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NARRATIVE REPORT

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PHOTOGRAPHS APPENDED

geese. The low portion of this field was planned for Japanese millet but wet conditions prevented this from being accomplished and a fall wheat browse was planted and utilized. The oat browse that was in this area the first of the year was utilized very poorly.

Fields were cooperatively farmed on the Knotts Island side. Crops grown were corn, milo and wheat. A number of hedgerows were removed enlarging the fields with expectation of goose usage but the results were negative. Past years we had a small amount of use on these areas when these fields were cut up by grown up hedgerows so we really expected improved usage this year.

II WILDLIFE

A. Migratory Birds

1. Waterfowl

a. Swan - After the first of the year swan use dropped sharply with the close of the hunting season when these birds moved off the refuge. The birds arrived in the fall with a good population of cygnets. A high of 6,000 swan was reached the middle of December. Heavy use areas were the Barleys Bay area and the entire Currituck and North Landing River shoreline. With this increase in swan there was again talk among the hunters advocating a hunting season on swan.

b. Canada geese - Use of the refuge in January and February was very light. The oats browse at Live Oak Point went almost untouched.

In an attempt to stop the trend the last few years of these geese not coming this far south to winter, the agricultural field at Live Oak Point was planted to corn and mowed after the birds arrived. Wheat browse was also planted in this area. Probably due to the mild weather it was the middle of December before any appreciable usage was made on this corn. The use on this field was heavy during periods of cold weather. The browse was kept eaten to the ground.

A small flock spent the entire fall in Halls Bay although the largest concentration rested in Currituck Sound.

Although there was an increase in geese on the refuge the trend in the general area was another decrease this year.

c. Snow geese - Although snow goose use of the refuge increased this year it was not a principal use area as it had been some years in the past. Burns made in the marsh attracted some geese but no large concentrations for long periods. The North Landing River marsh in the vicinity of Munden Point held the bulk of the birds for most of the winter.

This concentration of snow geese in the proximity of the Morse Point area produced a number of depredation complaints in this area as late as March. Much time was spent trying to move these birds with little success. Fresh marsh burns at both Back Bay and Mackay Island proved little attraction to them when their field feeding was most damaging to crops.

d. Ducks - During the first part of the year no unusual concentrations of ducks were noted. The summer population was low and three broods of blacks and two of wood ducks were recorded. Due to shortage of personnel, trips into the marsh during the summer were not frequent so our summer population and nesting success may have been higher than recorded.

Fall populations of puddle ducks increased but the diving duck population was low. Widgeon increased considerably, mostly concentrated in the Barleys Bay area and pintails were present in greater numbers. The corn field at Live Oak Point proved very attractive to ducks, primarily pintails, blacks, mallards and green-winged teal.

e. Coots - Rafts of coots were larger than for the past number of years. These birds concentrated in areas where milfoil was present.

2. Other Water Birds

Wintering black-crowned night herons have increased and most commonly use a silted up portion of a ditch near the tower on the causeway. One adult and one little blue heron was observed the last of December which is an unusual winter resident in this area.

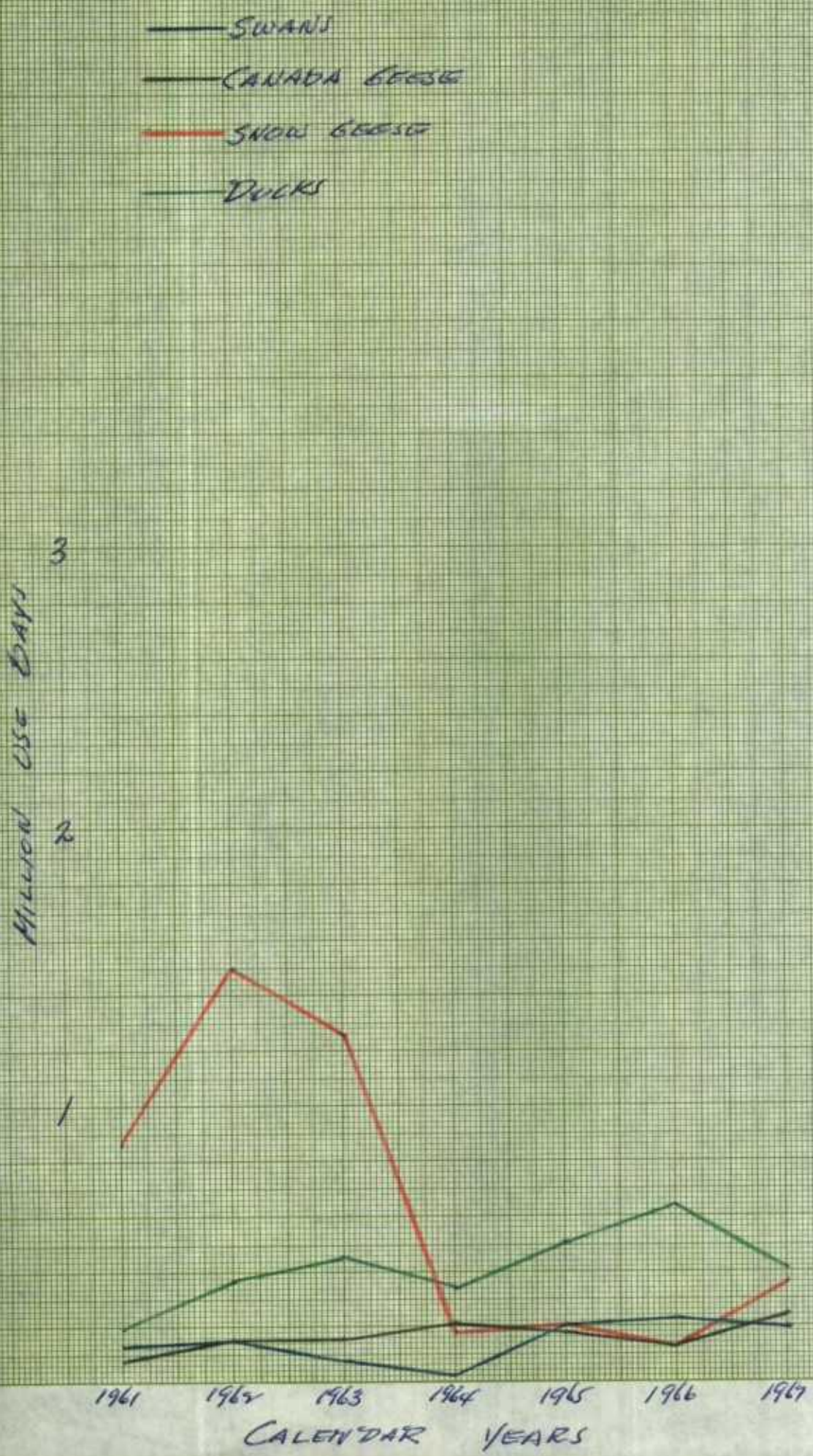
3. Shore Birds

Common Snipe were found concentrated on marsh burns.

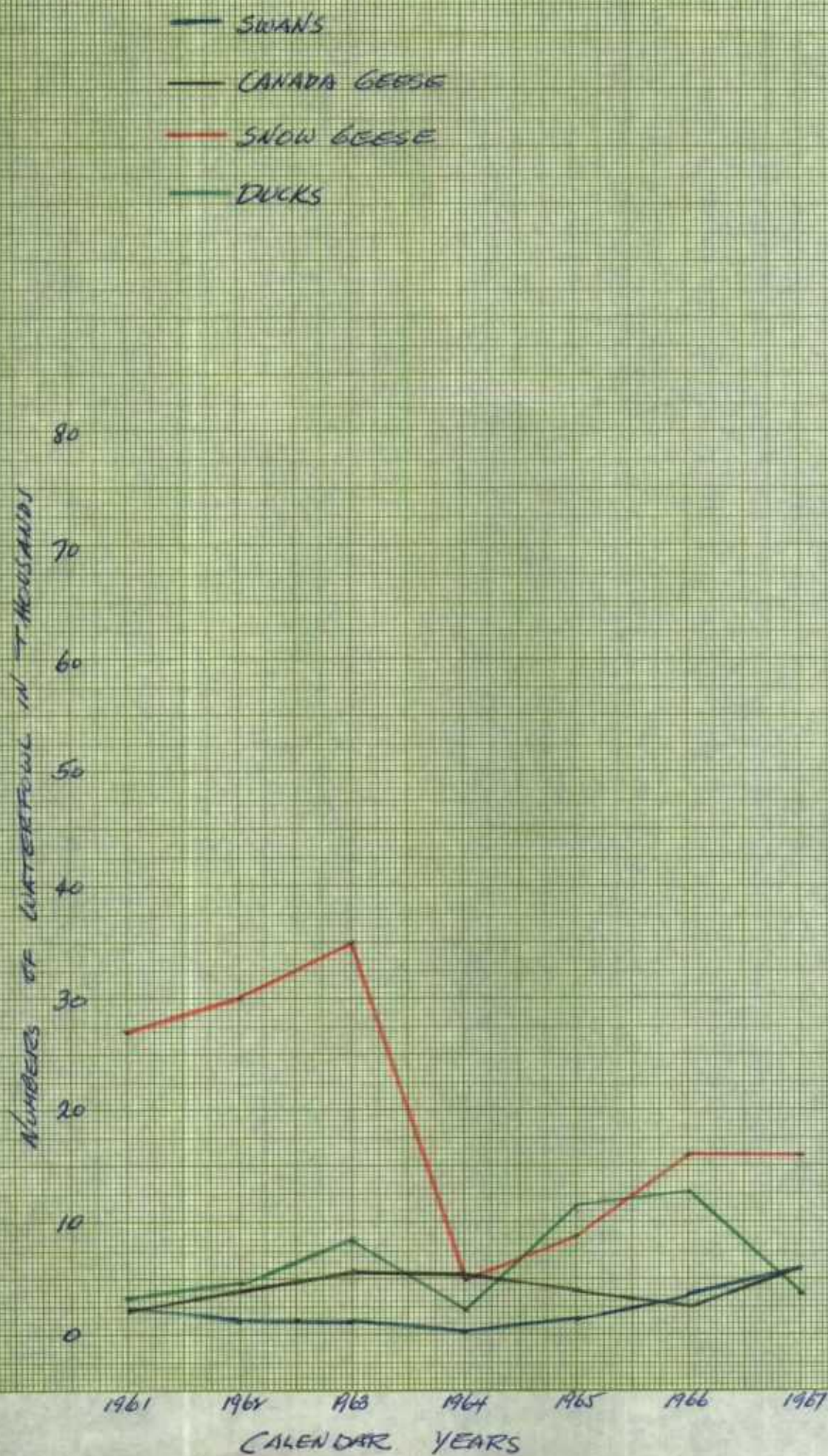
4. Doves

Doves were not present in the fall in the numbers that were present the year before although food conditions were good.

MACKAY ISLAND NATIONAL WILDLIFE REFUGE WATERFOWL USE DAYS



MACKAY ISLAND NATIONAL WILDLIFE REFUGE PEAK WATERFOWL POPULATIONS



B. Upland Game Birds

The only upland game bird is the bob-white quail which is increased on the refuge primarily due to the acquisition of quail habitat.

C. Big Game Animals

White-tailed deer have increased. Observations have become more numerous and a number are feeding on the agricultural crop grown. This increase is not only on the refuge but also on the Knotts Island area.

D. Fur Animals, Predators, Rodents and Other Mammals

The muskrat population remains extremely low but one house was seen this fall so we still have a remnant population.

Nutria on the other hand are everywhere. Our cooperative trapper took 375 and another 30 were removed by personnel as nuisance animals. The number trapped could have been greater but the price he received for the fur got to the point where he could no longer make expenses. These animals are troublesome in the vicinity of waterfowl banding traps. They also have a fondness for corn when it is getting started and when it is mature some animals had to be removed from around the Live Oak Point field. They also concentrate in marsh areas of the best three square bullrush which they dig up so are competitors with snow geese in these marsh areas.

Raccoon are reasonably plentiful and 38 were removed by our trapper and refuge personnel removed another 20. This is some less than were removed last year.

Mink are occasionally seen but have apparently no adverse affect on the refuge. Otter are less abundant but are occasionally observed.

If road kills are an indication as to the opossum population it is probably increased in the general area and on the refuge.

Gray Fox are present but their numbers are low.

Gray squirrel have increased some this past year while indications are that both marsh and cottontail rabbits are present in about the same numbers as last year.

E. Hawks, Eagles, Owls, Crows, Ravens and Magpies

No eagles were observed on the refuge but one was recorded on the Christmas Bird Count in the area but not on the refuge.

Osprey nested on the refuge and were present during the summer period but it is not believed that any young were raised.

Both fish and common crows were present in their usual numbers.

One red-tailed hawk was present this fall while screech owls are common. Marsh hawks are common during the winter months as are the sparrow hawks.

F. Other Birds

Nothing to report.

G. Fish

Using fishing pressure as an indication, little has changed in the fish population during the past year. The bridge across Coreys ditch on the causeway continues to be a popular spot. When wind conditions are right this place produces some rock fish and an occasional flounder.

Carp continue plentiful in the marsh during spawning season.

H. Reptiles

Cottonmouths continue abundant. These snakes are especially active in the fall when a number are killed along the roads.

I. Disease

Some loss of swan to lead poisoning was noted in January and February. No loss was noted after they returned this fall. This loss is influenced by bay tides. If the tides average low the loss to lead poisoning is higher while high tides make less shot obtainable. More shot is also picked up after the hunting season when the birds leave the refuge to feed in the areas that were hunted. Snow goose loss to lead poisoning on the refuge was absent or minimal.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Outside of routine maintenance to buildings and equipment much work was done on the Mackay Island Road. After putting it in good condition, 615 tons of oyster shell was purchased and spread on the worst portions of the road. This put about three-fourths of this road in fairly good condition.

Work on the agricultural fields on the Knotts Island side of the refuge was to incorporate these smaller fields into larger fields by removing hedgerows with the TD-9 dozer and the lesser grown up hedgerows with the offset rotary mower. This should have made these fields more attractive for waterfowl usage.

Old buildings were demolished and the sites cleaned up. One building was burned by the Knotts Island Fire Department who used it in their training program.

Canals which have grown to impede boat travel have been hand brushed and posting of acquired tracts was done. Reposting was done to the proclamation boundary as well as the public fishing areas.

B. Plantings

1. Aquatic and Marsh Plants

None

2. Trees and Shrubs

None

3. Upland Herbaceous Plants

None

4. Cultivated Crops

a. Refuge Farming

The oats planted at Live Oak Point was turned under in the spring for green manure. Fifty acres of this field was planted to corn, Dekalb variety 1055 which yielded about 90 bushels per acre. Three acres of this planting was destroyed by blackbirds and this was planted to milo. It was planned to plant the lower 25 acres of this field to Japanese millet but extremely wet conditions prevented this so 15 acres were planted to wheat for browse in the field.

b. Cooperative Farming

We had three permits for cooperative farming and two of them produced well. It has been the most successful season to date and we have broken the ice for cooperators. Wheat, corn and milo were planted by these cooperators. With additional agricultural land being acquired and improvement to drainage in these fields we should have a good cooperative program in the future. Sixty-three acres were cooperatively farmed this year.

C. Collections and Receipts

Receipts of grain were from cooperative farmers and were 76 bushel of wheat, 339 bushels of corn and 3,478 pounds of mile.

D. Control of Vegetation

None

E. Planned Burning

1. General

Burning early in the year progressed on schedule but burning at the end of the year was not as successful. Most years difficulty in burning is encountered before the first of the year.

2. Conditions Prior and After Burning

Area B located north of the Mackay Island Road and south of Back Creek was burned in January. There are 300 acres of marsh and 300 acres of timber on the area. The timbered area are mostly low hardwoods with standing water so very little of the area could be expected to burn. The marsh contains much needle-rush with frequent nutria runs and difficulty was expected in making this burn. After repeated attempts a 40% burn was finally achieved. Geese made very little use of this area but the burn did open up a few areas.

Unit C containing 80 acres of marsh was burned late in January. This area also contained much needlerush. About a 70% burn was accomplished and received no goose usage as we have never had any usage in this area in past years.

Fall burns were started the last part of November but little was accomplished. Burning areas were in the vicinity of Flynns Folly. The results were quite spotty but they were enough to get snow geese started in this area. Under these early burning conditions it doesn't take any more than a nutria run to stop the burn.

F. Fires

This has been a good year for the lack of unplanned fires. Don't know if it was the lack of desire to burn or the inability to get a burn started on the marsh.

IV RESOURCE MANAGEMENT

A. Grazing

None

B. Mowing

None

C. Fur Harvest

One cooperative trapper operated on the refuge this year. This trapper trapped 375 nutria and 38 raccoon between the period of January 4 thru February 25. He stopped trapping when catches and prices paid for his fur declined prior to the end of the season. Nutria prices started at \$1.00 to \$1.25 and fell to 50 to 75 cents per animal. Raccoon prices started at \$2.50 and declined to about \$1.50 per animal. These are prices for unskinned animals. No mink or muskrat were trapped.

With the price paid for fur in this area it is hardly a marginal business. Persons requesting trapping permits on the refuge is nil and we are fortunate to get a man with trapping ability to trap on the refuge each year.

D. Timber Removal

None

E. Commercial Fishing

None on the Refuge.

F. Other Uses

None

V FIELD INVESTIGATION OR APPLIED RESEARCH

A. Banding

We are still having much difficulty in banding and our success has again been poor. Results during the year were as follows:

<u>Species</u>	<u>Number banded</u>		<u>Total</u>	<u>Quota</u>
	<u>Males</u>	<u>Females</u>		
Canada Goose	1	2	3	500
Blue-winged teal	1	1	2	
Green-winged teal	10	3	13	

<u>Species</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>	<u>Quota</u>
Pintail	1	2	3	
Mallard	19	9	28	200
Black Duck	10	5	15	500
Wood Duck	1	1	2	
Baldpate	1		1	
Ring-necked duck	1	3	4	
Mourning Dove	5	6	11	
GRAND TOTAL			82	

B. Predator Egg Destruction Study

Due to the shortage of personnel this study was not carried out this year.

C. Mallard-Black and Wood duck Nesting Structures

The basket type and cylindrical nesting structures were put back in shape in the spring and checked but no use was made of them for any nesting.

Wood duck nesting structures were also checked and they also did not receive any use by nesting wood ducks.

D. Marsh Transects

The marsh transects that were run the two previous years were run by Tom Bend.

VI. PUBLIC RELATIONS

A. Recreational Uses

The primary recreational use on the refuge is public fishing. Some fishing is done in nice weather all year along the causeway. The fishing for crabs decreased some this year over the numbers of crabbers present the past two years.

There are a number of informal visits by birders and persons interested in wildlife who drive across the causeway to view the wildlife present. Concentrations of swan or snow geese increased this year.

C. Refuge Visitors

<u>Date</u>	<u>Person</u>	<u>Address</u>	<u>Purpose</u>
2/15	Ken Marek	Regional Office, Atlanta	Acquisition
2/17	Ronald Tansill	Regional Office, Atlanta	Acquisition

4/4	Ken Marek	Regional Office, Atlanta	Acquisition
5/2	Roger Ragot	Norfolk Museum	Observations
5/4	Don Gnagy	Wildlife Services	Blackbird damage to corn
10/18	Bill Reid	Regional Office, Atlanta	Acquisition
11/7	Walt Steiglitz	Regional Office, Atlanta	Orientation
11/16	Milford Thurber	Regional Office, Atlanta	Safety
11/16	John Jones	Washington	Safety

C. Refuge Participation

Much of our participation is not especially identified with this refuge, but with Back Bay and Mackay Island and is carried in the Back Bay portion of this report.

A book "Waterfowl Tomorrow" was presented to the Joseph Knapp High School in Currituck.

James Pittman continues as a member of the Creeds Huritan Club.

D. Hunting

There is no on the refuge hunting permitted.

Hunting of waterfowl in the general area was a disappointment to most of the hunters after the first two days. Ducks were present in the area in good numbers and a successful hunting season was expected but "bluebird" weather predominated.

This area did not attract doves in numbers great enough to produce some good dove shoots although some doves were shot at the beginning of the season.

E. Violations

Allen E. White	Possession Firearms	\$20.00 fine	Heard before
			U.S. Commissioner

Vandalism is still a problem in this area especially to refuge signs although the amount of vandalism this year showed some decrease over previous years. This vandalism does not appear to be directed at our agency as highway signs also take a portion of the damage.

F. Safety

Regular staff and safety meetings have been joint meetings between Back Bay and Mackay Island personnel. One minor accident occurred in which no lost time occurred. A laborer punctured his foot with a nail while we were cleaning up an old building site.

VII OTHER ITEMS

Assistant Manager Roger Steiner transferred to accept the position as Manager at newly formed Cedar Island N W Refuge on April 22. David Perkins transferred to Mackay Island from South Florida N W Refuge on October 5. Refuge work progressed well during this period without an assistant manager primarily through the cooperation and abilities of our maintenanceman James Pittman.

After a number of years of court proceedings on the Carrier tract and her moving from the refuge, this was finally accomplished in the fall and the buildings removed.

A son arrived at the Perkins resident on November 13. He is Christopher Love Perkins and weighed in at 7lbs. 13 3/4 oss.

This report was written by Ambrosen with the final MR reports by Perkins. Mrs. Ford did the typing.

PHOTOGRAPHS

Appended

Respectfully Submitted

FEB 14 1968

Date

D. R. Ambrosen

D. R. Ambrosen
Refuge Manager

FEB 16 1968

Date

Walter O. Stieglitz

Regional Office Approval

Assistant Regional Supervisor



Maintenanceman Pittman checking corn crop planted by the Refuge at Live Oak Point.



Permittee Mundens Corn planted on the Knotts Island side of the Refuge yielded well.



Hedgerows were removed in fields on the Knotts
Island side of refuge.



Permites share of corn harvested with Refuge
share left stand in the background



Offset rotary mower purchased proved to be an excellent piece of equipment to mow grown up drainage ditches and to mow dikes.



Aerial view of the 75 acre agricultural field
at Live Oak Point.



Goose and duck utilization of this field was very
good.



Woods Pond - This pond was dug by hand prior to our ownership and proves to be an excellent teal pond.



Swan and snow geese in Barleys Bay. There was good waterfowl usage in this area all fall.

WATERFOWL

[Handwritten signatures and stamps]
FILE COPY

REFUGE

MONTHS OF January 1 TO April 30, 1967

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

(1) Species	(2) Weeks of reporting period									
	1/1-1/7	1/8-1/14	1/15-1/21	1/22-1/28	1/29-2/4	2/5-2/11	2/12-2/18	2/19-2/25	2/26-3/4	3/5-3/11
Swans:										
Whistling	3,000	2,500	40	480	70	40	40	60	60	10
Trumpeter										
Geese:										
Canada	600	600	20	450	70	40	60	60	50	
Cackling										
Brant										
White-fronted										
Snow	13,000	6,000	300	50	10	5	10	5		
Blue										
Other										
Ducks:										
Mallard	350	350	400	120	350	400	400	400	400	200
Black	600	600	600	350	750	700	700	700	700	350
Gadwall			2	20	20	20	20	20	10	
Baldpate	30	20	40	25	25	30	30	30	30	10
Pintail	20	20	40	15	30	50	50	50	50	25
Green-winged teal	300	300	400	950	1,150	1,150	1,150	950	950	300
Blue-winged teal										
Cinnamon teal										
Shoveler	5	5	5	10	10	10	10		6	6
Wood					2	6	6			
Redhead										
Ring-necked	10	10	10	5		10	10	10	10	
Canvasback										
Scaup										
Goldeneye										
Bufflehead	4									
Ruddy	100	50								
Other										
Hooded Merganser			2		3	2	2			
Coots	60	40	20	40	20	10	10	10	10	10

WATERFOWL
(Continuation Sheet)

REFUGE MACKAY ISLAND NATIONAL WILDLIFE REFUGE

MONTHS OF January 1 TO April 30, 1967

(1) Species	(2) Weeks of reporting period								(3) Estimated: Production		(4) Estimated: Broods: Estimated	
	3/12-3/18	3/19-3/25	3/26-4/1	4/2-4/8	4/9-4/15	4/16-4/22	4/23-4/29	4/30	waterfowl: days use	Broods: seen	Estimated: total	
Swans:												
Whistling	5	5				6	6	6	44,260			
Trumpeter												
Geese:												
Canada	15								13,755			
Cackling												
Brant												
White-fronted												
Snow	3								135,681			
Blue												
Other												
Ducks:												
Mallard	150	100	40	30	10	4	10	10	26,008			
Black	225	225	70	50	20	8	10	10	46,616			
Gadwall									784			
Baldpate	10		15	6					2,107			
Pintail		10	10						2,590			
Green-winged teal	300	350	100	40	20	4			58,898			
Blue-winged teal	30	200	40	30	30	10	10	10	2,460			
Cinnamon teal												
Shoveler			6		1	1	1		532			
Wood	8	2	10	10	2	2	5	5	376			
Redhead												
Ring-necked									525			
Canvasback												
Scaup												
Goldeneye												
Bufflehead									28			
Ruddy									1,050			
Other												
Hooded Merganser									63			
Coot:	10	10	10	10	2	2			1,918			
					(Over)							

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	44,260	3,000	
Geese	149,436	13,600	
Ducks	142,035	2,340	
Coots	60	1,918	
	335,791		

SUMMARY

Principal feeding areas Wet marsh and protected bays

Principal nesting areas _____

Reported by Roger H. Steiner Assistant 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).

WATERFOWL

Given to: Handwritten initials
 Received by: Handwritten initials
 Date: Handwritten date
 Copy to: Handwritten initials
 FILE COPY

REFUGE MACKEY ISLAND

MONTHS OF May 1 TO August 31, 1967

(1) Species	(2) Weeks of reporting period									
	5/1-5/6 : 6 days	5/7-5/13 : 2	5/14-5/20 : 3	5/21-5/27 : 4	5/28-6/3 : 5	6/4-6/10 : 6	6/11-6/17 : 7	6/18-6/24 : 8	6/25-7/1 : 9	7/2-7/8 : 10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada			2							2
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	10	10	10	10	10	10	10	10	10	5
Black	20	30	30	30	30	60	60	60	60	60
Gadwall										
Baldpate										
Pintail										
Green-winged teal										
Blue-winged teal	20								2	2
Cinnamon teal										
Shoveler										
Wood	8	15	15	15	15	15	15	15	15	10
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
American Coot	2	2				1				

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

WATERFOWL
(Continuation Sheet)

REFUGE MACKAY ISLAND

MONTHS OF May 1 TO August 31, 1967

(1) Species	(2) Weeks of reporting period								(3) Estimated: Production		(4) Estimated: total to	
	7/9-7/15	7/16-7/22	7/23-7/29	7/30-8/5	8/6-8/12	8/13-8/19	8/20-8/26	8/27-8/31	waterfowl: days use	Broods: seen	Estimated: total to	Flight stage
Swans:												
Whistling												
Trumpeter												
Geese:												
Canada										28		
Cackling												
Brant												
White-fronted												
Snow												
Blue												
Other												
Ducks:												
Mallard	5	5	5	5	5	5	5	5	925			
Black	60	60	60	60	60	60	60	60	6,300	3	30	
Gadwall												
Baldpate												
Pintail												
Green-winged teal												
Blue-winged teal	2	2	2	2	2	2	20	50	622			
Cinnamon teal												
Shoveler												
Wood	10	10	5	5	5	5	5	5	1,523	2	8	
Redhead												
Ring-necked												
Canvasback												
Scaup												
Goldeneye												
Bufflehead												
Ruddy												
Other												
Coot:												
										33		
					(Over)							

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	0	0	0
Geese	28	2	0
Ducks	9,370	120	38
Coots	33	2	0

9,431

SUMMARY

Principal feeding areas Shallow flooded and weedy areas through marsh and timber edges.

Principal nesting areas Pine-hardwood timber areas

Reported by D. R. Ambrosen, 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).

WATERFOWL

REFUGE

HACKAY ISLAND

MONTHS OF September 1 TO December 31, 1967

(1) Species	(2) Weeks of reporting period									
	9/1-2	9/3-9	9/10-16	9/17-23	9/24-30	10/1-7	10/8-14	10/15-21	10/22-28	10/29-11/4
	2 days	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada					24	35	350	500	850	2,300
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	5	5	5	10	20	100	125	175	250	400
Black	60	60	60	80	80	100	150	225	250	350
Gadwall										
Baldpate					200	1,500	1,500	1,000	1,000	1,500
Pintail							30	50	200	500
Green-winged teal							350	400	400	350
Blue-winged teal	30	20	20	20	150	450	50	65	25	
Cinnamon teal										
Shoveler										
Wood	5	5	5	15	25	25	25	25	25	25
Redhead										
Ring-necked										
Canvasback										
Scaup					250				50	50
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coots			1		20	20	20	100	300	350

WATERFOWL
(Continuation Sheet)

REFUGE **HACKAY ISLAND**

MONTHS OF September 1 TO December 31, 1967

(1) Species	(2) Weeks of reporting period								(3) Estimated:	(4) Production
	11/5-11	11/12-18	11/19-25	11/26-12/2	12/3-9	12/10-16	12/17-23	12/24-31 8 days	waterfowl: days use :	Broods: Estimated seen : total
Swans:										
Whistling	300	1,000	2,500	2,500	4,500	6,000	2,000	3,000	155,600	
Trumpeter										
Geese:										
Canada	3,500	3,500	2,500	1,800	4,000	6,000	2,500	6,000	243,013	
Cackling										
Brant										
White-fronted										
Snow	3	50	50	50	2,500	8,500	2,000	4,500	128,071	
Blue										
Other										
Ducks:										
Mallard	500	500	500	400	300	600	500	500	34,740	
Black	450	500	500	500	500	1,200	650	600	44,505	
Gadwall			50	50	50	25	25	25	1,600	
Baldpate	2,000	1,800	1,000	1,000	1,000	500	1,000	1,000	113,000	
Pintail	500	500	500	500	100	100	200	400	25,460	
Green-winged teal	350	400	250	250	100	300	300	300	26,550	
Blue-winged teal									5,660	
Cinnamon teal										
Shoveler										
Wood	25	25	25	25	25	25	25	25	2,660	
Redhead						20	25	25	515	
Ring-necked	25	25	25	25	25	25	25		1,250	
Canvasback						10	8	10	206	
Scaup					50	50	50	50	3,900	
Goldeneye										
Bufflehead										
Ruddy								150	1,200	
Other								10	255	
Hooded Merganser		5	5	5	10					
Coot:	400	2,000	1,500	1,500	2,000	1,500	1,600	1,500	91,177	
					(Over)					

(5)

(6)

Total Days Use : Peak Number : Total Production

SUMMARY

Swans

155,600

6,000

Principal feeding areas

Geese

371,084

14,500

Ducks

261,501

3,850

Principal nesting areas

Coots

91,177

2,000

879 362

Reported by David C. Perkins, Assistant 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
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Hacky Island Months of January 1 to April 30 19 67

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. <u>Water and Marsh Birds:</u>										
Black-crowned Night Heron	1	3/15	Only one seen		1	3/15				74
Great Blue Heron	4	1/1	10	2/1-3/1	Remaining					1,055
American Egret	10	2/7	15	2/13	Remaining					1,180
Snowy Egret	10	2/15	15	3/24	Remaining					1,065
Louisiana Heron	10	2/13	15	2/18	Remaining					1,070
Glossy Ibis	4	3/15	12	4/13	Remaining					184
American Bittern	6	1/1	12	3/1	Remaining					909
Pied-billed grebe	2	1/1	15	3/1	Remaining					1,500
Sora Rail	1	1/20			Remaining					1,500
Virginia Rail	1	1/10			Remaining					1,200
Clapper Rail	1	1/10			Remaining					100
King Rail	1	1/10			Remaining					500
Little Green Heron	2	4/17	30	4/30	Remaining					400
II. <u>Shorebirds, Gulls,</u> <u>and Terns:</u>										
Great Black-backed gull	20	1/1	80	1/20-2/10	20	3/15				2,600
Herring gull	10	1/1	80	1/10-2/20	Remaining					2,400
Common Snipe	2	1/1	500	2/28-3/3	Remaining					20,000
Woodcock	1	1/20			Remaining					1,200

(over)

	(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:						
Mourning dove	10	1/1	250	1/15-3/10	40	4/8
White-winged dove						16,950
IV. Predaceous Birds:						
Golden eagle						
Duck hawk						
Horned owl						
Magpie						
Raven						
Crow	40	1/1	150	2/10	Remaining	9,000
Osprey	2	3/8	3	3/8-4/8	Remaining	130
Sparrow Hawk	4	1/1	10	2/15-2/20	2	4/18
Marsh Hawk	6	1/1	10	2/15-2/20	3	4/8
						750
						800

Reported by Roger H. Steiner, Asst. Ref. Mgr.

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (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.

3-1751
Form NR-1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge MACKAY ISLAND

Months of May 1

to August 31

19 67

(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>										
Great Blue Heron	Remaining		10		Remaining					984
American Egret	"		20	8/28	"					1,845
Little Blue Heron	5/3	1	3	5/24	"					240
Green Heron	5/1	3	20	8/11	"					1,845
King Rail	Remaining	Occasional sightings			"					500
Virginia Rail	"	"	"		"					1,500
Cattle Egret	Occasional movement from surrounding pastures									300
Glossy Ibis	Remaining		18	5/29	Remaining					1,230
Snowy Egret	"		10	5/11	"					900
Louisiana Heron	"		22		"					200
American Bittern	5/19	1	10		"					1,000
Sora Rail	Remaining				"					1,500
Least Bittern	5/31	1	10		"					800
<u>II. Shorebirds, Gulls, and Terns:</u>										
Herring Gull	Remaining		4		"					250
Laughing Gull			10		"					300
Common Tern	6/1	4	20		"					400
Least Tern	6/1	2	2		"					150
Killdeer	Remaining	2	5		"					100
Woodcock	Remaining		2		"					100
Common Snipe	"		6		"					300
White Rumped Sandpiper	"		10		"					100

(over)

	(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u>						
Mourning dove			50	8/30		40
White-winged dove						2,500
IV. <u>Predaceous Birds:</u>						
Golden eagle						
Duck hawk						
Horned owl						
Magpie						
Raven						
Crow						
Osprey						
Screech Owl	3	5/1	4	5/30	1	8/22
	Resident		6			0
						350
						700

Reported by D.R. Ambrosen, Refuge Manager

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (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.

3-1751
Form NR-1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge MACKAY ISLAND

Months of September 1

to December 31

19 67

(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>										
Pied-billed Grebe	8	9/1	35	11/17	Remaining					1,840
Snowy Egret	Remaining		3	9/5	1	9/30				200
American Egret	Remaining		15	12/13	Remaining					1,000
Little Blue Heron	Remaining		8	12/2	2	12/2				120
Green Heron	"		4	10/19	4	10/19				200
Great Blue Heron	Remaining		8		Remaining					1,000
Black-crowned Night Heron	2	9/1	20	10/15	2	12/15				2,000
Cattle Egret	Occasional movement from surrounding pastures					11/18				450
King Rail	Resident	Occasional sightings								500
Sora Rail	"	"	"							500
Virginia Rail	"	"	"							500
American Bittern	Remaining		2	12/15	1	12/30				650
Glossy Ibis	Remaining									10
<u>II. Shorebirds, Gulls, and Terns:</u>										
Killdeer	Remaining		6	10/10	Remaining					100
Woodcock	Remaining		2		Remaining					250
Common Snipe	Remaining		10		Remaining					2,500
White rumped Sandpiper	Remaining		15	11/1	Remaining					400
Common Tern	Remaining		8	11/5	Remaining					150
Laughing Gull	Remaining		18	10/15	Remaining					2,400
Herring Gull	Remaining		5	10/15	Remaining					800
Great black-backed gull	5	10/21	15	10/21	1	12/18				1,200

(over)

	(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:						
Mourning dove	Remaining		75	12/27	Remaining	4,000
White-winged dove						
IV. Predaceous Birds:						
Golden eagle						
Duck hawk						
Horned owl						
Magpie						
Raven						
Crow	Resident		100		Remaining	5,400
Screech Owl	Resident		6			700
Red tailed hawk	1	12/15	1	12/15	1	1
Marsh Hawk	3		10		Remaining	850
Sparrow Hawk	5	10/15	30	12/31	Remaining	1,500

Reported by David C. Perkins, Asst. Ref. Mgr.

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (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.

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge MACKAY ISLAND

For 12-month period ending August 31, 1967

Reported by D.R. Ambrosen

Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat		(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acreage			
Figures on waterfowl use include 756 acres water closed adjacent to Mackay Island Refuge	Crops	169	Ducks	434,731	10
	Upland	1,321	Geese	587,629	38
	Marsh	5,022	Swans	151,430	
	Water	720	Coots	43,811	
	Total	7,732	Total	1,217,601	10
					38
	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 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.

3-1752
Form M-2
(April 1946)

UPLAND GAME BIRDS

Refuge Mackay Island

Months of January 1 to April 30, 19 67

(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.
Bob-white Quail	Timber and brush 200 acres Croplands & fallow 130 acres Edges, fence rows etc., 50 acres	18			Est. 50-50	0	0	0	50	

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 No. 1
(April 1946)

UPLAND GAME BIRDS

Refuge MACKAY ISLAND

Months of May 1 to August 31, 19 67

(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.
Bob-white Quail	Agricultural fields uplands & timber 1,990 acres	10	3	100		-	-	-	200	

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 No. 2
(April 1946)

UPLAND GAME BIRDS

Refuge MACKAY ISLAND

Months of September 1 to December 31, 19 67

(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.
Bob White Quail	Timber & brush 200 ac. Croplands & Fallow 150 ac. Edges, fence rows, etc. 50 ac.		1	50	Est. 50/50	0	0	0	125	

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.

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions	(7) Estimated Total Refuge Population		(8) Sex Ratio	
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White tailed deer	Timber areas flooded and dry Pine hardwoods, over 1,000 acres of marsh	15	0	0	0	0	0	0	0	0		40	25	Est. 50/50

Remarks: One buck, two does and 2 young have been observed, however, from the abundance of deer sign and the fact that about 93 acres of corn was planted on the refuge this year, the above estimates are felt to be conservative.

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.

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs					(5) Total Popula- tion	
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping			Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
								Permit Number	Trappers Share	Refuge share				
Raccoon	Marsh & Woods, 6,000 acres	20	0	38	20			1-6805	38	0			20	300
Nutria	Marsh & flooded timber 4,500 acres	3		375	30			1-6805	375	0			30	1,500
Mink	Entire refuge 7,000 acres	466												15
Grey Fox	Woods & drier marsh 200 acres	50												4
Muskrat	Isolated canals & marsh, 300 acres	30												10
Grey Squirrel	Agriculture edges & timber, 100 acres	5												20
Opposum	Entire Refuge, 7,000 acres	70												100
Cottontail	Timber, agricultural 150 acres	1.2												125
Marsh Rabbit	Wet timber, marsh edges, 250 acres	1.7												150
Otter	Water, canals 720 acres	90												8

* List removals by Predator Animal Hunter

* List removals by Predator Animal Hunter

REMARKS: Nutria controlled in areas of waterfowl trapping

Reported by D. R. Ambrosen, Refuge Manager

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: Apply particularly to those species considered in removal programs. Density data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information 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, observation need not be repeated except when significant changes occur in 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, revegetating 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 observation and counts on representative sample areas. Survey method and size of sample area or areas should be indicated under Remarks.

REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including all taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.

SHARES: Share-trapped furs list 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 pelts 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.

Refuge

MACKAY ISLAND

Year 1967

Botulism

Period of outbreak NONE

Period of heaviest losses _____

Losses:

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

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

Areas affected (location and approximate acreage) _____

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

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease Lead poisoningSpecies affected Swan

Number Affected	Actual Count	Estimated
Species <u>Swan</u>	_____	<u>10</u>
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection Hunted areasWater conditions Low early in year, high in fall.Food conditions Good to excellent aquatic foods mainly along perimeter of refuge.Remarks Mild weather and high tides did not push the birds for feed and this probably accounted for low number of lead poisoning cases.

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge HACKAY ISLANDCalendar Year 1967

1. Visits
 a. Hunting 0 b. Fishing 4,755 c. Miscellaneous 26,825 d. TOTAL VISITS 31,580

1a. Hunting (on refuge lands)

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl	<u>0</u>		
Upland Game	<u>0</u>		
Big Game	<u>0</u>		
Other	<u>0</u>		

Number of permanent blinds 0
 Man-days of bow hunting included above 0
 Estimated man-days of hunting on lands adjacent to
 refuge 4,000

1b. Fishing (area open to fishing on refuge lands)

TYPE OF AREA	ACRES	MILES
Ponds or Lakes <u>453</u>		
Streams and Shores		

1c. Miscellaneous Visits

Recreation 26,680 Official 25
 Economic Use 116 Industrial 0

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	On Refuge		Off Refuge	
	NO. OF GROUPS	NUMBER IN GROUPS	NO. OF GROUPS	NUMBER IN GROUPS
Sportsmen Clubs				
Bird and Garden Clubs	<u>3</u>	<u>20</u>		
Schools				
Service Clubs				
Youth Groups				
Professional-Scientific				
Religious Groups				
State or Federal Govt.				
Other				

3. Other Activities

TYPE	NUMBER	TYPE	NUMBER
Press Releases	<u>0</u>	Radio Presentations	<u>0</u>
Newspapers (P.R.'s sent to)	<u>0</u>	Exhibits	<u>0</u>
TV Presentations	<u>0</u>	Est. Exhibit Viewers	<u>0</u>

INSTRUCTIONS

Item 1: Total of a, b, and c, equal d.

"Visit" - definition. Any person who is on refuge lands or waters during a day or part thereof for the purpose of: hunting, fishing, bird-watching, recreation, business or economic use, official visit, or similar interest. INCLUDE - those who stop within the refuge while traveling on a public highway because of an interest in the area. EXCLUDE - persons engaged in oil or other industry not directly related to the refuge, persons using refuge as most direct route or principal avenue of traffic, and those boating on navigable rivers or the Intercoastal Canal, unless they stop to observe wildlife on the refuge.

Computing visits. Where actual counts are impractical, "sampling" is used with midweek and week-end samples varied by season or weather. A conversion factor of 3.5 (of passengers per car) is used when accurate figures are not available. Each refuge will develop a conversion factor for boats based on range of usage. Count a camper once for each 24-hour period or fraction thereof.

Item 1a: Acres - of refuge open for each type of hunting.

Managed hunts require check in and out of hunters, issuance of permits, or assignment of blinds.

Other - INCLUDE crow, fox, and similar hunting.

Lands adjacent to refuge. Normally considered within 1 mile or less of boundary, unless established sampling procedures cover a wider area. For big game hunting, the distance may be greater.

Item 1b: Acres of streams open to fishing, if practical; otherwise just miles open. Information on "shores" is primarily for coastal fishing.

Item 1c: Recreation. INCLUDE photography, observing wildlife, picnicking, swimming, boating, camping, visitor center use, tours, etc. TOTAL Recreation, Official, and Economic Use visits under Item 1.

Industrial. INCLUDE persons engaged in industry, i.e., oil industry or factories. EXCLUDE these from Item 1.

Item 2: INCLUDE the "On Refuge" groups in Items 1c and 1. In "Off Refuge" column include only those group meetings in which refuge employees actually participate. EXCLUDE these from Items 1c and 1.

Item 3: Exhibits - INCLUDE displays, fairs, parades, and exhibits OFF the refuge; EXCLUDE those ON.

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

(1)

Refuge

MACKAY ISLAND

Year 1967

Collections and Receipts (Seeds, rootstocks, trees, shrubs)							Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
NONE													

- (1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:

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

Remarks: _____

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge MACKAY ISLAND County Currituck State North Carolina

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			
Wheat <div>230 3375 174 3779</div>	7.5	230 bu.	2.5	<div>473 76 bu.</div>			10		
Corn	86.2	1,375 bu.	4	<div>339 bu. 58</div>	53.4	4,594 bu.	93.6		
Milo	5	<div>174 4,434 lbs.</div>	1.7	<div>613 478 lbs. 310</div>	3.0	.5 ton	9.7		
Wheat browse	<div>48.7</div>	<div>40 423 420 234</div>	8.2	<div>478</div>	15	7.5 tons	<div>15 128.3</div>	15 acres wheat and woods - browse and green manure .5 tons/acre	15
					71.4				
								Fallow Ag. Land	26

No. of Permittees: Agricultural Operations 3 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				128.3
Hay - Wild				2. Acreage Cultivated as Service Operation				65

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 MACKAY ISLAND

Months of January through December, 195 67

(1) VARIETY*	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED OR SUITABLE USE*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Corn	40	339 bu.	379 bu.	240 bu.		99 bu.	339 bu.	40 bu.		X	
Wheat		76 bu.	76 bu.		50 bu.	5 bu.	55 bu.	21 bu.		X	
Milo		64 bu.	64 bu.	28 bu.		8 bu.	36 bu.	28 bu.		X	

(8) Indicate shipping or collection points _____

(9) Grain is stored at Barn at Live Oak Point

(10) Remarks * Transferred to Fox Island Refuge and Back Bay Refuge

*See instructions on back.

REFUGE GRAIN REPORT

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

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

3-1761
Form NR-11
(2/46)

TIMBER REMOVAL

Refuge MACKAY ISLAND Year 19 67

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
NONE								

Total acreage cut over.....

Total income.....

No. of units removed B. F.....

Method of slash disposal.....

Cords.....

Ties.....

ANNUAL REPORT OF PERSTICIDE APPLICATION

Proposal Number

2-67

Reporting Year

1967

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

Date(s) of Application	List of Target Pest(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)
6/21	Weed control in corn	Live Oak Point Field	47 acres	2,4-D	23½ lbs. a.e.	.5 lbs. a.e./acre	Water 2 lbs. a.e./55 gal.	Spray
6/25	Weed control in corn	Bonney tract and Williams tract	38 acres	2,4-D	14 lbs. a.e.	.4 lbs. a.e./acre	Water 1½ lbs. a.e./55 gal.	Spray
7/1	Weed control in corn	Litchfield and Gapps tracts	11 acres	2,4-D	5½ lbs. a.e.	.5 lbs. a.e./acre	Water 2 lbs. a.e./55 gal.	Spray

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

Adequate weed control. No apparent adverse effects noted.