ROUTING SLIP DIVISION OF WILDLIFE REFUGES DATE: May 22, 1946.

____ MR. SALYER

____ MR. ELMER

MR. KRUMMES

~~MR. DUMONT~~ (PAD) 6/10

SECTION OF HABITAT IMPROVEMENT:

~~Mr. Griffith~~ PEG 5-24

~~Dr. Dourm~~ WSA 5-22

~~Miss Cook~~ Jwc 5-31-46

____ SECTION OF OPERATIONS:

Mr. Regan

~~Mr. Ball~~ J.H.B.

Miss Baum

SECTION OF LAND MANAGEMENT:

Mr. Kent MK-5/4

~~Mr. Krummes~~

~~Mr. Dumont~~ ~~Mr. Folkerknecht~~ WA 6-12

____ SECTION OF STRUCTURES:

~~Mr. Taylor~~ GWT 6/17

STENOGRAPHERS:

ak 8-19-46

REMARKS:

MUD LAKE NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT & Annual Summary

Jan-Apr. - 1946.

Return to:

11528

MUD LAKE NATIONAL WILDLIFE REFUGE
NARRATIVE REPORT
Jan-Apr, 1946

1. GENERAL

A. Weather Conditions

1946	Snowfall	Precipitation		Max. Temp.	Min. Temp.
January	2.00	.04		31	-30
February	2.00	.10		37	-33
March	2.00	.68		75	-14
April		.95		75	22
Totals	6.00	1.77	(Extremes)	75	-33

1945	Snowfall	Precipitation		Max. Temp.	Min. Temp.
January	2.21			33	-29
February	2.25			35	-26
March		1.54		68	-25
April		2.09		65	12
Totals	4.46	3.63	(Extremes)	68	-29

Precipitation and temperature readings were obtained from the City Power Plant at Thief River Falls.

Cold weather prevailed during January, February and the first half of March. The weather man, however, became unusually generous in dishing out nice and balmy weather during the latter part of March and through April. The temperature rose to 75 on March 27 and again on April 30. Trees and shrubbery leaved out almost completely and the various berry species such as the dog-wood, chockcherry and Juneberry came into full blossom during this period. The season is about a month earlier than normal.

B. Water Conditions

This spring's runoff was considerably less than last year. It started about the middle of March and reached its highest point about the middle of April when the main pool levels were about nine inches over the crests of the spillways. All of the water controls were opened when the runoff started and they were kept open during the entire runoff period.

During the previous year the water levels rose to 18 inches above the crests of the spillways, and, as a result thereof, some of the dikes were badly damaged by erosion. This year, however, the dikes were only slightly damaged by erosion. This spring's runoff caused us the least trouble and the least damage to the water control structures since the full impoundment of water took place during the spring of 1941.

The following is a comparison statement of the water conditions between this and the corresponding period for the previous year:

Name of Pool	Spillway Crest Elevation	Gauge Readings 4/30/46	Gauge Readings 4/30/45
Mud Lake	1141.00	1141.22	1142.30
Green Stump Lake	1140.00	1139.92	1140.76
Headquarters Pool	1142.00	1141.24	1142.56

II. WILDLIFE
(By Mr. Ball)

A. Migratory Birds

1. Population and Behavior

American Mergansers, the first migrating waterfowl to arrive on the refuge, were observed March 18. This species was followed two days later by the appearance of Mallards, Pintails, and Buffle-heads. Other species arrived throughout the migration at normal frequencies. The Ruddy Duck, last species to be recorded, came April 25, and completed the list of known waterfowl reported in the year previous for the Mud Lake Refuge.

Duration of the migratory period corresponded closely to the migration period of the preceding year. Records of 1945 show the first Mallards arriving March 20, with last arrival, the Ruddy Duck, first observed April 17.

A waterfowl census taken May 3 and May 6, covering approximately 7.9 per cent of the total waterfowl area, revealed a decrease in population of 26.7 per cent, generally. Although the census showed a substantial

increase for such species as Mallards, Gadwall, Redhead, and Ring-necked Duck; most species declined in numbers. Buffle-heads were 73.2 per cent below their population of a year ago; Green-winged Teal was down 66.4 per cent; Lesser Scaup, 64.8 per cent; Baldpate, 51 per cent; American Pintail, 48.5 per cent; Ruddy Duck, 47.9 per cent; and Canvas-back, 33.9 per cent. The coot population dropped 49.5 per cent.

2. Food and Cover

The bulk of waterfowl food this spring seems to consist of duckweed, aquatic animal life, and insects. With the exception of duckweed, it is too early for appearance of major aquatic plants used for duck food. Duckweed, however, appeared early, and it is an abundant species in nearly all pools. Insects and aquatic animal food are now becoming plentiful.

An abundance of cattails, reed, and marsh grass affords adequate cover.

B. Upland Game Birds

1. Population and Behavior

Due, presumably, to cyclic influences, but, also, due in part, to limiting factors in composition of the habitat, all grouse populations are at an extreme low. Of the three grouse species, the ruffed grouse has probably suffered the most severe decrease in numbers. Throughout the period covered by this report, not more than five birds have been flushed on the refuge. Neither has a much greater number been indicated by "drumming" activities, usually a reliable index to population densities. The refuge is lacking a methodical census of the species. It would seem application of R. T. King's "strip census" method, with establishment of permanent "grouse lines", could be applied to the refuge area advantageously, and serve as a permanent index to fluctuating populations.

The low numbers of pinnated grouse have offered little information of this species. No "packs" were observed throughout the period. "Singles" were flushed occasionally from aspen or willow coverts. Not enough birds were present to observe a definite seasonal migration tendency.

Sharptail grouse seems to be more abundant than either ruffed or pinnated grouse, but the total population is low in numbers.

Although an exotic and encountering extreme low winter temperatures, the pheasant, apparently, is able to survive the winter in fair numbers. One frozen bird, however, of very low weight was found in a wood pile after an intense cold period. The species has a tendency to congregate in "packs" and was observed most frequently at Headquarters, in the Green Stump area, and in willow coverts along the river road of the Madsen Pool. It has not been determined if this species resorts to winter budding in this area.

2. Food and Cover

Available food in the form of grain and weed seeds is not commensurate with a large winter population of pinnated grouse, pheasants, or Hungarians. Of browse material, there is an ample amount in the aspen and willow coverts, well dispersed throughout the area. Animal food in the form of bugs and insects is now becoming available in large amounts.

Cover of the coniferous type is lacking in the upland game bird habitat, and this factor may place serious limitations on winter survival. Hardwood coverts of aspen and willow thickets have an adequate dispersal throughout the area.

C. Big Game Animals

1. Population and Behavior

From observations of individual animals the deer population survived the winter in excellent condition. No predation was observed. Yarding occurred in the Whiskey Lake area, and limited concentrations were evidenced in the Kelly Ridge area, and the southwest corner of the refuge. In the Whiskey Lake area deer used the edge of spruce and tamarack for cover, and browsed the hardwood and willow stands on the periphery. At present deer are dispersed widely throughout the area.

Three moose were reported seen by trappers. On three separate occasions moose were also observed by refuge personnel. One very large animal

was observed browsing willows in the Headquarters Pool area. Other areas in which moose were seen are Green Stump and the area just south of Webster Creek.

2. Food and Cover

A check of deer browse conditions in the Whiskey Lake area revealed the bulk of browse species consisted of dogwood and willow, with very little apparent browse of aspen, spruce, or tamarack. The limited amount of dogwood available was browsed heavily, showing a distinct "browse line." A large area of willows immediately adjacent to Whiskey Lake suffered medium heavy browsing. On Kelly Ridge deer showed a distinct preference for dogwood and young ash. Throughout the area, generally, dogwood is limited to small tracts, but the tracts are dispersed widely. Willows, classified by some authorities as an inferior browse species for deer, are available in large tracts and seem to be utilized extensively without adverse effects.

With the exception of the Whiskey Lake area, coniferous cover is nearly absent.

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

Beaver

Due to a successful trapping season the beaver population has been reduced by 41 beavers, of which 13 were taken in December and 28 in April. Shortly after the ice disappeared and while trapping was under way, the animals showed a considerable tendency to move from one habitat to another. Beaver damming activities have to a limited extent conflicted with the refuge water impoundment system. Dams constructed in vertical juxtaposition to stop-log structures have caused difficulty and expenditure of considerable time in pulling the "logs" to relieve water pressure in the spring. In the Madsen Pool beaver dams plugged a water course so that back-water constituted a hazard of spilling into an area with deficient water management devices.

Large aspen stands along waterways provide abundant beaver food.

Muskrat

With the disappearance of ice from the pools muskrats are seen frequently. It is believed an adequate breeding stock survived fall trapping activities, winter freeze-outs, and predation.

Mink

Despite numbers decimated by trapping, indications through the latter part of winter pointed to a fairly high population of this species, at least, in the Green Stump area. Considerable movement of the species was evidenced by tracks in a late snow of early spring.

Skunk

Population and behavior of this species remains the same as reported previously.

Coyote

Several tracks of this animal were observed in the Green Stump and Kelly Ridge areas.

III. REFUGE DEVELOPMENT MAINTENANCE

A. Physical Development

The construction of the stop-log structure below the Green Stump Lake spillway was brought to about 95% completion during the reporting period. Adverse weather conditions prevailed during most of this period, and, as a result thereof, extremely difficult construction donditions were encountered. The structure has now been completed with the exception of rip-rapping which is approximately one-third completed.

B. Plantings

Four cooperative farming permits, covering 440 acres of tillable lands, have been issued to date this season. Last year only two permits were issued and only 130 acres of tillable lands were involved. Owing to the prevailing high prices for agricultural products and the fact that the help problem is somewhat better, the demand for the refuge farming lands has greatly improved over the previous three years.

The cooperative farming is carried on under three plans as follows: Permittee gets 2/3 and leaves 1/3 standing; permittee gets 3/4 and leaves 1/4 in shocks; permittee gets 3/4 and delivers 1/4 of threshed grain to refuge headquarters. During recent years almost all of the cooperative farming has been on the basis of 2/3 to the permittee and 1/3 left standing for the refuge's share. Past experience has shown that the food made available in this manner does not create artificial feeding habits and that the food is fully utilized by the wildlife.

In addition to the grain cropping carried on under cooperative methods, food patches, scattered about the refuge area, are planted by refuge personnel using refuge equipment. The refuge farming plan for this season contemplates the planting of from 100 to 125 acres of grain crops, including barley, proso millet and buckwheat, all of which will be left standing.

In connection with the refuge farming plan weed eradication is also carried on as much as possible by intensive cultivation during the summer season. During the 1944 season 70 acres were treated and during the 1945 season 50 acres were treated under this method. The area treated in 1944 produced a very good crop in 1945.

IV. ECONOMIC USE OF REFUGE

A. Grazing

There are four grazing areas on the refuge comprising a total of some 38,500 acres. The existing rental rates are on the basis of 50¢ per head per month for adult cattle, 35¢ per head per month for yearlings and no charge for calves running with their mothers.

Nine grazing permits were issued last year for 651 animal use months. The demand for grazing lands has always been far below the carrying capacity of these lands. The outlook at the present time indicates that the demand will be about the same as last year.

B. Haying

There are some 1600 acres of hay lands, scattered about the refuge area, of which 670 acres were utilized last year and which produced 355 tons of hay. The demand for refuge hay varies with the seasons and is governed by

the abundance or scarcity in the neighborhood of the refuge area. Owing to the isolated location of the refuge, there is no demand for refuge hay except by neighboring farmers.

The existing rental rates are on the basis of $1.00 per ton on stump for clean stands and 50¢ per ton on stump for stands with heavy mixture of dead grasses.

This season is rather on the dry order and if it continues to be dry throughout the spring, the demand for the refuge hay will be somewhat greater than last year.

C. Fur Harvest

Permits were issued to six persons to trap predatory animals during the regular open season in the State, to eleven persons to trap muskrats and seven persons to trap beaver during the open season last December; and to five persons to trap beaver during a special open season in April.

All of the trapping was done on a share basis and the trappers were confined to the trapping of the species specified in their permits.

Under this trapping program 239 mink, 45 skunk, 60 weasel, 1 coyote, 1 raccoon, 2748 muskrats, and 41 beaver were taken.

This compares to a take of 315 mink, 30 skunk, 12 weasel, 1 coyote, and 2671 muskrats during the previous year.

The following is a comparative statement showing the returns to the trappers and to the Government for those furs which have been sold:

Permittees' Returns

Permittee	Permit No.	Kind	No.	Net Average Price	Date Sold	Buyer
Peter Becklund	T-3451	Mink	10	29.50	Nov-Jan	Local
		Weasel	6	1.66	Nov-Jan	Local
		Skunk	2	2.30	Dec. 20	Local
Selmer Bratteli	T-3462	Mink	17	30.25	Nov-Jan	Local
		Weasel	8	1.85	Nov-Jan	Local
		Skunk	5	2.30	Dec. 20	Local
Oscar Christenson	T-3459	Mink	19	33.10	Nov-Jan	Local
		Skunk	2	2.30	Dec. 20	Local
* Martin Holte	T-3450	Mink	25	30.50	Nov-Jan	Local
		Weasel	8	2.19	Nov-Jan	Local
		Skunk	3	2.30	Dec. 20	Local
* Leonard Haack	T-3453	Mink	26	30.50	Nov-Jan	Local
		Weasel	5	2.19	Nov-Jan	Local
		Skunk	5	2.30	Dec. 20	Local
* Francis Haack	T-3452	Mink	23	30.50	Nov-Jan	Local
		Weasel	2	2.19	Nov-Jan	Local
		Skunk	6	2.30	Dec. 20	Local
Oscar Christenson	T-2294	Beaver	1	70.00	Dec. 27	Local
Rude Christenson	T-2293	Beaver	2	55.00	Dec. 24	Local
John Cwikla	T-2290	Beaver	½	33.50	Dec. 21	Local
Leonard Haack	T-2295	Beaver	3	42.00	Dec. 24	Local

The beaver sales returns shown above covers the take of Dec.,1945

** Leonard Haack	T-2332	Beaver	3	53.33	Apr. 22	Local
** Martin Holte	T-2329	Beaver	3	53.33	Apr. 22	Local

The beaver sales returns shown above cover the take under two of the April permits. No returns have as yet been received from the other permittees.

* Sold as one lot
** Sold as one lot

All of the trappers received ceiling price of $2.30 for all of their muskrat pelts from local buyers.

Government's Returns

Mink	79	34.20	Jan. 10	N.Y.Auction Co.
Mink	18	26.55	Jan. 28	N.Y.Auction Co.
Beaver	6	42.27	Jan. 28	N.Y.Auction Co.
Beaver	½	33.50	Dec. 21	Local
Skunk	22	2.30	Dec. 20	Local

Unsold furs at the New York Auction Company Fur House:

40 Mink
31 Weasel
1 Badger
1386 Muskrats

Detailed information on trapping and fur activities are shown on the accompanying Form NR-4.

VI. PUBLIC RELATIONS

B. Refuge Visitors

The following Service employees visited the refuge during the reporting period on the dates set opposite their names:-

Arthur Huey	Regional	Jan. 18
John Wright	Regional	Jan. 18
Arthur Huey	Regional	Apr. 9-13
John Wright	Regional	Apr. 9-13

F. Violations

Four apprehensions were made on April 15 on the grounds of illegal fishing on the refuge. The violators were taken before the Justice of the Peace at Middle River on April 16 where they pleaded guilty and each received a fine of $10.00 and $3.50 costs.

Carl B. Vogen
Refuge Manager

Completed NR Forms attached

APPROVED
REGIONAL DIRECTOR
MAY 14 1946

Unsold furs at the New York Auction Company Fur House:

40 Mink
31 Weasel
1 Badger
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Detailed information on trapping and fur activities are shown on the accompanying Form MR-4.

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Carl B. Vogen
Refuge Manager

Completed MR Forms attached

APPROVED
REGIONAL DIRECTOR
MAY 1 4 1946

Form NR-1

MIGRATORY BIRDS

Refuge Mud Lake National Wildlife Refuge Months of January to April, 1946

1612

(1) Species	(2) First Observed		(3) Became Common	(4) Peak Concentration		(5) Last Observed		(6) Young Produced			(7) Total
Common Name	Number	Date	Date	Number	Date	Number	Date	No. Broods Obsvd.	Avg. Size	Esti-mated Total	Number Using Refuge
Holboell's Grebe	1	4/19/46	4/22/46	333	5/1/46						333
Pied-billed Grebe	1	4/12/46	4/15/46	670	5/1/46						670
Double-crested Cormorant	11	4/19/46	4/30/46	209	5/1/46						209
Great Blue Heron	2	3/27/46	4/4/46	293	4/20/46						293
Common Canada Goose	20	3/21/46	4/1/46	1,000	4/20/46						8
Common Mallard	50	3/20/46	3/27/46	11,374	5/1/46						11,374
Common Black Duck	2	4/1/46	--	--	--						167
Gadwall	2	3/28/46	4/4/46	1,296	5/1/46						1,296
Baldpate	15	4/8/46	4/12/46	4,434	5/1/46						4,434
American Pintail	2	3/20/46	3/27/46	3,000	4/20/46						1,542
Green-winged Teal	2	4/23/46	--	--	--						42
Blue-winged Teal	6	4/10/46	4/19/46	12,289	5/1/46						12,289
Shoveler	1	4/8/46	4/15/46	1,585	5/1/46						1,585
Wood Duck	1	4/19/46	--	--	--						80
Redhead	2	4/18/46	4/19/46	1,335	5/1/46						1,335
Ring-necked Duck	2	4/1/46	4/4/46	1,667	5/1/46						1,667
Canvas-back	2	4/9/46	--	--	--						33
Lesser Scaup Duck	12	3/27/46	4/4/46	5,494	5/1/46						5,494
American Golden-eye	50	3/26/46	4/1/46	2,000	4/10/46						--
Buffle-head	5	3/27/46	4/4/46	2,000	4/10/46						80
Ruddy Duck	1	4/25/46	4/30/46	418	5/1/46						418
American Merganser	1	3/18/46	3/20/46	1,500	4/10/46						--
Coot	1	4/4/46	4/15/46	4,771	5/1/46						4,771

REMARKS: (Pertinent information not specifically requested)

INSTRUCTIONS

Form NR-1 - MIGRATORY BIRDS (Include species in families Gaviidae through Strigidae; also doves and woodcocks)*

In case a resident form occurs, such as mottled duck on the Gulf Coast, use only the columns that apply.

(1) SPECIES: Use correct common names as found in the A.O.U. Check List, 1931 Edition, and list in A.O.U. order. General terms are to be avoided, such as "scaup", "teal", etc.; use "green-winged teal" or "lesser scaup".

(2) FIRST OBSERVED: The first refuge record for the species during spring migration, fall migration, wintering, or summering, and the number observed. In the case of resident species this column may be disregarded.

(3) BECAME COMMON: The date the species became common on the refuge.

(4) PEAK CONCENTRATION: The greatest number of the species present on any one date or limited interval of time.

(5) LAST OBSERVED: The last refuge record for the species during the spring or fall migration, wintering, or summering, and the numbers observed exclusive of obvious cripples or non-migrants.

(6) YOUNG PRODUCED: Estimated number of young produced based upon 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 are to be omitted.

(7) TOTAL: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the manner in which birds come through; i.e., in waves or all at once. On refuges representing the terminus of the flight lane, the figures would probably be the same in many cases.

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

Form NR-2 UPLAND GAME BIRDS 1613

Refuge Mud Lake National Wildlife Refuge Months of January to April, 1946

(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'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifioally requested. List introductions here.
Prairie Chicken	Shown in previous report	400							25	
Hungerian Partridge	"	526							19	
Sharp-tailed Grouse	"	267							112	
Ruffed Grouse	"	81							37	
Ring-necked pheasant	"	170							180	

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.

Form NR-3

BIG GAME

Refuge Mud Lake National Wildlife Refuge Year 1946

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population as of Dec. 31	(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Losses	Number	Source		Percentage
White-tailed Deer	Shown in previous report												350
Moose	Shown in previous report												12

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: Applies particularly to those species considered in removal programs (public hunts, etc.) exclusive of fenced herds. Detailed data may be omitted for species occuring 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 <u>each species</u> on the refuge as of December 31.

(8) SEX RATION: Indicate the percentage of males and females of each species as determined from field observations or through removals.

Form NR-4

SMALL MAMMALS

Refuge Mud Lake National Wildlife Refuge April 30, 1946

(1) Species	(2) Density		(3) Removals					(4) Disposition of Fur							(5)
								Share Trapping							
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control	For Re-stocking	For Research	Permit Number	Trappers' Share	Refuge Share	Total Refuge Furs Shipped	Refuge Income	Furs Donated	Furs Destroyed	Total Population
Striped Skunk	Refuge area				6			T-3450	3	3					
					4			T-3451	2	2					
					12			T-3452	6	6					
					10			T-3453	5	5					
					4			T-3459	2	2					
					9			T-3462	5	4					
					45				23	22	22	50.60			75
Mink	Marsh and water approximately 20,000 acres				50			T-3450	25	25					
					20			T-3451	10	10					
					46			T-3452	23	23					
					52			T-3453	26	26					
					37			T-3459	19	18					
					34			T-3462	17	17					
					239				120	119	119	incom-plete			50

REMARKS: (Continued on next page)

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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. "List of North American Recent Mammals" by G. S. Miller, Jr., a very good reference, is now out of print, although a revision is scheduled for publication in the near future.)

(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, 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. Also show any removals not falling under heading 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 and the total income to the refuge by species, including share-trapped furs and furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimness 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.

Form NR-4

SMALL MAMMALS (Continued)

Refuge Mud Lake National Wildlife Refuge April 30, 194 6

(1) Species	(2) Density		(3) Removals					(4) Disposition of Fur						(5)
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control	For Re-stocking	For Research	Permit Number	Trappers' Share	Refuge Share	Total Refuge Furs Shipped	Refuge Income	Furs Donated	Furs Destroyed	Total Population
Muskrat	Marsh and water approximately 40,000 acres			330				T-2275	165	165					
				187				T-2276	94	93					
				357				T-2277	178	179					
				177				T-2278	88	89					
				58				T-2279	29	29					
				301				T-2280	150	151					
				241				T-3496	120	121					
				398				T-3497	199	199					
				226				T-3498	113	113					
				103				T-3499	51	52					
				330				T-3500	165	165					
				* 3				T-3460		3					
				* 5				T-3462		5					
				** 2				T-2332		2					
				***30				Refuge		30	1396				
				2748					1352	1396					

REMARKS: * Muskrats accidentally caught by predatory animal trappers
** Muskrats accidentally caught by beaver trappers
*** Muskrats caught by ref[illegible] personnel

(Continued on next page)

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. "List of North American Recent Mammals" by G. S. Miller, Jr., a very good reference, is now out of print, although a revision is scheduled for publication in the near future.)

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(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year. Also show any removals not falling under heading listed.

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(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.

Form NR-4

SMALL MAMMALS (Continued)

Refuge Mud Lake National Wildlife Refuge April 30, 1946

(1) Species	(2) Density		(3) Removals					(4) Disposition of Fur							(5)
								Share Trapping							
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control	For Re-stocking	For Research	Permit Number	Trappers' Share	Refuge Share	Total Refuge Furs Shipped	Refuge Income	Furs Donated	Furs Destroyed	Total Population
Beaver	Marsh and water approximately 40,000 acres			1				T-2290	½	½					60
				4				T-2293	2	2					
				2				T-2294	1	1					
				6				T-2295	3	3					
				5				T-2328	2	3					
				5				T-2331	2	3					
				6				T-2330	3	3					
				6				T-2329	3	3					
				6				T-2332	3	3	6½	287.15			
				41					19½	21½					
Weasel	Refuge Area				17			T-3450	8	9					30
					12			T-3451	6	6					
					4			T-3452	2	2					
					10			T-3453	5	5					
					17			T-3462	8	9	31	—			
					60				29	31					
Coyote	Refuge Area				1			T-3450	1						10
Badger	Refuge Area				1			T-3452		1					20
Raccoon	Refuge Area				1			T-3452	1						10

REMARKS:

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. "List of North American Recent Mammals" by G. S. Miller, Jr., a very good reference, is now out of print, although a revision is scheduled for publication in the near future.)

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ANNUAL SUMMARY REPORT

A. General Conditions

Again the time has come to stop routine activities momentarily and evaluate one's accomplishments during the past year.

Major changes effecting refuge activities resulted from the termination of the war, especially the establishment of the 40-hour week. Experience has shown that the short work-week now in effect is highly undesirable on a refuge, both from the standpoint of administration and maintenance. The nature of the refuge work is more or less on a twenty-four-hour basis, and, obviously, the short work week does not fit at all, to say the least. Personally, I would much prefer a 44-hour-week even on the basis of no pay for the extra four hours.

Excellent local public relations prevailed throughout the year and the refuge maintained its prestige as an outstanding wildlife area and as an important economic unit in the community. Local people derive a considerable income from products, such as furs, grazing, wild hay, wood for fuel, and cattail fluff.

B. Water Conditions

The runoff this spring took place in an orderly manner and with a minimum damage to the water control structures and dikes. The badly eroded dikes which resulted from the previous year's runoff were repaired during the summer and fall of 1945 and will require minor repairing during the present season.

C. Wildlife

1. Migratory Water Birds

The duck population on the refuge during the past summer and early fall was substantially larger than during the corresponding period for the previous year, but the peak of concentration during the fall season was about 20% below the previous year, due to the fact that the influx of Northern ducks was a great deal less.

The influx started August 15 and the peak of concentration was reached about October 15, at which time the duck population was estimated at 600,000. This compares with an estimated 750,000 for the previous year.

The Canada Honker population on the refuge last fall was about the same as the previous fall - about 5000. About a dozen or so remained on the refuge during the entire season; the balance came during the first part of October and remained until the first heavy freeze occurred on October 31, Periodic investigrations which were made during the past season did not reveal any nesting by the birds that remained on the refuge.

According to information obtained from local hunters, goose hunting in this area last fall was the best in more than 25 years.

There were no complaints from farmers last fall about ducks destroying their grain fields although some damage did occur.

The spring bird census taken during the first part of May, 1945 revealed a population of some 66,000 and the census taken during the first of May, 1946 revealed a population of around 48,000, or a drop of about 27%.

2. Upland Game Birds

There was very little change in the upland game bird population during the past year. It was and is low. This same condition prevailed throughout this part of Minnesota.

The present population on the refuge is estimated to be about as follows:- 25 prairie chickens, 20 Hungarian partridges, 100 sharp-tailed grouse, 40 ruffed grouse, and 200 ring-necked pheasants.

3. Big Game Animals

There was a slight increase in the deer population during the past year. The present population is estimated to be around 350 and the moose population to be from 12 to 15.

4. Fur Bearing Animals

Under the trapping program during the past year 239 mink, 45 skunk, 60 weasel, 1 coyote, 1 raccoon, 2748 muskrats, and 41 beaver were taken. This compares to a take of 315 mink, 30 skunk,

12 weasel, 1 coyote, and 2671 muskrats during the previous year.

All of the trapping was done on a share basis.

D. Economic Uses

1. Grazing

Nine grazing permits were issued during the year for 651 animal use months. During the previous year 500 animal use months were utilized. The demand for the refuge grazing lands has never exceeded 25% of the carrying capacity.

2. Haying

Nine permits were issued during the season covering about 670 acres of the 1600 acres of hay lands on the refuge, which produced 355 tons of wild hay. During the previous year fourteen permits were issued covering 800 acres which produced 480 tons of hay.

3. Agriculture Uses

Four cooperative farming permits, covering 440 acres, have been issued and it is expected that two more, covering about 120 acres, will be issued for the present season. The potential agriculture areas on the refuge comprise some 2200 acres. There has never been much demand for these lands for cropping purposes, due to their isolated location and the inferior quality of the lands.

From 100 to 125 acres will be planted by refuge personnel in addition to the cooperative farming during the present season. The balance of the lands in this category are kept in an open state by controlled burning.

4. Cattail Harvesting

Cattail fluff has been harvested on the refuge during the past three seasons. During the fall season of 1943, 681,000 pounds were harvested and all of the returns went to the pickers and processers. The 1944 crop was almost a total failure and only 16,593 pounds were harvested that year. The 1945

crop was a bumper, but the factory could only take a limited amount, due to the fact that the Government had stopped buying and the commercial market was very limited. 176,107 pounds were harvested in 1945. During the past two seasons the harvesting has been on the basis of $\frac{1}{4}¢$ per pound to the Government.

Carl B. Vogen
Refuge Manager

crop was a bumper, but the factory could only take a limited amount, due to the fact that the Government had stopped buying and the commercial market was very limited. 176,107 pounds were harvested in 1945. During the past two seasons the harvesting has been on the basis of ½¢ per pound to the Government.

Carl B. Vogen
Refuge Manager