

SAND LAKE NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

MAY 1, 1955 to AUGUST 31, 1955

PERSONNEL

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Sand Lake National Wildlife Refuge

May 1, 1955 to August 31, 1955

I. GENERAL

A. Weather Conditions

A summary of weather data for the period May through August for the years 1953, 1954 and 1955 is given in Table No. 1 as recorded at the official weather station located at refuge headquarters.

TABLE NO. 1

Sand Lake Weather Data

Month	Precipitation			Max. Temp.			Min. Temp.		
	'53	'54	'55	'53	'54	'55	'53	'54	'55
May	3.2	1.1	2.3	86	80	87	25	21	23
June	7.9	2.6	4.4	95	90	85	38	34	42
July	.9	1.3	2.6	93	100	95	45	42	49
Aug.	2.0	2.1	2.6	95	90	101	47	45	40
Totals & Extremes	14.0	7.2	11.8	95	100	101	25	21	23

The spring drouth was broken on May 17 with a small shower followed by .81 the following day. Adequate rainfall the remainder of the month brought the total to 2.30 inches. Farmers in the area had been quite hesitant to continue planting corn until the "rains came" transposing apprehension to joy. Temperatures remained normal to slightly above for the month.

The weather man smiled during June bringing rains spaced evenly throughout the month while temperatures were average. Growing conditions being highly favorable, the crop outlook brightened a great deal after being pretty dim during the planting season.

The early part of July marked the biggest shot in the arm of the period for the farmers. Weekly rains up to one-half inch provided sufficient moisture to carry the small grain through. Another break followed in that harvest was $\frac{2}{3}$ completed under ideal conditions; no rain, bright sunny weather and normal temperature. There was some threat of damage by hail and wind due to thunder-

storms, but very little damage was evidenced in this area. The corn shot up the latter part of July having good ground moisture followed by sunshine, and high humidity.

Typical August heat crippled some of the fast growing corn along with only one good soaking rain of 1.61 inches on Aug. 6. The latter part of the month a few showers came to cool things off and brought fall weather to mind. Humidity remained high the forepart of the month adding some discomfort.

In summary it is felt weather conditions during the period were mostly normal in the immediate area. Other parts of the state suffered from lack of moisture, particularly the southwestern part of the state. Grasses never seemed to quite make a comeback after the dry spring. Crop yields were considered average to good and a plentiful supply of upland game food is promised.

B. Water Conditions

While potholes in the area were much below normal the lake level was maintained practically at authorized level throughout the period. A small flow in the James River was a big boost in keeping summer levels steady. Lowlands in the area are what can be considered dry. The Putney and Renzhausen Sloughs carry practically no water at all. These conditions will have a decided affect on local duck populations at the beginning of waterfowl season.

C. Fires

No fires were recorded during the period.

II. WILDLIFE

A. Migratory Birds

1. Populations and behavior.

a. Whistling Swans - built up to an impressive 150 during the last period but had all migrated by the beginning of this period.

b. Geese - were present in small numbers at the beginning of the period. About 2,000 Richardsons and 500 blues and snows remained on the refuge during the first week in May. The only geese present during the remainder of the period were our resident Canadas and the captives and cripples in the display pool.

Mating of Canadas got under way during March revealing a total of 18 nesting pairs. Two nests were located during aerials surveys, one of which was on a muskrat house - the first for Sand Lake. As has been the case in previous years, nesting activity was confined to the south half of the refuge.

The nesting pairs included some older birds that escaped from the display pool pen, during a late winter snow storm by walking onto a snowdrift and over the fence. Two have been seen with broods during the period. They will be picked up and returned to the pen this fall along with our regular collection of cripples.

The first goose broods appeared on Mud Lake Dike on May 18th. Below is a list of the 15 broods noted as successfully hatching from the 18 known mated pairs.

TABLE NO. II

Sand Lake Goose Broods 1955

<u>Date</u>	<u>Area</u>	<u>No. of Young</u>
5/18	Mud Lake Dike	6
5/18	Mud Lake Dike	5
5/20	So. Columbia Dam	4 plus
5/21	E. Harold Dennerts	6
5/21	E. Harold Dennerts	5
5/21	E. Harold Dennerts	5
5/21	Houghton Grade	6 plus
5/21	Houghton Grade	3
6/11	Houghton Grade	4
6/11	Houghton Grade	1
6/13	No. Harold Dennerts	2
6/13	No. Harold Dennerts	5
6/13	No. Harold Dennerts	4
6/23	Houghton Grade	5
7/13	Houghton Grade	7
Total		68 plus

The average brood size of 4.5 plus is somewhat lower than last years 5.1. However we were impressed by the total numbers as compared with previous years. Below is a comparison of numbers of goose broods and numbers of young produced at Sand Lake during the last six seasons.

TABLE NO. III

Goose Production Sand Lake Refuge

<u>Year</u>	<u>No. of Broods</u>	<u>No. of Young</u>	<u>Av. Brood Size</u>
1955	15	68 plus	4.5 plus
1954	9	46	5.1
1953	12	42	3.5
1952	18	65	3.6
1951	18	56	3.1
1950	12	50	4.1

At the end of the period the flock of resident birds is on the wing and feeding in refuge grain fields on the south half of the refuge. This flock of about 175 is comprised of family groups plus the non-nesters present during the period.

c. Ducks - As of May 1, approximately 7,000 ducks were present on the refuge and adjacent potholes. A very limited migration during the last period left Sand Lake with a below normal breeding population as was the case throughout South Dakota and Southern North Dakota. Total waterfowl use days last period

were just one-half those in the spring of 1954. Severe drought conditions prevailed over most of the upper mid-west sending our migrants along to more favorable breeding grounds.

An aerial survey made on May 12 revealed the following:

TABLE NO. IV

<u>Species (Pairs)</u>	<u>1955</u>	<u>1954</u>	<u>1953</u>
Blue Wing	48	73	63
Mallard	42	44	16
Gadwall	46	49	27
Pintail	8	18	8
Baldpate	-	6	5
Breen-wing	5	5	-
Shoveler	4	16	9
Redhead	8	15	34
Canvasback	-	2	-
Lesser Scaup	7	25	22
Ruddy	2	1	20
Total	<u>172</u>	<u>276</u>	<u>210</u>

The information given in the preceeding table is correlated with ground counts to arrive at an estimate of our population of breeding pairs. In previous years the sample ground counts compared with aerial surveys have shown a rate of about 2:1. In practice this seems logical that at the breeding and nesting period only about one half of the birds are observed during a single flight over this type of dense emergent vegetation. This factor was used in preparation of Table V in order to more accurately represent the breeding population rather than to use only the aerial data.

Ground counts were difficult to make at the proper time this year due to a shift in personnel and inclement weather prevailing during the latter part of April and May. However we feel the figures presented are as accurate as possible for this type of area. Consideration was given to particular species where a greater number of broods appeared than could be accounted for on the aerial census. The ratio of 2:1 is for the total population and varies somewhat for individual species.

In determining the number of broods shown in Table V a sample brood count of 22 miles of shoreline was run the latter part of July and early August. This sample comprises about 1/3 of the total shoreline hence the multiple of 3 was used in arriving at the total number of broods produced.

TABLE NO. V

SPECIES	COUNTED			ESTIMATED		MEAN AVG. BRD SIZE	TOT. EST. YNG PROD.
	PRS :	BRDS :	# OF YNG	PRS :	BRDS		
Mallard	42	19	77	84	57	6.52	372
Bluewing	48	13	58	75	39	6.80	265
Pintail	10	17	64	86	51	6.10	310
Gadwall	46	10	40	75	30	7.09	213
Redhead	8	1	5	6	3	6.31	19
Canvasback	-	3	13	15	9	6.18	56
Baldpate	-	1	4	6	3	6.36	19
Greenwing	5	-	-	10	6	6.07	36
Shoveller	4	-	-	8	5	6.33	31
Ruddy	2	-	-	4	2	5.34	11
Totals	165	64	261	369	205		1332
Coot	73	2	5	120	50	3.87	194

The following shows a comparison figures in previous years:

TABLE NO. VI

YEAR	EST. NO. OF BREEDING PRS.	EST. NO. OF BROODS	% OF PRODUCTION
1955	369	205	55%
1954	564	340	60%
1953	658	348	53%

As shown by the preceeding data Sand Lake experienced an overall 35% loss in nesting waterfowl as was expected and evidenced throughout the drought areas of the upper Midwest.

The water areas adjacent to Sand Lake did not provide appreciable nesting habitat and could not support the breeding populations which would ordinarily move into the refuge during the latter part of the period. Figures available at the end of the period show the total population to be nearly all residents. Small numbers of migrant pintails and bluewings have been seen feeding in refuge fields but no buildup has been noted among other species.

d. Coots - The coot population remained relatively constant from last period. The end of last period showed about 290 - 300 coots using the area. Coots did not buildup this spring as they have in previous years. An estimated breeding population of 120 pairs represented the peak concentration for the year.

The nesting population showed the same general decline as was noted among duck populations. The 50% reduction in young coots produced may, however, be attributed to something other than drought conditions. Coot nesting habitat was virtually the same as in past years.

e. Water and Marsh Birds.

Pied-billed Grebes - were common during the period. No figures on production are available; several broods were noted on the Mud Lake and Houghton Grades.

Western Grebes - were again abundant and very successful in raising their broods. A 20-30% increase over last year's population really put us in the grebe business. Broods were scattered over most of the refuge, however the south end showed the heavier concentrations. An estimated 600-700 young were produced.

White Pelicans - were present throughout the period. Nesting was confined to two islands. After denuding and defecating sufficiently to make the islands unattractive to everything including humans they built their nest and gloried in their deeds. A quick check of the islands revealed about 100 nests each producing perhaps 2 flying young. The direction of the wind prevented further investigations.

Cormorants - were also perpetrators in the above mentioned crime but confined their nests to the portion of the island they had prepared for themselves. They too were successful in rearing a bumper crop of young. Approximately 75 nests each produced 3-4 flying young.

Great Blue Herons - were seen frequently during the period. No nesting colonies were located but a few were undoubtedly raised on the refuge. Black crowned night herons were abundant throughout the period.

American Bitterns - were noted occasionally during the period. A least Bittern was noted on August 3rd in the north end of the refuge.

Sora and Virginia Rails - were seen occasionally during the period. These evasive birds are probably more often heard than seen.

f. Shorebirds, gulls and terns.

The shorebirds listed at the end of last period remained during this period. Bairds and Semi-palmated sandpipers were common. Piping and ringed plovers, turnstones and dowitchers were seen frequently during the period along the Houghton Grade. Avocets, willets and marbled godwits were seen occasionally but no evidence of nesting was found.

Forsters and common terns - were common throughout the period. Nesting of Forsters in at least one of the tow c colonies noted last year was carried on again this year. Common terns nested on small islands south of the Houghton Grade but did not nest with the pelicans and cormorants on their bilge raft as in previous years.

Franklins gulls - were present in large numbers again this year. A rough estimate of 100,000 at the end of the period is probably conservative.

2. Food and Cover

Aquatic food was abundant throughout the period in the main refuge pools. Drying of potholes reduced the food producing capacity of large areas adjacent to the refuge. With respect to our small resident population the natural food situation on the refuge is excellent for migrants.

Cultivated crop yields were near normal in the Sand Lake area. After a very dry spring and a nearly dry August, refuge lands produced a suprisingly good grain crop. The corn crop is still a matter for discussion but has every indication of making a good yield. A total of 123 acres of millet, 230 acres of barley and 362 acres of corn were left standing to provide a good supply of food.

Green goose browse is sparse at the end of the period due to the long dry spell. Fall rains will be necessary to green things up to provide good browse.

Cover for nesting is too dense in many areas on the refuge. The grazing program now underway is aimed at reducing this dense cover and providing a broken type cover pattern both on the upland and marsh edge. (See field investigation for discussion of this topic)

Brood cover is more than abundant over the major portion of the refuge. Emergent belts are at a stage of density where they are detrimental for nesting cover and may be creating a hazard for young birds by allowing predators to operate unnoticed. This is an opinion of course.

B. Upland Game Birds

1. Population and Behavior.

a. Ringnecked pheasant. The pheasant population on the refuge and over the state as a whole is at a high point after a mild winter and a successful hatch this spring. Warm dry weather conditions this spring were favorable for the production of a maximum number of birds. Second and third year alfalfa fields on the refuge produced a good number of young again this year.

The season in this area will again be 20 days from Oct. 22 to Nov. 13 with a daily limit of 3 cocks.

b. European Partridge. Only one pair of Huns was seen during the period at the south end of the refuge. No evidence of reproduction has been noted to date. This bird is approaching the rare species status in the refuge area.

c. Pinnated Grouse. No pinnated grouse were seen during the period. There is no evidence of any having nested in the Sand Lake area.

2. Food and Cover.

The food supply for upland game has been abundant throughout the period. A good crop of cultivated foods plus natural weed seeds and fruits should provide ample food for winter. A heavy sunflower crop has yielded seed enough to keep the pheasants going for some time. The practice of leaving a row or two of corn adjacent to shelter belts has proven valuable in carrying them over periods of bad weather.

Cover for upland game is plentiful and of a good quality. Shelter belts, marsh edges, and field margins provide excellent cover close to the best of feed.

3. Disease. None noted.

C. Big Game Animals

1. Populations and Behavior.

White-tailed deer and a few mule deer comprise the big game population at Sand Lake. The spring breeding population was estimated at 150 animals. A good number of does in this area have twins, producing a sizeable crop of animals in a season. Few fawns have made an appearance at the end of the period, however an increase of 100 animals is estimated. This would bring the total population to about 250 going into the fall and winter.

No open season is scheduled in this part of the state this fall. Information received from farmers and our observations on the refuge ^{show that a season} may be advisable the fall of 1956. The annual ^{aerial} survey will be made after sufficient snow cover is available, to more accurately determine this year's increase.

2. Food and Cover.

Food and cover are abundant on the refuge during the summer months. Food conditions in the winter however are a limiting factor in respect to the degree of browsing on shelter belts. Some corn is available throughout the winter months but as the herd increases the shelter belts tell the story. Complaints from permittees and farmers in the area keep us informed of damage,

done to their own crops and trees. As previously mentioned a thinning of the population will be necessary in 1956 if the herd continues to increase at its present rate.

The refuge has an abundance of cover for both winter and summer use.

3. Disease. None noted.

D. Fur Bearers and Other Animals

1. Raccoon.

The "coon" population remains at much too high a level. Even after the successful removal efforts of last winter they have bounced back with a bumper crop of young. Reports from all surrounding areas as well as the refuge proper indicates another concerted effort must be made this fall and winter to control the increasing numbers. Previously trappers have been on their own to take as many as possible. It may be necessary this year to make other arrangements in order to use refuge equipment and personnel to facilitate the "operation removal." An undercurrent of resentment has been voiced recently regarding the refuges "coon" population. These situations were concerning chicken and sweetcorn depredations.

2. Mink.

These animals appear to be increasing somewhat from sight observations during daylight hours on the refuge. Trapping operations will be aimed at harvesting the population to the fullest extent. The population at present probably exceeds 100 animals.

3. Beaver.

Numbers of these animals are not excessively large. Six known active colonies have reproduced sufficiently to bring the population to about 50 animals. No evidence of damage to shelterbelts has been noted.

4. Striped Skunks.

These have been seen occasionally but no evidence of their numbers increasing. Very few spotted skunks are seen in the area.

5. Muskrats.

Muskrats appear to be increasing again this year. This practically extinct species has been building up slowly the past two years. No figures are available on this years

increase. A check of muskrat houses will be made this fall prior to making trapping recommendations. It is felt a limited harvest may be possible this coming trapping season.

6. Cottontails and White-tailed Jackrabbits.

These animals are abundant on the refuge.

7. Red Foxes.

Apparently these animals are increasing rather rapidly on the refuge. Several den sites visited were active again this year and a large number of pups have been seen in late July and August. This species will need some special attention this winter along with other predators previously mentioned.

8. Fox Squirrels.

Are seen abundantly in most tree groves and around building sites.

9. Rats and Mice.

Rats and mice have been successfully controlled around buildings and grain storage by the use of warfarin. This is a continuous operation around the elevator and seed storage bins. Stations must be kept fresh or they lose their attraction.

E. Predaceous Birds

Marsh hawks, Swainsons, and red-tailed and sparrowhawks are present throughout the summer months. No appearance of a migration has been noted at the end of the period.

Short-eared and great horned owls have been seen frequently during the summer. No problem exists with the present concentration of hawks and owls.

Crows are not abundant in this area.

F. Fish

Carp, bullheads, suckers and yellow perch comprise the major portion of the fish population at Sand Lake. With large areas of shallow water and the present high population of rough fish, the game fish have little opportunity to increase. A few northern pike and crappies are taken at the Hecla recreation area however bullheads are the usual reward for bait dunking. The rough fish provide a good food supply for the pelicans and cormorants.

III. REFUGE DEVELOPMENT MAINTENANCE

A. Physical Development

1. Mulched and cultivated new shelter belts. This work consisted of cutting the weeds with the rotary mulcher (behind the Ford tractor) followed by disking. One mile of two-year-old cedars was gone over twice; one and one-half miles of composite belts were also treated twice in this manner. The trees in the new shelter belts on Hanson's point show good growth (four-year-old). The goose-corner shelter belt, planted in 1950, is in excellent condition with over 95% survival and growth of over 12 feet on the cotton woods. Most of the trees in the older shelter-belts (planted from 1937 - 1939) have reached climax and consideration must be given to annual under plantings to sustain wind break values, especially in relation to winter cover for pheasants.

2. Set up Weil rotary pump for irrigating headquarters area. Installation was made on the lake bank near original pump house built by CCC. Intake (screened) was built in the lake proper. Double screening was necessary to prevent sage pondweed from stopping up the pump and sprinkler heads. A mandril and pulley was installed on the pump so that it could be powered by either the Ford or John Deere tractor. This set-up permitted operating nine sprinklers at once, each with a radius of 60 feet. The system was ordinarily used from about four to eight PM; two evenings sufficed for a reasonably good soaking of the headquarters lawn area. This was the salvation of our grass and trees during the drouth period early this summer.

3. Set up and installed Hanson Broad-jet sprayer on Ford tractor. This consists of a 210 gallon alloy tank mounted on a sulky trailer (wheels 7.10 x 15). It operates from the PTO. The use of this excellent unit is described in the weed-control section of this report.

4. Planted 1,000 cedars (replacements) in shelter belt west of headquarters. Planting stock averaged 1 1/4 inches.

5. Cleared debris and trash from 8 acre area near site # 3 (Podolls). This used to be a dump ground and storage spot for "slaved materials" dating from CCC days. An 18 year accumulation of old posts, and other items was sorted and disposed of. The ground was plowed and seeded to grass with a cover crop of millet.

6. Surfaced approximately 8.6 miles of refuge trails with gravel - 700 cu. yds. to the mile. It was hauled and spread by contract each load being checked by refuge personnel. This stretch is from Gruetts to Podolls and east to the Mud Lake dike; and from the Weismantel sub-headquarters northeast to Silo Bay. Spot graveling was also done at headquarters and on both the Mud Lake and Columbia dikes.

7. Build yard-fence around buildings at Site # 4 (Clerk's residence), installed three gates.

8. Walked out 21 grazing units with SCS people (Don Minehart and Les Allbee). Determined recommended stocking rates and season of use.

9. Overhauled 18 foot barge; painted and caulked it. Added pontoons made from four 55 gallon oil drums and partial deck. Transported 14 cows to island grazing unit.

10. Daily observations on captive Canada geese in display pool areas.

11. Dragged Mitchell grazing unit for waterfowl and pheasant nests. Made study of comparative abundance in grazed areas as compared to mowed areas (hay units).

12. Painted (two coats) the barn, corn crib and two garages plus all sash and doors on the grain elevator at Weismantel sub-headquarters. Painted garage and shed two coats at Clerk's Residence.

13. Maintained warfarin stations at grain elevator and barn at headquarters.

14. Installed two 16 foot radial gates in Columbia Dam.

15. Service 10 flushing bars and distributed them to permittees for use while mowing refuge alfalfa.

16. Painted interior of upstairs apartment at the Weismantel sub-headquarters. Also painted interior of Managers residence with the exception of utility room and bathroom; these were done last winter.

17. Clean and rearrange grain elevator. Took in grain from permittees. (See grain report in Dec. 31 Narrative Report)

18. Set up stand for fire pump and tank so that this unit can be rolled onto any of the trucks instantly.

19. Mowed 15 miles refuge trails once; eight miles twice. Mowed grass at headquarters and two sub-headquarters periodically to maintain neat appearance.

20. Removed laboratory bench and surplus fixtures; moved furniture to provide office room for manager.

21. Hauled rock for rip-rap (71 loads) on lake bank near headquarters. Sloped bank and placed rock and seeded to alfalfa and brome. This completes revetment work.

22. Contractor (Stump and Stradinger) began work on ^{the} new structure in Mud Lake dike August 22. Checked plans with contractor and went over job with R. E. Johnston. Inspected work progress daily.

23. Regular service and repairs: two farm tractors, one tractor-dozzer, five trucks, one passenger car and other miscellaneous refuge equipment.

24. Mulched borrow pit areas east and west end of Houghton grade. Spread blackdirt with dozer and seeded.

25. Repair septic tank drain and floor drain in basement of Weismantel sub-headquarters.

B. Plantings

1. Aquatic and marsh plantings. None.

2. Trees and shrubs. 1,000 red cedars were planted in shelterbelts, to replace dead ones from last years planting.

3. Upland herbaceous plantings. None.

4. Cultivated crops. A total of 2,983 acres of crop were planted on the refuge this year. The harvest is not complete on corn, and millet and alfalfa seed. Following is a summary of harvest to the end of the period.

TABLE NO. VII

1955 CROP ACREAGES

<u>CROP</u>	<u>TOT.ACREES</u>	<u>GOV'T SHARE</u>	<u>LEFT STANDING</u>	<u>DEL.TO ELEVATOR</u>
Corn	880	421	362	not in
Millet	174 277	277 174	123	not in
Wheat	229	18	-	140
Oats	542	29	-	170
Barley	819	277	230	1872
Alfalfa	339	not in (+)	-	not in
Totals	2983 acres	1082 acres	715 acres	2092 bushels

The crop situation looked rather dim to start with this spring due to the lack of precipitation. However an average yield of small grains and a good crop of alfalfa was harvested on the refuge. The corn crop appears to be good in spite of rather dry weather during the critical period. The immediate area around the refuge has been fortunate in receiving more moisture than other sections of the county. The corn crop 20 miles west has burned to 60-70% loss in many fields. Below is a list of crop acreages harvested on the refuge the past 6 years.

TABLE NO. VIII.

SAND LAKE REFUGE AGRICULTURE HARVEST

1955 -	-	-	-	-	2983 Acres Harvested
1954 -	-	-	-	-	2827 " "
1953 -	-	-	-	-	2555 " "
1952 -	-	-	-	-	2525 " "
1951 -	-	-	-	-	2544 " "
1950 -	-	-	-	-	1894 " "

C. Collections - Seed and other propagules - None.

D. Receipt of seed and nursery stock

1,000 red cedars were received from the SCS during the period.

E. Weed Control

An application of 24D ester, at .75 lbs per acre was given. to a total of 1,368 acres of perennial sow thistle, Sonchus arvensis, and Canada Thistle. In addition 10 acres of perennial pepper grass, Lepidium draba and 2 acres of leafy spurge, Euphorbia esula, were given an application of 24D ester at 1.5 lbs. per acre. A second application is planned for as much coverage as weather will permit. An area of this size is impossible to cover with ground equipment between the time the rosettes form and frost kills them. Funds not being available for aerial spraying the second application will probably be limited to 300-400 acres.

The need for a second application is lessened over many of our acres however because of pasturing plans next spring. Cattle do a good job of controlling sow thistle and Canada thistle in pasture units. Parent plants were prevented from making viable seed by our first application and the cattle will take over from there in the spring by not allowing seed stalks to form next year.

Spraying was done with two broad jet tank type sprayers operated from tractor power take off. The refuge owned sprayer carries 210 gallons of solution at pressures from 0-150 lbs. covering a 45 foot swath effectively. Using tracks on a Ford tractor the rig can go down into the marsh and operate where no other equipment has been able to reach. The second sprayer was rented from a neighbor at .10 cents an acre and operated with government owned tractor. An average of 18 gallons of liquid per acre assured a much better penetration in heavy vegetation than does the 1-2 gallons used in aerial spraying. An average cost of \$1.06 per acre or a total of \$1,458.26 was required for the first application. The drawback to this type operation is the time required to cover the areas. An average of 35-40 acres a day per machine is rather slow considering the number of acres

to be covered.

The results at present appear to be 100% kill on seed stalks and parent roots. However a large number of sucker roots have ~~arrived~~^{survived} to produce winter rosettes. More information will be available after the second application. A more detailed report will be included in the Dec. 31 Narrative Report.

IV. ECONOMIC USE OF REFUGE

A. Grazing

The grazing program has changed considerably at Sand Lake during the period. Thirteen permits were in force, covering approximately 1900 acres. This is an increase of 1,000 acres over last years all time high. Several new units now being fenced will receive some use yet this year.

Receipts at the end of the period totaled \$1127. Fees remain the same as in previous years. Grazing is chargeable at \$1.00 per Animal Use Month, allowing five acres per head per month over a four month season, or .8 AUM per acre per season.

The long range plan for grazing is to convert most existing hay units into pasture units. A definite advantage has been experienced here as on other refuges in controlling vegetation by grazing rather than mechanical means. Nesting cover is improved by the patch effect from grazing rather than overgrown areas or close clipped hay units. Also, loafing sites are created along marsh edges where wide belts of emergents are broken up by cattle watering and loafing to keep away from flies. From the economic standpoint grazing affords permittees the use of waste areas while bringing in revenue for the service and accomplishing our objective in providing improved nesting and resting areas.

B. Haying

A total of twelve permits have been issued for approximately 640 ton of native hay. The hay crop has not been measured yet as hay is allowed to dry and settle before measuring stacks and weighing bales. The figures for hay removal will be available for the report next period.

C. Other Uses

One permit issued for the keeping of 100 hives of bees at 15 cents per hive per year.

V. FIELD INVESTIGATIONS AND APPLIED RESEARCH

A. Breeding pair counts and brood counts

This subject has been discussed and summarized under Section II A 1 c and tables IV, V and VI.

B. Nesting in relation to land use

A series of samples were run the middle of June using 200 foot rope drag with weights every 30 inches. Areas dragged were representative of four different types of land use at Sand Lake. The tests made this year were a continuation of a project started two years ago to gain information on nesting use as compared

with land use practice. These samples are not conclusive in themselves, however the pattern is forming in favor of grazed areas as compared with non-use or mowed areas. Following is the tabulation of the samples run this period.

TABLE NO. IX

<u>Land Use</u>	<u>No. of Acres</u>	<u>Duck Nests</u>	<u>Pheasant Nests</u>
Mowed	30	0	0
Grazed	30	3	0
Alfalfa (2nd year)	14	0	2
Non-Use	35	0	0

The picture represented in table IX is much the same as previous samples of dragging at Sand Lake and refuges in N. Dak. and Nebraska. Our program of converting non-use and hay units into pasture will give us further information on the effects of land use. Results to be reported in subsequent narratives.

15
12
30
15
160

VI. PUBLIC RELATIONS

A. Recreational Uses

Both the Hecla and Columbia recreational areas were used by a great many picnickers again this summer. The Columbia area was the site for a weekend camp of the Amateur Radio Operators (Hams) of the state, setting up a miniature city of antennas and the like.

B. Refuge Visitors

Bernie W. Palas - Regional office
Robert J. Sliwinski - GOC
Donald L. Chapman - GOC
Greenfield School - 20 Students and parents
Savo # 2 School - 26 "
Savo # 3 School - 20 "
Wilmsen, Engle, Bell Schools - 115 students and parents
Joan of Arc School - 10 Students and parents
Johnson School 15 "
Laurel School 3 "
Pearson School 4 "
Heinemann School 6 "
Karlan School 9 "
~~Harold~~ Titus - Field and Stream Magazine
Les Allbee - Soil Conservation Service
Don Minehardt - Soil Conservation Service
Amateur Radio Operators of S. Dak.
F. C. Gillette - Regional Office, Refuge Inspection

Frequent visitors:

L. C. Richardson - S. Dak. Game Warden
Everett Sutton - USFWS Game Agent

C. Refuge Participation - Summary of personnel attendance.

5/5/55 - Brown Cty. Weed Clinic, Woon, Sutherland, talk by Dill
5/6/55 - TV Broadcast ov Bismarck, Podoll and Dill, Refuge film.
5/13/55 - N. Dak. Sportsmens Group, Dill discussion and slides on wetlands drainage, fishery development at Tewaukon.
5/19/55 - Brown Cty Sportsmens Club, Dill discussion and slides on wetlands drainage.
6/20/55 - Methodist Church, Ellendale, Father and Son Banquet, two wildlife films and 15 minute talk on refuges.
6/25/55 - N. Dak. Wildlife Federation, Dill attending.
7/13/55 - Brown Cty Sportsmens Club Directors, Dill on Public Hunting
7/30/55 - S. Dak. Wildlife Federation, Woon and film by Dill.

D. Hunting - None this period.

E. Fishing

Fishing on the refuge is limited to the retired sleeper-fisherman who rests himself and cane pole while waiting for the big one to come along.

As mentioned previously in Section II F the fish population consists mainly of rough fish. A few sizeable northerns and bullheads have been caught at the Hecla recreation area where the James river enters the refuge. Fish taken from the Weismantel bridge have been limited strictly to small sized bullheads. Fishing man days is estimated at less than 1,000 for the period.

VII. OTHER ITEMS

A. Easement Refuges

1. Tewaukon Refuge

Numerous visits have been made to Tewaukon Refuge during the period. Land acquisition and the building of the new contract control structure, to replace the old White Lake bowl structure, has put Tewaukon on the map as a promising management area.

At the end of the period the structure is about complete except for finish work on the concrete and placing rip-rap on the dike. This will be a great improvement in water management for the area.

Three serious wind and hail storms the early part of July wiped out the southern half of Sargent County including refuge crops and ducks. Hail stones 4 inches in diameter were reported on two separate days with as much as 11 inches of rain in a week. Needless to say crops other than late millet and some flax were destroyed 100%. The refuge crops were so badly washed and inundated that the grain was left shelled out on the ground for early migrants. The local economic situation is at a very low level considering the bad rust infestations experienced the past two seasons.

Only two broods were reported on the area by local residents. A brief survey was made by refuge personnel on two different occasions in early August. Nothing appeared but a few scattered groups of non-nesters.

2. Maple River

This refuge was visited twice during the period. Water levels were above normal in July as a result of torrential rains early in the month, and use of the marsh by waterfowl was good.

The rubble structure in the river showed the usual amount of deterioration. Last year this dam was completely renovated - this year, while not as serious, some of the rocks have come loose and must be replaced.

All signs were in place and in good shape. This area was completely re-posted last fall.

3. Dakota Lake

Waterfowl populations were checked in conjunction with aerial counts made of Sand Lake. As has been found in the past, very few birds were present during the summer.

C. Photographs

Photographs on the following pages were taken by Manager H. H. Dill with the refuge 35mm camera.

Credits:

Dill - Portions of Sections III, IV, VI, VII and editing.
Ween - II, V and portions of III, IV, VI, VII and NP forms.
Wahl - I and portions of III, IV and typing.

Submitted by

Herbert H. Dill
Refuge Manager

September 22, 1955

Approved: Regional Office

WATERFOWL

MONTHS OF MAY 1955 TO AUGUST, 1955

[illegible]

WATERFOWL
(Continuation Sheet)

REFUGE SAND LAKE

MONTHS OF MAY THRU TO NOVEMBER, 1955

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production : Broods: Estimated : seen : total	
	11	12	13	14	15	16	17	18			
<u>Swans:</u>											
Whistling											
Trumpeter											
<u>Geese:</u>											
Canada	100	100	100	175	175	175	175	175	16,000	15	70
Cackling <i>Richardson</i>									14,500	-	-
Brant											
White-fronted											
Snow											
Blue											
Other											
<u>Ducks:</u>											
Mallard	150	150	150	150	150	150	150	700	34,450	19	372
Black											
Gadwall	150	150	300	300	300	300	300	500	24,500	10	213
Baldpate	7	7	25	25	25	25	25	100	1,575	1	20
Pintail	150	150	350	350	350	350	500	1,000	33,250	17	310
Green-winged teal	25	25	50	50	50	50	50	100	7,350	0	35
Blue-winged teal	150	150	350	350	350	350	300	500	32,900	13	265
Cinnamon teal											
Shoveler	25	25	50	50	50	50	100	150	5,950	0	30
Wood											
Redhead	25	25	40	40	40	40	40	40	5,250	1	20
Ring-necked											
Canvasback	25	25	50	50	50	50	50	50	5,600	3	56
Scaup											
Goldeneye											
Bufflehead											
Ruddy	7	7	25	25	25	25	25	25	1,050	0	10
Other											
<u>Coot:</u>	150	150	200	200	200	200	250	350	21,700	2	154

(over)

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans	:	:	:
Geese	51,985	2,703	78
Ducks	152,075	3,000	1350
Coots	21,700	350	200

SUMMARY

Principal feeding areas South half of Pond Lake

Principal nesting areas

Reported by

Howard S. Woon
Howard S. Woon

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form NR-1A
(Nov. 1945)MIGRATORY BIRDS
(other than waterfowl)Refuge SAND LANEMonths of MAY THRU to 13 AUGUST 1955

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. <u>Water and Marsh Birds:</u>										
Western Grebe			1,000	8/30						
Pied Billed Grebe										
White Pelican			2,500	8/30						
Double Crested Cormorant			2,000	8/30						
Great Blue Heron			60	3/30						
Black Crowned Night Heron										
Common Bittern										
Virginia Rail										
II. <u>Shorebirds, Gulls and</u>										
<u>Terns:</u>										
Killdeer										
Upland plover										
Banded plover										
Piping plover										
Lesser yellowlegs										
Greater yellowlegs										
Avocet										
Willet										
Spotted sandpiper										
Bairds sandpiper										
Pectoral sandpiper										
Semi-palmated sandpiper										
Piping plover, Marbled godwit, Common tern, Forster's tern, Black tern, Franklin's gull.										

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove					
IV. <u>Predaceous Birds:</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow Shortear owl	1	6/2			
Reported by.....				Howard W. Woon Howard D. Woon	

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

(1) Species	(2) Density	(3) Young Produced	(4) Sex Ratio	(5) Removals	(6) Total	(7) Remarks	
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'd. Estimated Total	Percentage	Hunting For Re- stocking For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring necked Pheasant	ocean edges and adjacent upland 10,000 acres			Insufficient data - see text.			
European Partridge	Upland meadow fields 4,000 acres			Insufficient data - see text.			



SD-SOL-721

Hanson Broad-Jet sprayer covers 45 feet. Used with sulky trailer and 210 gallon tank, the sprayer operates from pump on P70.



SD-SOL-722

A half-track attachment permits operating the sprayer almost anywhere in the marsh. A new supply of water is being taken on in the picture.

• SEP • 55 E



SD-50L-723

The large island just north of the Mud Lake Dike was burned over in March. These pictures show the practically solid stand of bluegrass found there in June; the snowberry in the upper picture was practically destroyed as a result of burning.



• SEP • 55 E

SD-50L-724



SD-SDL-725

A solid stand of emergents plus a matted accumulation of perennial grasses present in Grazing Unit No. 7Gb (Stensland) prior to initiation of grazing this summer. This area has been inviolate to grazing since establishment of the refuge in 1935.



A tremendous amount of forage nearly hides the cattle when they were turned into Unit 7Gb in June.

SD-SDL-726



SD-SDL-727

A month later improvement is noted in interspersion of cover in Unit 7Gb but the cattle are still belly-deep in forage.



SD-SDL-728

The refuge barge is equipped with pontoons and decked to haul two head at a time to the Mud Lake island - Grazing Unit No. 50.

SEP • 55 E



SD-50L-729

A little skeptical but cooperative white faces
leave the USS "Elmers" Ark.

• SEP • 55 E



SD-50L-730

A 200 Foot rope dray pulled by two pickups was
used to check some of the fields for nests.

• SEP • 55 E



SD-SDL-731

A span of refuge telephone line loaded up with bank swallows. The weight of these birds on the wires sometimes causes a short-circuit.

• SEP • 55 E



SD-SDL-732

A stately procession of refuge honkers. Seven families (with broods) along the Houghton Grade provided interesting camera material for visitors this summer.

• SEP • 55 E



SD-SOL-733

The buildings at the Weismantel sub-headquarters were painted. These are the two garages.

• SEP • 55 E



SD-SOL-734

Bank sloping and rip-rapping was completed during the period.



SD-SD-735

This is probably the last picture to be taken of the Tewaukon Bowl Spillway built in WPA days. It is slated for removal immediately following completion of the new structure.



SD-SD-736

The new Tewaukon structure, upstream from the old bowl, will be completed by early fall. Here the last of the sheet piling is being placed and forms for the footings built.



50-506-737

A five-inch rain plus severe hail caused 100% crop loss in the Tewaukon area July 10. Duck and pheasant broods were completely destroyed.



50-506-738



SD-50L-739

Sand Lake crops were good despite a dry spring. The rains came in June and July. The upper picture shows white proso millet that eventually yielded 22 bushels per acre; below is 40 bushel barley. The men are Merrill Hammond (visiting fireman) and Howard Woon.

