NARRATIVE REPORT

1987

LAKE ILO NATIONAL WILDLIFE REFUGE

DUNN CENTER, NORTH DAKOTA

LAKE ILO NATIONAL WILDLIFE REFUGE

(Pretty Rock, White Lake, Stewart Lake)
Dunn Center, North Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 1987

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTSEM

REVIEW AND APPROVALS

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Dunn Center, North Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 198

Kevin R. Willis	Date	David G. Potter Project Leader	3-17-88 Date
		Refuge Supervisor, ND	3-24-88 Date
		Regional Office Approval	3/25/88 Date

Refuge overlook with Lake Ilo headquarters in background.
KRW 1987

INTRODUCTION

Lake Ilo National Wildlife Refuge is located near the center of Dunn County in west central North Dakota. The refuge consists of 3,197 acres of fee title lands, 716 acres under flowage and refuge easement, and 120 acres under flowage easement. The main water area is composed of Lake Ilo, a 1240 acre impoundment created by a 1,525 foot long dam and fixed elevation spillway constructed in 1937 across Spring Creek.

Table 1. Land Type Inventory of Fee Title Lands, Lake Ilo NWR, 1987

Land Type	Acres	% of Total
Native Grasslands	1,205 ac.	38%
Open Water	940 ac.	29%
Marsh	390 ac.	12%
DNC/Planted Grasses	322 ac.	10%
Cropland	175 ac.	6%
Administrative	102 ac.	3%
Trees	63 ac.	2%
Total	3,197 ac.	100%

Lake Ilo NWR is located within the Missouri Slope physiographic region of North Dakota and the mixed grass prairie biome containing wheatgrass, needlegrass, stipa, and grama grasses. With an average annual rainfall of only 16.4 inches, the climate is characterized by hot dry summers with occasional thunderstorms, and cold winters. Topography of the area is characterized by gently sloping hills separated by nearly level terraces and swales. Land relief on the refuge ranges from 2,190 to 2,340 ft. msl. Wetlands in the immediate area of the refuge consist of creeks, small man-made impoundments and stock ponds, with relatively few shallow sloughs.

The surrounding land is used almost exclusively for agriculture, with cropland occupying approximately 35% of the area. Another 40% remains in native prairie and is used for grazing or haying. Approximately 8% of the area is covered with introduced grasses and legumes.

Lake Ilo Refuge is a satellite station of the Audubon National Wildlife Refuge Complex headquartered in Coleharbor, North Dakota. Lake Ilo Refuge staff administers the White Lake NWR, a 1,040 acre fee titled area, and the Stewart Lake and Pretty Rock NWR's, which are under flowage and refuge easements of 2,226 acres and 800 acres, respectively. Another 3.99 acres are held in fee title at Stewart Lake NWR.

Lake Ilo NWR and its satellites were established in 1939 by Executive Order. The primary objective is to provide waterfowl production and migration habitat. Secondary objectives include providing habitat for other migratory birds and protection and enhancement of resident wildlife. Environmental education and wildlife/wildlands oriented recreation are permitted where compatible with other objectives.

INTRODUCTION

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A. HIGHLIGHTS

A new headquarters building was erected. The 90X40 foot metal building includes an office, heated shop, and twin service bay storage area. It replaces a dilapidated 37 year old shop and an office in the residence basement. (Section I.1).

Ducks Unlimited constructed an electric predator barrier fence to protect a 31 acre peninsula on the west shore of Lake Ilo. (Section G.3).

The first recorded disease incidence at White Lake NWR occurred in August. Approximately 88 dead birds were retrieved; including ducks, coots, grebes, and gulls. Though not definitely determined, botulism was the probable cause.

The refuge residence tested positive for above normal levels of radon.

Prescribed burning was conducted on Lake Ilo NWR for the first time in its history. Everything went without a hitch.

B. CLIMATIC CONDITIONS

The winter of 1986-87 was one of the warmest and driest on record. Due to strong winds and low precipitation, open areas generally remained free of snow. This provided resident wildlife with access to abundant crop residues off-refuge. Because of the mild temperatures, ice conditions on Lake Ilo were highly variable and unstable at times, causing a drop in visits by ice fishermen.

Ice out occurred around March 25. Snowmelt runoff was below normal, but still sufficient to wash out the graveled surface of the spillway bridge. By mid-April, the runoff overtopping the Lake Ilo spillway was reduced to a trickle, which ceased for the year by May 7.

Available soil moisture was high going into planting season. Early sown crops did very well through the year. Late wheat plantings were spotty or stunted by June's drought. The warm, dry weather in June allowed haying activities to begin 7-10 days ahead of schedule, which probably had an adverse effect on ground nesters. Above normal precipitation in July (5.9") brought the refuge back to life, greening up the prairie and increasing lake levels.

Mild and very dry weather extended into December. Harvest conditions were excellent, unlike the previous 2 years. This meant less available crop residues for waterfowl to utilize during migration, and resident wildlife to use in the coming winter. At the end of the year there was no snow cover and lake ice measured 10 inches.

Table 1. Temperature and Precipitation for Calendar Year 1987, Lake Ilo NWR.

Month	Precip. (in.)	Normal	Snow	Max. Temp. (°F)	Min. Temp.
Jan.	.23	.40	1.7	53	- 13
Feb.	.44	.48	9.0	51	8
Mar.	.94	.60	5.8	72	3
Apr.	.08	1.60	-	88	22
May	2.04	2.35	-	95	35
June	1.56	3.69	-	99	45
July	5.90	2.17	-	92	46
Aug.	2.68	2.05	-	95	41
Sept.	.31	1.65	-	90	35
Oct.	.10	.87	-	78	13
Nov.	.22	.19	-	68	7
Dec.	.06	.34	T	54	- 10
TOTAL	14.56	16.39	16.5	99	- 13

C. LAND ACQUISTIION

No lands were acquired in 1987.

Anton Stroh, an adjacent landowner, expressed renewed interest in trading private lands for refuge fee title lands. He made a similar request in 1983 with the assistance of his Congressman. The trade would involve a half section of fee title lands located outside of the original MBCC boundary, and a half section of land owned by Mr. Stroh on the southeast side of the refuge. The north quarter of the Mr. Stroh's half section is under refuge and flowage easement, and contains the west half of Lee Paul Slough. I consider Mr. Stroh's land to be of greater value to the refuge than the fee title lands outside the MBCC boundary. However, in 1983 the Service appraised both parcels and offered to trade the lands if Mr. Stroh paid the Government and additional $17,500. This was due to the greater amount of Class II croplands found on the refuge tract. Mr. Stroh, believing the offer to be unfair, withdrew his request at that time.

Acquisition of the Stroh tract through trade would greatly add to Lake Ilo's waterfowl production capabilities due to its location. A possible trade should be pursued in 1988.

Fee acquisition proposals were forwarded to Bismarck WAO in July. The east half of Stewart Lake NWR (easement) was up for sale but was sold to an adjacent landowner before we could act. The other two proposals are for the west half of Stewart Lake NWR and most of Pretty Rock NWR (easement).

D. PLANNING

An amendment to the Audubon NWR Complex fire plan was written to cover prescribed burning and wildfire control on Lake Ilo NWR and satellites.

A Grassland Management Plan was drafted following extensive survey work conducted in 1986. The plan defines techniques and schedules for management of 1205 acres of native prairie and 322 acres of tame grasses.

An emergency Action Plan was developed at the regional level covering contingencies in the event of dam failure at Lake Ilo. The plan was presented to the Dunn County Disaster Services Coordinator, the Dunn County Sheriff and the mayor of nearby Dunn Center.

E. ADMINISTRATION

1. Personnel

Refuge Managers Kevin Willis (1985-1987) and Chesley Dinkins (1936-1983) in front of the new headquarters building.

Lake Ilo

1. Kevin R. Willis, Refuge Manager, GS-9, PFT, EOD 7/8/85, PCS 10/11/87.
2. Michael Erickson, Clerk/Typist, GS-3, PFT, EOD 11/30/87.
3. Susan Kuntz, YCC Enrollee, 6/87-8/87.
4. Nancy R. Willis, Volunteer.
5. Chesley M. Dinkins, Volunteer.
6. Lance Walker, SYEP Worker, 6/87-7/87.
7. C.J. Sivesind, SYEP Worker, 6/87-7/87.

Complex Office

1. David G. Potter, Project Leader, GS-12
2. Peter Smith, Asst. Refuge Manager, GS-9
3. Marilyn Wohlk, Refuge Assistant, GS-6
4. Duane Brenneise, Maintenance Worker, WG-8

Refuge Manager Kevin Willis left Lake Ilo to take a position as Wildlife Biologist for Fish and Wildlife Enhancement - Bismarck in October. The Refuge Manager has seen many good things happen during his 2-1/2 year tenur

Mick Erickson, TFT Biological Technician at Audubon NWR filled a newly established PPT Clerk/Typist position at Lake Ilo on November 30. He is acting manager until Mr. Willis can be replaced.

The TFT GS-3 Biological Aid position at Lake Ilo was not filled in 1987. The money saved was used to purchase necessary equipment and supplies. However, the lack of an extra hand made for an extra busy summer.

Table 2. Staffing Pattern, Lake Ilo NWR, 1983-1987.

	Permanent			Total Non-Youth	(YCC, ND Job Service)
	Full-Time	Part-Time	Temporary	FTE	Youth
FY-87	1	1	1	2.3	3
FY-86	1		1	1.3	1
FY-85	1		1	1.3	1
FY-84	1		1	1.3	?
FY-83	1		1	1.3	0

2. Youth Programs

One enrollee was hired for the 1987 YCC program on Lake Ilo. Susan Kuntz, a 17 year old from Halliday, was the first female ever hired at Lake Ilo. She proved to be an excellent worker in every way.

To help fill the void created by our not hiring a GS-3 temporary biological aid, we sought the assistance of the ND Job Service. Under their Summer Youth Employment Program, we hired 2 workers, aged 21 and 15 for a period of 8 weeks. Job Service paid their salaries, and their services this summer were well worth the added administration required.

3. Volunteer Program

Nancy Willis, the manager's wife, greatly assisted in office-related tasks. She also served as the resident expert on refuge songbirds, forwarding seasonal bird reports to Minot State University for incorporation into their records.

Chesley Dinkins, ex-manager of Lake Ilo, served as an invaluable source of information on refuge matters. He also kept up daily refuge operations in the manager's absence.

Adjacent landowners were signed as volunteers for White Lake NWR and Pretty Rock NWR. In 1985 Doug Nordby and Glen Hochhalter agreed to record periodic observations of waterfowl and other wildlife, and to report any unusual or illegal activity, rare or endangered species, abnormal weather conditions, disease outbreaks, broken fences, etc.. Since the refuges are located at least 90 miles away from Lake Ilo and are not visited as often as we wish, the volunteers serve as important eyes and ears for the refuge manager.

5. Funding

Lake Ilo is funded as part of the Audubon Complex. The budget for the Complex is shown in Table 3.

Table 3. Funding Comparisons 1984 - 1988, Audubon Complex

Sub-Activity	Fiscal Year 1988	1987	1986	1985	1984
Base 1260	-	-	243,000	206,900	202,000
Base 1261	233,000	220,000	-	-	-
1262	53,000	-	-	-	-
ARMM's	78,000	112,000	110,000	78,300	65,000
6860	6,000	6,000	7,000	5,000	5,000
8610	9,700	5,700	6,500	3,000	2,500
1520(1210)	3,000	0	7,600	6,000	3,000
2821	0	0	199,000	0	120,000
1902-05*	38,600	18,800	-	-	-
1929-29**	2,400	-	-	-	-
TOTALS	423,700	364,500	573,200	229,200	397,500

* GDU land management transfer funds
** GDU planning transfer funds (allocated from FWE - Bismarck)

6. Safety

No lost time accidents occurred at Lake Ilo NWR in 1987.

The refuge fire dispatch plan was reviewed and updated. Fire extinguishers were checked on a monthly basis. The refuge maintained its cooperative agreement with the West Dunn Fire Protection District at a cost of $150 per annum.

An Emergency Action Plan for the Lake Ilo dam was developed by Region 6 Engineering. The plan describes emergency action to be taken under several contingencies ranging from earthquake to civil disobedience. The plan was presented to and discussed with the Dunn County Disaster Coordinator, the Dunn County Sheriff, and the major of Dunn Center. An emergency action plan is required for all dams with a high hazard classification.

The refuge residence was tested for radon gas in May. Two test kits were placed in the basement. Results were far higher than what the EPA considers a safe level of the gas. The Region 6 Safety Manager and the North Dakota State Health Dept. were informed. The State Health Department plans to set up monitoring equipment in the residence for a 1 year period, to determine average annual levels of the gas. Though radon gas poses no immediate threat, the basement was ventilated as much as possible and its use restricted.

8. Other Items

Meetings and other duties performed by Manager Willis in 1987:

- Assisted Audubon NWR staff with various activities including initial review and mapping of CRP and other lands for easement acquisition; easement ground checks and landonwer contacts; and prescribed burning in the Audubon District.
- Assisted Zone II Supervisor in development of a method to gauge effectiveness of predator management activities in North Dakota. Developed reporting form and analyzed data from refuges for 1985, 1986.
- Served as inspector during construction of new headquarters building.
- Attended: Wetland Classification Workshop, Jamestown, N/d, June 15-18.
  Holistic Resource Mgmt. Workshop, Bismarck, ND, Sept.
  Project Leader's Meeting, Bismarck, ND, Aug. 25-28.

F. HABITAT MANAGEMENT

1. General

Lake Ilo's diverse habitats provide refuge to a good number of wildlife species. This photo appeared in an article of N.D. Outdoors Magazine on refuges in the State. KRW 1987

2. Wetlands

Lake Ilo is attracting increasing numbers of migrating waterfowl each year. The riparian habitat as well is important to many resident species, particularly songbirds.
KRW 1987

Wetlands comprise approximately 33% of the total acreage on Lake Ilo NWR. The largest body of water, Lake Ilo, is approximately 1,240 acres in size. Approximately 890 acres are open water with an average depth of 4-6 feet, and 350 acres are cattail and bulrush marsh, located on the south and west edges of the lake. Next in size is the 145 acre Lee Paul Slough. The slough is regenerated by Lake Ilo waters via a narrow canal between the two bodies of water.

Lake Ilo was formed in 1937 following construction of the 1,525 foot long dam and concrete spillway by the Civilian Conservation Corps. The Lake Ilo dam blocks Spring Creek, a tributary of the Knife River, and receives drainage from a 132 square mile area.

A 1983 dam safety report classified the Lake Ilo dam's hazard potential as high, with its hydrologic capabilities considered seriously inadequate. The dam is considered high-hazard because of the potential for loss of life and extensive property damage downstream should the dam ever fail, particularly in Dunn Center. During 1986, extensive field work was performed by contracted personnel to gather and analyze data on the dam's structural soundness and hydrologic capabilities. Other work was done to determine the affects of various events on the dam and

spillway, especially at the 50% PMF (probable maximum flood). Though the Lake Ilo dam has never been tested under such an event in its 50 year history, such events have occurred in high frequency within a 700 mile radius of the refuge.

Much of this work is being handled by the Denver Engineering Center (FWS). Their estimates for adequate repair of the dam and spillway range between $5-14 million. Various alternatives presented include doubling the size of the spillway and surfacing the earthen dam top with concrete to survive a 50% PMF. Repairs would also include placement of thousands of cubic yards of material along the toe of the dam, which has been weakened by the dam's weight resting upon unstable shale deposits.

In August, we developed and analyzed various alternatives to the dam repair suggested by DEC. The goal was to assure the best situation in public safety, wildlife use, and public use without the exorbitant price tag for total repair.

Spring runoff normally inundates main entrance road each year. KRW 1987

The best alternative may be to permanently breach the dam and construct a complex of subimpoundments within the lake basin. If hydrologically feasible it is believed this alternative would increase waterfowl production and use by more than 500% by providing constantly varying water levels at more attractive depths. The subimpoundments would be

gravity fed from Spring Creek. However, at this time we are unsure of the change in downstream flood protection a dam breach would effect. This alternative is not expected to get a favorable response from area residents, mainly because cabin owners are highly skeptical of the actual danger that exists with the dam. Hopefully, these questions will be answered in 1988 following a feasibility study.

Most of 1987 was fairly average in terms of water levels on Lake Ilo, the exception being an unusually dry fall that literally sucked many area wetlands dry. Water ceased overtopping the Lake Ilo spillway for the year on May 7. Dried wetlands off refuge meant much higher than normal waterfowl numbers on Lake Ilo in June. Nearly exposed mudflats attracted a high number of marsh and wading birds as well. Brood habitat was good on the refuge in 1987 with heavy rains putting us in decent shape for the fall migration.

Table 4. Lake Ilo Water Levels, CY-1987. Spillway Crest - 72.5 feet.

Month	Peak Elevation	Avg. Elevation	Area (acres)	Capacity (ac/ft)
Jan.*	72.7	72.7	1254	7358
Feb.*	72.7	72.7	1254	7358
Mar.*	73.5	73.0	1310	8230
Apr.	73.4	72.7	1254	7358
May	72.6	72.3	1212	6676
June	71.8	71.0	1050	4944
July	72.1	71.8	1152	5837
Aug.	71.8	71.0	1050	4944
Sept.	71.2	71.0	1050	4944
Oct.	71.0	70.4	978	4314
Nov.	70.2	70.2	954	4104
Dec.*	70.2	70.2	954	4104

* Frozen over most or all of month

A 4" siphon was placed over the Lake Ilo spillway in May to freshen the spillway bucket, which experienced a minor fish kill after runoff ceased. The siphon was kept running through most of the summer and removed in October.

The algal bloom experienced each summer persisted from July through September, though not as heavy as in 1985, when it killed hundreds of minnow-sized fish.

Lee Paul Slough was filled during spring runoff and then closed off from Lake Ilo the remainder of the year. It remained at approximately 80% capacity through September, drying relatively slowly and at a stable rate conducive to wildlife use. The 5 acre strip sprayed with Rodeo in 1986 remained relatively clear of cattail growth. Utilization of the increased edge of cattails formed after spraying was tremendous for nesting divers and eared grebes. Submergent vegetation in the slough

was very dense and much preferred by refuge duck broods.

Plans to reduce the cattail coverage on Lee Paul Slough by cutting or burning were not carried out because of manpower limitations. If it is to remain an attractive brood-rearing area, the cattails in Lee Paul Slough must be controlled.

The 1,000 acre Murphy Slough located 1 mile sough of the refuge was again allowed to remain inundated by its owners this spring to increase late summer hay production. It was heavily utilized by up to 6,000 ducks in April, and served as a rest stop for several migrating sandhill cranes.

3. Forests

Timbered areas on Lake Ilo are limited to 18 shelterbelts comprising 38 acres, and 25 acres of predominately cottonwood located along shorelines and stream courses. Most of the shelterbelts are nature stands of elm, Russian olive, ash, buffaloberry, and blue spruce. A mild winter and dry spring allowed abundant berry and fruit production (particularly plums) in 1987.

The Grassland Management Plan drafted for Lake Ilo NWR in 1987 also contained plans to rehabilitate certain shelterbelts and to plant new ones to provide improved food and cover for resident wildlife and non-game migratory species. These plans are dependent upon one acquiring tree and shrub seedlings at minimal to no cost from the Dunn County Soil Conservation District.

Through a cooperative effort with the Dunn County SCD, we were able to obtain approximately 400 seedlings free of charge in June. The seedlings included lilac, chokecherry, Siberian crab, caragana, pine & nanking cherry. The lilac and caragana were planted adjacent to existing shelterbelts in the headquarters area, and in the Lake Ilo park. A new shelterbelt below the dam was planted with chokecherry, Siberian crab, and nanking cherry. The pines were planted in the tree nursery located just east of headquarters to gain some size before transplanting. Survival was near 85% at summer's end.

In June the regional tree spade was used to transplant 8, 8-10 foot tall Colorado blue spruce from the refuge nursery to make a windbreak adjacent to the new headquarters building.

Beaver trapping was stepped up in 87 because of the extensive damage they are causing to tree plantings on the western shore of Lake Ilo. Population estimates show they can easily withstand the added trapping pressure. Many beaver had been trapped by the end of the year.

4. Croplands

Farming on Lake Ilo is conducted primarily as a means to rejuvenate old fields and plant better nesting cover. A secondary goal is to provide a

fall, winter and spring food source for migratory and resident wildlife.

The cropland program is managed under cooperative agreements. Cooperators conduct agricultural activities for the refuge in return for which they plant and harvest crops from refuge fields. This method is the most practical at Lake Ilo NWR due to the substantial savings in money and manpower. The disadvantage to this method is that for every one acre managed for wildlife, two acres must be provided to the farmer for his own crops. This tends to keep more acres in cropland than is actually necessary to meet wildlife objectives. It also ties up 66% of the cropland acreage that could otherwise be managed specifically for wildlife.

Refuge croplands currently total approximately 175 acres. These lands are primarily Class II and III soils managed in small fields ranging in size from 1.5 to 10 acres. For the most part, these fields were tilled prior to establishment of the refuge. Each cropland unit was measured directly in the field this spring for the first time in several years. Fields were for the most part slightly larger than that reported on cooperative farm agreements of the past several years. 1987 agreements were written to reflect actual acreage.

Highly erodible (Class IV and higher) portions of fields 2 and 3 in AU-6, totalling approximately 3 acres, were planted with native grasses by force account and retired permanently.

Farming in 1987 was conducted by 2 cooperators under 2 cooperative agreements on 106.5 acres of cropland. The cooperator's share included 54 acres of wheat and 1.7 acres of barley. The refuge share included 26.8 acres of unharvested barley and 1 acre of unharvested wheat. Approximately 23 acres were fallowed.

Yields were average for wheat and barley. But for corn it was the best in many years, thanks to 2 weeks of hot, humid, and wet weather in mid-July. A dry fall allowed for complete harvest of area crops for the first time in 3 years. One 6 acre field of swathed wheat on the refuge was used by approximately 1300 mallards for one week in late August, but most waterfowl preferred larger fields of harvested grain off refuge. However, the 28 acres of unharvested grain is expected to be utilized heavily by spring migrating waterfowl in 1988.

Approximately 9 acres of dense nesting cover (DNC) was planted force account in field 1 of AU-9 with the refuge Truax drill. About 69 acres of the 175 acres of active cropland have been planted with DNC since 1985. This figures out to a 39% decrease in tilled cropland on the refuge in the past 3 years. The cooperators have gone along with this reduction, grudgingly. In 1986 and 87, DNC accounted for 80% of all duck nests located by nest dragging and success rates were higher than in native grassland.

5. Grasslands

Typical native prairie in SW North Dakota. Silver sagebrush is utilized by early nesting mallards as well as resident prairie wildlife. KRW 1987

Grasslands account for 1,527 acres on Lake Ilo NWR, approximately 48% of its total acreage. Of this total, approximately 1,205 acres are untilled native sod, and 327 acres are previously tilled cropland that was planted with primarily tame grass mixtures before 1970. With waterfowl production as the refuge's number one objective, it is important that these grasslands are managed to their optimum potential for wildlife, particularly waterfowl, nesting and use.

Lake Ilo grasslands were loosely managed under a land use plan developed in 1959 and amended in 1963. For the most part, this plan relied upon season-long cattle grazing to maintain viable grass communities, and it did not cover all areas of the refuge. Grazing was halted on the refuge in 1981 following its fall from favor as a management technique. Refuge grasslands remained idled until 1986.

In 1986 extensive vegetative studies were conducted on refuge grasslands to establish baseline data from which a new management plan could be developed. The studies produced some interesting results. A comparison of all grassland units' vegetative composition in relation to their degree of disturbance showed few differences between units of similar range type. Areas that were grazed season-long up to 5 years ago showed

a slightly better range condition. But with few exceptions the density of exotic invaders and presence of noxious weds and brush species was quite similar between areas that had been idled for 28-43 years, and areas disturbed by grazing for the past 20 years. Kentucky bluegrass, crested wheatgrass, and smooth brome have invaded all native units to some degree; but for the most part access in scattered patches or dispersed throughout the unit rather than farming dense, sodic mats.

A new grassland management plan drafted in 1987 outlines an ambitious schedule of activities to bring refuge grass communities back to good to excellent condition for wildlife purposes. It incorporates a number of management techniques including deferred-rest rotation grazing (prescribed for 1,018 acres) and, prescribed burning (prescribed for 167 acres) for native grass units. Tame grass units, 78% of which are considered to be in poor condition, will be manipulated via reseeding to native grasses (prescribed for 250 acres) or DNC as a semipermanent cover (prescribed for 111 acres).

Except for prescribed burning, which will be conducted by Audubon complex staff, all management practices can be conducted through cooperative agreements. This will help to assure accomplishment of the plan, since Lake Ilo NWR is limited in staff, equipment and other resources.

1987 provided fair to good growing conditions for refuge grasslands. A dry spring forced abundant early flower and seed production, especially in native units. Haying activities off-refuge began 7-10 days early in June due to the warm spring, and probably hurt production by ground nesters to some degree.

As usual, most of the grasslands under easement continued to be overgrazed year long, especially on C. Murphy's land. A 40 acre field located along the southeast shore of Lake Ilo was not hayed by the Murphy's as it had been for the past 2 years. This should give the ducks a little extra cover in 1988.

6. Other Habitats

For many years the refuge has maintained an open pit from which scoria was extracted for use mainly as a road material. Scoria is a superheated clay rock that is abundant in this area in veins usually located on high ridges in native prairie. In 1986, Dunn County was issued a Special Use Permit to excavate and remove up to 20,000 cubic yards of scoria from the existing pit over a 2 year period ending October 1, 1988. In return for the materials removed, the county was required to provide the refuge with 2,500 cubic yards of crushed scoria, and reclaim the excavation site and an abandoned pit adjacent to the site.

The county began their work in late 1986 and by October, 1987 they had completed a good portion of the required work. In May approximately 2,500 cubic yards of crushed scoria was hauled to Riley Point on the

refuge where it was stockpiled for refuge use only. We expect this stockpile of scoria, worth about $3000, to meet refuge needs for the next 15-20 years. The stockpile is completely hidden from view by a 40 foot tall blue spruce. By July the county had reshaped and placed topsoil on approximately 5 acres of the 7 acre pit, and the entire 3 acres abandoned pit adjacent was reshaped. Reclamation of these areas should be easily completed in 1988, with native grass seeded by the county according to Service specification.

An engineer's survey paid for by the county showed that they had inadvertently excavated an extra 1,745 cubic yards of scoria above the 20,000 allowed (not bad, considering the county road crew had estimated by eyeball calculation). To account for this extra material, the county was required to stockpile an additional 150 cubic yards at Riley Point, and haul, place and grade 200 cubic yards to finish the road and parking area for the new headquarters building.

Also at our request the county renovated and placed 5,000 cubic yards of scoria on a county road that runs through the west side of Lake Ilo NWR and is often used by us for management and enforcement activities. This was not a SUP requirement.

The entire project proved a good example of two public entities working together to meet their goals. In all, the refuge received approximately $10,000 in work and material, and will receive renovation of approximately 10 acres of open rock pits into productive prairie. The project also helped to form a good working relationship between the Service and Dunn County, which heretofore had not been good. (This will be a plus when the Service addresses alternatives to repair the Lake Ilo dam in the near future). Our cost included a little administration and the loss of approximately 1.5 acres of native prairie to augment excavation (it will be replanted in 1988).

7. Grazing

There hasn't been any grazing on Lake Ilo for many years. In 1987, there were two cases of livestock trespass this year on the refuge. Pete Hutchinson, the neighbor on the west side of the refuge, had cattle enter the refuge numerous times during December. We were very patient with Pete giving him repeated phone calls letting him know that his cattle were on the refuge and putting up an additional wire on our fence.

The second case involved Pete's horses. Six of his horses entered the refuge through a gate that was opened by Pete while retrieving a cow that entered the refuge. Meanwhile, Pete supposedly "forgot" to close the gate and let the horses into the refuge for 10 days before they were seen. Pete was strongly warned and Audubon NWR also warned him by a certified letter informing him that fines may be issued for future violations.

8. Haying

Adjacent landowners Tony Ridl and Pete Hutchinson were allowed to hay the Highway 200 right-of-way under Special Use Permit. In return for haying privileges, the permittees gave the refuge 25% of all hay bales, which totalled only 3 large round bales to be placed for nesting Canada geese.

Approximately 12 acres of sod bound crested wheat in a retired cropland unit (Field RET-4) were hayed by Tony Stroh under SUP. We had hoped to also hay 2 other sodbound units totalling 34 acres, but the ground was too uneven from spiking conducted in the mid-70's to warrant the small hay crop that would be realized, and Mr. Ridl backed out with our understanding. Following haying to remove the accumulated litter, we hope to interseed alfalfa on the 12 acre field to increase its preferred nesting cover. This unit is included in our annual nest dragging areas.

Haying is delayed until after July 15 on refuge lands to protect ground nesters.

9. Fire Management

Manager Willis initiates first prescribed burn on Lake Ilo grasslands - a very uncommon practice in this part of the state.

A cooperative agreement was maintained between the FWS and the West Dunn Fire Protection District for the purpose of providing fire protection and suppression for refuge lands and facilities.

Following the completion of an amendment to the Audubon NWR Complex fire plan, a 43 acre field was prescribed burned in April. This was the first time that prescribed burning has been conducted on Lake Ilo NWR. The field, known as Unit NAT-3, was becoming increasingly sodbound with crested wheat after being idled for 15 years. Personnel from Audubon NWR assisted on the burn.

Vegetative response, so far, looked very good with lots of new big bluestem and forbs showing up. Community response was positive due to preburn discussions conducted with all neighbors. Chesley was interested in the grass response and the care given not to burn shrubs and trees. He brought several friends out from Dunn Center to see the grass green up.

Prescribed burning was planned for 2 other units but was not accomplished. Unit NAT-1, totalling 86 acres had not been disturbed for 25 years, but limitations in time and manpower prevented our burning this unit in 1987. Inadequate snow cover on adjacent uplands prevented our burning cattails on Lee Paul Slough. It was hoped that flooding over the burned cattail stalks would decrease their numbers.

10. Pest Control

Lake Ilo NWR is plagued by more than its share of noxious weeds, including leafy spurge, Canada thistle, absinth wormwood, and field bindweed. Much of this can be attributed to the refuge's location at the lower end of a 136 square mile drainage area. Our efforts at control and eradication of noxious weeds are hampered by the continual seed source of such a large area. The extent of the problem is made evident by the fact that the majority of our noxious weed infestations are located adjacent to water areas on the refuge.

Our efforts at Lake Ilo are organized into a 3 pronged attack on weeds via chemical, mechanical, and cultural control. In addition, we are now investigating the possibility of initiating biological control methods through the use of approved insects and fungi.

Chemical control efforts in 1987 were similar to that of the last 2 years. The chemical 2,4-D ester was used at a formulation of 2 qts. of a 4 lb/gal concentration in 5 gallons of water per acre. The use of picloram was halted this year on the refuge to protect groundwater resources. Equipment used included a 60 gallon Hardi sprayer with 15 ft. booms and hand sprayer mounted on a 4X4 truck.

Approximately two acres of rangeland containing scattered small patches of leafy spurge were sprayed in June and again in September. Approximately 25 acres containing Canada thistle were sprayed in late June.

Infested areas that cannot be chemically treated were mowed to halt seed dispersal and to decrease their carbohydrate root reserves. This year we invested $700 in the program with the purchase of a 5' rotary cutter. Though we were unable to cut as much thistle as planned in 1987 due to a major tractor breakdown, this cutter should prove invaluable through the years in reducing noxious weed infestations. As in previous years, temporary personnel spent two weeks cutting weeds in inaccessible areas with hand equipment.

In addition, cooperative farmers were responsible for weed control on refuge croplands.

The Dunn County Commissioners were made aware of noxious weed control activities on Lake Ilo by letter in July.

G. WILDLIFE

1. Wildlife Diversity

Dowitchers make use of late summer mud flats on Lee Paul Slough. KRW 1987

2. Endangered and/or Threatened Species

Bald eagles were infrequent visitors to the refuge during spring and fall migration periods. A peregrine falcon was observed near Lee Paul Slough for 2 days this spring. Golden eagles are becoming more frequent visitors to the refuge, accounting for approximately 79 use days in 1987.

At the request of the State End. Spp. Coordinator, an area near Beulah, ND was checked out for whooping cranes following a report of possible sightings by railroad personnel in September. No birds were observed.

3. Waterfowl

Canada goose use and production have increased dramatically in the past 5 years on Lake Ilo and its satellite refuges.

1987 was a very good year for waterfowl on Lake Ilo NWR and its satellite refuges. This continues a trend of steadily increasing waterfowl numbers over the past six years. For the second time in 2 years, total waterfowl use days exceeded 1 million on Lake Ilo NWR and

its 3 satellite refuges. Ducks accounted for 85% of the use days recorded. Up to 500 mallards and a few Canada geese remained on Lake Ilo NWR through the end of the year, a very unusual occurrence. The birds were feeding in stubble fields off-refuge and utilizing small pockets of open water on Lake Ilo and Spring Creek north of highway 200.

Table 5. Waterfowl Use Days, Lake Ilo NWR and Satellites, 1983-1987.

YEAR	DUCK	GOOSE	COOT	SWAN	TOTAL	
1987	974,332	93,400	81,495	0	1,149,227[1]	
1986	945,070	87,670	146,930	30	1,179,700	
1985	848,645	44,646	75,310	60	986,661	New Observer
1984	539,766	35,626	94,991	61	670,444	New Observer
1983	339,984	55,430	185,050	0	580,464	
5 yr. Avg.	729,559	63,354	116,755	30	913,299	

[1] Does not include October & November estimates since refuge was not staffed.

As was the case on Lake Ilo in 1986, summer waterfowl populations were far higher than normal due to adjacent landowners inundating the 1,000 acre Murphy Slough, located 1 mile south of the refuge. When the heavily utilized slough dried up in June, waterfowl moved over to permanent water on the refuge. Every effort should be taken to assure that this practice is continued on Murphy Slough.

A change in recording waterfowl numbers was implemented this year by which numbers are recorded monthly for each refuge instead of the 4 refuges combined. This will greatly increase an ability to interpret changes in waterfowl use and response to management on each refuge. It should have been started long ago. Table 6 shows a rather even distribution of waterfowl on all 4 refuges with relation to their size, although the fee title refuges, Lake Ilo and White Lake, are obviously attracting more waterfowl.

Table 6. Distribution of waterfowl use days, breeding population and estimated production as a percentage of total use on Lake Ilo NWR and satellites, 1987.

	Lake Ilo	White Lake	Stewart Lake	Pretty Rock
Avg. Use Days	34%	29%	25%	12%
Breeding Population	42%	17%	26%	15%
Estimated Production	39%	26%	12%	23%

Electric predator fence, constructed by Ducks Unlimited, will protect a 31 acre peninsula on the west side of the lake. KRW 1987

Ducks

Estimated production in 1987 for Lake Ilo satellites totalled 886 ducks, 42% of which were produced on Lake Ilo NWR. This is the highest production recorded since 1983. Though it's still below the previous 5 year average of 1,101 ducks/year, it continues an upward trend in production beginning in 1984.

Of all ducks produced on the 4 refuges, mallards and pintails accounted for 25% of the total, and gadwalls accounted for 29%. Other ducks produced included teal, widgeon, shoveler, wood ducks, redhead, canvasback and ruddy ducks. Teal production was far below normal. Redhead use and production was higher than normal at Lake Ilo, probably due to better water management and more open water on Lee Paul Slough.

Nest dragging was again conducted on Lake Ilo for the second time in as many years. Results were similar to those for 1986. On 177 acres searched, nest density was 0.1/acre, nest success was 71% (apparent), with predators taking 29% of nests. Mallards accounted for 24% of all nests found. Approximately 82% of all nests were found in DNC, even though native grassland acres outnumber DNC acres dragged by four to one.

Forty-four fiberglass duck nesting tubs were obtained through N.D. Wetland Habitat Office Extension monies. The tubs will be placed off-refuge on area sloughs in the future to promote duck production and the public's awareness in the region.

Ducks Unlimited approved a proposal to construct an electric predator barrier fence on the west side of Lake Ilo. The fence was constructed in August and September. It contains a gate and is solar charged. It protects two peninsulas totalling 31 acres and will be charged prior to the 1988 nesting season. We hope to increase nesting densities on the peninsulas from 0.1/ac. to more than 1 per acre from homing by successful hens.

In order to increase pair use and brood habitat for ducks, another proposal was drafted for Ducks Unlimited to create up to 8 new wetlands surrounding Lake Ilo. The wetlands proposed range in size from 1-20 acres and would require minimal construction to create. No decision had been made on the proposal by year's end.

Geese

Nine pairs of Canada geese produced 35 goslings on Lake Ilo this year. Three successful nests were located on a 4 acre peninsula which lies on the southern edge of Lake Ilo. Six successful nests were hatched off of large nesting bales placed in Lee Paul Slough in December, 1986. These bales are used by ducks as nesting platforms as well.

Eleven fiberglass tubs placed around the periphery of Lake Ilo in early 1986 were not used for nesting. However, several geese were observed

loafing on the tubs this spring which increases our hopes that they will start to get some use in 1988.

Sixty five Canada geese were the first waterfowl sighted in 1987 on March 6. Their population averaged around 35-60 on Lake Ilo through the summer, peaking at more than 400 birds in September. Up to 300 remained on the refuge up till December 15.

White front and snow goose visitation is increasing annually at Lake Ilo, but use is still far below that of Canada geese.

As in previous years the State proclaimed a "no hunting zone" for dark geese with boundaries approximately 3 miles out from Lake Ilo NWR boundaries. This zone is important to the survival and propagation of resident Canada geese at Lake Ilo, as their off-refuge feeding patterns are quite easily determined.

Swans

Tundra swans are an uncommon visitor to Lake Ilo. No birds were observed in 1987. However, the refuge was unstaffed in October and December when swans are normally observed.

4. Marsh and Water Birds

Use by marsh and water birds was average for Lake Ilo in 1987. Habitat conditions were favorable this year, with shallower water levels than in 1986.

The great blue heron rookery, which we feared would be abandoned following its decimation by a June, 1986 hailstorm was once again active. The rookery produced 8 young from 5 nests this year.

An uncommon sighting of a great egret was made near the rookery on July 6.

Lower water levels exposed rocky points on Lake Ilo and use was up for white pelicans and double crested cormorants with average summer populations of 30 and 20 birds, respectively.

Grebe use was the highest in several years. Two pairs of western grebes remained on the lake throughout the summer, but no young were ever observed.

An eared grebe nesting colony was established along the cattail edge formed by spraying Rodeo in Lee Paul Slough in 1986, and 60 adults produced approximately 40 young this summer.

Large flocks of sandhill cranes are commonly observed during spring and fall migration and often stop for an overnight rest in Lee Paul Slough. A pair of sandhill took up residence in the grasslands on the lake's western shore in July, and didn't leave until apparently tying up with a

migrating flock in September.

Use days for marsh and wading birds totalled 19,929 in 1987, not including October and November when the refuge was unstaffed.

5. Shorebirds, Gulls, Terns and Allied Species

These birds did well in 1987. Phalarope and dowitcher populations were higher than normal, and several other species took advantage of exposed flats and shallow water this year.

Use days for shorebirds, gulls, terns and allied species totalled 36,595 in 1987, not including October and November when the refuge was unstaffed.

6. Raptors

Known nesters on Lake Ilo NWR included the great horned owl, northern harrier and short eared owl. Other species observed included bald eagles, golden eagles, osprey, turkey vultures, red-tailed hawks, Swainson's hawks, northern goshawk, rough-legged hawk, American kestrel, prairie falcon, merlin and long-eared owl.

Use days for raptors and buteos totalled 6,852 in 1987, not including October and November when the refuge was unstaffed.

7. Other Migratory Birds

Mourning dove use and production was above average for 1987. Other migratory species were more evident at Lake Ilo NWR this year, mostly due to increased emphasis on censusing non-game species.

8. Game Mammals

Most of the refuge white tailed deer population, which averages 85 animals, remained off-refuge through the winter and early spring because of mild temps and abundant crop residues. Production appeared to be very good this summer. An EHD outbreak occurred throughout the western third of North Dakota in late October, with hundreds of dead deer observed in the vicinity (50 mile radius) of the refuge. Since the refuge was unstaffed during this period, it will be difficult to gage the affect on Lake Ilo's deer population until observations are possible in late winter 1988.

Antelope were sighted on and near the refuge in increasing numbers, with 8 sighted in 1987.

Furbearer populations, particularly coyote, raccoon, skunk and beaver are on the increase. A "sixpack" of coyotes were commonly observed on the lake ice in January and February.

Our protection and enhancement of muskrats and their habitat is paying off. In 1985 less than 10 lodges were observed. In 1987, 38 lodges were counted on the refuge before freeze up. Muskrats are preferred for their affects on cattail and their lodges as loafing and nesting habitat for waterfowl.

Our first observation of a badger in 3 years occurred in July following a heavy rainstorm.

No fox or fox sign was observed on the refuge for the third year in a row. Quite likely the coyotes are responsible for this.

10. Other Resident Wildlife

Nesting and escape cover and seed and berry production were good in 1987. Mild weather conditions for the past few years have stabilized resident population on the refuge.

The two known active sharp-tailed grouse leks on Lake Ilo showed a slight increase in number and use. Production was very good in the area, and hunter success was excellent this fall. Sharptailed populations peaked at 70 birds on the refuge.

Hungarian partridge increased their numbers in 1987. Three coveys were known to occur on the refuge.

Ring-necked pheasants are the most prevalent game bird on Lake Ilo NWR. They have undergone a steady decline for unknown reasons since 1985, when they peaked at 850 birds. In January, up to 400 birds were utilizing the 7 acre barley plot adjacent to Lee Paul Slough, moving between field and the slough like a feathered army each day. Quite a sight.

11. Fisheries Resources

No stocking has been conducted since 1984. In 1985 test nettings, suckers, bullhead and carp comprised 96% of the total fish caught by weight, and 85% by number. No fisheries management is planned until a final decision is made on repair of the Lake Ilo dam.

15. Animal Control

Trapping is conducted on Lake Ilo NWR to keep predator and furbearer populations in check.

One permittee, Pat Sinclair of Killdeer, ND, was selected to trap on Lake Ilo NWR during the 1987-88 season. Trapping seasons and hours were identical to those set by the state, except the use of snares was prohibited. Mr. Sinclair was required to pay $30 in trapping fees. He is give a $1 rebate for each skunk taken on the refuge. Quotas for all except coyote, with a limit of 10, were unlimited.

As of January 30, 1988 Mr. Sinclair had trapped the following animals:

10 skunks (unk)	12 beaver ($28)
5 raccoon ($15)	6 mink ($32)

In parenthesis are the average prices paid for each species' pelts in fall, 1987.

H. PUBLIC USE

1. General

Public use visits to Lake Ilo NWR totalled 2, 870 in 1987, primarily for fishing, picnicking and wildlife observation.

Happy family outings such as this are what public use programs are all about. KRW 1987

Probably the biggest boost to increasing public use and interpretive programs on the refuge occurred in 1987 with completion of the new headquarters building. Since the old office was situated in the residence basement, it was difficult to establish public use programs due to lack of adequate facilities.

The first ever refuge open house was held in September. Approximately 50 visitors were treated to a tour of the new headquarters building, a slide show and pamphlets, and refreshments. Pete Smith and Mick Erickson from Audubon NWR assisted.

Fifteen members of the McKenzie REC Board of Directors were given a slide show and tour of Lake Ilo. All received a new ball cap courtesy of wildlife extension.

Eleven news releases were issued to one or all of six newspapers in the West River area of North Dakota.

Take Pride in America pamphlets and litterbags were handed out to recreational users and other visitors to Lake Ilo throughout the year.

Wildlife oriented placemats were given to the restaurant in Dunn Center for use on their tables. The placemats were issued out of the Bismarck WHO office. Many more can probably be used in this area but I left before I could solicit more restaurant owners.

Manager Willis assisted in a Project Wild training session in Washburn, ND put on by Craig Hultberg of the Audubon staff. Also, a planning session for the WILD II session in Medora was attended.

Five new guide signs were ordered and placed on Lake Ilo NWR according to the refuge sign plan written in 1985. The brown and white signs will make it easier for visitors to find available facilities.

2. Outdoor Classrooms - Students

Plans were developed to renovate the Ilo Park bathhouse into an unmanned environmental education center. The stone and mortar structure is currently unused and boarded up, but could be easily and inexpensively renovated. The work awaits approval by the Audubon NWR Complex and the RO.

8. Hunting

Lake Ilo NWR is closed to all hunting. Boundary areas are hunted frequently during pheasant and deer seasons. State highway 200, which runs along the north refuge boundary, is a favorite cruising area for road hunters.

Hunting of other game is virtually nonexistent near the refuge.

9. Fishing

Following two years of very poor fishing success, the fish started biting in 1987. In January several 2-1/2 - 5 lb. northern pike were caught by ice fishermen on the lake's south side. Unstable ice conditions brought an end to that until the spring season opened in May. Several yellow perch in excess of 3/4 lb. or larger were caught throughout the summer. Fishermen also had fairly good luck catching walleye and northern pike in the 1-3 lb. range. A whopper class 9 lb. walleye was caught by a retired gentleman who had helped to construct the Lake Ilo dam back in 1937. Success, and fisherman visits, dropped off in late July, and remained low the rest of the year.

Fishing success increased tremendously over the previous two years. KRW 1987

Total fisherman visits on Lake Ilo for 1987 were 1,060, not counting October and November when the refuge was unstaffed.

14. Picnicking

A seven acre park in the northeast corner of the lake is maintained by Dunn County under Special Use Permit. The park has been a prominent feature in refuge visitation since the lake was established. It contains a wood concession stand and picnic shelter built by the County, and a rock bathhouse and two pit toilets constructed by the FWS. The park area is entirely tree covered and the County mows the grass during the summer.

Installation of a new park information sign and other guide signs will increase the public's enjoyment of the refuge. KRW 1987

Although use of the park was dropped off over the years, it is still used by area residents for large picnics and family reunions. Ten large picnics were held this year and along with smaller family picnics accounted for 684 visits.

A stone and mortar lazy "L" sign base was constructed for the new 4X8 foot information sign at Lake Ilo Park. With the help of Chesley Dinkins, we closely matched other structures in the park that were constructed by the CCC in 1936.

17. Law Enforcement

Because of the low population and general law abiding nature of people in this area, law enforcement on Lake Ilo NWR is fairly simple and easy. Refuge patrols and license checks are conducted on weekends, and during week days as needed or in conjunction with other activities.

Two violations were cited in 1987 -

Date	Violation	Disposition
6/7/87	Two individuals from Dickinson, ND were cited for driving on a refuge in an area other than a designated route of travel	$50 fine paid

Manager Willis assisted Audubon NWR staff with easement ground checks and landowner contacts for the experience.

I. EQUIPMENT AND FACILITIES

1. New Construction

The new 90X40 foot headquarters building is finally a reality. Construction began on the $96,345 heated section by Industrial Builders of Fargo on Oct. 6, 1986. By Jan. 27 of this year, work on that section was 90% complete. However, poor weather and delays in delivery of needed hardware delayed completion of this section until April 30. Half of May was spent moving in the office and shop equipment from their old locations, building new benches, etc.

Meanwhile, the contract to construct a 50X40 foot cold storage extension to the headquarters building was awarded to Terra Industries of Dickinson for $36,417. This section was completed in late September.

We now have a 90X40 foot metal building that contains a 338 sq. ft. office, 1212 sq. ft. heated shop with overhead storage, and 50X40 foot storage area with twin service bays to keep implements, the dump truck, TD14 dozer and tractor under cover. Quite a change for the better.

The new headquarters building greatly increases our management/maintenance capabilities on the refuge.
KRW 1987

2. Rehabilitation

The rest of the headquarters area got a facelift in 1987. Four original wood frame buildings were repainted with colors matching the new headquarters buildings

A concrete foundation was removed in the headquarters area. One of the original buildings was cleaned out in preparation for its renovation into a summer bunkhouse for refuge volunteers.

Old headquarters area buildings were given a facelift by temporary personnel this summer. KRW 1987

Maintenance worker Duane Brenneise from Audubon NWR spent one day with his D8 dozer burying the remains of an old cabin and outbuildings on Riley Point.

The Lee Paul Slough water control structure was cleared of a large beaver dam in July by backhoe. A trash guard was then installed to keep beavers from clogging the culverts.

3. Major Maintenance

Refuge roads were maintained with the MF40 tractor and rear blade from May to September. Roadsides were treated with Pramitol in May to restrict weed growth, and mowed in August.

The MF40 tractor underwent major repairs on the transmission, costing $700 and 3 weeks down time, and minor repairs on the hydraulic system. Its ability to perform needed work is limited and plans should be made

to replace it.

4. Equipment Utilization and Replacement

1) A J.D. rotary cutter was purchased for $700 and used to mow noxious weeds.
2) The 1972 J.D. riding lawnmower mowed its last blade of grass and was replaced with a comparable Sears model for $1049.
3) A snowplow was picked up from Garrison NFH on excess property and fitted on the Ford 4X4 truck. This beats pulling snow with the tractor and rear blade, our only means of snow removal before.
4) A retractable stairs was fabricated and installed in the new shop to access the overhead storage area for $450.

J. OTHER ITEMS

1. Cooperative Programs

A cooperative agreement is maintained with NOAA to operator a weather station and Fisher-Porter punch-type rain gage. The information is published in the Dunn County Herald newspaper weekly. The rain gages were moved to a more open location on the headquarters area in July.

The refuge Truax grass drill was loaned out twice to other entities under special use permit. The Dunn County SCD used the Truax drill to plant native grasses on 40 acres of private retired cropland. The ND State Water Commission used the drill to replant a 20 mile section of recently installed pipe for the Southwest Water Pipeline Project. Loan of the drill increases our public relation in the region and gets more ground back into grass. It also beats up the drill quite badly.

3. Other Items of Interest

Zone II Supervisor Dale Henry conducted a refuge inspection and tour of Lake Ilo NWR in June.

We submitted a lengthy request to rename the refuge after Chesley Dinkins, who managed the refuge for 45 years. It was denied at the regional level.

Chesley Dinkins, manager of Lake Ilo for more than 47 years, still keeps a hand in refuge operations

4. Credits

The entire report was written by Kevin Willis, ex-refuge manager, except for Sec. E.5 which was written by Sally Sovey. Mick Erickson provided technical support, and Marilyn Wohlk typed and assembled the report.

Biological control agent for manager's garden pests maintains backyard vigil.

County earth mover reclaims scoria pit as the clay rock is being excavated.

K. FEEDBACK

Kevin really got Lake Ilo and the three satellite refuges off and running. Many wildlife, habitat and building improvements bear his mark. In two short years he really got things moving.

Since Chesley retired two managers have come and gone in less than 4 years. To bring long term stability to this station, the RO and I decided to return to running it with a senior biological technician. Early in 1988 a sharp, aggressive, dedicated young man and his wife will take over Ilo as their first permanent full time job. Having worked at Tewaukon NWR since 1980 as a YACC, then temporary and lastly as a permanent part-time employee, Don Bozovsky is experienced and should fit in well at Ilo. Good for Ilo; good for Don.

Ilo is a beautiful station in rugged, beautiful country. A person can avoid most paperwork and really dig into wildlife work. It's a jewel of a wildlife project.

Unfortunately, it's not perfect. Life will be challenging in 1988 and beyond. Dam safety problems with the main Lake Ilo dam are estimated to require about $7-$12 million to correct. That's tough to come up with for a 1,200 acre lake which provides a marginal public fishery and local picnicking park. Also, the responsibility for flood storage is a major question. We shall see.

Dave Potter

WHITE LAKE NATIONAL WILDLIFE REFUGE

Dunn Center, North Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 1987

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

INTRODUCTION

White Lake National Wildlife Refuge is a 1,040 acre fee title area located along U.S. Highway 85, five miles east of Amidon, North Dakota in Slope County. The refuge was first established in 1956 as a refuge easement area of 960 acres. In 1959, the 960 acres under easement were purchased along with another 80 acres to set the boundaries as they are known today.

The refuge is administered as a part of the Audubon National Wildlife Refuge Complex by the Refuge Manager stationed at Lake Ilo NWR. Since the station is located 85 miles from the Lake Ilo headquarters, only monthly visits were made to the refuge to conduct surveys, maintenance and/or inspections.

Public use on the refuge is by special use permit only. The lake does not have a viable fisheries at this time. U.S. Highway 83 passes along the north boundary and affords the public a view of the area. A roadside rest/scenic view area was proposed many years ago in a development plan, but has never come to pass.

An oasis of water in an otherwise arid region of the State, White Lake NWR serves primarily as an important rest stop for migrating waterfowl. KRW 1987

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B. CLIMATIC CONDITIONS

The area received timely precipitation that maintained above normal water levels through the year.

The data found in Table 1 was collected by Mr. Roy J. Frederick, a NOAA observer located at the Slope County Courthouse in Amidon, ND. This weather station is located five miles west of the refuge.

Table 1. Temperature and Precipitation for CY-1987, White Lake NWR

Month	Precip. (in.)	Normal	Snow	Max. Temp (°F)	Min. Temp
Jan	.26	.37	4.0	56	- 11
Feb	.59	.37	6.0	58	12
Mar	-	.54	-	-	-
Apr	2.04	1.53	13.0	72	7
May	3.07	2.54	-	90	39
June	1.83	3.85	-	95	44
July	6.31	2.23	-	94	44
Aug	3.43	1.49	-	95	45
Sept	1.75	1.41	-	90	33
Oct	.04	.74	T	79	13
Nov	.17	.50	T	71	15
Dec	.06	.35	.5	13	- 10
Totals	19.55	15.92	23.5	95	- 11

F. HABITAT MANAGEMENT

White Lake is the largest body of water on the refuge at approximately 190 acres, and the major waterfowl attractant in the immediate area. It is impounded by an earthen dam containing two spillways constructed of concrete and petrified wood. There is currently no positive water control on the lake, which averages less than 4 feet in depth. A dam built by beavers adjacent to the south spillway in 1983 impounds an additional 18 inches of water above the spillway crest during periods of high water. During these periods, saline flats located on the west and south side of White Lake are naturally inundated and provide an additional 30 acres of waterfowl brood and loafing habitat. Providing positive water control for these areas would represent a major step toward increasing waterfowl use on the refuge.

Table 2. White Lake Water Levels During CY-1987 - (Spillway Crest 93.0)

Month	Average Elevation (ft)	Area (acres)	Capacity (acre ft)
Jan*	93.1	190	766
Feb*	93.1	190	766
Mar*	93.3	198	823
Apr	93.5	210	883
May	93.3	198	823
Jun	93.2	194	793
Jul	93.5	210	883
Aug	93.5	210	883
Sep	93.3	198	823
Oct	* Data not available		
Nov	* Data not available		
Dec	* Data not available		

* Frozen over all or most of month

A culvert in the Beaver Pond Dam remained plugged by beaver activity. It was not removed due to its advantageous affects on maintaining brood water in the pond. The 30 acre west marsh dried early, but provided good marsh and wading bird habitat as mudflats were slowly exposed. The same was true for the east marsh, where more than 30 avocets were seen over the summer.

One 10 acre field of crested wheatgrass and alfalfa was hayed as usual in August to provide a grazing are for Canada geese. One-fourth of all hay in large bales from this field is used for goose nesting platforms around White Lake. Nothing else was done to refuge grasslands. Plans are to develop a management plan for White Lake NWR in 1988 to provide optimum cover for waterfowl and other wildlife.

The highway 85 ROW was hayed by Doug Nordby by Special Use Permit. Hay production was good, and one-fourth of the hay crop in large round bales will be placed at White Lake and Stewart Lake NWR for goose nesting.

Scattered patches of Canada thistle were sprayed with 2,4-D in June. Noxious weeds are limited to approximately 5 acres on White Lake, and we believe we are getting good control with the 2,4-D spraying.

G. WILDLIFE

Waterfowl use days are included in the Lake Ilo narrative.

Waterfowl production continues to increase steadily at White Lake. 40 Canada geese were produced in 1987, the second highest rate in as many years. This compares to 1984 when 6 geese produced was a high number. The resident flock only used 3 of the 13 nesting bales placed in March. Most nested on the peninsula and islands located along the southwest shore of White Lake. An estimated 249 ducks were produced in 1987,

including 38 mallards, 17 pintail, 80 gadwall, 49 teal, 44 wigeon and shoveler, and 14 divers.

Though bales have been placed around the lake, many geese still prefer the ground level approach to nesting. KRW 1987

Because of staffing limitations we were unable to conduct nest dragging on White Lake NWR as was planned.

Other migratory birds included up to 30 pelicans and 200 eared grebes who remained through the summer and early fall.

The first documented incidence of disease at White Lake NWR occurred on August 19, when 21 birds (ducks, coots, gulls) were found dead on the lake's south shore. Two biological specimens were sent to the National Wildlife Health Lab. Though their findings were inconclusive, botulism was the suspected agent. On August 24, 41 ducks, 17 coots and 9 grebes, bitterns and gulls were found dead and retrieved for burial. The incidence disappeared on August 29, with total losses estimated at 260 birds.

Resident wildlife populations remained relatively stable in 1987. A pair of motherless twin mule deer were commonly observed on the refuge all summer.

I. EQUIPMENT & FACILITIES

No new construction occurred on the refuge in 19897. The dam and spillway appear to be in good condition.

STEWART LAKE NATIONAL WILDLIFE REFUGE

Dunn Center, North Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 1987

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

A portion of Stewart Lake NWR with Black Butte in background. In foreground are remains of bandstand and bathhouse built by CCC in 1936.

INTRODUCTION

Stewart Lake National Wildlife Refuge is located in Slope County about twelve miles southwest of Amidon, North Dakota. The refuge consists of 2,226 acres of flowage and refuge easement land and 3.99 acres owned in fee title. In 1936, approximately 1,906 acres of perpetual easements were obtained. In 1939 another 320 acres were put under easement and 3.99 acres were given to the government by Dugald A. Stewart, for park and recreational use. This area was very popular during the 1940's and 50's for family picnics and swimming.

The refuge is administered as a part of the Audubon NWR Complex by the Refuge Manager stationed at Lake Ilo NWR. The station is 17 road miles southwest of White Lake NWR and 102 miles from the Lake Ilo headquarters. Visits were made once a month for surveys, maintenance and/or inspections.

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B. CLIMATIC CONDITIONS

See White Lake NWR narrative for summary of weather conditions in 1987.

F. HABITAT MANAGEMENT

Stewart Lake NWR contains approximately 2,033 acre of native grasslands and rock outcroppings surrounding the 197 acre Stewart Lake. The lake is spring fed and impounded by an earthen dam with a rock and concrete spillway. The surrounding uplands have been severely overgrazed for several years and provide little nesting cover for waterfowl.

Table 1. Stewart Lake Water Levels During CY-1987 - (Spillway Crest - 154.0)

Month	Average Elevation (ft)	Area (acres)	Capacity (acre ft)
Jan*	153.5	183	716
Feb*	153.5	183	716
Mar*	153.8	192	768
Apr	154.0	197	802
May	153.7	189	750
Jun	153.0	171	631
Jul	153.4	181	699
Aug	153.2	176	665
Sep	153.0	171	631
Oct	152.7	164	583
Nov	152.5	159	550
Dec*	152.5	159	550

*Frozen over all or most of month

Stewart Lake NWR contains approximately 3,99 acres in fee title lands located on the shore of the lake. Region 6 engineers, at our request, attempted a field survey of the fee title lands. They said that with no markers available it would take 2 weeks to determine the boundaries. They estimated that 1/3 of the 3.99 acres has eroded away. This area of Stewart Lake receives heavy erosion due to wave action during northwest winds. In the past, bank stabilization measures were installed to prevent additional erosion. Several stone structures were protected.

Another area containing approximately 157 acres is surrounded by a 4-strand barb wire fence that is for the most part intact. This area is under easement whereby all trespass by cattle and people is to be prohibited between April 1 and July 15.

Although a poorly maintained fence surrounded the easement, it has not been enforced for over 30 years. Both landowners were contacted concerning the easement and were quite amicable and showed no disagreement to our repairing the fence and enforcing the easement. The west half of the 157 acre tract is now ready for closure between April 1 - July 15 each year.

In November, 1986, 640 acres within Stewart Lake NWR were foreclosed upon and put up for sale. Contact was made with new landowner to assure his understanding of the easement requirements. An acquisition proposal to purchase Stewart Lake was prepared and is pending until the other landowners are willing to sell.

G. WILDLIFE

Waterfowl surveys are included in the Lake Ilo Narrative.

Short grass prairie at Stewart Lake is of limited value to nesting ducks because of its overgrazed condition. KRW 1987

As in 1986, waterfowl breeding pair counts were up substantially with 192 pairs surveyed, however, only four broods were located during brood surveys. Marsh vegetation was average, however, there were no diver broods found during brood surveys. Also, since Stewart Lake is an easement refuge it receives high annual grazing pressure leaving little nesting cover for waterfowl. High predation rates by fox probably add to the problem of low duckling production as fox are often seen during monthly visits. Attempts to find interested trappers has been futile, and force account trapping would be uneconomical.

The area was heavily used by all migrating birds during the spring and fall migration periods. In fact, 200 Canada geese and 50 mallards stayed until the middle of December.

I. EQUIPMENT AND FACILITIES

No new construction occurred on the refuge this year. The dam and spillway appear to be in good condition.

PRETTY ROCK NATIONAL WILDLIFE REFUGE

Dunn Center, North Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 1987

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

Pretty Rock NWR maintains high production and use for an easement refuge because of good land management practices conducted by the landowner. KRW 1987

INTRODUCTION

Pretty Rock National Wildlife Refuge is located in Grant County, eight miles south of New Leipzig, North Dakota. The refuge is comprised of 800 acres of flowage and refuge easement obtained in 1936. These easements are perpetual.

The refuge is administered as a part of the Audubon NWR Complex by the Refuge Manager stationed at Lake Ilo NWR. The station is 115 miles southeast of Lake Ilo headquarters and 70 miles east of the nearest other satellite, White Lake NWR. Visits were made once a month for surveys, maintenance and/or inspections.

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B. CLIMATIC CONDITIONS

Precipitation for the year was normal, however, most of this precipitation occurred during the first seven months. Monthly accumulations were considerably less during the last half of the year.

The data found in Table 1 was collected by Mr. Daryl T. Hupel, a NOAA observer located approximately 9 miles southeast of the refuge.

Table 1. Temperature and Precipitation Data, Pretty Rock NWR, 1987.

Month	Precip. (in.)	Normal	Snow	Max. Temp. (°F)	Min Temp.
Jan	.01	.29	1.2	61	- 12
Feb	1.24	.30	18.8	58	10
Mar	2.47	.63	16.5	70	- 4
Apr	T	1.65	T	93	24
May	3.21	2.85	0	92	30
June	1.34	3.59	0	96	42
July	4.48	2.22	0	97	45
Aug	1.22	2.08	0	89	37
Sept	.62	1.38	0	90	32
Oct	.43	.88	1.2	88	10
Nov	.13	.43	0	65	9
Dec	.19	.27	2.8	57	- 8
Totals	15.34	16.57	40.5	97	- 12

F. HABITAT MANAGEMENT

Pretty Rock NWR consists of a shallow marshy slough roughly 147 acres in size surrounded by 650 acres of native grassland. Since the government only maintains refuge and flowage easements on this area, little to no Service management activity is carried out. Although this area is grazed season long, the current land renter or landowner, Ed Hochalter, has maintained the upland area in excellent condition for both is grazing operation and waterfowl nesting.

Pretty Rock slough is impounded by an earthen dam which contains a stone and concrete spillway. A graveled trail constructed between the slough and the spillway a few years ago by Biological Technician Chesley Dinkins raised the elevation of the spillway approximately 9-12 inches above the original 150.0 foot elevation.

Table 2. Pretty Rock Slough Water Levels in 1987 - (Spillway Crest - 150 feet)

Month	Avg. Elevation (ft.)	Area (Ac)	Capacity (Ac/ft)
Jan*	151.0	172	585
Feb*	151.0	172	585
Mar*	151.5	180	598
Apr	151.1	174	589
May	151.0	172	585
Jun	150.8	-	-
Jul	151.0	172	585
Aug	150.8	-	-
Sep	150.6	165	567
Oct	150.5	165	567
Nov	150.2	153	531
Dec*	150.2	153	531

* Frozen over all or most of month

Pretty Rock is located mostly on state land in Grant County. The Fish and Wildlife Service has submitted a land acquisition proposal for the property. The request is pending.

G. WILDLIFE

Waterfowl use days are included in the Lake Ilo Narrative. Duck production was slightly lower than last year with 180 total ducks produced. A breakdown by species includes: 48 galdwall, 20 mallard, 16 blue-winged teal and 16 pintail. Also represented were shoveler, green-wing teal, redhead and canvasback. Twelve Canada geese broods produced 72 young in 1987. This compares with 53 produced in 1986, 77 in 1985, and only 5 in 1984.

Eared grebe production increased from 6 produced in 1986 to 60 produced this year.

I. EQUIPMENT AND FACILITIES

There was no construction on the refuge this year. The dam is in good condition, however, an inspection of the rubble masonry spillway revealed serious cracking which is allowing water to undermine the structure during spring runoff. This problem has been addressed in the Pretty Rock Dam Intermediate Inspection Report, which classified the dam as low hazard. Remedies will be taken next summer.