

TABLE OF CONTENTS

	Page
I General	
A. Weather Conditions	1
B. Habatat Conditions	1
II Wildlife	
A. Migratory Birds	2
B. Upland Game Birds	3
C. Big Game Animals	3
D. Fur Animals	3
E. Eagles, Hawks, Owls, Crows, etc.	4
F. Other Birds	5
G. Fish	5
H. Reptiles	5
I. Disease	5
III Refuge Developement and Maintenance	
A. Physical Developement	5
B. Plantings	6
C. Collections and Receipts	7
D. Control of Vegetation	7
E. Planned Burning	7
F. Fires	8
IV Resource Management	
C. Fur Harvest	8
V Field Investigation or Applied Research	
A. Banding	9
B. Weed Duck Houses	9
C. Scientific Collecting	10
D. Predator Control	10
VI Public Relations	
A. Recreational Uses	10
B. Refuge Visitors	11
C. Refuge Participation	11
D. Hunting	11
E. Violations	12
F. Safety	12
VII Other Items	
A. Land Acquisition	12
B. Items of Interest	13

Mackay Island National Wildlife Refuge

Refuge Narrative Report

Calendar Year 1964

I. GENERAL

A. Weather Conditions

Weather conditions during the period will be found in this section of the Back Bay Narrative. No weather station is maintained at Mackay Island Refuge.

The prolonged wet and dry periods, along with the high winds in September and October, caused considerable crop loss in this area. Wet weather at time of harvest caused further loss when crops ready for picking could not be brought in.

B. Habitat Conditions

1. Water

Water levels remained at a high enough stage during major waterfowl concentrations to flood much of our marsh. Generally, depths ranged from 1-4" which made feeding conditions excellent.

We do not as yet have any gauges at Mackay nor do we have any water control structures for holding water in any particular area. The siltation of many of our ditches will hold some water in the ponds when excessive drops are found outside the refuge. Water levels within the refuge are directly controlled by the winds.

2. Feed and Cover

Although the flooded marshes mentioned above combined with the burning program provided excellent feeding conditions for snow geese and puddle ducks, burned marsh in other areas pulled most of our birds out during the early portions of the year. During winter and spring, the farm area of rye browse at Live Oak Point received 100% utilization by Canadian Geese,

and at times was clipped back so far, we did not believe that recovery was possible. This area was left standing until fall, and provided good feeding conditions for a large population of dove during August and early September. Utilization this fall was not as great.

Late spring checks of aquatic vegetation were most disappointing. A check prior to the fall migration was a little brighter. Dredging operations on the Inland Waterway, just west of the refuge, caused a good deal of turbidity in a number of our ponds. Duck Island and Sellow's ponds showed fair growth of celery, Vallisneria sp. and redhead grass Potamogeton sp. These ponds have bulrushes which will, although deteriorating rapidly, cut the turbidity. Ponds between the Mackay Island Road and the Inlet Island Causeway again showed no growth. Some minor growth of spike rush, Eleocharis sp., was found in Fish Pond and Wilson Point hole.

Eleocharis was the dominant vegetation found in ponds north of the causeway. It was also the major species found in areas where there had been burning and heavy snow geese use. In addition, in burn areas along canals, there was considerable increase in the amount of smart weed.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

During the early portion of the year, Duck Island and Sellow's ponds were heavily used by puddle ducks. Remaining ducks were scattered throughout the marsh and in burn areas. In addition, snow geese made use of the burns until Back Bay Refuge started their program - then nothing. The majority of wintering waterfowl was gone by mid-April.

We appeared to be holding our own as far as the summer population was concerned. Several broods of black ducks were observed on the few field trips made in the marsh. Other work duties, and being short staffed during the summer, cut our marsh activities below that desired. High predator numbers are believed to have held down the number of birds produced.

An initial buildup of wintering waterfowl came in mid-October, with the first Canadas being seen on the weekend of the 20th. Lack of cold weather and feed resulted in poor waterfowl population. The only exception is Canadian Geese which are at a 4 year high for the refuge. Early arrivals of snow geese again took to the marsh south and west of Finns Pelly and south of Bulls Bay. Some minor use was made of the marsh west of Bridge Pond and in parts of the Kitchen Tract by snows, but duck use was minimal.

TABLE I

Waterfowl Comparison Table

January - April

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
Swans	*	29,268	33,561	2,985
Canadian Geese	*	10,165	25,455	27,749
Snow Geese	*	990,700	794,500	92,800
Ducks	*	154,134	156,494	199,408
Geats	*	2,406	4,735	741

Waterfowl Comparison Table

May - August

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
Swans	0	0	0	0
Canadian Geese	0	0	0	0
Snow Geese	0	0	0	0
Ducks	56,526	15,490	35,490	37,065
Geats	0	1,149	40	0

Waterfowl Comparison Table

September - December

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
Swans	77,230	41,335	15,099	3,305
Canadian Geese	76,150	132,125	146,300	187,355
Snow Geese	856,000	507,880	437,500	101,500
Ducks	145,089	235,319	270,747	107,552
Geats	20,496	24,115	3,185	980

Although there was fair feed amounts in Duck Island and Ballows ponds, little use was made of them. Bulls Bay at the north end of the refuge, received the heaviest continued use by waterfowl.

2. Other Waterbirds

There is no significant change in our reports on waders during the year. Most were seen on an on and off basis throughout the year.

Geese were down considerably over past years. At no time were there any large flocks. Hunters were not very happy about this condition, as geese are a prized bird in this section.

3. Shorebirds

There has been no significant change in the shorebird population at Mackay Island during the year. It is only during periods of prolonged low water, do we see any shorebirds of number. Snipe are commonly seen on the refuge, most frequently in "cutout" areas and in burned sections. Again as in the past, the greatest number of gulls were present during farming operations at Live Oak Point.

4. Experimental mowing in our farm area at Live Oak Point brought in a good number of doves in late summer. Estimated at better than 500 birds, they remained until farming operations were well underway. This is the greatest number of doves yet reported during any period on the refuge.

B. Upland Game Birds

Additional farm land on the east side of the refuge, has increased our survey area for quail. A number of coveys were seen during the period with one of about 35-40 birds, being present in the vicinity of the Osbell Tract.

The high predator number which is present is a hunting factor in the population growth of this species. In addition to raccoons, we are having increased problems with domestic cats in the vicinity of our new acquisition areas.

C. Big Game Animals

During early fall, there was an increased number of deer seen along the Mackay Island Road. During a three week period at least five animals were seen. Tracks are commonly seen in the vicinity of the farm area at Live Oak Point. Some small increase in population is estimated.

D. Fur Animals

1. Nutria - The population of this species is increasing. The major center of activity is in the vicinity of Big Goose Pond

with increased numbers appearing in the vicinity of Knolls Pond and Woods Pond. Mink have been seen throughout the refuge area and have caused some difficulty in our other programs. (See Banding) Considerable damage is being done by this species to the Mackay Island Road and Hog Pen Point Road.

2. Skunks

It appears that the skunk population is steadily declining, if reduced numbers taken in trapping, lack of building activity, and lack of observations are used as criteria. Local inhabitants blame snow geese, ravens and mink for the decline. The fact that many areas were trapped out in past seasons by these same individuals is not taken into consideration. There has been no indication of any disease affecting this species.

3. Mink

Only occasional sightings of mink have been seen during the period. Any change in population is considered as slight.

4. Otter

Increased though still infrequent sightings of this species were made. Some increase in population numbers is believed present. Trapping of otter is prohibited in our fur management program.

5. Beaver

Visual sightings of this pest remain low, although tracks are seen all over the place. A control program was started in November, with emphasis in the vicinity of banding sites. Several beaver were removed by refuge personnel during the year.

6. Fox

Fox are present on the refuge but in limited numbers. There is no major change in population believed to have taken place.

7. Opossum

Dead opossums are frequently seen along the causeway. This species is most commonly seen along the east side of the refuge, in the vicinity of new acquisition areas.

8. Rabbits

The refuge rabbit population also appears to be on the decline. High predator numbers no doubt are an influencing factor.

9. Eagles, Hawks, Owls, Crows, etc.

No eagles or owls were seen during the period.

Cowbird returned to the refuge in March. A single bird was seen along the causeway west of the refuge line. A nesting pair returned to Live Oak Point, where early nesting activities were in vain when the nest was destroyed by high winds. A second nest was built, but was abandoned during early summer, with another nest being started near Bay Tree Point. If there were any young birds, they were not seen by refuge personnel. The last Cowbird was seen in mid-October.

A number of hawks were seen during the year. Sparrow and marsh hawks returned in September and October. There has been a slight increase in the number of Marsh Hawks seen this fall with peak numbers around 10.

F. Other Birds

There have been no additions to the refuge bird list this year.

G. Fish

There is no known change in the fish population of the refuge. It has been noted that there is a decreased amount of commercial fishing in the vicinity of the refuge this fall.

H. Reptiles

Early warm days in spring again brought out the snake and turtle population. Several cottonmouths were killed by refuge personnel during the year. There is little change noted in the population of this group on the refuge.

I. Disease

Several dead mallard geese were found early in the year but were too decomposed to make a study on them. Several additional birds were seen which were believed to be sick, but apparent recovery was made.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Two major projects occupied the majority of our time during the period - farming and clearing of land under Soil and Moisture. Slightly over 2 acres of additional farm land was cleared at Live Oak Point. Major work involved was the blasting of stumps, picking up and clearing of drainage ditches. Hard clay slowed down the drilling for placing charges, cutting down the amount of work completed.

Other work accomplished during the period:

1. Trail established, cleared and mowed out to Woods Pond. Although not serviceable for vehicles, it does give us a fast access to the pond.
2. 650 gal. gas tank and pump installed at Corbell property.
3. Eight surplus buildings sold.
4. Mowing and minor repairs on Mackay Island Road.
5. Made major repairs on TD-9, Chevrolet 1/2 ton pick-up and Dodge 1/2 ton pick-up and case loader.
6. Fenced newly acquired property and repeated proclamation line.
7. Cleaned out brooder house (Bldg. 47) at Corbell property. This building is being used as major storage. Also a work bench and storage bins were installed in this building.
8. New gate installed at Building 22.
9. Grain bin built in Building 7.
10. Routine inspection and maintenance on equipment assigned to refuge when required.

B. Plantings

1, 2 and 3 NONE

4. Cultivated Crops

During the fall, 62 acres at Live Oak Point were planted to Rye. This is an increase of 5 acres over the preceding year. Major funds for the clearing operation came from Seil and Maitland with additional contributions from the refuge allotment. The majority of the area was mowed and double disked, putting under, last years seed growth. Additional seed was obtained locally and drilled in where needed. Our new F010 John Deere saw a good deal of service during the summer and fall months. All areas of the field have received goose use thus far this fall.

The Corbell Tract was farmed on a cooperative agreement with Mr. Walter Williams of Knetts Island. The initial growth looked good but between rain, dry weather and high winds in September, the yield was below that which was hoped. The refuge received 1/4 of the crop in shelled corn which is being used in our banding program. A total of 15 acres was worked under the cooperative agreement with a harvested crop of slightly over 516 bu. A good deal of corn was left in the field. Some of this was used in our banding program.

C. Collections and Receipts

1. Seed and other propagules - None

2. Specimens - None

D. Control of Vegetation

None

E. Planned burning

1. General

With 1964-1965 burning season, a remembering system was established for the burning program. The new method is based on a three year rotation with the basic units lettered A, B, C. These units are subdivided into smaller sections for burning throughout the season.

In accordance with the refuge burning program, approximately 500 acres were selected for the 1963-1964 season. The area burned during this period is shown on the attached map.

In early December 1963, a brief survey was made of the area to determine vegetative cover which was present. In all cases, a brief walk through the area was all that was accomplished. The survey route started in section 8 and went back down to 1. Sections 7 and 8 are the highest areas in the refuge marsh. Small clumps of pines and wild cherry were found in Section 7. Soils for the most part were of heavy clay and are believed to be spoils from dredging operations in the ponds. As the survey approached section 1 more typical marsh habitat was found. In sections 2 - 5 and parts of 6, large patches of cattail (*Typha* sp.) and smartweed (*Polygonum* sp.) were found. In addition there was an increase of *Juncus* sp. Along the banks of the canals, cordgrass (*Spartina* sp.) was the dominant vegetation.

The cost for burning this area was approximately \$.10 an acre. Actual costs were difficult to determine since the burning was conducted along with other refuge work. Costs included are salaries and the operational cost of the boat used in this operations. One minor fire got started in the marsh east of the burning area but was quickly extinguished.

2. Conditions prior to burning

Cover type of the area has been described above. This area has not been burned since control was obtained by the refuge.

In most areas, considerable duff was present allowing a good burn. Prior usage has been limited to puddle ducks with minor usage of sections 2 and 5, by snow geese. Signs of small mammals, especially rabbits, were found throughout the area.

B. Conditions following burning

The only use made of the area by snow geese in sections 1, 5 and 6 with limited use in the latter areas. Excellent use was made of all areas with the exception of 7 by puddle ducks.

Burning of the areas was carried out as follows:

December - Section 1

January - Section 6, 7 and 8

February - Section 4 and 5

March - Section 2 and 3 and portions of 4 and 5 returned

Approximately 75% of the proposed area was burned during the winter season. The remaining 25% was too wet and would not carry a fire.

It is recognized that earlier burning would no doubt have more value for wintering waterfowl, but it has been found that we must wait until killing frosts have occurred.

F. Fires

Two fires occurred on refuge holdings during the year. One small fire was started in the vicinity of the observation tower along the ganseway. No damage was done to any government equipment or buildings. (See Violations)

A second fire occurred in May along the east side of the refuge. Although the fire started off refuge lands, it spread quickly to our holdings. A fire break was plowed by a local resident and the area backfired by refuge personnel. Estimated cost for putting out the fire was \$26.50. During the period, two Indian tanks and fire rakes which were needed badly, were obtained.

IV. RESOURCE MANAGEMENT

A and B - MOOSE

C. Fur Harvest

The annual trapping program was terminated on March 16, the closing date also for the state trapping in this area. As in 1963, only mink, muskrats, raccoons and nutria were taken. The following was taken during the season:

Mink	0
Muskrats	53
Raccoons	25
Nutria	510

Prices on Nutria ranged from \$.25 to \$.40 and total sales equaled \$148.00. Not all of the nutria were sold due to size and condition.

The refuge share of the muskrat pelts was 40% or 27 skins. There was no refuge share of raccoon or nutria. No prices have been received as yet on the refuge share of pelts. Prices received by the trapper for muskrats were \$1.75 per skin.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Banding

Banding efforts for both doves and waterfowl was a great disappointment. During the period of January and February only three ducks were trapped. High water in the trap area and ideal feeding conditions in the marsh contributed to our problems. An attempt was made in late February to trap Canada Geese using a cannon net but again this failed. Waterfowl traps of all types were pulled in early March.

In April, 4 sites were established to try and trap mourning doves. Our efforts were without success. A repeat on dove banding was attempted in September when we had our high dove population. An abundance of other food in the area was no help in our efforts.

Waterfowl banding was again started in November. Early heavy feeding on bait in the farm field by geese gave us some hope, but as soon as the net was in place, the birds pulled off.

An Ohio trap was placed south of the bridge on the Mackay Island Road. After heavy baiting we found that all we had was a bunch of well fed nutria and black birds. After removal of approximately 12 nutria, with no apparent reduction in numbers, this site was abandoned in December.

In December, an eastern shore type trap was placed at the south end of the refuge behind the boat house. In this area we have the only hard sand bottom which is readily accessible. When conditions are favorable, this is an ideal site. The area is subject to wind tide fluctuations. We caught only 23 birds in this trap including one red head.

At the end of the month, the shallow water eastern trap was replaced with a 6 x 10 trap of the same design, only of greater height. At the time of this writing we have had no success with the trap. High water levels prevailed during the remaining portion of the year.

B. Weed Duck Houses

As of the first of April, twelve weed duck houses have been built and placed on the refuge. The houses have been widely scattered to

and if one area is preferred to others. Several houses built by hermits during 1954 were relocated by refuge personnel.

Five of the houses are of square, metal type, made from sheet roofing, salvaged from the refuge. The cost for materials for these houses was negligible but cost for construction is about \$5.00. It is expected that this cost will drop as short cuts are found in construction methods. Green shields were attached below all boxes regardless of location.

Boxes built by the hermits were of the 10" stove pipe type. It was found that in most cases, 3/4" - 1" plywood was used in the ends. In every case, it was found that in the end where the opening was located, the plywood had split. Necessary repairs were made on all old boxes, and all were made serviceable.

All boxes were later checked for use. None was found used save by starlings in the square metal type. A local fisherman reported seeing a wood duck leaving one of the stove pipe boxes on Hog Pen Point Road but a subsequent check showed no duck nesting activities.

C. Scientific Collecting

A report was received through the regional office, from Mr. Roger Baggett of the Norfolk Museum of his collecting activities on the refuge. Of special interest were his comments on the decline of muskrats in the area, and the fact that Bobcat signs were found.

D. Predator Control

A predator control program was started in mid-November to reduce the high number of predators on the refuge. The effects of this program are still under evaluation at the time of this writing.

VI. PUBLIC RELATIONS

A. Recreational Uses

During the early months of the year, little use was made of the refuge. From mid-March there was a steady buildup of sports fishermen until June when warm weather really set in. There is considerable hesitancy shown by fishermen to use the road side canals during the summer months due to our high reptile population.

Informational maps, showing the refuge boundary, and fishing regulations, were distributed to several of the local agencies which sell licenses. The maps have proven very popular with the fishermen using the refuge.

Several camping trips were made under permit by various scout groups. (See Violations)

As fall approached, there was again an increase in public fishing along the roads. Public use of the refuge terminated on Oct. 15.

B. Refuge Visitors

1/25/64	Bill Ried	Regional Office	Land acquisition
1/29/64	Ed Addy	Patuxent	Snow geese count
2/6/64	Messers Givens and Findlay	Regional Office	Inspection & visit
3/10/64	Thomas Carter	Washington, N.C.	Violation investigation
3/11/64	Richard Certell	Regional Office	Land acquisition
3/17/64	Don Fortenberry (P & R C)		Predator Control
4/8/64	Larry Givens	Regional Office	Inspection & visit
5/4/64	Art Hughlett	Regional Office Region 3	Refuge visit
5/7/64	Swamp sprite demonstration		
8/17/64	Messers Carson & Sheppard	Puige Refuge	Pick up surplus vehicle
9/28/64	Messers Bell & Dew		Refuge orientation
11/17,	Messers Cunningham		Predator control
18,19/64	& Smith (P & R C)		
11/18/64	Nelson Swink (P & R C)		Visit & Predator control

C. Refuge Participation

2/14/64 Aldridge at scout meeting as neighborhood commissioner.

2/15/64 Aldridge conducted meeting for N. R. A. Hunter Safety.

2/17/64 Aldridge at Cub Scout meeting as neighborhood commissioner.

2/21/64 Aldridge at scout meeting as neighborhood commissioner.

2/22/64 Aldridge conducted meeting on N. R. A. Hunter Safety.

2/29/64 Aldridge conducted N. R. A. Hunter Safety course.

5/3/64 Aldridge at Workshop, Atlanta, Georgia.

5/13/64 Aldridge conducted field trip for 35 students and 4 teachers from Creeds School.

5/14/64 Ambrosen at meeting of Albemarle Soil and Water Conservation District Meeting at Elizabeth City, North Carolina.

8/3/64 Aldridge at Law Enforcement Workshop, Biloxi, Mississippi.

9/29/64 Aldridge at District meeting of N. C. Law Enforcement School to give talk on management and enforcement on Mackay Island.

D. Hunting

Duck hunting finished in North Carolina on January 4. Very little hunting of Canada geese took place after that date.

If the hunting was considered bad in '63, the hunting of waterfowl in '64 was terrible. Few limits were taken by persons hunting by legal means. What birds arrived never stayed in this area, most of them moving into lower Currituck. There was very little field shooting of Canadas this year. High water levels during most of the hunting season and lack of aquatic vegetation in the bays kept most of the puddle ducks back in the marshes. Few divers were taken with the exception of Ruddy ducks.

Early season dove hunting was good to excellent. One field on

Knetts Island reported to have a kill of better than 400 birds during the season. The second half of the season was very poor.

E. Violations

On January 19, a fire was started along the causeway. Two persons were seen in the vicinity of the fire and were reported to the V. S. G. M. A., as the persons possibly responsible for the fire. Agent Thomas Carter investigated and it was his conclusion that the boys were definitely responsible for the fire. Because of a lack of enough evidence, no charges were filed although the parties involved were badly scared.

On February 22, 1964, Ronald Ansell and Aubry Casen, both of Knetts Island, entered the refuge and attempted to break up a boy scout camp which was taking place. This action was reported by the scoutmaster and charges were filed. Ansell and Casen were tried March 24 before the U. S. Commissioner in Elizabeth City, N.C. Ansell received a \$40.00 fine, three months suspended sentence, and six months probation. Casen received the same sentence with the exception that he received only a \$20.00 fine.

In March several refuge signs were stolen from along the causeway. In addition the sign sheeters returned. Most of our signs now have bullet holes in them.

In June, two batteries were stolen from government equipment at the tower along the causeway. During October, a rim and tire were stolen from the grain drill located at Live Oak Point. Thefts were reported to proper authorities but because of their general nature, little could be done.

F. Safety

Safety meetings were held in conjunction with personnel from Back Bay Refuge in the main office and information will be found in this section of the Back Bay Narrative relating to these meetings. Additional safety meetings and discussions were held at the field station whenever it was necessary. We have had no lost time accidents at this refuge since it was started in 1961.

VII. OTHER ITEMS

A. Land Acquisition

During the year, the following tracts were acquired:

Williams, Wilton (TR 65)	5.70 acres
Williams, Stanford (TR 36)	28.15 acres
White, Addie J. (TR 18a)	2.00 acres
Litchfield, Susie A. (TR 70)	20.50 acres
Benney, Donaven (TR 62)	4.10 acres
Portions of the Richardson tract which were under condemnation, were settled during the year with payment being made to the owners.	95.85 acres
Total acreage	<u>156.10</u>

B. Items of Interest

In January the author married Miss Kathryn Hedges of Chesapeake, Va.

During August, a daughter, Norma Jean, arrived at the household of Mr. & Mrs. Pittman. James is maintenanceman at Mackay Island.

From June until mid-August, the author was detailed to Delta Refuge as acting refuge manager. This was the third tour at Delta for the author, having served then as laborer and student assistant under Manager DeLima.

This narrative is compiled from field notes of Manager Ambresen, maintenanceman Pittman and the author. Photographs are by the author.

Respectfully submitted,

January 22, 1965
Date

Gilman Aldridge
Refuge Manager

January 22, 1965
Date

Donald R. Ambresen
Donald R. Ambresen
Refuge Manager

Approved by:

Regional Director



TYPICAL BANDING PICTURE AT MACKAY. FAIR BOTTOM, GOOD TRAP, NO DUCKS

DEC. '64

CANADAS WORKING LIVE OAK POINT FIELD

DEC. '64

WATERFOWL

REFUGE Monkey Island

MONTHS OF September TO December, 1984

[illegible]

WATERFOWL
(Continuation Sheet)

REFUGE Lucky Island

MONTHS OF September TO December, 1964

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl: days use	(4) Production Broods: seen	(5) Estimated total
	11	12	13	14	15	16	17	18			
<u>Swans:</u>											
Whistling	10	150	75	50	50	50	50	50	3,305		
Trumpeter											
<u>Geese:</u>											
Canada	700	3,500	4,500	5,000	2,500	2,500	3,000	4,000	187,385		
Cackling											
Brant											
White-fronted											
Snow		1,000	2,000	2,000	2,500	1,000	1,500	2,500	102,500		
Blue											
Other											
<u>Ducks:</u>											
Mallard	185	300	150	200	200	250	350	525	14,180		
Black	200	200	200	350	250	400	400	450	24,475		
Gadwall			10	10	10				210		
Baldpate	50	150	200	200	200	150	100	50	8,475		
Pintail	200	200	200	250	200	100	150	350	12,400		
Green-winged teal	200	400	400	500	350	250	150	75	20,505		
Blue-winged teal									3,895		
Cinnamon teal									0		
Shoveler		10	25	25	30		5	10	725		
Wood	20	20	10	10	10	10	10	10	3,950		
Redhead						5			70		
Ring-necked	5	150	150	10					2,205		
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other									4,085		
<u>Common to Canada</u>		5		5	5				70		
<u>Hooded Merganser</u>									77		
<u>Other</u>	5	50	50	25					980		
					(Over)						

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	3,306	150	0
Geese	288,856	187,365	0
Ducks	107,862	1,505	0
Coots	900	50	0

SUMMARY

Principal feeding areas ~~throughout marsh - especially in~~
~~area south of Iowa Pelly and Bullis Bay. Canada geese in~~
~~Bullis Bay and farm area.~~

Principal nesting areas

Reported by G. L. Aldridge

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).

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W A T E R F O W L

MONTHS OF May TO Sept., 1964

[illegible]

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

WATERFOWL
 (Continuation Sheet)

REFUGE **MACKAY ISLAND**

MONTHS OF May TO Sept., 1964

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl: days use	(4) Production Broods: Estimated seen : total
	11	12	13	14	15	16	17	18		
Swans:										
Whistling										
Trumpeter										
ase:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard										
Black	250	250	250	250	250	250	250	5	200	
Gadwall									21,925	50
Baldpate										
Pintail										
Green-winged teal										
Blue-winged teal									180	
Cinnamon teal								30	250	
Shoveler										
Wood	150	150	150	150	150	150	150	150	14,170	50
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coot:										
					(Over)					

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	0	0	0
Geese	0	0	0
Ducks	37,085	430	100
Coots	0	0	0

SUMMARY

Principal feeding areas Throughout marsh area.

Principal nesting areas Generally throughout marsh area (Black) Geese ponds and flooded wooded areas (Wood ducks)

Reported by G. C. Aldridge

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 Nackay Island

MONTHS OF January TO April, 1964

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
	:	:	:	:	:	:	:	:	:	:
Swans:										
Whistling	300	75	10	25	15	25	10	25	25	25
Trumpeter										
Geese:										
Canada	450	200	150	75	300	300	75	400	400	150
Cackling										
Brant										
White-fronted										
Snow	5,000	5,000	2,500	1,500	0	0	0	0	0	0
Blue	20	10								
Other										
Ducks:										
Mallard	400	150	250	200	200	200	250	250	200	250
Black	900	500	500	500	300	500	450	400	750	500
Gadwall							5			20
Baldpate										
Pintail	250	1,200	1,000	750	1,000	500	750	750	450	400
Green-winged teal	350	500	500	400	400	400	150	150	750	500
Blue-winged teal										50
Cinnamon teal										
Shoveler										
Wood	10	10	10	10	10	10	10	15	15	20
Redhead										
Ring-necked				25	25					
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy			50	25	25	2,000	750			
Other										
Red Breasted Merganser								5	5	
Hooded Merganser									2	
Coots	25	25						10	2	5

3-1750a
Cont. 1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Holby Island

MONTHS OF January TO April, 1964

(1) Species	(2) Weeks of reporting period								(3) Estimated: Production		(4) waterfowl: Broods: Estimated	
									: days use : seen :		: total	
	11	12	13	14	15	16	17	18				
Swans:												
Whistling	16	6								2,055		
Trumpeter												
Geese:												
Canada	125	500	220	300	180	50	32			27,740		
Cackling												
Brant												
White-fronted												
Snow					1,400					52,230		
Blue										150		
Other												
Ducks:												
Mallard	250	300	100	50	25	25	10	10		25,020		
Black	500	500	150	100	100	50	25	25		45,900		
Gadwall	15									140		
Baldpate	10									70		
Pintail	150	50	25							50,175		
Green-winged teal	750	500	500	100	650	250				45,350		
Blue-winged teal	50	170	200	500	100	500	25	25		11,560		
Cinnamon teal												
Shoveler					20					140		
Wood	20	20	30	80	10	10	10	10				
Redhead												
Ring-necked			5							385		
Canvasback												
Scaup												
Goldeneye												
Bufflehead												
Ruddy	10	5								10,355		
Red-throated Loon					1	1				25		
Coot:	10	5		1	10	10	10	5		741		
					(Over)							

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	<u>2,335</u>	<u>300</u>	<u>0</u>
Geese	<u>100,340</u>	<u>5,000</u>	<u>0</u>
Ducks	<u>199,463</u>		<u>0</u>
Coots	<u>741</u>	<u>25</u>	<u>0</u>

SUMMARY

Principal feeding areas Flooded marsh, burned marsh
and refuge farm field.

Principal nesting areas N/A

Reported by G. C. Alldridge

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 NF-1
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge. Nickay Island Months of . . . January to . . . April 1964

(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:										
Red-necked Grebe	1	2/64	2	2/64	1	3/10/64				8
Pied Billed Grebe	Remaining		15	3/64	2	4/15/64				25
D-C Cormorant	1	4/22/64	1	4/22/64	1	4/22/64				Migrant
G. B. Heron	Resident		3	2/25/64	-	-				5
American Egret	Resident		4	4/7/64	-	-				8
Green Heron	1	4/10/64	3	4/27/64	Remaining	-				10
D-C Night Heron	Remaining		10	1/24/64	10	1/24/64				15
American Bittern	Resident		2	3/64	-	-				10
B. Glossy Ibis	1	4/17/64	2	4/18/64	2	4/18/64				Migrant
Cattle Egret	-	-	10	4/22/64	-	-				15
King Rail	Resident		3	3/64	-	-				20
EG. Shorebirds, Gulls and Terns:										
Killdeer	Remaining		10	2/25/64	Remaining					15
Woodcock	Occasional sightings only									5
Common Snipe	Resident		50	1/64						150
Greater Yellow legs	Remaining		5	4/64	Remaining					10
Least Sandpiper	4	4/27/64	50	4/28/64	Remaining					75
Herring Gull	Remaining		250	2/15/64	25	2/25/64				150
Ring-billed Gull	Remaining		only occasional sightings							25

(over)

III. Doves and Pigeons:
 Mourning dove
 White-winged dove

Resident

30-3/15/64

75

IV. Predaceous Birds:

Golden eagle
 Duck hawk
 Horned owl
 Magpie
 Raven
 Crow

Resident

180

Osprey

2

3/7/64

2 (Examining peak number)

4

Marsh Hawk

Examining

2 3/64

5

Sparrow Hawk

Examining

3 3/64

10

Reported by. G. C. Aldridge

INSTRUCTIONS

- (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, Stringiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (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 total number of the species using the refuge during the period concerned.

MIGRATORY BIRDS
(other than waterfowl)

Refuge. **MACKAY ISLAND REFUGE** Months of **MAY** to **SEPTEMBER**19**64**

(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. <u>Water and Marsh Birds:</u>										
Great Blue Heron	Resident		2	8/18						5
American Egret	Resident		5	May						10
Snowy Egret	2	May	5		Remaining					10
Louisiana Heron	1	May	1	Aug.	Remaining					5
Little Blue Heron	2	5/1	Seen only on occasion since that time							5
Green Heron	Remaining		3	July	Remaining					25
American Bittern	Resident - Seen only on occasion									10
King Rail	Resident - Seen only on occasion									25
Virginia Rail	Resident - Seen only on occasion									25
EE. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer	Remaining		5	June	Remaining					10
Common Snipe	Resident - Seen only on occasion									25
Greater Yellow-legs	Remaining -		2	June						5
Least Sandpiper	Remaining - Seen only on occasion - Remaining									10
Herring Gull	5	Aug	25	August	Remaining					50
(over)										

(1)	(2)	(3)	(4)	(5)	(6)
-----	-----	-----	-----	-----	-----

III. Doves and Pigeons:

Mourning dove	Resident	500	8/64	100 young	500
White-winged dove					

IV. Predaceous Birds:

Golden eagle					
Duck hawk					
Horned owl					
Magpie					
Raven					
Crow	Resident				150

Reported by. G. C. Aldridge

INSTRUCTIONS

- (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, Stringiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (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 total number of the species using the refuge during the period concerned.

3-1751
Form N-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge. Mackay Island

September to December 1964

(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:										
Pied-billed Grebe	3	10/29	15	Nov-Dec	Remaining					25
Red-necked Grebe	1	12/3	1	12/3	1	12/3				1
Double-crested Cormorant	4	10/2	4	10/2	1	11/29				5
Great Blue Heron	Resident		7	10/19						10
American Egret	Resident		3	9/22						10
Snowy Egret	Remaining		1	10/2	1	10/2				5
Louisiana Heron	Remaining		1	10/2	1	10/2				5
Green Heron	Remaining				1	10/15				10
Black-crowned Night Heron	2	10/29	3	11/27	Remaining					3
American Bittern	Resident	- Seen only on occasion								15
King Rail	Resident	- Seen only on occasion								20
Virginia Rail	Resident	- Seen only on occasion								20
Sora Rail	Resident	- seen only on occasion								10
EE. Shorebirds, Gulls and Terns:										
Killdeer	Remaining		12	11/64	Remaining					15
Common Snipe	Resident		10	10/29						50
Greater Yellowlegs	Remaining	- Seen only on occasion				1	11/27			5
Great Black-backed Gull	2	10/19	2		Remaining					5
Herring Gull	Remaining		125	10/54	Remaining					150
Ring Billed Gull	25	9/16	25		Remaining					30

(over)

(1)	(2)	(3)	(4)	(5)	(6)
-----	-----	-----	-----	-----	-----

III. Doves and Pigeons:

Mourning dove	Resident	60	10/19		75
White-winged dove					

IV. Predaceous Birds:

Golden eagle					
Duck hawk					
Horned owl					
Magpie					
Raven					
Crow	Resident				150

Reported by. . . G. C. Aldridge

INSTRUCTIONS

- (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, Stringiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (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 total number of the species using the refuge during the period concerned.

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, 19

Reported by G.C. Aldridge

Title Refuge Manager

(1)		(2)		(3)	(4)	(5)
Area or Unit Designation		Habitat		Use-days	Breeding Population	Production
		Type	Acreage			
Total Refuge	Crops		102	Ducks	507,175	75
	Upland		1,096	Geese	704,664	0
	Marsh		5,065	Swans	18,094	0
	Water		500	Coots	3,926	0
	Total		6,781	Total	1,233,859	75
		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		
		Crops		Ducks		
		Upland		Geese		
		Marsh		Swans		
		Water		Coots		
		Total		Total		

(over)

INSTRUCTIONS

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

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

3-1752
Form N
(April 1946)

UPLAND GAME BIRDS

Refuge Mackay Island

Months of September to December, 1964

(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	No. broods obs'd.	Estimat- ed Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bob-white Quail	1,280 acres of cropland, cutover timber and pine thickets	4.3	0			None			800	

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 N
(April 1946)

UPLAND GAME BIRDS

Refuge Mackay Island

Months of May 1

to September 1, 1964

(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	No. broods obs'd.	Estimat- ed Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Black-white Quail	1,198 acres of cropland and cut- over timber	4.3	3	75		NONE			250	

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.

UPLAND GAME BIRDS

Refugee in the United States Months of January to April, 1964

(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	No. broods obs'd.	Estimat- ed Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bob white quail	1170 acres oak over timber & 12 acres agricultural fields	100			100% males 100% females	0	0	0	1170	100% males seen in refuge since 1970 period

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.

3-1783
Form NR-3
(June 1945)

BIG GAME

Refuge MacKay Island

Calendar Year 1964

(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												
Virginia White Tailed Deer	Flooded timber (Hardwoods and pine) and farmlands. Total acreage 1,280 acres	5*		NONE			NOT KNOWN				NONE	30-60*	30-60*	UX

Remarks:

- * Young produced and population is estimated. Deer appear concentrated in area bounded by Live Oak Point to MacKays Creek to Back Creek.

Reported by G. C. Aldridge

INSTRUCTIONS

Form NR-3 - BIG GAME

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

3-1754

Form NR-4

(June 1945)

SMALL MAMMALS

Refuge Midway LakeYear ending April 30, 1946

(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					
Beaver	Marsh, timber & forest	13.6	0	33	0	0	0	7-182	20		0	0	0	500	
Masked	Marsh & forest (5,000)	11.4	0	22	0	0	0	7-182	41	20	27	0	0	500	
Beaver	" "	4.6-5.7	0	110	0	0	0	7-182	10	0	0	0	0	12-1,500	
Mink				None						None				80	
Otter				None						None				15	
Fox				None						None				10	
Rabbit				None						None				200	

* List removals by Predator Animal Hunter

* List removals by Predator Animal Hunter

REMARKS: Predator control figures indicate those animals removed by refuge personnel. Such furs taken were destroyed.

* Total refuge acreage - approximately 6,000 acres.

Reported by G. C. Aldridge

INSTRUCTIONS

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

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

Refuge Mackay Island Year 19 64

Botulism

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	_____	_____

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 Snow Geese

Number Affected Species	Actual Count	Estimated
_____	<u>5</u>	<u>50</u>
_____	_____	_____
_____	_____	_____

Number Recovered 20 (Estimated)Number lost 25-30 (Estimated)Source of infection Lead shot in marshWater conditions Normal for period (Jan) -
fluctuating with wind directionsFood conditions Burned marsh and old "eatouts"Remarks Number much reduced over previous years.

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge Mackay IslandCalendar Year 1964

1. Visits

a. Hunting 0 b. Fishing 4,500 c. Miscellaneous 5,112 d. TOTAL VISITS 9,612

1a. Hunting (on refuge lands)

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

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

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

TYPE OF AREA	ACRES	MILES
Ponds or Lakes		
Streams and Shores		

1c. Miscellaneous Visits

Recreation 8,000 Official 12

Economic Use 100 Industrial 0

2. Refuge Participation (groups)

ON REFUGE

OFF REFUGE

TYPE OF ORGANIZATION	NO. OF GROUPS	NUMBER IN GROUPS	NO. OF GROUPS	NUMBER IN GROUPS
Sportsmen Clubs				
Bird and Garden Clubs				
Schools	<u>1</u>	<u>20</u>		
Service Clubs				
Youth Groups	<u>3</u>	<u>45</u>	<u>3</u>	<u>60</u>
Professional-Scientific			<u>1</u>	
Religious Groups				
State or Federal Govt.			<u>1</u>	<u>15</u>
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.

PUBLIC USE - C. Y. 1964

Please supply figures, or your best estimates for the following categories when applicable to your refuge:

A. Mackay Island National Wildlife Refuge.

B. Estimated total use of all types 9,600 visitor-days.

1. Hunting use (for those refuges having public or regulated hunting.)

Estimate visitor-days 0

2. Fishing use.

Estimated visitor-days 4,500

3. Miscellaneous use (lump such uses as picnicking, swimming, wildlife observation, birdwatching, as well as those on the area for business or official use, including economic uses such as farming or trapping.)

Estimate visitor-days 5,100

C. Remarks.

Jan. 22, 1965
Date

D. R. Ambrosen
Refuge Manager

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

(1)

Refuge Nackay Island Year 19 64

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
Negative													

- (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 Makay 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			
Corn	15	234.57 bu.	3.75	81.42 bu.			15	Rye, green manure crop	63
								Fallow Ag. Land	17.5 acres

No. of Permittees: Agricultural Operations 1 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
NONE				1. Cattle	None			
				2. Other	None			
				1. Total Refuge Acreage Under Cultivation				72
Hay - Wild				2. Acreage Cultivated as Service Operation				63

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

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

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

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

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

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

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

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

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

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

3-1759
Form NR-9
(April 1946)

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

Refuge Mackay Island

Year 1954

Species	Collections				Receipts		Total Amounts on Hand	Amount Surplus
	Amount	Date or Period of Collection	Method	Unit Cost	Amount	Source		
Negative								

Interior Duplicating Section,
Washington 25, D.C. 17261

TIMBER REMOVAL

Refuge.....~~Monkey Island~~..... Year 195~~5~~
164

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
Negative								

Total acreage cut over..... Total income.....

No. of units removed B. F..... Method of slash disposal.....
Cords.....
Ties.....