SAND LAKE NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

September 1, 1948 to December 31, 1948

PERSONNEL

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(Vacant) - Jr. Refuge Manager

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I. GENERAL

A. Weather Conditions

The following data ~~was~~ were obtained from the official Weather Bureau station at the Aberdeen Airport which is located 28 miles southwest of the refuge headquarters.

	Snowfall		Precipitation		Max. Temp.		Min. Temp.	
	'47	'48	'47	'48	'47	'48	'47	'48
Sept.	-	-	1.00	.95	101	102	21	34
Oct.	-	-	2.03	1.53	94	76	25	17
Nov.	17.1	T	2.07	.17	52	65	-9	7
Dec.	0.7	1.2	.06	.06	42	56	-11	-11
Total	17.8	1.2	5.16	2.71	101	102	-11	-11

In general, the weather was warmer this year, especially during September and November. Rainfall did not exceed that of last year for any single month and the total for the period was 47 percent less than in 1947. Traces of snow occured frequently after November 4 and during December. However, the ground was bare most of the time and total snowfall for the period was only 7 percent as much as much as during 1947.

The first hard frost did not occur until October 2 which was nearly two weeks later than last year. Water areas froze over completely the week of November 8 but the ice broke up later on the larger bodies of water as a result of milder weather. This did not last long however as all water was frozen over again for the winter on the 19th.

B. Water Conditions

Water levels have been somewhat higher over the entire refuge this period than last year with the exception of the Sand Lake unit since freeze-up. Although precipitation was considerably less than last year we entered the period with much higher levels than the previous year. Levels ranged from 12.00 during September to 12.10 for December at the Mud Lake spillway which has a crest elevation of 12.10. In fact, water has been trickling across two low spots on this structure for the last three weeks. At the Columbia dam the range was from 11.04 during September to 10.70 for December with a structure elevation of 11.00. There was a continous flow over the Columbia dam until September 13 and again until the latter part of the month as a result of a good rain. This is the latest date for a continuous overflow since 1942.

All water areas were frozen over the week of November 8 but a period of mild weather resulted in this ice breaking up by the 16th on the larger bodies of water. All areas were frozen again

by the 19th for the winter. The ice has been practically bare this period and although the weather was not so severe we did expect considerable heaving. Fortunately, most heaving to date has occured out on the ice quite some distance from shore where no damage occurs.

C. Fires

No fires occured during the period. Conditions were extremely hazardous owing to heavy cover, periods of dry weather, and the multitudes of hunters present along the boundary after the waterfowl season opened. There was more fall plowing this year which is a definite advantage in preventing the spread of fires from the outside. Snowfall was very light and there were few times during this period when conditions were not favorable for dangerous fires.

II. WILDLIFE

A. Migratory Birds

1. Populations and Behavior

(a). Waterfowl: In general, it is estimated that the waterfowl population increased 40 percent as compared to the same period of 1947. Since geese make up an important part of the flight, both spring and fall, they have also been considered separately from other waterfowl to show the trend of both groups. Observations indicate that the goose flight increased 84 percent over that of last year. Likewise, there was an increase of 37 percent for other waterfowl. This is the second year in which the total flight of all birds has shown a favorable increase. However, most of this gain has been made by ducks since the goose flight during the past fall did not quite equal that of 1946.

The first migrant geese, white-fronts, dropped in just three days later than last year with all other kinds arriving from two days to nearly two weeks later. The first Blues were noted a week earlier than last season.

At least 4,000 geese, including all species commonly occuring at this station, were present for the opening of the waterfowl hunting season on October 15. The White-fronts had reached a peak by that date but remained in numbers throughout the month owing to the arrival of a new wave of migrants before the end of October. The population of Lesser Canadas built up rather slowly at first but there was a heavy flight beginning on October 11 and it is estimated the peak occured on October 21. The largest number of geese for the entire season was also present at this time which is just about the same date each year regardless of weather conditions.

There was a rather large number of geese present until the end of the hunting season on November 18. However, hunting was not so good the last 10 days of the season because freezing weather had damaged the succulent green forage. The birds then feed principally in cornfields on the refuge and very few moved outside of

the boundary each day. The population gradually tapered off from about 4,000 on November 18 to 200 at the close of the period. It is seldom that more than a few hundred are ever present after the middle of November but food has been plentiful this season with an open fall and winter to date.

The population of Canadas and White-fronts was about the same as last year. A huge gain of 250 percent was made by Lesser Canada but this was partially offset by a reduction of 20 percent for Blues and 75 percent for Snows. It appeared that the big Canadas were holding their own this season after a steady decline during 1946 and 1947.

The duck flight increased considerably and Mallards were present in numbers for a much longer period this year. There was little change in populations until after the middle of September. The principal periods of migration occured during the last days of September, October 11-16, October 29-30 and November 6-10. The peak concentration of Mallards occured a week earlier than last year. This was followed by a drop the last week of the hunting season but the number was back to the peak figure again the latter part of November.

Observations of diving ducks have been very rare again this year. It is reported that the pothole and lake regions east and west of Sand Lake supported a good population of divers but they seem to pass us up during the fall. A good flight of Canvasback was reported again this year in Marshall county to the east.

All water areas froze over the week of November 8 except for several holes kept open by the birds. Ice on the larger bodies of water broke up during the next few days with mild weather but were frozen over again for the winter on November 19. Five waterholes were being maintained by the birds at the close of the period. One two miles north of the 4-mile Grade, one about 1/2 mile north of the Mud Lake spillway, two on the east side of Sand Lake, and one about 1½ miles south of the Weismantel Grade. The following birds were still present at the close of the period: Canada geese - 200; Mallard - 13,000; Black duck - 5; Lesser Scaup - 1; and American Merganser - 5.

(b) Other Waterbirds

There was a considerable reduction in the pppulation of birds in this group. Most, if not all, of this change can be traced back to the spring flood and unfavorable and reduced nesting habitat. The populations of Pied-billed Grebes, Pelican and Black-crowned Night Heron were about the same as last year while there was a decided reduction in the numbers of Western Grebe, Cormorant, and Great Blue Heron.

(c) Shorebirds

With higher water levels this year the habitat for shorebirds was limited and extremely few birds were noted. However, outstand-

ing gains were made by Wilson's Snipe and Franklin's Gulls. Heretofore, it has been seldom that more than one or two snipe would be noted in an entire season while this year they were observed quite regularly. Although the total number is very small it may indicate a slight recovery for this species.

2. Food and Cover

In general, there has been much more food available on the refuge and the cover remains about the same as last year. Smartweeds, bulrushes, and sago produced good crops of seed but the acreage of marsh smartweeds appeared to be less than last year. Some sago was again uprooted in the Sand Lake unit by wave action but there was no more damage than last year. In the Mud Lake unit sago produced a heavier crop of seed than usual.

With more moisture in the soil, fall plowing of stubble on heavy soils west of the river was carried on extensively in this territory. Such lands produce an unlimited supply of volunteer grain which makes excellent forage for the geese when there is sufficient rainfall. Those fields which were plowed soon after harvest produced dense stands of grain but this became too rank for the geese by the time there were any number of birds present. As the season progressed the soil became dry and there was very little vegetation produced on late plowing. However, the supply of forage from this source was more than last year. All observations indicate that there is a definite period or stage of growth of grains when the geese make heaviest use of such food. This seems to be when the plants are from one to three inches tall and a very sparce stand is just as acceptable as when the ground may appear as completely covered.

Mild weather during October and occassional showers brought up a fine crop of volunteer grain in the stubble fields all over the refuge . As a result of this a larger percentage of the geese fed on the refuge this year. Several plots of millet was left for the birds and geese fed at those locations for an unusually long time. In our opinion millet is the best crop, acre for acre, for wildlife during the early fall in this country. It may be planted late, produces a good yield, is equally relished by both waterfowl and upland game birds, and since the seed is small it keeps the birds busy for alonger period to obtain a full feed. Heavy use was made of corn which was disc down and later the picked fields were favorite spots.

It was not uncommon to observe from 5,000 to 7,000 geese feeding in one field with as many as 15,000 on the refuge at one time. The ducks travel long distances to feed outside of the refuge in all directions but from 5,000 to 10,000 could be observed using refuge fields at various locations. We are positive that many ducks were traveling up into North Dakota to feed after most of the corn had been picked. One one occasion a heavy evening flight from Sand Lake was noted moving north at a point eight miles north of the state line and flocks were feeding beyond that location as far as the eye could see.

A total of 469 acres of grain, which should have produced 10,121 bushels if harvested, was left in the fields for wildlife. This was a reduction of 49 percent in acreage but only 21 percent in yield below that of a year ago. This came about because 4335 bushel of grain, from 279 acres, was stored this year. Owing to hail damage last year only 360 bushel of grain, from 17 acres, was placed in storage.

3. Botulism

On Form 3-1755, Disease, under botulism we have indicated the period of outbreak as from July 19 to September 30. Actually it is doubtful if losses to the end of August resulted from Botulism since not more than one dead bird per week was found during that time. Botulism definitely did take a number of birds during September. Soon after the first of the month dead birds were noted along the south side of the Mud Lake dike and both sides of the Houghton Grade. These birds were picked up and disposed of. Prior to this time all dead birds had been found north of the Mud Lake dike. Outbreaks in the past have nearly always started or appeared to be more severe in that area below the Mud Lake dike and extending to a line about ½ mile south of the Houghton Grade and the same held true this year. The conditon of vegetation has changed but very little over this area in the past three years and water levels were continually falling during this outbreak.

Losses this year were confined almost entirely to waterfowl with about 20 percent of the total being coots. Very few of the other classes of birds were affected.

4. Lead Poisoning

There has been quite a loss of birds from lead poisoning again this year. Apparently such losses can be expected annually where birds winter in the northern latitudes. Had these birds moved on south before cold weather, where water areas do not freeze, some may have survived. Although the loss under those circumstances may be just as high, they go unnoticed because the birds are scattered. In a cold climate the losses are heavy after the freeze up because wounded and weak birds are confined to small water holes and are unable to obtain food unless they can fly. Therefore, a large number die before the ice is safe for travel so that the concentrations may be reached.

Losses this year are following the same pattern as the previous year except that there were more wounded birds and a larger number suffering from lead poisoning. This could be expected since these birds represent the accumulation from the entire fall mighration. Hunting pressure was heavy and the total migration was 40 percent above that of the previous year.

It is estimated that 2,000 waterfowl have been lost to date and practically every one have been Mallards. This is only 1.5 percent of the total using the refuge this period. There were many week birds remaining yet at the close of the perior at four

of the five water holes. Therefore, some additional losses can be expected during the next few weeks.

B. Upland Game Birds

1. Populations and Behavior

Although the pheasant population made a favorable increase this year the number using the refuge this period has dropped 30 percent below that of last year. In our opinion this has been caused by weather conditons and the number removed on the outside during the hunting season. With bare ground and rather mild weather there has been an abundance of waste grain over the entire country available to the birds. Therefore, a large number of birds, which usually concentrate on the refuge during the winter, still remain outside.

The bag limit was raised to four cock birds per day this year with a 45 day season in this county. Non-residents were again prohibited from hunting the first ten days of the season but there was at least double the number of these hunters this year. It is estimated that the local kill was the highest of any time within the past three years.

Prairie chickens appear to be very rare this period with only a single bird noted. Additional birds have been noted outside of the refuge but the number is lower than last year. These birds seldom use the refuge except during the winter so it is possible that a number will move into the area during the next period.

Hungarian partridge were noted quite regularly during the early fall but appear scarce now despite the fact that there was no open season. None have been observed on the refuge since the hunting season ended.

2. Food and Cover

The supply of food and cover is abundant on the refuge but below that of last year over the surrounding country because of fall plowing. However, the ground has been bare most of the time so waste grain, which was covered with snow last year long before this time, has been available throughout the period. Some corn was left standing for winter food but so far it has not been utilized by upland birds.

Cover on some of the higher ground is shorter than last year as a result of dry weather during the spring. Very little fall plowing is permitted on the refuge so there are numerous stubble fields well distributed over the area. In addition, there is an abundance of giant ragweed, wild sunflower, sweet clover, smartweeds, and grasses.

3. Disease

None to our knowledge

C. Big Game Animals

The deer herd made a normal increase again this year but we do not have any definite figures on the population for this period. The Service aircraft was not available for a census and since the animals travel about considerably that is the only way to obtain reliable figures. We are positive that many of the animals which usually winter on the refuge were scattered over the currounding country, prior to the hunting season because of mild weather and lack of snow. The population in January 1948 was 541. The annual increase in this part of the country runs as high as 60 percent but it was noted that there were fewer twin fawns this year. Figuring an increase of 50 percent would make a total of about 800 animals.

Fortunately, we were permitted to open the entire refuge for deer hunting this year during the special season for the eastern section of the state. The season was from November 26-28 with a bag limit of one deer regardless of sex and age. Firearms were restricted to shotguns using a ball or slug weighing not less than 5/8 ounce or buckshot No. 1 or larger. The entire county was open for hunting as well as parts of 16 other counties located to the west and south.

The entire refuge was open for unrestricted hunting with the exception of small areas around the building sites. No permits were required but certain gates were designated for entry. Vehicles were not permitted on the refuge since all points could be reached from public roads on the outside and the area is relatively narrow.

Hunting pressure was very heavy the first morning and we estimate that 60 percent of the total take on the refuge was killed by noon of that day. There were probably 600 hunters on the area the first day with an additional 300 on the outside of the fence. Hunting success dropped off sharply after the first two or three hours. It is estimated that from 250 to 300 deer were killed the first day, from 25 to 50 the second day and less than 25 the last day for a total kill of from 300 to 400. There is no doubt but what some deer left the refuge after the hunt began and were killed outside in all directions. Heavy kills were made in the vicinity of the usual winter concentration areas but as mentioned before we are sure that many animals were staying outside of the boundary owing to mild weather.

No checking stations were set up on the refuge because of lack of manpower so exact figures on the kill, sex ratio, weights etc. are not available. The state P-R technicians did operate two checking stations on the outside the first two days. We fully expected to have a summary of the data obtained at those stations for this report but it has not been received as yet. Records as to sex were obtained on 90 animals and this indicated a sex ratio of 61 bucks to 39 does but we do not believe this to be correct for the entire kill.

One large buck was killed which we believe may be a record for White-tails in South Dakota at least. This animal weighed 296 pounds hog-dressed which would mean a live weight of from 350 to 375. There were a number of bucks which weighed more than 250 hog-dressed. All animals examined were in excellent condition and fat.

There is no doubt that the open season resulted in control of the deer herd for the present and perhaps for some time to come. Not a single animal has been noted on the refuge since the season ended by refuge personnel including two trappers who have been in the field daily. However, two or three tracks have been noted and we have reports of several animals on the outside. Quite likely more will show up during the next period.

2. Food and Cover

Cover conditions are good with an abundance of wild sunflower giant ragweed, sweet clover and marsh vegetation in addition to the shelter-belt plantings. Now that the deer have been drastically reduced some trees will have a chance to recover from over browsing. However, in many cases it will be too late because all lower branches are dead.

The food supply is adequate now that the herd has been reduced. There was much waste grain available during the period owing to the lack of snow and corn has been left standing for later use. Practically all corn in this part of the country was havested this year so in the event of deep snow there will be less food available on the outside this winter.

3. Disease

None to our knowledge.

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

Muskrat: All observations indicate that the population has increased some this year despite flood conditions during the spring. No aerial house count was made because the Service plane was not available this period. Last year there were 438 houses counted and it is estimated that the number is about the same or slightly less this year. There has been a definite increase in bank rats, especially in the Mud Lake unit. This change may have been caused by the spring flood which forced the animals to higher ground.

The food supply seemed to be as good as last year but in general the muskrats which have been trapped are not carrying as much fat as last season. There is also a larger proportion of small rats from the Mud Lake unit. No doubt many early litters were lost owing to high water conditions during the spring and these smaller animals are from late litters.

Mink: It is apparent now that our estimate for the fur harvest was too high. The population prior to the trapping season was probably not more than 20 animals. No predation has been

noted except for damage to a few muskrats while they were in traps. A total of ten were trapped this period.

Raccoon: A normal increase occured this year and the population is too high considering the welfare of other wildlife. A considerable number have been removed this period but they will be difficult to take during the remainder of the season because they have denned up in the ground. A total of 34 were removed during this period.

Skunk: These animals have increased for several years and are much too numerous. The population has been reduced this period by trapping which is expected to continue throughout the season. Seventy were taken this period.

Weasel: It is rare that any weasel are noted during the winter months and the population seems to be down. Only one animal has been trapped so far.

Badger: No doubt there has been a normal increase in the population this year. Signs were noted over most parts of the refuge until the ground froze but one animal can dig a large number of holes in just one night. Roads and trails always seem to be the favorite spots when digging for food to. Three have been removed by trapping.

Red Fox: It does not appear that the population has increased to any extent this period which has usually been the case in the past. Several animals were reported during the deer hunt but only two observations have been made other than that. Of course, with bare ground most of the time there has been fewer chances for observing signs.

Coyote: No animals have been observed but there may be one or more using the refuge. Here again bare ground conditions have made it difficult to observe signs.

Rabbits: Jack rabbits are definitely on the increase for the first time in several years. Quite a number have been killed by traffic along the public roads and a few more are noted on the refuge. However, the population still remains fairly low.

Cottontails do not seem to be so plentiful as last year and no damage to trees has occured this period.

Fox Squirrel: There is no apparent change in the pppulation of squirrels. Only an occasional individual is noted and the number remains about the same from year to year.

E. Predaceous Birds, Including Crws, Ravens, and Magpies

Teh first Snowy Owl appeared on December 26, somewhat later than our first record of December 15 last year. Only one bird has been noted so very few have moved this far south to date.

Golden Eagles have been common since the freeze up with at least eight birds present during late December which is about the same as last year. The Bald Eagle has been rare as usual with only one record during the period. Great Horned and Short-eared Owls are present throughout the year but the number is limited. Hawks are never plentiful and predation by this class of birds is not serious. There has been little change in the Crow population this period but there was a large increase during the spring. It is only during the spring and fall that these birds are noted in any numbers.

F. Fish

Conditions for fish life have been as good as can be expected this period. Water levels have been higher and the ice has been bare. There is no evidence of lack of oxygen as yet but such conditions may develop in the future in the event of deep snow.

III. REFUGE DEVELOPMENT MAINTENANCE

A. Maintenance - Flood Damage Repair - Job No. 5196

1. Weismantel Grade: This public road grade was completed during September by placing 1358 yards of fill, making a total of 15,515 for the entire job. The County then placed oversize gravel on the slopes and a light coat of road gravel on the top before the end of the month.

2. Mud Lake Dike & Emergency Spillway: A total of 13,882 cubic yards of dirt fill was placed on this dike during September, October, and November to bring it up to grade again. This was slow work with crawler tractors owing to the fact that the average haul was about ½ mile. The emergency spillway was extended about 150 feet making a total length now of 600 feet. A total of 2477 yards of oversize gravel was hauled on the slopes of the dike during December. Of this amount 425 yards was from our own pit and the remainder from a privately-owned pit. The slopes on the west section of the dike have been fairly well covered with gravel. Gravel was hauled to the east section the last three days of the period.

3. Columbia Dam: The only thing accomplished on this job was the procurement of certain materials. One carload of lumber was received and also a quantity of reinforcing steel.

4. Roads and Trails: A total of 1284 yards of fill was placed on one low spot on the patrol road and at a causeway both of which are near Site 3. Two metal culvert pipe 30 X 36 were placed in the causeway to replace an old wooden bridge. Two culvert pipe were also dug up and relocated on the patrol road in the north part of the refuge where a washout had occured.

5. Much time was also spent on maintenance and repair of equipment used on the above jobs. A 40 Caterpillar tractor and trailbuilder was obtained from Squaw Creek. The trailbuilder would not work on that unit because of the front mounted pump so it was

necessary to change the bulldozer from our old worn out unit to this machine. One D7 tractor was partially overhauled by replacing track link assembly, rollers, and seals in one final drive in addition to minor items. Two dump trucks were obtained from Swan Lake and two others from Mud Lake. The Unit Crane was also changed over for dragline operation. Work was also performed on three other dump trucks, another D7 and two Model M Carryalls.

Maintenance - Mpale River - Project 53

The repair work on the spillway, which was not completed last year, was finished this period. The roadway crossing adjacent to the spillway was raised and widened by adding stone and then covered with concrete. All cement for the job was furnished by the landowner. Last spring there was still a small flow of water around under the ruble masonry which came out under the east wing wall. Stone was removed from the face of the structure, voids filled with concrete, and all cracks grouted.

Maintenance - Painting - Project 46 and 4

The grain elevator at Site 2 was given two coats of paint under contract. A rather rough job was performed and it will be necessary for the contractor to go over part of the surface again before settlement can be made. Funds were received so late in the season that the refinishing could not be done this period.

Maintenance - Regular Funds

Relative little has been accomplished under this heading owing to the fact that regular personnel spent so much time on the Flood Damage Repair Projects. Labor was impossible to obtain during the summer and until late fall. Therefore, refuge personnel spent almost full time on other jobs in order to keep equipment in production seven days a week whenever possible.

The following jobs were accomplished during the period:

1. Completed mowing roads, dikes, and areas around building sites.

2. Cut weeds around recognition signs.

3. Division of corn crop on 12 units and measurement of hay on 11 units.

4. All rooms on first floor at Quarters 4 redecorated by Clerk on his own time.

5. Unloaded one-half car of coal at Columbia and stored it at Headquarters.

6. Additional patrol of refuge during waterfowl and deer season, erection of signs for deer season, and removal of signs after season closed.

7. Assisted in making engineering surveys on Mud Lake dike and at the Columbia dam.

8. Moved Service well machine, tools, casing, and pipe from Des Lacs and Upper Souris to Sand Lake. Started drilling shallow well at Site 3. 36 feet of 8 inch casingdriven and hole drilled to about 50 feet to date.

9. Continued maintenance and repair on four pickup trucks, one stake, F-30 Farmall tractor and power mower, power lawn mower, and two light plants. Found block cracked on Stake truck I-16936 so complete new motor installed. Light plant at Site 2, a Kohler 1½ KW, was given a top overhaul. One Pickup I-16934 was retired during the period and is now up for sale.

B. Plantings

1. Aquatic and Marsh Plants - none

2. Trees and Shrubs - none

3. Upland Herbaceous Plants - none

4. Cultivated Crops

A total of 2602 acres were under cultivation during the year in connection with share cropping operations as compared to 2741 acres last year. This reduction resulted entirely from flood conditions which affected at least 300 acres. Otherwise the crop acreage would have been the highest of any time within the last three years.

No hail damage of any consequence occured during the season and crops were good considering weather conditions. Yields were reduced on small grains by dry weather and corn was thin in some fields owing to cutworm damage. The growing season was longer than usual so there was ample time for corn to mature. This made it possible to harvest the crop before there was much chance of waterfowl depredations.

Practically all of the small grains were mowed or swathed while all of the corn, except one unit, was left standing. The varieties of grain left in the field and estimated yield are as follwos:

	Acreage	Yield
Corn	128	2602
Wheat	117	1401
Oats	134	4409
Millet	90	1709
Totals	469	10121

C. Collections - None

D. Receipts of Seed and Nursery Stock - None

IV. ECONOMIC USE OF REFUGE

A. Grazing

Only three permits, covering 695 acres, were issued this year and grazing operations were completed by the end of October. There has been no apparent conflict with wildlife at any time. Unit 1 still supports quite a growth of weeds but the grasses have been improving the last few years. It is believed that mowing part of the unit each year would help to kill the undesirable vegetation. Units three and four have deteriorated considerably because of flooding for long periods during the spring, especially this year. This has resulted in a rank growth of weeds over all of the lower ground which are difficult to burn unless they are mowed first.

B. Haying

A total of 11 permits were previously issued to cover every bit of hay land this year. The yield per acre was almost identical with last year, averaging about .74 tons per acre. There was a heavy demand for hay this season because over the country as a whole the yield of prairie hay was much lower owing to dry weather in the spring. Several of the units cannot now be utilized to the full acreage originally set up. This is because marsh vegetation has been creeping in on the lower ground owing to high water conditions during recent years.

C. Fur Harvest

One permit was issued for the removal of all fur-bearers, except muskrat, and operations have been underway since November 3. Trapping conditions have been good in that there has been very little snow to contend with. This has made it possible to remove a good number of these animals for the first time in many years on a share trapping basis.

Although the quota on muskrats was increased this year only two permits were issued for trapping. It has been proven that a much better job is done when the trapper is allowed to take a sufficient amount of fur to make it a full time job. Trapping operations started December 1 and have been continuous since that time. Since there was a noticable increase in bank 'rats a real effort has been make to take as many from those locations as possible because few have been removed in the past. The trappers spent 5 days staking every feed bed which could be found so that they could be located and trapped even if there was deep snow. By trapping the feed beds instead of the houses a much higher percentage of bank 'rats can be taken.

The following animals have been taken to date:

Muskrat	Mink	Raccoon	Skunk	Weasel	Badger
1285	10	34	70	1	3

Local fur prices have dropped considerably below that of a year ago on muskrat and mink and the long-haired fur is still very low. Prices on mink range from $17.00 to $27.00, Muskrat $1.10 to $1.30, raccoon about $2.50 and skunk .50¢ with few buyers interested.

D. Timber Removal - None

E. Other Uses

Quarters 2A has been rented to one of the trappers since November 28 for a total revenue to date of $15.64.

Electrical energy has been supplied to a house trailer at the headquarters site which is occupied by another trapper. Revenue from this source since November 3 has been $4.84.

V. FIELD INVESTIGATION

None

VI. PUBLIC RELATIONS

A. Recreational Uses:

A very limited amount of sport fishing is all that we have to report this period. In fact, fishing has been very poor all year probably because of the heavy loss last winter. It was noted that there was quite a bit of fishing going on all fall at and just above the road bridge outside of the north boundary. Many n nice perch and bullheads were taken there up until early November which was rather unusual.

B. Refuge Visitors

Name	Title or Affiliation	Date	Time Spent
Dr. Hathaway	Professor - Tulane U	9/3-4	1 day
Carl Vogen	Ref. Mgr. - Long Lake	9/14	1 hr
Mr. Kendall	Mech-Pat - Long Lake	9/14	1 hr
A. G. Huey	Reg. Engineer	9/18	4 hr
"	"	9/24	8 hr
"	"	11/11	4 hr
"	"	12/18	2 hr
Harry Neilson	Ref. Mgr. Trempleau	9/19	½ hr
R. W. Arrowsmith	Ref. Mch. Lower Souris	9/20-21	4 hr
J. Clark Salyer	Chief, Branch W. Ref.	9/24	8 hr
D. H. Janzen	Regional Director	9/24	8 hr
W. V. Taylor	Chief Engineer	9/24	3 hr
		11/11	4 hr

B. Refuge Visitors (Cont.)

Name	Title Or Affiliation	Date	Time Spent
R. W. Dougall	Watermaster	9/26	3 hr
Mr. R. Oliva	Dist. Agt. FCIC	9/30	½ hr
R. Wright	Civil Engineer	10/6-7	2 days
Mr. Kibbe	Asst. Reg. Dir.	11/15	5 hr
F. C. Gillett	Reg. Ref. Supv.	9/24	8 hr
"	"	11/15	5 hr
F. A. Carpenter	Asst. Reg. Ref. Supv.	11/15	5 hr
Mr. Stillings	Mech. - Tamarac	10/23	4 hr
W. H. Thornsberry	Maint. - Swan Lake	11/14	1 hr
Dalton Logue	Chief Warden- So. Dak.	11/26-27	2 days
R. Forder	Lab-Pat - Mud Lake	12/11	½ hr
Mr. Davidson	Maint-For. Mud Lake	12/11	½ hr
Leo R. Childers	Game Management Agent	) Periodic visits	
Mr. Sutton	Dept " "	) throughout the	
L. C. Richardson	State Warden	) period	

C. Refuge Participation

None this period.

D. Hunting

Hunting pressure was very heavy around the refuge boundary again this year although non-residents were prohibited from hunting waterfowl. The number of goose hunters definitely increased for the second year in succession. Although the geese did not fly back and forth across the boundary so much this year there were several "hot spots" where heavy kills were made. Most of these were located at corners and along sections of the boundary adjacent to public roads. Since more birds were feeding on the refuge many of them would cut across these corners in moving from one field to another or from fields to the marsh or water. Hunters at such places would be lined up almost shoulder to shoulder at times. This also resulted in a great amount of shooting "over the fence" whenever there was no warden or patrolmen in sight and a large number of birds dropped inside the refuge. A small army of patrolmen would be required to bring about strict compliance of the regulations under these circumstances.

The goose kill was very heavy with an estimated kill of 3000 birds plus at least 1000 lost as cripples.

Duck hunting was only fair in the vicinity of the refuge even though shooting was permitted one-half hour earlier each day. Clear, mild weather prevailed until the latter part of the season. Hunting did improve the last two weeks of the season with colder weather and occasional stormy days. Much corn had been picked by that time and as the weather became colder the birds move about much more during the entire day. It is estimated that 2000 ducks were killed in this vicinity plus at least 750 wounded which were not brought to bag.

Pheasant hunting was better this season but it still does not compare with that of four or five years ago. Non-resident hunters increased considerably although they are not permitted to hunt the first 10 days of the season. The season was extended to 45 days this year and the bag increased from three to four cock birds. However, non-residents could possess twenty brids as compared to twelve for the local boys.

The kill around the refuge is estimated at 2000 birds which is much more than that of last season.

E. Fishing

Reported under VI. Public Relations - A. Recreational Uses.

F. Violations

With a heavy work program there was less time for patrol during the hunting season and fewer violators were apprehended. A total of five cases were made as follows:

DATE	VIOLATOR	OFFENSE	FINE AND COSTS
10/24/48	Richard Moeckley-Gun	not plugged	Pending in Fed. Court
"	Merl Moeckley	"	"
"	Orvin J. Nelson	"	"
10/25/48	Bernhard E. Olson	"	"
"	Julius J. Kobl	"	Pending

In addition, the following cases from previous years were completed in Federal Court this period:

10/21/46	Robert Yentes	Unplugged gun	$25.00	none
10/21/47	Glenn Hinds	"	25.00	none

VII. OTHER ITEMS

A. Easement Refuges

Maple River: Several days were spent on the area this period to complete repairs to the spillway. During the spring water was still entering cracks in the face of the structure and escaping around under the east wing wall. Stone were removed, the voids filled with concrete, and all cracks grouted. Stone was added upstream of the spillway to bring the roadway up to grade and the surface then covered with concrete. Cement for the roadway was furnished by the landowner.

Water levels continued to drop this period until freeze up with the river about two feet below the spillway at that time. The marshy area was entirely dry except for two small potholes.

Very few waterfowl were noted at nay time and that is usually the case during the fall when water levels are low. The number present was so small that no report is being made.

Dakota Lake: Periodic visits were made to this area for the purpose of checking water levels. Water stages ranged from 7 to 19 iches below the spillway this period as compared to from 6 to 14 inches low last year. However, most likely the supply has been larger this year. No stop logs have been used in the structure since last March while last year there was 24 inches of stop-logs in the control during this period.

Only a relatively few ducks and geese were noted until the latter part of the hunting season when most of the corn had been picked. Much food was available in the picked fields and several waterholes were maintained along the river after the first freeze up. Waterfowl usage increased many times over the previous year.

Storm Lake & Lake Elsie:

Not visited this period.

Lake Tewaukon & Clouds' Lake: The water level at Clouds' Lake was about two feet below the spillway with the lake entirely frozen except for a few small holes. Only 17 Mallards and 3 Pintail were noted on the area.

The level at Lake Tewaukon stood about one foot below the spillway which is normal for this season. Mud Flats were exposed in the White Lake unit and all water areas frozen on November 20 except several waterholes maintained by ducks.

There has been a decided increase in the number of waterfowl this fall from all reports and our limited observations. At least 10,000 Mallards, 140 Lesser Canada geese, 100 Lesser Scaup, and 6 Bufflehead were noted on the day of inspection. Considerable corn and millet is grown in this territory and the supply of waste grain from this source is almost unlimited until covered by deep snow. Hunting was reported as good but several persons advised that the waterfowl were very reluctant to leave the refuge during the hunting season.

On November 20 it was noted that a wooden road bridge was under construction across the Wild Rice River about one-fourth mile below our spillway at Tewaukon. This is to serve the new county road which is to be built around the north shore of the lake. The proposed road will cross two or three tracts of refuge land but no request for right-of-way has reached this office yet. One or more new County Commissioners were to take office January 1 so action probably will be started in the near future.

Two grazing permits, covering a total of 139 acres, were issued this year and all operations have been completed. The amount of forage was not up to normal because of dry weather so useage was kept below capacity on unit G-2. The use of the other unit has always been very light.

Three hay permits, covering 90 acres, were also issued.

There was a greater demand for hay but only 60 acres was utilized. In one case the grass was so short that it was not economical to cut it and at other locations on high ground there was so little hay that it was difficult to pick up with a rake. This same situation was quite general all over the country. A total of 167 acres was under cultivation, 68 acres of this was summer fallow and 99 acres incrops. One field of 22 acres of wheat was a failure and no crop was harvested. Practically all crop lands are infested with quack grass so a rotation including summer fallow or row crops should be followed. One plot of old farm land, containing about 60 acres, was broken up for the first time this year. This formerly supported an almost complete stand of quack so it was summer fallowed. The entire refuge share of all crops were left in the fields for wildlife since we control a limited acreage on these easements. A total of 32.7 acres of wheat and millet, equivilent to about 453 bushels, had it been harvested, was left in the field.

From all reports fishing was rather poor during the year and very little activity was noted. There was a heavy loss during the winter of 1947-1948.

Homer L. Bradley.
Homer L. Bradley
Refuge Manager

(title)

January 10, 1949

APPROVED:

WATERFOWL

Refuge Sand Lake Months of September to December 1948

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan	13	10/16	65	11/16	15	11/9			100
II. Geese:									
Canada goose	15	10/11	500	10/29	PRESENT				1000
Cackling goose									
Brant									
White-fronted goose	16	9/24	2000	10/15	1	11/30			5000
Snow goose	2	10/7	50	11/13	15	11/26			200
Blue goose	3	10/12	50	"	10	"			200
Lesser Canada	13	10/1	12,500	10/21	250	11/30			25000
III. Ducks:									
Mallard			100,000	11/16	PRESENT				300000
Black duck			-	-	PRESENT				50
Gadwall			1,500	10/10	1	11/1			2500
Baldpate			250	10/5	2	10/25			500
Pintail			5,000	10/3	3	11/20			15000
Green-winged teal			500	10/15	3	11/1			750
Blue-winged teal			3,000	10/15	15	11/6			6000
Cinnamon teal									
Shoveller			1,000	10/20	5	11/1			2000
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup	1	10/20	50	11/6	PRESENT				50
Golden-eye									
Buffle-head									
Ruddy duck			25	10/11	5	10/29			50
IV. Coot:			2,000	10/3	25	10/29			4000

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese _____

Ducks _____

Coots _____

Total waterfowl usage during period 362,400

Peak waterfowl numbers 128,490

Areas used by concentrations Mud Lake and east side of Sand Lake

Principal nesting areas this season _____

Reported by Refuge Personnel

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentration: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.

(5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(6) 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 nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

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

MIGRATORY BIRDS
(other than waterfowl)

Refuge Sand Lake Months of September to December 1948

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Western Grebe			75	9/25	3	10/20				100
Pied-billed Grebe			-	-	1	11/13				300
White Pelican			4000	9/10	2	11/7				6000
Double-crested Cormorant			-	-	1	11/1				1500
Great Blue Heron			-	-	2	11/6				15
Black-crowned Night Heron			-	-	1	10/29				50
American Bittern			-	-	1	11/12				25
American Merganser	1	10/29	5	12/30	PRESENT					25
Sandhill Crane	1	10/27	1	10/27	1	10/27				1
II. Shorebirds, Gulls and Terns:										
Wilson's Snipe	4	9/2	4	9/2	1	10/30				25
Long-billed Dowitcher			-	-	-	-				50
Ring-billed Gull			-	-	-	-				25
Franklin's Gull	-	-	25,000	9/17	5	10/30				50000

(over)

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Sand Lake Months of September to December, 1948

(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.
Ring-necked Pheasant	8,000 ac.	.571							14,000	
Prairie Chicken	1,000 ac	100.							10	
Hungarian Partridge	1,000 ac	40.							25	

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 Sand Lake Year 1948

(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	11,000 ac	270	25									less than 10	

1614

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.

3-1755
Form NR-5
(April 1946)

DISEASE

Refuge Sand Lake Year 1948

Botulism

Period of outbreak July 19 to September 30

Period of heaviest losses September 10 to 15

Losses:

	Actual Count	Estimated
(a) Waterfowl	250	500
(b) Shorebirds	4	10
(c) Other	5	10

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

Areas affected (location and approximate acreage) One small area one mile north of Mud Lake dike and south from Mud Lake dike for 1½ miles.

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc. Small area north of Mud Lake dike averaged from 4" to 1' of water. Area south of Mud Lake dike averaged from 0 to 3' of water. Water levels receding throughout period.

Conditions of vegetation and invertebrate life no abnormal conditions and invertebrate life not more than usual

Remarks Not more than one or two dead or sick birds noted per week until after September 1.

Lead Poisoning or other Disease

Kind of disease Lead Poisoning

Species affected Waterfowl - Principally Mallards

Number Affected

Species	Actual Count	Estimated
Mallard		2500
Black Duck		5
Pintail		5

Number Recovered - - -

Number lost Estimated - 2000

Source of infection Lead shot obtained while feeding in shallow water before freeze up.

Water conditions Normal - in fact water levels averaged higher than usual during the fall migration.

Food conditions Good - there was a normal amount of natural foods in addition to grain left in the fields unharvested and an unlimited quantity of waste grain.

Remarks The above losses represent the accumulation of affected brids from the entire fall migration. This figure is less than 2% of the total population which made use of the refuge.

Form NR-6

FISH

Refuge Sand Lake Year 1948

Species	Relative Abundance	Sport Fishing		Commercial Fishing		Restocking		Number removed for Restocking
		Man days Fishing	Number Taken	No. of Permits	Pounds Taken	Number Stocked	Area Stocked	
Large M. Black Bass	Rare	-	-			None		None
Yellow Perch	Scarce	-	-			"		"
Northern Pike	Rare	-	-			"		"
Crappie	Rare	-	-			"		"
Bullhead	Abundant	25	500			"		"
Wall-eyed Pike	Rare	-	-			"		"
Buffalo	Scarce	-	-	none	none			
Carp	Abundant	-	-	none	none			

REMARKS: Three 10 inch Wall-eyed Pike found dead at Mud Lake dam as a result of winter kill last January. These have been the only specimens noted for serveral years.

3-1758
Form NR-8
(April 1946)

CULTIVATED CROPS

Refuge Sand Lake Year 1948

Permittee (If farmed by refuge personnel, so indicate)	Permit No.	Unit or Location	Crops Grown	Avg. Yield per Acre	Permittee's Share		Government's Share or Return				
							Harvested		Unharvested		Compensatory Services, or Cash Revenue
					Acres	Bu. Harvested	Acres	Bu.	Acres	Bu.	
Wm. Jones	11017	1	Barley	11	24.5	274	12.5	140			
			Oats	15	13	195	-	-			
			Corn	22	20	444	7	150			
W. Sieber	13242	3	Barley	25	11	270	3.5	90			
			Millet	-	4	-			2	-	Crop did not mature
G. Wilke	13240	4	Barley	15	50	775	50	775			
			Wheat	10	40	400					
			Oats	30	60	1800					
B. Tollefson	19606	5	Oats	34	110	3740					
			Barley	27	70	1890			35	945	
			Corn	12	-	-			55	660	
M. Kimball	13213	6	Oats	25	27	675			13	325	
			Corn	30	23	690			12	360	
F. Lahman	13238	7 & 33	Barley	6	65.5	400	21.5	135			
L. Scott	12350	7 & 8	Wheat	10	16	160			4	40	
			Barley	15	21	315	9	140			
			Oats	30	30	900					
			Millet	20					10	200	
W. Koch	11725	9, 10 & 11	Barley	13	26	338	37	480			
	13250	12 & 14	Wheat	17	18	306					
			Corn	30	40	1200					
			Oats	32	68	2176			12	384	
			Millet	12					20	300	

Summary of Crops Grown:

Crop	Acreage	Permittee's Share		Government's Share				Total Revenue
		Acres	Bushels	Harvested		Unharvested		
				Acres	Bu.	Acres	Bu.	$

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS

Cultivated Crops Report Form NR-8 should be prepared on a calendar-year basis for all crops harvested or utilized during the calendar year and submitted with the December 31 refuge report.

Permittee - List each permittee separately. If lands of the refuge are farmed by refuge personnel or hired labor, this should be indicated in the Permittee column.

Permit No. - List the number of the Special Use Permit issued to the individual.

Use or Location - The Unit No. or name specified in the Economic Use Plan should be listed in this column.

Crops Grown - A separate line of the form should be used for each crop grown by each permittee or by refuge personnel. This is important, since if each crop grown by each operator is not specifically enumerated, the report will be of no value for statistical purposes.

Average Yield per Acre - It is important that the average yield per acre of each crop grown by each operator should be shown.

Permittee's Share - Only the number of acres harvested or utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. It is requested that all crops harvested be reduced to bushels wherever possible, or, as in the case with the harvesting of seed such as that of sweet clover, alfalfa, bromegrass, etc., the total harvested crop in pounds may be shown. Timothy, alfalfa, or other hay harvested by the permittee should be shown on Form NR-10 and should not be shown in the Permittee's Share column.

Government's Share or Return - Harvested - Show the number of bushels harvested for the Government and the acreage from which this share is harvested, both for grain raised by refuge personnel and by permittees. Unharvested - show the exact number of acres of crops allowed to remain unharvested as food and cover for wildlife. An estimate of the number of bushels of grain that is available for the wildlife in such unharvested crops should be shown in the Bushels column.

Compensatory Services, or Cash Revenue - Show other services received by the Government in cooperative farming activities, the number of acres of food strips planted for wildlife, the amount of wildlife crops not otherwise reported that are planted by cooperators for the Service, or the cultivation of wildlife plantations. If the permit is on a fee basis, the total cash revenue received by the Service.

3-1758
Form NR-8
(April 1946)

CULTIVATED CROPS
(Page 2 Cont.)

Refuge..... Year 194....

Permittee (If farmed by refuge personnel, so indicate)	Permit No.	Unit or Location	Crops Grown	Avg. Yield per Acre	Permittee's Share		Government's Share or Return				Compensatory Services, or Cash Revenue
							Harvested		Unharvested		
					Acres	Bu. Harvested	Acres	Bu.	Acres	Bu.	
H. Koch	18695	13	Millet	18	17	306			8	144	
G. A. Dinger	12354	15	Corn	62	35	2170			27	945	
G. Pfutzenreuter	13243	16,17,18,19	Barley	20	29	580	3	60			
			Corn	38	58	1204					
			Oats	25	36	900					
	16213	43	Oats	30					47	1410	
S. Dennert	18960	21,22,37, 39 & 40	Rye	12	75	900					
			Oats	35	105	3675			20	700	
	12351	208	Wheat	10	20	200			80	800	
G. A. Dinger	11719	20W & 34	Barley	19	45	855	15	295			
			Oats	30	54	1620			26	780	
H. Wells	18100	23	Corn	6			17	100			
			Rye	7	50	350					
C. Spurr	13239	25	Wheat	12	10	120	3	40			
John Hinderks	12016	26 & 27	Wheat	13			12	160			
			Rye	18	15	270					
			Oats	20	20	400					
E. Mitchell	11307	28	Oats	60	20	1200			10	600	
R. Herseth	13221	29,30,31,42	Corn	25	32	800	12	300			
	18696		Corn	10	43	430			15	150	
			Millet	20	4	80			2	40	
			Barley	25	94	2350	31	785			
			Wheat	17	67	1139			33	561	

Summary of Crops Grown:

Crop	Acreage	Permittee's Share		Government's Share				Total Revenue
		Acres	Bushels	Harvested		Unharvested		
				Acres	Bu.	Acres	Bu.	$.....

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS

Cultivated Crops Report Form NR-8 should be prepared on a calendar-year basis for all crops harvested or utilized during the calendar year and submitted with the December 31 refuge report.

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Permit No. - List the number of the Special Use Permit issued to the individual.

Use or Location - The Unit No. or name specified in the Economic Use Plan should be listed in this column.

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Average Yield per Acre - It is important that the average yield per acre of each crop grown by each operator should be shown.

Permittee's Share - Only the number of acres harvested or utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. It is requested that all crops harvested be reduced to bushels wherever possible, or, as in the case with the harvesting of seed such as that of sweet clover, alfalfa, bromegrass, etc., the total harvested crop in pounds may be shown. Timothy, alfalfa, or other hay harvested by the permittee should be shown on Form NR-10 and should not be shown in the Permittee's Share column.

Government's Share or Return - Harvested - Show the number of bushels harvested for the Government and the acreage from which this share is harvested, both for grain raised by refuge personnel and by permittees. Unharvested - show the exact number of acres of crops allowed to remain unharvested as food and cover for wildlife. An estimate of the number of bushels of grain that is available for the wildlife in such unharvested crops should be shown in the Bushels column.

Compensatory Services, or Cash Revenue - Show other services received by the Government in cooperative farming activities, the number of acres of food strips planted for wildlife, the amount of wildlife crops not otherwise reported that are planted by cooperators for the Service, or the cultivation of wildlife plantations. If the permit is on a fee basis, the total cash revenue received by the Service.

3-1758
Form NR-8
(April 1946)

CULTIVATED CROPS
(Page 3 Cont.)

Refuge..... Year 194....

Permittee (If farmed by refuge personnel, so indicate)	Permit No.	Unit or Location	Crops Grown	Avg. Yield per Acre	Permittee's Share		Government's Share or Return				Compensatory Services, or Cash Revenue
							Harvested		Unharvested		
					Acres	Bu. Harvested	Acres	Bu.	Acres	Bu.	
A. Scott	13220	32	Barley	23	20.5	471	6.5	150			
			Corn	25	27	675			12	300	
			Wheat	10	18	180	6	60			
J. Kenny	13245	32a	Corn	25	15.5	387			7.5	187	
A. Severin	11 93	35	Oats	35	14	490			6	210	
			Millet	20	12	240			8	160	
H. Richardson	17370	36	Wheat	25	5	135	2	45			
Joe Hinderks	18698	38 & 44	Wheat	13	15	195	10	135			
			Barley	15	10	150	10	150			
			Rye	20	35	700					
			Millet	10	21	210			9	90	
W. Sieber	18697	41	Oats	40	62	2480					
			Millet	25					31	775	
H. Richardson	18699	45	Corn	13	33	435	11	145			

Summary of Crops Grown:
Total Production all Crops - 59,554 bu.

Crop	Acreage	Permittee's Share		Government's Share				Total Revenue
		Acres	Bushels	Harvested		Unharvested		
				Acres	Bu.	Acres	Bu.	$.....
Barley	665.5	466.5	8668	199	3200	-	-	
Oats	753	619	20251	-	-	134	4409	
Corn	502	326.5	9435	47	695	128.5	2602	
Wheat	359	209	2835	33	440	117	1401	
Rye	175	175	2220	-	-	-	-	
Millet	148	53	636	-	-	80	1709	
Totals	2602.5	1854	45053	279	4335	459.5	10121	

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS

Cultivated Crops Report Form NR-8 should be prepared on a calendar-year basis for all crops harvested or utilized during the calendar year and submitted with the December 31 refuge report.

Permittee - List each permittee separately. If lands of the refuge are farmed by refuge personnel or hired labor, this should be indicated in the Permittee column.

Permit No. - List the number of the Special Use Permit issued to the individual.

Use or Location - The Unit No. or name specified in the Economic Use Plan should be listed in this column.

Crops Grown - A separate line of the form should be used for each crop grown by each permittee or by refuge personnel. This is important, since if each crop grown by each operator is not specifically enumerated, the report will be of no value for statistical purposes.

Average Yield per Acre - It is important that the average yield per acre of each crop grown by each operator should be shown.

Permittee's Share - Only the number of acres harvested or utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. It is requested that all crops harvested be reduced to bushels wherever possible, or, as in the case with the harvesting of seed such as that of sweet clover, alfalfa, bromegrass, etc., the total harvested crop in pounds may be shown. Timothy, alfalfa, or other hay harvested by the permittee should be shown on Form NR-10 and should not be shown in the Permittee's Share column.

Government's Share or Return - Harvested - Show the number of bushels harvested for the Government and the acreage from which this share is harvested, both for grain raised by refuge personnel and by permittees. Unharvested - show the exact number of acres of crops allowed to remain unharvested as food and cover for wildlife. An estimate of the number of bushels of grain that is available for the wildlife in such unharvested crops should be shown in the Bushels column.

Compensatory Services, or Cash Revenue - Show other services received by the Government in cooperative farming activities, the number of acres of food strips planted for wildlife, the amount of wildlife crops not otherwise reported that are planted by cooperators for the Service, or the cultivation of wildlife plantations. If the permit is on a fee basis, the total cash revenue received by the Service.

Form NR-10

HAYING AND GRAZING

Refuge Sand Lake Year 1948

Permittee	Permit No.	Unit or Location	Actual Acreage Utilized	Animal Use Months	Tons of Hay Harvested	Period of Use From - To	Rate	Total Income	Remarks
R. Herseth	16902	2-3-4	110		79.35		1.00	79.35	
Tunby Bros.	16983	5	60		43.11		1.00	43.11	
A. Herseth	16981	6	150		102.89		1.00	102.89	
M. Kimball	16989	7	20		17.94		1.00	17.94	
Alba Scott	12358	10	100		81.23		1.00	81.23	
H. Cordes	12352	14 - 15S	100		78.25		1.00	78.25	
L. W. Bruns	16988	15S	50		39.81		1.00	39.81	
H. Koch	12359	16S	80		56.30		1.00	56.30	
Porason & Stearns	12360	16S	50		36.78		1.00	36.78	
G. A. Dinger	16906	19	40		22.36		1.00	22.36	
R. J. Vitense	16984	20	7		7.04		1.00	7.04	
Milo Kimball	12353	1	320	237.77			.40	95.11	
G. Crawford	16990	3	175	51			.50	25.50	
P. Scott	16991	4	200	87.9			.50	43.95	

Totals:

Acreage grazed 695 Animal use months 376.67 Total income Grazing $164.56

Acreage cut for hay 767 Tons of hay cut 565.06 Total income Haying $565.06

WATERFOWL

Refuge Dakota Lake Months of September to December 1948

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan									
II. Geese:									
Canada goose									200
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
Lesser Canada									500
III. Ducks:									
Mallard									100,000
Black duck									10
Gadwall									
Baldpate									
Pintail									200
Green-winged teal									
Blue-winged teal									
Cinnamon teal									
Shoveller									
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup									
Golden-eye									
Buffle-head									
Ruddy duck									
IV. Coot:									

SUMMARIES

Total Production:

Geese_____

Ducks_____

Coots_____

Total waterfowl usage during period 100,910

Peak waterfowl numbers unknown

Areas used by concentrations Waterholes on river below dam and north of Ludden Bridge

Principal nesting areas this season_____

Reported by Homer L. Bradley

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentration: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.

(5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(6) 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 nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

WATERFOWL

Refuge Lake Tewaukon & Cloude Lake Months of September to December 1948

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan									
II. Geese:									
Canada goose									200
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
Lesser Canada									800
III. Ducks:									
Mallard									30,000 mal
Black duck									10
Gadwall									500
Baldpate									100
Pintail									500
Green-winged teal									100
Blue-winged teal									1,000
Cinnamon teal									
Shoveller									500
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup									500
Golden-eye									
Buffle-head									25
Ruddy duck									
IV. Coot:									200

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese_____

Ducks_____

Coots_____

Total waterfowl usage during period 34,435

Peak waterfowl numbers Unknown

Areas used by concentrations Lake Tewaukon

Principal nesting areas this season_____

Reported by Homer L. Bradley

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

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(6) 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 nature of the migrational movement.

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2338

3-1758
Form NR-8
(April 1946)

CULTIVATED CROPS

Refuge Lake Tewaukon & Clouds Lake Year 1948

Permittee (If farmed by refuge personnel, so indicate)	Permit No.	Unit or Location	Crops Grown	Avg. Yield per Acre	Permittee's Share		Government's Share or Return				Compensatory Services, or Cash Revenue
							Harvested		Unharvested		
					Acres	Bu. Harvested	Acres	Bu.	Acres	Bu.	
Olaf Lee	12355	C-1	Wheat	10	23.3	237	-	-	11.7	117	
George Thornberg	12357	C-2	Wheat	no crop	15	-	-	-	7	no crop	
			Sum. Fallow	-	8	-	-	-	-	-	
Theodore T. Skroch	12356	C-3	Wheat	12	13	132	-	-	8	96	
			Millet	40	-	-	-	-	6	240	
			Sum. Fallow	-	60	-	-	-	-	-	
		C-4	Barley	10	17	170	-	-	-	-	

Summary of Crops Grown:

Crop	Acreage	Permittee's Share		Government's Share				Total Revenue
		Acres	Bushels	Harvested		Unharvested		
				Acres	Bu.	Acres	Bu.	$
Wheat	76	49.3	369	-	-	26.7	213	
Barley	17	17	170	-	-	-	-	
Millet	6	-	-	-	-	6	240	
Sum. Fallow	68	-	-	-	-	-	-	
Total	167	66.3	539			32.7	453	

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS

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Average Yield per Acre - It is important that the average yield per acre of each crop grown by each operator should be shown.

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Compensatory Services, or Cash Revenue - Show other services received by the Government in cooperative farming activities, the number of acres of food strips planted for wildlife, the amount of wildlife crops not otherwise reported that are planted by cooperators for the Service, or the cultivation of wildlife plantations. If the permit is on a fee basis, the total cash revenue received by the Service.

Form NR-10

HAYING AND GRAZING

Refuge Lake Tamarack & Cloud Lake Year 1948

Permittee	Permit No.	Unit or Location	Actual Acreage Utilized	Animal Use Months	Tons of Hay Harvested	Period of Use From - To	Rate	Total Income	Remarks
John L. Gelinski	16992	H-1	30		42.95		1.00	42.95	
George Thornberg	16997	H-2	15		13.88		1.00	13.88	
Theodore T. Skroch	16994	H-3	15		3.60		1.00	3.60	hay very short
George Thornberg	16996	G-1	80	32		8/1 - 8/31/48	.50	16.00	
Theo T. Skroch	16993	G-2	90	70.4		7/16 - 10/30/48	.50	35.20	

Totals:

Acreage grazed 130 Animal use months 102.4 Total income Grazing $51.20

Acreage cut for hay 60 Tons of hay cut 60.43 Total income Haying $60.43

1621