SAND LAKE NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

MAY 1, 1950 to AUGUST 31, 1950

PERSONNEL

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Sand Lake National Wildlife Refuge

May 1, 1950 to August 31, 1950

I. GENERAL

A. Weather Conditions

An official weather station is maintained by Sand Lake Refuge for the U. S. Weather Bureau.

A summary of Sand Lake weather data for the period May through August 1950 is given below in table 1.

TABLE NO. 1

Sand Lake Weather Data, May - August, 1949 & 1950

MONTH	SNOWFALL '49	SNOWFALL '50	PRECIPITATION '49	PRECIPITATION '50	MAX. TEMP. '49	MAX. TEMP. '50	MIN. TEMP. '49	MIN. TEMP. '50
May	-	2.00	5.88	6.70	90	91	32	24
June	-	-	1.32	0.30	96	97	34	34
July	-	-	3.97	1.79	107	90	45	42
August	-	-	1.25	1.30	102	89	40	35
		2.00	12.42	10.09	107	97	32	24

The last snowfall was recorded on May 5th when about 2" of snow remained for two days. Total precipitation was less during May - August 1950, as compared with the same period a year ago. Almost 70% of the precipitation fell the first 10 days of May. A near drought has prevailed for the rest of the period. June was the third driest on official record.

Temperatures were cooler than average for the entire four month period. Near freezing temperatures prevailed in the area on August 3rd when frost was reported a few miles from the refuge. Highest temperature (97°) was recorded on June 22. Lowest temperature (24°) was recorded on May 21

May was cooler than average with higher than average precipitation during the first ten days of the month. Heavy rains and late snows in this region and northward into North Dakota prolonged the flood period along the James River. June temperatures were about average and comparable to 1949. There was a near absence of violent prairie storms which usually occur in this area during the month. Two storms during the period, June 22 and 25 caused some structural damage in this vicinity. Precipitation for the month of June was much below normal. July was cooler than average with normal precipitation during the first fifteen days becoming

very dry the last one-half of the month. August temperatures were below normal with near freezing conditions on August 20. Precipitation for the month (1.30") was slightly less than average.

Unusually cool temperatures and heavy rainfall during late April and early May had a pronounced effect on farming operations. Many fields of small grain were not seeded until May 25 and the last corn in the locality was planted from June 20 - 25. The cool weather that persisted throughout July and August made it possible for the small grain crops to ripen without damage. Fair yields and good quality grains were reported. Harvesting however, was about one month later than usual. As of the end of this period, most corn is just reaching the roasting-ear stage. If warm weather prevails for another 3 weeks, a good crop is expected.

B. Water Conditions

The unusual late snow and heavy spring rains in this area and northward through North Dakota greatly increased the amount of spring run-off through the James River valley. Normally the high water passes through Sand Lake during late April. This year the levels were above normal during late April and continued to rise until a flood stage was reached by May 1. Major flood crests occurred on May 5 and 24. Water remained at flood stage throughout May and began receeding the first week in June. Flood stage was passed by June 10. High waters remained throughout the summer. About .1 foot was passing over the Dakota Lake spillway at the end of this period. The Sand Lake unit had not quite receeded to its' authorized level of 1279.33 ft. as of August 31.

Gauge readings at the Columbia and Mud Lake dams were recorded almost daily during May. The flood crest on May 5 reached an elevation of 1275.56 feet at the Columbia dam. On May 24 an all t time high of 1275.58 feet was recorded. This was the highest water level recorded for this area according to any existing records. Local residents reported it to be the highest level attained since 1890 and many thought it exceeded the 1890 flood.

The flood caused considerable damage to roads, dikes and banks. The Weismantel Grade at the south end of the refuge went out on May 5 and was impassible until restored by the County on July 20. The Houghton grade was under water on May 7. Wave action cut through the grade at several places. State highway crews attempted to keep the road open but high water badly damaged the grade and made it impassable for nearly 3 weeks. The second crest on May 24 went over the grade again. The Columbia and Mud Lake dikes were subjected to severe wave action but oversize fill and sand bags prevented serious losses. It was felt that sand bagging by refuge personnel saved the water control structures from serious erosion or possible destruction. On Mud Lake dike the top gravel washed off but was beached out on each side so as to form a good gentle sloping base. Resurfacing the top of the dike will put it in better condition than it was prior

to the flood. The banks around headquarters and the recreation area were badly eroded by flood waters. Banks were cut back as far as forty feet in some places. The front end of the boathouse at headquarters was knocked out and the boathouse at the Mud Lake Dike was completely destroyed. Much of the surrounding farm land was still under water on July 1. Some fields could not be cultivated this year. Many of the refuge waterfowl nesting areas were under water when nesting activity would normally be at the peak.

Records kept on rising water levels on the James River from the state line to the Columbia dam indicated that a flood crest arrived at the Hecla bridge 10-11 days after passing Jamestown and required almost two days more to reach the Columbia dam, providing the channel was not full. When the James River Channel was full the crest passed through approximately two days sooner.

C. Fires

A fire occurred on June 28 on refuge land farmed by a permittee. This fire was the direct result of his hired man burning a pile of weeds deposited on the land by the recent flood. The fire attained a size of approximately one and one-half acres but there was no serious damage except to a small grove of about 12 trees. A routine fire report was submitted.

II. WILDLIFE

A. Migratory Birds

1. Population and Behavior

a. Swan A few whistling swans lingered on the refuge during the early part of May. Three were observed on May 1 and occasional observations of 1 or 2 birds were made until May 20. On May 18 a captive Whistling Swan, taken as a wounded bird in the fall and kept through the winter, was banded and released. The bird was a strong flyer and appeared able to care for itself. It apparently joined the few Swan remaining on the refuge. Observations indicated all the Swan had moved northward by the end of May.

b. Geese Unseasonable cold weather during the spring caused the migration of geese to be late and erratic. On May 1 when the major flights of geese are usually about over at Sand Lake we still had 50,000 birds on the area. This represented only 1/5 the number of geese counted on April 13 but was many times the number present the same date the previous year. As of May 1 the composition of the goose flock was as indicated in Table No. 1.

TABLE NO. 2

COMPOSITION OF SAND LAKE GOOSE FLOCK
May 1, 1950

Snow Geese	20,000
Blue Geese	20,000
Richardson's Geese Branta canadensis hutchinsi	7,000
White-fronted Geese	1,000
Lesser Canada Geese B. c. leucopareia	1,000
Common Canada Geese B. c. canadensis	1,000

A major flight of geese, occurring during the evening of May 1, reduced the flock to 10,000 as of May 2. The flock built up again somewhat despite the lateness of the season. On May 7, 12,000 geese, largely Snow and Blue with lesser numbers of the other species, were seen on the area. Thereafter the flock dwindled rapidly however until only 100 Common Canda (honkers) remained as of June 1.

The 100 Common Canada Geese remained throughout the summer. Many were known to have nested on the refuge despite flood waters which covered favorite nesting sites until mid-June. The first brood of Common Canada geese was observed on June 25, 6 weeks later than the first brood was observed in 1949. Six broods were actually observed, numbering 3 to 6 goslings each. Apparently 10 or 12 broods were raised on the area. An aerial census made August 31 indicated our summer population of Common Canada geese had increased to 150. This represented an increase of 50 birds over the June 1 census figure. The increment was apparently due to nesting only. Our summer population of Common Canada geese remained at the same level as in 1949 but we felt we had a few more broods and less non breeding birds. This was encouraging in view of adverse nesting conditions created by flood water which covered favored nesting habitat on islands and dikes. It appears that nesting of Common Canada Geese on Sand Lake can be gradually increased by keeping disturbance to a minimum and maintaining attractive nesting habitat.

Due apparently to the delayed nesting season, our breeding geese have not displayed the flocking habit to the extent they did in 1949. The birds are still largely dispersed in family groups as of the end of the period. Feeding in grain fields was barely begun by late August whereas it was a common practice at the same time a year ago.

In addition to the 150 Common Canada geese found on the refuge throughout the summer, 3 Blue geese and 3 Snow geese were observed on several occasions. These birds appeared to be casualities of the spring migration. Of the 6, only 1 was definitely observed

flying. Although the Snows and Blues remained together throughout the summer, mating or nesting was not observed and probably did not occur.

b. Ducks Flood water and unseasonably cold weather dispersed and delayed the spring flight of ducks through the Sand Lake area. Many of the favorite feeding-loafing spots were inundated throughout May and early June. The cold weather held many early migrants in the vicinity several weeks beyond normal. Outlying potholes were filled with water. As a result our refuge flock of ducks was scattered throughout the vicinity and were found on the refuge only part of the time. Every pothole had its quota of Pintails, Shovelers and Mallards and Blue-winged Teal ~~and~~ a little later in the season. The spring flight was largely complete by May 1 at which time only 30,000 ducks were on the area. Rafts of Scaup were common; this species was more abundant than in 1949. The flight of Pintails was likewise above normal. Mallards were widely scattered and appeared more scarce than figures indicated.

On May 1 the Blue-winged Teal was the most abundant species. Pintails, delayed by cold weather, were still second in number. Shovelers were nearly as abundant as Mallard. Gadwall and Baldpate ranked next in importance. Representatives of other species were found in lesser numbers.

During all of May, the James River remained at high flood level and the northward movement of ducks was retarded by cold weather. The duck flock numbered 20,000 on May 10; 15,000 on May 20 and 10,000 on June 1. Dry and warmer weather in June rushed the lingering migrants northward. By June 10 our duck population was reduced to about 5,000 which represented breeding birds.

The composition of the Sand Lake breeding bird population during the past summer is indicated in Table No. 3.

TABLE NO. 3
Breeding Duck Population - Sand Lake Refuge
June-July 1950

Blue-winged Teal	2000
Pintail	1000
Mallard	800
Baldpate	500
Gadwall	500
Shoveler	100
Ruddy	50
Other	50
TOTAL	5000

The nesting season was delayed 3 to 4 weeks by inclement spring weather. Only 1/10 the normal number of broods per mile was observed during the July 20 - 25 period when broods are normally most abundant. Brood counts were again made between August

10 and 20; the count was slightly above our normal average, thus proving that nesting was delayed about one month. Reproduction, other than being delayed, appeared quite normal. Brood size compared favorably with figures from former years. Evidently the total number of ducks produced was up to average but some of the late hatched birds will be quite immature at the opening of our hunting season on October 6.

Grain field feeding did not get underway until considerably later than normal. The ripening of small grain was 3 to 4 weeks behind schedule but ducks did not ~~immediately~~ begin to feed in the fields immediately after the grain was cut. As a result no complaint was received from neighboring farmers. As of the end of August some of the ducks are feeding in grain fields quite regularly but grain harvesting was completed about one week earlier and no damage resulted.

An aerial census made on August 31 indicated our ducks were beginning to congregate at favorite feeding - loafing spots on the marsh. Some of the early hatched family groups were breaking up and merging with the flock. Most of the male "flappers" had regained their power of flight and eclipse plumages were beginning to disappear.

More ducks appeared to be feeding on the refuge than usual for September 1. Sago pondweed potomogeton pectinatus proved the most attractive natural food. The eveing and morning flights of ducks to and from feeding grounds in grain fields were very little in evidence as of September 1. Apparently the immature condition of many ducks, together with late grain harvest and an abundance of Sago Pondweed, delayed the grain feeding habit.

The usual late summer movement of ducks into Sand Lake Refuge was not apparent until the last 10 days of August when a noticeable increase in Pintail, Blue-winged Teal and Shoveler was recorded. Whether this represented the beginning of a regular migration from North Dakota and Canada or an accumulation of ducks raised on the refuge and in neighboring potholes, could not be definitely determined. Reports from many sources combined with our own observations made within 50 miles of the refuge indicate the new ducks represented the first true migrants plus broods hatched on the refuge and in the territory surrounding the refuge. Our duck population began increasing quite suddenly on August 20 at which time about 8000 birds were on the area. Aerial count on August 31 indicated our population had nearly doubled in 10 days. As of the end of the period (August 31) we have a refuge duck population of 15,000 and it is rapidly increasing. Of special interest was the observation of a pair of Wood Ducks on the river south of Helea Grade on August 15.

c. Coot Coot were noticeably more abundant during spring migration and our late summer population of 3000 represented a 50% increase over 1949. About 500 young were hatched on the refuge and 6000 used the area during the May through August period.

df. Pelicans White Pelicans were somewhat more scarce than usual during May and June. Flood water over many of their favorite nesting-roosting islands during this period was the probable cause. As the flood water receeded and the heavy spawn of rough fish became concentrated in the river channel Pelicans increased rapidly. Just where they came from is a puzzle. We know of very few Pelicans other than the Sand Lake flock for distances exceeding 100 miles. Nevertheless, when the rough fish spawn fingerlings became available in abundance the Pelicans were here. The Pelican flock increased rapidly during July and early August. Our peak population was apparently reached about August 10 when about 12,000 birds were recorded. This apparently represents an all time high in the Sand Lake summer Pelican flock.

Pelican nesting at Sand Lake was delayed by flood water but about 50 nests were checked July 9 on a small island north of Mud Lake dike. During 1949 100 nests were counted on the same island. Evidently Pelican nesting was reduced by about 50% this year.

e. Double Crested Cormorant The Cormorant is the second most abundant marsh bird at Sand Lake. The flock was reduced this summer as compared with 1949. High water and ice knocked down practically all of the dead trees standing in the lake at the time of the spring break-up. These were used extensively as Cormorant nesting sites. Loss of nesting trees and inundation of nesting island apparently reduced our Cormorant nesting colony by at least 50%. We have noted a gradual build up of Cormorants during late summer but the increase was not nearly as spectacular as that noted for White Pelicans.

f. Herons, Grebes, Bitterns, Egrets Black-crowned Night Herons were very common during the summer. A limted number of nests were recorded.

Great Blue Herons were first observed on July 15. No nesting of this species occurrs on the refuge. American Bitterns were common. Nesting probably occurred.

One American Egret was observed on ~~July~~ Aug. 16. This was the only observation made on this species during the current season. A single observation was made on American Egret during 1949 also. This species is rare on the refuge. The lone stragglers apparently wandered up the Missouri and James Rivers to reach Sand Lake Refuge.

g. Shorebirds, Gulls and Terns Wilson's Snipe were observed on two occasions. 20 birds on May 7 and 6 on May 8. A movement of Snipe appeared to be on at this time. We have some indication that Wilson's Snipe may be on the increase but our observations are too limited to be positive.

Sora Rail were very common during the summer. Virginia Rail was recorded on one occasion but apparently this species is rather scarce at Sand Lake.

Marbled Godwits were very common during spring migration. On September 3 a group of 200 Godwits was noted in one location. The birds began returning from northern breeding ground about July 20.

Avocets and Long-billed Dowitchers showed up in fall migration on July 27 and became numerous by August 15. Both species were very numerous by August 31.

Lesser Yellowlegs as usual, were first fall migrants to appear, being recorded first on July 10. Greater Yellowlegs were first noted July 12. Both species were very abundant as of August 15.

During the last days of July and first part of August the Western Willet, American Knot, Semi-palmated Plover, Spotted Sandpiper, Baird's Sandpiper and other shorebirds were observed. Shorebirds increased in number throughout August and were very abundant as of the close of the period covered by this report.

OnJuly 10 a Caspian Tern was observed. This represents a first for the refuge it is believed. Black Tern nested on the area in large numbers and were very numerous by Lake August.

Ring-billed Gulls began showing up in fall migration by late July and were fairly common as of late August.

Franklin's Gulls nested on the refuge in the usual large numbers. About 15,000 breeding birds were recorded in mid summer. The colony increased steadily as the season progressed. By early August the morning and evening flights became pronounced. As of August 31 about 150,000 Franklin's Gulls are using the refuge and the morning and evening flights are spectacular.

h. Mourning Doves Our usual breeding population of about 300 birds was present. Nesting appeared to be successful. One Dove at headquarters hatched 3 broods of young. Doves increased rapidly during late July and early August. Apparently a migrational movement was on. A maximum population of about 1400 brids was noted on August 15. The birds was noted on August 15 were reduced to about 500 as of August 31.

i. Predaceous Birds Red-tailed hawks began concentrating on the area in early August and were very common by the end of the month.

Red-winged Blackbirds became increasingly abundant throughout mid and late summer. As of August 31 Blackbirds are very abundant and are causing farmers some concern. No serious depredations have been reported to date however.

2. Food and Cover

Grain foods will be somewhat short for waterfowl at Sand Lake Refuge during the coming season. Flood water covered nearly half of our agricultural land until early June, thus prevent-

ing the cultivation of many fields. Wherever possible a crop of millet was sown. Some fields were seeded as late as mid July. Lack of rain prevented some of the millet from sprouting. To compensate for our inability to raise our usual crop of grain we have left all the refuge shre in the field. Our total share this year will be 547 acres of corn, wheat, oats and barley.

Our corn and millet are both very late but if frost does not occur until September 15 to 20 we will have some very good waterfowl feeds.

We have a considerable amount of grain stored in our elevator which we can use if we find our waterfowl in serious need. We do not anticipate any serious problem.

Sago Pondweed Potamogeton pectinatus and Smartweed Polygonum muhlenbergii were unusually abundant, especially in the Sand Lake unit. This apparently was due in part to our lowering the water to our new authorized level for this unit. Several mud flats were exposed as the water level dropped to 1270.33 at the end of August. It would have been an excellent opportunity to seed millet and smartweed except that the flood held the water level very high until late in the season. This seeding should definitely be planned for next year before River Bulrush Scirpus fluviatilis and other low value plants take over the mud flats.

A small amount of Star Duckweed Lemna trisulca was the only other aquatic of any importance found in Sand Lake this summer. This species will provide only a very limited amount of feed.

High turbidity, caused in part by excessive wave action and rough fish feeding activity, prevents most aquatic plants from growing in our refuge waters.

Cover plants in the form of emergents such as Phragmites Phragmites communis and River Bulrush Scirpus fluviatilis are very adequate for waterfowl needs. In some parts of the Sand Lake unit a few more of these emergents would help to keep down excessive wave action and thus lessen water turbidity and erosion of structures. This was one of our reasons for requesting a lower water level for this unit.

3. Disease

Six ducks were found dead from unknown causes on September 2 and 3. Botulism was suspected in part of the cases. No more dead birds have been found however. The approach of cold weather within 2 weeks will eliminate the danger from botulism. No other disease noted.

B. Upland Game

1. Population and Behavior

a. Ring-necked Pheasant

A normal summer Ring-necked Pheasant population of 8000 birds

was observed on the refuge. Nesting was delayed fully 4 weeks due to abnormally cold weather in spring. As of August 31 it appears that pheasant reproduction will be normal except that broods are 4 weeks late. A few broods were observed during the last 10 days of August which were only a few days old. Late hatched birds will not have mature plumage when the local hunting season opens. The birds should be sufficiently mature to overwinter successfully however.

b. Hungarian Partridge "Huns" have been observed occasionally throughout the summer but our population is low, probably no more than 100 birds at the end of the breeding season. Mated pairs have been observed now and then but to date no brood has been recorded. Despite the fact that we have what appears to be suitable habitat for Hungarian Partridge, the birds fail to increase appreciably. Severe winter weather or other factors of decimination apparently kill off the yearly increment.

2. Food and Cover

We are increasing the amount of standing corn to be left in the field for both waterfowl and upland game. Observations made last winter indicate Pheasants can and do take corn hanging 4 feet above the ground. Mallards will likewise reach unsuspectedly high to harvest corn. Standing corn is the only available grain food for Pheasants and Mallards when the snows pile up in mid winter. Only a small proportion of the corn will be left standing however because of the need for waterfowl feed during fall migration. To meet the tremendous demand for food created by a half million waterfowl that will stop at Sand Lake this fall and for approximately 20,000 pheasants and other resident game, the following grain crops will be left in the field: Corn 241 acres; barley 101 acres; Oats 15 acres; wheat 20 acres; Millet 210 acres for a total of 547 acres.

An excellent crop of Russian Olive, Buffalo Berry, Honeysuckle, Sumac and Carygana seed is noted in the shelterbelts. In addition sunflower Helianthus, Ragweed Ambrosia spp., Smartweed Polygonum spp., Clover Melilotus alba and Fragrant False Indigo Amorpha Microphylla are also abundant and heavy with seed. Natural foods combined with grain foods not eaten by waterfowl will, we believe, prove ample to support our 20,000 pheasants and other resident game during the winter.

With the excellent growth of our shelterbelts, some of which are 30 feet tall, and the abundance of emergent marsh vegetation, it appears that our upland game will be well provided with winter cover.

C. Big Game Animals

1. Population and Behavior

White-tailed deer are again on the increase. An aerial census indicated 103 were using the refuge last winter. Several

does with fawn have been noted during the summer indicating the herd is still increasing. During the evening of July 17 while driving 2 miles along the patrol road north of the Weismantle quarters, 14 Deer were observed of which 7 were bucks, 4 were does and 3 fawns. Two of the fawns were twins one of which had spots still plainly visable while the spots on its twin were nearly faded out. Considering our summer increment our present Deer population is placed at 150.

2. Food and Cover

Food and cover for our Deer appear to be very adequate at present. Considerable browse is available around the old farm groves and newer shelterbelts. Corn left in the refuge primarily for waterfowl and Pheasants is readily taken by Deer. Alfalfa fields, hay stacks and old straw piles provide additional Deer foods. Waste grains of many varieties are to be found both on the refuge and in the immediate visinity. These grains provide valuable supplement to the Deer diet. Altogether the Deer at Sand Lake appear to live off "the fat of the land".

Refuge Deer cover, despite our prairie habitat, is proven to be entirely adequate. During coldest mid winter weather deer are observed bedded down in the dense stands of Phragmites, apparently very comfortable. In addition we do have about 300 acres of shelterbelts and farm groves which are used regularly by deer. Adequacy of food and cover is proven by the fact that bucks weighing up to 285 pounds dressed were shot on the refuge during the open season of 1948. This weight is a matter of record established by South Dakota game technicians.

3. Disease

None observed during this period.

D. Fur Animals, Predators, Rodents and Other Mammals

1. Fur Animals

Muskrats are apparently quite scarce although it is too early to estimate total populations. The flood destroyed early litters and the continued high water made it difficult to obtain food.

The population of Raccoon, Skunk and Badger is high. The Badgers are causing considerable damage to patrol roads by digging numerous holes. Mink and Red Fox are common. One female mink was observed with a litter of 6, about one-half grown. Several other individuals were seen. One female Red Fox and two kits were seen.

There is a high population of Cottontail rabbits. Jack rabbits are apparently more plentiful than last year.

2. Predators

There was some evidence of nest depredation by Skunk and Raccoon. There is a high population of both species and good management should call for a reduction in numbers. Due to the extremely low value of such fur, it is difficult to induce trappers to remove many of these animals. Other control measures may have to be taken if their numbers continue to increase.

Since waterfowl concentrations have began to build up there have been several instances where nesting ducks were prayed upon during the night. On approximately 2 miles of shoreline 17 fresh kills were noted one morning. It is assumed that these ducks were in good health as there is little evidence of botulism so far. Signs indicated that it was the work of possibly both Mink and Raccoon.

Badgers in the area prey heavily upon ground squirrels and apparently exercise some control on the entire rodent population. It was also noted that Badgers tunnel along banks where Bank Swallows nest are present and destroy many nests which most likely contain eggs, young or adult birds.

3. Rodents

There is a high population of ground squirrels on the refuge, mainly 13-lined, Franklin's and some Richardson's. Pocket gophers are not very common. Field mice, house rats and house mice periodically become abundant around quarters. Hawks, owls and badgers apparently keep the rodent population checked to some extent.

E. Fish

River Basin Studies during August 27-29 indicated the species composition of fish for the entire refuge impoundment as follows in the order listed: Carp, Bigmouth Buffalofish and Bullhead - 75%; Perch - 15%; Northern Pike- 10%; Crappies - trace and Suckers - trace.

Carp, Buffalo and Bullhead remain abundant although the Northern Pike and perch populations are becoming well established.

As fishing is allowed only from bridges and roads within the refuge, the pressure is concentrated at such places. Dakota Lake has had the highest number of anglers per day in this area. (Average of 10 and as high as 50 on Sundays.) The Heela bridge area running a close second. The main species caught are Northern Pike, Perch and Bullheads.

The Tewaukon Easement Refuge is fished more heavily than either of the previous areas and yields fair sized Walleyed Pike, Northern Pike, Crappies and Perch.

III. REFUGE DEVELOPMENT, MAINTENANCE

A. Maintenance

1. Dakota Lake: A total of 400 yards of oversize gravel was hauled to the road and spillway at Dakota Lake (Easement Refuge) to repair flood damage.

2. Tewaukon: Repairs were made on four leaks in the rubble masonary of the spillway and control gate at the outlet of Lake Tewaukon.

3. Painting: The equipment shed, duck hospital, root cellar, eight-stall garage and quarters No. 4 were all painted on the exterior during this period. Outside trim, screens and door were painted on the barn at Headquarters, the oil house, managers residence and the headquarters service building. The barn at Site 3, the roof of the barn at Site 2 and the tower steps were painted.

4. Building Repairs: The floors in Quarters No. 2 were sanded and varnished. New doors were made for the barn at Headquarters. The storm shelter on the office entrance was remodeled. The porch roof at Quarters No. 3 was rebuilt. The interior of the office and laboratory was painted and inlaid linoleum was laid on the office and laboratory floors and new mop boards were constructed. Bathroom plumbing was also repaired. A new martin house was built for the headquarters lawn.

5. Equipment: A 1939 Ford truck motor was completely overhauled. Minor repairs were made on three other trucks and the 40 Cat. The track rollers on the 40 Cat were rebuilt. Routine servicing and repairs were made on all equipment in use.

6. Weed Sprayer: A Hudson (hand nozzle) sprayer was converted by Elmer Podoll, Equipment Maintenance Man into a 14 foot boom sprayer. The completed boom sprayer was then mounted on a jeep pickup. This devise proved very successful for spraying throughout the refuge. (see attached photos).

7. Recreation Area: A well was completed at the area and a pump installed. Four tables, two toilets and trash barrel were set up for public use. The grass was cut by the Columbia ball team who used the area for their games most of the season.

8. Wells: Wells were completed, curbed and pumps installed at Site No. 2, the Recreation Area and Headquarters.

9. Refuge Signs: Four large entrance signs were rebuilt and repainted. Six others were repainted. Numerous boundary signs were replaced.

10. Fences: Several stretchs of boundary fence which were damaged by the flood were repaired so as to keep cattle out of the refuge. Further repair of fence damaged by the flood is pending.

11. Roads: The refuge roads used during the spring and summer were graded. Some fill was added to lower grades in preparation for the flood. Additional fill was made in washed out areas after the flood receeded.

All patrol roads used were mown during the last week of July and the first week of August. Additional weed patches and grass areas around headquarters were mown.

12. Weed Control: Spraying operations were started on June 15. First treatment was the application of Borascue powder to Leafy Spurge. This was followed by Spraying with 2,4-D. Sow thistles and Hoary Cress were also sprayed. Additional spraying was carried on from July 11-21. Other patches of Leafy Spurge, Canada Thistle or Sow Thistle were sprayed during the weeks of August 7-11 and 14-18.

A total of approximately 23 acres of Sow Thistle, 10 acres of Canada Thistle, 5 acres of Leafy Spurge and 12 acres of Hoary Cress were sprayed. These areas were scattered throughout 21 sections within the refuge. Some of the acreage was sprayed twice and several small patches three times. In applying 2,4-D to these areas, approximately 160 acres were sprayed.

Thirty gallons of 2,4-D were used on the 160 acres sprayed. This was applied at the rate of 1½ pounds per acre. A total of 135 man hours were required.

12. Division of Crops: Six man days were spent dividing crops on the Sand Lake and Easement Refuges.

B. Plantings

1. Aquatic and Marsh Plants - None

2. Trees and Shrubs

About 200 Caragana, 12 Lilac and 12 Blue Spruce seedlings were planted in May. The Caragana were planted in areas where they will serve as a natural snow fence.

3. Upland Herbaceous Plants - None

4. Cultivated Crops

The annual harvest of small grain on share crop lands has been completed and most permittees are through combining or threshing. Corn is now in the roasting-ear stage and most millet has headed out.

A total of 1914 acres were under cultivation this year compared to 2602 last year. This reduction resulted from flood conditions which effected about 800 acres of land. Only 100 bushel of barley were harvested for the refuge share this year. Approximately 101 acres of Barley, 15 acres of oats and 20 acres of wheat were left in the field for waterfowl feed. About 240 acres of corn and 210 acres of Millet will be left as well.

Previous to crop division all fields were inspected, and any grain which would have served to lure birds toward the boundary

(and resulting heavy gun pressure), was harvested. The minimum safe distance to the boundary was considered to be 80 rods. Where possible, corn was left standing in the vicinity of wind breaks in order to give Pheasants convenient access to food and shelter. Most of the refuge share of grain that was left in the fields was mown rather than windrowed in order to produce a better germination of ~~sheltered~~ scattered seed and consequent excellant good feed. Mown grain is also less likely to mold during wet weather, and windrows of grain considerably handicap spring cultivation.

Large numbers of ducks and a few geese are already feeding in the stubble fields and on acres left by the refuge. Nearly all the grain was harvested by the time such feeding activity began so there have been ~~few~~ no complaints of crop depredation.

C. Collections

The following were added to the refuge collection.
Fox Squirrel -- killed by car.
Fish sample from James River Below Columbia Dam
(Bigmouth buffalo, Carp, Perch, Bullheads,
Black Crappie, Green sunfish, common sucker)
American Knot

D. Receipt of Seed and Nursery Stock - None

IV. ECONOMIC USE OF REFUGE

A. Grazing

Three permits, covering 695 acres, were issued this year. No grazing was permitted this year until after July 16. Units 1 and 3 continue until October 31 while Unit 4 is grazed until November 16.

B. Haying

Fourteen haying permits were issued this year for a total of 767 acres. There is a heavy demand for hayland this season as in the past. Some of the units cannot be fully utilized due to high water conditions throughout the past spring and summer

C. Fur Harvest - none

D. Timber Removal - none

E. Other Uses

A permit was issued for placing 170 hives of bees on the refuge from May 1 to October 31.

V. FIELD INVESTIGATIONS

A. Brood Counts

Routine waterfowl brood counts were taken from July 19 - 23

At Sand Lake and the Easement Refuges. Thirty six miles of shoreline were traveled by foot and by canoe. Only eighteen broods were observed giving a density of one brood per two miles of shoreline. This was very low compared to our average of 5 broods per mile of shoreline recorded over the same period in 1949. It was felt that the marked scarcity of broods indicated by the 1950 census was not due to an unsuccessful waterfowl nesting season but rather a delayed nesting season.

Sample brood counts were made a month later during the period August 10-20 to determine if more broods were present due to late nesting. Approximately 17-3/4 miles of shoreline were traveled and 122 broods were observed giving an average of 6.81 broods per mile. This was slightly above the normal average of 5 broods per mile established for this area. This indicated that the nesting season was from 3-4 weeks later than normal and that the data obtained on routine waterfowl brood counts from July 19-23 were not representative of this area.

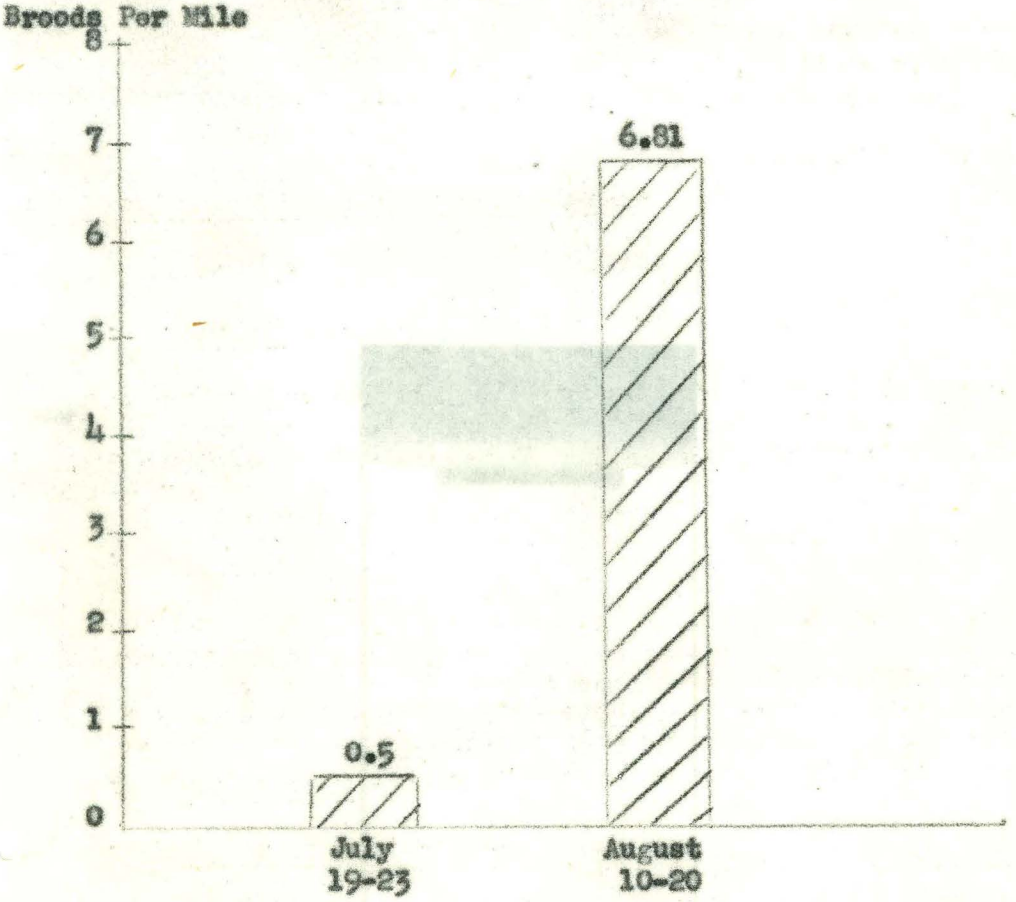


FIGURE 1

WATERFOWL BROODS PER MILE

(All of the shoreline traveled during the second series of brood counts was also covered during the first period from July 19 to 23.)

It was evident that more broods in age class III were recorded during the seasons series of counts than the total number of broods in all age classes recorded during the first counts, July 19-23. It seems as if many of the birds in age class III should have been recorded in Age Class I around July 20. It may be that many of the Class I broods are not seen because of the tendency of hens to keep young broods well hidden. It is also possible that many of the Class II and III broods recorded in mid August had moved in from surrounding areas.

TABLE NO. 3

Age Classes of 122 Waterfowl Broods Observed During Mid August

SPECIES	I	II	III	All classes
Blue-winged Teal	12	22	24	58
Pintail	4	11	6	21
Mallard	1	14	4	19
Baldpate	1	2	3	6
Shoveller	1	1	2	4
Gadwall	1	3	-	4
Ruddy Duck	1	2	-	3
Unidentified	1	-	3	4
Canada Goose	-	-	3	3
				122

The average size of broods observed during mid August was as follows for the three species listed:

Blue-winged Teal (Age Class)	I	6.2	(12 broods)
	II	5.9	(22 ")
	III	5.5	(24 ")
Pintail	I	6.8	(4 ")
	II	6.0	(11 ")
	III	5.8	(6 ")
Mallard	I	8.0	(1 ")
	II	5.1	(14 ")
	III	6.0	(4 ")

B. A Study of the Effect of Mowing on Waterfowl & Pheasant Nesting

An attempt was made to determine the effect of mowing on waterfowl and pheasant nesting. Similar areas of cut and un-cut grassland were selected and the number of waterfowl and pheasant nests located. Each area was approximately 6 acres in size and located about 100 yards from lake or marsh. No portion of either was subject to floods. The uncut grassland area had not been cut or grazed for 4 years. The ~~mowed~~ area had been cut 4 successive years.

The study was made after most nests had hatched out but nest sites were still obvious. The nests or nest sites were located by two observers each covering an area of about ten feet in width, guiding on markers placed on the outer edge of the territory previously examined. Nests were identified by whole eggs, pieces of egg shells or down and feathers present. Successful nests were identified by the condition of eggs remaining, egg shells and eggs with marks. Unsuccessful nests were identified by signs of predator activity, abondoned nests or other evidence of destruction.

The area which had not been ~~mowed~~ yielded 13 nests, 4 of which showed evidence of having been destroyed by predators. A breakdown by species was as follows: 5 Blue-winged Teal, 2 Mallard, 2 Mallard or Gadwall, 2 unidentified duck, 1 Canada Goose and 1 Hungarian Partridge. This gave a density of 2.2 nests per acre and an acre success of 1.5 nests per acre.

The cut-over area showed evidence of four nests, all of which were destroyed or abandoned. Two of these were pheasant nests, 1 Blue-winged Teal (abondoned) and one unidentified duck. In addition 5 pheasant eggs and 4 duck eggs were found scattered in the area. It was believed that such eggs were either layed at random or dragged from nests by haying equipment. The nesting density was established as .66 nests per acre, none of which appeared to have been successful.

There is ~~an~~ indication then that grassland areas of moderate height, adjoining water are more beneficial for wildlife when not ~~mowed~~. It was also established that the largest percentage of nests were located in that portion of the upland within approximately 200 yards from the edge of the marsh or area which was subject to flooding.

The data obtained are not sufficient to draw any definite conclusions from but it is believed that studies during future nesting seasons will bear out the theory that grassland areas of moderate height adjoining water are more beneficial from a wildlife standpoint when left uncut.

C. Species Composition of Fingerlings

When the stop logs were put in the Columbia dam to hold Sand Lake at its authorized level, myriads of fingerlings were trapped below the dam. A random sample was taken from several seine hauls and the following species composition was obtained.

Perch	46.0%
Carp	32.6
Bullheads	20.7
Crappie	Trace
Bluegill	"
Buffalo	"
Sucker	"
Green Sunfish	"

(Representing 1052 fish.)

Due to the high percentage of Carp present, no effort was made to allow the fingerlings to enter the lake.

D. Banding Operations

Refuge personnel assisted Jerry Stoudt (Flyway Biologist) and members of the South Dakota Department of Game and Fish in trapping and banding ducks on August 21 and 22. Efforts were concentrated on potholes where broods were more easily caught. A total of 165 ducks were banded, mainly juvenile birds. The major species were blue-winged teal, Pintail and Mallard with a few Gadwall, Baldpate, Ruddy Duck, Lesser Scaup and Coot.

VI. Public Relations

A. Recreational Uses

Fishing: Sport fishing for Northern Pike, Bullheads and Perch is popular on roads and bridges. The best fishing has been reported from Dakota Lake and the Hecla Bridge. The record catch known so far has been a 11 lb. Northern Pike. If the area is not subject to a heavy winter kill this year, fishing may improve considerably next season.

Recreation Area: The public recreation area was greatly improved by the construction of a well, toilets, tables, benches and a baseball diamond. The Columbia baseball teams used the diamond most of the summer. Over 1,000 people were counted on one holiday when a ballgame was in progress. Crowds of this size were common most every week-end. Many others used the area for picnics. Swimming was also popular along the sandy shore below the recreation area.

Visitors: From 50 to 100 people frequent the refuge headquarters each weekend - primarily to climb the tower or observe waterfowl in the vicinity. Bird Clubs and other wildlife enthusiasts were frequently guided about the refuge when time permited.

B. Refuge Participation

On May 1, the Refuge Manager welcomed the Barnard High School biology class at the refuge office and briefly explained the part played by wildlife refuges in wildlife conservation.

A talk with movies was given by the Refuge Manager to the Barnard High School on May 12.

The Mitchell Bird Club was conducted about the refuge by the manager on May 13.

A county weed meeting was attended by the Refuge Manager on May 19 to learn the newest methods of weed control and explain our part in the county weed control program.

The Refuge Manager wrote an article on spring migration for Audubon Field Notes and 5 articles for publication in the local papers.

The Jr. Refuge Manager assisted state technicians in pinioning captive Canada Geese at the Aberdeen City Park on July 14.

The entire refuge personnel assisted Jerome Stoudt and state technicians in trapping and banding 165 ducks in the vicinity of the refuge on August 21, 22.

The refuge manager attended the North Dakota State Game Conference held in Bismark on August 28 and 29.

C. Violations - none

D. Refuge Visitors

Name	Title or Affiliation	Date
Robert Scott	Army Eng. Omaha	5/1
Don Vogtman	MRBS - Bismark	5/11
Ray Glan	Pilot-Biologist - L. Souris	5/12
Mitchell Bird Club	Mitchell, S. D. .	5/13
John Leete	MRBS - Pierre	5/23
Cecil Guber	MRDS - Billings	5/23
Mr. Elliot	GMA - Atlanta, Ga.	6/28
E. Sutton	GMA - Aberdeen, S. D.	6/28
Wallace Aikin	S. D. Geo. Survey	7/13
Jewell Phelps	S. D. Geo. Survey	7/13
Robt. Dougal	Civil Eng. FWS	7/13
Richard Johnston	Civil Eng. FWS	7/13
D. Richardson	State Warden	frequent
O. B. Simmons	US Geo. Survey	8/2
Mr. Jenkins	US Geo. Survey	8/2
Forrest Carpenter	Asst. Reg. Ref. Insp.	8/3
Glen Larry	Cad. Eng. FWS	8/7
Jerry Stoudt	Flyway Biol. Aberdeen	8/22
Don Knebel	GMA - Platte, S. D.	8/22
Ray Murdy	State Tech.	8/22
M. Anderson	State Tech.	8/22
Leo Kirsch	State Tech.	Frequent
R. D. Jones	Ref. Mgr. Alaska	8/28
R. D. Jones, Sr.	Pres. S. D. Sportsmans Club	8/28
E. Madder	MRBS - Bismarck	8/30
R. Bagwell	MRBS - Bismarck	8/30

VII. OTHER ITEMS

A. Notes of Interest

1. Harvey K. Nelson joined the refuge staff in June as Jr. Refuge Manager. He is a graduate of the University of Minnesota and was formerly employed by the Minnesota Division of Game and Fish.

2. The U. S. Geological Survey is drilling 50 test wells in this area to check ground water levels and determine the effect of the Sand Lake impoundment on ground water in the vicinity.

3. Two students (geography majors) from Northwestern University have been studying soil formations in this area to determine the extent of former Lake Dakota and its effect on agriculture.

4. A Caspian Tern was observed on Sand Lake, July 10. This is another "first" for the Refuge.

B. Easement Refuges

Dakota Lake: Visited periodically during the summer to check flood levels, flood damage, to make flood damage repairs and to record wildlife usage. Water depth over the spillway ranged from about 5 feet during the May flood to 1 inch at August 31. Several hundred yards of fill were washed from the road-spillway by the flood and were replaced with 400 yards of oversize gravel late in August.

Waterfowl brood counts were made on July 21 and August 18. No brood was observed July 21 during a 5 mile shoreline canoe trip but 4 broods were noted in a 1 mile trip on August 18. This indicates the Dakota Lake Refuge is an important waterfowl breeding refuge. Probably 80 broods totalling about 400 ducks were raised on the area. A late summer population of about 800 ducks was on the area, with Blue-winged teal, Mallard and Pintail the dominant species.

Maple River: Visited May 2 and June 4. Water control structure in good shape. Water 4 inches over spillway on first visit and 2 inches over on June 4. New stop logs were placed on the minor control structure and repairs made to rubble masonary.

Several pairs of Blue-winged Teal and Mallards were seen about the area but no census was made.

Storm Lake: Brood counts made on July 22 and August 19. On the last count 10 broods were observed in 1½ miles of shoreline. Blue-winged Teal; Shoveler, Mallard, Baldpate and Gadwall were recorded. Teal were easily most abundant. The Brood count indicated 25 broods for a total of about 125 young raised on the area. Breeding bird population was placed at 200 ducks.

Lake Elsie: Brood counts made on July 22 and August 19. Eight duck broods were recroded on 1½ miles of shoreline. Blue-winged Teal, Mallard, Pintail and Ruddy Duck were recroded. Teal ranked first. About 20 broods were raised on the refuge for a total of 100 young. Total breeding population is placed at 150.

Tewaukon - Clouds Lake: Visited 4 times during the summer. Over 100 cars of fishermen-picnicers were counted on each of 2 Sundays. Many more were reported for holidays.

Water 2 inches over spillway during early May and 1 inch over until mid June. Water level 2 inches below spillway as of mid August.

Four minor leaks in the rubble masonry at the spillway were repaired on August 17.

Brood counts made July 23 and August 20. On one bay above the bowl spillway 31 broods were counted along 1¼ mile of shoreline. This part of the refuge is an excellent waterfowl nesting area. The brood count indicated Tewaukon is a more valuable waterfowl nesting area than previously thought. The brood index indicated a total of at about 150 broods for this area which would mean a total production of about 750 young ducks. The breeding population (including young) is about 1000. Pintail ranked first with Blue-winged Teal and Mallard tied for second place and Baldpate, Ruddy and Gadwall next in order.

Clair T. Mollings
Refuge Manager

September 8, 1950

Approved: _____

SD-SDL-484

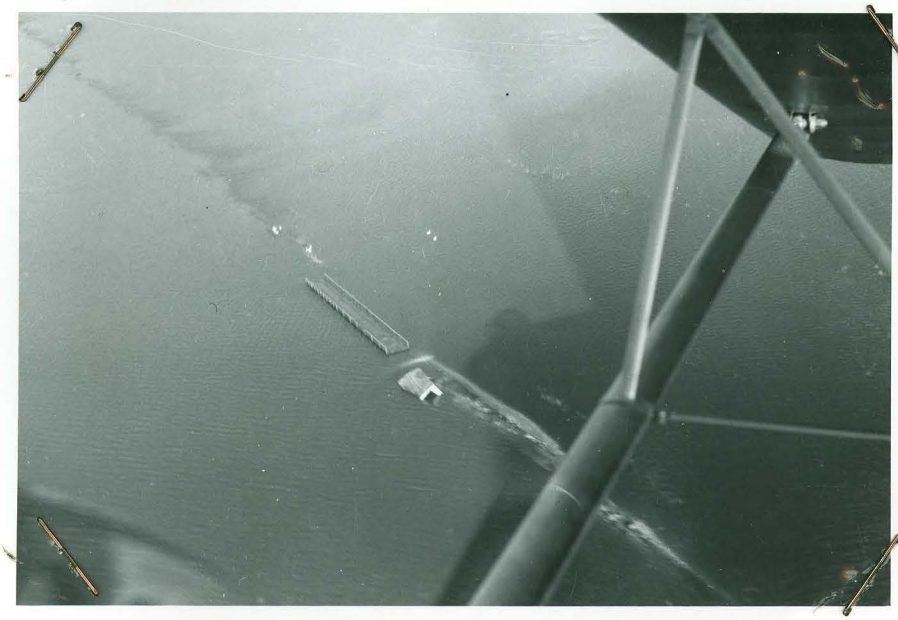
No. 1: May 10, 1950 - Columbia Dike, flood near crest, 18" water over the structure.

SD-SDL-485

No. 2: May 10, 1950 - Columbia Control Structure. Flood near crest 15" of water over gate road.

SD-SDL-486

No. 3: May 15, 1950 - Flood near crest, water knee deep over Mud Lake dike. Giant waves knocked out boathouse.



SD-SDL-487

No. 4: May 18, 1950 - Flood within inches of crest. Mud Lake dike and boathouse. Bridge floor awash with water.

SD-SDL-488

No. 5: May 19, 1950 - Near Flood crest. Quarters No. 3. Use of boat necessary for 6 Weeks.

SD-SDL-489

No. 6: May 18, 1950 - Quarters No. 3 on an island - Flood near crest.

SD-SDL-490

No. 7: May 15, 1950 - Water takes out Weismantle Grade. Looking East.

SD-SDL-491

No. 8: May 15, 1950 - Flood destroys Weismantle Grade. Bridge withstood the flood. Looking west.

SD-SDL-492

No. 9: May 19, 1950 - Looking west on Houghton Grade - State Highway No. 10. Grade badly eroded. Closed for 2 weeks.

SD-SDL-493

No. 10: May 20, 1950 - Water near peak. Headquarters bank and boathouse badly damaged by wave action.

SD-SDL-494

No. 11: May 20, 1950 - Repairing minor control structure at Maple River. E. Podoll and E. Knastad.

SD-SDL-495

No. 12: May 19, 1950 - Water over the spillway at Maple River. Clair T. Rollings.

SD-SDL-496

No. 13: May 23, 1950 - Water over spillway at Tewaukon

SD-SDL-497

No. 14: May 18, 1950 - Captive Whistling Swan banded and released, E. Haastad.

SD-SDL-498

No. 15: May 20, 1950 - Planting Carygana for a living snow fence at headquarters. W. Ackerson.

SD-SDL-499

No. 16: May 20, 1950 - Planting Blue Spruce at headquarters. E. Haastad.

SD-SDL-500

No. 17: May 2, 1950 - A new 16 room Martin House built and erected by E. Haastad.

SD-SDL-501

No. 18: June 25, 1950 - Baseball game at the refuge recreation area. More than 1000 people used the area during weekends.

SD-SDL-502

No. 19: June 25, 1950 - Boom sprayer designed and built by E. Podoll. Mounted on a Jeep it became a very useful and effecient unit capable of getting most anywhere with a minimum of time.

SD-SDL-503

No. 20: May 1, 1950 - Track rollers on 40 Cat raised by E. Podoll.

SD-SDL-504

No. 21: July 10, 1950 - a 5-story Robin nest built at residence No. 1 - nests have been built one on top of another for years.

SD-SDL-505

No. 22: July 21, 1950 - More nesting activity. Blue-winged Teal nest at Quarters No. 3.

SD-SDL-506

No. 23: July 20, 1950 - Active Beaver lodge along James River 2 miles south of Neola Grade - Harvey K. Nelson.

SD-SDL-507

No. 24: August 1, 1950 - One pass with a 15 foot minnow net netted 10 bushels of rough fish fingerlings. E. Podoll and H. K. Nelson.

SD-SDL-508

No. 25: August 22, 1950 - Banding trap with about 50 ducklings about to enter.

SD-SDL-509

No. 26: August 26, 1950 - Banding was done in cooperation with J. Stoudt and S. D. technicians. C. Pellings, J. Stoudt, E. Podoll and two technicians.

SD-SDL-510

No. 27: August 15, 1950 - Thousands of Pelicans gathered to harvest the abundant spawn of rough fish that followed the spring flood - Columbia dike spillway.

WATERFOWL

REFUGE Sand Lake MONTHS OF May to August, 1950

(1) Species	(2) First Migrants Seen		(3) Peak Concentration		(4) Last Migrants Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
1. Swans:									
Whistling swan					2	5/20			25
2. Geese:									
Canada goose Can			1000	5/1			5	50	2,000
Cackling goose									
Brant									
White-fronted goose									
Snow goose			20,000	"	300	5/25			50,000
Blue goose			20,000	"	150	"			50,000
Richardson's Goose			7,000	"	200	5/5			15,000
Lesser Canada			1,000	"	100	"			2,000
3. Ducks:									
Mallard			5,000	"				750	8,000
Black Duck			50	8/31					100
Gadwall			1,000	"				500	2,500
Baldpate			1,000	"				500	2,500
Pintail			7,000	5/1				850	10,000
Green-winged teal			25	8/31					50
Blue-winged teal			10,000	5/1				1000	10,000
Cinnamon teal									
Shoveller			3,000	5/1				100	1,000
Wood duck					2	8/15			5
Redhead			50	8/31				25	250
Ring-necked duck									
Canvas-back									
Scaup			1,000	5/1					2,000
Golden-eye									
Buffle-head									
Ruddy duck								50	500
			3,000	8/31				500	6,000
4. Coot:									

Form NR-1

3-1750
(June 1949)

(over)

SUMMARIES

Total Production:

Geese 50

Ducks 3775

Coots 500

Total waterfowl usage during period 160,930

Peak waterfowl numbers 80,125

Areas used by concentrations

Principal nesting areas this season

Reported by Clair T. Rollings

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 May to August 1950

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Pied-billed Grebe	k									750
Western Grebe										1,500
Double Crested Cormorant										3,000
Great Blue Heron	8	7/15	75	8/31						150
Black-crown Night Heron										1,000
American Bittern										200
White elican			12,000	8/10						12,000
American Egret	1	8/16	1	8/16	1	8/16				1
II. Shorebirds, Gulls and Terns:										
Killdeer										1,500
Western Willet										200
Lesser Yellowlegs										2,000
Greater Yellowlegs										2,000
Avocet										500
Wilson's Phalarope										500
Marbled Godwit										1,000
Ring-billed & Herring Gulls										300
Franklin's Gull										150,000
Black Tern										5,000
Wilson's Snipe										150
Golden Plover										25
Long-billed dowitcher										

(over)

(1)	(2)		(3)		(4)		(5)		(6)
III. Doves and Pigeons:									
Mourning dove			1400	8/15					1400
White-winged dove									
IV. Predaceous Birds:									
Golden eagle									
Duck hawk									
Horned owl									25
Magpie									
Raven									
Crow									
Red-tailed Hawk									200
Am. Rough-legged Hawk									200
Marsh Hawk									25
Sparrow Hawk									200
Short-eared Owl									50
									100

Reported by.....

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 Gruiiformes)
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.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Sand Lake Months of May to August, 1950

(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	.53		7000					15,000	Hatch very late
Hungarian Partridge	1,000	10.0		50					100	Population very low.

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.

WATERFOWL

REFUGE Maple River MONTHS OF May to August, 19 50

(1) Species	(2) First Migrants Seen		(3) Peak Concentration		(4) Last Migrants Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
1. Swans:									
Whistling swan									
2. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
3. Ducks:									
Mallard							[illegible]	4	75
Black Duck									
Gadwall									
Baldpate									
Pintail									25
Green-winged teal									
Blue-winged teal								6	100
Cinnamon teal									
Shoveller									
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup									
Golden-eye									
Buffle-head									
Ruddy duck									
4. Coot:									

Form NR-1

3-1750
(June 1949)

(over)

SUMMARIES

Total Production:

Geese_____

Ducks 50

Coots_____

Total waterfowl usage during period 200

Peak waterfowl numbers_____

Areas used by concentrations_____

Principal nesting areas this season Upland adjoining the river

Reported by_____

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.

61355

WATERFOWL

REFUGE Storm Lake MONTHS OF May to August, 19 50

(1) Species	(2) First Migrants Seen		(3) Peak Concentration		(4) Last Migrants Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
1. Swans:									
Whistling swan									
2. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
3. Ducks:									
Mallard							1	3	50
Black Duck									
Gadwall							1	3	25
Baldpate							1	3	25
Pintail									
Green-winged teal									
Blue-winged teal							5	12	75
Cinnamon teal									
Shoveller							2	4	25
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup									
Golden-eye									
Buffle-head									
Ruddy duck									
4. Coot:									

Form NR-1

3-1750
(June 1949)

(over)

SUMMARIES

Total Production:

Geese_____

Ducks 125

Coots_____

Total waterfowl usage during period 200

Peak waterfowl numbers 200

Areas used by concentrations Surrounding upland

Principal nesting areas this season_____

Reported by_____

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 Elsie MONTHS OF May to August, 19 50

(1) Species	(2) First Migrants Seen		(3) Peak Concentration		(4) Last Migrants Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
1. Swans:									
Whistling swan									
2. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
3. Ducks:									
Mallard							2	6	50
Black Duck									
Gadwall									
Baldpate									
Pintail							1	2	15
Green-winged teal									
Blue-winged teal							4	10	75
Cinnamon teal									
Shoveller									
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup									
Golden-eye									
Buffle-head									
Ruddy duck							1	2	10
4. Coot:									

Form NR-1

3-1750
(June 1949)

(over)

SUMMARIES

Total Production:

Geese_____

Ducks 100

Coots_____

Total waterfowl usage during period 150

Peak waterfowl numbers_____

Areas used by concentrations_____

Principal nesting areas this season_____

Reported by_____

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 Dakota Lake MONTHS OF May to August, 19 50

(1) Species	(2) First Migrants Seen		(3) Peak Concentration		(4) Last Migrants Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
1. Swans:									
Whistling swan									X
2. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
3. Ducks:									
Mallard									300
Black Duck									
Gadwall									50
Baldpate									25
Pintail									100
Green-winged teal									
Blue-winged teal									300
Cinnamon teal									
Shoveller									25
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup									
Golden-eye									
Buffle-head									
Ruddy duck									
4. Coot:									

* Includes approximately 400 young, representing 80 broods

Form NR-1

3-1750
(June 1949)

(over)

SUMMARIES

Total Production:

Geese_____

Ducks 400

Coots_____

Total waterfowl usage during period 800

Peak waterfowl numbers 800

Areas used by concentrations Surrounding upland not subject to flooding.

Principal nesting areas this season_____

Reported by_____

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 Tewaukon & Cloude Lake MONTHS OF May to August, 19 50

(1) Species	(2) First Migrants Seen		(3) Peak Concentration		(4) Last Migrants Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
1. Swans:									*Including young
Whistling swan									
2. Geese:									
Canada goose									
Cackling goose									
Brant									
White-fronted goose									
Snow goose									
Blue goose									
3. Ducks:									
Mallard							8	40	275
Black Duck									
Gadwall							2	10	75
Baldpate							3	15	100
Pintail							10	50	300
Green-winged teal									
Blue-winged teal							8	30	200
Cinnamon teal									
Shoveller									
Wood duck									
Redhead									
Ring-necked duck									
Canvas-back									
Scaup									
Golden-eye									
Buffle-head									
Ruddy duck							2	5	50
4. Coot:									

Form NR-1

3-1750
(June 1949)

(over)

SUMMARIES

Total Production:

Geese_____

Ducks 750

Coots_____

Total waterfowl usage during period 1000

Peak waterfowl numbers_____

Areas used by concentrations Bay areas in east and west ends.

Principal nesting areas this season Upland surrounding marsh areas

Reported by_____

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.

61355

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge Sand Lake Months of May thru August 1950

(1) VARIETY	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED USE		
				TRANS-FERRED	SEEDED	FED	TOTAL		SEED	FEED	SURP.
Barley	3991	100	4091					4091		2591	1500
Wheat	1864		1864					1864		1064	800
Oats	1630		1630							0	1630
Shelled Corn	218		218					218		218	0
Ear Corn	1500		1500					1500		500	1000

(8) Indicate shipping or collection points Columbia, South Dakota (CMW RR)

(9) Grain is stored at Site No. 2 Elevator

(10) Remarks

NR-8a REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)--55 lbs., Corn (ear)--70 lbs., Wheat--60 lbs., Barley--50 lbs., Rye--55 lbs., Oats--30 lbs., Soy Beans--60 lbs., Millet--50 lbs., Cowpeas--60 lbs., and Mixed--50 lbs. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately: Corn, wheat, proso millet, etc. Include only domestic grains; aquatic and other seeds will be listed on NR-9.

(3) Report all grain received during period from all sources, such as transfer, share-cropping, or harvest from food patches.

(4) A total of Columns 2 and 3.

(6) Column 4 less Column 5.

(7) This is a proposed breakdown by varieties of grain listed in Column 6.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters grainary", etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.