waterfowl)

Refuge Bombay Hook

Months of January to April 1968

(1) Species	(2) First Seen		(3) Peak Concentration	(4) Last Seen		(5) Production			(6) Total	
	Number	Date	Number	Inclu- sive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
<u>I. Water and Marsh Birds:</u>										
<u>II. Shorebirds, Gulls and Terns:(cont'd)</u>										
Dowitcher	1	3/30	5	4/1-30	Still Present					50
Ruff	1	4/6	1	4/6,4/21	1	4/21				2
American Avocet	1	3/23	5	4/13	2	4/14				8
Great Black-backed Gull	Previous	Period	50	1/15-3/15	Still Present					3500
Herring Gull	Previous	Period	300	1/15-3/15	Still Present					20,000
Ring-billed Gull	Previous	Period	400	3/13-3/20	Still Present					5,000
Laughing Gull	5	4/8	100	4/12-30	Still Present					1,700
Bonaparte's Gull	2	3/24	2	3/24	2	3/24				2
<u>II. Shorebirds, Gulls and Terns:</u>										

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove					
IV. <u>Predaceous Birds:(cont'd)</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow					
Barred Owl	Previous Period	6	1/1-4/30	Still Present	720
Short-eared Owl	1 3/7	2	3/10-30	1 3/30	50

#### INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing Species in Group I, X out heading for Group II and retype below or continue on second form.

Explanation of column headings:

- (1) Species: Use correct names as found in the A.O.U. Checklist.
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population no. days present) of refuge during the reporting period.



(1)	(2)	(3)	(4)	(5)	(6)			
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove	Previous Period	150	7/1-8/31	Still Present		10,000		
IV. <u>Predaceous Birds:</u> <del>Sparrow</del> eagle, Bald	Previous Period	2	5/1-31	Still Present		100		
Duck hawk	Previous Period	8	5/1-8/31	Still Present		1,000		
Horned owl	Previous Period							
Magpie	Previous Period							
Raven	Previous Period							
Crow, Common & Fish	Previous Period	75	8/1 - 31	Still Present		6,000		
Cooper's Hawk	1	8/25	1	8/25		5		
Red-tailed Hawk	Previous Period	6	5/1-8/31	Still Present		800		
Red-shouldered Hawk	"	"	"	"		250		
Marsh Hawk	"	"	8/25-31	"	1	0	300	
Osprey	"	"	5/1-7/15	2	8/18	1	0	500
Sparrow Hawk	"	"	8/25-31	Still Present			600	
Barn Owl	"	"	5/1-8/31	"	"		500	

INSTRUCTIONS

Continued on Page 2.

- See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing species in Group I, you can X out heading for Group II and continue listing. Retype heading of Group II below, or list Group II on a second page. Here, too, if the list is long, you can X out both headings and retype heading for Group II at top of form. This can eliminate the necessity for a third page of form.

Explanation of column headings:

- (1) Species: Use correct names as found in the A.O.U. Checklist.
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-175  
Form NR-1A  
(Aug. 1952)

MIGRATORY BIRDS  
(Other than Waterfowl)

Refuge Bombay Hook

Months of May to August 19 68

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
	Number	Date	Number	Inclu- sive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
<del>XXXXXXXXXXXXXXXXXXXX</del>										
<b>II. Shorebirds, Gulls and Terns:</b>										
Semipalmated Plover	15	5/2	300	8/1-31	Still Present					10,000
Killdeer	Previous Period		35	8/1-31	" "					2,500
Black-bellied Plover	45	5/2	55	5/3	" "					1,200
Ruddy Turnstone	1	8/1	35	8/1-31	" "					150
American Woodcock	Previous Period		40	5/1-8/25	" "					5,000
Common Snipe	" "		15	8/1-31	" "					600
Whimbrel	38	5/23	38	5/23	38 5/23					38
Spotted Sandpiper	21	5/4	25	7/25-8/15	Still Present					1,000
Solitary Sandpiper	2	5/8	2	5/8	1 8/24					10
Willet	Previous Period		350	6/7-30	1 8/20					18,000
Greater Yellowlegs	" "		300	8/1-31	Still Present					12,000
Lesser Yellowlegs	" "		150	8/1-31	" "					6,000
Knot	1	8/24	1	8/24	1 8/24					1
<del>XXXXXXXXXXXXXXXXXXXX</del>										
<del>XXXXXX</del>										
Pectoral Sandpiper	Previous Period		25	8/1-31	Still Present					900
Least Sandpiper	" "		500	8/1-31	" "					18,000
Curlew Sandpiper	One present	5/17-20		and one present	7/28-30					7
Dunlin	Previous Period		500	5/23	Still Present					15,000
Dowitcher	" "		400	8/1-31	" "					15,000
Stilt Sandpiper	4	5/23	41	8/4	" "					1,000
Semipalmated Sandpiper	25	5/2	2,000	8/1-31	" "					60,000
Western Sandpiper	5	8/7	50	8/15-31	" "					400
Sanderling	25	7/25	150	8/7-31	" "					3,000
American Avocet	1	5/11	24	8/10	" "					700
Black-necked Stilt	3	7/17	22	8/20	" "					50
Wilson's Phalarope	1	5/13	3	8/31	3 8/31					10

(over)

Continued on Page 3.

5RF-4/68

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove					
IV. <u>Predaceous Birds:</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow					
<u>Barred Owl</u>	Previous Period	6	5/1-8/31	Still Present	750
<u>Short-eared Owl</u>	1 8/22	1	8/22-24	1 8/24	3

#### INSTRUCTIONS

- See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing species in Group I, you can X out heading for Group II and continue listing. Retype heading of Group II below, or list Group II on a second page. Here, too, if the list is long, you can X out both headings and retype heading for Group II at top of form. This can eliminate the necessity for a third page of form.

#### Explanation of column headings:

- (1) Species: Use correct names as found in the A.O.U. Checklist.
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1757  
Form NR-1A  
(Aug. 1952)

MIGRATORY BIRDS  
(Other than Waterfowl)

Refuge Bombay Hook Months of May to August 19 68

(1) Species	(2) First Seen		(3) Peak Concentration	(4) Last Seen		(5) Production			(6) Total	
Common Name	Number	Date	Number	Inclu- sive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
<b>I. Water and Marsh Birds:</b>										
<b>II. Shorebirds, Gulls and Terns:</b>										
Great Black-backed Gull	Previous	Period	100	7/15-8/15	Still	Present				5,000
Herring Gull	"	"	1,000	"	"	"				40,000
Ring-billed Gull	"	"	400	"	"	"				20,000
Laughing Gull	"	"	300	8/1-8/31	"	"				15,000
Forster's Tern	1	5/30	50	8/7-31	"	"				1,500
Least Tern	1	5/23	5	5/30-7/14	2	8/15				300
Caspian Tern	1	5/18	1	5/18-19	1	5/19				2
Black Tern	1	5/18	1	5/18, 5/26	1	5/26				2
Black Skimmer	4	7/6	4	7/6	1	7/14				10

(over)

5RF-4/68

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

#### INSTRUCTIONS

• See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing species in Group I, you can X out heading for Group II and continue listing. Retype heading of Group II below, or list Group II on a second page. Here, too, if the list is long, you can X out both headings and retype heading for Group II at top of form. This can eliminate the necessity for a third page of form.

#### Explanation of column headings:

- (1) Species: Use correct names as found in the A.O.U. Checklist.
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-175  
Form NR-1A  
(Aug. 1952)

MIGRATORY BIRDS  
(Other than Waterfowl)

Refuge Bombay Hook Months of September to December 1968

(1) Species Common Name	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
Horned grebe	1	11/27	1	11/27-12/8	1	12/8				12
Pied-billed grebe	Previous	Period	30	9/1-15	2	12/23				1,000
Great blue heron	Previous	Period	75	12/5-15	Still	Present				3,500
Green Heron	Previous	Period	100	9/1-31	1	10/24				4,000
Little blue heron	Previous	Period	250	9/1-30	1	10/25				9,000
Cattle egret	1	10/7	1	10/7-11/2-28	1	11/28				3
Common egret	Previous	Period	100	9/1-30	1	12/8				4,000
Snowy egret	Previous	Period	200	9/1-15	1	11/24				5,000
Louisiana heron	previous	Period	2	9/8	2	9/8				5
Black-crowned night her.	Previous	Period	25	9/1-10/15	Still	Present				1,500
Least bittern	Previous	Period	75	9/1-15	1	10/15				1,500
<del>II. Shorebirds, Gulls, etc.</del>										
American bittern	Previous	Period	40	9/1-15	Still	Present				1,500
Glossy ibis	Previous	Period	23	9/2	1	11/26				50
White ibis	1	9/1	1	9/1-10/17	1	10/17				47
Clapper rail	Previous	Period	400	9/1-10/15	Still	Present				25,000
Virginia rail	Previous	Period	50	9/1-30	1	10/15				2,000
Sora	Previous	Period	50	9/15-10/1	1	10/15				2,000
Common Gallinule	Previous	Period	35	9/1-15	1	10/28				1,500

(over)

5RF-4/68

(1)	(2)		(3)	(4)		(5)	(6)
III. <u>Doves and Pigeons:</u>							
Mourning dove	Previous	Period	200	10/15-31	Still Present		10,000
White-winged dove							
IV. <u>Predaceous Birds:</u>							
<del>Golden</del> eagle, bald	Previous	Period	2	10/30-12/31	Still Present		75
Duck hawk	1	9/28	1	9/28	1 9/28		1
Horned owl	Previous	Period	8	9/1-12/31	Still Present		1,000
Magpie							
Raven							
Crow common & fish	Previous	Period	500	10/15-12/31	Still Present		40,000
Red-tailed hawk	Previous	Period	25	11/1-12/31	Still Present		2,000
Red-shouldered hawk	Previous	Period	2	9/1-12/31	Still Present		250
Rough-legged hawk	1	10/26	15	11/15-12/31	Still Present		800
Marsh hawk	Previous	Period	50	11/1-12/31	Still Present		4,500
Osprey	1	9/23	1	9/23	1 9/23		1
Sparrow hawk	Previous	Period	8	10/15-12/31	Still Present		750

#### INSTRUCTIONS

- See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing species in Group I, you can X out heading for Group II and continue listing. Retype heading of Group II below, or list Group II on a second page. Here, too, if the list is long, you can X out both headings and retype heading for Group II at top of form. This can eliminate the necessity for a third page of form.

#### Explanation of column headings:

- (1) Species: Use correct names as found in the A.O.U. Checklist.
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-175  
Form NR-1A  
(Aug. 1952)

MIGRATORY BIRDS  
(Other than Waterfowl)

Refuge Bombay Hook Months of September to December 19 68

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
	Number	Date	Number	Inclu- sive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
<b>II Water and Marsh Birds:</b>										
<b>Shorebirds and gulls and Terns:</b>										
Semipalmated plover	Previous	Period	300	9/1-15	4	10/20				8,000
Killdeer	Previous	Period	50	11/15-30	1	12/24				2,500
American golden plover	2	9/23	23	10/12	10	10/22				500
Black-bellied plover	Previous	Period	30	8/29	1	11/1				1,200
Ruddy turnstone	Previous	Period	35	9/1-7	5	9/10				200
American woodcock	Previous	Period	50	10/15-31	1	11/28				4,000
Common snipe	Previous	Period	50	9/15- 10/15	Still	Present				2,500
Spotted sandpiper	Previous	Period	1	9/2	1	9/2				5
Willet	1	9/30	1	9/30	1	9/30				1
Greater yellowlegs	Previous	Period	300	9/1- 10/15	6	11/29				15,000
Lesser yellowlegs	Previous	Period	150	9/1-30	2	11/20				6,000
<b>III. Shorebirds, Gulls and Terns</b>										
American Avocet	Previous	Period	133	10/12-17	17	12/5				2,500
Knot	3	9/1	3	9/1	3	9/1				3
Pectoral sandpiper	Previous	Period	52	9/28	1	11/22				1,500
White-rumped sandpiper	1	9/1	6	9/26	1	9/29				25
Baird's sandpiper	1	10/7	1	10/7-12	1	10/12				5
Least sandpiper	Previous	Period	500	9/1-31	5	10/31				18,000
Dunlin	Previous	Period	2,000	11/5-15	65	12/24				60,000
Dowitcher	Previous	Period	400	9/1- 10/15	3	11/30				25,000
Stilt sandpiper	Previous	Period	19	10/17	5	10/20				4,000
Semipalmated sandpiper	Previous	Period	2,000	9/1-15	13	11/30				50,000
Western sandpiper	Previous	Period	50	9/1-30	1	10/25				2,500
Buff-breasted sandpiper	Previous	Period	2	9/8	2	9/8				2
Sanderling	Previous	Period	50	9/1-30	10	10/10				2,500

(over)

5RF-4/68

(1)	(2)	(3)	(4)	(5)	(6)		
<b>III. Doves and Pigeons:</b>							
Mourning dove							
White-winged dove							
<b>IV. Predaceous Birds:</b>							
Golden eagle							
Duck hawk							
Horned owl							
Magpie							
Raven							
Crow							
Barn owl	Previous	Period	4	9/1-12/31	Still Present	500	
Barred owl	Previous	Period	6	9/1-12-31	Still Present	750	
Short-eared owl	1	10/7	1	10/7-10	1	10/10	4

#### INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing species in Group I, you can X out heading for Group II and continue listing. Retype heading of Group II below, or list Group II on a second page. Here, too, if the list is long, you can X out both headings and retype heading for Group II at top of form. This can eliminate the necessity for a third page of form.

Explanation of column headings:

- (1) Species: Use correct names as found in the A.O.U. Checklist.
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-175  
Form NR-1A  
(Aug. 1952)

MIGRATORY BIRDS  
(Other than Waterfowl)

Refuge Bombay Hook Months of September to December 19 68

(1) Species Common Name	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
<u>I. Water and Marsh Birds:</u>										
<u>II. Shorebirds, Gulls and Terns:</u>										
Black-necked stilt	Previous Period		1	9/2	1	9/2				1
Wilson's phalarope	3	9/1	20	9/28	1	12/2				250
Northern Phalarope	1	9/4	2	9/5-8	2	9/8				9
Great black-backed gull	Previous Period		50	12/1-31	Still Present					2,500
Herring gull	Previous Period		500	9/1-10/15	Still Present					25,000
Ring-billed gull	Previous Period		300	9/1-10/15	Still Present					15,000
Laughing gull	Previous Period		300	9/1-15	10	10/15				6,000
Bonaparte's gull	1	9/28	100	12/6	100	12/6				115
Forster's Tern	Previous Period		50	9/1-15	3	10/18				1,000
Black tern	1	9/1	1	9/1,9/5	1	9/5				2
Black skimmer	1	11/13	1	11/13	1	11/13				1

(over)

5RF-4/68

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

#### INSTRUCTIONS

- See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing species in Group I, you can X out heading for Group II and continue listing. Retype heading of Group II below, or list Group II on a second page. Here, too, if the list is long, you can X out both headings and retype heading for Group II at top of form. This can eliminate the necessity for a third page of form.

#### Explanation of column headings:

- (1) Species: Use correct names as found in the A.O.U. Checklist.
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1752  
Form R-2  
(April 1946)

UPLAND GAME BIRDS

Refuge Bombay Hook

Months of January to April, 1968

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'd.	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bobwhite	1,100 acres of upland and edges.	11	0	0	50/50				100	Estimates based on random field observations.
Ring-necked Pheasant	1,100 acres of upland and edges.	37	0	0	33/67				30	Estimates based on random field observations.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.\*

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

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

3-1752  
Form 2  
(April 1946)

UPLAND GAME BIRDS

Refuge Bombay Hook Months of May to August, 1968

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
						Hunting	For Re-stocking	For Research		
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods observed	Estimated Total	Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bobwhite	1,100 acres of upland and edges	7	3	75	50:50				150	Estimates based on random field observations.
Ring-necked Pheasant	1,100 acres of upland and edges	18	3	40	50:50				60	Estimates based on random field observations.

256 1/68

5871-2  
Form  
(April 1966)

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.\*

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

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

5RF 11/66

3-1752  
Form R-2  
(April 1946)

UPLAND GAME BIRDS

Refuge Bombay Hook

Months of September to December, 19 68

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
						Hunting	For Re- stocking	For Research		
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'd.	Estimated Total	Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bobwhite	1,100 acres of upland and edges	9	0	0	50/50				125	Estimates based on random field observations.
Ring-necked Pheasant	1,100 acres of upland and edges	8	0	0	50/50				40	Estimates based on random field observations.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.\*

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

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

3-1773  
Form NR-3  
(June 1945)

BIG GAME

Refuge Bombay Hook

Calendar Year 1968

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions	(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss		Number	Source	
Whitetail deer	2,000 acres of upland woods, field edges, cropland and marsh.	35	* 34								150	110	50/50

Remarks: \* Includes 29 deer bagged and 5 killed but not recovered.

Reported by Norman E. Holgersen

## INSTRUCTIONS

Form NR-3 - BIG GAME

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

3-1754  
Form NR-4  
(June 1945)

SMALL MAMMALS

Refuge Bombay Hook

Year ending April 30, 1968

(1) Species  Common Name	(2) Density		(3) Removals				(4) Disposition of Furs					(5) Total Popula- tion	
	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping			Furs Destroyed		
								Permit Number	Trappers Share	Refuge share			Total Refuge Furs Shipped
Opossum	1,700 Upland	17			11*								100
Cottontail Rabbit	1,700 Upland	8.5	10			182**							200
Woodchuck	1,700 Upland	11.3											150
Grey Squirrel	400 Timber	10											40
Muskrat	14,500 Marsh, water	14.5		8333				8377 8378 8379	803 814 807	268 271 269	3,232	101	1,000
Red Fox	14,000 Upland, marsh	560			4*								25
Grey Fox	14,000 Upland, marsh	1,400			2*								10
Raccoon	14,500 Upland, marsh Swamp	193.3	35					8376 8377 8378 8379	14 6 8 7	0 0 0 0	35		75
Striped Skunk	1,700 Upland	34											50
River Otter	14,500 Marsh, water	1,450											10

\* List removals by Predator Animal Hunter

REMARKS: \*Taken incidental to other trapping.

\*\*Under permit to Delaware Game and Fish Commission.

Muskrat population based on house count. Other populations based on random observations.

Reported by NORMAN E. HOLGERSEN

INSTRUCTIONS

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

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

REPORT OF BANDING ON Bombay Hook REFUGE - CALENDAR YEAR 1968

	Method of Trapping*	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
<u>Geese</u>														
Canada	CAN	547	55											602
Brant														
<u>Ducks</u>														
Mallard	CAN	20	86											106
Black	CAN	4	4											8
Gr.-Winged Teal														
Bl.-Winged Teal														
Wood Duck														
Eider														
<u>Total Waterfowl</u>		571	145											716
<u>Other</u>														
Mourning Dove														
Woodcock														
Red-winged blackbird		-	44				11	9						64
Starling		-	8											8

Quotas: Canada geese 500; Mallard \_\_\_\_\_; Blacks \_\_\_\_\_; Other \_\_\_\_\_

\*Method of Trapping: CAN - Cannon Net; CAGE - Cage; MIST - Mist Net; NITE - Night-lighting

3-1750b  
 Form NR-1B  
 (Rev. Nov. 1957)  
 5RF-10/64

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

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Bombay Hook For 12-month period ending August 31, 1968

Reported by Norman Holgersen Title Wildlife Biologist

(1) Area or Unit Designation	(2) Habitat Type Acreage	(3) Use-days	(4) Breeding Population	(5) Production
<b>Finis</b>	Crops	Ducks 59,128	20	40
	Upland	Geese --		
	Marsh	Swans --		
	Water	Coots 1,186		
	Total	Total 60,314	20	40
<b>Shearneck</b>	Crops	Ducks 189,586	70	125
	Upland	Geese 845,381	8	10
	Marsh	Swans 7		
	Water	Coots 4,969		
	Total	Total 1,039,943	78	135
<b>Raymond</b>	Crops	Ducks 119,869	30	50
	Upland	Geese 287,181		
	Marsh	Swans 14		
	Water	Coots 133		
	Total	Total 407,197	30	50
<b>Bear Swamp</b>	Crops	Ducks 78,957	10	10
	Upland	Geese 221,234		
	Marsh	Swans --		
	Water	Coots 98		
	Total	Total 300,289	10	10
<b>Salt Marsh</b>	Crops	Ducks 2,262,821	420	165
	Upland	Geese 1,311,133	2	0
	Marsh	Swans --		
	Water	Coots 50		
	Total	Total 3,574,004	422	165
<b>Whitehall Neck</b>	Crops	Ducks 1,925		
	Upland	Geese 320,530		
	Marsh	Swans --		
	Water	Coots --		
	Total	Total 322,455		
<b>Dutch Neck</b>	Crops	Ducks 2,100		
	Upland	Geese 760,979		
	Marsh	Swans --		
	Water	Coots --		
	Total	Total 763,079		

(over)

INSTRUCTIONS

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

(1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

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

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

3-1750b  
 Form NR-1B  
 (Rev. Nov. 1957)  
 5RF-10/64

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

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Bombay Hook For 12-month period ending August 31, 1968

Reported by Norman Holgersen Title Wildlife Biologist

(1) Area or Unit Designation	(2) Habitat		(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acreage			
<b>TOTALS</b>	Crops	1,262	Ducks 2,714,386	550	390
	Upland	451	Geese 3,746,438	10	10
	Marsh	11,853	Swans 21		
	Water	2,714	Coots 6,436		
	Total	16,280	Total 6,467,281	560	400
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		

(over)

## INSTRUCTIONS

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

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

*Bombay Hook*

PUBLIC USE REPORT - 1968

Refuge name <b>Bombay Hook</b>
State <b>Delaware</b>

(This block completed by Washington Office)

State Code <b>08</b> (1-2)	Congressional District Code <b>00</b> (3-4)	Refuge Code <b>501</b> (5-7)	Report Yr. <b>1968</b> Period <b>1968</b> (8-11)
-------------------------------	--	---------------------------------	--

ACTIVITY	Code	VISITS FOR THE MONTH	
		Total Number	Total Hours
Hunting: Big Game	01	366	2,196
Upland Game	02	95	200
Waterfowl	03	2,266	13,251
Other Migratory	04	50	135
Bow	05	674	3,132
Fishing: Salt Water	06	200	1,080
Warm Water	07		
Cold Water	08		
Bird and Animal Calling	09		
Wildlife Photography	10	19	81
Wildlife Observation	11	3,345	12,320
Dog Training	12		
Field Trials	13	550	5,000
Wildlife Trails and Walks	14	4,795	5,175
Wildlife Tours	15	1,632	2,388
Wildlife Scenic Veh. Rts.	16	20,047	20,047
Camping (related to above)	17		
Picnicking (related to above)	18	150	75
Wildlife Interpretive Center	19		
*Miscellaneous Wildlife	20		

ACTIVITY	Code	VISITS FOR THE MONTH	
		Total Number	Total Hours
Swimming	21		
Boating	22		
Water Skiing	23		
Camping	24		
Group Camping	25		
Picnicking	26		
Horseback Riding	27		
Bicycling	28	33	84
Skiing, Sledding, etc.	29		
Ice Skating	30		
Fruit, Nut. & Veg. Collecting	31		
Non-Recreational Use (inspections, audits, etc.)	32	91	196
Actual Visits	33	24,750	
Peak Load Day	34	2,065	
* Miscellaneous Non-Wildlife	35	2,295	2,890

\*Use blank spaces to indicate the types of activities summarized under miscellaneous codes 20 and 35.

3-1758  
Form NR-1  
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Bombay Hook County Kent State Delaware

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage									
	Acres	Bu./Tons	Harvested		Unharvested													
			Acres	Bu./Tons	Acres	Bu./Tons												
Corn (cereal)	527.4	52,740	-	-	59	5,900	586.4	Goose browse (wheat)	254									
Buckwheat (cereal)					9.5	160 bu.				9.5	Deer browse (alfalfa)	9						
Millet (cereal)					12	180 bu.							12	Goose browse	215			
Browse (wheat)					254	40 t.										254	(grass/clover)	
Browse (alfalfa)					9	None*												
							Fallow Ag. Land	84.4										

No. of Permittees: Agricultural Operations 4 Haying Operations None Grazing Operations None  
 \* No stand established because of drought

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle				
				2. Other				
				1. Total Refuge Acreage Under Cultivation				870.9
Hay - Wild				2. Acreage Cultivated as Service Operation				

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

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

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

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

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

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

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

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

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

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

3-1979 (NR-12)  
(9/67)

Bureau of Sport Fisheries and Wildlife

Refuge

Bombay Hook

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number  
None

Reporting Year  
1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
September 9	Salt-marsh Mosquito ( <u>Aedes sollicitans</u> )	Kent Island and portion of salt marsh between Duck Creek and Shearneck Gut	500	Abate 4E, ULV*	16 lbs.	.032 lbs./A.	None	Airplane

10. Summary of results (continue on reverse side, if necessary)

State Mosquito Control Division reported 90% control on 250 acres and 99% control on 250 acres.

\*Ultra-Low-Volume

Approval for this application given verbally by Regional Office.

3-1979 (NR-12)  
(9/6)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Bombay Hook

Proposal Number  
BH-68-1

Reporting Year  
1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
June 4	Salt-marsh Mosquito ( <u>Aedes sollicitans</u> )	Portions of Bombay Hook and Kent Islands	1,830	Dibrom 14	91.5 lbs.	.05 lbs./A.	#2 Fuel Oil, 2 Qts./A.	Airplane

10. Summary of results (continue on reverse side, if necessary)

The State Mosquito Control Division estimated control of adults to be 95-100%.

3-1979 (NR-12)  
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Bombay Hook

Proposal Number

Reporting Year

BH-68-2

1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application	List of Target Pests(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
June 29	Salt-marsh Mosquito ( <u>Aedes sollicitans</u> )	Bombay Hook, Kent and Kelly Islands	3,825	Abate 4E	122.4 lbs.	.032 lbs./A.	Water, 2 qts./A.	Airplane
July 13	"	"	4,225	"	135.2 lbs.	"	"	"
August 8 & 9	"	"	3,825	"	122.4 lbs.	"	"	"
August 27	"	"	4,225	"	135.2 lbs.	"	"	"

10. Summary of results (continue on reverse side, if necessary)

The application of Abate 4E in a water carrier leaves no trace of the spray swath to guide the pilot on his next pass. This caused uneven coverage as in 1967 and decreased control effectiveness.

Effects on fish and wildlife were not monitored.

3-1979 (NR-12)  
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Bombay Hook

Proposal Number  
BH-68-3

Reporting Year  
1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application	List of Target Pests(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
July 1	Salt-marsh Mosquito ( <u>Aedes sollicitans</u> )	Bombay Hook and Kelly Islands	425	Abate 2% Granular	42.5 lbs.	0.1 lbs./A.	Celeton 5 lbs./A.	Airplane
July 5	"	Bombay Hook Island	250	"	25 lbs.	"	"	"
July 26	"	"	250	"	25 lbs.	"	"	"
July 29	"	Bombay Hook and Kent Islands	780	"	78 lbs.	"	"	"
July 30	"	Bombay Hook Island	300	"	30 lbs.	"	"	"
August 30	"	Kent Island	250	"	25 lbs.	"	"	"

10. Summary of results (continue on reverse side, if necessary)

The State Mosquito Control Division estimated control to be 95-100% effective.

3-1979 (NR-12)  
(9/67)

Bureau of Sport Fisheries and Wildlife

Refuge

Bombay Hook

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number  
BH-68-5

Reporting Year  
1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application	List of Target Pests(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
May 10 - 20	Broad-leaved Weeds	Field #4,9,13,19, 21,27,30,32p,34, 38,102,103,104, 108, 110,114, 305	376.3	2,4-D, low volatile ester	564.5 lbs. a.e.	1.5 lbs. a.e./A.	Water 10 to 30 gals./A.	Boom drop nozzle sprayer.

10. Summary of results (continue on reverse side, if necessary)

Control was satisfactory.

3-1979 (NR-12)  
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Bombay Hook

Proposal Number

BH-68-6

Reporting Year

1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application	List of Target Pests(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6/8 - 24	Broad-leaved Weeds	Field #4,9,13,27, 29,30,32p,34,38, 206,307	204.6	2,4-D, low volatile ester	102.3 lbs. a.e.	0.5 lbs. a.e./A.	Water 10 to 30 gals./A.	Boom drop nozzle sprayer

10. Summary of results (continue on reverse side, if necessary)

Control was satisfactory.

Injury to the foliage of hardwood trees bordering the east side of Field #27 occurred as a result of spray drift. Injury was greatest on black locust and sassafras with many leaves shriveling and dying. However, even the trees that had browned completely put out new leaves and there appeared to be no permanent damage. The spray damage resulted from herbicide application during windy weather.

3-1979 (NR-12)  
(9/6)

Bureau of Sport Fisheries and Wildlife

Refuge

Bombay Hook

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number  
BH-68-7

Reporting Year  
1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
5/10	Nut grass ( <u>Cyperus</u> <u>esculentus</u> ) annual grasses, broad-leaved weeds	Field #20	41	Atrazine	164 lbs.	4 lbs. a.i./ A.	Water 10 gals/A	Boom drop nozzle sprayer
5/17	"	Field #201,202,203, 204, 209	116	"	464 lbs.	"	"	"

10. Summary of results (continue on reverse side, if necessary)

Control was satisfactory.

3-1979 (NR-12)  
(9/67)

Bureau of Sport Fisheries and Wildlife

Refuge

Bombay Hook

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number  
BH-68-9

Reporting Year  
1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
6/21	Canada Thistle	Field #12,14,15,33, 35,308 and edges of boathouse road.	4	2,4-D liquid amine salt	6 lbs. a.e.	1.5 lbs. a.e./A.	Water	Hand Wand

10. Summary of results (continue on reverse side, if necessary)

Control was good.

Chemical control supplemented with mowing.

3-1979 (NR-12)  
(9/67)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Bombay Hook

Proposal Number

BH-68-10

Reporting Year

1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
6/6	Broad-leaved weeds and woody plants	Sides and bottom of drainage ditches in Fields #20,21,23, 32	0.5	2,4-D liquid amine salt	0.75 lbs. a.e.	1.5 lbs. a.e./A.	Water	Hand Wand

10. Summary of results (continue on reverse side, if necessary)

Control was satisfactory.

3-1979 (NR-12)  
(9/67)

Bureau of Sport Fisheries and Wildlife

Refuge

Bombay Hook

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number  
BH-68-11

Reporting Year  
1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application	List of Target Pests(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
May 1 - June 15	Grass and broad-leaved weeds	Adjacent to buildings and in parking lots and drive-ways	0.5	Ureabor	250 lbs.	5 - 10 lbs./1,000 sq.ft.	None	Hand

10. Summary of results (continue on reverse side, if necessary)

Control was effective.

3-1979 (NR-12)  
(9/67)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Bombay Hook

Proposal Number  
BH-68-13

Reporting Year  
1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
August 22	Adult Mosquitoes	Grass fields 15 and 16 south of Raymond dike road.	10	Methoxychlor 4 MR	2.5 lbs.	ULV*, .25 lbs./A.	None	Airplane

10. Summary of results (continue on reverse side, if necessary)

Conditions for airplane application were ideal. In general, control was poor. Mortality of adult Aedes sollicitans was 62%. No residual control as determined from periodic landing counts and light trap operations for four days following application.

\*Ultra Low Volume.

A portion of 12 acres planted to Japanese millet. This area is usually flooded during the fall but stayed dry this year due to the drought.

9/4/68

Holgerson

BH-R10-68-7

Canada geese feeding in a semi-permanent grassfield. Available high preference food being nearly consumed, the birds had to forage on less desirable browse.

12/13/68

Holgerson

BH-15-68-10



An adult bald eagle feeding on a dead goose in Shearness Pool.  
A pair of eagles have nested on the refuge unsuccessfully the  
past four years.

12/20/67

Holgerson

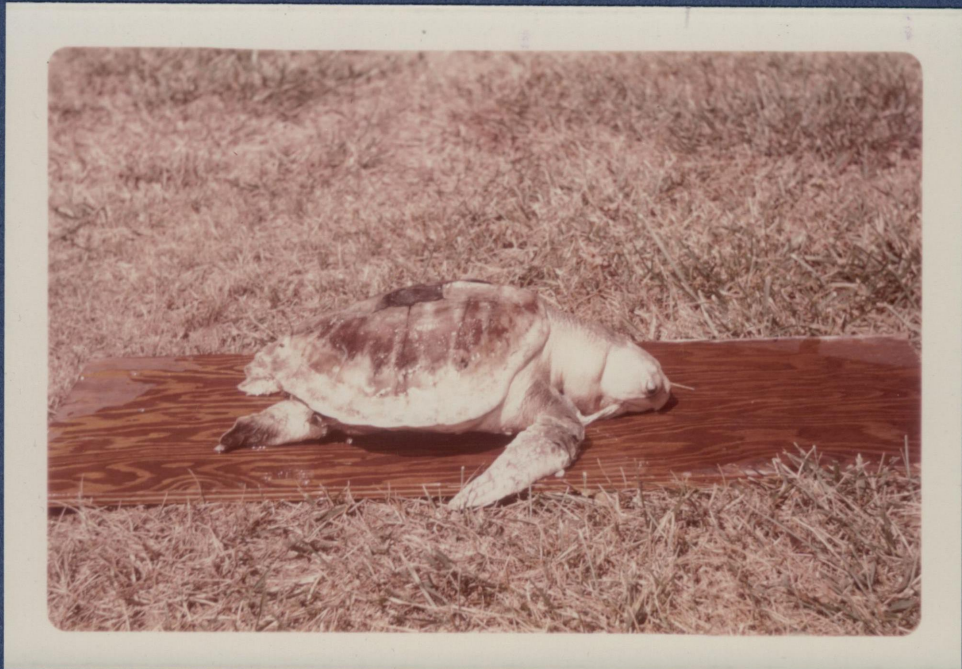
BH-R1-67

An Atlantic Ridley sea turtle was found dead in the saltmarsh.  
This was the first refuge record of this Gulf of Mexico species  
that wander northward to New England and England.

9/3/68

Holgerson

BH-R10-68-6



Pennsylvania State graduate student, Robert Monro, setting #2 steel trap for raccoon in saltmarsh; as related to raccoon predation in his waterfowl production study.

5/31/68

Holgerson

BH-R6-68-10

Fishery Services student assistants' making a routine fish sample via electric shocking in Raymonds Pool. Note the absence of water in the background.

8/27/68

Holgerson

BH-R9-68-1



The north-end of Raymond Pool with a thick stand of common three-square and softstem bullrush prior to heavy snow goose feeding.

11/21/68

Holgerson

BH-R13-68-1

Same area as above after heavy feeding by snow goose.

12/9/68

Holgerson

BH-R14-68-18



Damage to a newly installed entrance gate at Dutch Neck Road caused by a vehicle. Vandalism?

6/18/68

Tibbs

BH-RL-68-17

Safety shield on John Deere 3010 Tractor. The driver (other side of shield) is protected against flying objects ejected from the rotor mower. Note the scars on the shield.

1/12/68

Tibbs

BH-RL-68-17



Renovation of Shearness Pool dike with rip-rap placed at water's edge through a \$13,000 formal contract.

7/8/68

Tibbs

BH-R7-68-10

A ditch affording field drainage and incidental food and cover for wildlife. Constructed in cooperation with the Kent County Soil Conservation District.

8/21/68

Holgersen

BH-R8-68-19



Trainers and "trainee" at one of the two Dog Field Trails held on the refuge this year.

10/18/68

Holgersen

BH-R12-68-6

Our "National Emblem" shown to one of many school groups touring the refuge. The mount is the confiscated property of the Division of Management and Enforcement.

4/2/68

Nelson

BH-R14-68-5



Experimental saltmarsh mosquito control via aerial application of methoxychlor to grass field: Adult mortality - 62%.

8/22/68

Holgerson

BH-R15-68-4

Low water levels curtailed duck feeding on Bear Swamp Pool until mid-November's water-level made it available to them.

10/2/68

Holgerson

BH-R11-68-7



An Explosive Ordnance Disposal team from the Dover Air Force Base getting set to detonate an old World War II air-to-surface rocket, just south of Bear Swamp Pool. The location was formally an Army target area.

4/12/68

Tibbs

BH-R4-68-17

More rockets exposed in the tidal gut south of Bear Swamp Pool. A danger inasmuch as many contained live warheads. Not included in the photograph were cases of live 50-caliber ammunition.

4/9/68

Tibbs

BH-R4-68-15



A close-up view of a C-clamp welded to a rear light and license plate unit. Foreman Steller and Maintenceman Sipple received an incentive award for this idea.

2/26/68

Tibbs

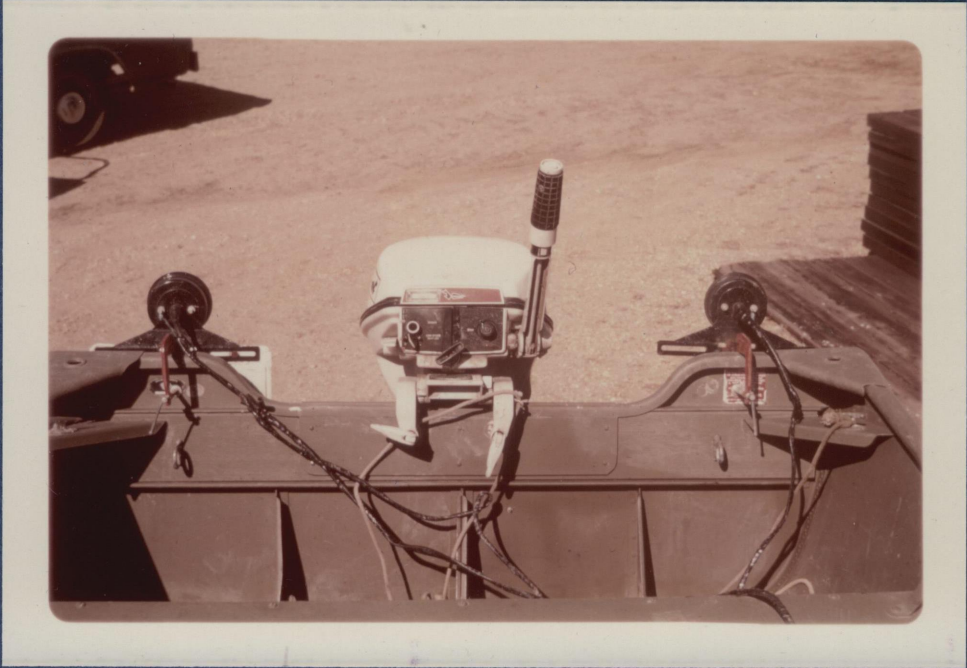
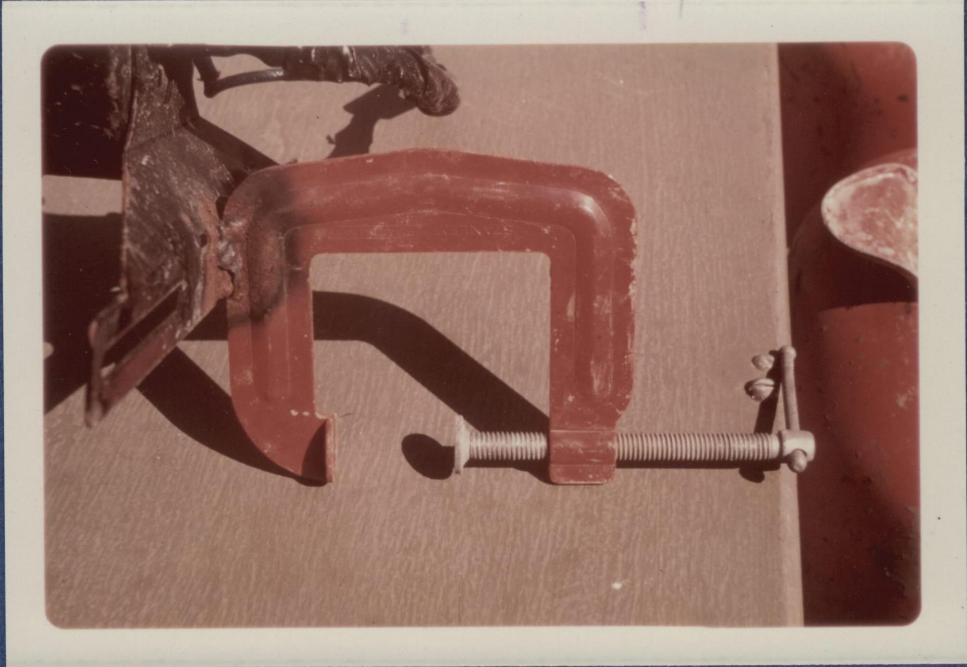
BH-R2-68-10

The C-clamp hook up as seen from inside boat. It facilitates the use of running lights between various trailers, being very easy to hook-up or transfer between trailers.

2/26/68

Tibbs

BH-R2-68-8



Snow geese feeding on common threesquare; north end of Raymond pool,  
a major feeding area during fall migration.

12/5/68

Holgerson

BH-R14-68-12

More snow geese with intermingled Canada geese and whistling  
swans in foreground.

11/22/68

Holgerson

BH-R13-68-12



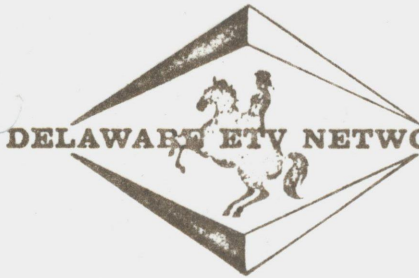
A group of enthusiastic "Young Waterfowlers" at one of their dozen blind sites. Each blind accommodates two hunters and an instructor.

Liehr

Successful Young Waterfowler Hunter trainees. A program highly recommended by the sportsmen, participants and the refuge.

Liehr





**DELAWARE ETV NETWORK** P.O. Box 898 / Dover, Delaware 19901 / Phone: (302) 674-3060

Mr. Robert J. Lucas  
Program Director  
Delaware ETV Network  
Dover, Delaware 19901

In compliance with the aims, purposes, and objectives of the Educational Television Act, (HB 623) the following program proposal is submitted.

Submitted by: H.C. LeVan

School or Agency Delaware Wildlife Federation

Address 630 West Front Street, Wilmington, Del. Telephone 0L8-9211

Title or Position Committee Chairman, Young Waterfowlers Training Program

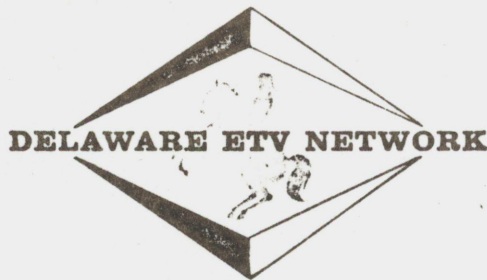
Type of Program Proposed (Series, Single Program, etc.)

Three-half hour programs

Content Area, Grade Level(s) Ages 10 to 16

Brief rationale, statement of need for the proposed program -- include instructional objectives and why television is an appropriate means of achieving these objectives. (Attach sheet if additional space is necessary).

See addendum attached.



**DELAWARE ETV NETWORK** P.O. Box 898 / Dover, Delaware 19901 / Phone: (302) 674-306

**Robert I. D. Allen**

*Chairman, Seaford, Delaware*

**Kenneth C. Madden**

*Executive Officer*

*Superintendent of Public Instruction*

**W. Edward Hanford**

*Director, Educational Television*

The Delaware Wildlife Federation is the sponsoring organization for the Young Waterfowlers Training Program. Through cooperation and encouragement of interested Federal Agencies, the program is designed to teach future waterfowlers the skills and sportsmanship required afield. The primary objective is to furnish these future sportsmen, some of whom will be our leaders of tomorrow, with an opportunity in the classroom and in the field to develop an appreciation in one area of our natural resources.

Similar programs have been successfully conducted in other states. The pilot program for the state of Delaware appears to be the first in which instructional television has been considered as a teaching tool. Television is required as the means to disseminate the core materials essential to the success of the total program. The program itself consists of classroom and field experiences for the participants, culminating in an actual hunt on federally controlled grounds, which will permit the student to employ his newly acquired knowledge.

Two specific areas are especially important in the success of the program. These are Federal and State Waterfowl Regulations, and Waterfowl Identification. Experienced people in both areas are available from Federal and State Agencies to teach in these areas. As the program is statewide, with the various sponsoring clubs meeting with their student participants in local classrooms, it would be considerably more efficient if these resources people could distribute their information via television rather than personal appearances.

Three one-half hour programs are proposed to be telecast on a mutually agreeable evening transmission schedule in September and October, 1968. These programs may be telecast during evenings when the Network is already transmitting. The first half hour program will deal with Federal Waterfowl Regulations, and personnel from the Bombay Hook National Wildlife Refuge will act as content and television specialists. The second half hour program will deal with State Waterfowl Regulations, with personnel being provided by the Delaware Game and Fish Commission. The third half hour program on Waterfowl Identification will actually be a formal test of the students' aptitudes at waterfowl identification acquired in the conventional classroom manner, with students responding on answer sheets in their classrooms.

Classroom instructors, their written instructional materials, and all other necessary equipment for both classroom and television studio use will be provided by the Delaware Wildlife Federation. The Federation requests the Delaware ETV Board to supply studio facilities and television personnel required to videotape the three one-half hour programs, and transmission time on the Network.

**DELAWARE ETV NETWORK** P.O. Box 898 / Dover, Delaware 19901 / Phone: (302) 674-3060

**Robert L.D. Allen**

*Chairman, Seaford, Delaware*

**Kenneth C. Madden**

*Executive Officer*

*Superintendent of Public Instruction*

**William J. Hanford**

*Director of Educational Television*

p.2

This pilot project will have a limited enrollment in 1968. The success of the pilot will determine the final scope in future years. It is possible to have a portion of the project federally funded in 1969 and later, depending on the success of this experience. Future areas of the project such as hunting techniques, gun safety, etc. may also be considered as suitable material to be taught by television. This determination will be made also on the basis of television's success with the three areas listed.

Blessed event due at Bombay Hook?

# Eagles' home generates expectancy

By BETTY BURROUGHS  
and JIM HARDCASTLE

A big bundle of sticks atop a tall tree is generating expectancy and vigilance at Bombay Hook National Wildlife Refuge near Smyrna.

This ungainly tangle of twigs is the home of a pair of bald eagles—a breed that is fast vanishing from the American scene.

Because these birds are disappearing at such an alarming rate, the U.S. Fish and Wildlife Service is keeping its eyes fixed on this pair at Bombay Hook—and any others that may show promise of increasing their numbers.

But the watch—at Bombay Hook, at least—is exclusively by telescope or binoculars, lest these potential nesters should become frightened and seek a less populated retreat.

TO insure the eagles complete

See EAGLES—Pg. 2, Col. 1



Bald eagle hopes soar at Bombay Hook Wildlife Refuge where two have made their home in a treetop.

Staff Photo by Chuck McGowen

# Eagles' home generates expectancy

(Continued From First Page)

privacy and protection, the refuge area within a half-mile radius of the nest, or eyrie, has been closed off to the public. The "no trespassing" law will remain in effect until early or mid-April.

February normally is the nesting month for eagles and the coming week may be the crucial one for the Bombay Hook duo, according to Robert G. Nelson, refuge manager.

"It depends on the weather," said Nelson, "if it gets very cold it will delay it or if we have a warm period it will hasten it."

Weather affects the nesting schedule of all birds, he added.

**THE female eagle should be on the nest incubating the eggs within the next two weeks, in any event, he said, and if she is not, this probably will mean an unsuccessful nesting.**

Nelson says that for the last several years there have been unsuccessful nesting attempts by bald eagles. The failures, he believes, may have been caused by curious spectators trying to get close enough to the nest to take pictures.

This year they're not taking any chances. Nelson and his biologist, Norman Holgersen of the National Wildlife Service, have taken every precaution to insure that the eagles will not be disturbed—even by refuge personnel.

Nelson and Holgersen keep

close check on the eagles several times daily, observing their activities from a pond dike about a half mile from the nest.

**THEY use either a spotting scope of 20-powered magnifying strength, or, sometimes the eagles can be seen clearly through binoculars.** Trespassing restrictions do not apply to the dike road from where visitors are welcome to look and to take pictures of the eagles flying or swooping down from the open sky in search of food or nest-building materials.

"What we don't want is for people to go near the tree or stand under it and try to get photographs of the nest," said Nelson.

The nesting tree, which Holgersen thinks is an oak, rises from a fresh water marsh between a wooded section and pool impoundments which are the source of the eagles' food supply.

"We watched an interesting thing today," reported Nelson last Friday. "One of the eagles was feeding on a dead goose on one of the frozen ponds . . . and he was surrounded by gulls."

**THE bald eagle's diet is primarily fish, but he also eats small mammals, reptiles and birds . . . often freshly-dead waterfowl.**

The Bombay Hook eagles apparently have considered the

accessible food supply in choosing their home site.

Holgersen says the two at the refuge are among no more than a dozen seen recently in Delaware where they once were a fairly common sight. The start of the decline in their numbers goes back 25, 30, probably 40 years.

Nobody seems to know why they have become so rare, but the National Audubon Society claims the bald eagle is being shot out of existence by gunners who either don't know or don't care what they are shooting.

**AS part of its campaign to preserve the dwindling population of eagles and hawks, Audubon is making a special effort to educate all who carry guns about the plight of the bald eagle—and how to identify the bird that is the official emblem of the United States.**

The major problem of the bald eagle—also called the baldheaded or white-headed eagle—is that the gleaming white head and tail feathers do not appear until after the bird is more than four years old. Therefore, young eagles often are mistaken for and shot as "chicken hawks."

"From the standpoint of plumage," says Holgersen, "the bald eagle is not fully adult until it's from four to six years old. But by the end of its first summer, before it gets its adult plumage, the bird is reproductively mature."

As many as five bald eagles were sighted at Bombay Hook "on and off" last summer and fall, but the two adult birds now adding to and perching on the edge of the nest are the only ones around right now.

**THE wildlife biologist estimates their wingspread as about six feet, but as for distinguishing male from female, he confessed drily:**

"Until the nesting starts, I guess only the bald eagle knows. The female usually is larger but it's hard to tell from a distance."

The nest being guarded so conscientiously at the refuge was built last year. Holgersen says they don't know if the two now using it are the same as the ones who built it.

"They may be the same, or there may be one of the same and a new mate. We have no way of knowing," he said.

It is characteristic of the eagle and some other large species to use the same nest year after year and keeping adding to it.

"An eagle's nest may get to be a tremendous size," says Holgersen.

**THE Bombay Hook eyrie is about "five by five"—diameter and depth and very conspicuous on the landscape if you know where it is.**

Nelson describes the materials as "more sticks than twigs."

But its lack of symmetry does not detract from its beauty in the eyes of the naturalist and wildlife conservationist.

Holgersen says if preparations now in progress bring forth eaglets, they will be the first known to have originated at Bombay Hook "for at least a decade."

The bald eagle lays from two to three eggs which incubate in from 34 to 35 days. Both parents sit on and guard the nest and bring food to the young—which may foul up observers in determining sex.

**BABY eaglets are hatched with their eyes open and are ready to fly within 10 to 13 weeks.**

Paradoxically, the bald eagle, which poses majestically on the Great Seal of the United States, the President's flag and on some American coins and paper money, is neither a fierce nor an aggressive bird.

"Some of your smaller birds put up more show of ferocity than the eagle," said Holgersen. "They will not try to fight off any threat to their nest."

In other words, the bald eagle is not a bold eagle, any more than it really is a bald eagle. It just appears to be.

"We don't know how much disturbance the eagle will take before he leaves his nest," Holgersen said, "but we really don't care to find out."

## 2 Eagles Nesting At Hook

Two men from the U.S. Fish and Wildlife Service are acting like expectant fathers at the Bombay Hook National Wildlife Refuge near Smyrna.

They are assuming that two bald eagles nesting in a five-foot pile of twigs have parenthood on their minds, and the wardens are doing their best to make sure that no one scares the pair out of the idea.

Bald eagles, which pose majestically on the Great Seal of the United States, on the president's flag, and on some money, are vanishing from America, so when they act like they want to multiply, they get VIP treatment.

Robert G. Nelson, manager of the refuge, has closed off the area within half a mile of the nest to keep away the curious.

**THE** female eagle should be on the nest incubating the eggs within the next two weeks, he said, and if she is not, this probably will mean an unsuccessful nesting.

Nelson says that for the last several years there have been unsuccessful nesting attempts by bald eagles. The failures, he believes, may have been caused by curious spectators trying to get close enough to the nest to take pictures.

Nelson and his biologist, Norman Holgersen of the National Wildlife Service, have taken every precaution to insure that the eagles will not be disturbed this year.

Nelson and Holgersen keep close check on the eagles several times daily, observing their activities from a pond dike about a half mile from the nest.

THEY use either a 20-power spotting scope or binoculars.

Holgersen says the two eagles at the refuge are among no more than a dozen seen recently in Delaware where they once were a fairly common sight.

Nobody seems to know why they have become so rare, but the National Audubon Society claims the bald eagle is being shot out of existence by gunners who either don't know or don't care what they are shooting.

The major problem of the bald eagle is that the gleaming white head and tail feathers do not appear until after the bird is more than four years old. Therefore, young eagles often are mistaken for and shot as "chicken hawks."

Holgersen says if preparations now in progress bring forth eaglets, they will be the first known to have originated at Bombay Hook "for at least a decade."

## On the Bum



"If that eagle doesn't hatch somethin' soon, I will."

# EVENING JOURNAL

WILMINGTON DELAWARE

An independent newspaper published every afternoon except Sunday by the News-Journal Company  
CHARLES L. REESE JR., President and Chairman of the Board  
FREDERICK WALTER, General Manager  
RICHARD P. SANGER, Managing Editor  
LESLIE E. CANSLER JR., Day Managing Editor  
CHARLES M. HACKETT, Executive Editor  
JOHN G. CRAIG JR., Editorial Director  
FREDERICK W. HARTMANN, Metropolitan Editor

Page 20

Wilmington, Delaware \* \* \* Tuesday, February 20, 1968

## Eyrie Is Well 'Off Limits'

**B**ENJAMIN FRANKLIN opposed selection of the bald eagle as the national bird because it is a bird of prey. He threw his weight behind the turkey; fortunately he lost.

Not that selection of the turkey would have altered the nation's Thanksgiving activities; the fact that the bald eagle is the national bird certainly hasn't reduced the willingness of many Americans to kill it.

The numbers of this majestic bird have dwindled alarmingly and naturalists speak of the very real possibility of its extinction. For that reason, the safeguards adopted at Bombay Hook National Wildlife Refuge to guard against discouraging a pair of bald eagles from nesting are welcome news indeed.

The fact that the nest is in the

refuge, well away from the paths of gun-toting opportunists seeking off-season target practice, makes "accidental" death of the eagles an unlikely prospect. It becomes especially desirable, therefore, to prevent the curiosity of visitors from disturbing this pair of birds enough to drive them away from the nest.

There will be time enough, should the pair nest, for watching the comings and goings of two parent eagles after any young have been hatched and begun their constant demands to be fed. The smallest hope that the ranks of this endangered species can be increased by a pair of bald eagles in Bombay Hook National Wildlife Refuge deserves the enthusiastic support of every Delawarean who has thrilled to the flight of the national bird.

# The Morning News Opinion

Wilmington, Delaware, Thursday, February 22, 1968

\*\*\*

Page 20

## Eagles nesting in Delaware?

For wildlife's friends and admirers the reported nest under construction by a pair of bald eagles puts the Bombay Hook National Refuge in Delaware on something of a par with the Aransas National Refuge on the Gulf Coast of Texas. That's the sole known nesting place of the whooping crane—a huge bird of species hanging on the brink of extinction.

Extinction is possibly in sight today for the bald eagle even though its existing numbers in North America are still estimated at several thousand. It has been years since a nesting pair was recorded in Delaware, though eagles have nested in all three counties in the memory of many a farmer or other outdoorsman.

One trouble has been the farmer's and the waterfowler's notion that the only good eagle is a dead eagle — because it occasionally takes a wild duck. More often it steals a fish from an osprey (fish hawk) if it can find an osprey to rob. The osprey itself has been declining. If both species are becoming sterile, it may be, as some scientists suggest, because of the concentration of DDT or other pesticide poisons in the fish that both kinds of birds eat.

In any case the management at

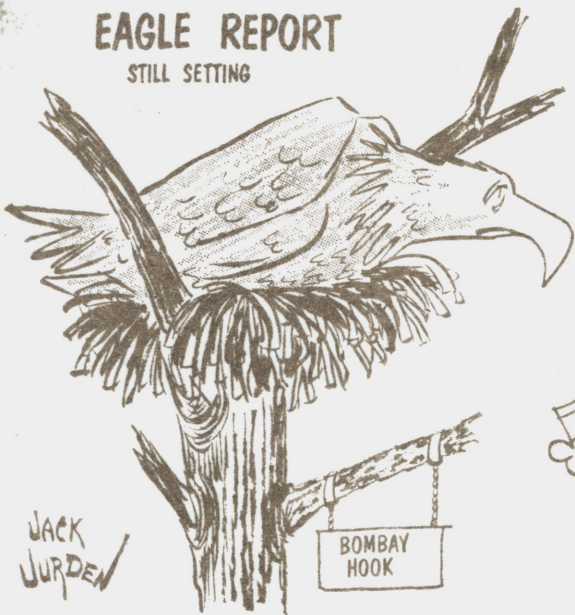
Bombay Hook is doing the right thing by ringing the half-built nest with a marked perimeter to keep humans well away. This kind of protection and patience may someday be well rewarded. All it will take to set the watchers to cheering will be discovery that setting on eggs has begun in that big nest in the swamp treetop. The very long incubation of five weeks, if it gets under way, will serve to keep up the suspense.

Could there be a more appropriate adornment of Delaware than for the First State to do its part in trying to perpetuate the living symbol of the American nation since its beginnings?

Meanwhile the state can do more to cut down on the threat to the bald eagle. Some of those who wouldn't knowingly shoot an eagle will shoot large hawks in the old-fashioned notion that hawks are vermin because they catch an occasional quail or chicken. Eagles under four years old look like other hawks because their heads and tails haven't grown the white adult feathers. Hence immature eagles get shot unwittingly. Protection of the eagle is thus another good reason why the legislature should place all hawks on the Delaware protected list as other states wisely do.

# THE WEEK THAT WAS

## EAGLE REPORT STILL SETTING

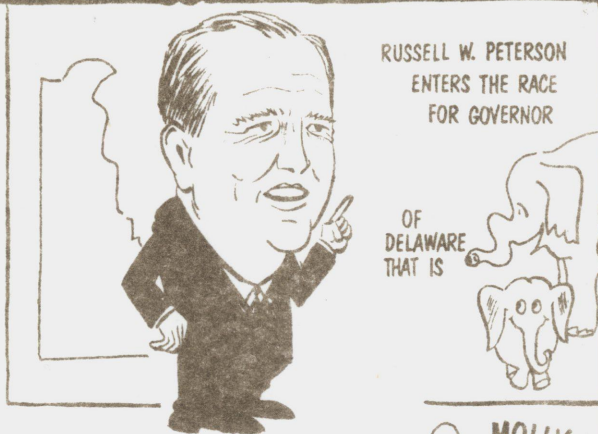


JACK  
MURDEN

BOMBAY  
HOOK



LET'S GET AN EGG  
SITTER AND GO  
SOAR A LITTLE



RUSSELL W. PETERSON  
ENTERS THE RACE  
FOR GOVERNOR

OF  
DELAWARE  
THAT IS



## ST. PATRICK'S DAY TOMORROW

WHO THREW THE CHOWDER  
IN MRS. MURPHY'S  
OVERALLS?

GREEK  
MELODIES  
FOR  
ST. PATRICK'S  
DAY

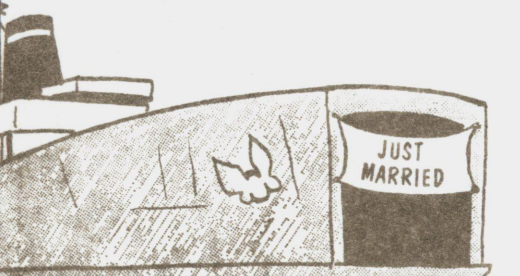


MOLLY  
VILONE

GREEN EYES  
I'LL TAKE YOU  
HOME AGAIN  
OLE BEAN

ERIN GO  
BAH

JERSEY COUPLE TO BE MARRIED ABOARD THE S.S. DELAWARE  
FLAGSHIP OF THE CAPE MAY - LEWES FERRY FLEET



FINALLY FOUND A WAY TO MAKE  
THE FERRY PAY OFF

YA THEY TURNED IT INTO A  
FLOATING ELKTON

MY WILD IRISH  
CROWS



VISIT  
WONDERFUL  
DELAWARE

# EVENING JOURNAL

WILMINGTON DELAWARE

An independent newspaper published every afternoon except Sunday by the News-Journal Company  
 CHARLES L. REESE JR., President and Chairman of the Board  
 FREDERICK WALTER, General Manager  
 RICHARD P. SANGER, Managing Editor  
 LESLIE E. CANSLER JR., Day Managing Editor  
 CHARLES M. HACKETT, Executive Editor  
 JOHN G. CRAIG JR., Editorial Director  
 FREDERICK W. HARTMANN, Metropolitan Editor

Page 12

Wilmington, Delaware \* \* \* Saturday, February 24, 1968

## THE WEEK THAT WAS



REP. WILLIAM V. ROTH ASKS FOR POULTRY INSPECTION BILL

YA MEAN WE'RE GONNA HAVE TO TAKE PHYSICALS

WALTER A. NEIDIG CITY TRAFFIC SUPERVISOR

ANNOUNCES INCREASE OF TOWAWAY ZONES



EAGLES NESTING IN DELAWARE?

THIS SURE IS AN EERIE EYRIE

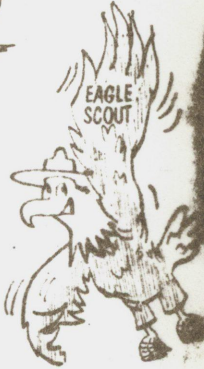
DOUBLE EAGLE

IF YOU THINK I'M GOING TO SIT ON THOSE COLD THINGS YOU'RE CRAZY!

YOU LAID EM YOU SIT ON EM



PHILADELPHIA EAGLE



EAGLE SCOUT



BOMBAY HOOK

WASHINGTON'S BIRTHDAY



I STILL THINK WE SHOULD'VE USED THE BRIDGE!

LUCKY JORDEN 2-24-68



## Once Upon Paper

By

*Betty Burroughs*

**VANISHING AMERICANS**—It's official now. This is not the year of the eagle in Delaware.

The rueful report isn't as pessimistic as it sounds. For instance, it doesn't mean the pair of bald eagles nesting at Bombay Hook Wildlife Refuge were leading their watchers on a wild goose chase when they made like brooding parents for days on end.

Nor does it mean these would-be breeders were the victims of pesticide-induced sterility which scientists fear is thinning the ranks of the great American bald eagle to near extinction.

"There is every indication those eagles were brooding," says refuge manager Bob Nelson, "then suddenly, one very cold morning, they didn't enter the nest for great lengths of time."

Nelson, and Norman Holgersen of the U.S. Fish and Wildlife Service, who had been observing the pair anxiously since mid-February, knew that something had gone awry.

Eagles don't act that way when they have live young in the nest.

The men's earlier sightings had been by binoculars or spotting scope from at least a half mile from the nest—lest they frighten the eagles away. In fact, the refuge area within a half-mile radius of the nest was closed off to the public during the crucial weeks.

When it became apparent there were no eaglets, there was a viewing of the nest from the air. It appeared to be empty but Nelson and Holgersen were issuing no bulletins "until we get someone to climb the tree and look in the nest."

This assignment fell to Bill Burton, a farmer and professional tree climber. What he found and brought down with him were some "downy feathers and egg fragments."

The feathers, described by Nelson as "of unknown origin," nevertheless, "strong evidence that one eaglet hatched."

The contents of the abandoned nest have been mailed to the Smithsonian Institution's Mammal and Bird Laboratory in Washington, D.C., for examination.

Among other things, Nelson said, the scientific tests will determine whether the downy feathers are an eaglet's or the remains of a goose or other prey carried to the nest by the adult eagles.

Nelson said that until they get a report it can not be definitely established what really happened to the nesting that showed such promise back in February.

This is only a theory, but Nelson thinks the newly-hatched eaglet fell prey to either a great-horned owl or a raccoon.

"But somehow I don't think it was a raccoon," he added thoughtfully.

The Bombay Hook eagles' nest—sometimes called an aerie (eyrie or aery) by hawk hounds—is high in a lofty white oak tree that rises from a fresh water marsh on the refuge.

When the nesting activities were first noticed in mid-winter, the tree was a stark, spindly silhouette against the gray sky—except for this huge bundle of sticks in its upper branches. It was a last year's nest. Eagles are a practical lot.

Biologist Holgersen, assigned to Bombay Hook by the U.S. Fish and Wildlife Service, had some reservation about making their discovery public. He was afraid the public—photographers and bird-lovers primarily—would converge on the site and in their eagerness violate the privacy of Mr. and Mrs. Eagle.

Shortly after Kent County's expected event was broadcast, there came a flash from Sussex. An aerie and two nesting eagles were reported near Dagsboro.

Robert O. Halstead, U.S. game agent for Delaware, kept watch over that eagle incubation, the U.S. wildlife refuge worried about the pair at Bombay Hook, the U.S. wildlife refuge at Smyrna.

And did they worry! Well, there was good reason. Conservationists have been concerned in recent years at the decline in the bald eagle population. The causes are believed to be three fold.

The No. 1 reason is thought to be the relentless encroachment of their natural habitats by the great urban swoop, and the Audubon Society is screaming about this, hunters are killing them off—mistaking them for hawks.

The third probability, and one being pursued eagerly by biologists, is that pesticides may be rendering this powerful and virile bird sterile.

Holgersen disclosed that analyses of eagle eggs have been run in which residue of pesticides have been found, but there has been no definite conclusion.

Nevertheless, it is suspected appreciable concentration of foreign substances affects the reproduction of eagles adversely.

How do harmful chemicals get to the bird? Through the circuitous channel of food. Eagles live largely on fish and waterfowl. Contamination may be transmitted from sprayed land to water and the wildlife that subsists therein.

As for the Dagsboro nest, the Sussex spies gave up their egg hunt before Easter. They didn't even find a shell fragment in their aerie.

And so until next year (hopefully), Delaware's eaglet score is zero. Aug or goose egg, if you wish. And the adult eagles have left the immediate area until next fall when the waterfowl begin to fly in.

Ironically, there was an anticlimax to this eagle epic Sunday. Four little girls reported they found a "baby eagle" by the Brandywine. They brought it into this office live—and to the best of our combined ornithological knowledge . . . it was a baby robin. Hope its Mommy went back to the Brandywine to fetch her faltering fledgling.



# This Bears Mention

By Tom Malone

## For the watchers

Mr. Mohr also sent along a copy of the Fall 1967 issue of the Delaware Conservationist which, though a year late, could bear some repeating here. He talks at length about bird migrations and it's likely that all of us have been birdwatchers at some time or another.

Some of his notes:

"The public will find deluxe birdwatching at Bombay Hook Wildlife Refuge, between Smyrna and Leipsic. In early fall . . . there may be as many as 50,000 Canada, Snow and Blue Geese and as many ducks of assorted species . . .

"Primehook Migratory Wildfowl Refuge, near Milton, established in 1963, is the second federal refuge in Delaware. Not nearly as well known as Bombay Hook . . . it is considered "a refuge of great potential" by federal officials . . .

"Smaller, but important water fowl refuges are operated by the Delaware Game and Fish Commission. They include Thousand Acre Marsh, just south of the Chesapeake and Delaware Canal, Woodland Beach, east of Smyrna, Little Creek (North and South) and Assawoman.

"Delaware Route 9 is truly a scenic route during fall migration. It is not unusual to see scores of cars pulled off along the shoulders as occupants take time out to enjoy the spectacle. The stretch between Taylor's Bridge and Leipsic is unsurpassed for bird watching."

He also salutes the records compiled by the Delmarva Ornithological Society for providing an increasingly comprehensive picture of Delaware birdlife.

# EVENING JOURNAL

WILMINGTON DELAWARE

An independent newspaper published every afternoon except Sunday by the News-Journal Company  
CHARLES L. REESE JR., President and Chairman of the Board

FREDERICK WALTER, General Manager  
RICHARD P. SANGER, Managing Editor  
LESLIE E. CANSLER JR., Day Managing Editor

CHARLES M. HACKETT, Executive Editor  
JOHN G. CRAIG JR., Editorial Director  
FREDERICK W. HARTMANN, Metropolitan Editor

Page 18

Wilmington, Delaware \* \* \* Monday, January 22, 1968

## From \$1 to \$300 an Acre

DELAWARE HAS a higher proportion of its area in marshes, wooded swamps, and other wetlands — some 8 per cent — than any other state except possibly Maryland and Louisiana. Sheer area, accordingly, is sufficient reason for the public's taking stock of the marshes along Delaware estuary plus its tributaries and around those little tidal salty lakes in eastern Sussex called Rehoboth Bay, Indian River, and Little Assawoman Bay.

Jim Hardcastle's recent articles on the subject may have been eye-openers for many readers. Marshes selling for \$300 or more an acre are far from being the most expensive real estate in Delaware today, but the value shows a dramatic rise since the 1930s when the U.S. Government picked up much of what is now Bombay Hook National Refuge for a dollar or two an acre.

The fact is that many of the recent transactions have involved tracts of marsh and tillable land in combinations. Good farmland in Delaware, generally speaking, has always been more valuable on the market than even the best of marshes. But farmland, combined with marsh, as in the five-mile deep strip along the Delaware River and Bay in all three counties, has taken on new value because of the interest of wild goose hunters in blinds and pits. Drive down along Delaware 9 in northeast Kent County and note the blinds in cornfields along the road. Apparently \$1,500 a year is not an unusual rental for a good blind location near Bombay Hook Refuge.

It is the state and U.S. refuges and the farmers' cornpicker machines (missing some ears) that are responsible for the ever greater numbers of Canada geese and the accompanying demand for good hunting sites.

Studies by the state Board of Game and Fish Commissioners indicate that waterfowlers spend \$500,000 a season in Delaware on their sport including blinds, guns and other equipment, accommodations, and the like.

But there is also another value of marshes and adjacent upland that is not easily measured in dollars. Biological science has been discovering and appraising the essential part that tidal marshes play in the life chain of shellfish and finfish that wind up as food in the human diet. Study after study — some made in recent years by biologists of the University of Delaware — have demonstrated that marshes are the nurseries for the commercial fisheries of the Atlantic Coast.

In the populous East, people are depending more and more on the refreshment to be found in open spaces and the sights and sounds of the outdoors. The bird watchers and other sightseers who visit Bombay Hook from many states far outnumber the gunners who take out licenses for ducks and geese. Parents take their children to see the deer come out of the woods along marshes just before sunset. Delaware has no mountains or scenery in the grand style of the West. Marshes are a quieter, more gentle kind of wilderness — but with their own attractions and values.

# Kent Gives \$19,962 For Resources Film

From the Dover Bureau

DOVER—The Kent County commissioners yesterday turned over \$19,962 to the Delaware Conservation Education Association to prepare a film on the state's natural resources.

The nonprofit association is made up of state and private agencies.

Glen A. Richter, Levy Court president, said the funds, which were payments to the county by the U.S. Department of Interior in lieu of rent for the Bombay Hook Wildlife Refuge, represented the county's share of federal profits realized in the sale of federal lands throughout the country.

The Levy Court earmarked \$11,000 last year for the film project and yesterday released those funds in addition to a check for \$8,962 presented to the Levy Court by Robert Nelson, director of the Bombay Hook Wildlife Refuge at the weekly meeting.

NELSON explained that the federal government stipulated such funds must be used either for roads or for schools and praised Kent County for using the money for the education films.

Mrs. Charlotte Purnell, supervisor of science education for the Department of Public Instruction, told the Levy Court the project would cost about \$40,000 in actual expenditures, plus an additional \$60,000 in time and the work of various agency staffs connected with the project.

Mrs. Purnell said the first funds would be used to hire a script writer for the planned eight 15-minute films.

ROBERT Van Abell, president

of DCEA and operations and production director of the state Educational television network, announced yesterday afternoon that Mrs. Rebecca Comegys of Dover had been employed by the group.

He refused to disclose her salary for writing the film, saying only that it was well under \$11,000.

The money will not only go for the production of films, but will also be used to prepare notebooks for teachers for use in conjunction with the films, a workshop on how to use the material and an inventory of the state's natural resources, Mrs. Purnell said.

ETV will air the films, which are tentatively scheduled for completion by July 1970, she said. Six copies of each film will be made.

Mrs. Purnell said the film topic will be: Delaware estuary, dunes and beaches; forests, swamps and wetlands; soil and water conservation, air and water pollution; game and wildlife; marine and estuarine life; summary of resources.

Mrs. Purnell said the State Department of Public Instruction in the past "has been besieged with requests from teachers for material on Delaware history, but try to find material on Delaware today."

VAN Abel said the DCEA hopes "to create a conservation ethic in students so that they can make a reasonable judgment when they are the state's leaders."

Mrs. Purnell told the Kent Levy Court she would try to persuade the Sussex Levy Court to turn over its federal check to the project. Last year their

funds went to the Milton School District, she said.

A private foundation and the New Castle County Council have also indicated interest in the project, she said.

"I really think it's a good cause," said Richter just before Mrs. Purnell's request passed without a ripple.

THE Sussex County Levy Court was presented a check for \$9,759.91 by officials of the Prime Hook Natural Wildlife Refuge—almost \$3,000 more than the amount presented last year.

The increase, the officials said, was due to additional land acquisitions. In past years the money has been divided on a percentage basis between the Milford and Milton School Districts.

Yesterday, Norman G. Wilder, director of the State Game and Fish Commission, put a bid in for the DCEA film.

THE Levy Court noted that the local school districts, especially Milton, which is one of the poorest in the county, depend on the money to make up for that lost in taxes when the land was taken for the refuge.

Wilder, who did not press for an immediate reply to his request, asked that the county commissioners consider it, perhaps with the idea of just donating the amount in excess of the \$6,561.10 that was split between the districts last year.

## Presidential Phone

First telephones in the White House were installed during the administration of President Rutherford B. Hayes in 1878.

## Schools In Milton Get \$10,000

Milton Consolidated School system and Milford Special School District will share a Department of Interior check for almost \$10,000, representing a payment in lieu of taxes for lands taken off the tax rolls by Prime Hook Preserve.

Sussex Levy Court yesterday decided to allocate the \$9,759.91, which represents three quarters of a per cent of the land's value, according to the same formula used for the past three years.

Last year Milton received approximately 90 per cent of the fund, which was just over \$6,000, but because additional lands from the Milton School District were acquired during the last tax year, the exact amount to be paid each district will be worked out on the basis of taxes lost in each district.

The fund is presented to the Levy Court each year with the stipulation that it can be used only for roads or schools.

The Delaware Soil and Water Conservation Association had asked for a share in the fund to prepare an educational film on Delaware Wildlife.

But H.O. Brittingham, Milton school chief, told Levy Court last session that his district was badly in need of the fund this year. After school consolidation is accomplished in 1969, the district is not expected to be in such serious financial condition.

Under the mandatory consolidation program, Milton is expected to abide by the State Department of Education's ruling and consolidate with the Lewes and Rehoboth Beach systems.

EVENING JOURNAL

# Peninsula

## Sussex Balks At Releasing Money for Film

From the Sussex Bureau

GEORGETOWN — The Sussex County Levy Court yesterday refused to give its federal payment in lieu of taxes to help make motion pictures about Delaware's natural resources.

The county got \$9,759 from the U.S. Department of Interior as reimbursement for taxable properties absorbed in the Prime Hook Wildlife Refuge. This is \$3,000 more than it got last year.

In past years, the money has gone to Milford and Milton School Districts. Levy Court Commissioner John L. Briggs said Milton is a poor district and badly needs any revenue it can get.

ON Oct. 22, Kent County Levy Court gave the Delaware Conservation Education Association \$19,962 for the films including \$11,000 saved up over many years in this fund. This is in lieu of rent for the Bombay Hook Wildlife Refuge. This grant to the association still stands despite the failure of Sussex County to contribute, the Kent court's president, Glen A. Richter, said today.

The Sussex court tabled discussion of a suggestion it give \$500 or \$1,000 of its own money to the association.

Mrs. Charlotte Purnell, supervisor of science education for the State Department of Public Instruction, had appealed to the two Levy Courts and New Castle County Council for money to make eight 15-minute films.

THEY would cost \$40,000 in cash plus \$60,000 in time given by various state agency employes. A private foundation has shown some interest, she added. The nonprofit association is composed of state and private agencies. Robert J. Van Abell is president. He is operations and production director for the Delaware Educational Television Network.

Van Abell said today the Sussex action is a setback but the association will go ahead. He said, "It is extremely disappointing because we hoped to have the cooperation of all three counties." He said research on the films has begun.

# Training Program Set For Youthful Hunters

SMYRNA — A new program for training young waterfowl hunters has been announced by Bombay Hook National Wildlife Refuge Manager Robert G. Nel-

son.

The pilot project, sponsored by the Delaware Wildlife Federation, is designed to teach future waterfowlers the skills and sportsmanship required afield.

Assisting in the pre-hunt training program is the Delaware Game and Fish Commission and Delaware ETV Network.

Van Able, ETV program director, defined the objective of the program "to furnish these future sportsmen, some of whom will be our leaders of tomorrow, with an opportunity in the classroom and in the field to develop an apprecia-

tion in one area of our natural resources".

To qualify, the youth must be 10 to 16 years of age, complete an approved gun safety course and pre-hunt training program. This will then be followed by a day's hunt on the Bombay Hook Refuge. Training will be provided by various sportsmens organizations and individuals throughout Delaware.

Hensyl LeVan, chairman of the Delaware Wildlife Federation's Youth Training Committee, suggests all interested persons contact one of the sportsmen's clubs in Delaware or the refuge for further information.

Morning News \* \* \* 19  
Wilmington, Del. May 23, 1968

## ETV board ok's series on wildlife

DOVER — The Delaware Educational Television network will produce three half-hour programs for the Delaware Wildlife Federation as part of a pilot project to teach youngsters nature skills.

The state ETV board yesterday gave its approval for the network to produce the series for the federation.

The program is the Young Waterfowlers' Training Program' which is designed to teach children from 10 to 16 the skills and sportsmanship required in the field and to instill in them an appreciation of natural resources.

Similar programs have been operated in other states but this is the first time that instructional television has been used for teaching.

One program will explain federal waterfowl regulations, the second will deal with Delaware's laws on waterfowl, and the final telecast will be a formal test of waterfowl identification.

The series will be telecast over the state network during evening hours next fall.

A condition of the network's producing the series without cost is that it retain ownership. Dr. Hiram Lasher, a board member, suggested that perhaps the series can be rented to other states for their programs if it proves successful.



COURSE OUTLINE is explained to Delaware Wildlife Federation members by Robert Halstead, U.S. Game Management agent who is instructor-in-charge. Seated at table are H. L. LeVan, Federation chairman of program; J. Van Abel, ETV network operations director; and Robert Nelson, Bombay Hook Wildlife Refuge manager.

## Waterfowl Signup Near End

A limited number of vacancies exist for enrollment in the Young Waterfowlers Training Program as the cutoff date of Friday, Sept. 20, approaches.

Experienced duck and goose hunters to help in the unique program, which will culminate in blinds on Bombay Hook for the young waterfowlers who complete the course, are still needed.

Information on enrollment,

limited to boys and girls in the 10-16 age group, may be obtained from Bombay Hook Wildlife Refuge.

Ten blinds will be constructed in a special area on the Refuge for the young hunters, who will be accompanied in the blind by an experienced hunter who won't be allowed to shoot.

The program is under the general direction of the Delaware Wildlife Federation, as-

sisted by the Delaware ETV Network Resources Center, Dover, and state and game officials.

A number of prizes will be offered to the young participants, including 5 copies of "Wildfowl Tomorrow" and "Birds In Our Lives," each autographed by the Secretary of the Interior.

The top 10 students will compete in an essay contest on

### Training Help Wanted

Are you a qualified waterfowl hunter?

Would you like to help a boy or girl learn how to hunt ducks and geese from a blind at Bombay Hook although you yourself won't be able to shoot?

If so, drop a line or call Bob Nelson at the Refuge, 653-9345.

some aspect of the program, and the winner will receive the Ted Harvey Trophy as the Young Waterfowler of the Year.

A total of 66 students have already registered for the course. A number of those have already passed the pilot program held in August at ETV center in Dover.

- State News, Dover, Del., Tuesday, November 26, 1968



## **Goose For Thanksgiving**

Thanks to their 11-year-old son Brad, Mr. and Mrs. Clarence G. Blendt of near Smyrna won't have to buy a Thanksgiving turkey. Brad brought down the goose Saturday at Bombay Hook Wildlife Refuge, which this year is conducting a program for young waterfowlers who earlier this summer completed a prescribed firearms safety course. Another group of the young hunters will take to the blinds on Thanksgiving Day. (State News Photo by Jim Miller)



Staff Photo By Donaghey Brown

## Duck Hunting Lesson

This short course is one the students didn't try to duck out on. The 24 boys, aged 10 to 16, from the Wilmington area, sponsored by the Fraternal Order of Police Sportsmen's Association, are getting gun safety instructions from Warden Anthony Grello. They and groups sponsored by other gunning clubs in the area are taking part in a duck

hunting instructional program initiated by Bombay Hook Wildlife Refuge. It includes three closed circuit television sessions, a safety lecture tonight and the qualifying round pictured above Sunday at the state police rifle range. They also will have a day of duck hunting at Bombay Hook, in an area never before opened to the public.



Dever Bureau Photo by Chuck McGowan

## Commuters' return

Canada geese are returning by the thousands to the Bombay Hook National Wildlife Refuge. This is their time of year.

## Public Hunting Set For Refuge

SMYRNA — Bombay Hook National Wildlife Refuge will be open to both archery and shotgun deer hunting, Manager Robert G. Nelson announced today.

Approximately 1,045 acres of the Dutch Neck Unit will be available to licensed archers from one-half hour before sunrise to one-half hour after sunset Sept. 14, 21 and 28, October 5, 12, 19 and 26, and November 2. Hunting area maps and regulation leaflets will be issued at the entrance to the hunting area located at the junction of Route 9 and Dutch Neck Road.

During last year's controlled hunting program, archers harvested nine deer on the refuge.

The Dutch Neck Unit will be open to licensed shotgun deer hunters from one-half hour before sunrise to one-half hour after sunset Nov. 15, 16, 18 and 19, 1968, and January 16, 17 and 18, 1969.

\* Required federal permits will be reserved for successful mail applicants as chosen by a public drawing. Application must be made on special refuge forms and mailed to arrive at the refuge by Oct. 8. Successful applicants will be notified by mail. Application forms may be obtained from state hunting and fishing license sales offices.

The number of hunters admitted to the open area at one time will be restricted to 50.

Reservations forfeited by non-appearance of applicants or not previously reserved will be made available by drawing at the refuge office one hour before sunrise.

Applications will be required for shotgun deer hunting only. However, a fee of \$1 per person will be charged all deer hunters.

Additional information may be obtained by contacting the refuge manager.

State News, Dover, Del., Monday, September 16, 1968

### Archers Count Four Deer Kills

Four deer were killed, three Bombay Hook National Wildlife Refuge, in the first two days of Delaware's bow and arrow season.

Mrs. Joanne Naylor of Townsend brought down a 3-point, 140-pound buck.

Other successful hunters were Ross Vickers of Newark, 91-pound doe; John Bradley of New Castle, a 50-pound buck; and Nick Mullen, an 88-pound doe.

## Hunters Kill 727 Deer In 2 Days

Delaware hunters continued to shoot deer at a record rate Saturday during the second day of the state's deer-hunting season.

First State marksmen killed 317 deer, 38 more than were felled on the second day of last year's season. Added to the amended figure of 410 deer that were killed Friday, state hunters have now downed 727.

The two-day deer kill last season was 614, and Delaware hunters went on to bag a record—846. Although this year's season has been shortened by a day, the 1967 record probably will be surpassed.

The Dover weighing station checked in 118 kills Saturday, again the top figure of Delaware's five check points. Dover registered 152 deer Friday.

The State Road Station on Du Pont Highway in New Castle counted 98 deer, Georgetown registered 52, Bridgeville 40 and Bombay Hook nine. Because the New Castle deer-hunting season closed Saturday, the State Road Station will be closed today and tomorrow.

No deer checked in Saturday topped John Cianci's prize 235-pounder that was killed Friday. Cianci of Wilmington felled his 2½-year buck outside of Smyrna.

*Outside Stuff*

# Waterfowl Season Attains High Mark

The waterfowl season closed Saturday on a high note as far as I was concerned.

There's a pond near my house that maintained an open pocket of about an acre of water throughout the cold snap and once the geese discovered it, there was no keeping them out even though we were shooting from a makeshift blind that was anything but fully concealed.

Most hunters agree that stillness is more important than concealment in any event. They maintain that if you sit perfectly still, even in the open, the geese will still come into you if that is their bent.

OTHERS, however, maintain that geese will decoy to movement, especially to a retriever

By  
Ned  
Davis



making his way back to the blind with a dead bird.

I've seen both phenomena happen, but believe for the most part it is best to be as completely hidden as possible.

There is general agreement that Delaware enjoyed its best waterfowl season in many years, if not ever. Certainly never before have we had so many geese. And ducks also were plentiful in a sporadic fashion.

ANOTHER season -- dove -- also closed Saturday without such glowing assessments. There were a few good dove shoots in the last half of the season but most of them took place where farmers had grain stored in a field and a hunter could station himself so as to wait for them to come in to feed. At most other locations the birds remained scattered and shooting was anything but successful.

The abbreviated quail season ends this Saturday and I have yet to hear anyone take issue with the decision of the Game and Fish Commission to cut the shooting dates short by about a month.

IN fact, many upland game hunters have applauded the decision.

It can't be said that quail are actually hard to find. I've enjoyed several days when I have been "in birds" virtually from the time the dogs were released and kills do compare favorably with other years.

But on the other hand all hunters have had the experience of not being able to find quail in locations where they have been plentiful in the past and this is

naturally a cause for great concern.

SOME extensive studying of quail habitat and breeding should undoubtedly be done during the off season.

Incidentally, I have heard several discussions about the largest Canadian goose shot during the season. I lay no claims to the record myself. The largest I actually heard about was one of nine and a half pounds brought down by Louis Gallo of Wilmington at Bombay Hook on Nov. 18, but other hunters -- while disclaiming anything larger -- have asserted that the birds sometimes get up to 12 pounds or slightly more.

\* \* \*

THE bitter weather has put a damper on codfishing for all but the most persistent and hardy devotees. A few boats went out of Ocean City, Md., the past few days but most men are waiting for a break in the weather. They don't mind cold, but chilling winds and heavy precipitation are different factors that command respect.

## Fun Outdoors

Best possible image.

## Goose, Deer Blind Drawing Completed

The drawing for goose blind and shotgun deer hunting reservations on Bombay Hook National Wildlife Refuge was held Tuesday, October 15.

Messrs. Paul Boswell, U.S. Commissioner; Hensyl Le Van, Chairman, Young Waterfowlers Training Program, Delaware Wildlife Federation; Robert VanAbel, Operations and Production Director, Delaware Network ETV; Holger Harvey, Delaware Wildlands, Inc.; and Richard Bailey, Sports Writer, Delaware State News, officiated at the drawing.

Selected from 1,018 goose hunting applications received were 496 lucky goose hunters; 350 deer hunters were selected from the 578 deer hunting applications received. Successful applicants are being notified by mail.

Reserved blinds and deer hunting reservations unclaimed by one and one-half hours before sunrise will be awarded by a drawing the morning of the hunt.

The goose hunting on the refuge will be from one-half hour before sunrise until noon on Tuesdays, Thursdays, and Saturdays during the regular goose hunting season. A \$5.00 daily fee will be charged for the use of refuge provided blinds and goose decoys.

Shotgun deer hunting will be from one-half hour before sunrise until one-half hour after sunset during the regular shotgun deer season. A \$1 user fee will be charged.

# Drawing planned for deer permits

From the Dover Bureau

DOVER — A drawing will be held this fall for permits to hunt deer on the Bombay Hook National Wildlife Refuge this fall.

Refuge Manager Robert G. Nelson yesterday said applications for the drawing must be on special refuge forms and mailed to arrive at the refuge by Oct. 8.

Successful applicants will be notified by mail, he said.

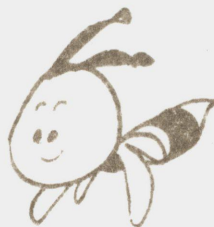
Nelson also announced that nearly 1,045 acres of the refuge's Dutch Neck area will be opened to licensed archers from 30 minutes before sunrise to 30 minutes after sunset Sep. 14, 21, and 28, and Oct. 5, 12, 19 and 26 and Nov. 2.

Nine deer were bagged on the refuge last year during the archery season, Nelson said.

The same area will be open to licensed deer hunters from 30 minutes before sunrise to 30

minutes after sunset Nov. 15, 16, 18 and 19, and Jan. 16, 17, and 18.

Only 50 hunters will be admitted to the open area at one time. Reservations forfeited will be made available by drawing at the refuge office one hour before sunrise.



Love Bug Alert!  
Love Bug Alert!

# Delaware: A Happy Hunting Grounds Today

Delaware expects to be a really happy hunting ground this fall, for both upland game and migratory wildfowl. Despite the dry summer, the more than 20,000 acres of public hunting grounds administered by the Delaware Game and Fish Commission are in excellent condition. Upland hunters will find deer, rabbit, pheasant, and quail plentiful, and the hunting marshes have fine supplies of food for the duck and geese, now beginning to come in from the north.

Areas particularly recommended this year are:

The Canal Wildlife Area, 5000 acres on lands bordering the Chesapeake and Delaware

Canal, clear across the state, especially good for pheasant and rabbit.

The Petersburg Wildlife Area, northwest of Felton. 600 acres have been added, making 3400 acres in all of fine upland hunting for quail, pheasant, rabbit.

Blackiston Wildlife Area, 1325 acres, 8 miles west of Smyrna on Route 6. All upland game.

Milford Neck Wildlife Area, 1200 acres between Milford and Big Stone Beach.

Assawoman Wildlife Area, about 12 miles east of Dagsboro in the southeast tip of the state has been managed for both upland hunting and

waterfowl, particularly Brant. Woodland Beach Wildlife Area, five miles east of Smyrna, has 3600 acres of good duck hunting and more than 30 blinds available on a first come, first-served basis.

Ellendale State Forest and Redden State Forest, in Sussex County between Milford and Georgetown, are the two best places to find Delaware's growing deer herd.

The two big federal wildlife refuges in Delaware are marvelous places for waterfowl. Part of Bombay Hook's 20,000 acres is open for hunting — this is where to go see thousands upon thousands of duck and geese. And Primehook

National Wildlife Refuge is open for hunting.

Delaware hunting seasons for migratory wildfowl:

Rails & Gallinules - September 2 - November 9, Mourning Dove - September 13 - November 21, Woodcock - November 22 - January 25, Snipe - November 8 - December 27, and Geese - November 16 - December 28; December 30 - January 25.

Brant - same as geese, and Ducks - November 8 - December 27.

For upland game: Deer (bow & arrow) - September 14 - November 2 - whole state, Deer (shotgun) - November 15, - 16, -

whole state, and November 18, 19; January 16, 17, 18 - Kent & Sussex Counties.

Opossum & Woodchuck - no closed season, Raccoon - September 2 - March 31, Pheasant (male) - November 22 - January 25, Quail - same as pheasant, Rabbit - November 22 - January 25, and Squirrel - September 14 - November 2

Further hunting information and maps are available from the Delaware Game and Fish Commission, Dover, on National areas from Refuge Manager, Bombay Hook National Wildlife Refuge, Smyrna.

## State Files

### Power Line Question

An Army Corps of Engineers spokesman yesterday said the State Planning Office has suggested that suspension of power lines across the Smyrna River might affect the Bombay Hook Wildlife Refuge.

The planning office sent the only response concerning an application by Delmarva Power & Light Co. to place aerial power lines over the river about a mile north of Fleming Landing drawbridge, a corps spokesman said. Yesterday was the deadline for filing criticism or protest of the work with the district engineer in Philadelphia.

The wires the company wants to install would have a minimum vertical clearance of 48 feet above the river.

The corps will write to the planning office and ask whether it is specifically objecting to the permit, the spokesman said. If there are no specific objections, the permit will probably will be issued, he said.

### Refuge Employees

#### Given Citations

SMYRNA — Manager Robert G. Nelson announced today that ten employees of Bombay Hook and Prime Hook National Wildlife Refuges were given superior performance awards.

The awards were for contributions toward carrying out the refuge program during the period February 25, 1967 to August 28, 1967 when both stations were operating with only a minimum of help.

Awards were presented to Virginia Baughman, Henry Bush, Howard Cottman, George Gage, Norman Holgersen, Kenneth Liehr, John Parker, William Sipple, Louis Steller and Lee Tibbs.

A monetary award was given, as well as a letter which stated in part, "It is commendable that with such a critical personnel shortage, so much had been accomplished and both refuges continued to operate without sacrifice or cancellation of refuge programs."

### N.Y. dog wins all-age stake

SMYRNA — Andy's Partner Pick, owned by Mrs. Clifford Brokaw of Glen Cove, N.Y., won the amateur all-age stake in the annual three-day American Kennel Club licensed field trial at the Bombay Hook National Wildlife Refuge this weekend.

F. C. Mr. Mac's Billy Boy, owned by Mrs. George Murnane of Syosset, N.Y., was the open stake winner with Muscles Jet Jock taking the derby stake for Col. W. B. Twichell of Wayne, Pa.

Two area dogs — A. Nelson Sills' Big Dipper of Hickory Glen and the Jesse Mitchell—R: R. M. Carpenter entry of Mount Joy's Dilwyne Jez O'Meg—took judge's awards of merit in the derby stake.

# Bombay Hook Started a Love Affair

By Anthony Higgins

**WILD SANCTUARIES—Our National Wildlife Refuges, a Heritage Restored, by Robert Murphy. Foreword by Stewart L. Udall. 258 pages. 250 photographs in color and monochrome, and 32 maps. Indexed. Dutton, \$22.50.**

For us in this part of the country there is a sort of national park experience available near at hand, that should be better known for the pleasure it offers. Not everyone can easily visit Yellowstone, Yosemite, or even Shenandoah National Park. But nobody in Delaware is more than an hour away from Bombay Hook National Wildlife Refuge in Kent County.

Bombay Hook hasn't a snow-capped peak to its name. Instead, its 16,000 acres beside Delaware Bay earn it the subtitle "Blue Water, Golden Marsh, and Geese" in Robert Murphy's magnificent book about the National Wildlife Refuge System.

THE National Park System's 18 million acres can be seen well supplemented by the 28 million acres of the refuge system — even though 15 million of it are in Alaska. In a foreword to the book, the boss of both systems for eight years, Secretary Stewart L. Udall of the Department of the Interior, sets the focus.

"Many of us Americans," he writes, "think of national wildlife refuges as rigidly defined sanctuaries for wildlife. They are much more than this. Imaginative management has found ways in which they serve elemental needs of both wildlife and man — because man and wildlife must live together, as 20 million people

are currently learning each year on the refuges.

"In the great Western refuges, there are far more acres than people over the face of the land. By contrast, consider new and comparatively tiny Great Swamp National Wildlife Refuge in New Jersey, from which you can almost see the towers of Manhattan. Here, at considerable expense in federal funds and with large donations from citizens, many thousands of school children (and many an adult) are introduced to wild living things for the first time in their lives."

AS Mr. Udall says, "Robert Murphy has supplied the most complete account of these refuges to be found outside government reports — and his style is more readable."

It happens that the author of "Wild Sanctuaries," in choosing from 312 refuges for words and pictures, starts out with the one he first fell in love with — Bombay Hook. "not far from Dover, the capital of Delaware." As he went about collecting refuges he didn't realize he would find himself "eyeball to chilly eyeball with a large Okefenokee alligator in Georgia, within 15 yards of a very large Kodiak brown bear in Alaska, or within stone-throwing range of the very rare muskox on Nunivak Island in the Bering Sea."

It is a great scope and variety of scene that Murphy introduces with his naturalist's eye and his gift for illuminating what he sees. It is a measure of Bombay's Hook's character as a major link in the Atlantic Flyway's refuge chain — and as a spectacle — that he selects it as the show-window, so to speak, for his book.



Staff Photo by Bill Snead

## Delaware night sky

... Canada geese over refuge

I've had my own eye on that wonderful place ever since its salt marshes and wooded freshwater swamps were bought for a very few Depression dollars an acre. The same kind of marsh along the bay shore nearby has increased in market value a hundredfold or more in these 30 years. I could go on and on about Bombay Hook; enough to say that I share it with Mr. Murphy as the stimulus for visiting other national refuges near and far.

THE new Prime Hook Refuge in Sussex County, now taking ultimate shape, encloses one of the finest fresh water marshes of the Atlantic seaboard. A good many landowners and duck-hunters down there vigorously op-

posed establishment of a federal refuge five years ago.

As a farmbred duck hunter from away back, I could understand their resentments. But I am glad to have had a part in editorial policy backing the Interior Department in its careful determination that a Prime Hook refuge was essential in any plan for the future of migratory waterfowl in the eastern United States.

My wife and I have visited and can recommend three other nearby refuges—Brigantine in New Jersey, Blackwater near Cambridge, Md., and Chincoteague Refuge on the Virginia third of Assateague Island. We have delighted in the Savannah River Refuge, S.C., and the remote and wonderful 5,000-acre Blackbeard Island Refuge off the Georgia coast.

LAST March a trip into the 338,000-acre Okefenokee Swamp Refuge, in southern Georgia, with its moss-draped cypresses, its myriad bird life and big alligators everywhere, was a plunge into prehistoric, even pre-human America when reptiles and reptile-like birds held sway. The previous March, it was the vast green mosaic of Delta Refuge at the mouth of the Mississippi. At Sacramento Refuge in northern California the mallards were ricefield decorations. At little Willapa Refuge on the cold Washington coast the memorable sight was a flock of miniature Canadas called cackling geese, no larger than fat mallards. Our present hopes are for visiting refuges including Aransas (Texas) and its whooping cranes, and that greatest of all U.S. waterfowl concentrations, the Klamath Basin of California and Oregon.

All of these great and lesser national wildlife refuges, plus refuges (and parks) preserving bison, elk, and mountain sheep, are described in sensitive but unsentimental fashion by the author. The book is expensive. For those who enjoy refuges, but must forgo visiting most of them, "Wild Sanctuaries" and its handsome pictures can be a welcome bargain indeed.

## Outdoorsman's Outdoorsman

# Delaware Naturalist Limns Beautiful Marsh He Loves

By Anthony Higgins

*TAYLORS GUT in the Delaware State. By Dudley Cammett Lunt. Drawings by Anthony John Florio. 303 pages. Alfred A. Knopf. \$6.95.*

There can be no pretense of any rarefied objectivity in this review. Dudley Lunt of Wilmington is not only my friend from away back, but a gunning friend as well. In particular we have long shared a respectful and grateful concern for the salt and fresh marshes and wooded swamps that comprise an eighth of the state of Delaware.

I've been acquainted with Taylors Gut — that woods-and-field-rimmed shallow pond converted from tidal marsh — at least as long as he has studied it with the naturalist's vision he brings to it in this latest book of his. I've been his guest in his blind, and he in mine on the Thousand Acre Marsh near where I grew up.

He mentions his "setting-pole." Is that a term from his native Maine?

**THE last time I saw Dudley poling the quaint old bit of flotsam he calls a boat, he was using the proper Delaware push-pole I was able to get Robert A. Beck of Delaware City to make for him. Such a pole is long and light and has three hardwood prongs at the bottom end to get a purchase on the mud.**

At Taylors Gut, near Bombay Hook National Wildlife Refuge, Dudley Lunt and I have shared the same atavistic excitement from the approach of Canada geese setting wings to pitch to his decoys on the water out front. Very probably the geese come in because of (and not in spite of) his use of a goose call.

Can the man who has produced 100,000 delightful words about this small pond keep quiet in a blind on its shore? Indeed he can,

and does. Silence is part of his lively companionship. Like the best of the waterfowlers anywhere, he concentrates on watching the middle-distant sky for geese or ducks on the wing. When he talks, it's in low tones. He knows his business, all right.

**"ATAVISTIC" did I call the excitement felt by a gunner in a goose blind? Yes. It can only be the stirring of instincts implanted by remote ancestors who lived by the chase for food.**

Mr. Lunt makes no apologies, nor do I, for the pleasure a civilized man gets out of dropping a game bird in flight. It's easy enough to miss entirely. There is a surplus of geese for harvest annually by gunners — thanks largely to the federal refuges which the sportsmen's money originally made possible.

Nobody could better demonstrate the other side of the atavistic coin than the author of Taylors Gut. There he is in the dawn, tossing his decoys and their anchors out of the boat, intent on getting his rig properly afloat and himself in the blind ready to shoot. Some geese come in close enough. He and his companion shoot and pick up the dead.

But it's still early, and what happens? His limit of two birds in hand, Dudley Lunt turns quietly to perceptive enjoyment of the scene around him. Another man might pick up and leave the marsh, but he stays to watch. His naturalist's educated vision takes up where atavism left off.

**HE is entranced by the millions of blackbirds that visit the Delaware marshes in fall. A tight-packed horde of them approach:**

"Flying close to the surface they come on and on right into the eye of the light southerly breeze. Over the pond the effect is of a black-flaked snowstorm. Blackbirds are steaming past the blind. The flight of the individual bird is a continuous sequence of bouncing zooms, and en masse this gives to those streaking past a curious undulatory effect . . . I stand up in the blind. Instantly the flight splits and flows in streaming flight on either side of the blind. A duck is flying inside the flock. This is always a fascinating spectacle. The wildfowl looms so large; its flight is swifter, straighter."



**AUTHOR 'AT WORK'**—Dudley Lunt in his blind on Taylors Gut



**Drawing by Anthony John Florio**

A blackbird is seen to bounce off a duck's body!

That is the kind of rare natural sight that only the outdoorsman's trained eye is likely to see.

Dudley Lunt is more than a woodsman, a marshman, and a man of law and letters. He is a seasoned and quietly impassioned conservationist all year round. Two decades ago American marshes were still regarded far too widely by the uninitiated as worthless terrain, fit only for dumping trash into. Thanks to Dudley Lunt and his kind, and to public leaders including Secretary of the Interior Stewart L. Udall, marshes in recent years have been recognized as wildernesses of beauty and great importance in the human environment.

**BIOLOGISTS** like Franklin C. Daiber of the

University of Delaware are proving that it is the riches of marsh nutrients that support the shellfish and the finfish of the estuaries and the continental shelf. No longer is the fate of marshes left to a simple contest between destroyers or exploiters on the one hand, and waterfowlers and fishermen on the other. An estuary like the lower Delaware River and Bay with its array of tidal channels and its Taylors Gut east of Smyrna, in the "Delaware state," is likely to be guarded henceforth. Those who would bring heavy industrial development to this estuary's shoreline, henceforth, no longer sitteth on the right hand — as the Shell Oil Co. found out in Delaware a few years ago.

As for the little body of water that is Taylors Gut, itself, perhaps only Henry Thoreau's Walden Pond — another of Dudley Lunt's favorite places — has ever got comparable treatment for comparable size. Tony Florio's drawings add distinction to a Delaware book of appeal to any and all who don't need to look far to see plenty to enjoy in nature.

An independent newspaper published every afternoon except Sunday by the News-Journal Company  
CHARLES L. REESE JR., President and Chairman of the Board  
FREDERICK WALTER, General Manager  
RICHARD P. SANGER, Managing Editor  
LESLIE E. CANSLER JR., Day Managing Editor  
CHARLES M. HACKETT, Executive Editor  
JOHN G. CRAIG JR., Editorial Director  
FREDERICK W. HARTMANN, Metropolitan Editor

# Wildlife, People and Refuges

**A**N EVER-INCREASING number of people are enjoying the U.S. National Wildlife Refuge System with its 317 major units, as administered by the Department of the Interior. Some 250 of the refuges are largely devoted to waterfowl, but there are also the Bison Refuge in Montana, for example, and the Aleutian Islands Refuge of Alaska where seals and sea otters are the chief inhabitants.

Last year 15.6 million visits to the national refuges were recorded. Of these, 4 per cent came for hunting, and 27 per cent for fishing — with 69 per cent for general recreation.

"Finding a reasonable compromise between isolationism and over-use" was one of the reasons why Interior Secretary Stewart L. Udall asked, and has now received, a report by a competent advisory board on how the refuges are faring in their booming popularity.

On the whole, fortunately, the report gives satisfaction rather than sounds an alarm. The chains of waterfowl refuges in all four main flyways are making sure of something like 150 million ducks and geese as an average fall population. However, "to provide permanently for such a population will require preservation of considerable habitat now in private ownership and subject to drainage," according to the report.

The trouble is that federal funds for new refuges or for adding to existing ones have been limited to the proceeds of the sale of "duck stamps." This isn't enough. The land-acquisition program deserves and should get funds from general appropriations as well.

As for the problem of human over-use of some refuges and underuse of others, the report wisely asks that a principle be adhered to — namely, that visiting be permitted and encouraged on a particular refuge up to a point where the visitors begin to impair the usefulness of the refuge as such — and no further. Thus, many Delawareans have been among the 78,000 visitors to Brigantine Refuge near Atlantic City, where they can use a "loop road on a levee to observe waterfowl and wading birds without interfering with the birds or with each other."

The same good facilities exist, to a degree, at Bombay Hook Refuge, in Kent County, which attracted 22,000 visits last year including 2,635 waterfowl hunters on parts set aside for gunning.

By the way, have you been to Bombay Hook for the spring show there? Until you've seen "thousands of geese and ducks against a sunset sky" — in the words of the report — you won't understand what you're missing.

All unique information in the document is visible in this image.

# EVENING JOURNAL

WILMINGTON

DELAWARE

Thursday, January 18, 1968

## Conservationists Purchase Marshland

*(First of two articles on  
Delaware's wetlands.)*

By **JIM HARDCASTLE**  
Dover Bureau

A group of conservationists paid nearly \$1 million for 2,600 acres of Delaware marshland this fall.

The group, Delaware Wildlands Inc., paid the sum for tracts of marsh along the Blackbird Creek in southern New Castle County and at the mouth of the St. Jones River in Kent County, figures released by Wildlands president Edmund H. Harvey reveal.

The price, he concedes, is a lot to pay for marshlands. But Harvey says the expense is justified.

"They (the marshlands) are a priceless natural resource," he said. "We want to make sure we have them for the future."

"But because they might go to some other use," he said, referring to the increasing use of marshland for industrial and housing sites, "we bought them."

**HARVEY** has said his group intends to buy endangered marsh and swamplands for conservation purposes "for as long as our friends continue to believe in our programs and goals."

Some people who have sought to use the marshland for other purposes in the past predict that will be a long time.

"They don't ever seem to run out of money," one oil industry spokesman said in a tone that resembled awe.

Nevertheless, Delaware Wildlands would have a long way to go if it ever decided to secure

See WILDLANDS—P. 29, C. 4



Dover Bureau Photo by Chuck McGowen

**Thousands of geese find refuge in Bombay Hook, part of Delaware's vast wetlands.**



Dover Bureau Photo by Chuck McGowen

**Deer stares down photographer at Bombay Hook National Wildlife Refuge.**

# Wildlands Group Buys Marshland in Kent

(Continued From Page One)

all of the state's marshlands for conservation purposes.

About 120,000 acres — 8 per cent of Delaware's area are wetlands, a term that encompasses both grassy marshlands and wooded swamps, said David M. Kiefer, state planning office technical director.

Of this 120,000 acres, the largest bulk extends virtually intact along the Delaware Bay from the Chesapeake and Delaware Canal south to near Lewes, the U.S. Fish and Wildlife Service reports.

The rest are located primarily along the waters of the many streams which zig-zag across the state.

Few can argue about the value of the wetlands for the feeding, nesting and wintering of birds.

Strategically located along the major thoroughfare for ducks and geese migrating from Canada to Florida, Delaware's wetlands probably accommodate as many geese as any of the 10 states in the northeastern United States, says the U.S. game agent Robert O. Halstead.

His staff recently estimated that more than 80,000 geese were stopping over in the Delaware wetlands for the winter. As many as 100,000 might converge on the same area later.

During the same estimate, he added, his staff also counted 60,000 ducks in the wetlands.

A stirring sight for the casual birdwatcher, Delaware's flocks of migratory birds are also a big business for farmers owning land near or on marshlands.

Halstead says there are more than 500 goose and duck blinds in the state. Some of the goose blinds — little more than shoulder deep pits dug in the middle of cornfields — rent for as much as \$1,800 a season, he said.

YOU can't get a decent one for less than \$500," he added.

Duck blinds cost a little less per season but \$200 would probably be the lowest price, he said.

Waterfowl hunters, however, do more than rent blinds, Wilder said. They buy guns, stay overnight in hotels, and buy meals.

Wilder estimates that the 8,000 waterfowl hunters who bought federal duck stamps in Delaware last year spent in the neighborhood of \$500,000 in pursuit of their sport.

Of lesser economic importance, but probably greater in numbers, are the state's many casual and serious birdwatchers. A recent survey on the

Little Creek Wildlife Area showed 10 persons come to look at the birds for every hunter who comes to shoot them, Wilder said.

THE reason they come to the marshes to watch the birds is simple. There are a lot of birds to watch

About 300 species of birds have been observed on the Bombay Hook National Wildlife Refuge southeast of Smyrna says Robert Nelson, refuge manager. Among the species observed are the virtually extinct bald eagle, of which there are five, and two fairly rare shorebirds, the Hudsonian godwit, and the avocet, all of which birdwatchers claim are "real finds."

Not as well understood, but more economically significant than the connection between the marshes and birds, is the relationship between the marshes and aquatic life in the Delaware Bay and the Atlantic Ocean.

IN recent years, aquatic biologists have determined that marshlands are part of the life cycle of virtually every saltwater fish hooked by sports fishermen.

John Clark, a marine biologist at the U.S. Bureau of Sports Fisheries and Wildlife's Sandy Hook Marine Laboratory in Highland, N.J., last year told a group of marine researchers at the University of North Carolina that nearly 70 per cent of America's fishes are dependent upon estuaries, the protected tidal waters which consist primarily of wetlands.

Most coastal fish, he continued, use the wetlands as a hatchery for the eggs they deposit in the tidal streams once a year.

"Most coastal fish," he said, "appear not to be fitted for survival in the open ocean. Once the floating eggs and larvae have survived the jellyfishes and small predatory fishes, the juveniles in the sea are now vulnerable to multitudes of larger predatory fish.

"But in the shallow brackish waters (of the wetlands and shallow coastal streams) young fish are safe because large predators are rarely found there," Clark said.

AMONG the sports fishes dependent upon the estuaries are virtually every species sought by Delaware's saltwater anglers. These include striped bass, fluke, weakfish, tarpon, snook, bluefish and croaker

Again, as in the case of waterfowl hunters, these fishermen spend a great deal of money in pursuit of their sport.

In 1960 a Fish and Game Commission survey reported that 33,000 fishermen dabbled their hooks in Delaware's bays and coastal waters. On the basis of figures derived from a survey of what fishermen spend, Wilder estimated that these fishermen spent over \$3.3 million in 1960.

But due to increases in the number of fishermen and increases in costs, Delaware fishermen probably spend 50 per cent more today than they did in 1960, Dr. Jay L. Harmic, assistant fish and game director, says.

(Continued)

**SEVERAL** species of commercial fish, which once provided the backbone of a major down-state industry, are also dependent upon the marshes.

Shellfish, for example, live only in areas where the algae-rich run-off from the wetlands is available, says George P. Spinner, formerly refuge manager at Bombay Hook and now a research associate at the University of North Carolina.

Other species of commercial fish dependent on the marshlands are menhaden, the basis for a \$2 to \$5 million fishing industry in the 1950s but now limited by overfishing, or other causes, and shad, which were wiped out in the bay around the turn of the century by pollution.

**THE** wetlands, however, do more than just protect young fish and feed those near the shore. They also provide vital nutrients for fish that live deep in the bays and oceans.

"There is good reason that fish and shellfish are most abundant near the coasts of our great oceans," Clark said.

"First off," he said, "the estuaries are among the most fertile areas of the world." On one Georgia marshland studied, he continued, 10 tons of marsh grasses and algae are produced every year on each acre. In comparison, he added, world average wheat production is only 1½ tons per acre per year.

Many of these plants, he explained, are swept into the bays and oceans where they feed the fish that never come close to shore.

So for these reasons and many more, men like Harvey are willing to pay a million dollars for a marsh.

**TOMORROW: Competition for wetlands.**

EVENING

JOURNAL

WILMINGTON

DELAWARE

Friday

January 19, 1968

## Environment Threat Seen

# State Wetlands Vital to Game

*(Second of two articles on Delaware's wetlands.)*

By **JIM HARDCASTLE**  
Dover Bureau

Striped bass and Canada geese both need Delaware's wetlands in order to survive in this state.

But recently they have found stiff competition for their environment from industry and the state's mosquito control program, says Norman G. Wilder, director of the State Fish and Game Commission.

"In the past few years," he explains, "the wetlands have been dwindling at the rate of 1 per cent per year." He predicts that the rate will accelerate in the years ahead as industry looks for cheaper sites with access to the sea.

In the meantime, he adds, the quality of the wetlands may be drastically reduced by water pollution and by mosquito control programs.

INDUSTRY will only be able to acquire a limited portion of the wetlands, Wilder says because state and federal agencies and conservation groups have already secured some 50 per cent of the shoreline available.

Opposing well-heeled interests however, are scrambling for the 60,000 acres that remain, he claims.

"When we started to buy wetlands for game areas in 1954, there weren't any other buyers in the field," Wilder says. "We bought them for \$18 an acre."

Since that time, his agency has purchased 7,000 acres of wetlands. Delaware Wildlands

**State Wetlands Vital to Game  
(Continued)**

**Evening Journal  
Wilmington, Delaware  
Friday, January 19, 1968**

Inc., secured 6,500 and the U.S. Fish and Wildlife service has bought 4,600 acres in Sussex County toward the large new Prime Hook Wildlife Refuge.

MEANWHILE, he says, "Tidewater (Getty Oil Co.), Shell (Oil Co.), Sinclair Pipeline Co., Hercules, Inc., and Union Carbide have all bought land along the Delaware Bay."

"With these kind of pressures on the land," Wilder says, "we've been priced out of the market."

Value of the wetlands, explains David R. Kiefer, State Planning Office technical director, is derived from five conflicting factors.

"The wetlands, are one of Delaware's most valuable resources because of their wildlife

value and the esthetics of their open spaces."

Since the bulk of them border the Delaware Bay, the marshlands are also coveted by industry because of their access to deep water, their proximity to one third of the country's population and the low price of land, he continues.

DESPITE these industrial values, however, many groups claim the wetlands should remain forever wild. The State Planning Office recommends in its recently published state development plan that the wetlands be preserved from just south of the Chesapeake and Delaware Canal to just north of Lewes.

Kiefer explains that once wetlands are filled for building sites

they can never be reclaimed. Accordingly, he says, "our basic philosophy is that it is our obligation to future generations to preserve them (the wetlands) the way they are."

One other reason for the Planning Office's stand is that industries seeking to build in the wetlands are usually producers of petrochemicals, the planners say.

THE value of refineries to a state's economy is questionable, many planners contend. Their payrolls are large — the Getty Oil refinery located on the wetlands just north of the canal injected \$10.5 million into the Delaware economy in payrolls alone last year, company officials said.

These planners contend that



Dover Bureau Photo by Chuck McGowen

**WINGED TRIP RESUMES** — Canada Geese are shown as they resume flight south after brief rest at Bombay Hook federal wildlife refuge east of Smyrna.

Visitors were part of a huge flock making the stop recently en route to warmer climes.

other, cleaner forms of industry would use even more labor because the refineries are so highly automated. And in Delaware, they add, much of the value of the refinery is not taxed because most of their expensive equipment is exempted as tools.

What's more, adds Wilder, wherever there are refineries there are likely to be oil spills devastating to wildlife.

For that reason, a bitter battle erupted in 1962 when Shell Oil Co. acquired 3,244 acres of land, including some 500 acres of wetlands for a refinery site, and asked that New Castle County rezone the land for industrial use. Despite backing from national conservation groups, the Delaware Wildlife Federation lost the battle and the land was rezoned for industrial use.

**ONLY one more hurdle remains** for Shell, says Wilder (who lost 20 pounds during the drawn out battle), and that is the Delaware River Basin Commission, where Secretary of the Interior Stewart L. Udall has a veto over the construction of the refinery.

At the present time, a Shell spokesman said recently Shell has no set schedule for the construction of the refinery.

"But like it or not," he continues, "those people referring to Delaware's conservation groups) are going to have to realize they are in the middle of a huge metropolitan area."

While Shell goes ahead with its plans for the refinery, conservationists still seethe about Delaware's \$2 million ditching program nearing completion on the wetlands.

**THE program, which began in 1965, was launched by Gov. Charles L. Terry Jr., who in a speech before the Senate that year promised to "eradicate" the mosquito, which he termed "a mockery of civilization."**

**The key weapon in the eradication of mosquitos is the mosquito control ditch, says Ernest A. Davidson, who as highway department director of operations, is charged with overall administration of the program.**

These ditches, he explains, are used to dry up the pools of water in the salt marshes where mosquitos breed and to permit small fish to swim into the marshes where they can eat mosquito larva.

So far, his department has spent \$1.45 million on permanent mosquito control devices in the state. Of these devices, Davidson says, "only a very few" have been other than mosquito control ditches, a device used with some success since the 1930s.

**THIS last point — the fact that the highway department is reluctant to experiment with newer mosquito control devices, particularly bothers Delaware Wildlands' Edmund H. Harvey.**

Harvey, who was president of the Delaware Wildlife Federation during the first year of the mosquito control program, claims that the highway department's control program has not taken account of advances in insect control less harmful to the wetlands.

By digging ditches across most of Delaware's wetlands, he claims, the Highway Department is changing the native vegetation and destroying the mollusks that feed waterfowl and fish.

**THE highway department, Harvey says, should spend much more on research before advancing with a program as potentially dangerous as ditching. He contends only \$24,000 is spent a year on research and nearly \$1 million on ditching.**

"What we are advocating and urging is the finest mosquito control program possible," Harvey once said. "Based on our consultation with nationally known authorities, that is not what the state has done."

New advances in mosquito control such as impoundments, blind ditches, and some forms of spraying, he added, promise to destroy many more mosquitoes with much less damage to the wetlands.

These then, are the forces conservationists believe they must battle if they are to preserve Delaware's wetlands. Will they be successful?

That question, says Harvey, "future generations must decide."

# The Morning News

MONDAY, JANUARY 12, 1969

## In state sky

# Bird counters spy newcomers

By BETTY BURROUGHS

The bluebird's in the orchard, robins are bobbing everywhere and Audubon bird counters added two new species to Delaware's airborne roll call.

The annual Christmas count, conducted in five areas between Dec. 21 and 29, resulted in a record 133 species in the Bombay Hook census.

Although total sightings on the five counts have not been tabulated, it is expected to run to 150 species or more.

DELAWARE has participated in the Audubon Christmas count since about 1940, but in the first years all observing was at Bombay Hook Wildlife Refuge. In recent years, Wilmington, Middletown, Cape Henlopen-Prime Hook and Rehoboth counts have been added.

Detailed results of the latest count will be released at a meeting of the Delmarva Ornithological Society Wednesday night at Wilcastle Center.

Meanwhile, the Wilmington beak counters, headed by Nick Brokaw, a Princeton junior, reported seeing 79 species during their dawn to dusk survey Dec. 21. The most unusual sightings were three phoebes seen off Delaware 100 near the Pennsylvania line.

THE Wilmington counters, numbering about 50, covered territory within a 15-mile radius of the center of Brandywine Springs Park.

Brokaw's scouts spotted seven bluebirds, which while heartening to the layman who never sees any, is a signal to ornitholo-

gists that the species is becoming extinct here. They blame DDT and the starlings. The Wilmington counters saw more of the little red-breasted blue birds last year.

On the other hand, the Brokaw birders saw 9,000 Canada geese (three times the 1968 count), 700 mourning doves, 345 robins. Less common birds that appeared in fairly large numbers include the red-tailed hawk, 47; sparrow hawks, 52, and great-horned owls, 10. Next to the phoebes, two hermit thrushes were unexpected finds.

WINSTON J. Wayne of the Delmarva Ornithological Society was in charge of the over-all count and of the Rehoboth expedition on Dec. 29. The results of the latter, he said, were disappointing with only 122 different species sighted.

"This is on the low side," said Wayne. "We had too few observers and the weather was bad—high winds."

Nevertheless, it was Wayne's group that came up with the two species never before included in the December count in Delaware. They are the black-legged kittiwake, a northern gull, and the knot, a relatively common shore bird in the summer.

Two other northern gulls, the Iceland and the Glaucous, were seen on the Rehoboth safari, as well as the black-headed gull, which, Wayne says, is a European gull "that wanders over here sometimes."

DAVID Cutler of Philadelphia was captain of the Bombay Hook record count on Dec. 22. Edward Strickland, a newcomer, headed the Middletown scouts who saw 74 species on

Dec. 26. The Cape Henlopen-Prime Hook survey on Dec. 29 was led by Seal Brooks and produced 107 species.

Wayne estimates about 75 persons—mostly men and all trained observers—were involved in the five counts.

Although not spotted on any of the five official counts, the most exciting "find" of the watch period was a pair of Virginia rails seen on the grounds of Delaware Nature Center in Brandywine Creek State Park on New Year's Day.

Wayne says they are a most uncommon sight here this time of year and they will be added to the Christmas count.