

BRANCH OF WILDLIFE REFUGES NARRATIVE REPORTS

MR. SALYER _____

MISS BAUM _____

MR. GRIFFITH _____

Operations

~~MR. REGAN~~ _____

✓ ~~MR. DuMONT~~ WAD

Land Management

~~MR. ACKERKNECHT~~ EOA

~~DR. MORLEY~~ Law

Habitat Improvement

DR. ERICKSON _____

MR. STILES WTBS

MR. KUBICHEK _____

Stenographers

REFUGE BOMBAY HOOK

PERIOD SEPT - DEC 1957

NARRATIVE REPORT

BOMBAY HOOK NATIONAL WILDLIFE REFUGE

SEPTEMBER * DECEMBER 1957

REFUGE STAFF

Edwin H. Chandler	Refuge Manager
Henry S. Bush	Refuge Assistant
(Vacant)	Refuge Clerk
John W. Parker.....	Refuge Maintenanceman
Louis Steller.....	Refuge "
John McBride	Tractor Operator
William C. Storey.....	" "

TEMPORARY EMPLOYEES

James B. Reed.....	Bulldozer Operator
Joseph F. Heininger.....	Dragline Operator
Harvey Killen.....	Laborer
Lex Miller.....	"

U. S. DEPARTMENT OF THE INTERIOR - FISH & WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES & WILDLIFE

SMYRNA, DELAWARE

NARRATIVE REPORT

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NARRATIVE REPORT

BOMBAY HOOK NATIONAL WILDLIFE REFUGE

SEPTEMBER - DECEMBER 1957

I GENERAL

A. Weather Conditions

The following summary of weather conditions for the report period are taken from records of the U. S. Weather Bureau, Wilmington, Delaware (temperatures) and from refuge records (rainfall/snowfall);

	<u>Precipitation</u>		<u>Temperatures</u>		
	<u>Rain</u>	<u>Snow</u>	<u>Max.</u>	<u>Min.</u>	<u>Average</u>
September	3.58		93	37	68.7
October	2.55		76	31	53.3
November	3.72		73	23	46.6
December	4.30*	6"-7"	&		
Totals	14.15 *	6" - 7"	93		

* December's total includes moisture content of snow.

Near - normal precipitation occurred throughout the period, except that December's total was about 1" above normal. The only bad storm which occurred was a strong NE blizzard on December 4th; while it deposited only 4"-5" in this area, there was considerable drifting and severe icing conditions on the highways. During the storm, visibility was often cut to zero. This, together with hazardous road conditions, resulted in long delays, tie-ups, and minor accidents on the local highways. Temperatures averaged above normal for the entire period and undoubtedly accounted for the late waterfowl migration (similar conditions prevailed north of us) and for the poor hunting conditions.

B. Water conditions

At the beginning of the period, all pools were below normal levels. Raymonds Pool, which had been drained so the Carp could be poisoned, remained quite low until late in the period. Several heavy rains brought both Shearness and Raymonds Pools up to near normal by the end of December; Shearness is at its optimum of 2.75' and Raymonds is at 2.22' (optimum 2.75'). The increasing water level in Raymonds has made a large quantity of millet available to ducks and usage of this pool is approaching what it was two years ago. With little emergent vegetation (food) and no aquatics available last fall and winter, this pool was barren of waterfowl much of the time.

C. Fires

None this period.

II WILDLIFE

A. Migratory Birds

1. Populations and Behavior

a. Waterfowl - The outstanding feature of this fall's waterfowl behavior pattern was the very slow migration into Delaware. Continued mild weather here (and in the northern part of the flyway, according to fragments of information filtering down to us) delayed the arrival of both ducks and geese. By the end of November, we had only 6000-7000 geese and a like number of ducks. This was a drop of 6000 ducks from a peak late in October. Duck populations built up steadily after the 1st week of December to a peak of 29,000 for the rest of the month. Of this total, there are approximately 14,000 Mallards, 8,000 Blacks, 6,000 Pintails, and lesser numbers of Widgeon, Green-winged Teal, and Shovelers. Goose populations were also slow to build up and it was not until the 1st week of December that their numbers reached 10,000. By the 3rd week of December, they had increased to 13,000, where they remain at this writing.

However, it should be noted that there is a strong possibility (actually, a probability) that the refuge population figures belie the true picture of waterfowl number's in Delaware. Mild weather throughout the period kept birds off the refuge; large evening flights over the refuge to nearby farmlands led to the supposition that many birds were rafted offshore from the refuge in Delaware Bay. This was substantiated to some degree by reports from local waterman that the Bay was " black with ducks ". No aerial flights over the Bay are made since float planes are not readily available. Our observations, combined with the above-mentioned reports, lead us to the conclusion that normal waterfowl populations are present - although they were later than usual in appearing.

Coot populations are well below normal and it is suspected that this area was by-passed this fall. The greatest number of Coot observed has been only 10; populations at this time last year was 350-400.

As far as total waterfowl populations for December are concerned, the refuge is a little above the figure for last year (40,000 vs. 33,000). The State count showed only an additional 18,000 birds, but, as stated above, the Bay apparently has plenty of birds rafting (last year's December count for the State showed about 85,000 birds and 58,000 this year).

b. Shorebirds, Gulls, and Terns - Normal numbers of these birds were present during the period. Herring Gulls were more prominent on our fields, with up to 150 being present during the last two months. Egrets occurred in small numbers and one was still on Shearneck Pool at the end of December. Great Blue Herons are present in numbers varying between 10 and 15.

c. Doves - No large concentrations during the fall flight were observed, but they are common in the general area.

d. Woodcock - Several Woodcock were observed throughout October and early November. It is estimated that our peak was about 10 during late October.

2. Food and Cover - Excellent food and cover for all species existed this period. This summer's drought dropped pool levels well below normal, with the result that luxurious growths of wild millet spread over much of the exposed mud flats. A gradual raising of pool levels kept a fairly stable food supply for the ducks. Blackbirds in very large numbers (up to 500,000) gleaned much of the natural foods, but there was still an abundant supply left for water-fowl. Refuge crops supplied an abundance of food, as well, with corn and winter wheat supplying the majority of it. Buckwheat, Jap. Millet, clover, and sorghum supplied lesser amounts. Our experimental plantings of Dwarf Sunflower were successful, but all seed was taken by the Blackbirds. This plant warrants further trial and additional plantings will be made next summer.

Cover has remained essentially unchanged since last year, although Finis Pool has opened up more with more and more dead trees and brush being blown down. Duck usage of this pool increased over last year.

B. Upland Game Birds

1. Populations and Behavior

Little change in our populations of Bob-white Quail and Pheasants is apparent. It is estimated that there are 12 coveys of quail and 30-40 pheasants on the refuge.

2. Food and Cover - Both are adequate for quail and pheasants.

C. Big Game Animals

1. Populations and Behavior

There appears to be no change in our deer herd, which is estimated at 70-75 animals. Only three were removed during our regulated archery season during October.

2. Food and Cover - Both are plentiful for the herd.

D. Fur Animals, Predators, Rodents, and Other Animals

No apparent change has occurred for populations of raccoon, otter, fox, or opossum. Muskrats appear to be holding their own: an aerial survey showed 333 houses and it was estimated that the refuge population (including bank rats) was 1545. Most of the houses were small and there were very few eat-outs.

E. Predaceous Birds

One to two Bald Eagles have been present throughout the period. Occasional observations of a Golden Eagle were made during the early fall. Marsh Hawks have been present in normal numbers (10-12). Sparrow Hawks were common late in November. Crows were present during November and early December in numbers up to 200. Owls (Great Horned, Barn, Short-eared) were present in normal (low) numbers.

F. Fish

While Raymonds Pool was cleared of Carp last summer (July 1957), Shearneck Pool has a large population which should be poisoned during the next 2-3 years. Finis Pool is due to be stocked with Large - mouthed Bass this coming season.

III REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

1. Bear Swamp Dike

Work continued on this dike, begun during the last period, until late November when the Lima Paymaster 34 dragline was returned to Headquarters for repairs to the vertical swing shaft assembly. About the first of October, the 3/4 - yard bucket was replaced by a 1/2 - yard bucket; this new bucket eased the work on the soft marsh, although it cut down on the per-day yardage. We are presently about 1/2 the way across to Cat Island (about 1200 feet). We nearly lost the machine in matting it back to the mainland; one end of the mats sank and the machine slid to that end. Only the skid rails held it from landing on its side in the marsh. The machine was righted, brought to Headquarters, and torn down. At this writing, we are awaiting the arrival of parts.

2. Miscellaneous Maintenance and Work Jobs

a. The bathroom of Quarters # 1 was tiled with ceramic tile and new plumbing and tub installed.

b. The Striker (FWS 117) had 1486 screws put into the bottom planking and the engine serviced and run as required.

c. Additional mats were constructed for the dragline work at Bear Swamp.

d. A new heating system was installed in the Service Building.

e. Two stalls and half of the deck of the boathouse were screened over to protect the boats and decking from roosting birds.

f. A temporary corn crib was constructed of snow fence on the Cement Platform and filled with an additional 650 bushels of corn from this year's harvest.

g. The propeller shaft of the Snow Goose (FWS 150) was repaired and the hull scraped, painted, and the engine tuned.

h. The refuge boundary was inspected and reposted where necessary.

i. A new radio was installed in Quarters # 1 and will allow us to communicate to the office as well as to transmit through the central set.

j. A tool board was constructed for Caterpillar tools received from GSA surplus.

k. Cleaned up Cement Platform and rearranged equipment and supplies.

l. Hauled gravel in to fill up bad spots in the roads and dikes.

m. Received the following equipment during the period:

- 1) New 13-ton capacity tilt-top trailer ✓
- 2) New Case Model 613 Rotary Cutter ✓
- 3) New Brillion Rotary Hoe ✓
- 4) New farm wagon ✓
- 5) Surplus 16 mm. movie projector ✓
- 6) Surplus heavy equipment trailer w/tandem wheels to replace our single axle trailer. ✓

From Surplus

- n. Regular maintenance of motor vehicles, farm tractor, trailer, and farm equipment.
- o. Roads were graded as required.
- p. Regular maintenance of buildings and grounds.

B. Plantings

1. Aquatic and Marsh - None. The Jap Millet planted in Raymonds Pool was essentially a failure, probably due to drought conditions.

2. Trees and Shrubs - None.

3. Upland Herbaceous Plants - None.

4. Cultivated Crops - Yields of corn and soybeans were better than anticipated (see previous NR). Approximately 2200 bushels of corn were harvested from 43 acres, or almost 52 bushels per acre. Enough soybeans were harvested to use for seed for next year. It was expected that this past summer's drought would cut yields considerably, but late summer rains apparently came in time to save the crops. Clover fields showed nothing but weeds until September rains fell and good growths for goose pasturage resulted. Winter wheat was sown in Fields 1, 3c, part of 10, 13, 17, 18, and 19 - a total of about 135 acres. This crop has done well, but has been heavily browsed by geese. We are expecting a good harvest of wheat next summer.

C. Collections

1. Seed and Other Propugales - None.

2. Specimens - None.

3. Receipt of Seed and Nursery Stock - None.

D. Control of Vegetation - None, except by mowing of brush along dikes.

E. Planned Burning - Not applicable this period.

F. Fires - None this period.

IV RESOURCE MANAGEMENT

A. Grazing - None.

B. Haying - None.

C. Fur Harvest - None.

D. Timber Removal - A total of 65 trees (oaks and gum) were cut for use in constructing 10" X 10" X 24' mats timbers for use here and at Brigantine Refuge.

E. Commercial Fishing - None.

F. Other Uses - None.

V FIELD INVESTIGATION OR APPLIED RESEARCH

A. Waterfowl Trapping and Banding

In an attempt to supply northern refuges with known-age and decoy geese, we have had our cannon nets out and baited since early in October. However, mild weather kept the geese feeding on green pasturage (wheat and clover) until late in December. During the last week of December, we were able to trap 104 geese, but at this late date it was virtually impossible to age birds by the notched tail feather criterion for birds of the year as required by the Central Office. Before any birds are shipped out, we shall have to determine age as closely as possible.

Duck banding will commence after the close of the waterfowl season on January 9. Most of the work will be done in cooperation with the State Game and Fish Commission. An additional trap (modified decoy pipe) was constructed on Shearness Pool this period. It is hoped that we can surpass our total of more than 1400 birds banded last year.

VI PUBLIC RELATIONS

A. Recreational Uses

Public use of the refuge was normal this period; this period is generally the highest in such use as many visitors come during weekends to view the waterfowl concentrations on the pools. Annual usage of the refuge this calendar year approached 10,000 again; our usually slack summers were not so this year as mosquitoes were not a problem for the first time in years. The only hunting on the refuge was for deer with bow and arrow; no shotgun season was allowed this year. A breakdown is listed on NR-6.

B. Official Visitors

The following officials and others of note visited the refuge during the period:

D. R. Gascoyne, Regional Director	Visit
A.F. Miller, Refuge Supervisor	Inspection
M. F. Radway, Asst. Refuge Supervisor	"
C. R. Mitchell, Asst. Supervisor, GF-H	Re Stocking
D. L. Buck, Gen. Engineer	Inspection
J. C. Dakin, Civil Engineer	"
H. E. Whitley, Manager, Brigantine	Visit
N. Wilder, Acting Director, Del. G. & F. Comm.	Meeting
W. Wheatley, State Mosquito Control Div.	"
Dr. R. Darsie, Entomologist, U. of Del.	"
Y. Robinson, Engineer, State Highway Dept.	"
A. F. Florio, Game Manager, Del. G. & F. Comm.	"
B. B. Reath, Chm., Natl. Retriever Trial	Trial Program
W. Lockland, Pres. Natl. Retriever Club	Field Trial
Theodore Roosevelt II,	" "
J. Linduska, Remington Farms	" "

Many other prominent citizens attended the National Retriever Field Trial, but are too numerous to record here. Other officials who visited the refuge often were GMA's Russ Gallo and Harry Greenwald, and E. B. Chamberlain, Delaware Game & Fish Commission.

C. Refuge Participation

The manager conducted several groups on a tour of the refuge, including the officers and judges of the National Retriever Club (in regard to our work and in setting up the 1957 National Championship Stake), a group from the Wilmington YWCA, several Cub Scout Packs, and several individual birders.

Several news releases publicizing the National Championship Stake were sent to all Delaware newspapers. Other publicity was sent to New York, Philadelphia, and Baltimore newspapers; national magazines (such as Sports Illustrated, Sports Afield Outdoor Life, and Field and Stream) by the Trial Chairman. The Trial was covered by several of these magazines and newspapers. The Service, through the work and development of Bombay Hook, received very good publicity and many favorable comments from all of those participating in the Trial. We feel, as a result of the many compliments filtering back to us, that the Service has gained a great deal of support from many influential people and it is hoped that the Service will benefit from the Trial having been held on one of its properties. Bombay Hook may very well be chosen as the site for the next National when it is held in the East.

D. Hunting

The Dutch Neck portion of the refuge was again opened to public hunting for deer, but only for bow and arrow hunting. It was not felt that a shotgun season was warranted due to the small size of the herd and the small public response a year ago. The season ran for the month of October and during that time, 815 hunters were checked into the refuge. The deer were fairly plentiful until after the first week when they stayed in the marsh or were in the closed area of the refuge. As a result, only three deer were taken - two fawns and one 110 lb. doe. Three or four more were hit, but it was thought that none were seriously hurt.

E. Fishing - None this period.

F. Violations

None this period. It was unusually quiet along our boundaries during deer season and no apprehensions were made. Most of the hunters along our boundaries were local people - none from Pennsylvania or New Jersey from whom we have experienced trouble in the past.

VII OTHER ITEMS

A. National Championship Stake

From November 14 to 17, the refuge was the site for the National Championship Stake for retrievers. Over 1000 people attended the Trial, including about 165 people attended the Trial, actually connected with the Trial. Regional Director D. R. Gascoyne was in attendance for most of the Trial. It had been thought in the past that a fall trial would drive out most of our waterfowl, geese in particular. However, during one day's test, geese flying directly over the gallery and test site poured into the pools by the thousands. No disturbance of waterfowl was noted during the four days the Trial was run.

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У* исторический состав населения г. Саратова

ALL OTHER ITEMS

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E. ALSTON

В. БЕРНУК - тоже друг Белого.

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D. HOFFMANN

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 setting up the 1984 National Constitution strike)' & along with the MURDERSON LMCV
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 the national congress several along on a form of the letter, including the

С* БЕЛКЕ БЕЛГОУБЕЖНОУ

HIGH COMPRESSION*

These SNVs, a knee injury and health screening, and E. B. Christopher, Jr., DeWitt County, and
and the too numerous to record here. Other officials who attended the 1978-79
with other. Blockading citizens attended the national conference. They did.

Competition was keen and, although the dogs started off rather sloppily, they picked up after the first two days and were working very well as the Trial went into the last two days. The Championship was won by Spirit Lake Duke, a 2 1/2 year old Labrador owned by Mrs. George Murnane of Syosset, Long Island, New York. He was hard pressed by a puppy (1 1/2 years old) owned by Mr. Herbert Flomshacker of San Francisco, but took home the Winner's Trophy as a result of the last test.

The refuge staff was on duty throughout the Trial and was ably assisted by GMA's Gallo and Greenwald, State Troopers, and State Game Wardens. Much valuable assistance in the way of highway signs, gravel for the roads, and for informational signs was extended by the State Highway Department.

B. Christmas Bird Count

The annual Christmas Bird Count was conducted by the Audobon Society (Delaware Valley Ornithological Club) on December 29. The results are not yet tabulated and will be included in the next NR.

C. Refuge Clerk Vacancy

It was hoped that we would be able to fill the Clerk vacancy - left when Buddy Parker transferred to Maintenance last period. We found an excellent candidate and he took Civil Service exams, passed them, and was all ready to start work for us. However, with the manpower ceiling imposed as of September 30, we were unable to process his employment. When the ceiling is lifted, we hope to put him to work for us; he is still eager to start whenever we get the green light on the position.

D. Mosquito Control Advisory Committee

Two meeting of the Committee were held this period, mainly in regard to the State Game and Fish Commission's working out an agreement and practical arrangement with the Mosquito Control Division of the State Highway Department for the construction of an impoundment in one of Delaware's coastal marshes to provide multiple use, i.e., mosquito control without ditching and wildlife habitat. At present, one of the Highway Department's engineers is making a preliminary survey of one of the sites tentatively chosen for this work.

E. NR Forms - Appended.

F. Photographs - Appended.

Approved

Arthur Freeman 1/1a
Refuge Supervisor

Approved

Regional Director

Respectfully submitted,

Edwin H. Chandler
Edwin H. Chandler
Refuge Manager

Date: January 7, 1958



Judges conducting a water series at Shearness Pool during the National Championship Stake for retrievers.



Retriever after downed pheasant, National Championship Stake.



Showing some of the cars of those on hand to view the National Championship Stake.



Part of gallery watching a water test in Finis Pool, National Championship Stake.



Dragline at work on Bear Swamp Dike Construction. Material soft and does not slope too well.



Showing dragline at work on mats under normal conditions.



Pasture Point portion of Bear Swamp Dike after having been partially completed by bulldozer.



Showing Raymonds Pool during September before beginning to fill up. This condition prevalent from April to October.

WATERFOWL

REFUGE Bombay Hook

MONTHS OF September TO December, 1947

(1) Species	(2) Weeks of reporting period									
	Sept.									
	1-7 1	8-14 2	15-21 3	22-28 4	29-5 5	6-12 6	13-19 7	20-26 8	27-3 9	4-10 10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	23	29	22	30	175	500	2000	4500	5500	5500
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	148	220	250	250	300	350	500	2147	2600	2000
Black	380	250	275	540	600	650	1500	2000	2100	2500
Gadwall	75	49	50	50	50	50	75		75	150
Baldpate	24	66	5	50	250	200	200	100	2000	500
Pintail		66	170	225	425	500	1000	4118	2500	2200
Green-winged teal	106	55	50	75	110	3500	300	3194	1500	1200
Blue-winged teal	231	155	54	150	150	200	150	150	50	
Cinnamon teal										
Shoveler		11	10	15	25	75	15	150	25	
Wood			5	5	10	150	50	25	10	75
Redhead										
Ring-necked										
Canvasback										
Scaup							150	150		
Goldeneye										
Bufflehead										
Ruddy					15			2		5
Other Merganser							4			
M. Merganser										25
Coot:		5	5			10	10	10	10	

3 -1750a

Cont. NR-1

(Rev. March 1953)

WATERFOWL (Continuation Sheet)

REFUGE Bombay HookMONTHS OF September TO December, 1957

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production : Broods: Estimated : seen : total	
	10-16 11	17-23 12	24-30 13	1-7 14	8-14 15	15-21 16	22-28 17	28-31 18			
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada	6000	6000	5970	10,000	10,000	13,000	13,000	13,000	646,743		
Cackling											
Brant	1								7		
White-fronted											
Snow	3	310	281				300	300	8358		
Blue						2	2	2	42		
Other											
Ducks:											
Mallard	3000	2500	930	4000	6000	14,000	14,000	10,000	443,065		
Black	3500	3000	2539	3500	4500	7000	8000	6000	341,838		
Gadwall	200	200	60	75	75	75	75	50	10,038		
Baldpate	650	300	100	150	300	500	500	250	42,553		
Pintail	2500	2000	1180	1200	1000	6000	6000	2000	231,558		
Green-winged teal	800	1070	835	500	200	200	150		96,915		
Blue-winged teal									9,170		
Cinnamon teal											
Shoveler			410	400	250	200	150	50	12,502		
Wood	75	50							3,185		
Redhead											
Ring-necked											
Canvasback		40							280		
Scaup		65	11						2,352		
Goldeneye											
Bufflehead											
Ruddy	10	10							315		
Other Merganser		30			10	6	25	25	700		
H. Merganser	15	11				3	3		385		
Coot:	10	10	11	10	10	10	10	10	917		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	655,150	13,000	
Ducks	1,194,856	28,903	
Coots	917	11	

SUMMARY

Principal feeding areas Pool, cropfields, marsh

Principal nesting areas _____

Reported by

Edwin H. Chandler

Edwin H. Chandler - Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form NR-1A
(Nov. 1945)MIGRATORY BIRDS
(other than waterfowl)Refuge Bombay HookMonths of September to December1945

(1) Species		(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name		Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:											
Great Blue Heron		15	9/1	15	9/1-10/15	6	12/31				567
American Egret		2	"	12	10/7	1	"				183
Clapper Rail		Resident									
Sora "		"									
King Rail		"									
Pied-billed Grebe		1	11/10	3	12/29	1	12/31				57
II. Shorebirds, Gulls and Terns:											
Gr. Yellowlegs		Present in small numbers thru early September									
Killdeer		"	"	"	"	"	"				
Willet		"	"	"	"	"	"				
Herring Gull		"	"	150	12/29	100	12/31				
Laughing Gull		"	"	in small numbers on occasion							

(over)

UPLAND GAME BIRDS

1613

Refuge Bombay Hook

Months of September to December, 1947

(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.
Ring-necked Pheasant	600 acres upland and marsh	24			100:200				30-40	
Bob-white Quail	" " "	3			100:100				200	12 known coveys

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

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

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

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Bombay Hook

Calendar Year 1957

(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	At period of Greatest use	As of Dec. 31	
Common Name	Cover types, total Acreage of Habitat	Number												
White-Tail Deer	1200 acres marsh, swamp, and upland	15	3									70-75	50	

Remarks:

Reported by Edwin H. Chandler

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.

Refuge Bombay Hook

Year 19 57

Botulism

NONE

Lead Poisoning or other Disease NONE

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

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

(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

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

Condition of vegetation and invertebrate life _____

Remarks _____

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

PUBLIC USE

Refuge Bombay Hook

Calendar Year 1957

Total Use Visitor-Days	Hunting Use	Fishing Use	Miscellaneous Use
9385	815	1000	7570 7500 (PA)

Where practical, by means of occasional spot checks, or other methods, show by percent and visitor-days the breakdown of the above figures and other related information:

Hunting (on refuge lands):	Percent	Visitor-Days	Acres	Miscellaneous:	Percent	Visitor-Days
Waterfowl	--	--	--	Recreation *	90.3	7 8470
Upland Game	--	--	--	Official	1.1	100
Big Game	8.6	8.15	400	Economic Use	--	--
Supervised by refuge <u>✓</u> by State		No. of blinds		Other		

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

Fishing:

Acres of ponds or lakes None and miles of streams

open to fishing. At Boathouse only;
mainly for Blue Crabs.

Comments:

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

3-1757
Form NR-7
(April 1946)

PLANTINGS
(Marsh - Aquatic - Upland)

Refuge Bombay Hook Year 195 7

Species	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount & Nature of Propagules	Date of Plant- ing	Survival	Cause of Loss	Remarks
			NOT APPLICABLE					

TOTAL ACREAGE PLANTED:

Marsh and aquatic.....
Hedgerows, cover patches.....
Food strips, food patches.....
Forest plantings.....

3-1758
Form NR-8
(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			43	2200	30		73	Soybeans (GM)	119
Soybeans			35	350			119	Wheat (Browse)	119
Wheat			30	625			119	Rye/wheat "	10
								Buckwheat "	15
								Millet "	18
								Sorghum "	9
								Lespedeza (Cover)	43
								Clover (Cover Browse)	60
								Fallow Ag. Land	73

No. of Permittees: Agricultural Operations Haying Operations Grazing Operations

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				500
Hay - Wild				2. Acreage Cultivated as Service Operation				500

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.

REFUGE GRAIN REPORT

Refuge Bombay Hook

Months of Sept. thru Dec. 19457

(1) VARIETY	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED USE		
				TRANS- FERRED	SEEDED	FED	TOTAL		SEED	FEED	SURP.
Corn	642	2200	2842	448		200	648	2194		500	1694
Soybeans		350	350					350	350		
Wheat	625		625					625		125	500

(8) Indicate shipping or collection points Clayton, Delaware

(9) Grain is stored at Headquarters and Dutch Neck Grain Bins

(10) Remarks

NR-8a (8) REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lbs., Corn (ear)—70 lbs., Wheat—60 lbs., Barley—50 lbs., Rye—55 lbs., Oats—30 lbs., Soy Beans—60 lbs., Millet—50 lbs., Cowpeas—60 lbs., and Mixed—50 lbs. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately: Corn, wheat, proso millet, etc. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share-cropping, or harvest from food patches.
- (4) A total of Columns 2 and 3.
- (6) Column 4 less Column 5.
- (7) This is a proposed breakdown by varieties of grain listed in Column 6.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters grainary", etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

3-1759
Form NR-9
(April 1946)

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

Refuge Bombay Hook Year 1957

Species	Collections				Receipts		Total Amounts on Hand	Amount Surplus
	Amount	Date or Period of Collection	Method	Unit Cost	Amount	Source		
			NOT APPLICABLE					

TIMBER REMOVAL

Refuge Bombay Hook Year 195⁵⁷

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
Refuge		Dutch Neck		65 trees cut for 10" X 10" X 24' timbers to be used by refugs as mats.				White Oak Red Oak

*Not Carried
Out*

Total acreage cut over.....

Total income.....

No. of units removed B. F.

Method of slash disposal.....

Cords.....

Ties.....

Timbers 65