

SAND LAKE NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

January 1, 1950 to April 30, 1950

PERSONNEL

Clair T. Rollings - Refuge Manager

(V. ent) - Ref. Mgr. (trainee)

John H. Nowak - Refuge Clerk

Elmer Podolski - Maintenance Man (Equipment)

Einar Kaastad - Maintenance Man (General)

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Sand Lake National Wildlife Refuge  
January 1, 1950 to April 30, 1950

I GENERAL

A. Weather Conditions

A summary of weather data for the period January through April for the years 1948, 1949 and 1950 is given below in table No. 1.

TABLE NO. 1 WEATHER DATA, JANUARY-APRIL, 1948 - 1950.

Month	Snowfall			Precipitation			Max. Temp			Min. Temp.		
	'48	'49	'50	'48	'49	'50	'48	'49	'50	'48	'49	'50
Jan.	4.0	12.8	14.5	.18	2.19	.52	39	48	32	-30	-31	-34
Feb.	6.6	3.1	3.0	.63	.19	.05	40	45	37	-21	-22	-20
Mar.	4.9	5.1	3.5	.39	1.05	.43	66	50	55	-27	-6	-15
Apr.	-	-	6.0	.77	.36	.57	78	83	73	16	18	12
TOTALS	15.5	21.0	27.0	1.97	3.79	1.57	78	83	73	-30	-31	-34

Weather during the period January through April 1950 at Sand Lake was generally characterized by low temperatures, cloudy skies and late spring snows. January mean temperature was the second coldest on record averaging about 10 degrees below normal. Lowest recorded temperature was -34; January 26. During this month five blizzards occurred and numerous snow flurries. Fortunately the 14.5 inches of snow that fell during January was quite equally divided among the many storms so that severe drifting of snow took place only twice during the month.

February temperatures were only slightly below normal and precipitation was moderate. Only one relatively mild snow storm occurred during the month.

The most severe storm of the winter occurred on March 7. Although the snowfall was relatively light in the vicinity of Sand Lake, winds up to 72 MPH reduced visibility to zero, caused severe drifting of snow, damage to property and loss of life. Temperatures averaged somewhat below normal for March.

Weather was extremely backward in April. Temperatures averaged considerably below normal. Blizzards occurred on April 10 and 25 and a six inch snowfall was recorded on April 29. Although precipitation was moderate during this month, continued cold, cloudy weather delayed the arrival of spring two to three weeks beyond normal. Local farmers normally finish grain seeding about April 20 but had sown less than 50% of their grain as

of May 1 this year. Some had not seeded an acre. Frost four inches deep was noted on freshly piled dirt as of April 27. Sand Lake remained ice bound almost two weeks later than normal. Some snow remained on the ground as of May 1.

B. Water Conditions

Water (ice) level remained at 0.5 foot below spillway at Columbia dam, 0.4 below spillway at Mud Lake dam and 0.65 below at Dakota Lake dam through January, February and until March 26, on which date four inches of water were noted flowing over Dakota Lake spillway. 127

Channels were chopped in the ice and snow at Mud Lake spillway and the logs at Columbia dam were freed of ice during the last days of March. Water began to trickle over Mud Lake spillway on March 30 and raised gradually till April 11 at which date 0.7 foot was recorded on the regular spillway and a trickle over the emergency spill was noted.

The top log was removed from Columbia gate on April 3 to create a current and thereby begin clearing the channel of ice above the gate. Five more logs were chipped from the ice on April 4 and on April 17 all logs were removed to allow the channel below the gate to fill and thus prevent damage to the emergency spillway and dike by the oncoming flood.

A very rapid rise in the water level began on April 11. By April 18 about 2.5 feet of water was pouring through the regular spillway at Mud Lake and 2 feet of water was moving through the emergency. A heavy wind on this date forced ice 12 to 16 inches thick against and over Mud Lake dike (photo), bridge and both spillways. Only continuous effort by two and three men prevented a serious ice jam and loss of Mud Lake bridge (photo). An equal effort was necessary to keep the heavy ice from jamming the Columbia gate. Mud Lake was largely clear of ice on April 18. Ice was practically all out of Sand Lake on April 22.

Waves began splashing over Columbia emergency spillway on April 21 with the water at 1.83 over regular spillway level. The emergency was flowing freely the following day but serious erosion to the newly filled spillway was prevented by a head of only two or three inches. Water began seeping over the eastern end of Columbia dike on April 24 but no channelling was observed. As of April 30 Columbia dike is completely inundated except a few square feet of new oversize fill and sandbags on the approaches to the bridge. Mud Lake dike is 100% under water. The water continues to rise slowly, indicating the crest will be reached about May 5.

The water level stands at slightly more than four feet over spillway level at Mud Lake and just slightly less than four feet over at Columbia as of April 30. The crest is expected to be 4 to 6 inches higher. According to local records this flood in the James River is higher than the 1943 level and may break the all time record established 60 years ago. Refuge Records for

Columbia dam indicate 4.4 feet above spillway during April 1943. These records are apparently in error because we now have approximately 4.0 over spillway at Columbia dam as of May 1 and farmers living along Sand Lake claim the water is several inches higher now than in 1943. Farmers' statements are borne out by the fact that water crossed the north-south road east of Site No. 2 and flooded the Edwin Weismantle field. This field was not flooded in 1943.

Flood waters have already caused considerable damage. The Weismantle grade is going out as of this writing. Houghton Grade is closed after being badly eroded. Water is flowing over it in several places. Water is within three inches of topping Hecla Grade and a lesser amount of erosion is noted there. Mud Lake dike took a terrific pounding as the water crept steadily upward. Approximately 1500 sandbags and 475 yards of sand and gravel were placed on the Mud Lake dike and about the approaches to the Columbia gate. Mud Lake dike will require very extensive repairs. Rather minor damage is expected at the Columbia dike. Wave action is causing serious bank erosion about the refuge headquarters. The total amount of damage cannot be determined until the water has receded but it is obvious that damage will be extensive.

For future reference a record was made on the advance of the James River flood water from Jamestown through Sand Lake Refuge. The flood crest required  $10\frac{1}{2}$  days to advance from Jamestown, North Dakota to the State line; 11 days to the Hecla bridge;  $11\frac{1}{2}$  days to Mud Lake dike and 12 days to Columbia dam. These data may be of value in preparations for future flood waters at Sand Lake Refuge.

## II WILDLIFE

### A. Migratory Birds

#### 1. Population and Behavior

a. Swan: Whistling Swan noted first on April 8 increased to 15 as of April 20. This apparently represented the maximum concentration of this species for the period.

b. Geese: Apparently no geese overwintered at Sand Lake. Aerial censuses made on January 20 and February 4 failed to reveal any geese present. Spring-like weather on March 4, 5 and 6 melted practically all the snow from the ground and brought the first Common Canada Geese back on the latter date. The first flock of 19 honkers flew past headquarters at 10:00 A.M. on March 6. By nightfall 500 of this species were seen on and near Mud Lake.

A severe blizzard struck Sand Lake about midnight the same day and drove most of the geese back south. A few small flocks were seen for several days although the weather was very cold and winter-like. Flocks of five and seven honkers were observed on the display pool on March 9 and 10 respectively but by March 15 no geese remained on the area.

A second arrival of Common Canada Geese was noted on March 23. Several flocks numbering 12 to 30 flew northward past headquarters throughout the day. Common Canada and Lesser Canada geese increased steadily during the last week in March.

Blue, Snow and White-fronted Geese were first observed on March 30. On this date 750 (mostly Blues and Snows) passed by headquarters between 6:15 and 7:15 P.M. and the flight continued after dark. The flock of snows and blues had increased to 25,000 by April 1. Richardson's (Hutchins) geese began to appear on March 31.

The second and third major flights of Blue and Snow geese (with lesser numbers of other species) were observed on April 1-2 and 13-15. The peak population of all species of geese was reached on April 13 - 250,000. The goose flock was quickly reduced to 25,000 as of April 17. At the peak population the goose flock composition was as indicated in Table No. 2.

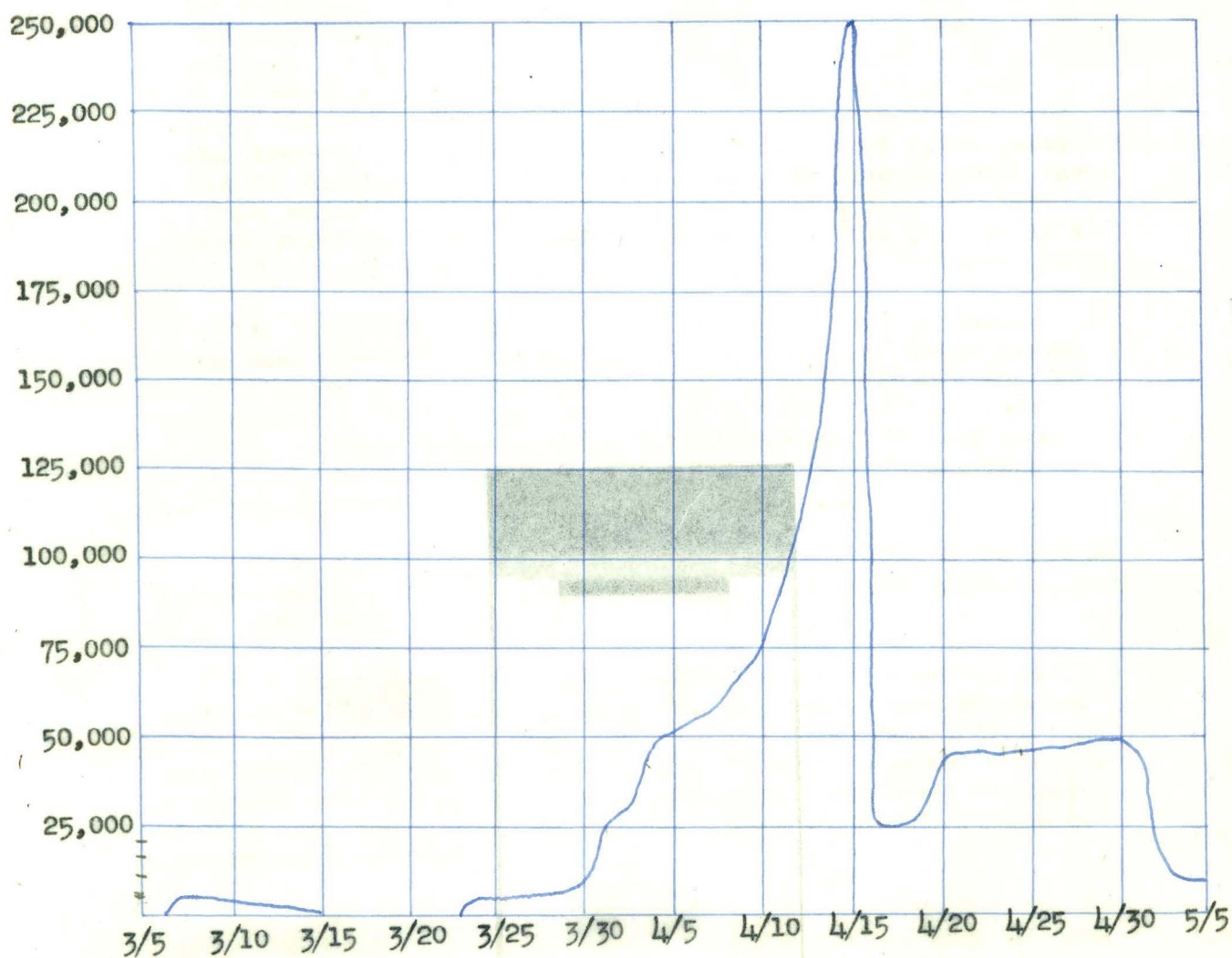
TABLE NO. 2  
COMPOSITION OF SAND LAKE GOOSE FLOCK  
April 13, 1950

Snow Geese . . . . .	120,000
Blue Geese . . . . .	100,000
Richardson's Geese . . . . .	17,000
White-fronted Geese . . . . .	7,000
Lesser Canada Geese . . . . .	4,500
Common Canada Geese . . . . .	1,500
TOTAL . . . . .	250,000

From a low of 25,000 reached on April 17 the goose flock was again increased to 40,000 by flights of April 19 and 20. A gradual increase of geese occurred during the last 10 days of April. The flock numbered about 50,000 as of April 30. The last major goose flight of the season occurred during the late evening and night of May 1. As of May 2 only 10,000 geese remain on the area. The migration of geese (all species) through Sand Lake is indicated in Graph No. 1 on the following page.

c. Ducks: The late spring delayed the arrival of ducks a week to 10 days. On March 6 the first spring migrants (Pintails) appeared. The pintails, first noted during the P.M. of March 6, were observed flying back southward at sunset of the same day. A severe blizzard struck just five hours later. The Pintails reappeared on March 23. Three hundred Mallards overwintered at Sand Lake (photo), staying about open water at artesian wells. Migrant Mallards arrived a few days after the pintails - about March 25. Scaup and American Mergansers were seen two days later - March 27. Most of the other species appeared shortly after April 1. Canvasback and Blue-winged Teal were first noted April 15 but the arrival of the Ruddy Duck was recorded last

GRAPH NO. 1  
GOOSE MIGRATION - SAND LAKE REFUGE  
Spring, 1950



April 17. It is necessary to make observations on migration incidental to other work and for this reason our first observations may not represent the exact time of arrivals, although the discrepancy is probably not great.

Pronounced flight of ducks through Sand Lake were observed on March 23-25, March 29 - April 1, April 7 - 9 and April 14-15. The first flight involved largely Pintails and Mallards. Pintails, Mallards and geese predominated the March 29 - April 1 flight but large numbers of Scaup also were noted. The third flight on April 7 - 9 was rather spectacular and involved all but the latest migrants. This flight began at 4:45 P.M. April 7 and continued on into the night. Calls of many species of geese and ducks could be heard as late as midnight, indicating the flight was still on. Despite a strong northwest wind and lack of open water on this date the birds continued to pour through the area, flying only a few feet above the ice on Sand Lake. Between 5:00 and 7:30 P.M. 25,000 ducks and 5,000 geese passed by headquarters. Many more birds went through after dark. The last major flight of April 14-15 involved all of the late migrant ducks and most species of geese. The duck population and major flights are indicated on Graph No. 2 on the following page.

The flight of pintails showed the most marked increase. Scaup were likewise twice as numerous as in other recent years. Gadwall appeared to show some increase. Mallard population for this spring is higher than '49 but it is felt that last years figures, gathered largely by another observer, were very conservative. Baldpate was the only species of major importance that was appreciably less abundant this spring.

One Barrows Goldeneye, observed on April 12 was a new record for the refuge. This observation was made at close range, in good light and identification was positive.

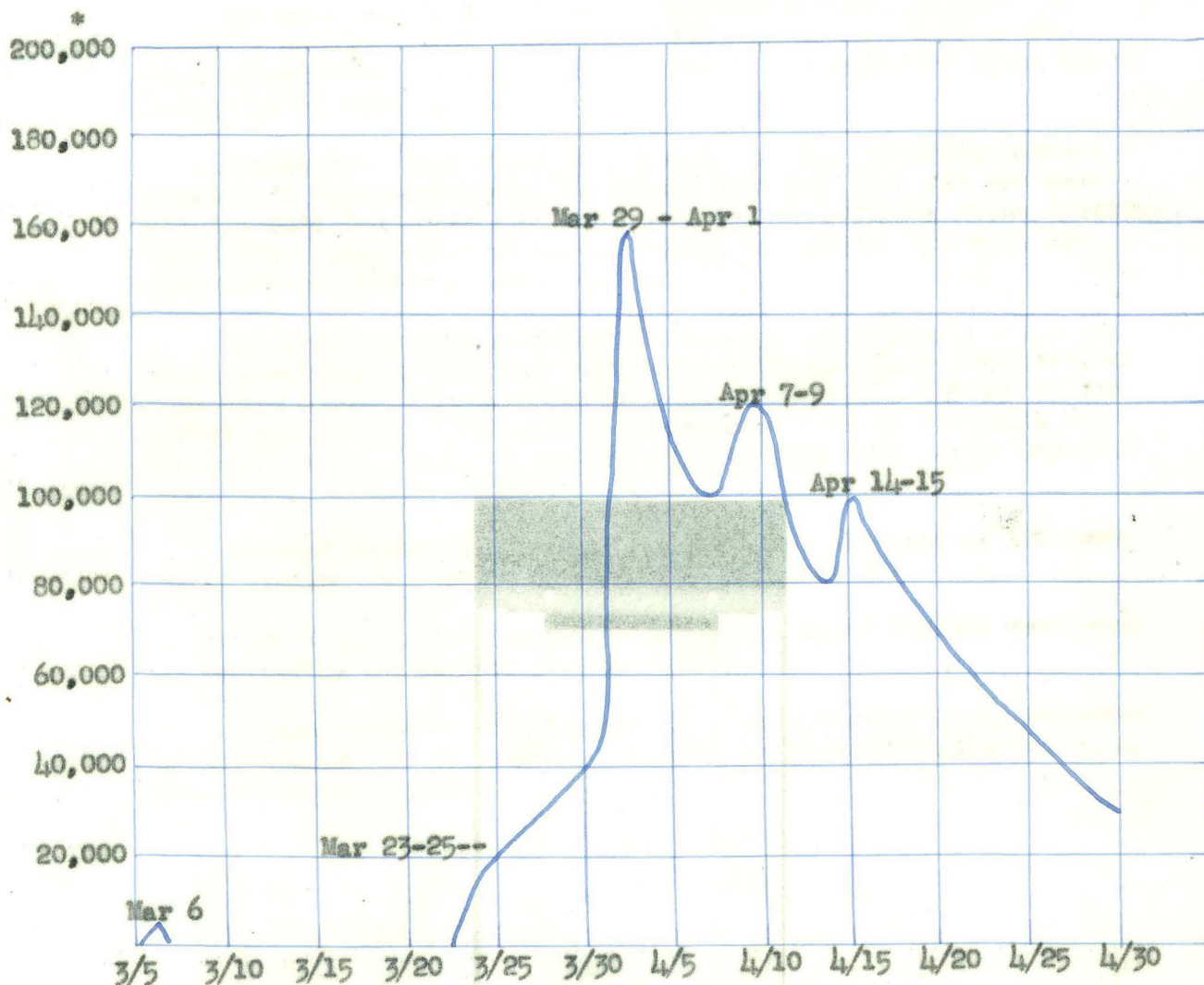
d. Coot: The first coot observed this spring was noted at Bakota Lake dam on March 30. The population increased steadily until April 20 when 5,000 were on the area. About 7,500 represented the total for the period. This is a marked increase over last year and appears to be higher than has been recorded at Sand Lake for several years. The increase was noticeable to all refuge personnel.

e. Pelicans and Cormorants: White Pelicans arrived early - 20 were noted on April 6. Cold weather and lack of open water apparently drove some of these birds back southward but they again showed up in increasing numbers by April 15. As of April 30 about 700 Pelicans are recorded.

Double-crested Cormorants were first noted on April 14. Population of this species has built up to about 500 as of April 30. Pelicans and Cormorants are about equal in number to last year and apparently show a gradual increase over previous seasons.

# GRAPH NO. 2

## DUCK FLIGHTS and POPULATIONS Sand Lake Refuge Spring, 1950



\* Duck Populations - All Species

f. Heron and Grebes: Great Blue Heron and Black-crowned Night Herons appeared in usual numbers. Western Grebe, Pied-billed Grebe and Horned Grebe have been recorded in Normal numbers to date.

g. Shorebirds, Gulls and Terns: A rather unusual concentration of Ring-billed Gulls appeared this spring. Among them were a few Herring Gulls. Dr. W. C. Breckenridge of the Museum of Natural History, University of Minnesota identified several of the latter species during a five day photographic trip at Sand Lake Refuge during mid April.

The more common Franklin's Gulls, noted first on April 14 are very abundant as of April 30. This species appears to be increasing at Sand Lake. A population of about 15,000 is on the refuge as of April 30.

Common Tern were first observed April 24. Probably several Forester's Tern were among the Common Tern but time did not permit the detailed identification necessary to separate these species. Black Tern has not been recorded during the period but will undoubtedly be observed soon.

Of special interest is the observation of Wilson's snipe in what appears to be slightly increased numbers. Eight observations totalling about 40 birds have been recorded by all members of the refuge personnel. This sample is admittedly small but still represents several times the number of snipe observed during previous springs.

Marbled Godwit appeared quite numerous. As many as 100 were noted feeding in a flooded alfalfa field April 30.

Both Long-billed Dowitchers and Long-billed Curlews were seen on the refuge during the current spring.

A list of first observations for all migratory birds recorded by all members of the refuge personnel is given in Table No. 2. on the following pages.

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TABLE NO. 2  
NATURE CALENDAR, SAND LAKE REFUGE  
Spring, 1950

Date	Species	No.	Remarks
1/29	Crow	1	Common by late February
2/15	Golden Eagle	1	Occasional one seen
2/28	Pinnated Grouse	50	Several small flocks this Wt.
3/3	Meadowlark	1	Common by April 1
3/6	Com. Canada Geese	500	Returned south by 3/15
	Pintails	250	Retnd south same day

Date	Species	No.	Remarks
3/23	Com. Canda Geese	300	Reappeared
Pinel	Pintails	400	"
	Ring-billed Gulls	1	More than usual
3/26	Sparrow hawk	2	very common by 4/15
	Marsh hawk	2	Very common by 4/10
	Red-tailed hawk	1	
3/27	Scaup	2	common by 4/11
	Mallard (migrants)	500	
	Am. Merganser	2	common by 4/1
3/28	Purple Martin	1	not seen next day - re-appeared 4/10 and 4/15.
3/29	R.W. blackbird	5	common in week
3/30	Coot	1	increased steadily till 4/20
	Blue, Snow, White-fronts, L. Canada	1000	increased very rapidly
	Richardson Geese		
	Song sparrow, junco		
3/31	Robin	1	common in week
4/1	Blackduck	2	very few seen here
4/2	Green-winged Teal	2	
	Shoveler	2	
	Baldpate, gadwall	few	common in few days
4/3	R. B. Merganser		
	Killdeer		
4/6	White Pelican	20	scarce till 4/15
4/8	Redhead		
	Baldeagle		
	Whistling Swan	2	10 seen 4/11
4/9	Am. Goldeneye	2	few seen later
4/10	Bufflehead		
	Flickertail		
	Ground squarrel		
	Lapland Longspur	500	definite movement
4/12	Barrow's Goldeneye	1	only one observed
4/13	Mourning Dove		
	Pied-billed grebe		
	Yellow-headed BlackBd		
4/14	Franklin's gull		
	Marbled Godwit		
	Sparrow Hawk		
	Great Blue Heron		
	D. C. Cormorant		
4/15	Long-billed curlew	2	few of these seen
	Canvasback		
	Blue-wing teal		
4/17	Avocet, Ruddy duck		
	Ring-necked duck		
4/18	Swainson's Hawk		
	Herring gull	1	
4/20	Sharp-shinned hawk		
4/24	Common tern		
	Bank Swallow		
	B. C. Night Heron		

Date	Species	No.	Remarks
4/25	Long-billed Dowitcher		
	Fox Sparrow		
	Western Grebe		
4/26	Greater Yellowlegs		
	Wilson's Snipe		40 snipe seen during Apr.
4/27	Lesser Yellowlegs		
	Western Willet		
4/28	Piping Plover		
4/29	Golden Plover		
4/30	Myrtle Warbler		
	Horned Grebe		
	Cooper's Hawk		
	Sharp-shinned Hawk		

h. Mourning Doves: Mourning Doves appeared first on April 13 and became quite common within a few days. The population built up to about 250 by April 30. This is a normal number of doves for Sand Lake.

i. Predaceous Birds: American Rough-legged Hawks and Snowy Owls were both quite abundant during the winter. The owls found easy prey among the crippled and lead shot poisoned ducks noted after the hunting season. The Snowy Owl invasion was one of the most pronounced in the past 25 years. A population of about 25 snowy owls was noted for Sand Lake Refuge during January. The crippled and poisoned ducks taken by the snowy owls would, for the most part, not have survived the winter so the loss was more apparent than real. A few of the snowy owls remained on the area until about April 1. The rough-legs also appeared more common than usual. Probably the food supply in the arctic was short for both snowy owls and rough-legs hence their unusual winter migration into this area.

Golden and Bald Eagle, Pigeon, Red-tailed, Swainsons, Red-shouldered, Sharp-shinned and Cooper's Hawks have been noted in normal numbers. Sparrow Hawks have been quite abundant. A few Prairie Falcons have been observed.

Great-horned and Short-eared Owls were quite common. The Short-eared Owls were observed hunting mice very actively along dikes as the rising flood water forced the mice to concentrate.

Three Magpie were observed during the period. Crows were as common as usual.

The abundance of snowy Owls and American Rough-legged Hawks represented the only unusual character of our winter and spring population of predaceous birds.

## 2. Food and Cover

The 300 Mallards that remained overwinter about artesian wells appeared to find sufficient food in cornfields left standing on the refuge and in occasional patches of corn on neighbors farms that were not harvested last fall. The spring migrants scattered throughout a large area surrounding the refuge and could be seen daily feeding in temporary grain field potholes formed by the spring run-off. In spring, one does not see the mass movement of feeding ducks making twice daily flights from refuge to feeding grounds, so common during the fall. Newly flooded fields and potholes appear to provide all the food migrant waterfowl need during the spring flight. There is no waterfowl food shortage for puddle ducks during this season at Sand Lake. Diving ducks may find a definite food shortage due to the poor growth of aquatic vegetation in Sand Lake. The shortage of aquatic foods is due in part to a relatively high level of water maintained on the refuge.

Although cover is probably not a major problem for waterfowl in spring, it appears that more emergent vegetation such as Phragmites Phragmites communis, Cattail Typha latifolia and various bulrushes Scirpus spp. could be used to advantage by the birds during stormy periods. On several occasions large rafts of waterfowl were observed seeking protection from wind and storm by crowding close to high banks or wooded shorelines. Emergent vegetation is becoming rapidly less abundant on the refuge. Large areas formerly occupied by emergent vegetation are now devoted to open water. Lower water levels during the growing season would encourage the growth of emergent cover.

## 3. Disease

Lead shot poisoning continued to take its toll as severe weather set in. Birds weakened by lead-shot poisoning were frequently trapped as open water froze during storms. Some probably starved due to inability to reach feed in distant fields. Many dead birds were observed about the artesian wells during the winter, apparently victims of lead shot poisoning as evidenced by green feces. Probably 500 Mallards died either directly or indirectly from lead shot poisoning on Sand Lake Refuge during the early part of January. The loss may be higher due to extreme difficulty of checking losses. This is in addition to the reported loss from the same cause indicated in the previous narrative report.

## B. Upland Game

### 1. Population and Behavior

Ring-necked Pheasants: moved into the Sand Lake marshland cover from a radius of ten miles during early winter. Population pressure became great with the advent of severe weather and dwind-

ling food supplies. Aerial censuses made on January 20 and February 4 indicated a pheasant population of 17,000 on the refuge. Movements of the birds searching for better food and cover was noted throughout the winter. During the morning of January 8 several flocks numbering seven to fifteen were observed walking eastward across the ice of Sand Lake, a distance of more than a mile. The birds were evidently in search of better winter food and cover. Apparently part of these birds returned to the west side of the lake in the spring. Several small flocks were seen walking back westward over this same part of the lake during late March. This movement was typical of our winter pheasant flock.

Spring dispersal of our winter pheasant population began during the spring-like days of March 2 to 6. The first breeding season activity was noted March 2 when one cock was seen chasing another from an established crowing territory. An extremely late, cold spring has delayed nesting activity among the pheasants far past normal.

Pinnated Grouse were observed six times during the January - April period. Flocks of 25 and 150 were observed twice during mid winter. On four other occasions from 1 to 4 birds were recorded. Apparently a varying population of Pinnated Grouse passed through and wintered on the refuge. Probably our maximum winter population was about 200 birds. No booming of males has been heard this spring. Apparently we have no nesting Pinnated Grouse on the refuge.

Hungarian Partridge continue to be scarce. Occasional observations were made on winter coveys but the entire population for the refuge is probably no more than 50 birds. Paired "Huns" have been observed this spring indicating we do have some nesting birds.

## 2. Food and Cover

The winter concentration of pheasants quickly ate up standing corn left for them (photo) and began feeding on all natural foods available (photo). Ears of corn hanging four feet above the snow were fed upon by the pheasants. The birds apparently jumped from the crusted snow, pecking the corn off the cob one kernel at a time without disturbing the covering of shucks. As the supply of grain foods dwindled in late January the pheasants made extensive use of Ragweeds Ambrosia spp., Smartweeds Polygonum spp., Smooth Sumac Rhus glabra, Russian Olive Elaeagnus angustifolia and even such strictly emergency foods as Fragrant False Indigo Amorpha microphylla (photo). Neighboring farmers' corn cribs became very attractive to the hungry pheasants (photo), necessitating the distribution of some bait corn (photo) to lessen the damage.

By late February the pheasants were in a near starving condition. Several dead birds were found, apparently having succumbed to starvation. One hen pheasant, found dead on February 28, weighed only 20 ounces. When the weight of mature hen pheasants

goes below 25 ounces they are in danger of dying from starvation and exposure during severe weather. Fortunately the period March 2 to 6 was warm enough to remove all snow from the open fields and the birds were saved from serious loss by starvation.

Pheasant losses up to 95% were recorded during severe storms in areas to the west of the refuge but our excellent marshland and shelterbelt cover apparently provided adequate protection from the many severe storms that occurred during the winter. Our extensive marsh and numerous shelterbelts grown up with luxuriant natural vegetation provide some of the very best winter cover for pheasants and other upland game.

3. Disease - none

C. Big Game Animals

1. Population and Behavior

An aerial census made on February 4 covering 100% of the refuge area revealed a white-tailed deer population of 103 on Sand Lake Refuge. The increase of deer during one breeding season is remarkable. It was thought by refuge personnel that the deer herd had been reduced to less than 10 by hunters during a 3 day open season in October 1948. It is of course obvious that either more than 10 deer escaped the hunters or deer moved in from the outside but the fact remains that the deer did make a remarkable come-back.

2. Food and Cover

The majority of the deer were seen in rank growths of Phragmites, Cattail and Bulrushes. Apparently the herbaceous cover provided all the protection the deer needed, even in severe winter weather. A few of the deer habitually used the more dense shelterbelts or old farm groves.

Some deer browsing was observed on young branches in shelterbelts although little damage was noted. Excellent deer food was provided by standing corn left in the refuge primarily for the pheasants. Additional deer food was provided by occasional patches of corn left unharvested in fields surrounding the refuge. Some grazing on alfalfa fields probably occurred prior to heavy snow. The excellent physical condition of the deer indicated they were getting ample food. No complaint of deer damage was received at the refuge.

3. Disease - none

D. Fur Animals, Predators, Rodents and Other Mammals

Muskrat: A house count made in November indicated a refuge muskrat population of no more than 1000. As the flood water

advanced in April practically all the muskrats were forced out of their houses and bank dens and were easily counted along dikes, roads and banks. The relatively few muskrats seen even when they were forced to concentrate proved that our census figure of 1000 or less muskrats was quite accurate. We feel sure that our muskrat population is no more than 100 at present. No trapping of muskrats was permitted this year because of the present low population.

Mink: are quite common. Several were observed as the flood water advanced. Our permittee trappers failed to catch any mink during the trapping season, due apparently to inexperience rather than lack of mink.

Raccoon: continue quite abundant. Fourteen were removed under permit. The low value of the fur discourages trapping this species. Other means may eventually be necessary to remove the surplus.

Fox: Seven Red Fox were observed during a 100% count of deer on the refuge. Foxes are apparently not too plentiful for a good balance of refuge mammals. Jack rabbits and Cottontails were both quite abundant last winter. We need our present population of foxes to keep rabbits in check.

Coyote: Occasional coyotes wander into the refuge. Two were killed by airplane hunters last winter just east of Sand Lake. These coyotes had apparently been frequenting the refuge during the late fall and winter.

Badger: This species is very common. They are very useful in keeping ground squirrels and gophers in check but they do create a nuisance by digging holes in our patrol roads and other inconvenient places.

#### E. Fish

Northern Pike are the most sought after game fish. This species appeared quite common during early winter and early spring. North Dakota Conservation Department employees were observed stripping Northern Pike caught in the James River just below Dakota Lake dam. Some of the Pike weighed six and seven pounds. Crappie and Bullhead are also fairly common in refuge waters. Carp and Sucker have always been abundant. Apparently little winter killing occurred despite heavy ice. Lack of snow on the ice during much of the winter was the probable reason.

### III REFUGE DEVELOPMENT, MAINTENANCE

#### A. Physical Development

1. Interior of the office was redecorated. The wall around the old heating well was removed, a filler applied to all the cinderblock walls and then a finished coat of paint.

2. A good portion of one month was spent by all refuge personnel hauling oversize rock and sandbagging our dikes in preparation for and during the James River flood.

3. Three new tubular wells were drilled and cased. One at Site 2, one at headquarters and the third at the Sand Lake Recreational Area.

4. A top overhaul given the 1946 International pickup.

5. Minor overhaul made on transmission of Chevrolet panel.

6. Numerous minor repairs, maintenance and 5,000 mile check made on 6 dump truck, 1 stake, 4 pickups, 2 caterpillar tractors, light plants, etc.

7. New linoleum laid in kitchen and bathroom at Quarters 2.

8. One trip made to Des Laes and Lower Souris Refuges to deliver two Jeeps and pick up well casing and D7 rockguard and one trip made to Sullys' Hill and Mud Lake to deliver three dump trucks and bring back new Reo stake truck.

9. Considerable time spent trying to catch up on back office work carried over from last period when construction work took almost entire time of all refuge personnel.

#### B. Plantings

##### 1. Trees and Shrubs

Patrolman, Einar Kaastad purchased with personal funds the following trees for planting at Quarters No. 2: 2 Ponderosa Pine, 2 Norway Pine, 2 Colorado Blue Spruce, 2 Black Hills Spruce and 2 Alpine fir. Plantings are also planned by other members of the refuge personnel.

##### 2. Cultivated Crops - none

#### IV ECONOMIC USE OF REFUGE

A. Grazing - None this period

B. Haying - None this period

C. Fur Harvest - Reported in last report

D. Timber Removal - None

E. Other Uses - none

#### V FIELD INVESTIGATIONS

None

## VI PUBLIC RELATIONS

### A. Recreational Uses

Fishing: Ice fishing was good by the Hecla bridge before the season closed. Northern Pike were most sought. A few six pound pike were caught. Perch was also quite good. Fishermen could usually get Perch when the Pike refused to bite. Little winter killing of fish was noted and the spring run of Northern Pike was at least fair. Many fish are expected to move up from the Missouri River on the present flood of the James River. Fishing on Sand Lake may be much improved this summer.

Hunting: None this period

Other: None this period

### B. Refuge Participation

1. Refuge Manager wrote 5 articles for publication in the Aberdeen American News.

2. Two articles were written by the Refuge Manager for publication by the Audubon Club.

3. Two articles were also written by the Refuge Manager for publication in the South Dakota Bird Notes, official publication of the South Dakota Ornithological Union.

4. All members of the refuge personnel played host to about 250 ornithologists in groups and as individuals who came to see and to photograph the spring migration of waterfowl. Some groups drove over 300 miles and individuals came over 500 miles to view and record on film the spectacular spring flight of geese. Dr. Landis from Wisconsin and Dr. Breckenridge from Museum of Natural History, University of Minnesota each spent nearly a week on Sand Lake Refuge taking colored movies of the spring migration. Genuine Sand Lake hospitality was extended to all.

5. On January 6 the Refuge Manager met with the technicians from the South Dakota Department of Game, Fish and Parks at a meeting held in Aberdeen for purpose of discussing wildlife research problems.

6. The Brown County Sportsman's Club held a meeting in Aberdeen on January 25. The Refuge Manager attended.

7. The Refuge Manager attended an R. E. A. meeting held in Hecla February 28 for purpose of discussing problems of REA cooperators of which Sand Lake is one.

8. On March 4 the Refuge Manager attended a weed control meeting called by the Brown County Weed Committee.

9. A waterfowl conference held in Minneapolis April 14 was attended by the Refuge Manager.

C. Violations - none

D. Refuge Visitors

NAME	TITLE AND ADDRESS	NO. DAYS
John Leite	MRBS - Pierre, S. D.	1/4 ✓
Nelson & Brooks	Lacreek Refuge	1/4
W. W. Aitken	Biologist, U. S. Engineers	1/4
Tom Price	Pres. Aberdeen Sportsmen's Club	1/4
J. Kimball	S. D. Game Dept.	1/2
Elmer Lund	SCS - Aberdeen, S. D.	1/8
Wm. Pfeiffer	N. D. State Warden	1
R. W. Dougall	Hyd. Eng. FWS - Minot, N. D.	1/2
Russ Ziegen	Field Agent - BSA	1/4
Bob Jensen	Fed. Court Reporter - Aberdeen	1/8
Stanley Soule	S. D. State Warden	1/2
Louie Smith	S. D. State Warden	1/2
W. Breckenridge	U of M Museum of Nat'l History	5
John Jarosz	" " " "	5
Dr. R. V. Landis	Appleton, Wisconsin	7
F. A. Carpenter	Asst. Reg. Ref. Supv.	2
F. C. Gillett	Reg. Refuge Supv.	1/2
A. Jamieson	Const. Foreman, Branch of Eng.	1/4
E. Sutton	GMA - Aberdeen, S. D.	Occasional
J. H. Stoudt	Flyway Biologist - Aberdeen	"
L. C. Richardson	S. D. State Warden	"

In addition to the above some 250 amateur ornithologists visited the refuge at various times during the spring.

#### VII OTHER ITEMS

1. A common skunk was noted foraging about the field on Feb. 4, apparently unmindful of the cold weather.
2. Ice measured 30 inches thick on March 21 at Sand Lake.
3. Muskrats, flooded out of their bank dens and houses by the April flood, built temporary rafts attached to flooded tree tops upon which they could be seen feeding and resting throughout the day.
4. Purple Martins made three separate "spring arrivals" -- March 28, April 10 and April 15. Many, if not most, of the early arrivals died from starvation and cold weather. Eight martins were found dead about quarters 3 and headquarters. When warmer weather finally arrived, Martins in the usual number were seen about their houses.
5. Elmer Podoll, Maintenance Man, has been forced to use a boat into and out of his quarters for over two weeks. With new flood



(1) Species  Common Name	(2) First Migrants Seen		(3) Peak Concentration		(4) Last Migrants Seen		(5) Young Produced		(6) Total
	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
1. <u>Swans:</u>									
Whistling swan	2	4/8	15	4/20	3	4/28			25
2. <u>Geese:</u>									
Com. Canada goose	19	3/6	2,000	4/5	Still present				4,000
Cackling goose									
Brant									
White-fronted goose	3	3/30	7,000	4/13	Still present				15,000
Snow goose	500	3/30	120,000	4/13	Still present				225,000
Blue goose	500	3/30	100,000	4/13	Still present				200,000
Lesser Canada	50	3/25	4,500	4/5	Still present				9,000
Richardson's Goose	25	3/31	17,000	4/10	Still present				17,000
3. <u>Ducks:</u>									
Mallard	-	-	25,000	4/1	Still present				40,000
Black Duck	2	4/1	150	4/5	2	4/10			250
Gadwall	2	4/4	5,000	4/9	Still present				7,000
Baldpate	2	3/27	2,500	4/5	Still present				3,000
Pintail	250	3/6	110,000	4/1	Still present				150,000
Green-winged teal	2	4/2	1,500	4/9	10	4/25			2,500
Blue-winged teal	10	4/15	Still increasing		Still present				10,000
Cinnamon teal									
Shoveller	20	4/2	7,000	4/9	Still present				10,000
Wood duck									
Redhead	4	4/8	1,000	4/9	Still present				2,000
Ring-necked duck	2	4/17	500	4/20	2	4/25			1,000
Canvas-back	2	4/15	500	4/17	4	4/26			1,000
Scaup	2	3/27	10,000	4/15	Still present				20,000
Am. Golden-eye	2	4/9	500	4/10	2	4/15			750
Buffle-head	1	4/10	500	4/12	4	4/20			750
Ruddy duck	1	4/17	750	4/20	Still present				1,000
Barrow's Goldeneye	1	4/12	One one seen						1
Am. Merganser	7	3/27	2,500	4/1	Still present				5,000
R. B. Merganser	6	4/3	100	4/5	2	4/15			150
4. <u>Coot:</u>	1	3/30	5,000	4/20	Still present				

## SUMMARIES

### Total Production:

Geese \_\_\_\_\_

Ducks \_\_\_\_\_

Coots \_\_\_\_\_

Total waterfowl usage during period 731.925

Peak waterfowl numbers 434.500

Areas used by concentrations entire refuge area

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 the 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 LakeMonths of January to April 1945

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Colonies	Total # Nests	Total Young	Estimated Number
<b>I. Water and Marsh Birds:</b>										
White Pelican	20	4/16	700	4/30						1,500
Double-crested Cormorant	2	4/14	500	4/30						1,000
Horned Grebe	2	4/30	25	4/30						50
Western Grebe	1	4/25	200	4/30						500
Pied-billed Grebe	1	4/13	300	4/30						600
Great Blue Heron	1	4/14	25	4/30						50
Blk-crn Night Heron	1	4/24	500	4/30						1,000
American Bittern	1	5/3								
<b>II. Shorebirds, Gulls and Terns:</b>										
Reddish	3	4/3	1,000	4/15	Still here					3,000
Western Willet	1	4/27	300	"	"					1,000
Lesser Yellowlegs	1	4/27	1,000	4/30	"					2,000
Greater Yellowlegs	2	4/26	500	"	"					1,000
Avocet	2	4/17	150	4/25	"					300
Marbled Godwit	3	4/14	1,000	4/30	"					1,500
Ring-billed Gull	1	3/23	3,000	4/20	"					5,000
Herring Gull	1	4/18	50	4/20	"					100
Common Tern	10	4/24	1,000	4/30	"					2,000
Forsters Tern	1	4/26	100	"	"					200
Long-billed Dowitcher	1	4/25	25	"	"					50
Long-billed Curlew	2	4/15	25	4/20	2	4/15				50

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u>					
Mourning dove	1	4/13	250	4/30	500
White-winged dove					
IV. <u>Predaceous Birds:</u>					
Golden eagle	1	2/15	5	2/30	7
Duck hawk					
Horned owl					
Magpie					
Raven					
Crow	1	1/29	500	4/15	1,000
Snowy Owl			25	1/15	50
Cooper's Hawk	1	3/30	5	3/30	10
Sharp-shinned Hawk	1	3/30	5	3/30	10
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 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.

Refuge Sand LakeMonths of January to April, 1940

(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	Marsh fringe and adjacent upland 10,000 acres	.59							17,000	
Pinnated Grouse	Upland meadow 1000 acres	5							200	
Hungarian Partridge	Upland fields and meadow 1,000 acres	80							50	

## 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.

SMALL MAMMALS

Refuge Sand Lake Year ending April 30, 1950

(1) Species	(2) Density	(3) Removals	(4) Disposition of Furs									(5) Total Popula- tion		
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping			Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
								Permit Number	Trappers Share	Refuge share				
Muskrat	Marsh, 5000 acres	5												1000
Mink	" " "	50						1-3655	0	0				100
Raccoon	" " "	2.5						"	11	3			3	2000
Skunk	Field & Meadow, 1000	4						"	13	0				1000
Weasel	" " "	20						"	3	1			1	200
Red Fox	" " "	266						"	0	0				15
Coyote	" " "							"	0	0				2 (1)

\* List removals by Predator Animal Hunter

\* List removals by Predator Animal Hunter

REMARKS: Furs poorly fleshed and badly damaged by grease burns rendering the 3 raccoon and 1 weasel valueless.

Reported by \_\_\_\_\_

# INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- (1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)
  - (2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
  - (3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.
  - (4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.
  - (5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.
- REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

# WATERFOWL

REFUGE

Dakota Lake

MONTHS OF

January

to

April

1950

61222

(1) Species  Common Name	(2) First Migrants Seen		(3) Peak Concentration		(4) Last Migrants Seen		(5) Young Produced		(6) Total
	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
1. <u>Swans:</u> Whistling swan									
2. <u>Geese:</u> Canada goose									5,000
Cackling goose									
Brant									5,000
White-fronted goose									50,000
Snow goose									45,000
Blue goose									
3. <u>Ducks:</u> Mallard									10,000
Black Duck									250
Gadwall									1,000
Baldpate									1,000
Pintail									15,000
Green-winged teal									1,500
Blue-winged teal									2,000
Cinnamon teal									
Shoveller									750
Wood duck									
Redhead									500
Ring-necked duck									350
Canvas-back									500
Scaup									4,000
Golden-eye									
Buffle-head									100
Ruddy duck									500
4. <u>Coot:</u>									2,500

3-1750

(June 1949)

(over)

Form NR-1

(044)  
SUMMARIES

Total Production:

Geese \_\_\_\_\_

Ducks \_\_\_\_\_

Coots \_\_\_\_\_

Total waterfowl usage during period 245,450

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 the data are necessarily based on an analysis of the rest of the form.



50-30L-458  
No. 1: Feb. 4 - Headquarters residence in winter.

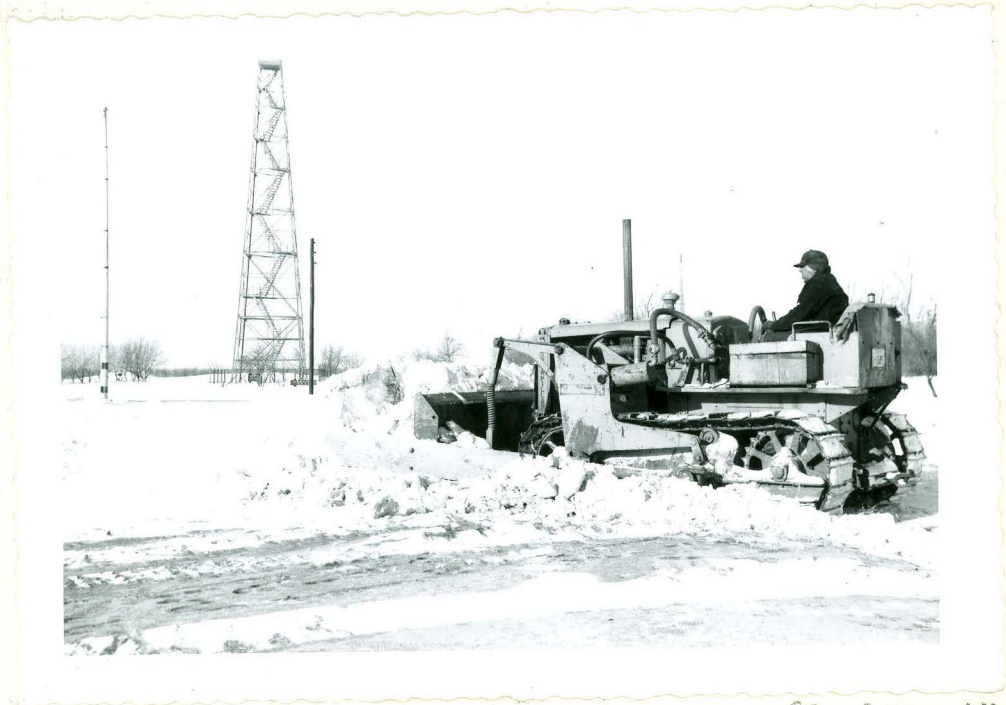


50-30L-459  
No. 2: Feb. 28 - Drifts 8 to 10 feet deep in shelterbelt. Much wildlife food became unavailable. Elmer Podoll on the snowshoes.



SD-SDL-460

No. 3: Feb. 6 - Snow removal with refuge snowplow. John Nowak operator.



SD-SDL-461

No. 4: Feb. 15 - Snow removal at headquarters. Note wings on dozer blade "invented" by Elmer Podoll the operator.



SD-SDL-462

No. 5: Feb. 15 - Mallards wintering at outlet of artesian well;  
Display Pool.



SD-SDL-463

No. 6: Feb. 15 - Captive Swan, Geese and Ducks at the hospital pen.



SD-SOL-464

No. 7: Feb. 20 - Pheasants begin feeding on neighbors' corn cribs as result of deep snow and buried food. Snow is 10 feet deep and drifted completely over top of this crib. E. Podoll.



SD-SOL-465

No. 8: Feb 21 - E. Podoll spreading bait corn to lessen pheasant depredations on neighbors' corncribs.



SD-SOL-466

No. 9: Feb. 28 - Pheasants, feeding on refuge corn left in field for this purpose successfully feed upon corn hanging as much as 4' above the snow. E. Podoll.



SD-SOL-467

No. 10: Feb. 28 - Hungry pheasants find every kernal of corn. Note barren cobs. E. Podoll holding cob.



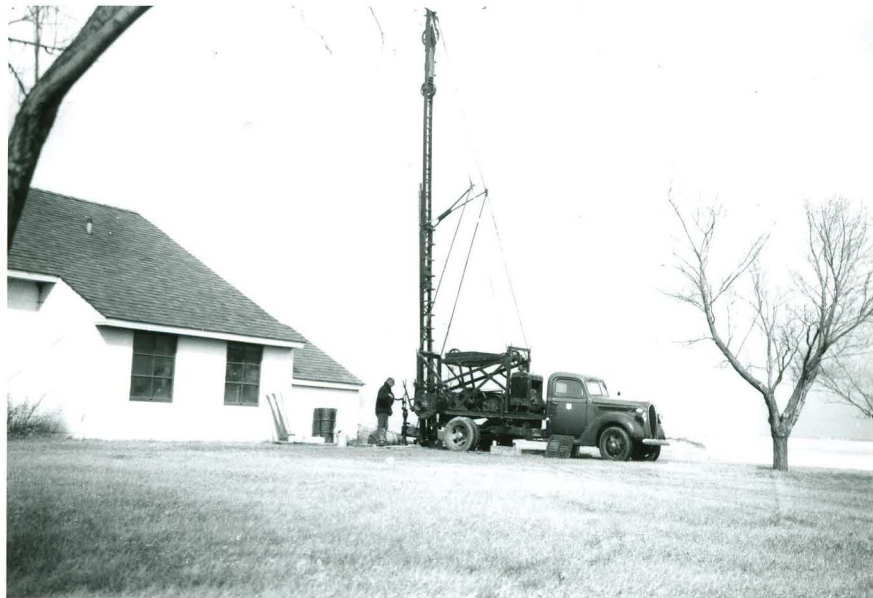
SD-SDL-468

No. 11: March 1 - E. Podoll examines Sumac upon which hungry pheasants have been feeding. Extensive use was made of this food.



SD-SDL-469

No. 12: March 1 - Near starving pheasants fed upon low priority, emergency foods such as this Fragrant False Indigo Amorpha microphylla.



50-SOL-470

**No. 13: March 7 - Surface well drilled at headquarters. Standby well in case of failure of artesian well such as happened at Sites 2 and 3. Water is good for drinking and cooking.**



**No. 14: March 5 - Surface well drilled at Site 2 to replace failing artesian well. A third well was drilled at our Recreation Area. E. Podoll and E. Kaastad operating.**

50-SOL-471



SD-SOL-472  
 No. 15: Apr. 17 - Spring break-up. Ice 14" thick forced over Mud Lake dike by high wind did considerable damage to the dike. E. Podoll and E. Kaastad.



SD-SOL-473  
 No. 16: Apr. 18 - E. Kaastad and E. Podoll breaking ice jam at Mud Lake bridge to prevent loss of the structure.



SD-SOL-474

No. 17: Apr. 19 - Advancing flood pouring through Mud Lake Spillway. John Nowak, Clerk on the bridge.



SD-SOL-475

No. 18: Apr. 22 - Water begins to flow freely over the newly constructed emergency spillway at Columbia dam. A head of only 2 to 3 inches prevented serious erosion. E. Kaastad checking.



SD-SOL-476

No. 19: Apr. 24 - Flood advances. Columbia control gate operating at capacity. Filling oversize on the newly filled approaches to prevent serious erosion when water tops the structure.



SD-SOL-477

No. 20: Apr. 25 - Kaestad sandbagging newly filled approaches to Columbia control gate to lessen erosion. Note control gate operating at maximum capacity. Water later raised about 14" to completely inundate the structure.



SO-SOL-478

No. 21: Apr. 23 - 400 cy of oversize was hauled to Mud Lake dike for sand-bagging and spreading to prevent damage to the dike by the advancing flood. E. Kaastad on the shovel.



SO-SOL-479

No. 22: Apr. 21 - First sand bags were placed at the point where the ice gouged a huge chunk out of Mud Lake dike. Hoadley and Clark on the bags.



50-50L-480

No. 23: Apr. 27 - Water still rising. E. Podell placing sandbag on Mud Lake dike to prevent channelling. Note the ice which added to our difficulties.



50-50L-481

No. 24: Apr. 28 - Over the top. E. Kaastad placing sand bags to stop channelling as flood water tops Mud Lake dike. Note ice which denotes unseasonably cold weather.



SD-SOL-482

No. 25: Apr. 30 - Flood destruction. E. Kaastad watching wave action take tons of fill out of State Highway #10 (Houghton Grade) where it crosses Sand Lake Refuge. Road badly damaged and closed later.



SD-SOL-483

No. 26: Apr. 30 - More flood destruction. High water and waves combine to destroy the Weismantle Grade. E. Kaastad watching. Grade later cut through in many places.