

LAKE ILO

NARRATIVE REPORT

January-December 1966

NARRATIVE REPORT
CALENDAR YEAR 1966
LAKE ILO NATIONAL WILDLIFE REFUGE
&
EASEMENT REFUGES - DISTRICT IV

Permanent Personnel

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Temporary Personnel

Matt Remsing	-	Truck Driver
Joe Remsing	-	Truck Driver
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I. GENERAL

A. Weather Conditions

	Month	Precipitation		Max. Temp.	Min. Temp.
		Normal	Snowfall		
January	<u>.21</u>	<u>.40</u>	<u>4.0</u>	<u>35</u>	<u>- 39</u>
February	<u>.22</u>	<u>.40</u>	<u>5.0</u>	<u>43</u>	<u>- 23</u>
March	<u>.28</u>	<u>.62</u>	<u>4.0</u>	<u>70</u>	<u>- 6</u>
April	<u>.93</u>	<u>1.16</u>	<u>8.0</u>	<u>66</u>	<u>11</u>
May	<u>1.29</u>	<u>1.92</u>	<u>T</u>	<u>88</u>	<u>26</u>
June	<u>4.26</u>	<u>3.74</u>	<u>0</u>	<u>93</u>	<u>38</u>
July	<u>2.04</u>	<u>2.38</u>	<u>0</u>	<u>100</u>	<u>48</u>
August	<u>2.50</u>	<u>1.94</u>	<u>0</u>	<u>93</u>	<u>42</u>
September	<u>.85</u>	<u>1.29</u>	<u>0</u>	<u>95</u>	<u>32</u>
October	<u>.55</u>	<u>.80</u>	<u>T</u>	<u>78</u>	<u>17</u>
November	<u>.32</u>	<u>.53</u>	<u>4.0</u>	<u>51</u>	<u>- 10</u>
December	<u>.32</u>	<u>.28</u>	<u>6.0</u>	<u>47</u>	<u>- 25</u>
Annual Totals	<u>13.77</u>	<u>15.46</u>	<u>31.0</u> Extremes	<u>100</u>	<u>- 39</u>

The above data was obtained from the weather station at headquarters. Mean temperatures were above average for March, June, July and for each of the last 4 months of the year. All remaining months of the year were cooler than normal.

Precipitation was above normal for June, August and December. The amount for the May-August growing season was adequate for good crops, being slightly above the long-term average for that period.

Snow cover reached a maximum of 5 inches in March and there was a snowfall of 8 inches in April. Snowfall for the recent fall season was below average with 4 inches during November and 6 inches in December. All of this had melted by December 18 and there was only a trace on the ground for the remainder of the year.

Total precipitation for the year was only 13.77 inches as compared to 19.15 inches for 1965. This was 1.69 inches or 10.9% below the normal of 15.46 inches.

B. Habitat Conditions

1. Water

The water level was .6 foot below the spillway on January 1 and remained at this level until March 10 when it raised .4 foot. Water started flowing over the spillway on March 12 reaching a peak of 1.28 feet above spillway on March 14. The level then dropped slowly reaching a stage .1 foot above the spillway on April 2. This trend continued with the stage dropping to .1 below the spillway on May 28. A small raise brought the level up to where a small stream was passing over the spillway again on June 6. After that date the water level gradually dropped until freeze-up on November 4 with a reading of 1.6 feet below the spillway. The stage at the end of the year was still the same.

Water level readings were recorded as follows:

Date	Water Level	Date	Water Level
1/1/66	.6 below spill	6/25	Sm. stream over
3/10	.2 " "	7/2	.1 below spill
3/11	.1 " "	7/9	.2 " "
3/12	.6 above spill	7/16	.4 " "
3/14	1.28 " "	7/23	.6 " "
3/16	.9 " "	7/30	.7 " "
3/18	.7 " "	8/6	.9 " "
3/19	.5 " "	8/13	1.0 " "
3/26	.2 " "	8/20	1.1 " "
4/2	.1 " "	8/27	1.2 " "
4/9	Sm. stream over	9/3	1.2 " "
4/16	" " "	9/10	1.3 " "
4/23	" " "	9/17	1.4 " "
4/30	" " "	9/24	1.4 " "
5/7	" " "	10/1	1.4 " "
5/14	" " "	10/8	1.45 " "
5/21	" " "	10/15	1.5 " "
5/28	.1 Below spill	10/22	1.5 " "
6/4	.1 " "	10/29	1.6 " "
6/11	.1 " "	11/5	1.6 " "
6/18	.1 " "	12/31/66	1.6 " "

The freeze-up occurred on November 4 as compared to November 13 last year. The ice was 18 inches thick at the beginning of the year and later reached a maximum of 29 inches during January.

Owing to more moderate temperatures the ice had only attained a thickness of 13 inches by the end of December this year. The water in Lake Ilo was again muddy during the entire open water season. It did clear up after freeze-up as it has done the past 4 years.

2. Food and Cover

The supply of waterfowl food produced by aquatic and marsh plants in the lake proper was very small again this year. The food and cover in the Lee Paul Slough was also not up to the high production level of last year. The large population of carp in the main lake destroy practically all vegetation and are responsible, at least in part, for the turbid water conditions. Most of the waterfowl concentrated in the Slough where food and cover received intensive use.

Food conditions for field feeding waterfowl and upland game birds were good during both spring and fall seasons. Barley and corn that was left standing on the refuge last fall was completely cleaned up. Deer obtained their share during the winter and the remainder was taken by waterfowl during the spring migration.

The corn crop over the surrounding territory was good but most of it was cut for silage, leaving little waste grain. A total of 20.5 acres of corn was left standing on the refuge for wildlife food. This corn, which had been fertilized, was better than average and produced an estimated 30 bushel per acre. White-tailed deer fed extensively on corn during the fall along with a few mallards and numbers of sharp-tailed grouse.

In addition there was 29.6 acres of barley left standing in the fields. Unfortunately, blackbirds took 50% of one 7 acre field during the late summer. It is estimated that waterfowl consumed only 20% of the remaining barley during the fall migration.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

a. Swans: No Whistling Swans were observed on the area during the year.

b. Geese: A few Common Canadas, White-fronts and Snows used the area during the spring but only a few White-fronts were present during the fall. Despite the small numbers, overall use for 1966 was 4,791 use days as compared to 3,430 for 1965, an increase of 40%.

c. Ducks: Total use by ducks increased 53% this year over the total for 1965. Overall use for each of the spring, summer and fall periods was higher this year with the largest increase occurring during the spring. Most of the improvement was made up by puddle ducks which as a group increased 65%, as the result of an increase, for all common species except BW Teal. On the other hand total use by divers as a group was lower again for the second year, dropping 13% below the total for 1965. Bufflehead, Ruddy Duck and Common Merganser were the only divers showing a small increase.

Despite the favorable increase for dabblers, total use was still 43% below the 5 year average. This reflects the general scarcity of Mallards and Pintails during that period. The trend for diving duck use is also down, being 16% below the 5 year average. Total duck use for 1966, including both dabblers and divers, was 41% below the 5 year average.

Two brood counts were made during the summer, the first on July 14 and the second on August 16. A total of 40 non-duplicated broods were counted, 8 less than last year. Coverage was estimated at 75% for the Lee Paul Slough and 100% for the lake proper. Total broods for both areas combined was estimated at 47.

A tabulation of breeding pairs, brood counts and estimated production and nesting success for the past 8 years is indicated below:

<u>Year</u>	<u>Breeding Pairs</u>	<u>Broods Counted</u>	<u>Estimated Broods</u>	<u>Estimated Production</u>	<u>Percent Success</u>
1959	358	38	76	495	21.2
1960	267	52	104	678	39.0
1961	289	51	64	412	22.1
1962	286	43	57	370	19.9
1963	854	64	85	553	10.0
1964	902	41	78	503	8.6
1965	179	48	63	393	35.2
1966	196	40	47	287	24.0
8 year Average	416	47	72	461	17.3

d. Coot: The Coot population was again below average and total use of 22,750 use-days was 22% less than the 29,190 use-days recorded in 1965. Use was much lower during the spring and summer this year than a year ago while that for the fall season exceeded the 1965 figures. It is estimated that 20 young were produced from 10 successful nests as compared to 140 young in 1965 and 300 in 1964.

A summary of overall waterfowl use for the years 1962-1966 and comparison of 1965 with the 5 year average is included in Table I on page 5.

Table I. Comparison of Waterfowl Use Days 1962-1966

Species	1962	1963	1964	1965	1966	Total	5 Year Average	% 1966 Over Ave.
W. Swan	56	0	0	21	0	77	15	--
Com. Canada Goose	5,397	9,751	11,977	2,016	861	30,002	6,000	- 86
W.F. Goose	5,635	3,605	3,290	154	3,769	16,453	3,291	+ 15
Snow Goose	5,639	10,612	14,000	1,260	161	31,672	6,337	- 97
Blue Goose	65	56	84	0	0	205	41	--
Sub-total Geese	16,736	24,024	29,351	3,430	4,791	78,332	15,746	- 70
Mallard	947,140	1,925,042	636,510	299,285	514,465	4,322,442	864,488	- 40
Gadwall	35,696	45,360	13,930	7,595	19,600	122,181	24,436	- 20
Widgeon	89,195	203,070	53,760	28,140	48,090	422,255	84,451	- 43
Pintail	231,940	365,470	182,630	39,480	63,000	882,520	176,504	- 64
GW Teal	14,730	28,420	18,830	6,300	15,610	83,890	16,758	- 7
BW Teal	32,410	50,050	19,824	24,780	15,050	142,114	28,423	- 47
Shoveler	53,110	43,260	18,270	16,200	22,050	152,890	30,578	- 28
Sub-total Dab.	1,404,221	2,660,672	943,754	421,780	697,865	6,128,292	1,225,658	- 43
Redhead	4,799	6,412	9,240	2,730	1,260	24,441	4,888	- 74
Ringneck	0	154	0	0	0	154	31	--
Canvasback	4,105	2,870	5,740	2,870	1,190	16,775	3,355	- 65
Scaup	53,540	61,250	70,224	67,655	60,130	312,799	62,559	- 4
Com. Goldeneye	2,462	644	154	700	420	4,380	876	- 52
Bufflehead	302	728	420	329	770	2,549	510	+ 51
Ruddy	8,400	4,830	9,100	1,834	2,100	36,264	7,253	- 71
Com. Merganser	2,026	3,724	504	672	840	7,766	1,553	- 46
Sub-total Div.	75,634	80,612	95,382	76,790	66,710	395,128	79,026	- 16
Grand Total All Ducks	1,479,855	2,741,284	1,039,136	498,570	764,575	6,523,420	1,304,684	- 41
Coot	100,420	105,840	88,550	29,190	22,750	346,750	69,350	- 67

2. Water and Marsh Birds

All of the common species such as Horned, Eared and Pied-billed Grebes, White Pelican, Double-crested Cormorant, Great Blue Heron, and American Bittern were observed in small numbers at one time or another during the year. It is believed that the populations of this group in general were about the same as in 1965.

Sandhill Cranes first appeared on April 15. The peak number for the spring flight was estimated at 400 birds, all passing over. None of these birds stopped on the refuge and very few were observed passing over during the fall migration.

3. Shorebirds, Gulls and Terns

The populations of all shorebirds using the area appeared to be below normal. Species observed during the year were as follows: Killdeer, Spotted Sandpiper, Willet, Greater and Lesser Yellowlegs, Marbled Godwit and Wilson's Phalarope.

The numbers of Ring-billed and Franklin's Gulls seemed to be about the same as last year but still below the long-term average.

4. Doves

Mourning Doves were plentiful on the refuge again this year. The peak population was estimated at 1500 during September. It is estimated that 1000 young were produced on the refuge this year.

B. Upland Game Birds

1. Sharp-tailed Grouse

A good increase occurred during the year owing to improved production. Five separate broods were observed and it is estimated that 50 young were produced. The population at the end of the year is estimated at 75 birds as compared to 30 one year ago. Hunting pressure was light in the vicinity of the refuge and success was considered good by the few hunters participating.

2. Ring-necked Pheasant

The increase in the population to a total of 200 birds during the summer resulted from releases of young birds and improved production. A total of 120 young were released by a neighbor near the refuge and 20 young were released on the refuge. Seven separate broods were observed during the summer as compared to only one brood last year. It is estimated that 50 young were produced on the refuge. It appears that the population was reduced to 100 by the end of the year as the result of adjacent hunting and other losses. Three pheasants were found along the refuge boundary that had been shot. In addition, an estimated 15 dead birds were observed on the highway along the north boundary.

3. Gray Partridge

It is estimated that 20 of these birds were present on the refuge last spring with an increase to 130 for the summer period. Adjacent hunting and other losses had reduced the population to an estimated 100 at the end of December as compared to 40 one year ago.

C. Big Game Animals

1. White-tailed Deer

The production of 20 young on the refuge brought the peak count to 40 White-tails prior to the fall hunting season. Adjacent hunting reduced the population by 50% leaving an estimated 20 remaining at the end of the year.

Heavy hunting pressure occurred again in the vicinity of the refuge. One doe killed illegally on the refuge, was confiscated and turned over to the State Game and Fish Department when 3 hunters were apprehended within the refuge.

2. Mule Deer

Only one Mule Deer was observed on the refuge this year and none were found the year before. They are common in the badlands only a few miles north and west of the refuge.

3. Antelope

It is estimated that 30 Antelope made use of the refuge during the year. They do not stay on the area but come and go at various times. In early December 70 antelope were counted one-half mile south of the refuge. None were found on the area at the end of the year.

It is estimated that the overall population has increased during the year. The area around the refuge was open to bow hunting but closed during the gun season.

D. Fur Animals. Predators. Rodents and Other Mammals

Muskrat: It was apparent later that the 400 reported on NR-4 at the end of April was too high. Winter losses were definitely higher than anticipated at the time. The population was estimated at 200 on September 26. This was partially based on the 30 houses counted on the lake and slough. By late December the shallow water in the Lee Paul Slough was frozen to the bottom and "rats" were moving on top of the ice. It is estimated that a large proportion of the "rats" in the slough will be lost before spring. No muskrats were removed during the trapping season.

Mink: An estimated increase from 10 in the spring to 20 for the fall season. None were taken during the trapping season and only 3 sets of tracks were found on the refuge at that time.

Beaver: An increase from 2 in the spring to a total of 6 for the fall period. Two were removed before the fur season to reduce damage to trees in the recreational area. None were taken during the trapping season.

Raccoon: Several were sighted and signs were numerous during this year. One was taken by the trapper and 6 were removed by refuge personnel.

Skunk: The population is still considered to be high but somewhat below the level for recent years. A total of 31 disposed of by refuge personnel and one removed by the trapper.

Weasel: Only 4 animals seen during the year. A few signs were evident in the snow during the latter part of the year. These animals were not included on the trapping list this year.

Badger: Only a few badger continue to use the refuge. Four animals were disposed of during the year.

Red Fox: It is believed the population has decreased by 50% in the vicinity of the refuge and in southwestern North Dakota. Removals included 23 during the past winter and spring, 19 during the summer and one taken by the trapper for a total of 43 for the year. A total of 50 were removed during 1965.

Coyote: None seen during the year but their tracks were found on the refuge several times. The population seems to be increasing in the badlands north and west of the refuge. Also not included on the trapping list this year.

E. Hawks, Eagles, Owls, Crows and Magpies

Red-tailed, Swainson's, Marsh and Sparrow Hawks all appeared during both the spring and fall migrations. A few Rough-legged Hawks were seen only during the fall. Two Prairie Falcons were observed on the refuge in November while none at all were seen last year.

Two Golden Eagles were seen on the refuge last spring and 2 were present again in the fall and early winter. The Bald Eagle was not found on the refuge at any time during the year.

The Horned Owl is a permanent resident. It is estimated that 8 used the refuge, the same number as last year.

Crows were common during both spring and fall migrations but, fortunately, they do not nest here.

Magpies are common on the refuge and in the nearby badlands. It is estimated that 20 were present on the refuge during December.

F. Other Birds

A large number of song birds stop at the refuge during spring and fall migrations. Many of these remain to nest in the shelterbelts and on the uplands. A large number of Blackbirds used the refuge this year. They were responsible for considerable damage to certain fields of barley when in the late dough stage. They also caused some damage to the corn but not as much as last year. Bohemian Waxwings have been unusually common as several flocks were present during December.

G. Fish

The Carp population in the lake is very high and they have destroyed every bit of aquatic vegetation. Increased damage to vegetation in the slough also occurred. It will be only a matter of time now until that area will be devoid of aquatic plants.

Water levels were slightly lower than for the past 2 years but still adequate for fish. Activity by carp was responsible for keeping the water muddy throughout the year except during the colder months when frozen over.

A number of Northern Pike were reared in the Lee Paul Slough and in the creeks flowing into the lake. It is doubtful if any were produced in the lake this year. The few fish caught during the spring and summer included Carp, Bullheads, Perch and Northern Pike.

Winter fishing was permitted until March 27 and then opened again on December 15. A good number of fishermen used the lake during both periods. Good numbers of Northern Pike were taken, the largest weighing 24#, along with a few yellow Perch. The perch now run from 8 to 10 inches long and appear to be in better condition than they have been for the past several years.

H. Reptiles

Nothing unusual was observed during the year.

I. Disease

There was no evidence of disease among waterfowl, upland birds or mammals during the year.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

1. Soil and Moisture Program

a. Cover Crops

A total of 26.9 acres was seeded this year. In April 10 acres was seeded with a tame grass-legume mixture in Unit A-5, field #3. A tame grass mixture, without any legume, was seeded during October in Unit A-4. This included Fields #2 and 4 for a total of 16.9 acres. The omission of a legume for the latter seeding was necessary because it will be necessary to treat this acreage later with herbicide to control field bindweed. These seedings will provide undisturbed nesting cover, reduce erosion and improve soil fertility.

b. Critical Area Planting

An estimated 5 acres of roadside, along the new entrance road, was seeded in May with a native grass-legume mixture.

c. Weed Control. Land

Weed control was carried out on 5.5 acres for the control of field bindweed. A total of 70 acres of small grain was also treated for the control of annual weeds. Twelve acres of this amount was land that was farmed by refuge personnel. Cooperators were responsible for weed control on the remaining 58 acres which they farmed.

d. Bank Protection

A total of 1300 feet of sharp cut banks along the north side of Lake Ilo was given some protection to reduce erosion by wave action. An estimated 485 CY of coarse scoria was hauled and spread along the bank to serve as riprap.

e. Operation and Maintenance

Eight separate tree plantings, containing 16,175 trees and shrubs, were cultivated several times during the summer as needed.

2. Maintenance. General

a. Roads and Trails

Removed snow as needed from refuge roads with truck plow and tractor with utility blade. Maintained refuge roads several times with tractor and blade. Mowed and removed weeds from shoulders of roads and county road along refuge boundary to prevent accumulation of snow during the winter months.

Levelled and shaped grade to complete new entrance road of about .6 mile. Stockpiled 1,000 CY of scoria at pit on refuge. Hauled and spread 590 CY of scoria on new entrance road and improved sections of other road.

b. Fencing and Posting

Moved and rebuilt one mile of fence along west and north sides of older section of entrance road. This fence was set back to provide adequate space to backslope the roadside ditch.

c. Buildings and Structures

Maintained fire guard around buildings on refuge. Checked dam and spillway during spring run-off. Placed baled hay along spillway crest after freeze-up to protect structure from ice expansion.

d. Recreation

Trees were cultivated and grounds and buildings kept clean. The Recreational Area was checked many times by refuge personnel to record public use information needed for reports.

e. Equipment

Serviced, made 3000 mile Safety Checks as required and made minor repairs on one pickup, 3 dump trucks, 2 farm tractors with loaders, mower and a number of farm implements.

B. Plantings

1. Aquatic and Marsh None
2. Trees and Shrubs None
3. Upland Herbaceous Plants

Reported under S&M Program

4. Cultivated Crops

Four Cooperative Agreements, covering 180.3 acres of cropland in Units A-3, 4, 5 and 6, were in effect this year. The small grain yield was fair with barley averaging 30 bushel per acre and wheat about 25 bushel per acre. Oats was the most productive of all small grains, making 85 bushel per acre.

A part of Unit A-1, containing 23 acres, and a 7 acre field in Unit A-6 and 2.5 acres in Unit A-3 was farmed by refuge personnel. This has been done for several years to provide more food for waterfowl, upland game birds and big game at strategic locations. Corn was produced on 20.5 acres and barley on 12 acres. It is estimated that

the corn would yield 30 bushel per acre and the barley 40 bushel per acre as both crops were fertilized. Crops that remain standing by next spring will be mowed to make the food more readily available for waterfowl.

C. Collections and Receipts

The seeds listed below were either collected or received by transfer during the year:

<u>Amount</u>	<u>Species</u>	<u>Source</u>	<u>Condition</u>
550#	Alfalfa	Harvested	Good
40#	Slender Wheatgrass	"	"
230#	Crested Wheatgrass	"	"
8#	Alfalfa	Des Lacs	"
100#	Slender Wheatgrass	"	"
89#	Crested Wheatgrass	"	"
20#	Western Wheatgrass	"	"

2. Specimens None

D. Control of Vegetation

Weed control consisted of one herbicide treatment on 5.5 acres infested with field bindweed. Most of this was spot treatment in cover strips on crop units and the chemical used was 2,4-D. It is estimated that an 80% kill was obtained.

The 12 acres of barley on Unit A-1 and 58 acres of small grains planted by cooperators was also treated with 2,4-D for the control of annual weeds. This is a normal farming practice which generally improves crop yields.

E. Planned Burning None

F. Fires

No wild fires occurred on the refuge during the year.

IV. RESOURCE MANAGEMENT

A. Grazing

Three grazing permits covering 5 units were in effect during the year. A maximum of 104 cattle were grazed on the area during the year. Total utilization was 303.19 AUM's on 849 acres. Revenue from this source was \$521.48. One small unit generally used by refuge personnel was vacant this year. Good cover remained on all units at the end of the grazing season.

B. Haying None

C. Fur Harvest

One Trapping Permit, no. T-9623, was issued for the removal of furbearing animals. The season for mink, weasel, muskrat and beaver opened on November 14 and closed on December 31 for all protected species except beaver. Muskrat, weasel and coyote were not included on the trapping list this year. The only removals made by the trapper were one Raccoon, one Skunk and one Red Fox. Mink and beaver were to be shared but all other furs went to the trapper.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Animal Control Study

This study was initiated in 1965 to determine the need, if any, for predator control and the possible benefits of such control. This refuge, being small, was divided into only two parts for the study. The Lee Paul Slough and adjacent land, consisting of 640 acres, make up one unit which will remain "as is" as a check area. The other part, including all land around the main lake, was selected for control.

Poisoned Eggs and Traps

Field work began this year on April 14 when 72 poisoned eggs were placed at strategic locations in the control area, 3 eggs per set. The eggs were checked regularly until only a few were being taken. Those remaining were then destroyed.

Steel traps were also used and 12 no. 2's were also set in the control area on April 14. These remained in the field until June 1, for a total of 552 trap-days.

Results of the study during 1966 is summarized below:

Total Estimated Removals

<u>Species</u>	<u>Eggs</u>	<u>Traps</u>	<u>Known Removals</u>	<u>Egg Probables</u>	<u>Estimated Total</u>
Raccoon	2	0	2	6	8
Skunk	9	12	21	10	31
Badger	4	0	4	0	4
Red Fox	3	4	7	3	10
House Cat	0	2	2	0	2

Cost - Animal Control with Eggs and Traps - 1965 - 1966

	1965		1966	
	<u>Eggs</u>	<u>Traps</u>	<u>Eggs</u>	<u>Traps</u>
Labor	104.76	52.38	79.78	53.12
Material & Depreciation	2.50	1.89 ^{1/}	1.50	1.89
Equipment, travel	<u>11.20</u>	<u>5.60</u>	<u>5.60</u>	<u>12.20</u>
	\$118.46	\$59.87	\$86.88	\$67.21
Est. total Predators removed	41	8	37	18
Ave. Cost/Predator	\$2.89	\$7.48	\$2.35	\$3.73

^{1/} This figure corrected for 1965 to include depreciation on 10 year basis.

In 1966 not as much time was devoted to Animal Control as the year before owing to the demand for time on other important jobs.

The above figures indicate that the cost per animal removed is considerably less by the use of poisoned eggs as compared to steel traps. However, this evaluation does not consider that eggs are probably more selective for skunk and raccoon than other common predators.

B. Dummy Nest Study

Dummy nest sampling was used for the second year to collect additional data on predation rates. The primary aim was to compare plots having predator control with non-controlled areas. It was considered that 100 nests in each area would suffice as this would detect a difference of 15% or more. The sampling was further broken down to 50 nests in grazed and 50 nests in ungrazed plots in both the controlled and uncontrolled areas.

Eggs were placed in the field, one egg per nest, starting on May 19 so as to be available during the peak of the waterfowl nesting season. Lines were staked in the field 200' apart at right angles to the shoreline prior to the placement of eggs. From 2 to 6 nests were used per line and the nests were 200' apart. The first nest on each line was located at a random distance (under 200') from the shoreline. A short stake, off set a few feet from the nest line, was used to mark each nest. Willows and old tires were used to mark lines. In order to reduce scent, which animals might follow, a 20' pole with cup attached was used for placing each egg. Another late period sampling of eggs were placed in the field on July 1. Both early and late samples were checked after 35 days exposure and the remaining eggs destroyed. Cover density was also recorded for each nest.

A summary of the data collected to date is indicated in Table II.

It will be noted from the table that in 1965 survival for late nests was higher for grazed than ungrazed plots as might be expected. In 1966 this trend was reversed when survival was higher for grazed than ungrazed plots for both early and late nests. This points up the need for the collection of data over a longer period before conclusions are drawn.

Table II. Survival of Dummy Nests on Grazed and Ungrazed Samples - Lake Ilo - 1965 - 1966

		6/21-7/26		Survival by Cover Density						Total Survival	
1965		Early	Late	Type I		Type II		Type III			
Sample	Type Area	Nests	Nests	Early	Late	Early	Late	Early	Late	Early	Late
1	Grazed <u>1/</u>	None	50	-	11	-	6	-	0	-	17
2	Grazed	None	50	-	10	-	4	-	2	-	16
	Total Grazed	None	100	-	21	-	10	-	2	-	33
3	Ungrazed <u>1/</u>	None	50	-	0	-	10	-	22	-	32
4	Ungrazed	None	50	-	1	-	7	-	13	-	21
	Total Ungrazed	None	100	-	1	-	17	-	35	-	53

		5/19-20 -	7/1-8/5								Total Survival	
1966		6/22-23	Early	Late	Type I		Type II		Type III			
Sample	Type Area	Nests	Nests	Nests	Early	Late	Early	Late	Early	Late	Early	Late
1	Grazed <u>1/</u>	50	50	22	14	9	6	0	0	31	20	
2	Grazed	50	50	33	18	6	6	0	0	39	24	
	Total Grazed	100	100	55	32	15	12	0	0	70	44	
3	Ungrazed <u>1/</u>	50	50	3	1	15	7	19	13	37	21	
4	Ungrazed	50	50	5	3	21	12	2	0	28	15	
	Total Ungrazed	100	100	8	4	36	19	21	13	65	36	

1/ These samples subjected to Animal Control.

IV. PUBLIC RELATIONS

A. Recreational Uses

The Recreational Area, which is maintained by the Dunn County Park Board, was kept in good order again this year. The area was used for various public gatherings, picnicking, swimming, fishing and ice skating. Fishing and miscellaneous uses both increased this year. Overall use is estimated as follows: Fishing - 1600 visitors and miscellaneous - 5475 visitors for a total of 7,075 visitors for the year. This is equivalent to 1869 visitor days under the new method of computing public use.

The Dunn County Park Board provided labor for cultivating around trees, disposing of rubbish and cleaning grounds and buildings. They also furnished material and labor for repairing the roof of the bath house.

B. Refuge Visitors

<u>Date</u>	<u>Name</u>	<u>Location</u>	<u>Purpose</u>
1/13	C. R. Estheimer	AAO - Minot	Rental Survey
4/6	R. V. Hanson	Wildlife Services - Bismarck	Predator Control
4/29	Walter LeRoy	Contractor - Killdeer	Build Road
5/12	Homer L. Bradley	Refuges - Des Lacs	Dummy Nests
5/31	William McClure	M&E - Bismarck	Law Enforcement
6/18	Mike Laughlin & family	Wildlife Services - Coolidge, Ariz.	Courtesy Call
6/30	Homer L. Bradley	Refuges - Des Lacs	Inspection
8/6	Homer L. Bradley	Refuges - Des Lacs	Delivered Supplies
9/22-23	Homer L. Bradley	Refuges - Des Lacs	Inspection
10/7	Elmer M. Richwalski	Refuges - Des Lacs	Deliver Truck
10/7	Gerald L. Felch	Refuges - Des Lacs	Deliver Truck
11/2	Levi J. Waggoner	Dunn Center	Trapping Permit
11/19	Joe Tysver	Dep. Sherrif - Dunn County	Deer Violation
11/21-22	Ray Goetz	State Warden - Belfield	Law Enforcement
11/26	Mr. & Mrs. Seb. Koch	Amidon	Courtesy Call
11/28	Ray Goetz	State Warden - Belfield	Law Enforcement
12/13-14	David Smith	Div. of Realty - Minneapolis	Land Acquisition

C. Refuge Participation

Several news released concerning Wildlife Week were furnished to the newspapers at Killdeer and Dickinson.

D. Violations

One violation occurred during the deer hunting season when a White-tailed doe was killed on the refuge on November 19. This case was turned over to the local State Warden and was still pending at the end of the year.

VII. OTHER ITEMS

A. Death of Dave Riley

Mr. Riley, a bachelor, had resided on a small tract of land within the refuge boundary for many years. The grounds around his home were beautifully landscaped and included many native and ornamental trees and shrubs. In addition, Mr. Riley always grew many flowers which added to the attractiveness of this unique site. The grounds were always especially well kept until Mr. Riley's health began to fail a few years ago.

The Bureau purchased the Riley tract in 1959 with the reservation that Mr. Riley would have use of the property as long as he lived. Mr. Riley passed away on August 1, 1966. The little house is now empty and it is not likely the grounds will ever look the same again.

B. Credits

Mr. Chesley M. Dinkins, Biological Technician, who is stationed at the Lake Ilo Refuge, furnished practically all of the information for the Lake Ilo, Pretty Rock, White Lake and Stewart Lake sections of the Narrative Report.

C. Photographs

All photos taken by refuge personnel as indicated.

SIGNATURE PAGE

Submitted by:

Homer L. Bradley
(Signature)
Homer L. Bradley

Refuge Manager
Title

Date: February 8, 1967

Approved, Regional Office:

Date: 2-8-67

Edward J. Smith
(Signature)

Regional Refuge Supervisor

WATERFOWL

REFUGE Lake Ilo

MONTHS OF Sept. 1 TO Dec. 31, 19 66

(1) Species	(2) Weeks of reporting period									
	8/28-9/3 1	9/4-10 2	9/11-17 3	9/18-24 4	9/25-10/1 5	10/2-8 6	10/9-15 7	10/16-22 8	10/23-29 9	10/30-11/5 10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted				50	150	183				
Snow										
Blue										
Other										
Ducks:										
Mallard	500	500	800	1,200	4,000	6,000	3,000	3,000	4,000	20,000
Black										
Gadwall	40	40	150	200	200	200	50	50		
Baldpate	30	50	500	800	1,500	300	200	100		
Pintail	400	300	200	150	200	200	100	100	100	
Green-winged teal	50	50	60	60	100	100	50	30		
Blue-winged teal	150	200	150	100	150	50				
Cinnamon teal										
Shoveler	50	100	150	200	200	300	200	100	200	
Wood										
Redhead						20	30	30		
Ring-necked										
Canvasback						20	30	20		
Scaup							150	200	600	1,000
Goldeneye									20	20
Bufflehead									20	30
Ruddy			30	80	50	50	30			
Other										
Com. Merganser										30
Coot:	50			500	1,500	500	100	50		

Form NR-1.
(Nov. 1945)

Refuge Lake Ilo Months of Sept. 1 to Dec. 31 1966

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. <u>Water and Marsh Birds:</u>										
Horned Grebe	Common		50	9/1-10						
Eared Grebe	Common		100	9/1-10						
Pied-billed Grebe	Common		20	9/1-10						
White Pelican	Common		23	9/20-30						
Double-crested Cormorant			20	9/20-30						
Great Blue Heron	Common		20	9/20-30						
American Bittern	Common		10	9/1-10						
Sandhill Crane	None Observed On Refuge This Period									
II. <u>Shorebirds, Gulls and Terns:</u>										
<u>Terns:</u>										
Killdeer			100	9/1-20						
Spotted Sandpiper			20	9/10-20						3,000
Willet			10	9/1-10						
Greater Yellowlegs			300	9/20-30						50
Lesser Yellowlegs			50	9/20-30						8
Marbled Godwit			10	9/20-30						4
American Avocet	None Observed on Refuge This Period									
Wilson's Phalarope			400	9/20-30						9
Ring-billed Gull			300	9/10-20						
Franklin's Gull			200	9/10-20						
Common Tern			200	9/10-20						3,000
(over)										

(1)	(2)		(3)		(4)	(5)		(6)
III. <u>Doves and Pigeons:</u>								
Mourning dove			1,500	9/1-20				3,000
White-winged dove								
IV. <u>Predaceous Birds:</u>								
	<u>Spring Migration</u>					<u>Fall</u>	<u>Migration</u>	
Golden eagle	Common		2			2		6
Duck hawk						2		4
Horned owl	Common		8	Summer		8		8
Magpie	Common					10	12/10-20	20
Raven								
Crow	20	3/15	1,000					3,000
Red-tailed Hawk	4	4/15				12	10/1-10	20
Swainson's Hawk	2	4/15				10	9/20-30	
Rough-legged Hawk						10	9/20-30	20
Bald Eagle	None seen on refuge this year (8 seen flying over, 15 mile North of refuge on 11/12/66)							
Marsh Hawk	1	3/13						20
Prairie Falcon						2	10/20	2
Sparrow Hawk	6	4/17				10	10/10-20	20
Reported by						Chesley M. Dinkins		

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.

3 -1750a

Cont. N
(Rev. March 1953)WATERFOWL
(Continuation Sheet)

REFUGE Lake Ilo

MONTHS OF Sept. 1 TO Dec. 31, 19 66

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods: Estimated seen : total
	11	12	13	14	15	16	17	18		
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted									1,981	
Snow										
Blue										
Other										
Ducks:										
Mallard	1,000								308,000	
Black										
Gadwall									6,510	
Baldpate									24,360	
Pintail									12,250	
Green-winged teal									3,500	
Blue-winged teal									5,600	
Cinnamon teal										
Shoveler									10,500	
Wood										
Redhead									560	
Ring-necked										
Canvasback									490	
Scaup									13,650	
Goldeneye									280	
Bufflehead	10								420	
Ruddy	0								1,680	
Other										
Com. Merganser	20								350	
Coot:									18,900	

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	0	0	
Geese	1,981	150	
Ducks	388,150	21,080	
Coots	18,900	1,500	

SUMMARY

Principal feeding areas _____

Principal nesting areas _____

Reported by Chesley M. Dinkins

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

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

Interior Duplicating Section, Washington, D. C.
1953

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Lake Ilo & Dist. IV Easements

Months of Sept. 1 to Dec. 31, 1966

(1) Species	(2) Density	(3) Young Produced	(4) Sex Ratio	(5) Removals	(6) Total	(7) Remarks
(1) Common Name	(2) Cover types, total acreage of habitat	(3) Acres Per Bird Number broods observed Estimated Total	(4) Percentage	(5) Hunting For Re- stocking For Research	(6) Estimated number using Refuge	(7) Pertinent information not specifically requested. List introductions here.
<u>Lake Ilo</u>	(2)					
Sharp-tailed Grouse					75	Estimated 30 last year
Ring-necked Pheasant					100	120 were released near refuge boundary and 20 released on the refuge during the year.
Gray Partridge					100	Estimated 40 last year
<u>Pretty Rock</u> Sharp-tailed Grouse					10	Estimated 15 last year
Ring-necked Pheasant					10	Estimated 15 last year
Gray Partridge					40	Same as last year
<u>White Lake</u> Sharp-tailed Grouse					0	
Ring-necked Pheasant					10	Estimated 40 last year
Gray Partridge					20	Same as last year
<u>Stewart Lake</u> Sharp-tailed Grouse					30	Same number as last year
Ring-necked Pheasant					0	
Gray Partridge					20	Same as last year

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.

Refuge Name and Date of Survey

Month of Report

to Dec. 31

1966

UPLAND GAME BIRDS

3-1753
Form NK-3
(June 1945)

BIG GAME

Refuge Lake Ilo & Dist. IV Easements Calendar Year 1966

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions	(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss		At period of Greatest use	As of Dec. 31	
Common Name	Cover types, total Acreage of Habitat	Number								Number	Source		
<u>Lake Ilo</u>													
White-tailed Deer	2780 acres upland.	20	0								40	20	
Mule Deer	Estimated 50% killed	0	0								2	1	
Antelope	during hunting season.	0	0								30	0	
<u>Pretty Rock</u>													
White-tailed Deer	650 acres upland	Unknown									6	Unknown	
Mule Deer		Unknown									4	Unknown	
Antelope		Unknown									10	Unknown	
<u>White Lake</u>													
White-tailed Deer	840 acres upland	10	0								40	20	
Mule Deer		0	0								4	Unknown	
Antelope		16	0								30	15	
<u>Stewart Lake</u>													
White-tailed Deer	1900 acres upland	Unknown	0								Unknown	Unknown	
Mule Deer		Unknown	0								Unknown	Unknown	
Antelope		Unknown	0								15	Unknown	

Remarks:

Reported by Chesley M. Dinkins

INSTRUCTIONS

Form NR-3 - BIG GAME

- (1) **SPECIES:** Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) **DENSITY:** 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 total number of young produced on refuge.
- (4) **REMOVALS:** Indicate total number in each category removed during the year.
- (5) **LOSSES:** On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) **INTRODUCTIONS:** Indicate the number and refuge or agency from which stock was secured.
- (7) **TOTAL REFUGE POPULATION:** Give the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.
- (8) **SEX RATIO:** Indicate the percentage of males and females of each species as determined from field observations or through removals.

116000

3-1755
Form NR-5

DISEASE

Refuge Lake Ilo & District IV Easements Year 19 66

Botulism NONE

Lead Poisoning or other Disease NONE

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
---------------------	---------------	-------------

(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks _____

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

PUBLIC RELATIONS
(See Instructions on Reverse Side)

Refuge Lake IloCalendar Year 1966**1. Visits**

a. Hunting 0 b. Fishing 1600 c. Miscellaneous 5475 d. TOTAL VISITS 7,075

1a. Hunting (on refuge lands)

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl	<u>0</u>		
Upland Game	<u>0</u>		
Big Game	<u>0</u>		
Other	<u>0</u>		

Number of permanent blinds 0Man-days of bow hunting included above 0

Estimated man-days of hunting on lands adjacent to
refuge 200

1b. Fishing (area open to fishing on refuge lands)

TYPE OF AREA	ACRES	MILES
Summer	<u>400</u>	
Ponds or Lakes	<u>1050</u>	
Winter		
Streams and Shores	<u>0</u>	

1c. Miscellaneous Visits

Recreation 5400 Official 50
Economic Use 25 Industrial -

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	On Refuge		Off Refuge	
	NO. OF GROUPS	NUMBER IN GROUPS	NO. OF GROUPS	NUMBER IN GROUPS
Sportsmen Clubs				
Bird and Garden Clubs				
Schools	<u>5</u>	<u>600</u>		
Service Clubs				
Youth Groups	<u>4</u>	<u>400</u>		
Professional-Scientific				
Religious Groups	<u>3</u>	<u>200</u>		
State or Federal Govt.				
Other				

3. Other Activities

TYPE	NUMBER	TYPE	NUMBER
Press Releases	<u>4</u>	Radio Presentations	<u>None</u>
Newspapers (P.R.'s sent to)	<u>2</u>	Exhibits	<u>None</u>
TV Presentations	<u>None</u>	Est. Exhibit Viewers	<u>None</u>

INSTRUCTIONS

Item 1: Total of a, b, and c, equal d.

"Visit" - definition. Any person who is on refuge lands or waters during a day or part thereof for the purpose of: hunting, fishing, bird-watching, recreation, business or economic use, official visit, or similar interest. INCLUDE - those who stop within the refuge while traveling on a public highway because of an interest in the area. EXCLUDE - persons engaged in oil or other industry not directly related to the refuge, persons using refuge as most direct route or principal avenue of traffic, and those boating on navigable rivers or the Intercoastal Canal, unless they stop to observe wildlife on the refuge.

Computing visits. Where actual counts are impractical, "sampling" is used with midweek and week-end samples varied by season or weather. A conversion factor of 3.5 (of passengers per car) is used when accurate figures are not available. Each refuge will develop a conversion factor for boats based on range of usage. Count a camper once for each 24-hour period or fraction thereof.

Item 1a: Acres - of refuge open for each type of hunting.

Managed hunts require check in and out of hunters, issuance of permits, or assignment of blinds.

Other - INCLUDE crow, fox, and similar hunting.

Lands adjacent to refuge. Normally considered within 1 mile or less of boundary, unless established sampling procedures cover a wider area. For big game hunting, the distance may be greater.

Item 1b: Acres of streams open to fishing, if practical; otherwise just miles open. Information on "shores" is primarily for coastal fishing.

Item 1c: Recreation. INCLUDE photography, observing wildlife, picnicking, swimming, boating, camping, visitor center use, tours, etc. TOTAL Recreation, Official, and Economic Use visits under Item 1.

Industrial. INCLUDE persons engaged in industry, i.e., oil industry or factories. EXCLUDE these from Item 1.

Item 2: INCLUDE the "On Refuge" groups in Items 1c and 1. In "Off Refuge" column include only those group meetings in which refuge employees actually participate. EXCLUDE these from Items 1c and 1.

Item 3: Exhibits - INCLUDE displays, fairs, parades, and exhibits OFF the refuge; EXCLUDE those ON.

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

(1)

Refuge Lake Ilo

Year 19 66

Collections and Receipts (Seeds, rootstocks, trees, shrubs)							Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Cres. Wheat	89#	R	Oct	Des Lacs		*							
Sl. Wheat	100#	R	Oct	" "		*							
Wes. Wheat	20#	R	May	" "		*							
Alfalfa	8#	R	May	" "		*							
Cres. Wheat	230	C	Aug.	Combine	Shared	*							
Sl. Wheat	40#	C	Aug.	" "	"	*							
Alfalfa	550#	C	Oct.	" "	"	*							
Wes. Wheat							Road Ditch	4#/Ac.	5 Ac.	20#	5/10	Good	
Alfalfa							" "	1.6#/Ac.	5 Ac.	8#	5/10	"	
Sl. Wheat							A-5, Field 3	1#/Ac.	10 Ac.	10#	4/1	Good	
Alfalfa								4#/Ac.	10 Ac.	40#	4/1	"	
Crested Wheat							A-4, Fields	4#/Ac.	16.9 Ac.	66#	10/24	Undetermined	
Sl. Wheat							2 and 4	2#/Ac.	16.9 Ac.	33#	10/24	"	

- (1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Remarks: * Included on Refuge Grain Report

Total acreage planted:

Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____
Rotated Cropland, Cover 26.9 acres
Critical Area, Roadside 5.0 acres

3-1758
Form 8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Lake Ilo County Dunn State North Dakota

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested Acres	Bu./ Tons	Unharvested Acres	Bu. /Tons			
By Cooperative Agreement									
Barley	.7 ac.	28 Bu.	0	0	29.6	936 Bu.	30.3		30.3
Oats	17.0 ac.	1500 Bu.	0	0	0	0	17.0		17.0
Wheat	41.3 ac.	1032 Bu.	0	0	0	0	41.3		41.3
By Refuge Personnel									
Barley					12.0	480 Bu.	12.0		12.0
Corn					20.5	615 Bu.	20.5		20.5
								Cover seeded: A-4, field 2,4 - 16.9 Ac. A-5, Field 3 - 10 Ac.	16.9 10.0
								Fallow Ag. Land.	79.7

No. of Permittees: Agricultural Operations 4 Haying Operations 0 Grazing Operations 3

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle	104	303.19	\$521.48	849
				2. Other				
				1. Total Refuge Acreage Under Cultivation				202.8
Hay - Wild				2. Acreage Cultivated as Service Operation				32.5

DIRECTIONS FOR PREPARING FORM NR--8'
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops Specify the acreage kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation Report total land area devoted to agricultural purposes during the year.

REFUGE GRAIN REPORT

Refuge Lake Ilo

Months of January thru December 1966

(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	550 Bu.	0	550	0	40	10	50	500		500	
Corn, ear	5 Bu.	0	5	0	0	2	2	3		3	
Corn, shelled	15 Bu.	0	15	0	0	5	5	10		10	
Wheat	1 Bu.	0	1	0	0	1	1	0			
Millet	60#	0	60#	0	0	60#	60#	0			
Alfalfa	66#	8#	74#	0	48#	0	48#	26#	26#		
Crested Wheatgrass	67#	89#	156#	0	99#	0	99#	57#	57#		
Slender Wheatgrass	0	100#	100#	0	43#	0	43#	57#	57#		
Western Wheatgrass	0	20#	20#	0	20#	0	20#	0			
Alfalfa 1/	0	550#	550#	0	0	0	0	550#	350#		200#
Slender Wheatgrass 1/	0	40#	40#	0	0	0	0	40#	40#		
Crested Wheatgrass 1/	0	230#	230#	0	0	0	0	230#	230#		

(8) Indicate shipping or collection points.....

(9) Grain is stored at Grainary, Donahoe Place and at headquarters.

(10) Remarks 8# Alfalfa, 89# crested wheatgrass, 100# slender wheatgrass and 20# western wheatgrass
received from Des Lacs.

1/ This seed harvested in fall of 1966 and is uncleaned.

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.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

Refuge

Lake Ilo

ANNUAL REPORT OF PERSTICIDE APPLICATION

Proposal Number

Reporting Year

66-2

1966

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6/7*	Polygonum convolvulus - Wild buckwheat; Salsol kali - Russian thistle; Brassica arvensis - Wild mustard; Helicanthus annuus - Wild sunflower; Ambrosia elator - Common ragweed	Unit A-1 Barley	11.5	2,4-D Ester	5.75#	1/2#/Ac.	Water 1:40	Power Sprayer
6/2-7 **	Same as above	Units A-3,4,5 and 6 Wheat and Barley	58.0	2,4-D Ester	29#	1/2#/Ac.	Water 1:40	Power Sprayer

10. Summary of results (continue on reverse side, if necessary)

	<u>Material</u>	<u>Labor</u>	<u>Equipment</u>	<u>Total</u>	<u>Per Acre</u>	<u>% Kill</u>	<u>Obs. Date</u>
First rainfall* - 6/11	3.74*	13.60*	2.00*	18.34*	1.59*	90%*	July*
First rainfall** - 6/3-10-11	13.10**	20.95**	13.87**	47.92**	.83**	95%**	July**

* Spraying done by refuge personnel with refuge equipment.

** Spraying done by cooperators with their own equipment and materials.

ANNUAL REPORT OF PERSTICIDE APPLICATION

Lake Ilo

Proposal Number

Reporting Year

66-3

1966

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. 6/10	Field Bindweed	Scattered patches in Unit A-4	.5 Ac.	2,4-D Ester	.5#	1#/Ac.	Water 1:40	Power Sprayer and Handgun
2. 9/15	Field Bindweed	Scattered patches in Units A-1,3 and 4	5.0 Ac.	2,4-D Ester	5#	1#/Ac.	Water 1:40	Power Sprayer and Handgun

10. Summary of results (continue on reverse side, if necessary)			<u>Material</u>	<u>Labor</u>	<u>Equipment</u>	<u>Total</u>	<u>Per Acre</u>	<u>% Kill</u>	<u>Obs. Date</u>
1. First rainfall - 6/11	1.		.325	6.86	1.50	8.69	17.38	80%	July
2. First rainfall - 9/16	2.		1.63	13.72	3.00	18.35	3.67	95%	Oct.

Chesley M. Dinkins - Biological Technician
(Photo by Dinkins)

Overflow below dam flooding creek crossing
and entrance road - March 13, 1966
(Photo by Dinkins)



JAN • 67



Before -
(photo by Bradley)

After construction of new entrance road.
(Photo by Bradley)

• JAN • 66



• JAN • 67



Stockwater Dugout in Unit G-5
(Photo by Bradley)

Stockwater Dam in Unit G-6
(Photo by Bradley)

• JAN • 67



• JAN • 67



C O N T E N T S

EASEMENTS AND WHITE LAKE REFUGE - DISTRICT IV

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WHITE LAKE

I. General

Total precipitation for the year as recorded at the Amidon weather station, which is located 4 miles west of the refuge, was 15.82 inches. A long-term normal has not been established for this station. However, the annual average for the southwestern district of the state, in which Amidon is located, is 15.37 inches. This indicates that precipitation at Amidon in 1966 was near the normal. Rainfall of 11.66 inches during the primary growing season, May through August, was more than 2 inches above average.

A severe blizzard occurred in this locality on March 3 and 4. Snowfall was above normal in March but below average for the recent fall and winter period. Heavy rainfall occurred on June 4 and again on July 1. July was unusually wet with over 5 inches of rainfall for the month.

In general crops were very good in this locality. It was reported that many fields of oats yielded over 100 bushels per acre. Crop yields on the refuge were good on units farmed by one cooperator but poor where farmed by another party who does not qualify as a modern farmer.

On January 1, 1966 the water level was 1.5 feet below the spillway. The lake filled up during the spring run-off and some water was spilling later during June and July. The peak run-off of the year occurred on July 1 after a heavy rain when the water level was 2 feet above the spillway.

Water level records obtained during the year were as follows:

<u>Date</u>	<u>Water Level</u>	<u>Date</u>	<u>Water Level</u>
1/1/66	1.5' below spillway	7/23	Sm. stream over spill.
3/15	.4' above spillway	8/11	.5' below spillway
3/28	Sm. Stream Over	9/22	1.0' below spillway
5/23	.2' below spillway	9/30	1.0' below Spillway
6/2	.5' below spillway	10/15	1.1' below spillway
6/24	.3' above spillway	10/27	1.1' below spillway
7/1	2.0' above spillway	11/29	1.1' below spillway
7/7	.3' above spillway		

There appeared to be much more aquatic and marsh vegetation in the lake than ever observed in the past. The water was much clearer than usual. The bottom of the lake is composed primarily of sterile bentonite and the water has always been gray or whitish in color.

II. Wildlife

A. General

The following birds and animals were recorded when the refuge was visited on the dates indicated: (See page 3)

The above observations indicate that only a moderate number of waterfowl stopped in the spring and that larger numbers were present during the fall. It is probable that peak numbers were missed during both the spring and fall periods. It is believed the fall peak occurred during the week of Oct. 30-Nov. 5 during which time the refuge was not visited.

A waterfowl breeding pair count was made on June 2. A total of 39 pairs of dabblers were counted as compared to 46 pairs last year. Divers are not considered as nesting here owing to the scarcity of suitable habitat.

Two brood counts were also made, the first on July 7 and the second on August 11. A total of 19 non-duplicated broods were counted with 100% coverage. Production was calculated at 120 young as compared to 212 last year. Nesting success dropped from 71.7% in 1965 to 48.7% for this year which is still fairly good. Only 4 coot were tallied when the pair counts were made and it is estimated that 4 young were produced on the area.

Sharp-tailed Grouse were not seen on the area at any time during the year. Only 2 Ring-necked Pheasants were observed on the refuge and very few were seen in the vicinity. It is believed that most of the 40 pheasants, released adjacent to the refuge last year, perished during the blizzard of March 3 and 4. Two coveys of Gray Partridge were found on the refuge during October.

Muskrats are scarce again after showing a slight increase the 2 previous years. Only 4 rats were seen during the year. Signs indicate that a few Raccoon and Badger are present. Skunk and Red Fox are plentiful, both on the refuge and over the surrounding territory. However, it is believed that Red Fox numbers have dropped slightly since last year.

B. Plantings

1. Aquatic and Marsh Plants None
2. Trees and Shrubs None
3. Upland Herbaceous Plants None

<u>Species</u>	<u>3/15</u>	<u>3/28</u>	<u>6/2</u>	<u>6/27</u>	<u>7/7</u>	<u>8/11</u>	<u>9/22</u>	<u>9/30</u>	<u>10/17</u>	<u>10/14</u>	<u>10/21</u>	<u>10/28</u>
Can. Geese												5
Mallard			15	20	40	32	1200	2000	1000	2000	4000	3000
Gadwall			8	5		13	50	100	50	50	60	
Widgeon			1			6	150	200	200	50		
Pintail	6	150	5	10	30	45	200	100			50	50
GW Teal	25	30	1		4	15	50	50	100			
BW Teal			6	8	6	55	200	200	200			
Shoveler			3	4	4		50	50	50	100	100	100
Redhead						2						12
Canvasback			(2)							10		25
L. Scaup			(15)							150		
Ruddy			(21)						30	30	20	20
Com. Merganser		4										
Total Ducks	31	184	39	47	84	168	1900	2700	1630	2390	4230	3207
Coot			4 birds		2	8	250	400	20	20	20	
			<u>Census</u>								<u>10/27</u>	
Horned Grebe					5	2						
Eared Grebe			11							20	10	
Western Grebe			7	3	4	6		5	6			
Killdeer			8	10	12	12						
Willet			4	4	4	6						
Les. Yellowlegs			50			20						
Marbled Godwit			4									
Am. Avocet												
W. Phalarope			50		10	30						
Pheasant	2											
Gray Partridge	12				2							
Golden Eagle	1	1										
Marsh Hawk												
White-tailed deer			5	5	2	6	2	2	4	4	6	
Antelope	21	17	11	27	28	28	11	14	14	14	14	
Muskrat			2					2				
Jackrabbit	2		3									

() Total birds - diving ducks not considered as breeding here.

4. Cultivated Crops

Two cooperative agreements were in effect for farming 162.4 acres on a share basis. The small grain yields were very good on Units 1 and 4 where the wheat averaged 30 bushel and barley 45 bushel per acre. Poor farming on Unit 2 and 3 was responsible for average yields of 15 bushel for wheat and 20 bushel for barley. The refuge share of 27.25 acres of barley was left standing in the field for wildlife food.

III. Refuge Development and Maintenance

A. Physical Development

1. Soil and Moisture Program

a. Weed Control, Land: A total of 43.6 acres of cover crop on Unit A-2, which was seeded in 1963, was mowed in the spring. This was necessary to remove the overstory accumulation so that the 2,4-D treatment which followed would be more effective for the control of field bindweed. Some seedling plants of bindweed developed later and there was some resprouting. Therefore, the same acreage was treated again with 2,4-D in September.

A total of 83.5 acres of barley and wheat planted by cooperators was treated by the cooperators with 2,4-D for the control of annual weeds. This is a normal farming practice which generally improves crop yields by conserving moisture which would otherwise be taken by the weeds.

b. Bank Protection: A total 2690 feet of sharp cut banks along the north side of the lake was given some protection to reduce erosion by wave action. A total of 480 CY of screened over-size gravel was hauled from a pit 12 miles away and 630 CY of similar material hauled from another pit located 8 miles from the refuge. The entire amount of 1,110 CY was spread along the shoreline to serve as riprap. The 1600 feet of bank that was worked on last year has become stabilized and erosion at normal water levels has been controlled there.

B. Maintenance, General

1. Fencing and Posting

Boundary markers were checked as well as the boundary fence and repairs were made where necessary.

IV. Resource Management

A. Grazing

Two grazing permits were in effect during the year. A total of 41 head of cattle were grazed on 379 acres during the season. Total use was 103.19 AUM's, as compared to 110.35 AUM's last year, and revenue of \$177.49 was collected. The cover remaining on both grazing units at the end of the season was in good condition.

B. Haying

The only haying permitted is a small acreage on a share basis to provide supplemental food for wildlife. The 19 acres of alfalfa on Unit WL-2 was cut after July 1, after the main nesting season, and baled. The refuge share of 50% was stacked in the field for deer and antelope in case of deep snow.

C. Fur Harvest

Trapping Permit no. T-9625 was issued to a team of two trappers for the removal of fur bearing animals. The following animals were removed by the trappers: 3 Mink, 2 Raccoon, 7 Skunk, 1 Badger and 9 Red Fox. The refuge share of one female mink was sold for \$7.00. Mink were shared but the trappers received 100% of all other furs.

V. Field Investigation or Applied Research

A. Dummy Nest Study

Dummy nest sampling was used for the second year for the purpose of collecting data on predation rates in general. It was not feasible to divide this small refuge into separate parts as has been done on larger areas. Because of the small size of the area only 100 nests were used, 50 on grazed and 50 on ungrazed lands.

Eggs were placed in the field on May 23 in exactly the same manner as described for the Lake Ilo study. Each nest was checked after 35 days exposure and the remaining eggs destroyed. Cover density was also recorded for each nest.

A summary of the data collected to date will be found in Table I on page 6.

In 1965 dummy nests were not placed in the field until late in the season while this year they were placed earlier. Therefore, the data collected is not directly comparable. It will be noted from the table that survival in 1965 was higher late in the season for ungrazed than grazed plots while just the reverse was true for the early season nests this year.

Table I. Dummy Nest Survival 1965 - 1966 - White Lake

Sample	Type Area	Early Nests	Late Nests	Survival by Cover Density						Total Survival	
				Type I		Type II		Type III		Early	Late
				Early	Late	Early	Late	Early	Late		
<u>1965</u>											
1	Grazed	-	25	-	12	-	-	-	-	-	12
2	Grazed	-	25	-	-	-	3	-	-	-	3
	Total Grazed	-	50	-	12	-	3	-	-	-	15
3	Ungrazed	-	25	-	11	-	1	-	-	-	12
4	Ungrazed	-	25	-	2	-	3	-	6	-	11
	Total Ungrazed	-	50	-	13	-	4	-	6	-	23
<u>1966</u>											
		<u>5/18-6/27</u>									
1	Grazed	25	-	18	-	2	-	-	-	20	-
2	Grazed	25	-	8	-	3	-	-	-	11	-
	Total Grazed	50	-	26	-	5	-	-	-	31	-
3	Ungrazed	25	-	7	-	5	-	2	-	14	-
4	Ungrazed	25	-	8	-	2	-	3	-	13	-
	Total Ungrazed	50	-	15	-	7	-	5	-	27	-

STEWART LAKE

I. General

Total precipitation for the year at Amidon, which is located about 12 miles northeast of the refuge, was 15.82 inches. A long term normal has not been established for the refuge or this weather station. However, the annual average for the southwest district of the state, in which Amidon is located, is 15.37 inches. This indicates that precipitation at Amidon in 1966 was near the normal. Rainfall of 11.66 inches during the primary growing season, May through August, was more than 2 inches above average.

Snowfall was above average for March and again in November. A severe blizzard occurred on March 3 and 4. It is believed that some of the few ring-necked pheasants remaining were lost during this blizzard.

The lake filled during the spring run-off and there was a small flow of water over the spillway in March. Exceptionally heavy rainfall in the late part of June and the first part of July created the heaviest run-off for the year. Water flowed over the spillway to a depth of one foot on July 1.

Water level records obtained during the year were as follows:

<u>Date</u>	<u>Water Level</u>	<u>Date</u>	<u>Water Level</u>
3/1	1.6' below spillway	8/10	.5' below spillway
3/15	Sm. stream over	9/22	.7' below spillway
6/2	.5' below spillway	10/27	1.1' below spillway
7/1	1.0' above spillway	11/29	1.1' below spillway
7/6	.1' above spillway		

Water quality seemed to be above average this year in that it appeared to be much clearer. Aquatic and marsh vegetation developed over a much larger part of the impoundment, covering more area than ever noted in the past.

II. Wildlife

The following birds and animals were noted when visiting the refuge on the dates indicated:

<u>Species</u>	<u>3/15</u>	<u>Pairs</u> <u>6/2</u>	<u>7/6</u>	<u>8/10</u>	<u>9/22</u>	<u>10/27</u> <u>35</u>	<u>11/29</u>
Can. Geese							
Mallard	12	9	20	210	1000	2500	30
Gadwall		21	6	10	30	160	
Widgeon		1	2	25	75	200	
Pintail	30	6	20	140	150	100	
GW Teal		2	2	25			
BW Teal		5	6	35	40		
Shoveler		5	15	20	20	50	
Redhead		(1)	2			50	
Canvasback		(4)				100	
L. Scaup		(3)	7				2
Ruddy		(4)				12	
Bufflehead						6	
Total Ducks	<u>42</u>	<u>49 Pairs</u>	<u>80</u>	<u>465</u>	<u>1315</u>	<u>3178</u>	<u>32</u>
Coot		5 birds	2	6	500	40	
Horned Grebe		5	4				
Eared Grebe		5				10	
G. B. Heron			2	2	1	2	
Am. Bittern				2			
S. Crane					1		
Killdeer		10	16	12			
Spot. Sandpiper		2		4			
Willet		2	3	3			
Les. Yellowlegs		2	6				
W. Phalarope		10					
Am. Avocet		1					
Golden Eagle		1			1	1	1
Marsh Hawk		2	2	2	2	3	
Muskrat		2					

() Total birds - divers not considered as breeding here.

From limited observations it is apparent that a few more waterfowl used the refuge this year than in 1965. Since the refuge is not visited weekly the peak populations are probably missed.

A waterfowl breeding pair count was made on June 2. A total of 49 pairs of dabblers were counted as compared to 43 pairs last year.

Two brood counts were also made, the first on July 6 and the second on August 10. A total of 26 non-duplicated broods were counted with an estimated 100% coverage. Production was calculated at 158 young as compared to 128 last year. Nesting success was up again this year at 53.1%, a small increase over the 46.5% for 1965. Coot production was estimated at 5 birds as compared to 15 for last year.

A total of 35 Common Canada geese were observed on the refuge on October 27. It is believed that additional Canadas as well as a few White-fronted geese used the area during both spring and fall migrations.

No upland game birds were seen on the refuge at any time during the year. However, it is estimated that a few Sharp-tailed Grouse, Ring-necked Pheasant and Gray Partridge did use the area at times. All of these birds are present in this vicinity. The pheasant population is considered to be very low over the surrounding territory.

White-tailed Deer, Mule Deer and Antelope were not seen on the refuge during any visits to the area. All of these animals are common in the vicinity and a few antelope were observed nearby. It is believed that the number of antelope is quite low as compared to the past years.

Two Muskrat were found on the refuge on June 2. It is estimated that a few more are present on the area. Only a few Mink signs were observed during the year. Skunk are numerous in the locality and the usual number used the area during the year. The Red Fox population appears to be down some from what it has been for the past several years. No trapping was done on this refuge during 1966.

III. Refuge Maintenance

1. Checked water level and structures several times during the year.
2. Checked boundary markers and installed recognition sign that was repainted.
3. Made wildlife census each time refuge was visited.

PRETTY ROCK

I. GENERAL

Total precipitation for the year as recorded at the Pretty Rock weather station, located several miles south of the refuge, was 18.26 inches. A long-term normal has not been established for this station. However, the annual average for the south central district of the state, in which Pretty Rock is located, is 16.07 inches. This indicates that precipitation at Pretty Rock in 1966 was probably above normal. Rainfall of 11.88 inches during the primary growing season, May through August, was well above average. This was responsible for good crops in this locality.

A severe blizzard occurred in this area on March 3 and 4. Snowfall was above average for March but less than normal for the other winter months.

The impoundment filled up in March during the spring run-off for the first time since 1952. The water level had dropped to 1.9 feet below the spillway crest by the time of freeze-up in November. Water level records obtained during the year were as follows:

<u>Date</u>	<u>Water Level</u>	<u>Date</u>	<u>Water Level</u>
3/15	Sm. Stream over spill	8/15	.6 below spillway
6/2	.7 below spillway	9/22	1.0 below spillway
7/8	.6 below spillway	12/2	1.9 below spillway

The development of aquatic and marsh vegetation was very good as a result of the higher water level this year.

II. WILDLIFE

Occasional observations indicated that a good number of waterfowl used the area during the spring and summer. The fall migration was disappointing in that waterfowl numbers were below normal as they were over most of the western part of the state.

A waterfowl breeding pair count was made on June 2. A total of 246 pairs of dabblers and one pair of divers were counted as compared to only 14 dabblers and 13 pairs of divers for 1965.

Two brood counts were made, the first on July 8 and the second on August 15. A total of 40 non-duplicated broods were counted with an estimated 80% coverage. The total estimated broods for the entire refuge was 50. Production was calculated at 304 ducks, a sharp increase over the 192 for last year. On the other hand nesting success of only 20.2% was quite low. A total of 33 Coot were counted when the pair counts were made. It is estimated that 20 Coot were produced on the refuge this year.

The following birds were recorded while visiting the refuge on the dates indicated:

Species	3/15	6/2-Pairs	7/8	8/5	9/22
Mallard	2	73	75	150	600
Gadwall		64	30	10	30
Widgeon		3	10	10	200
Pintail	16	56	140	125	100
GW Teal		2	10	20	
BW Teal		29	30	150	30
Shoveler		19	6	10	
Redhead		(12)	-	-	
Canvasback		1	-	2	
L. Scaup		(14)	5		
Ruddy		(9)	14		16
Total Ducks	18	247	320	477	976

Coot 33 birds 40 60 1200
 () Total birds-these divers not considered as breeding birds here.
Census

Red-necked Grebe			4
Eared Grebe	19	32	
Pied-billed Grebe	3	4	4
Great Blue Heron		1	
Killdeer		150	30
Spotted Sandpiper		4	
Willet		10	8
Lesser Yellowlegs		60	40
Marbled Godwit		60	
Wilson's Phalarope		2	
Common Tern	20	20	100
Marsh Hawk	2	2	

No Sharp-tailed Grouse or Gray Partridge were seen at any time when the refuge was visited. However, it is believed that a few of each did use the refuge during the year. Only one Ring-necked Pheasant was observed on the refuge after the blizzard which occurred the first part of March.

Skunk and Red Fox are still numerous in this locality. It is believed that the fox population is slightly lower than it has been for the past several years. Signs of Raccoon were observed along the lakeshore. A few muskrats were seen but the total is believed to be very small. A 3-1400 permit for trapping was issued to the farmer living on the refuge. No report of his trapping results have been received to date.

III. REFUGE MAINTENANCE

1. Made 5 wildlife censuses during the year.
2. Water level and structures checked on each visit.
3. Refuge markers checked and replaced where necessary.

SIGNATURE PAGE

Submitted by:

Homer L. Bradley
(Signature)
Homer L. Bradley

Date: February 2, 1967

Refuge Manager
Title

Approved, Regional Office:

Date: _____

(Signature)

Regional Refuge Supervisor

3-1758
Form N 3
(Rev. Jan. 1956)

(Fish and Wildlife Service Brand f Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge White Lake County Slope State North Dakota

Cultivated Crops Grown	Permittee's		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Share	Harvested	Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./ Tons	Acres	Bu. /Tons			
Barley	1.2	54 Bu.			27.25	718 Bu.	28.45		28.45
Wheat	55.55	1276 Bu.					55.55		55.55
								Fallow Ag. Land.	78.4

No. of Permittees: Agricultural Operations 2 Haying Operations 1 Grazing Operations 2

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
Alfalfa	19	19	NONE	1. Cattle	41	103.19	\$177.49	379
Refuge share stacked in field for deer and antelope feed			Refuge share 50%	2. Other				
				1. Total Refuge Acreage Under Cultivation				162.4
Hay - Wild				2. Acreage Cultivated as Service Operation				

DIRECTIONS FOR PREPARING FORM NR--8'
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops Specify the acreage kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting

Total Refuge Acreage Under Cultivation Report total land area devoted to agricultural purposes during the year.

ANNUAL REPORT OF PERSTICIDE APPLICATION

Refuge

Lake Ilo (White L)

Proposal Number

66-5

Reporting Year

1966

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. 6/8	Field Bindweed	A-2 and A-3, Cover crop seeded in 1963	44	2,4-D Ester	44#	1#/Ac.	Water 1:40	Power Sprayer
2. 9/1	Field Bindweed	Same as above	44	2,4-D Ester	44#	1#/Ac.	Water 1:40	Power Sprayer

10. Summary of results (continue on reverse side, if necessary)			<u>Material</u>	<u>Labor</u>	<u>Equipment</u>	<u>Total</u>	<u>Per Acre</u>	<u>% Kill</u>	<u>Obs. Date</u>
1. First rainfall - 6/12	1.		28.60	62.38	35.00	125.98	2.86	80%	July
2. First rainfall - 9/6	2.		28.60	62.38	35.00	125.98	2.86	80%	September

This spraying was done by refuge personnel using Government equipment.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

Refuge

Lake Ilo (White La

ANNUAL REPORT OF PERSTICIDE APPLICATION

Proposal Number

Reporting Year

66-4

1966

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. 6/1	Wild Buckwheat Russian thistle Wild Mustard Common Ragweed Field Bindweed	Units A-1 and A-4 Barley & Wheat	44	2,4-D Amine	22#	$\frac{1}{2}$ #/Ac.	Water 1:40	Power Sprayer
2 6/8	Same as Above	Units A-2 and A-3	39.5	2,4-D Ester	19.75	$\frac{1}{2}$ #/Ac.	Water 1:40	Power Sprayer

10. Summary of results (continue on reverse side, if necessary)			<u>Material</u>	<u>Labor</u>	<u>Equipment</u>	<u>Total</u>	<u>Per Acre</u>	<u>% Kill</u>	<u>Obs. Date</u>
1. First rainfall - 6/10	1.		8.80	9.00	4.20	22.00	.50	90%	July
2. First rainfall - 6/10	2.		9.00	7.00	3.75	19.75	.50	40%	July

Entire application made by and at the expense of farming cooperators.

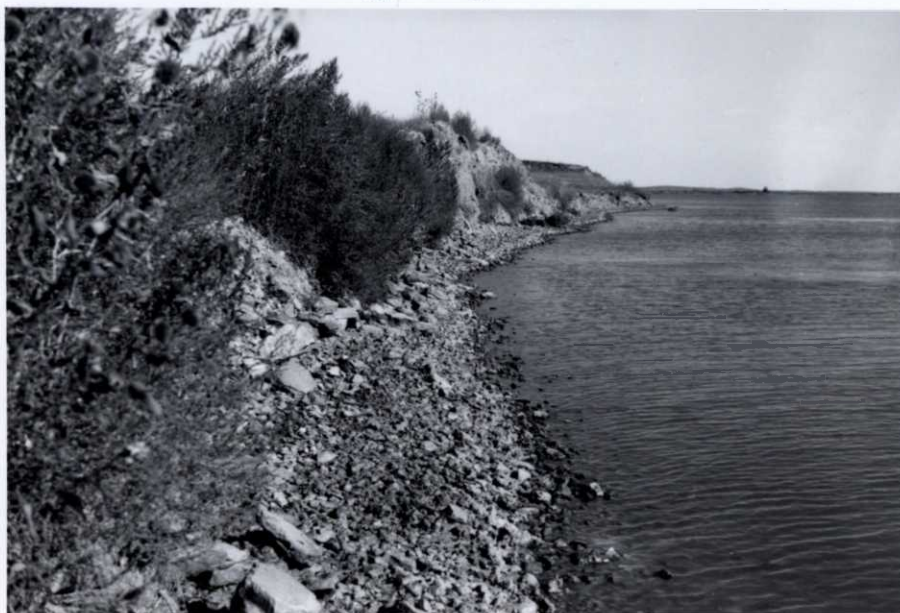
Before - Showing cut banks along north side of
White Lake which are subject to severe erosion.
(Photo by Bradley)

After - Showing results after oversize gravel
was placed along shoreline at White Lake - fall 1964⁵
(Photo by Bradley)

JAN • 67



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View along dam, Pretty Rock Refuge, showing
the pool full for the first time since 1952.
(Photo by Dinkins)

Stewart Lake, showing how shoreline had eroded
up to the old bandstand before riprapping in 1966.
(Photo by Dinkins)

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JAN • 67

