ROUTING SLIP   DIVISION OF WILDLIFE REFUGES   DATE May 12 1943

✓ MR. SALYER ___
___ MRS. WOODIN ___
✓ MR. ELMER ___
___ MRS. GARVIN ___
___ MR. DUMONT ___

✓ SECTION OF HABITAT IMPROVEMENT:

Mr. Kubichek ___
Mr. Smith ___
~~Mr. Griffith~~ REG 6/3/43
~~Miss Cook~~ mwc 8-16-43

✓ SECTION OF OPERATIONS:

~~Mr. Krummes~~ 5/24
~~Mr. Gustafson~~ ___
Miss Baum ___
Mrs. Kricun ___

✓ SECTION OF ERA:

~~Mr. Regan~~ HJR 5/24/43
~~Dr. Bourn~~ WSB 8/13/43
Mrs. Fishman ___

✓ SECTION OF LAND MANAGEMENT:

~~Mr. Barnshaw~~
~~Mr. Ackerknecht~~ 5-21

___ STENOGRAPHERS:

Miss Wborley ___

✓ SECTION OF STRUCTURES:

~~Mr. Taylor~~ 6/7/43

REMARKS: UPPER SOURIS NATIONAL WILDLIFE REFUGE NARRATIVE REPORT

JANUARY - APRIL 1943

Summary Fiscal Year 1943

Return to: Miss Cook

NARRATIVE REPORT

OF

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

UPPER SOURIS NATIONAL WILDLIFE REFUGE

FOR

JANUARY TO APRIL

1943

submitted by

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REFUGE MANAGER

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UPPER SOURIS NATIONAL WILDLIFE REFUGE
Narrative report from January--April 1943

I. General

A. Weather conditions:

Month	Snowfall	Total Precip.	Maximum Temp.	Minimum Temp.
January	8.3"	.61"	39	-35
February	1.3"	.09"	42	-21
March	21.7"	1.64"	56	-20
April	T	2.20	77	17

The above weather data was obtained from an official weather station located 3 miles east of headquarters.

Mean Maximum temperatures for this report period in the past years are:

	Jan.	Feb.	March	April
1941	19.0	21.5	32.9	53.2
1942	30.0	22.4	39.0	56.0
1943	7.0	21.4	25.5	59.8

The Mean Minimum temperatures have been:

	Jan.	Feb.	March	April
1941	0.0	1.3	14.2	32.9
1942	7.8	3.0	20.0	32.0
1943	-11.5	6.3	7.2	30.3

Comparisons of precipitation for the past years are:

	Jan.	Feb.	March	April
1941	.39"	.12"	.74"	1.51"
1942	.34"	.25"	1.81"	1.35"
1943	.61"	1.30"	1.64"	2.20"

In comparing the data of the above tables, one will note it has been consistently colder during this report period than in the years previous. Likewise the precipitation was much greater during the period than during the same period of previous years.

The month of January was exceptionally cold, with approximately one foot of snow on the ground during the month. The month of February was somewhat warmer and we experienced a thaw around February 20. However, as the month of March approached, the weather turned bitter cold and continued cold until on March 13th a blizzard started that lasted five days. The snow was accompanied by one of North Dakota's famous high

winds. After the blizzard subsided, we found that approximately 21.7" of snow had fallen, the greater part of which was piled in coulees and snow banks. The spring thaw began on March 22nd and continued unbroken until all snow and ice were melted. April was moderate, but high winds prevailed the greater part of the month. We had two good spring rains totaling approximately 1½", which should be of considerable help to grazing and crop lands.

B. Water Conditions:

All units were frozen over on January 1, with ice approximately 33" thick. The water gauge readings on the various pools were stationary until March 23rd, when the spring thaw began. Water gauge readings for the various pools prior to the breakup were as follows:

Unit	Gauge Reading	Pool Elevations	Spillway Crest	Remarks
96	15.19	1577.19	1577.00	Gate closed.
87	15.19	1577.19	1578.00	Gate wide open.
83	15.90	1592.90	1598.00	Gate closed.
41	15.80	1592.80	1596.50	Gate open.

The water levels in the various units began to raise as the spring run-off got under way. Mr. Brice McBride and Mr. Robert Dougall took full charge of regulating control gates on the refuge during the run-off period, changing gate openings as they deemed necessary. The peak of our run-off came on April 22nd when the water in # 83 pool reached an elevation of 1599.90. Approximately 2700 cubic feet of water per second was being passed over the spillway, since the control gates were closed on the 21st, allowing the spillway to carry the entire discharge. Water gauge readings on the various units on April 22nd were as follows:

Unit	Gauge Reading	Pool Elevations	Spillway Crest	Remarks
96	16.38	1578.38	1578.00	Gate wide open.
87	18.38	1580.38	1578.00	Gate wide open.
83	22.90	1599.90	1598.00	Gate closed.
41	23.00	1600.00	1596.50	Gate wide open.

(Note: water gauge on dam # 41 had a high reading of 23.04 on April 20)

The run-off had gradually decreased until the water level elevation of pool # 83 was 1596.80 on April 30. The peak water passed Sherwood gauging station on April 12th at which time they were passing 5040 cubic feet per second. To date (April 30) approximately 170,000 acre feet of water had passed Sherwood. The present figures would indicate

that there was 66,000 acre feet of water in Lake Darling prior to the local run-off. The spring run-off in Lake Darling by April 1st amounted to 8,000 acre feet, leaving but 38,000 acre feet of storage below spillway crest. The control gates on # 83 were opened to various heights on various dates after April 1st, and the spillway began to function on April 16th. As of this date 96,000 acre feet of water has passed out of Lake Darling, leaving 126,400 acre feet in the present Lake Darling storage reservoir. The above figures on acre feet are approximate, however, they are quite accurate.

C. Fires:

Field conditions during the latter part of the month of April were ideal for prairie fires, and the hazard was increased by exceptionally high winds.

On April 15, a fire started on the refuge near Johson sub-headquarters. It is believed to have started from sparks coming from the chimney of the residence. All refuge personnel were at Refuge Headquarters at the time the fire was reported; therefore, the fire was well spread by the 50 mile per hour northwest wind by the time we were able to drive to sub-headquarters. The fire was brought under control and eventually extinguished by running side line fires into the Soo Line Railway cut on the west, Lake Darling on the east, and by setting backfires north of U.S. Highway # 28 at Greene. Upon reviewing the area after the fire, we found the following fire damage:

1. 310 acres refuge grazing land burned over.
2. 150 acres refuge brush land burned over.
3. 180 acres refuge abandoned farm land burned over.
4. 120 acres non refuge stubble land burned over.
5. 310 acres non refuge grazing land burned over.
6. Five Soo Line telegraph poles burned off.
7. All rail snow fence between sub-headquarters and Greene on the west side of pool # 33 destroyed.
8. The 12'x12'x9' icehouse located at sub-headquarters completely burned.
9. Salvaged lumber piles (sold to various bidders) burned, valued at approximately $140.00.

II Wildlife

A. Migratory Birds:

1. Population and Behavior

Migratory birds in general are now present in large numbers on the refuge area and its immediate vicinity. At

Form NR-1

MIGRATORY BIRDS

Refuge Upper Souris National Wildlife Months of January to April, 194 3

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
Mallard	Winter resident			24,000							24,000
Pintail	20	Mar. 20		40,000							40,000
Gadwall	2	Apr. 6		9,000							9,000
Baldpate	5	Apr. 15		7,000							7,000
Black duck	Not yet observed										
Green-winged teal	2	Apr. 17		3,000							3,000
Blue-winged teal	10	Apr. 20		6,000							6,000
Shovellers		Apr. 17		5,000							5,000
Redhead	3	Apr. 6		1,500							1,500
Canvas-back	1	Apr. 7		4,500							4,500
Scaup	100	Apr. 1		10,000							10,000
Goldeneye	3	Apr. 5		1,200							1,200
Buffle-head	3	Apr. 10		1,500							75
Ruddy duck	100	Apr. 20		1,500							1,500
Canada goose	25	Apr. 5		2,000							100
White fronted goose	100	Apr. 5		2,000							25
Snow and blue geese	5	Apr. 5		200							--
Whistling swan	4	Apr. 2	Apr. 10	75	Apr. 20						15
Cormorant	3	Apr. 10	May	Not yet reached							75
Pelican	10	Apr. 7	Apr. 20	1,000	May 1						1,000
American bittern	1	Apr. 20		Not yet reached							
Sandhill crane	75	Apr. 5	Apr. 10	600	Apr. 15						50

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-1

MIGRATORY BIRDS

Refuge Upper Souris National Wildlife Months of January to April, 1948

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
Black-crowned night heron	8	May 3		Not yet reached							50
Coot	4	Apr. 20	May	Not yet reached							1,000
Eared grebe		Apr. 25	May 1	Not yet reached							500
Horned grebe		Apr. 25	May 1	Not yet reached							200
Pied-billed grebe		Apr. 25	May 1	Not yet reached							300
Ring-billed gull	100	Apr. 2	Apr. 15	7,000	May 1						5,000
Herring gull		Apr. 7	Apr. 15								500
Franklin's gull	10	April 27	May 1	Not yet reached							
American merganser		Mar. 29	Apr. 5	2,000	Apr. 15						2,000
Red breasted	2	Apr. 10	Not common								200
Hooded merganser	Not yet observed										
Marbled godwit	2	Apr. 21									500
Western willet	2	Apr. 26									500
Greater yellowlegs	4	Apr.									500
Lesser yellowlegs	10	Apr. 14									2,000
Killdeer		Apr. 8									10,000
Crow	2	Mar. 23									
Swainson's hawk	2	Apr. 8									
Marsh hawk	3	Mar. 25									
Red-tailed hawk	1	Apr. 10									
American rough legged	1	Mar. 10									
Ferruginous rough legged	1	Mar. 21									

REMARKS: (Pertinent information not specifically requested)

INSTRUCTIONS

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

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

Form NR-1

MIGRATORY BIRDS

Refuge ~~Upper Souris National Wildlife~~ Months of ~~January~~ to ~~April~~, 194~~3~~

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
Sparrow hawk	3	Apr. 2									
Duck hawk											
Bald eagle	Winter	resident									
Golden eagle	Winter	resident									
Common redpoll	100	Mar. 4									
Prairie horned lark	5	Mar. 9									
Slate colored junco	15	Apr. 1									
Tree sparrow	20	Mar. 28									
Song sparrow	2	Apr. 9									
Vesper sparrow	3	Apr. 9									
Purple grackle	5	Apr. 10									
Robins		Apr. 2									
Red winged blackbird		Apr. 6									
Meadowlark		Apr. 3									
Yellow headed blackbird		Apr. 25									
Belted kingfisher		Apr. 10									
Mourning dove		Apr. 21									

REMARKS: (Pertinent information not specifically requested)

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is estimated that they have shown an increase amounting to five or ten per cent. This increase is well distributed among the different species. The spring migration, as could be expected, progressed much as in past years. Arrival dates and dates of peak concentrations conform very much with records of previous years.

High water levels have caused the flooding of much of the bottom land between the refuge and Minot. There is also an increase in the number of flooded potholes and borrowpits in the vicinity. This condition has resulted in the diversion of many ducks from the refuge area. In the case of the mallard, pintail, and blue-winged teal, nearly as many of these birds are found in the immediate vicinity as are actually on the refuge proper. Many of these birds will likely move onto the refuge with the recession of high water levels.

At present the water units south of dam # 83 do not contain as many birds as are present during summer nesting. This shortage is more than compensated for by the large flocks congregated on the flooded refuge fields in the north portion of the refuge.

The more important species of waterfowl now on the refuge listed in descending order of importance are as follows: pintail, mallard, scaup, gadwall, baldpate, blue-winged teal, canvas-back, shoveller, green-winged teal, redhead, ruddy duck, buffle-head, Canada goose, American golden-eye, black duck, mergansers, grebes, cormorant, and whistling swans.

The most noteworthy increase for a single species was observed for the scaup--the increase being estimated at 20%. Increases were recorded for all of the diving ducks with the exception of the redhead and the ring-necked duck.

Canvas-backs showed an increase of 10% as did the ruddy duck, buffle-head, and golden-eye. The ruddy duck, a late migrant, is now appearing in good numbers. The buffle-head and golden-eye have not been recorded as nesting here, and most of these birds have already left the refuge. The peak of their migration was reached at about April 18.

Increases of 10% were observed for the pintail and mallard. These two species make up the bulk of the refuge summer population.

The green-winged teal has shown an encouraging increase of 10%, but is still not present in any great number.

Baldpates, blue-winged teal, and gadwall remain about the same as last year. The peak of their migration is not believed to have arrived yet, as they are increasing daily.

The divers are well distributed over the refuge and are utilizing regions where submerged aquatics are found and newly flooded land, to some extent. The puddlers are naturally concentrated over areas where fields have been flooded, and are found feeding in these places in large numbers.

Geese and whistling swans passed over the area in approximately the same numbers as last year. The migration of these birds through here is not particularly heavy. The swan population at no time this spring was believed to have exceeded 75 birds. Canada and white fronted geese are the main species observed. Apparently the snow and blue goose migration detours around this area altogether, as only a very few of these birds are noted.

Apparently there will be a few full winged geese remain on the refuge to nest with the pinioned birds. One in particular, believed to be a repeater from last year, has been observed to be mated with a pinioned goose for the past three weeks. This is the goose known publicly as "Oscar".

One duck nest has been found to date. This was a mallard's nest containing two eggs. Courtships have been observed for some time, and nesting will soon be in full swing.

The mallard was the only duck that remained on the refuge through the winter. Approximately a thousand remained south of dam # 83 using the open water of the connecting channels. Approximately thirteen hundred remained in the vicinity of north sub-headquarters using the open spots on the river channel. It was not necessary to feed these birds as the winter was fairly open, permitting them to obtain feed in the refuge fields and fields outside the refuge. Shocks of grain left standing in the north portion of the refuge were well utilized, especially when snow made other feed unavailable.

SHOREBIRDS AND OTHER WATERBIRDS

To date the shorebirds have not appeared in any great numbers. So far the lesser and greater yellowlegs, western willet, marbled godwit and the killdeer have been recorded. None of the sandpipers have been observed, nor have the plovers, avocets, or phalaropes have been seen.

Several large flocks of sandhill cranes were observed during April. Some of these flocks numbered a hundred birds or so to a flock. Though these used the refuge to some extent, their presence was temporary, and none have been observed for some time.

Gulls are now quite numerous. About two thousand ring billed gulls have been congregated at the spillway of dam # 83, being attracted there by large numbers of minnows and suckers swimming against the spillway flow.

Several hundred pelicans have also been attracted to this spot, and can be observed busily at work scooping up fish.

Cormorants are not yet numerous on the refuge, though a few have been observed. The first American bittern was seen on April 20, and the first black crowned night heron on May 3. No great blue herons have yet appeared.

Mourning doves have been present since April 21, but are not particularly numerous.

2. Food and Cover

Due to the rise in water levels, much of last year's refuge crop land has been flooded, presenting ideal conditions for waterfowl feeding. As has already been mentioned, there is considerable flooded crop land off the refuge, which is also being heavily utilized by waterfowl.

Several of the flooded refuge crop lands will be too wet to farm this season, but other fields will be opened on higher ground to replace them. These fields are abandoned farm lands that are not yet coming back into grass.

The submerged aquatics appear to be attractive to the divers, and they can be observed busily feeding in areas where they are present. Seeds washed up along the shores are also attracting birds.

It is to be expected that natural marsh vegetation will be deficient in many new water areas of moderate depth. This condition will be remedied if water levels are maintained constant. Natural restocking was begun in some of these areas last year. If possible, supplementary plantings should be made in these areas.

The condition of the marshes south of dam # 83 is excellent.

The feeding done during the last report period was mainly that of soft corn and damaged barley. A limited amount of other grains was fed also. The grains were all well utilized.

3. Botulism

No positive evidence of botulism was discovered during the past report period. However, two mallards were picked up in January that were suspected to be infected. These birds were in good flesh, and examination failed to show evidence of shot wounds or lead poisoning. An attempt to secure more of these birds to send in for more thorough examination was unsuccessful.

As high water levels and spring winds have beached nearly all of the debris in the Lake Darling area and left it high and dry with the recession of the lake, it is expected that there will be no occurrence of botulism in that area this year. This same process has been in effect on the other areas of the refuge also. It is possible that outbreaks could occur in the extreme north region on newly flooded lands. However, conditions favorable for an outbreak have existed there previously without any botulism occurring.

4. Lead Poisoning and Other Diseases

It is believed that no cases of lead poisoning occurred here. There are no areas where the birds obtain gravel that have been shot over to the extent that there is much possibility of them securing any lead. Several dead emaciated birds were examined and found to carry shot wounds from the past hunting season.

Immediately following the March storm, several dead ducks were found in the north part of the refuge. A few were found dead in the road, and were believed to have been killed by striking trees or wires. Other birds were found near a strawpile. These were in poor flesh, and it is thought that they were weakened birds that were unable to survive the rigors of the storm. The exact extent of this type of loss is not known, but it is not thought to be excessive.

B. Upland Game Birds:

1. Population and Behavior

The refuge supports good populations of upland game birds, though not nearly so many as have been previously reported. This may be due to a difference of opinion concerning the number of birds using the refuge temporarily.

It is believed that there is little or no competition between species of birds on this area at present. As is known, the topography of the refuge and vicinity is much varied and well suited to accomodate different species of upland game birds.

Form NR-2 UPLAND GAME BIRDS 1613

Refuge Upper Souris National Wildlife Months of January to April, 1943

(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 specifically requested. List introductions here.
					Cocks-Hens					
Pheasant		1.8			3:2		35		12,000	These figures show considerable reductions over last fall's estimates. However, these are based on careful observation and are believed accurate. The pheasant population was determined by covering 7 sections of the most densely populated pheasant cover--number of birds by actual count and allowances was 2300. Giving approximately 1 bird to 2 A. This was applied to the entire refuge and considerable allowance made for birds using the refuge temporarily. The figures for the other species were arrived at in much the same manner though the information is not so detailed. About half of the grouse population uses the refuge only temporarily, and the partridge population is more or less constant.
Sharptailed grouse		14.0							1,500	
Pinnated grouse		141.0							150	
Hungarian Partridge		26							800	
	1. Prairie hills with brushy and wooded coulees. 17,000 A. 2. Bottomland, diversified, weedy, farmed, wooded and grassy. 4,200 A.									

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.

1613

Pheasants, though numerous, are not sufficiently so to exert any unfavorable pressure on other species in their preferred range. They are most numerous on the cropped bottomlands of the refuge. As the Hungarian partridge, and the sharptailed and pinnated grouse prefer other types of habitat for nesting, there is no strife at this point.

The partridge is not common on the refuge, preferring the upland farmland of the vicinity. The sharptailed and pinnated grouse occur more on the upland areas, especially in areas near brush patches and brushy coullees.

The number of true prairie chickens or pinnated grouse in this vicinity is not large. From actual counts of over five hundred birds during the past season the ratio of pinnated grouse to sharptailed grouse was concluded to be 1:40. The ratio is a little more favorable on the refuge proper, as the pinnated grouse are attracted to the reverting natural prairie of the refuge more than are the sharptails.

Several flocks of grouse numbering up to 50 birds were observed feeding on the refuge during the winter. However, they were at all times more numerous on the upland areas surrounding the refuge.

Nesting of all upland game birds is observed to be in progress. Birds have been mated and courting for some time. Partridge were first noted to be paired off on March 9. At about this time pheasant cocks started having their spring bouts.

2. Food and Cover

Food and cover conditions of the refuge are excellent for the different species. The refuge croplands are in all cases ideally situated with regard to proximity to good cover. This is emphasized by the fact that during the recent severe snow storm there was no loss of birds. Other parts of the state reported large losses from this storm.

The winter on the whole was open and consequently favorable for all types of game. Food was available to the pheasants all winter with the exception of the storm period, which greatly curtailed or stopped feeding activities altogether. Several times the birds were forced to work down through several inches of snow to obtain food, but this bothered them little. Where shocked grain was present, it was heavily utilized during these periods, both by upland game and waterfowl.

No artificial feeding was carried on until near spring. At this time, soft ear corn, damaged barley and smaller amounts of other grains were put out. This was available to waterfowl and upland game.

During the winter, pheasants were observed on several occasions to scratch up the litter washed up along the shoreline by wave action. Here they secured seeds of aquatic plants and some weed seeds. This practice was resorted to mainly by the birds that wintered some distance from croplands.

In February a small amount of feed was distributed in piles to attract pheasants for state trappers. The trapping carried on for two weeks in early March was rather unsuccessful with less than 50 birds being removed.

3. Disease

No cases of death directly attributable to disease were found. During the one period when losses could normally be expected, no fatalities were observed. This was during the already mentioned five day storm period. No losses were noted, and attempts to find any dead birds after the storm were unsuccessful. No doubt a few weakened and aged birds succumbed to the storm.

C. Big Game Animals:

1. Population and Behavior

At present, the whitetailed deer population as determined by airplane census is 420 animals. This census was conducted by the North Dakota State Game and Fish Department. The figures include only those animals actually observed between the north and south boundaries. Naturally there are more animals in the valley, both immediately south and north of the boundaries.

This number is a substantial increase over last year's census. The following is a comparison of the populations since the inauguration of the state airplane census here:

Year	Population
1941	288
1942	340
1943	420

To date no evidence of intraspecific strife has been noted. The winter was open enough that the deer were able to move about freely all winter. All observed were in good condition.

Though most of their food was browse, many utilized the shocked grain on the refuge and foraged around nearby granaries and strawpiles getting what grain they could find.

With the flooding of large areas of bottomland in the north portion of the refuge, a great deal of good deer range was lost. This is the area of heaviest concentration, and the deer have been even more heavily concentrated in the remaining suitable cover.

Because of this reduction in range, and also because of the constant increase in population, it has been recommended that the deer population be reduced next fall by opening portions of the refuge to hunting. This will safeguard against the possibility that a severe winter would force the large numbers of deer into small areas where they would soon deplete their food supply and face starvation. The recommendation suggests reduction to 200 deer, which number should satisfactorily survive a severe winter.

On one occasion a pair of coyotes was observed to drive a herd of 5 deer across pond B with the possible thought of circling them and getting one down on the ice. When they failed to do so, they ceased driving them after the deer had reached shore. No deer dead from any cause were discovered.

Rutting began in October, and many of the saplings still bear the scars where the bucks polished their antlers. No fawn are believed to have been dropped yet, though several does observed were obviously heavy with fawn. The sex ratio in this area is approximately 1:1.

It has been noted that the deer in this area are rather late shedding their antlers. Practically all bucks retain their antlers until after mid-February. One extreme case was a buck noted on April 10 still carrying both antlers.

Two mule deer have been observed on the refuge in past years. On February 5 a buck was seen at a distance, he was recognized almost positively as a mule deer by the formation of the antlers.

2. Food and Cover

As has been mentioned in the foregoing, food and cover are satisfactorily sufficient for the present number of deer providing the winter is open. However, with the reduced cover area and constantly increasing numbers, the entire population would be endangered by a severe winter.

No actual artificial feeding has been carried on, although deer were quick to utilize any of the shocked grain left in the refuge fields.

There is a good variety of browse in the coulees and river bottoms. Inspection of browsing areas showed little preference as to food plants. Roses, ash, elm, and buck brush were utilized. Willow and dogwood were utilized where they were available.

3. Disease

No losses of big game animals were noted during this period.

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

The refuge is well populated with the various fur bearers of the locality.

With the increase of water areas and stabilization of levels, the muskrat can be expected to become much more numerous. At present their numbers are insignificant in view of the amount of water area suitable for their use. A fair population of seed stock is distributed over the refuge, and after an encouraging increase last year, this important fur bearer may soon be expected to increase to a point where it will be bale to take an annual harvest. As the area to be populated is large, this will likely take three, or at the least two more seasons. At present, muskrat trapping is done solely in the units south of # 83 where they are damaging control structures.

When the newly created marshes from Greene north become stocked with emergent vegetation, the muskrat will be important in making openings in the marsh with his house building activities. This will serve to make the area more attractive for the nesting of diving ducks and will also provide nesting and preening spots for birds.

Beaver are at a desirable point at present. It is now possible to remove an annual harvest of this valuable animal.

In early March a beaver census was made covering the area between dam # 83 and the south boundary. In this area all of the beaver were found on the timbered river channel. The active lodges were established by the presence of the cache of fresh saplings and cuttings in front of the lodge. The census was made on ice skates at a time when all of the green caches would be located by the portions protruding above the ice.

Form NR-4

SMALL MAMMALS

Refuge Upper Souris Refuge April 30, 1942

(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
1-Skunk	1 and 2	65		76				8260							1- 510
2-Weasel	1 and 2	125		42				Skunk	39	26	30	55.75			2- 300
3-Fox, Red	1 and 2	4000		1				Weasel	15	17	22	24.20*			3- 10
4-Coyote	1 and 2	850*		2				Mink	1	2	3	15.00			4- 45
5-Raccoon	1,2,4 and 5	300-500		2	found dead in road			8265		2	1	.50		1	5- 80
6-Mink	2,3,4,and 5	600		4				Muskrat	44	40	40	54.50			6- 55
7-Muskrat	3,4 and 5	Thinly populated 84						8297							7-1200
8-Beaver	4 and 5	5 per mile in river and few in lake		22				Skunk	7	4					8- 125
								Weasel	5	5					
								Mink	0	1					
								Fox,Red	1	0					
								Coyote	1	1	1				
								8606							
								Beaver	7	10	13	327.00			
								8621							
								Beaver	2	3					

1. Prairie hills (grama & needle grass) with brushy & wooded coulees. 17,000 A.
2. Bottomland; diversified, weedy, wooded, farmed, and grassy. 4,200 A.
3. True marsh. 3,200 A.
4. Miles of timbered river, 20/
5. Miles of open water shoreline near which there is little or no emergent vegetation.

Revised form rec'd 4-7-44

REMARKS: * Because of the physical nature of the refuge, coyotes from an area much larger than the refuge harbor here. Much of the marshland is in transition from bottomland, being newly flooded--hence the low muskrat density. Control trapping to protect structures has lowered population in best marsh. The populations estimated for skunk and weasel are based on the trapping removals for the area from headquarters south. As the removal was estimated to be about 60% complete for the area a total population was figured and applied to the entire refuge.

* Estimate of Section of Fur Resources.

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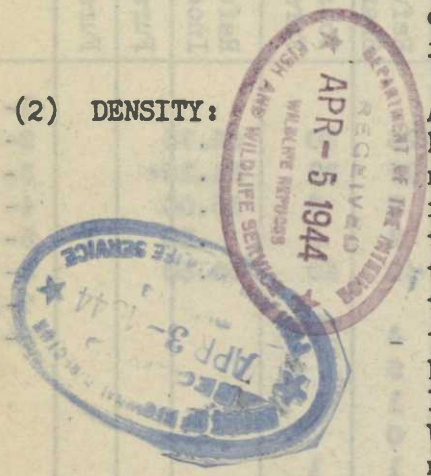
INSTRUCTIONS

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.

The area contained 9 active lodges. Going by the size of the cache, the number of animals to each lodge was estimated. These estimates were later proven very accurate in two instances where it was deemed advisable to trap off practically all the occupants of the lodge. From these estimates the population for the area was set conservatively at 50 beaver. This included about 10 river miles, making an average of 5 beaver to the mile. Seventeen of these beaver were removed.

Time did not permit coverage of the rest of the refuge, but conclusions drawn from the foregoing would indicate an additional 75 animals in the north portion of the refuge. Only five of these beaver were removed.

Raccoons have increased steadily and were, last fall, very destructive to rats held in traps. Several were damaged to the point of worthlessness. This is the only concrete evidence of any damage done by this animal. However, it is recommended that approval be granted to remove a limited number of them during the coming fall trapping season, as with the annual increase they will be even more numerous, and will possibly become destructive to nests and young birds.

Mink are not numerous on the refuge. This is not due to over trapping, as only a slight number is taken each year. Observations show a normal amount of predation by this animal. Wintering mallards were preyed upon regularly by them, although it is suspected that most of the victims were weakened or wounded birds. Other evidences of predation on cottontails and pheasants were noted.

Weasels are present in good numbers throughout the refuge. Though some observances of predation on birds and cottontails were noted, their food, as proved by haphazard scat analysis, consisted mainly of mice.

Skunk were removed in considerable numbers from around the units below dam #83. This is an area of heavy nesting and should now be relatively free from nest depredations by skunks. This animal is still too numerous in the north portion of the refuge, and every effort will be made to diminish their numbers there next fall.

Some complaints were received on coyote damage, mainly by sheep and poultry raisers. It is known that considerable numbers of coyotes utilize the refuge, mainly as a daytime haunt from which they carry on their depredations. From actual observations on various parts of the refuge and from

tracking during the winter, it is believed that coyotes are more numerous than previously reported. Time permitting, an attempt will be made to den hunt this animal in May.

Trapping was not successful in controlling the coyote--mainly for want of large enough traps. One refuge trapper removed two and lost several, while another trapper lost coyotes on six different occasions. About 10 others are known to have been taken from the immediate vicinity of the refuge by other trappers and hunters.

Cottontail rabbits are not overly numerous on the refuge, and are present only in limited areas. Jackrabbits are also at a low ebb in the district. However, they were present in sufficient numbers to do some damage to nursery stock around headquarters. Damage to natural cover by these animals was negligible.

Porcupines were occasionally observed on the refuge during the period, both on the ground and feeding in trees.

It is believed that the gray squirrel is either not present here, or is here only in very limited numbers. The red squirrel was only observed once during the past period. Richardson's ground squirrels are well represented on the refuge.

E. Predacious Birds, Including Crows and Magpies:

During the winter both the bald and golden eagle were present here. One pair of golden eagles remained in the vicinity of headquarters until recently. In the north portion of the refuge both bald and golden eagles were winter residents. No excessive predation on birds by the eagles was noted. Although one was observed to strike down a duck, it is believed that their winter food consisted mainly of rodents and lagomorphs, chiefly the cottontail.

The prairie falcon was not numerous, but on three different occasions was noted to take a healthy Hungarian partridge. These were the only feeding observations made for this bird.

The screech owl, short-eared owl, snowy owl, and great horned owl were winter residents here, but were observed only occasionally.

Magpies remained throughout the winter and their numbers have now been strengthened by birds that wintered farther south. Crows were first observed on March 23, and are now quite numerous.

The other summer resident species of hawks have also made their appearance. To date nearly all those expected here have been noted except the sharp shinned hawk and the Cooper's hawk.

It is believed that the large numbers of marsh hawks and Swainson's hawks found on the refuge will exert considerable pressure on young game birds. An attempt will be made to learn the extent of this pressure.

F. Fish:

Though the waters of the refuge should be suitable for practically all fish expected in this region, there as yet appears to be a deplorable lack of them.

Suckers have been found in numbers in the spillway flow below dam # 83. During February a northern pike, estimated to weigh 6 pounds, was found on the ice by the control gate at dam # 41. He had apparently floundered onto the ice while attempting to catch minnows.

Minnows of several species are very numerous and would support large numbers of fish. An application has been sent in to obtain fry for restocking purposes.

III Refuge Development Maintenance

A. Physical Development:

The refuge boundary fence will require extensive repair this spring, as the snow that drifted into coulees this winter damaged approximately 30% of all boundary fence.

Little repair work has been accomplished on fences to date, as refuge personnel have been extremely busy with dike repair during the spring run-off.

The refuge trails are in excellent condition this spring, even though they have had no maintenance whatsoever since last summer.

Refuge buildings in general all need paint and shingle stain very badly. It is believed that it may be possible to have paint transferred to this refuge for the painting of some of the buildings by the refuge personnel.

During the spring run-off all dikes and structures were carefully inspected and temporarily repaired as they became defective. It was necessary to do considerable sand bagging to prevent erosion on dike A in several places. The outlet channel of the control structure in dam # 83 failed to carry the water that was necessary to pass through the structure.

It is expected that Grano Crossing will show considerable damage from wave action. The water has not receded sufficiently as of this date to permit adequate inspection of the embankment.

During the period of time the refuge headquarters residence was unoccupied, all water was shut off and pipes drained as well as construction permitted. However, when the house was re-occupied, the water pipe from the office to the residence, lying seven feet underground, was frozen solid. It was finally necessary to excavate approximately 50% of the length of the pipe and apply heat to get water into the residence.

B. Plantings:

1. Aquatics and Marsh Plants

No plantings of aquatics or marsh plants were made during this period.

2. Trees and Shrubs

In mid April a shipment of nursery stock was received from the Lower Souris nursery. This shipment included 1,000 tartarian honeysuckle, 500 black haw, 1,000 redstem dogwood, 150 American plum, 200 red cedar, 300 silverberry, and 20 ponderosa pine. This stock was in good condition. About 200 willow propagules were cut and planted in low areas on the refuge.

Plantings were made at headquarters, the recreational area, at north and south sub-headquarters, and in areas by pond B, unit 87, and unit 96 in locations where conditions were suitable for the growth of the different species. Since planting, weather has been favorable, with several showers occurring. It is expected that with the favorable start the stock will show a good percentage of survival.

3. Upland Herbaceous Plants

No plantings were made. The only range revegetation has been to restrict grazing to the point where old agricultural lands will come back into grass as quickly as possible. In some instances very favorable results are appearing, while in others, little progress has been made.

4. Cultivated Crops

The increased water elevation of Lake Darling has inundated several parcels of valley cropland. In view of this fact, together with recent advice on opening abandoned farm land for increased farm acreage, we contacted share croppers and released considerable refuge owned land. However, after having contacted the Renville county AAA office, we were forced to inform the farmers that providing they farmed the increased acreage, they would be penalized $3.00 per acre according to existing AAA regulations. Consequently, we were able to release only 377 acres of new farm land. Our total refuge farm land will show a decrease since approximately 500 acres of 1941 cropland will be under water.

The following is a tabulation of the proposed crop acreage on the refuge in Ward and Renville counties.

	Oats	Wheat	Corn	Barley	Flax	Millet	Alfalfa
Renville	94	301	50	202	134	12	0
Ward	8	97	50	45	0	25	30
Total	102	398	100	247	134	37	30

The above acreages will provide ample food for our wildlife. However, we would have increased crop acreage considerably had not the AAA organization interfered.

It will be noted that the above crop acreages conform with the Economic Use Plan as set up by Mr. Dart. The intended harvest will also be carried out following the principles as set forth in the approved Economic Use Plan.

C. Collections:

1. Seeds or other Propagules

No collection of seeds were made during this period. However, approximately 200 willow propagules were gathered for planting on the refuge.

2. Specimens

No specimens were taken or preserved during this period.

D. Receipts of Seeds and Nursery Stock:

As was previously stated, the nursery stock received from Lower Souris Refuge was of good quality and in good condition.

IV Economic Use of the Refuge.

A. Grazing:

Preparation is being made to open all available grazing land to cattle grazing during 1943. Many ranchers and farmers have already made inquiries regarding grazing permits. We are, therefore, of the opinion that there will be a great demand for grazing permits. In view of this fact, it is essential that our fences be repaired as rapidly as possible. Ward county AAA is cooperating to see that grazing areas will not be over grazed. A price of $.50 per head per month will be charged. Benefits of reducing the fire hazards by this grazing are also very desirable in this area. There has been no conflict between cattle and wildlife in the past.

B. Haying:

Hayland in areas large enough to interest farmers is practically nil on this refuge, especially since the water levels in the upper region have been raised.

C. Fur Harvest:

Six share trapping permits were issued for the taking of fur bearing animals on the refuge.

The trapper assigned to the south portion of the refuge was given three permits; one for muskrat; one for coyote, mink, weasel, skunk, and fox; and one for beaver. The trapping program in this area was very successful, and during the early part of the season the trapper employed an assistant to enable him to cover his traps more thoroughly.

One permit was issued for the taking of coyote, skunk, mink, weasel, and fox in the refuge area between Grano and Greene. Then two permits were issued; one for coyote, mink, skunk, weasel, and fox; and one for beaver, on the refuge area above highway # 28.

The two above areas on the refuge were undermanned in regard to trapping. The trappers would no doubt have been more successful had not their farm duties interfered with their trapping schedule.

Trapping conditions were, on the whole, favorable; fall weather remained open long enough to permit the removal of skunks before they denned up, and the taking of muskrats from the banks before heavy ice had formed. Some difficulty was experienced in removing the full quota of beaver, due to

adverse weather conditions during March. An extension of five days was obtained to permit the removal of the beaver quota.

Though complete data are not yet available concerning the prices on furs sold by the trappers, the following are believed representative.

	Species	Average Price Received
44	Muskrat	$1.40-$1.45
40	Skunk	$2.10
17	Weasel	$1.02
1	Mink	$8.00
7	Beaver	$26.43

The trapper at the south end of the refuge, on suggestion of the management, rendered all the carcasses he obtained and marketed approximately 100 pounds of this fat.

D. Timber Removal:

The amount of timber removed from the refuge on special permit has been so small that it is not noticeable. As the water levels of the pools increase, more and more trees in the bottom land are drowned out. One must be present on the refuge during a spring run-off to appreciate the hazard that dead trees in the reservoir create at the critical time when all controls must function properly to handle excess empondments. This spring, lims, tree trunks, and whole trees became lodged on the control gate trash racks. With a 20 ft. head of water, it is almost impossible to remove the debris without some type of mechanical means.

With the increased prospects of coal shortages, we believe every incentive possible should be offered the community to remove their winter's fuel supply in wood, from the reservoir, not only for the financial benefits derived therefrom, but also to clear the Lake Darling and dam # 41 reservoirs of as much dead timber as possible.

During the report period, there were but 20 cords of wood removed from the refuge, totaling $20.00 revenue.

VI Public Relations.

A. Recreational Uses:

The picnic area has not been used during this period. However, it is estimated that seven or eight thousand people

visited the area to see water flowing over the spillway and through the control structures of the Lake Darling dam. Arrangements were completed by the officials of Minot for the State Militia to guard the dam # 83 during the period of high empondment.

B. Refuge Visitors:

Mr. Maurek arrived at the refuge on April 8 and remained in direct contact with flood conditions until April 18th. Mr. Maurek inspected all structures during the various stages of the spring run-off, as well as inspecting the area burned over by the prairie fire of April 15th. His presence was greatly appreciated during this critical time.

Messrs. McBride and Dougall were ever present, regulating gates, computing volume of run-off and inspecting structures during the period April 1 to April 27.

Mr. Warren E. Hall was present from April 17 to April 24, inspecting structures and directing emergency repair to dikes and structures.

Mr. Gillett arrived at the refuge on April 18 inspecting the area in general and assisting in every way possible.

Mr. Wm. V. Taylor arrived to review the damages caused by the spring run-off on April 21st. Mr. Taylor covered the entire area in studying repairs necessary to the various developments.

Other visitors included Wm. J. Lowe, State Game and Fish Commissioner, Refuge Managers McKenzie, Lawson, Hammond, Ambrosen, State Engineer Tucker, Chief of State Highway Patrol and Mayor Sundberg of Minot.

C. Refuge Participation:

We were visited by the Minot sportsmans Club officials and invited to attend their monthly meetings. We also contacted the local newspapers prior to wildlife week and had the prepared newspaper items printed.

E. Fishing:

Fish in this area are quite limited; however, Mr. Gillett reported he had removed a 6 pound dead northern pike from the control structure on dam # 41. Several large suckers were also observed attempting to swim up current over the Lake Darling spillway. No other species have been evident.

F. Violations:

No violations have been observed or reported during this period. Mr. R. L. Miller, Deputy State Game Warden, visited the refuge during April and expressed his willingness to cooperate in every way possible in game management.

VII Other items.

A. Items of Interest:

1. Roads

We have been asked by Muskego Township officials to complete our agreement with the Township relative to construction of roads off the refuge. This matter is being referred to the Regional Office.

Date Submitted: May 8, 1943

Arthur G. Huey
Refuge Manager

Regional Office Approval Bernie Maureth

MAY 11 1943

SUMMARY REPORT

FOR

THE UPPER SOURIS NATIONAL WILDLIFE REFUGE

FISH AND WILDLIFE SERVICE

JULY 1, 1942 TO APRIL 30, 1943

SUBMITTED BY

ARTHUR G. HUEY
REFUGE MANAGER

TABLE OF CONTENTS

GENERAL:

In the past many have envisaged the Upper Souris Refuge with water running over the Lake Darling Spillway and have looked forward to the day when this would become a reality. This vision became an actuality on April 16, 1943, when the water elevation of Lake Darling reached 1598.0'. With all the units and pools on the area filled to capacity and water tumbling through the gates and over the spillways, a beautiful panorama might be had from most any point of vantage.

The fall months of 1942 were exceptionally dry, accompanied with mild weather. Very little precipitation was received in this area during the month of December when .83" was received in snowfall. During the months of January and February we received approximately 2 inches of precipitation. In the month of March, a heavy snowstorm blanketed all of the Upper Souris watershed area. This melted rapidly, producing the water that caused all pools and units to fill to capacity. Under these conditions, we expect a most successful year on the refuge.

The spring months of 1943 have thus far been very cool, with more than average rainfall, making the ever present high winds more noticeable. The high winds blowing over the pools at this high water elevation have caused considerable damage to riprap and embankments over the entire refuge.

BIRDS:

A. Migratory Birds

The waterfowl in general remained at about a constant number throughout the fall months. As the fall season progressed and the early migrating species left the refuge, they were replaced in number by the mallard population until in October approximately 98% of the duck population on the refuge consisted of this species.

On October 14 a flock of 36 white winged scoters was observed on pond "B", this being the largest number of this species ever observed on this refuge.

During the winter months of 1942 - 1943 approximately 2300 mallard ducks remained on the refuge. They were to be found in open water south of dam #83 and in open channels near the Johnson sub-headquarters.

This spring, migration has progressed much as in the past years. It was difficult to arrive at an accurate estimate on the number of each species on the refuge due to the excellent feeding areas and potholes lying outside the refuge caused by the high water stages. However, we have quite accurate figures showing the following increases in

population over last year for various species:

Mallard -	10%	Goldeneye -	5%
Green-wing teal-	10%	Bufflehead -	10%
Pintail -	10%	Ruddy duck -	10%
Canvasbacks-	10%	Scaup -	20%

Those species showing a decrease in population from last year are the gadwall at 5%, the shoveler at 5% and the coot at 10%. It is thought that some of these species have not reached their peak of migration and are increasing in numbers daily.

Gulls and pelicans are now quite numerous. However, the pelicans have shown no signs of nesting, and in all probability will leave the refuge as soon as the excellent feeding declines with the recession of high water.

B.Upland Game Birds

The refuge supports a good population of upland game birds. As is known the topography of the refuge is varied and well suited to accommodate different species of upland game birds. There is no evidence of conflict between the various species of upland game birds, as each keeps to its favorite type of habitat for feeding and nesting purposes.

Upland game birds listed as to their abundance in descending sequence would be as follows: 1. pheasants: 2. sharptailed grouse; 3. Hungarian partridge; 4. pinnated grouse. The pinnated grouse, or prairie chicken, is rather scarce in this vicinity.

The ample supply of food and cover for upland game birds was emphasized by the fact that during the March blizzard we lost few, if any, birds, while many birds were lost during the same period over the remainder of the State.

Both duck and upland game hunting adjacent to the refuge this fall was the best it ever has been despite the unfavorable weather conditions. Hunters contacted were successful and well satisfied. The numbers of birds taken, however, were not sufficient to cause any noticeable decrease in population.

ANIMALS:

White tailed deer have shown a constant increase through the past years. It has been estimated that by this fall we will have a population of approximately 525 deer. It has been recommended that we reduce this population to 200 head by opening the refuge to a deer hunting season.

It has been necessary to carry on an annual reduction program to keep various small animals from becoming too

numerous. The trapping removals this year consisted of the following:

skunk -- 76	coyote - 2
weasel - 42	raccoon - 1
fox (red)- 1	mink - 4
muskrat- 84	beaver - 22

WATER CONDITIONS:

The water levels remained approximately constant during the fall months, and at the time of the spring break-up the various pool elevations were as follows:

Unit #96 - elevation 1577.19', gate closed.
Unit #87 - elevation 1577.19', gate open.
Unit #83 - elevation 1592.90', gate closed.
Unit #41 - elevation 1592.80', gate open.

During the spring run-off all units were filled to capacity and water was being released as rapidly as feasibly possible. We intend to have Lake Darling drawn down to elevation 1596.00 by May 15 and down to elevation 1588.00 by November 15.

With the abundance of water, it will be interesting to see what develops in plant life, new feeding areas and disease.

IMPROVEMENTS:

Small improvements were accomplished during this period. Since the CCC Camp has been abandoned and WPA has gone out of existence, no large improvement projects have been undertaken with the exception of repair to the Grano Crossing. $1500.00 was set up for this project under Project #53, Job #1792 and a few additional men were hired to operate equipment. We were able to place 3700 cubic yards of riprap on the upstream side of the embankment and around the abutments of the bridge. Then 1300 cubic yards of fill was placed on the Grano Crossing to raise a low section of the fill. This was all done in fifteen working days under adverse weather conditions.

All small improvements and repair to fences and buildings were accomplished with regular refuge personnel.

RECREATION:

The recreational area has been used by few this period, although several thousand people visited the refuge to witness water pouring over the Lake Darling Spillway and through the control gates.

Refuge Manager

numerous. The trapping removals this year consisted of the following:

skunk -- 76	coyote - 2
weasel - 42	raccoon - 1
fox (red)- 1	mink - 4
muskrat- 84	beaver - 22

WATER CONDITIONS:

The water levels remained approximately constant during the fall months, and at the time of the spring break-up the various pool elevations were as follows:

Unit #6 - elevation 1577.19', gate closed.
Unit #7 - elevation 1577.19', gate open.
Unit #3 - elevation 1592.90', gate closed.
Unit #1 - elevation 1592.80', gate open.

During the spring run-off all units were filled to capacity and water was being released as rapidly as feasibly possible. We intend to have Lake Darling drawn down to elevation 1586.00 by May 15 and down to elevation 1588.00 by November 15.

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