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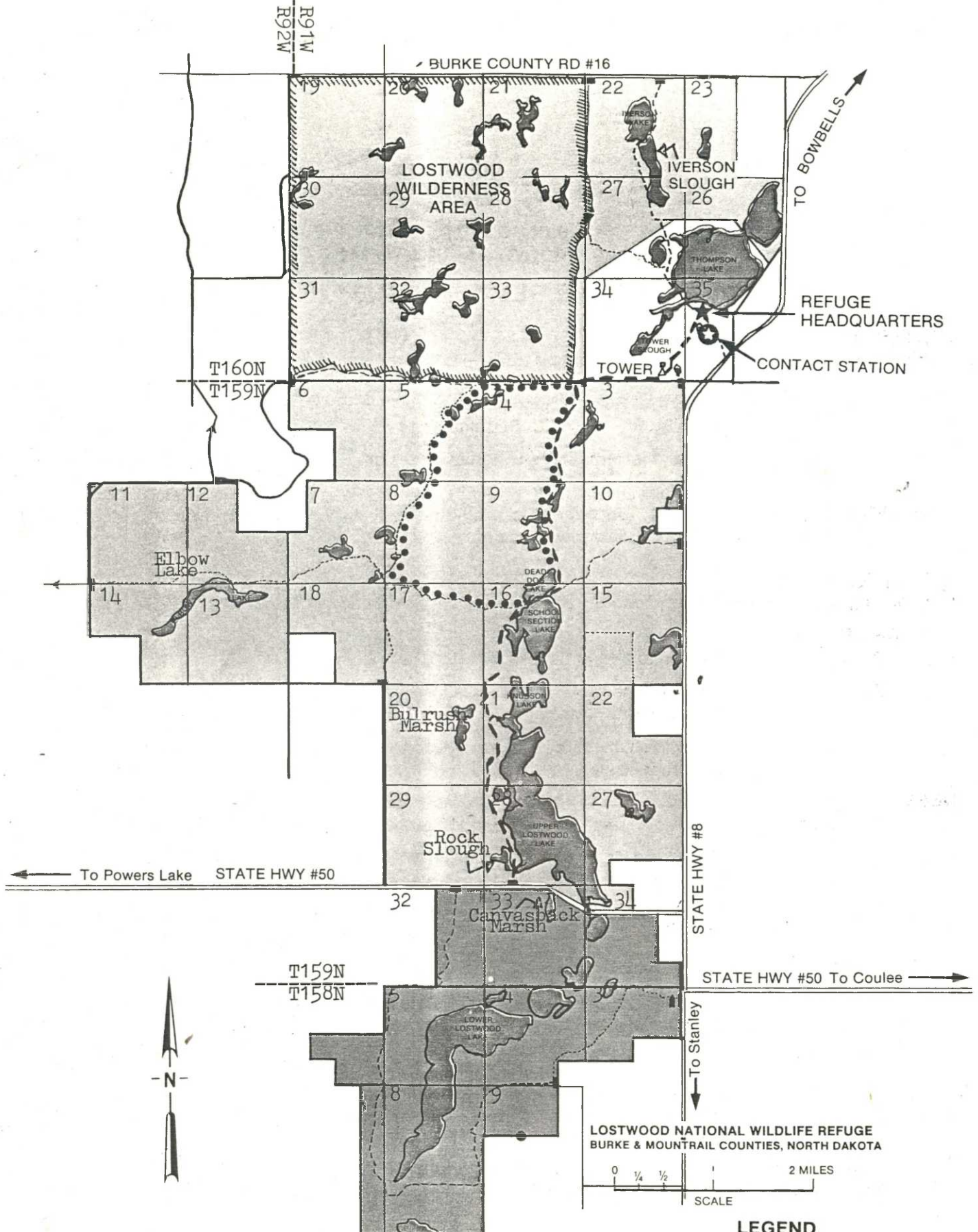
LOSTWOOD NATIONAL WILDLIFE REFUGE

Kenmare, North Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 1983

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



- LEGEND**
- ★ Refuge Headquarters
 - ⊛ Contact Station
 - 🗼 Tower
 - Gates
 - 🏠 Missile Site
 - 🌊 Lakes and larger wetlands
 - ⋯ Sod Trails
 - - - Trails
 - Area A
 - Area B
 - ▨ Area C
 - |||| Wilderness Boundary
 - - - Auto Route
 - Hiking Trail

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NATIONAL WILDLIFE REFUGE SYSTEM
Fish and Wildlife Service
U.S. DEPARTMENT OF THE INTERIOR

DES LACS NWR COMPLEX STAFF

- | | | |
|---|-------|-----|
| 1. Delano A. Pierce, Project Leader, EOD 1-9-83 | GS-12 | PFT |
| 2. Rolland Krieger, Asst. Project Leader | GS-11 | PFT |
| 3. Muriel M. (Molly) Hansen | GS-6 | PFT |
| 4. Joan W. Peterson, resigned 7-8-83 | GS-3 | PPT |
| 5. Doris E. Huwe, EOD 10-17-83 | GS-3 | PPT |



Lowell Vaage John Stewart Karen Smith Frank Kartch

LOSTWOOD NWR STAFF

- | | | |
|--|-------------------|------|
| 1. Karen A. Smith, Refuge Manager | GS-9 | PFT |
| 2. John Stewart, Maintenance Worker | WG-8 | PFT |
| 3. Robert K. Murphy, Biological Technician
(Wildlife) | GS-5 | Temp |
| | 4-3-83 to 9-30-83 | |

Review and Approvals

Kenneth Smith 2-11-84
Submitted By Date

Del Piero
Complex Office Review Date

Dale Henry 3-14-84
Regional Office Review Date

INTRODUCTION

The 24,810 acre Lostwood National Wildlife Refuge lies in northwestern North Dakota, 23 miles south of the Canadian border and 70 miles east of the Montana line. It was established in 1935 by Executive Order 7171 as a ". . . refuge and breeding ground for migratory birds and other wildlife . . ." within Burke and Mountrail Counties on the Missouri du Coteau (this is a geological feature created by a terminal moraine deposited about 10,000 years ago by the Wisconsin glacier). The refuge topography is rolling to steep hills covered with native (70%) and tame (30%) grasslands, small patches of aspen (about 1% of the refuge), and numerous wetlands. This is the largest block of native grassland under U.S. Fish and Wildlife Service ownership in the pothole region of Minnesota, Montana, and North and South Dakota. The hills are most frequently covered with western snowberry, needle-and-thread, green needlegrass, western wheatgrass, blue grama, plains muhly, small-flower aster, northern bedstraw, goldenrod, wild licorice, meadow anemone, white sage and others. Some of the native resident fauna is sharp-tailed grouse, whitetail deer, beaver, coyote, and whitetail jackrabbit. The native migratory fauna include waterfowl (mallard, wigeon, gadwall, blue-winged teal, giant Canada goose and others), shorebirds (upland plover, marbled godwit, avocet, piping plover, and others), passerines (clay-colored sparrow, Sprague's pipit, sharp-tailed sparrow, Baird's sparrow and others) and bird-of-prey (red-tailed hawk, Swainson's hawk, marsh hawk, short-eared owl, and others). The grassland and associated wildlife are enhanced and/or maintained by land use management practices such as idle, prescribed burning, grazing, and others.

Public use facilities on the refuge include a self-guided auto route, a hiking trail and a photo blind on a sharp-tailed grouse dancing ground. Birding, photography, hunting for grouse, Hungarian partridge and deer are the main public use activities. In 1975, the 5577 acre Lostwood Wilderness Area was established by P.L. 93-632, 12, Section 1 (d) (12).

On 1 July 1973, Lostwood NWR, staffed with a resident manager and one maintenance man, was placed under the administration of the Des Lacs Complex, headquartered at Des Lacs NWR in Kenmare, North Dakota.



Photo #2

An aerial view of the coteau prairie with numerous wetlands that typifies Lostwood National Wildlife Refuge (SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec 32 T160N R91W, looking south).
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K. FEEDBACK

A. HIGHLIGHTS

The fall snow goose population peaked at 24,000 - a new record. (Page 36).

From the first of October until mid-November freeze up, 10,000 to 15,000 coots and ducks (predominantly wigeon and gadwall) surface fed on School Section Lake (an open water lake of about 250 acres). (Page 35).

The Lostwood Wilderness Plan was submitted to the Regional Office. (Page 29).

The refuge's residence was remodeled. (Pages 42 & 43).

A permanent, full time biologist was hired in March to assist the Lostwood manager in managing Lostwood NWR, Lostwood WMD, and Shell Lake NWR. This new position was transferred on 1 October 1983 to the Des Lacs Complex office to manage Lostwood WMD and Shell Lake NWR separate from Lostwood NWR. (Page 8).

A presentation was given to the North Dakota Chapter of the Wildlife Society on 1 February 1983 by the Lostwood manager about the refuge's prescribed burning program. (Page 12).

Private, state, federal and the Canadian government have been interested in our prescribed burning program. (Pages 12 & 13).

National Geographic Society representatives visited Lostwood NWR for information to be included in a book about wildlands for wildlife. (Page 45).

The spring grazing program encountered problems as a result of the cold and unstable weather conditions in the spring of 1983. (Page 20).

North Dakota Natural Heritage Program's representative visited Lostwood to locate territorial piping plovers. Four suspected territories were found on two different lakes. (Page 38).

A native grass seed storage facilities, built in 1980, was successful in maintaining or improving germination of seed stored for three years. (Page 17).

Hydrogen sulfide does kill some resident avian species and is suspected of killing migratory birds at some well sites in the area. (Page 44).

B. CLIMATIC CONDITIONS

The 1982-83 winter (November through March) was mild. The winter had about 20.18 inches of snow (9.7 inches in March), and air temperatures ranged from 58°F to -26°F with fewer days than normal below zero. Spring tried to spring in April but winter returned on 12 May with five inches of snow and strong winds forming the worst 1983 winter snowstorm. The late, wet snow helped to fill wetlands and provided good early spring moisture. However, May remained cold with eleven freezing nights that stopped most of the spring grass growth. June was very dry with only 1.44 inches of rain (average is 3.55). Our main cool season grasses, the needlegrasses, produced very few seed heads, due, in part, to the lack of June rains. July through September was not much better for rain, 1.41 inches below normal (average for the three months is 6.24 inches). The 1983-84 winter began on 21 November when all wetlands and lakes became frozen. December started mild but ended with record breaking cold temperatures - average high was 5.58°F, while the average low was -11.16°F (one night was -40°F with a wind chill factor of -95°F).

Table 1. 1983 Weather Records & 45 Year Average Precipitation

<u>Mo.</u>	<u>Temperatures*</u>				<u>Precipitation</u>		
	<u>Max.</u>	<u>Ave Max.</u>	<u>Min.</u>	<u>Ave Min.</u>	<u>Rain</u>	<u>Melt</u>	<u>45 Yr Ave</u>
Jan	44	27.26	-26	5.77		0.75*	0.43
Feb	46	28.64	-19	15.93		0.18*	0.52
Mar	50	31.23	-11	15.33		1.8*	0.58
Apr	70	46.48	13	25.48		0.19*	1.32
May	86	61.71	22	35.61	0.38	0.92	2.04
Jun	95	74.83	37	49.77	1.44		3.55
Jul	97	83.23	45	56.55	2.42		2.29
Aug	104	88.10	45	55.94	1.37		2.05
Sep	96	65.97	21	41.27	1.04		1.90
Oct	75	56.53	18	31.29	0.82		0.91
Nov	73	37.87	3	22.53	0.27*	0.20*	0.51
Dec	25	5.58	-40	-11.16		0.41*	0.50
Sub Totals					7.74	4.45	
Totals					12.19		16.60

* Records from the Des Lacs NWR weather station

D. PLANNING

2. Management Plan

The Lostwood Wilderness Plan was submitted to the Denver Regional Office in December.

5. Research and Investigations

Project 924 (was 905): Effects of Land Management. Practices on upland habitats and wildlife populations in the glaciated prairie region.

Work Unit 924.02
(was 905.08) "The effects of rest-rotation grazing and prescribed burning on the mixed grass prairie community and wildlife production in the glaciated prairie region".

Details of the study were explained in the 1981 narrative. Updates of current information on the eight-year study are not available.

Project 901: Factors influencing productivity of upland nesting ducks in the glaciated prairie region.

Amendment to work unit 901.2: Spatial relationships between coyotes and red foxes on the northern plains. Details of the study were explained in the 1981 narrative. Scats were identified but were not analyzed and tabulated. 1983 canid den site locations were not available. The completion of the study will occur in 1984.

Robert Murphy, a 1983 summer biologist, organized and began (on his own time) a project entitled: Aspects of the Nesting Ecology of Raptors and Corvids on Lostwood National Wildlife Refuge, Northwest North Dakota. His 1983 findings are summarized below. Raptor nest locations are shown on Map 1. Photos 3, 4 and 5 show techniques and an unusual finding.

Summary and Conclusions:

Low raptor productivity and the absence or near absence of several raptorial species that usually nest were associated with an apparent lack of microtine prey at Lostwood NWR in 1983. Although it was not determined whether great horned owls attempted to nest, no young were found during nest searching. Red-tailed hawks nested successfully, probably because of their ability to use waterfowl as prey. Certainly, in terms of biomass, ducks were of primary importance in red-tail diets.

The absence of nesting ferruginous hawks may have been due to the lack of ground squirrels on Lostwood NWR (unpubl. data, U.S.F.W.S.), particularly Richardson's ground squirrel (Spermophilus richardsonii) which is the most important prey item for ferruginous hawks in North Dakota (Gilmer and Stewart 1983) and in northern South Dakota (Lokemoen and Duebbert 1976). The low productivity of Swainson's hawks on Lostwood NWR probably also was linked to low ground squirrel availability as well as sparse Microtus numbers. Swainson's hawks seemed to be more productive in agricultural areas where Richardson's and thirteen lined (Spermophilus tridecemlineatus) ground squirrels were more abundant. Perhaps ground squirrels will become more available on Lostwood NWR, and ferruginous and Swainson's hawks more abundant, as prescribed burning continues.

A paucity of Microtus also was suggested by an absence of nesting short-eared and long-eared owls. Harriers seemed moderately successful in producing young, perhaps because they are not entirely limited to voles for food (Hammerstrom 1979).

I expect that use of ducks by red-tailed hawks will decrease as an anticipated increase in "buffer" prey, particularly Microtus, occurs. It also will be interesting to monitor reoccupancy of red-tail territories, and intra and inter-specific territorial spacing, if nesting horned owls, ferruginous hawks, and Swainson's hawks increase on Lostwood NWR.



All known stick nests on Lostwood NWR were searched to determine what species of raptors and Corvids were establishing territories or making nesting attempts.

KAS

Photo #3

July 1983

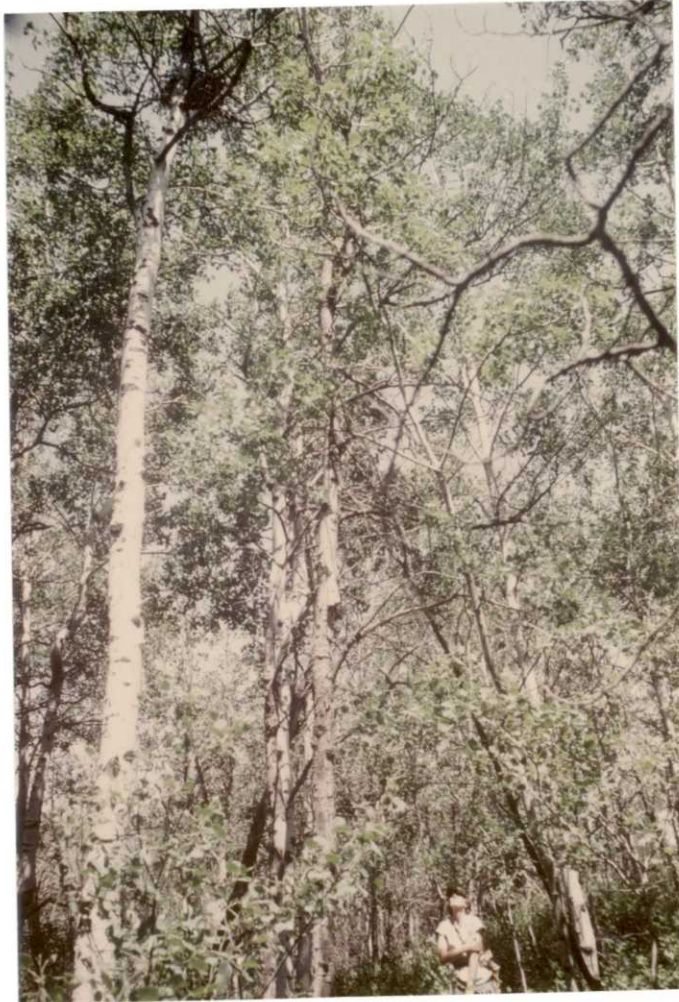


Photo #4

While checking for stick nesting raptors
and Corvids, we found a mallard nest
26' 11" from the ground in a stick nest.
KAS July 1983

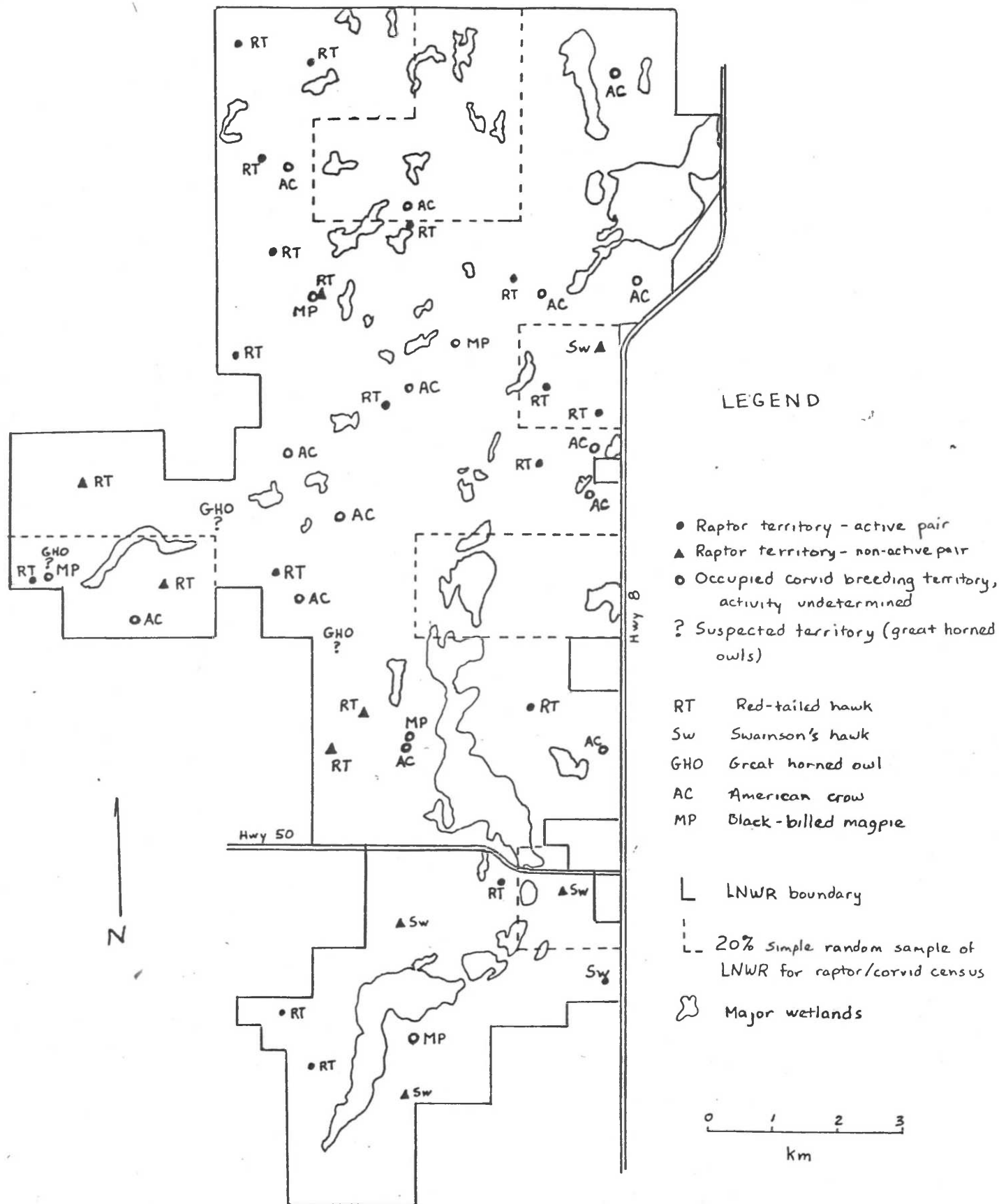


Photo #5

The mallard hen hatched her clutch of eggs but how the ducklings made the "downfall" is unknown.

RKM

July 1983



Map 1. Breeding territories of stick-nesting raptors and corvids on Lostwood National Wildlife Refuge (LNWR), northwest North Dakota, 1983.

E. ADMINISTRATION

1. Personnel (Des Lacs Complex)

The Complex office processed a wide range of personal actions this year. Each of the field stations underwent at least one change. Major actions by months are summarized below.

January:

Marilyn Goad was appointed as Biological Technician GS-5 at Lostwood Refuge on a permanent part time appointment. However, she resigned four days after her entry date. Del Pierce was reassigned from the J. N. "Ding" Darling Refuge to the Complex Project Leader position.

February:

Maintenance men WG-8 Lowell Vaage and Johnny Stewart at the Lostwood Refuge were given permanent full time appointments. They had each spent many years on career-seasonal appointments.

April:

June Bergquist left her GS-7 Biologist position with the Corps of Engineers in Chicago and was hired as a Biological Technician, GS-5, at the Crosby WMD. Robert Murphy was appointed as a temporary Biological Technician GS-5 with one half of his time paid by NPWRC and one half paid by the Refuge. His work with both agencies was at the Lostwood Refuge.

Dave Gins was selected from a Civil Service Register to fill the Heavy Equipment Mechanic Helper WG-5 position at the Des Lacs Refuge. This is a PPT-36 hours per week appointment.

Frank Kartch transferred to the Complex as a GS-7 Wildlife Biologist from the Spearfish Fish Hatchery where he was an Outdoor Recreation Planner, GS-7. He was assigned to the Lostwood Refuge.

Scott Busching was reinstated as Biological Technician GS-6 at the Crosby WMD. This was a permanent full time appointment. Scott had resigned from this position in 1982 when it was career seasonal.

June:

June Bergquist resigned her temporary position at Crosby to accept a permanent position as clerk at the Crescent Lake Refuge.

July:

Joan Peterson resigned from the permanent part time (20 hours) Clerk-Typist position. Robert Murphy was reappointed from his "50-50" position to full time temporary at Lostwood Refuge.

October: Biologist Frank Kartch was assigned as manager of the Lostwood WMD and his office was moved from the Lostwood Refuge to the Des Lacs Refuge. His position description was changed but still awaits R. O. approval.

Doris Huwe, who had recently resigned from the NPS in Washington State, accepted the GS-3 Clerk-Typist position on a part time appointment (24 hours).

November:

Rollie Krieger, Assistant Project Leader, submitted his resignation papers effective January 1984. He was on leave status after 16 December. Rollie had been with the FWS for 16 years.

Chesley Dinkins retired from his Biological Technician position at the Lake Ilo Refuge. He had held this position for 39 years. Prior to this, he had been Laborer Patrolman for four years and had worked on CCC and WPA projects at Lake Ilo several years prior to this.

The five year comparison chart below shows a substantial increase in permanent full time personnel for the Complex between 1982 and 1983. However, three of the four position increases came as a result of converting career seasonal positions to full time. Although this was a very welcome improvement, the conversion did not increase refuge staff hours significantly. We did gain a new position with the addition of the Biologist position at Lostwood.

See Table 2, next page (Staffing Des Lacs Complex).

Larry Kittilson was selected for a position of Biological Aid GS 401-4/1 at the Des Lacs NWR duty station, Dunn Center, North Dakota, Lake Ilo Refuge at a salary of \$5.12 per hour (\$10,645 PA). Larry started work on 3 May 1983 and worked until September. Larry worked in 1982 under the YCC program.

5. Funding

Funding and budgeting are for the Des Lacs Complex. Field stations do not have individual allocations.

Funding levels for 1983 were adequate for basic operations and maintenance. We were fortunate not to have any unforeseen large expenses and only had to pay for one employee transfer. Since the Biologist position at Lostwood came to us as a result of a RIF action, another agency paid for associated moving expenses.

Another reason for our adequate money year was that vacant periods occurred for several positions. One position was not filled until January, three were not filled until April, and one was void from July to October. These vacant periods resulted in about two person years salaries and wages "saved".

We are cautiously optimistic about being allocated enough funding for basic operations and maintenance plus enough ARMM's to make some headway towards improving facilities and resources. However, if we are to obtain "better biology" or more intensified management and if we are to respond appropriately to pressures from the fossil fuel industry, we will need increasing amounts of funding and staffing.

Table 2. Staffing-Des Lacs Complex

Yr.	Des Lacs Refuge			Lostwood Refuge			Lostwood WMD			Crosby WMD			Lake Ilo Refuge			H.Q. Staff			Complex Total		
	Perm.		Temp.	Perm.		Temp.	Perm.		Temp.	Perm.		Temp.	Perm.		Temp.	Perm.		Temp.	Perm.		Temp.
	F.T.	P.T.		F.T.	P.T.		F.T.	P.T.		F.T.	P.T.		F.T.	P.T.		F.T.	P.T.		F.T.	P.T.	
83	2	1	1	2	0	1	2	0	0	2	0	1	1	0	1	3	1	0	12	2	4
82	2	1	1	1	2	0	-	-	-	1	1	1	1	0	0	3	1	0	8	5	2
81	2	1	4	1	2	1	-	-	-	1	1	1	1	1	0	3	1	0	8	6	6
80	2	1	1	1	2	1	-	-	-	1	1	1	1	0	2	3	1	0	8	5	6
79	2	1	1	1	2	1	-	-	-	2	0	1	1	0	1	3	1	0	9	4	4

Operational Funding for the Des Lacs Project

<u>FY</u>	<u>O & M Funding</u>	<u>6860</u>
1984	528.0*	10.0
1983	355.5	9.5
1982	315.0	9.0
1981	310.8	6.0
1980	294.0	4.0

*Includes \$64,000 ARMM's funds

6. Safety

No lost time accidents occurred on the Des Lacs Complex in 1983 and no injuries occurred that required medical attention.

In spite of snowstorms, ice storms and wind chill factors of down to -100° , no weather-related vehicle accidents or cases of frost bite were recorded by Complex personnel.

Signs indicating maximum load capacities were installed at storage lofts at the Lostwood and Des Lacs shops and at one of the equipment sheds at Des Lacs.

Four tractors equipped with station installed rollover protection structures (ROPS) were sidelined pending installation of OSHA approved ROPS.

A memorandum "General Procedures for Reporting and Initiating action on Oil Industry Pollution Incidents" was sent to all field stations. Of particular concern to us, from a safety standpoint, is the danger of hydrogen sulfide leaks.

All fire extinguishers were checked and, if necessary, recharged.

Pierce, Krieger and Gins attended a Red Cross Multi-Media First Aid Course in Minot.

Eight refuge employees, three refuge employee dependents and two YCC enrollees attended a Defensive Driver's Course given by GSA in Kenmare.

7. Technical Assistance

Several inquiries about our burning program were received from private, state, federal and Canadian organizations or agencies.

- a. The manager at the Nature Conservancy's Cross Ranch contacted Lostwood regarding the burning program.
- b. A wildlife manager from a private organization that is purchasing waterfowl habitat in North Dakota contacted Lostwood regarding the burning program. The manager was given a tour on 9 May 1983.
- c. A presentation on the prescribed burning program was given at the North Dakota Chapter of the Wildlife Society on 10 February 1983 and again in the evening to personnel from North Dakota Game and Fish Department who missed the presentation during the day.
- d. A slide program was given to a Soil Conservation Service District meeting (included several northwestern North Dakota counties) on 22 June 1983 regarding the burning program, and leafy spurge control program (burning and herbicides).
- e. Mountrail County Soil Conservation Service supervisor, Richard Maliski, requested and received a tour of the refuge burning program on 25 August 1983.

- f. The University of Wisconsin has requested a brief summary of our burning program to be included in their "Restoration and Management Notes" publication.
- g. The University of North Dakota requested a program to be presented to wildlife graduate students on the burning program similar to what was presented at the North Dakota Chapter of the Wildlife Society. This was denied due to travel restrictions.
- h. A request came in December 1983 to give a presentation about the burning program at a Prairie Conference to be held in Fargo, North Dakota in 1984. No decision has been made.
- i. Roosevelt National Park personnel requested a tour of the burning projects. This was given on 27 July 1983.
- j. The Canadian Wildlife Service, Prairie Migratory Bird Research Centre, Western and Northern Region contacted Lostwood about a tour of the burning program in December 1983. December weather was not conducive to such a tour so it was postponed until March 1984.
- k. Two Corps of Engineer groups requested (one in February and one in December) information on how burning and spraying combined was used to reduce or eradicate leafy spurge (Euphorbia esula).

8. Other Items

Mineral rights are owned by the State of North Dakota on Section 16, T159N R91W (which is on the refuge). Details were presented in the 1982 narrative. In 1983, most of the remaining portions of Section 16, not under NPWRC's research project, were searched for nests. This will be done during the next two years to obtain base data in case oil development should take place. (Page 35 has details on the 1983 data).

F. HABITAT MANAGEMENT

Refuge objectives established in the March 1971 Master Plan for wildlife and wildlands are:

Wildlife Objectives:

- Provide for maximum natural production to ducks and Canada geese within biological and economic limitations.
- Provide protection and conditions that will perpetuate all native animal species on the refuge.
- Demonstrate management practices that people can use to enhance wildlife values on private lands.
- Reintroduce select species of native wildlife.

Wildland Objectives:

- Recreate and preserve native prairie conditions consistent with total refuge management needs.
- Consideration of a portion of the refuge for inclusion in the National Wilderness preservation System.

A synopsis of Lostwood's objectives is simply put as the management of a prairie ecosystem for native flora and fauna. The native wetlands are managed by annual fluctuation of precipitation, air temperature and wind. The native and tame upland habitats are managed by refuge personnel and climatic factors. Grassland needs periodic disturbance in order for the flora to maintain its vigor and density. Without disturbance, the native flora becomes litter choked, killing itself due to lack of sunshine, competition from more shade-tolerant species, such as Kentucky bluegrass (*Poa pratensis*), and other factors. Another problem that is reducing native grasses and forbs is expansion of native woody species. Management techniques used to prevent grassland degradation are prescribed burning, grazing, and mowing/grazing. Some old cropland, predominantly occupied by exotic species, is being reclaimed by reseeding it to native plants.

1. General

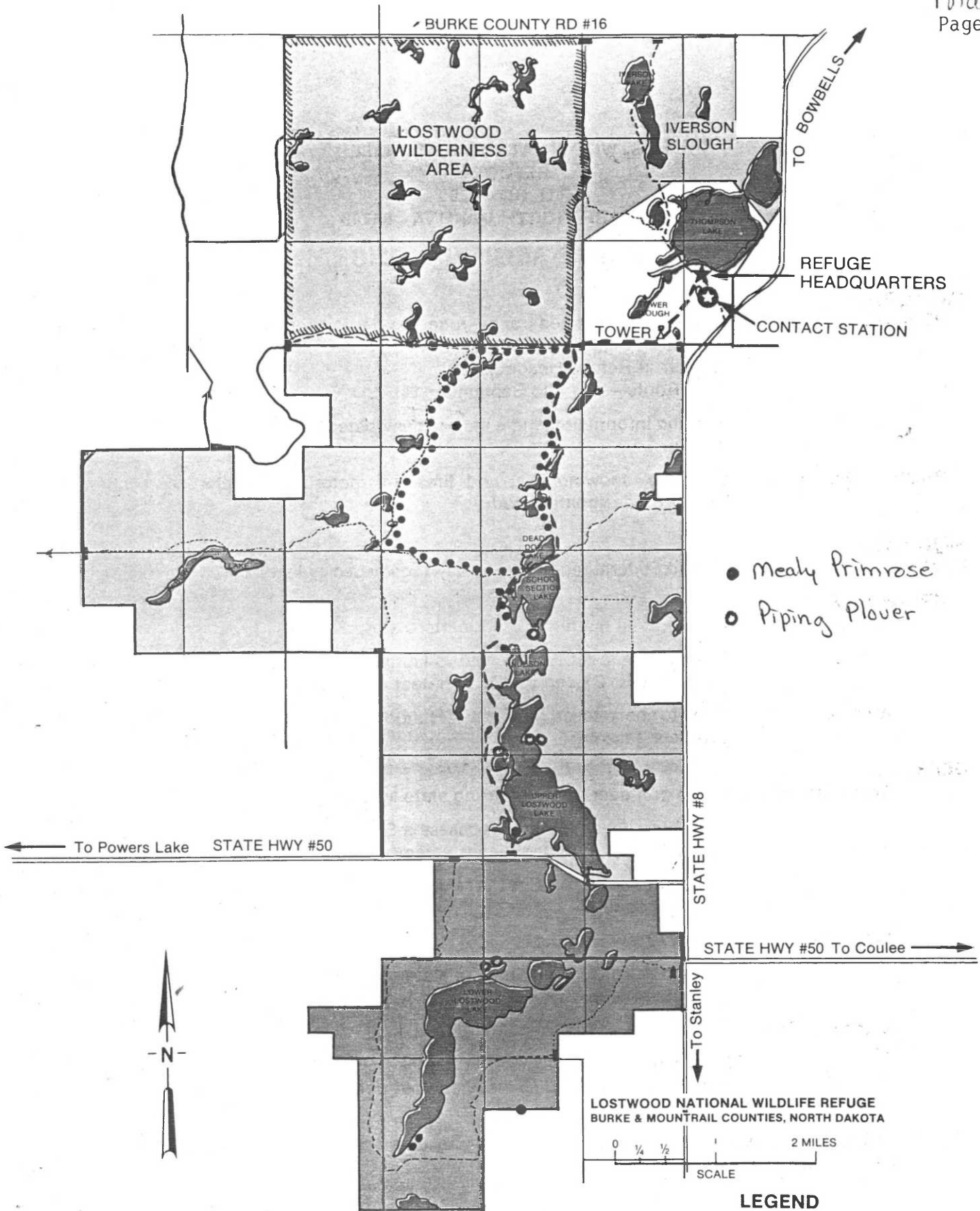
Mealy primrose (*Primula incana*), a rare plant in North Dakota, was re-discovered on Lostwood at five locations. Map 2 shows the locations, and photo 6 shows the plant.



Photo #6

Mealy primrose is a rare perennial, 4 to 12 inches tall that grows along saline meadows, open moist slopes and slough margins.

KAS. June 1983



● Mealy Primrose
○ Piping Plover

LEGEND

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2. Wetlands

Spring runoff partially filled most type I and III wetlands with some overflow into type IV wetlands. On burn areas, more wetlands were filled from runoff than on idle areas. Wetland water levels decreased during the dry June. The cold April and May may have prevented good invertebrate production which may have adversely affected early hatches of mallard, pintails and canvasbacks. Brood waters were reduced to only the large type IV and V wetlands by late July and August due to the lack of precipitation. When freeze up occurred on 21 November, type I wetlands were dry, most type III wetlands were with minimal water depths, some type IV wetlands were dry and type V wetlands were below fall levels.

Prairie wetlands need to experience the wet to dry cycles either seasonally and/or over several years to maintain their high fertility for high production of waterfowl and other water-dependent wildlife. In high water years, wetlands on the entire refuge produce 45,000 ducks or more, while in drier years less than half of that are produced. It may appear that the dry years are bad for ducks, but, in reality, it helps to make the high water years that much more productive. In dry years, shallow wetlands dry up, exposing the wetland bottom to the air. This permits the wetland bottom to interact with large quantities of oxygen that decomposes dead plant and animal material. When it refills, the oxygen-rich water produces excellent conditions for aquatic insects, the main protein source for laying hens and growing ducklings. Without the dry cycle, the dead plant material in the wetland would take the oxygen it needed for decomposition from the water, depleting the water of oxygen and killing the aquatic insects. These conditions also create circumstances prime for duck disease outbreaks.

4. Croplands

Refuge cropland that is predominantly exotic grasses will be seeded to native grasses and, possibly, native forbs. Two fields in 1983 were seeded to natives, one 33 acre field and one 67 acres (this field is in 70 foot contour strips). The seedbed was in 4-10 inch stubble with excessive amounts of straw that had to be removed before it could be seeded. Seeding began on 11 May, a little late for the best catch, and was held back by the 12 May snowstorm. The following mixture was planted on the 33 acres:

Prairie sand reed goshen (Calamovilfa longifolia), green needlegrass (Stipa viridula), switchgrass (Panicum virgatum), western wheatgrass-rosana (Agropyron smithii), slender wheatgrass (Agropyron caninum), and big bluestem, North Dakota variety, (Andropogon gerardii).

The strip contours were seeded according to their topographical locations.

High or dry sites were seeded to:

Prairie sand reed goshen, green needlegrass, slender wheatgrass, western wheatgrass-rosana, and sideoats grama-Pierre (Bouteloua

curtipendula).

Moderate sites were seeded to:

Little bluestem-camper (Andropogon scoparius), prairie sand reed goshen, western wheatgrass-rosana, slender wheatgrass, green needlegrass, and big bluestem, North Dakota variety.

Low or wet sites were seeded to:

Switchgrass, North Dakota variety, big bluestem, North Dakota variety, green needlegrass, and western wheatgrass-rosana.

Two major seeding problems occurred: 1) the quantity and growth of annuals that shaded and took the needed moisture from the seedlings; 2) exotic grass expansion (predominantly quackgrass, Agropyron repens), and brome grass (Bromus inermis) that out competed the seedlings (no chemicals were applied to kill exotic grasses). In hopes of overcoming the first problem, 2,4-D was applied twice on the fields. The first application would have been the most effective, but old 2,4-D was used (it had begun to crystallize) and, once applied, acted more as a fertilizer than as a killer to the annuals. A second application with active 2,4-D was applied but seedling loss had already occurred. The second problem, exotic grass expansion, cannot be resolved except to start over.

The land treatment used for preparing the seedbed for the 1983 native seeding was: first year break out and cultivate; second year, cultivate; third year, seed to a cover crop; fourth year, seed to natives. No chemicals were applied except the year the natives were seeded. A better sequence of land treatment in preparing the seedbed may be (the erodible soils must be considered in any plan):

<u>Year</u>	<u>Management</u>
1st	Break and cultivate the sod with the last cultivation occurring just before freeze up.
2nd	Cultivate four to six times.
3rd	Plant a cover crop of oats, barley or spring wheat (to cultivate a third year would likely increase soil erosion significantly because the sod would have been predominantly decomposed), leaving a 4-10 inch stubble with the straw removed.
4th	Chemical fallow by applying glyphosate when exotic grasses are in the two to three leaf stage. Apply glyphosate in the fall to kill plants germinating in the summer and early fall. (Without chemical fallow, an over abundance of exotic grass growth will likely adversely affect the native grass seedlings).
5th	Seed natives into the year old stubble as early in the spring as equipment can get into the fields.

Native grass seed was purchased in 1980 for the 1983 plantings because money was available in 1980. A seed storage facility (SCS design) was built for storing the seed (photo #7). Native seed may improve in

germination while in storage (under controlled conditions) over a few years (SCS findings). The seed dealers germination figures were used as a comparison for germination tests completed in the spring of 1983. Table 3 presents the findings. Three species remained basically the same, two increased 20%, one decreased 10%, and one bottomed out to, basically, nothing (exotic species do not store well and slender wheatgrass that was purchased was an exotic). If monies are available one year to purchase native seed and may not be available during the seeding year, we will likely purchase seed and store it for up to three years.

Table 3. Germination of Native Seed After Three Years of Storage

Species	1980		1983	
	Germ.	Purity	Germ.	Purity
Prairie Sand reed	84	83	80	81
Slender Wheatgrass	92	96	4	97
Little Bluestem	52	96	70	92
Sideoats Grama	69	99	59	99
Thickspike Wheatgrass	99	83	96	96
Green Needlegrass	33	97	58	99
Western Wheatgrass	90	99	92	97



Photo #7
The seed storage facility constructed for native grass seed. The interior has three inches of foam insulation.
KAS Feb 1983

5. Grassland

A prescribed burning program and limited rotation grazing is being used to meet wildlife and wildland objectives. The wildland objective that requires recreating and preserving native prairie conditions stated that it ". . . will require controlled burning to retard the growth of tame grasses and woody plants". Fire, in the history of grassland, was an extremely important component to maintain healthy native grasses and forbs with its associated fauna. Fire was virtually eliminated from this grassland with the advance of homesteads in the early 1900's. Since that time, brush species, especially western snowberry, have expanded extensively over the refuge, shading out native grasses and forbs. Introduced grasses, such as quackgrass (Agropyron repens), smooth brome, crested wheatgrass (Agropyron cristatum) and Kentucky bluegrass (Poa pratensis) have invaded into native grassland. Fire has been returned to this area to reduce the frequency of snowberry, discourage introduced grasses, and encourage native grasses and forbs.

After an area that has excessive amounts of introduced grasses has been prescribe burned, early spring grazing with cattle has been used. Introduced grasses typically germinate earlier in the spring than do native cool season grasses. Cattle graze on these species until the natives begin to grow (typically late May to early June) and gradually switch to the natives. Cattle are removed as they begin to graze on the natives. The management goal is to create conditions that permit the natives to easily compete with the earlier germinating introduced grasses.

A prescribed burning program, referred to as renovation prescribed burning, has been used on Lostwood since 1978. In general, each area receiving the renovation will be prescribe burned every other year either in mid June or late July to early August for three burns. The timing of the burn is critical and has been shown to be the most important factor in harming snowberry. Once renovation has been completed, and the native vegetation is spreading into the brush stands and introduced species are slowly reducing, maintenance prescribed burning plus maybe spring or fall grazing to discourage introduced grasses on a ten to twenty year cycle may be needed to prevent Lostwood from returning to its present condition.

Details on the effects of renovation prescribe burning and cattle grazing on vegetation and wildlife is being evaluated in Research Project 905 that began in 1980 (consult the 1981 Lostwood narrative for details). Effects of maintenance prescribed burning and cattle grazing to vegetation and wildlife is also being evaluated in this research project, but the research fields are located in central North Dakota. Results from this study will be used to develop a plan for the entire refuge in order to meet the wildlife and wildland objections.

7. Grazing

Six research fields (Project 924) were grazed in 1983. Three of these fields were grazed from 1 May to 15 June in 1982 and 1983. Their last spring grazing treatment will be in 1984 with grazing pressure at 1.0 acre/AUM. The other three fields were burned in July and August of 1982 and grazed from 1 May to 15 June 1983 at 1.0 acre/AUM. (Early spring grazing is used to reduce exotic grass competition to native cool season grasses). May was extremely cold (Climatic Conditions, page 2), and, as a result, the grass grew very little. Cattle on the burn fields had little green grass to feed on and there was no residual growth on two of the three fields. Two permittees fed hay to their cattle, especially through the snowstorm, however the cattle did poorly. Fortunately, the conception rate was very close to normal (Table 4); unfortunately, calf gains were 50 to 100 pounds less on these two fields than calves off the burn areas. The permittees lost money. To partially compensate their losses, they were charged only two of the six weeks grazed. (We do not want to lose this management tool). The manager spent time with each permittee to obtain his idea for improving the burning-grazing program. The major idea received was to reduce the grazing pressure. The third field burned in 1982 had more areas unburned which left litter for the cattle to graze on in 1983. This permittee was very pleased with his calf gains, averaging 586 pounds in the fall (calves born in April-May). He did not know about the conception rates. He was very pleased with how his cattle did on the area.

Table 4. Gerald Roise's Cattles' Conception Rates
(Determined from Veterinary Tests)

Calving Month(84)	Refuge Herd*			Off Refuge Herd**		
	# of Cows	# of Heifers	Sub- Total	# of Cows	# of 1st Calf Heif.	Sub- Total
Feb	3	0	3	5	1	6
Mar	24	26	50	25	7	32
Apr	20	13	33	25	12	37
May	0	0	0	10	2	12
Jun	0	1	1	1	1	2
Open	3	0	3	1	1	2
Total	50	40	90	67	24	91

*The herd he put on the refuge consisted of average animals.

**This herd consisted of 22 adult prime cows (6 year average age), 20 first calvers, 20 cull cows and 13 late cows. He also tried to AI 35 females in this herd.

9. Fire Management

The Fire Management Plan and Wildfire Management Plan were completed and submitted to Denver Regional Office for approval.

The goals of the refuge burning program are to reduce western snowberry (Symphoricarpus occidentalis) and increase native grasses and forbs and to acquire experience and knowledge on how to conduct safe and successful burns. This knowledge will be used for the eventual prescribed burning of the Lostwood wilderness and for the future burning program on portions of all of the refuge. A comprehensive prescribed burning program for the refuge will be developed when enough data becomes available (research project 924).

The refuge has been involved in a renovation prescribed burning program since 1978. This program is designed so that each area will be burned at least three times. Photo points and a limited number of Robel and Daubenmire transects have been established to monitor the effects.

There were five prescribed burns planned and completed in 1983 totaling 1900 acres. Four of the five received burns in previous years as part of the renovation burning program. Four of the five burns were mapped to locate burn and non-burn areas for future comparisons. All burns have photo points that are photographed spring and fall.

On 21 April, the 59 acre Pasture Burn area received its first burn. This small area is being burned early in the spring so that we may determine if three continuous burns will reduce western snowberry.

On 16 June, the 136 acre Headquarter Burn area received its third renovation burn. The Robel height and density readings are shown in Table 5.

On 28 July, the 1220 acre Teal Slough Burn area received its second renovation burn. The Robel height and density readings are shown in Table 5. An avian census was completed from 1979 to 1983. General information from this census is presented in Table 6 (detail information is available at refuge headquarters).

On 8 August, the 220 acre North Dead Dog Slough Burn area received its third burn. The Robel height and density readings are shown in Table 5. An avian census was completed from 1979 to 1983. General information from this census is presented in Table 6 (detail information is available at refuge headquarters).

Table 5. Robel Height and Density Readings on Three 1983 Burns

	<u>Year Burned</u>	<u>Height</u>	<u>Density</u>	<u>Annual Precipitation</u>
<u>Headquarter Burn</u>				
1978				14.96
1979	X	5.12	0.51	8.72
1980		4.22	0.44	15.59
1981	X	6.53	0.60	15.34
1982		3.75	0.27	19.56
1983	X	4.60	0.82	12.19
<u>Teal Slough Burn</u>				
1979				8.72
1980		5.26	2.03	15.59
1981	X	-	-	15.34
1982		3.82	0.25	19.56
1983	X	5.40	1.00	12.19
<u>North Dead Dog Slough Burn</u>				
1978				14.96
1979	X	6.02	1.11	8.72
1980		-	-	15.59
1981		-	-	15.34
1982	X*	4.72	0.57	19.56
1983	X	4.82	1.00	12.19

*Less than a quarter of the area burned.
All readings are completed before burning.

Table 6. Avian Census Results on Two Burn Areas

	<u>Year Burned</u>	<u>True Grassland Species</u>			
		<u># of Spp.</u>	<u># of Indi-viduals</u>	<u>Total # of Species</u>	<u>Total # of Individuals</u>
<u>Teal Slough Burn</u>					
1979		7	25	24	180
1980		7	37	23	179
1981*	X	6	26	31	292
1982		7	39	37	202
1983**	X	7	30	35	203
<u>North Dead Dog Slough Burn</u>					
1979	X	4	45	23	176
1980		7	27	22	158
1981		10	50	30	211
1982	X	-	-	-	-
1983	X	7	25	26	128



Photo #8

The first initiated burn on Lostwood NWR to specifically reduce western snowberry was the Iverson Slough Burn. One photo point on this burn is shown here. Note the 2 patches of brush among the heavy stands of western snowberry, this is a reference point in the next two photos. Note the dense stand of snowberry that completely surrounds the two patches of brush.

KAS

8 June 1978



Photo #9

Note the two brush patches that are now black stems sticking out of the vegetation, the same two patches of brush as identified in photo #8. This photo, taken in September 1981 shows the photo point after receiving two June burns, one in 1978 and the other in 1980. Note the grass and forb expansion and snowberry reduction. KAS Sept 1981



Photo #10

Note the same two patches of brush. This area has now received 3 June burns, one in 1978, one in 1980 and the last in 1982. This 23 September 1983 photo shows the grasses becoming more dominant. Some warm season natives such as big bluestem are beginning to show up. This is the mosaic of prairie habitat we are seeking instead of the solid stand of snowberry as shown in photo #8.

KAS

23 Sept 1983



Photo #11

Another photo point on Iverson Slough Burn taken at the time of its first June burn in 1978. The entire peninsula was predominantly western snowberry. KAS 6 June 1978



Photo #12

The same photo point as in photo #11. This area was burned in June 1978 and 1980. This September 1981 photo shows the grass and forb expansion and snowberry reduction.

KAS

Sept 1981



Photo #13

The same photo point as in photo #11. This area has now received 3 June burns, 1978, 1980, 1982. This 23 September 1983 photo shows a mosaic pattern of grasses (native warm seasons are beginning to show up), forbs and snowberry that is being sought as a management goal.

KAS

23 Sept 1983

*Census conducted before the burn
 **Census conducted after the burn

Observers: Gammells (Ann and Robert) completed the census from 1979 to 1981; Broerman in 1982; and Gammel (Robert), Murphy and Smith in 1983.

On 10 August, the 245 acre Iverson Lake Burn area received its third burn.

One burn area, Iverson Slough Burn (12 acres), has received one complete renovation burn cycle; three burns and three complete growing seasons. Photos 8 through 13 show visual changes. Table 7 presents grass brush changes on a vegetation transect. One more year of data is needed to complete the information from the plots.

Table 7. Results From 16 Brush Plots on Iverson Slough Burn

<u>Year</u>	<u>Max Height</u>	<u>% Canopy</u>	<u># of Green Stems</u>
1978*	26.88	47.19	11.06
1979	UNK	27.19	15.56
1980*	18.72	28.75	13.36
1981	12.13	23.13	19.00
1982*	12.63	27.88	14.50
1983	11.25	24.38	18.00

(no average height of brush was taken)

* Year burned

All readings completed before the burn

10. Pest Control

Two maintenance personnel, John Stewart and Lowell Vaage, were asked to summarize their opinions on the leafy spurge (Euphorbia esula) control program. They provided a summary from 1961 to 1983. This is their report.

"In our opinion of spraying over the years at Lostwood Refuge and WPA's, the once a year spraying is ineffective. Once a year spraying was done from 1961 to 1976 (with Tordon), then we began spraying spring and fall with Tordon. We are getting a much better kill percentage now.

Some spots were killed in one year; we are still fighting other spots. We think the percentage of kill depends upon when we find the spots and also how many years it has been growing. We know of five or six first year spots that were killed with one year of spraying. We believe the success has to do with insufficient development of a root system in the first year spots.

Also, we think degree of control depends on the development of the plant at the time of spraying. If the spot is uniform in plant development (which seems to be the case with new first year spots) it seems

our chances of killing it with spring and fall applications of Tordon the first year is about 95%. If the spot has been growing for two or three years before we find it, the percentage rate drops way down.

Since we have started our prescribed burning on the refuge and WPA's where spurge occurs, it seems we are getting a better percentage of kill in a shorter amount of time. In one example, we found a small spot in June and sprayed it with Tordon. That same year, it was burned. That fall, when we sprayed it again, there were no plants flowering but there were numerous small plants two to six inches high. The burning seemed to set off all the seedlings at once. We checked it this spring (1983) and found no plants. We are just getting into this method of burning spots of spurge so it might be too early to form an opinion".

This is the fifth year that approximately 15 acres of leafy spurge has been sprayed in June and September, mostly with Tordon 22K. The spurge spots are definitely smaller and have fewer plants with some spots having no spurge plants in 1983.

Spray masks and disposable spray coveralls are worn by personnel who are involved in the leafy spurge program.

12. Wilderness and Special Areas

The Lostwood Wilderness Plan was submitted to Denver Regional Office.

The Clean Air Act Amendments of 1977 (P.L. 95-95; 7 August 1977, Part C; Subpart I; Section 162) and the North Dakota Air Pollution Control Regulations (Title 33, Article 15, Prevention of Significant Deterioration of Air Quality, 15-02, (c), (02) designated Lostwood Wilderness Area as a Class I air quality area and is ". . . not (to) be redesignated". Class I air quality, although not clearly defined in the Acts, has the following 1977 designated air quality standards for pollutants: particulate matter-annual geometric mean 5 ug/m³, and 24-hour maximum 10 ug/m³; and sulfur dioxide - annual arithmetic mean 2 ug/m³, 24-hour maximum 5 ug/m³, and 3-hour maximum 25 ug/m³. In the same Part C, subpart I of the 1977 Amendment, it explains who is responsible for the air quality over the wilderness. It states in Section 165 (paragraph (d), (2), (B) that "The Federal Land Manager and the Federal official charged with direct responsibility for management of such lands shall have an affirmative responsibility to protect the air quality related value (including visibility) of any such lands within a Class I area ." It is the Secretary of the Interior's responsibility to protect the Class I air quality over the Lostwood Wilderness. Also, in paragraph (d), it states that the Federal Land Manager, Administrator, or Governor of any adjacent state may file a notice alleging that emissions from a proposed facility" . . . may cause or contribute to a change in the air quality in such area and identifying the potential adverse impact of such change, a permit shall not be issued . . ." It is the Secretary of the Interior's responsibility to prohibit deterioration of Class I air quality by identifying a change in air quality and the potential adverse impacts. It is increasingly important for the Lostwood Wilder-

ness to have a continuous monitoring system to evaluate "changes" in the air quality.

The National Park Service (FWS representative for Class I air quality areas) commissioned the North Dakota State Department of Health to inventory sources of SO_2 emissions for oil and natural gas development in a 50 kilometer area around the Lostwood Wilderness area from 1 January 1982 to 31 December 1982. The inventory information is found in "Final Report, Sulfur Dioxide Emissions Inventory for Sources Near the Lostwood Wilderness Area", August 1983, prepared by North Dakota State Department of Health, Division of Environmental Engineering. Two sources of SO_2 were inventoried: two natural gas processing plants located in the vicinity of Lostwood Refuge; and 280 individual well sites. The ". . . two (2) major point sources of air pollution located within 50 km . . . are natural gas processing facilities which process much of the field gas from the area. The gas processing plants emit sulfur dioxide; however, their emission rates are regulated and monitored by the Department", (page 2 of Final Report). The oil and gas production at individual well sites ". . . are also responsible for sulfur dioxide (SO_2) and hydrogen sulfide (H_2S) emissions. A number of new and existing oil wells vent or flare gases which often release H_2S or SO_2 directly to the atmosphere. Information on the emissions from well sites is limited. The type and amount of the emissions depend upon many factors including the quality of gas produced and the composition of such gas", (page 2 of the Final Report). In 1982, there were a total of 978 well sites in the study area. These were screened for negligible SO_2 emissions that reduced the quantity to 758 wells. This was further reduced with updated information regarding such factors as low gas quantity and/or low H_2S that eliminated 478 wells, leaving 280 wells that were calculated for annual SO_2 emissions. The North Dakota State Health Department's inventory report, that was under various constraints, provided very valuable information. Unfortunately, there are other sources of SO_2 emissions that could not be included. These included the remaining 698 wells within the 50 km area; oil and gas development beyond the 50 km area (As of December 1982, there were 3,731 oil producing wells in the state, the majority of them in central and western North Dakota. Another 66 were listed as gas producers); coal development in North Dakota; coal generated power plants in Canada; and coal, oil and gas development in Montana, Wyoming and Canada.

Figures within the inventory report show that the 280 wells produced 4,500 tons, and the two point sources produced 5,941 tons of SO_2 , totaling, for 1982, 10,441 tons of SO_2 emissions. North Dakota's baseline date of 19 December 1977 had 1,426 tons of SO_2 . In just five years, there has been a 732% increase in SO_2 . The report states that nearly 40% of 4,500 tons of SO_2 were from wells in the Flaxton field. Most wells from this field are to be tied-in into Cities Service's Lignite Gas Plant upon completion of construction of their sulfur plant (page 43 of the Final Report). This was to be completed on 4 October 1983. (The recovery plant is being tested at the time of this report writing). It is estimated that the SO_2 from wells in the 50 km area will drop to 2,720 tons per year after the recovery plant is operating. This still annually leaves 7,600 tons of SO_2 from wells and point sources within

the 50 km area, 6,174 tons above the baseline established just five years ago. This figure does not take into consideration additional sources of SO₂, as previously mentioned. The figure could go higher. What effects this will have on air quality, water quality of wilderness wetlands with associated effects to invertebrates, soil chemistry with associated effects to native plants, and wildlife dependent upon these resources is all unknown.

In order for the "Federal Land Manager" to ". . . protect the air quality . . ." within Class I area, information is needed to gather baseline data and monitor effects on other aspects of air pollutants such as acid rain, nitrates, particulates, etc. This information is needed to monitor changes on site. The Monitoring System is needed in conjunction with the Emissions Inventory (both are needed according to NPS, FWS Class I air quality representative) to determine deterioration of air quality that will enable the Federal Land Manager to make accurate conclusions and sound decisions.

The costs of a monitoring system can be negotiated from the Environmental Protection Agency's grants, State of North Dakota's funding and expertise, and FWS's funding. The system can be maintained and operated under contract and the State of North Dakota has expressed their capabilities and willingness to do the analysis work in their laboratories. Total estimated costs are \$60,000 initial costs and \$5000 annual maintenance costs.

Fire was a major component of grasslands before the coming of man. E. V. Komarck, Sr. from Tall Timbers Research Station in Tallahassee, Florida, after intensive review into past lightning and other weather patterns, concluded in "The Meteorological Basis for Fire Biology" (Fifth proceedings of Tall Timbers Fire Ecology Conference, March 24-25 1966), "Thus, before the coming of man to North America, the fauna and flora constituted a FIRE MOSAIC of great diversity created and maintained by lightning-caused fires along with other climatic and physical factors in the environment". An article entitled, "The Ecology of Smoke Particulates and Charcoal Residues from Forest and Grassland Fires: A Preliminary Atlas" By E.E. Komarck, Betty B. Komarck, and Thelma C. Carlisle stated in the interpretive summary "Low intensity forest and grassland fires create airborne particulates and charcoal which act as environmental cleansing agents.

The morphological integrity of plant material which remains after burning creates a filter with varied porosity". (Miscellaneous Publication No. 3, Published by Tall Timbers Station, Tallahassee, Florida 1973).

Various other studies identify that prescribed burning smoke, a mixture of particulates, vapors and water droplets, does not compare to smoke from nonresidential urban and industrial sources that produce carbon monoxide, nitrogenoxide, sulfur dioxide, hydrocarbons and particulates (which may include unburned carbon and hydrocarbons as well as lead, mercury, asbestos, coal and quartz dust, cadmium, DDT, nitrogen, sulfuric acid and various man made compounds). An article entitled "Smoke and Prescribed Burning" by Milo E. Richmond concluded that "The pro-

ducts of prescribed fires are non-polluting. They occur in much smaller quantities than products of forest wildfires and urban fires. Their concentrations are not harmful like those of residential and other urban fires. Most of the products of prescribed fires do not remain in the atmosphere for an appreciable time because they are removed by the atmosphere's self-cleaning processes. The products of prescribed fires are basically like those products produced by living and decomposing vegetation. In fact, emissions from living and decomposing vegetation are produced in far greater quantities than emissions from prescribed fires. Other studies drawing similar conclusions are "Fire's Effect on the Atmosphere" by R. G. Vines; "Prescribed Burning and Air Pollution in the Lake States Region" by Rodney W. Sando; and others.



Photo #14

Just as the 1983 year was about to end, up sprang a "noxious weed" along the refuge boundary. The oil drilling rig had a sign erected at the entrance road to the rig. The yellow sign has three colored circles on it with definitions for each color. Green means no danger of H_2S , a deadly gas, being present; yellow means danger, a potential of H_2S gas being present; and red means danger, H_2S gas present. The yellow erected flag on top of the sign is up. BEWARE, the Refuge is endangered if quantities of H_2S , SO_2 and other pollutants associated with oil development occur around the refuge without pollution control laws and enforcement.

KAS

2 Jan 1984

The North Dakota State Health Department has an air quality monitoring station at refuge headquarters. Refuge personnel conduct the sampling procedures. All filters and graphs are evaluated at the state health laboratory.

The refuge manager attended a Wilderness Symposium from 15 to 18 November 1983 at Missoula, Montana. The symposium helped the manager understand how other agencies are managing wildernesses and provided ideas for management decisions. Topics included: 1) the historical occurrences of fire on each area (both climatic and Indian influences), 2) determination of historical vegetation composition, 3) the use of prescribed burning in wilderness areas to duplicate historical occurrence of fire and vegetation, 4) importance of wilderness planning, 5) mosaic patterns of historical fires, 6) air quality, 7) need to communicate with other agencies in wilderness planning and management in order to be as uniform as possible, 8) public information, 9) importance of research and monitoring (fire, vegetation, etc.).

G. WILDLIFE

Two of the four wildlife objectives for Lostwood Refuge in the 1971 Master Plan are: (1) provide protection and conditions that will perpetuate all native species on the refuge and (2) reintroduce select species of wildlife. The ultimate aim of the prescribed burning program is to return an abundance of native grasses and forbs with young growth of western snowberry scattered in small patches comprising 20-30% of the topography. This should create diverse habitat that will be attractive to true grassland species, native animal species and other wildlife.

According to the master plan, four species of birds considered rare with potential for re-establishment on Lostwood are northern greater prairie chicken, greater sandhill crane, trumpeter swan and western burrowing owl. The only current effort for meeting this objective is to reduce snowberry and increase native grasses and forbs. The western burrowing owl may return on its own once grassland is re-established since they naturally reproduce on scattered locations in northwestern North Dakota. The trumpeter swan reintroduction proposal was disapproved by the Denver Regional Office. The habitat at Lostwood is not ideal for this species, particularly if they do not migrate south in the winter. All other species may be reintroduced if vegetation conditions meet the species needs.

2. Endangered and/or Threatened Species

Bald and golden eagles are observed during spring and fall migrations. One to five balds are most often observed when fall migrant waterfowl populations peak. Golden eagles are observed infrequently in fall and early winter. In the spring, eagles are typically observed only at high altitudes flying north.

The sixth Midwinter Bald Eagle Survey was completed on 6 January 1983. No eagles were observed.

3. Waterfowl

The third wildlife objective in the 1972 Master Plan is "Provide for maximum natural production of ducks and Canada geese within biological and economical limitations". Since the wetlands all occur naturally and maintain fertility through wet to dry climatic cycles, the only way to "maximize" natural production is upland habitat and predator species management. Mallard, gadwall, wigeon and pintails are attracted to nesting in heavy stands of snowberry. However, heavy stands of snowberry, in quantities present, reduces significantly "Native animal species" and also does not meet wildlife objectives #2. The prescribed burning and grazing program evaluated by the research project of Northern Prairie Wildlife Research Center will guide management to reach a compromise that will obtain maximum natural production of ducks and Canada geese . . . " and "Recreate and preserve native prairie".

a. Ducks

Duck production is determined by walking eighteen quarter sections for pair counts and nine of the eighteen are counted twice for broods. Brood counts are completed with the use of at least two people and one trained dog (broods take off on upland and would not be observed without the aid of trained dogs). A summary of pairs and production from 1979 to 1983 is presented in Table 8.

Table 8. Breeding Duck Pairs and Production - 1979 to 1983

<u>Species</u>	<u>1979</u>		<u>1980</u>		<u>1981</u>		<u>1982</u>		<u>1983</u>	
	<u>Prs.</u>	<u>Pro.</u>	<u>Prs.</u>	<u>Pro.</u>	<u>Prs.</u>	<u>Pro.</u>	<u>Prs.</u>	<u>Pro.</u>	<u>Prs.</u>	<u>Pro.</u>
Mallard	2240	8780	2690	3110	2810	3387	1860	3711	1630	2883
Gadwall	1430	8586	1700	5462	2020	1923	1520	4410	900	3214
Wigeon	860	5805	1090	3815	1060	1081	450	1920	590	2138
Gr-wgd teal	70	652	200	308	40	62	130	100	140	147
Bl-wgd teal	3240	14823	1890	6683	1280	2008	1690	3889	2630	5222
Shoveler	640	922	560	202	680	286	590	2620	740	977
Pintail	480	2688	400	1208	420	252	770	878	310	1042

Table 8. Breeding Duck Pairs and Production - 1979 to 1983 (cont'd)

Species	1979		1980		1981		1982		1983	
	Prs.	Pro.	Prs.	Pro.	Prs.	Pro.	Prs.	Pro.	Prs.	Pro.
Redhead	70	420	90	0	50	150	200	96	90	70
Cnvsbck	90	302	90	77	0	0	40	0	10	100
Lesser										
Scaup	1430	1430	1340	5427	1630	1434	1470	515	1330	2652
Ruddy	350	350	0	0	100	0	220	0	250	140
Cmmn										
Teal	1	0	0	0	0	0	0	0	0	0
Ring-nck										
Duck									10	0
Wood										
Duck	1	0	0	0	0	0	0	0	0	0
	10902	44758	10050	26292	10090	10583	8940	18139	8630	18585

Total duck production was down 13% from the four year average (1979-82). There were several high water years prior to 1979 that attracted waterfowl to the refuge in high numbers (100 breeding pairs of mallards per section were present in 1979), but production decreased from 1980 to 1982, reflecting the drought conditions that were present from late summer 1979 to the fall of 1981. There has not been a good spring run-off since 1979.

Pair counts, however, remained stable until 1982 when they dropped 14% from the four year average. Mallards dropped 35%, gadwalls 49% and wigeon 45%. Blue-winged teal increased 8%, reflecting improved spring water conditions in 1983.

A white-winged scoter was observed on Thompson Lake on 13 October 1983. On that same day, about 300 buffleheads were scattered on the refuge along with just about every waterfowl species that occurs in North Dakota; mallard, gadwall, wigeon, blue-winged teal, green-winged teal, shoveler, pintail, ring-necked duck, lesser scaup, redhead, canvasback, ruddy duck, Richardson goose, lesser Canada goose, giant Canada goose, and snow goose.

On 29 September 1983, 7,000 coots, dabblers and divers were observed surface feeding on School Section Lake (alkaline water). On 6 October, 15,000 predominantly coot, gadwalls and wigeon were observed surface feeding on the same lake. This concentration of waterfowl and coot occurred on this lake until freeze up on 21 November.

There is one section of land (Section 16 T159N R91W) in the middle of the refuge that has mineral rights owned by the State of North Dakota. There was an inquiry in 1982 for oil exploration access to this section. This section has about 250 acres of open water and 300 acres of native grassland involved in research project #924, and 140 acres of idle native grassland. To evaluate affects of oil development, if it should take place, base data is needed on the 140 acres of idle grassland.

It was determined to monitor nesting attempts and success for two or three years to see if it is similar to research control fields on other areas of the refuge. If there is a definite relationship, nest monitoring will cease on the idle grassland in Section 16. Should oil development occur, we can monitor changes not only with two or three years of base data on the entire upland in Section 16 (excludes about ten acres), but also have areas for comparisons on research control fields elsewhere on the refuge. Results from nest dragging the idle grassland on Section 16 (120 acres) and control field #4 (a 104-acre field 1/3 mile from Section 16) are shown in Table 9. (Many thanks to Northern Prairie Wildlife Research Center for nest dragging the area).

Table 9. Nesting Attempts on Field Sec. 16 & Field #4 in 1983

Species	Total		Hatched		Destroyed		Abandoned	
	16	4	16	4	16	4	16	4
Mallard	9	15	3	8	5	7	1	0
Gadwall	3	1	1	0	2	1	1	0
Wigeon	4	1	2	1	2	0	0	0
Blue-wgd								
Teal	6	5	2	3	4	2	0	0
Pintail	5	2	1	1	4	1	0	0
Scaup	4	2	3	0	0	1	1	1
Shoveler	0	1	-	1	-	0	-	0
Sharp-tail								
Grouse	2	3	2	2	0	1	0	0
Marsh Hawk	1	0	1	-	0	-	0	-
C. Goose	0	1	-	0	-	1	-	0
Total	34	31	15	16	17	14	2	1

b. Geese

Giant Canada geese (*Branta canadensis maxima*) were monitored by two methods in 1983. One was checking known nest structures and known upland nest sites. The results are shown on Table 10. The other was a Canada goose pair survey conducted on 75 randomly selected 40 acre refuge plots. Northern Prairie Wildlife Research Center was consulted for survey design. Total number of pairs was 162. This excludes a pair of Richardson geese observed with a pair of giants.

Table 10. Canada Goose Nesting Attempts

<u>Nesting Sites</u>	<u># of usable Sites</u>	<u>Total Nests</u>	<u>Success-ful Nests</u>	<u>Percent Success</u>
Islands	35	11	8	73
Flax Bales	11	3	2	67
Structures	5	3	3	100
Upland Nests	-	2	1	50

Another record number of snow geese used the refuge this fall. Snows first appeared on 13 October and built to about 24,000 the first of

November. Flocks were using Thompson Lake, School Section Lake, and Upper Lostwood Lake during the night and mid-day activities. When they dispersed to feed, there were skeins of geese heading in all directions along 2/3 of the length of the refuge.

c. Swans

An unusually high number of swans were observed migrating over the Lostwood area on 21 November, the day of major freeze up. The actual numbers are unknown but skeins of swans were observed migrating southeast through the day.

On 6 November, while hunting a WPA, I found a weak, immature whistling swan along the shoreline. It was retrieved and brought to the refuge. After a couple of weeks of being force fed, it slowly began to recover, however it lacked normal balance. Cause of this condition was unknown. The bird was donated to the Minot Zoo, North Dakota, on 23 November.

4. Marsh and Water Birds

A colonial nesting bird census was completed on the entire refuge. No colonies were located, except that one or two pair of black terns were found at three locations; Knudson Slough, Bowtie Marsh (SW $\frac{1}{4}$ Sec 22 T159N R91W), and a marsh in SW $\frac{1}{4}$ Sec 27 (T159N R91W). Other birds observed included black-crowned night heron (8), and double-crested cormorants (about 60). These were assumed to be non-breeders and were observed on Rock Slough, Elbow Lake, School Section Lake and Canvasback Slough.

Eared grebes were also observed on the colonial nesting census. On five different marshes or lakes, pairs or pairs with chicks were observed. An American bittern was also observed on Knudson Slough.

6. Raptors

Nine randomly selected sections of the refuge (20% of the refuge) were surveyed for stick nesting raptors and Corvids in 1982 and 1983. Results are shown in table 11. A summer employee, Robert Murphy, surveyed the entire refuge (on his own time) for stick nesting raptors and Corvids. (A summary of his work is found on pages 3 and 4. Comparisons of the expanded nine section survey and the actual occupied territories are also shown in table 11.

Table 11. Stick Nesting Raptors and Corvids on Lostwood National Wildlife Refuge, 1982-83

Species	9 Sections		Projected		Actual # Occupied Territories	
	1982	1983	1982	1983	1982	1983
Red-tl Hawk	5	5	25	20	-	22
Long-erd Owl	5	0	25	0	-	0
Swainson's Hawk	2	1	10	4	-	5
Great-hrnd Owl	1	0	5	0	-	0
Cooper's Hawk	1	0	1	0	-	0
Ferruginous Hk	0	0	0	0	1	0
American Crow	4	2	20	10	-	14
Black-billed Magpie	0	1	0	5	-	5

During nest dragging surveys by NPWRC on 1,200 acres (4% of the refuge), three marsh hawks and no short-eared owl nests were found. In 1982, 17 marsh hawks and nine short-eared owls' nests were found on the same 1,200 acres. This reflects similar findings in Mr. Murphy's raptor survey that 1983 was a low productive year for raptors, which probably correlates with a low Microtus population (600 trap nights with no Microtus caught).

On 23 September, an osprey was observed drifting over Iverson Slough on its southerly migration.

7. Other Migratory Birds

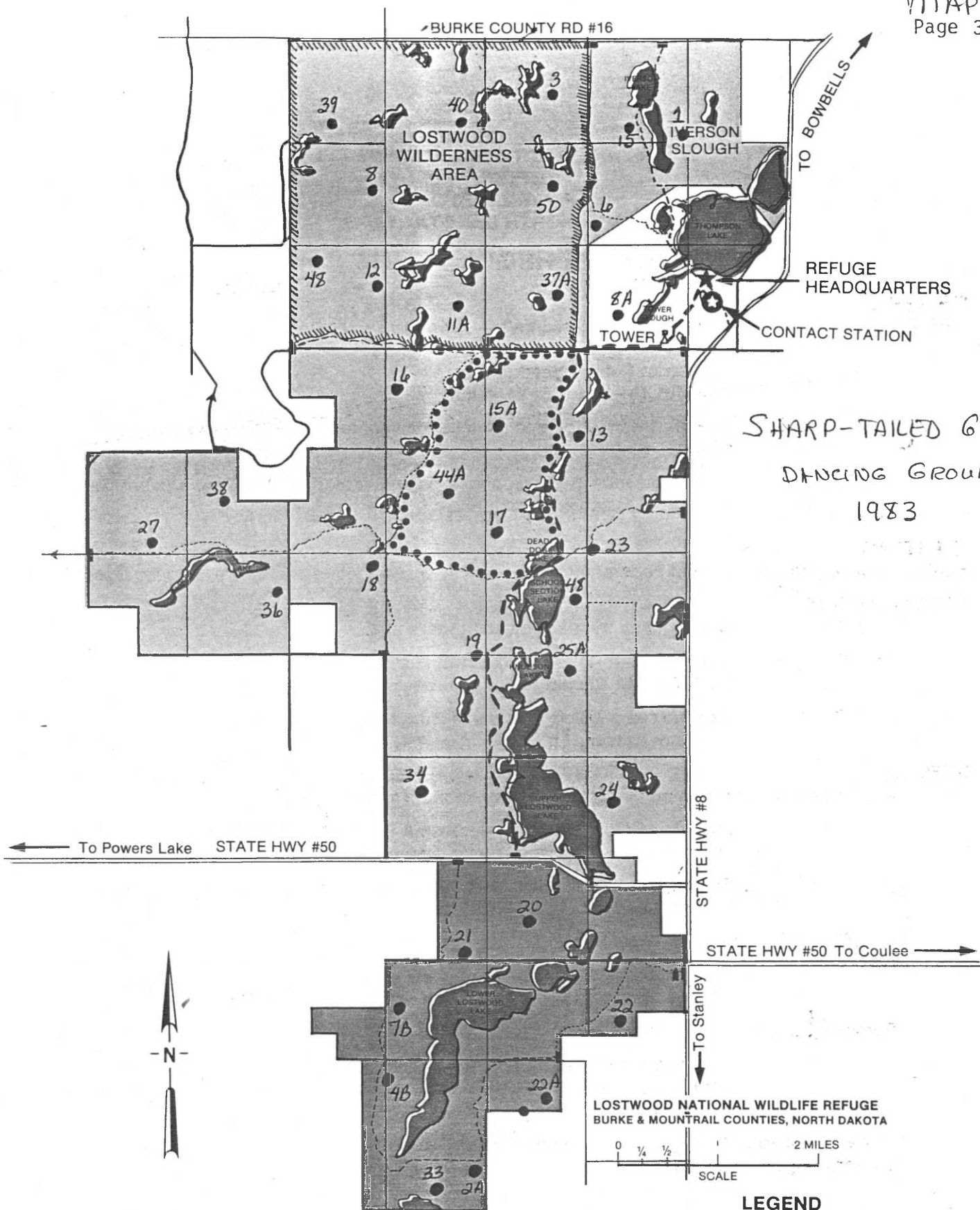
Passerine transects were completed on two burn areas. The information is found on page 22.

Pam Soine, Coordinator Zoologist with North Dakota Natural Heritage Program and Lostwood manager conducted a census on alkaline refuge waters on 13 June 1983 for piping plovers. Five probable territories were found and are shown on Map 2.

8. Game Mammals

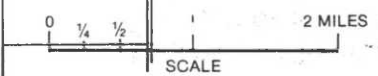
The North Dakota Highway Department was contacted regarding installation of deer crossing warning signs along Highway #8 which abuts the east refuge boundary.

There are several areas along an eight mile stretch that deer cross morning and evening, especially in the fall, winter and early spring. The highway department wants proof that the kill is significant enough to warrant mirror reflectors (deer crossing signs were refused because, he said, "Deer can't read"). So we are to record and report to North Dakota Game and Fish Department every kill. If the highway department determines the kill is significant enough, maybe reflectors will be



SHARP-TAILED GROUSE
DANCING GROUNDS
1983

LOSTWOOD NATIONAL WILDLIFE REFUGE
BURKE & MOUNTRAIL COUNTIES, NORTH DAKOTA



LEGEND

- ★ Refuge Headquarters
- ☆ Contact Station
- ⚡ Tower
- Gates
- 🚀 Missile Site
- 🌊 Lakes and larger wetlands
- ⋯ Sod Trails
- Trails
- Area A
- Area B
- ▨ Area C
- |||| Wilderness Boundary
- - - Auto Route
- Hiking Trail

installed.

10. Other Resident Wildlife

Certain raptors, coyotes and fox appear to use small mammals as a main food source when available (canid information is from unpublished literature from Project #901). When not available, some predators may have a low productivity (such as the raptors on Lostwood in 1983) or they may switch to other food sources. 1983 was a very low Microtus year (600 trap nights with no Microtus caught). Red-tailed hawks had a low productive year (refer to summary on page 3), and no great-horned owls, short-eared owls or long-eared owls were found nesting on Lostwood in 1983. To monitor annual population fluctuations of small mammals and the lack or abundance of a predator food base, "Drift Fences" were constructed in late summer. The following studies were used to design three drift fence refuge sites (Mr. Robert Murphy initiated the project and completed the literature search): "Terrestrial Drift Fences with Pitfall Traps: An Effective Technique for Quantitative Sampling of Animal Population", by J. Whitfield Gibbons and Raymond D. Semlitsch; "Evaluation on Techniques for Assessment of Amphibians and Reptile Populations in Wisconsin", by Richard C. Vogt and Ruth L. Hine; and, "Determination of Anuran Terrestrial Activity Patterns by a Drift Fence Method", by J. Whitfield Gibbons and David H. Bennitt.

The 1982-83 winter was mild with the 1983 spring and summer being an excellent sharp-tailed grouse production year. Table 11 shows the grouse dancing ground counts and Map 3 shows the ground locations.

Table 12. Sharp-tailed Grouse Dancing Grounds Counts 1979-1983

<u>Year</u>	<u>No. of Grounds</u>	<u>No. of Male Grouse</u>	<u>Ave. No. Grouse Ground</u>
1979	32	325	10.16
1980	37	644	17.41
1981	40	764	19.10
1982	38	435	11.45
1983	37	528	14.27

15. Animal Control

Animal Damage Control and/or private hunters removed the following number of coyotes around the refuge: north of the refuge, one adult male (four years or older) and two other adults were killed during this spring and summer; south of the refuge, one adult female (seven or eight years old), two adult males (one seven or eight years old and the other five plus years), one yearling female, one yearling male and one pup were killed in October; and east of the refuge, one adult male (six years plus) was killed this summer. There were fox present around the sheep ranch and also east of refuge headquarters across Highway #8.

The only area on the refuge that was known to have fox was east of Upper Lostwood Lake. All other portions of the refuge were predominantly

within coyote territories. The only complaint that the refuge heard was from a party south of the refuge where 400 plus sheep were grazed day and night on two sections of land adjacent to the refuge. ADC resolved the problem by killing six coyotes off and adjacent to the refuge.

H. PUBLIC USE

1. General

Frank Kartch gave refuge tours to the following groups; 15 students in a North Dakota Wildlife Federation program, 12 biology students from Powers Lake, and 12 Girl Scouts plus two leaders. Mr. Kartch showed one film entitled "Wetland Ecology" to eleven eighth graders at Powers Lake.

One news release about our sharp-tailed grouse dancing ground blind was' sent to three local papers and the Minot Daily News.



Photo #15

Part of North Dakota Wildlife Federation Summer Camp was held on Lostwood NWR. Ernie Zahn, retired state and federal trapper is giving a demonstration in the Lostwood shop. FXX 1983

Mr. Kartch gave a two hour guided tour on the refuge after Mr. Zahn was finished.

5. Interpretive Tour Routes

One of the 1971 Master Plan objectives for Public Use states ". . . . Provide a visitor program that stresses increased understanding, appreciation, and enjoyment of wildlife and the environment". A seven mile

auto tour route and a five mile hiking trail were established in 1980. Unfortunately, tour leaflets for this auto route have yet to be completed. In 1983, approximately 150 people used the auto route and 60 used the hiking trail.

6. Interpretive Exhibits/Demonstrations

An information exterior structure is maintained for the spring and summer bird watchers and fall hunters. Information, such as locations to find grassland species sought after by birders, interpretation of trail signs, regulations, hunting information, etc. is provided.

8. Hunting

During the 1983 deer gun season, approximately 387 hunters with special refuge permits hunted the first 2½ days and took about 31 deer. Hunting during the remaining portion of the season was probably lighter than normal with an average of probably less than six hunters per day.

Grouse hunters hunted the southern portions of the refuge. Their numbers and success is unknown.

12. Other Wildlife Oriented Recreation

Most of Lostwood's spring and summer visitors are birders. The auto route and hiking trail is satisfying their needs.

The grouse blind was reserved on seven different mornings by seven different parties. Due to weather, only three or four parties actually used the blind.

17. Law Enforcement

No violations were found on the refuge in 1983.

I. EQUIPMENT AND FACILITIES

1. New Construction

The old resident garage (it was part of the old office that was torn down) was replaced with a new garage. A new flag pole was erected adjacent to the new shop constructed in 1982. Equipment and tools were rearranged in the new shop and new storage facilities were constructed. Our efficiency and quality of work has improved significantly due to a warm shop in which to accomplish winter work projects, and more efficient working conditions.

2. Rehabilitation

The following projects were completed on the residence:

- the 1982 rehab project was completed
- insulation was installed on the outside concrete basement wall two feet into the ground

- soils were sloped adjacent to the house so that runoff is away from the basement
- a resident phone was installed
- storm windows were installed

The old office-student-garage building was torn down this summer. Debris from this building and the old shop and barn was buried at the old refuge gravel pit site along the southwest side of Thompson Lake. The area was reshaped to the original contour and will be seeded to natives in the spring of 1984.

4. Equipment Utilization and Replacement

The following equipment had repair or remodeling:

- Des Lacs' old water pump and motor was installed on Lostwood's slip in unit (fire equipment)
- installed a new 2½ inch suction pump on the fire truck
- the blue jeep had timing gears installed
- the green jeep had a carburetor kit installed and brakes and igniton system were fixed
- major repair to the Schafer disc-replaced bearings and back spool and welded tongue again
- Lostwood's old rotary mower had new blades installed
- major repair occurred on our Nesbit drill
- John Deere tractor had the power take off remodeled and heat gauge installed
- Ford tractor had a heat gauge installed and was painted

This spring we borrowed Tewaukon's Truax drill to complete spring seeding (there is only one native grass drill, Brillon, for five different management units in the Des Lacs Complex). The drill worked well for seeding a mixture of cool and warm season grasses. Tewaukon transferred two old Nesbit drills to us. One will be over hauled with the other and the one at Lostwood used for parts. Thank you, Tewaukon.

5. Communication System

One state radio was installed in the Lostwood manager's vehicle.

6. Energy Conservation

It is not uncommon, in rural North Dakota, to have power outages. It is also not uncommon to have lots of wind. Lostwood manager is seeking a wind generator. This could help to reduce electrical bills and also be a supplemental power when outages occur.

7. Other

The Lostwood shop-office contractor subcontracted to Larry Westby for hauling gravel in 1981-82. Mr. Westby bought gravel from a refuge neighbor, Mr. Lester Lindberg. Mr. Lindberg has not received payment from Mr. Westby. Mr. Lindberg contacted the refuge for help in getting paid. Denver suggested a procedure for getting payment and this was explained

to Mr. Lindberg. Mr. Lindberg was contacted again this winter to see if the bill had been paid. He said no. He had not tried the Denver procedures. Fortunately, he was not blaming us since Mr. Westby had taken gravel for other private jobs from Lindberg's gravel pit and had not paid Mr. Lindberg for them either. It is unfortunate that several people (shop-office contractor, Westby and Lindberg) were not more responsible to ensure everyone was paid.

J. OTHER ITEMS

1. Cooperative Programs

In the NE $\frac{1}{4}$ Section 3, T158N, R91W, the U.S. Air Force has a Minuteman Missile, Missile Facility K-9 Lostwood National Wildlife Refuge, that has sometimes caused problems. Before a fence was constructed around the missile site to the boundary fence, military personnel would leave the gate open when cattle were present. The open gate also permitted vehicle access for anyone desiring to enter the refuge. To resolve the problems, the refuge constructed a fence around the site and to the refuge boundary fence in 1980. A locked gate was installed on the north side. The problems did not stop, however. In 1983, we were told by military personnel to stop using a refuge trail and stay off military property (the enclosure we made when we built the fence around the missile site, which is refuge property). A letter was sent to the U.S. Air Force to clarify the situation. To, hopefully, stop any future FWS employees from gun-point situations, the refuge has chosen to establish a new trail and boundary gate. The Air Force's gate on the refuge boundary fence is often down and torn apart. The Air Force is responsible to "keep the premises in an orderly condition . . .". We asked the Air Force to keep the gate's appearance appropriate. We also asked what herbicides were being used on the missile site. (Runoff occurs into refuge wetlands). The following herbicides are used; Simazine 80 WP EPA Reg. No. 70001-185-AA, Duron 80 WP and/or Oust.

By state law, school bus routes' road right-of-ways are to be mowed to prevent snow from drifting the road shut. A school bus route on a township road along the refuge boundary in Garness Township is mowed (inside slope) annually by refuge staff.

A neighboring farmer, Mr. Dale Larson, permitted his garbage pit fire to escape on 2 May 1983. The refuge fire truck and crew were at the site and had most of the fire (about fifteen acres of stubble and pasture) out before rural fire departments arrived.

A local oil worker has been an informant regarding suspected H₂S bird kills at well sites in Williams County. One great-horned owl he provided to us was analyzed by the National Fish and Wildlife Health Laboratory and found to have 4.0 ppm of hydrogen sulfide in its lung fluid. This level is toxic to humans. He had brought two passerine species to us, too, but these have not been analyzed yet. Unfortunately, the worker is being transferred (not due to his involvement with us).

The National Geographic Society is writing a book on wildlands for wildlife. The writer, Noel Grove, spent time on Lostwood for information to be included in the book.

Dale Henry, North Dakota Supervisor, visited Lostwood on 8 June 1983.

3. Credits

Del Pierce wrote sections E1, E5 and E6. All other sections were completed by Karen Smith, Refuge Manager, Lostwood NWR. All editing was done by Del Pierce, and typing and assembly by Molly Hansen and Doris Huwe.

K. FEEDBACK

Oil development is occurring throughout western North Dakota, some 200 yards from the refuge boundary. It is not uncommon for oil producing wells to also produce hydrogen sulfide (H_2S), a very deadly gas (refer to pages 30 through 32 and page 44 of the 1983 narrative). Also, sulfur dioxide (SO_2) is produced at the wells. There is open pit burning and open flaring that adds significant amounts of SO_2 to the atmosphere. We are responsible, by law, to protect the Class I air quality of the wilderness. One of the first things we are supposed to do is monitor air quality changes. To get accurate information air quality monitoring equipment is needed that, initially, will cost somewhere between \$60,000 and \$100,000. We must become more involved in protecting the Class I air quality for the wilderness and its wildlife. Some chemical reactions that can occur are H_2S (heavier than air) combines with water, such as in a wetland, forming sulfuric acid; and SO_2 , when mixed with atmosphere air chemical, reacts to form the acid again known commonly as "acid rain". We need to get "on the ball".

Also, someone in FWS or a National Park Service (NPS) representative should be involved with PSD permits. NPS has been monitoring these for the Lostwood wilderness in the past but not with a contract. This situation needs to be addressed and resolved so that someone is monitoring these permits to ensure FWS interest are addressed, and please let the field personnel know the decision.

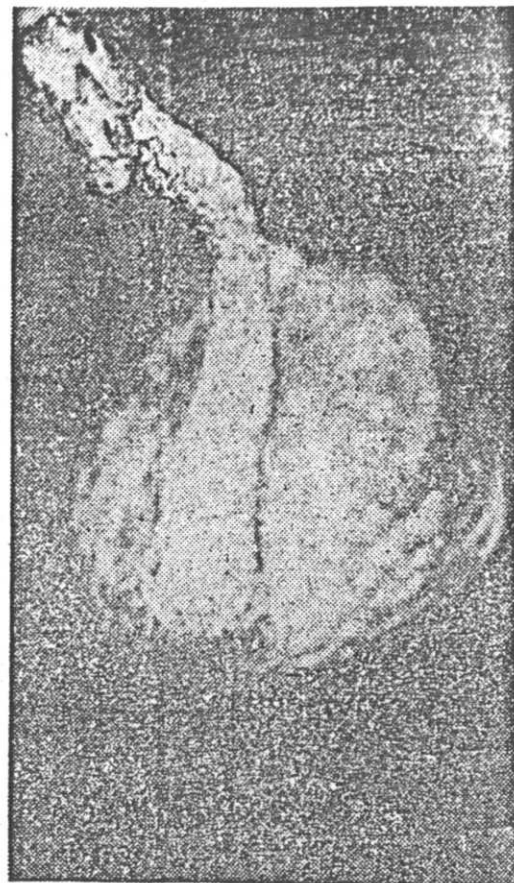
It is so sad that FWS professional biologists have to spend their own time and money to keep up with the current research that assists the manager in making resource management decisions as accurately as possible. FWS is quick to have personnel attend programming meetings but, basically, frown on biologists using government time to attend biological meetings where current information about various species we are managing can be learned. What or where are our priorities? Each professional biologist should be allowed to attend at least one or two wildlife programs annually, at government expense, that will help them do a better job at managing the resource. Any others they wish to attend that would be worthwhile should be allowed with the biologist going on government time but paying his or her own way.

In 1971, the Regional Office in Minneapolis (North Dakota was included in Region 3 in 1971), with the help of refuge field personnel, completed the Lostwood NWR master plan. In that plan it provided a solid base for managing a resource. This plan is only twelve years old. Grassland management needs long term management (40 to 100 years) with continual monitoring of vegetation and wildlife to ensure we are on the "right track". The "right track" was, basically, outlined in the 1971 master plan (refer to page 13 of the 1983 narrative). In 1983, personnel from the Denver Regional Office called the 1971 master plan out of date or no longer valid. This is so wrong. Why do we bother with these plans if they are going to be obsolete in just twelve short years, or when we change regional office personnel? We have no need of continually rewriting "master plans".

One last comment for 1983 from a professional female biologist. There is a definite displeasure on my part to being singled out by whoever as a female. If professional biologists would forget what sex and/or color a person is they are working with and work with the minds of the professional biologists, all would be more comfortable and more constructive accomplishments for the resource could be accomplished with the limited money and time that FWS has. I especially find it very displeasing when I am at a FWS meeting and I am singled out as the only professional female in the group. I feel separate from the group, instead of part of a group of professional biologists.

Signed,

Ann Banders (KAS)



LEFT: A mature bald eagle which was rehabilitated at a Minnesota facility but failed reintroduction into the wild now is at Roosevelt Zoo for exhibit purposes. The bird is the property of the U.S. Fish & Wildlife. RIGHT: This spring-hatched whistling swan, found starving in the Stanley area this fall, was nursed back to better health by its finder, Karen Smith of Lostwood. The grayish swan will turn an off-white color as it matures. (Photo by Judy Tell of The News)

Bald Eagle On Loan To Zoo, Whistling Swan Donated

By ELOISE OGDEN
of The News Staff

Two new birds, a bald eagle and a whistling swan, are the newest residents of Minot's Roosevelt Zoo. Both joined the zoo's stock last week.

The eagle, one of an endangered species, is the first of its kind to be exhibited at the zoo, according to zookeeper Donald Fricke. It is on display in the owl pens on the east side of the zoo. Fricke said the owls were moved into the corn crib because the eagle needed more room than the owls. The swan, which is a protected bird, is not ready for public viewing.

The eagle, a mature bird, is the property of the U.S. Fish and Wildlife Service and is on loan to the zoo, according to William Skar, special agent with the U.S. Fish and Wildlife division of law enforcement in Minot. He said the only reason the bird would be removed from the zoo is if the facility closed.

Originally the eagle was sent to the Raptor Rehabilitation Center at the University of Minnesota in Minneapolis where Skar said

birds which have been trapped, shot, flown into a high line wire or perhaps are sick are rehabilitated. By an agreement between Republic Airlines and the center, the birds are shipped free. In explaining the agreement Skar said, "Republic Airlines realized the need of and importance of bald and golden eagles."

Minot veterinarian Dr. Louis Pinkerton said the center attempted to release the eagle now at the zoo to the wild again but it failed its introduction.

The zoo also received its pair of golden eagles in a similar manner, Pinkerton and Fricke said.

When another bald eagle is available, Fricke said the zoo is "at the top of the list" to receive it.

The whistling swan was donated to the zoo by Karen Smith of Lostwood. On a hunting trip this fall, Smith and her hunting partner found the bird, near starvation, on Waterfall Production Area, N.D. 2, north of Stanley.


The manager of the Lostwood Wildlife Refuge, Smith said the bird had no broken

wings or limbs when it was found. She said, "It was just about starving." She speculated that the bird may have been in its condition due to lead poisoning after being shot or there may have been some other reason. "We didn't take X-rays," she said.

Between 110 and 113 whistling swans were in the Waterfall Production area this fall, Smith said, an increase over past years. She believes that's the reason she and her hunting partner stumbled across the bird.

The swan lived in Smith's house for three weeks. There she force fed it. She said the bird was "really improving" when it was taken to the zoo.

Fricke said when the swan arrived at the zoo, it was having problems with its balance but since has greatly improved. The bird is being cared for in the basement of the zoo building. When the bird regains its health, Fricke said it will be ready for public viewing.



**SOURIS LOOP
BIRDS**

NORTH DAKOTA



SOURIS LOOP BIRDS

The "Souris Loop" National Wildlife Refuges were established in 1935. They are Des Lacs (18,881 acres), Lostwood (26,747 acres), J. Clark Salyer (58,695 acres), and Upper Souris (32,092 acres). Wetlands consist of restored marshes on Des Lacs, J. Clark Salyer, and Upper Souris and potholes in the rolling hills on Lostwood. Other important wildlife habitats are remnants of the original short-grass prairie, lowland meadow, wooded sandhills, river bottoms, and coulees.

While the waterfowl concentrations of spring, summer, and fall are spectacular, bird observers are generally most interested in the five species of grebes, white pelicans, certain hawks, grouse, cranes, shorebirds, Franklin's gulls, burrowing owls, Sprague's pipits, lark buntings, longspurs, and sparrows—including Baird's and Le Conte's. About 140 species are known to nest on these refuges.

CHECKLIST

Souris Loop National Wildlife Refuges

This list contains 290 species (23 are accidental species) recorded on the refuges since 1935.

Species nesting on the refuge are indicated by a (•). The relative abundance of each species at each season is coded as follows:

S—March-May F—September-November
 S—June-August W—December-February

a—abundant common species, very numerous
 c—common certain to be seen in suitable habitat
 u—uncommon present, but not certain to be seen
 o—occasional seen only a few times during a season
 r—rare seen at intervals of 2 to 5 years

S S F W

Common Loon	r	r	r
• Red-necked Grebe	o	o	o
• Horned Grebe	u	u	u
• Egred Grebe	c	c	c
• Western Grebe	c	c	c
• Pied-billed Grebe	c	c	c
White Pelican	c	c	c
• Double-crested Cormorant	u	u	u
• Great Blue Heron	u	u	u

S S F W

• Little Blue Heron	u	u	u
• Cattle Egret	u	u	u
Great Egret (Common)	r	r	
Snowy Egret	r	r	
• Black-crowned Night Heron	c	c	c
• American Bittern	u	u	u
Least Bittern	r	r	r
White-faced Ibis	r	r	
Whistling Swan	u	c	
• Canada Goose	c	u	c
White-fronted Goose	c	c	
Snow Goose (Snow & Blue)	a	a	
Ross' Goose	r		
• Mallard	a	c	a
• Black Duck	r	r	r
• Gadwall	a	c	a
• Pintail	a	c	a
• Green-winged Teal	u	u	u
• Blue-winged Teal	a	c	a
Cinnamon Teal	r	r	
European Wigeon (European Widgeon)	r	r	
• American Wigeon (Am. Widgeon)	c	u	c
• Northern Shoveler (Shoveler)	c	u	c
• Wood Duck	u	u	u
• Redhead	c	u	c
• Ring-necked Duck	u	o	u
• Canvasback	c	u	c
Greater Scaup	r		
• Lesser Scaup	c	u	c
Common Goldeneye	u	u	
Bufflehead	u	o	u
• White-winged Scoter	r	r	r
• Ruddy Duck	c	c	c
• Hooded Merganser	o	o	o
Common Merganser	c	u	
• Red-breasted Merganser	u	u	
Turkey Vulture	r		
Goshawk	r	r	
• Sharp-shinned Hawk	o	o	o
• Cooper's Hawk	o	o	o
• Red-tailed Hawk	c	u	c
• Broad-winged Hawk	o	o	o
• Swainson's Hawk	c	u	c
• Rough-legged Hawk	o	o	o
• Ferruginous Hawk	o	o	o
Golden Eagle	o	o	o
Bald Eagle	o	o	
• Marsh Hawk	c	c	c
Osprey	r	r	
Gyr Falcon	r		
Prairie Falcon	o	o	
Peregrine Falcon	r	r	
Merlin (Pigeon Hawk)	o	o	r
• American Kestrel (Sparrow Hawk)	u	o	u

S S F W

Greater Prairie Chicken (1)			
• Sharp-tailed Grouse	c	c	c
• Ring-necked Pheasant	u	u	u
• Gray Partridge	c	c	c
Whooping Crane	r	r	
Sandhill Crane (2)	a	r	a
• Virginia Rail	u	c	u
• Sora	u	c	u
• American Coot	c	c	a
Semipalmated Plover	u	u	
• Piping Plover	o	o	o
• Killdeer	c	c	c
American Golden Plover	u	r	
Black-bellied Plover	u	u	
Ruddy Turnstone	r	r	
• Common Snipe	o	o	o
Long-billed Curlew	r		
• Upland Sandpiper (Plover)	u	c	u
• Spotted Sandpiper	u	c	u
Solitary Sandpiper	u	u	
• Willet	u	u	c
Greater Yellowlegs	u	c	
Lesser Yellowlegs	c	u	c
Pectoral Sandpiper	c	c	c
White-rumped Sandpiper	r	r	
Baird's Sandpiper	u	u	
Least Sandpiper	c	c	a
Dunlin	r		
Short-billed Dowitcher	r	r	
Long-billed Dowitcher	u	u	c
Stilt Sandpiper	o	u	
Semipalmated Sandpiper	a	a	a
Western Sandpiper	r	r	
Buff-breasted Sandpiper	r		
• Marbled Godwit	u	u	c
Hudsonian Godwit	r	r	
Sanderling	r		
• American Avocet	c	c	c
• Wilson's Phalarope	c	c	c
Northern Phalarope	a	a	
Herring Gull	r	r	
• California Gull	u	r	u
• Ring-billed Gull	c	c	c
• Franklin's Gull	c	c	c
Bonaparte's Gull	r	r	
• Forster's Tern	c	c	c
• Common Tern	u	u	u
• Black Tern	a	c	c
• Rock Dove	o	o	o
• Mourning Dove	c	c	a
Yellow-billed Cuckoo	r		
• Black-billed Cuckoo	o	o	o

(1) Last observed in 1956
 (2) Nesting recorded at J. Clark Salyer in 1973

S S F W

• Screech Owl	o	o	o
• Great Horned Owl	u	u	u
• Snowy Owl	o	o	o
• Burrowing Owl	o	o	o
• Long-eared Owl	o	o	o
• Short-eared Owl	u	u	o
• Boreal Owl			r
• Saw-whet Owl	o	o	o
• Common Nighthawk	o	o	o
Chimney Swift	r		
• Ruby-throated Hummingbird	o	o	o
• Belted Kingfisher	o	o	o
• Common Flicker (Yellow & Red Shafted)	c	c	c
• Red-headed Woodpecker	r	o	r
• Yellow-bellied Sapsucker	o	o	o
• Hairy Woodpecker	o	o	o
• Downy Woodpecker	u	u	u
• Eastern Kingbird	a	c	c
• Western Kingbird	a	c	c
• Great Crested Flycatcher	r	o	o
• Eastern Phoebe	r	o	o
• Say's Phoebe	o	o	o
• Yellow-bellied Flycatcher	r	r	o
• Willow Flycatcher	c	c	a
• Least Flycatcher	c	c	a
• Eastern Wood Pewee	r	o	o
• Western Wood Pewee			r
• Olive-sided Flycatcher	o	u	
• Horned Lark	a	c	a
Violet-green Swallow			r
• Tree Swallow	c	c	a
• Bank Swallow	c	c	a
• Rough-winged Swallow	o	o	o
• Barn Swallow	c	c	a
• Cliff Swallow	a	a	a
• Purple Martin	c	c	c
• Blue Jay	o	o	o
• Black-billed Magpie	u	u	u
Raven			r
• Common Crow	c	u	c
• Black-capped Chickadee	c	c	c
• White-breasted Nuthatch	o	o	o
• Red-breasted Nuthatch	u	c	r
Brown Creeper	u	u	r
• House Wren	c	c	c
• Long-billed Marsh Wren	c	c	c
• Short-billed Marsh Wren	c	c	u
• Rock Wren	r	r	r
Mockingbird	r	r	r
• Gray Catbird (Catbird)	u	u	u
• Brown Thrasher	u	u	u
• Sage Thrasher	r	r	r

S S F W

— • American Robin (Robin)	c	c	a	o
— Hermit Thrush	u	u		
— Swainson's Thrush	c	c		
— Gray-cheeked Thrush	c	c		
— • Veery	u	c	u	
— • Eastern Bluebird	o	o	o	
— Mountain Bluebird	u	r	u	
— Townsend's Solitaire	r	r	r	
— Golden-crowned Kinglet	u	u		
— Ruby-crowned Kinglet	u	u		
— Water Pipit	u	u		
— • Sprague's Pipit	u	u	o	
— Bohemian Waxwing	u	u	u	
— • Cedar Waxwing	c	c	c	e
— Northern Shrike				o
— • Loggerhead Shrike	u	u	u	
— • Starling	u	u	u	u
— • Yellow-throated Vireo	o	o	o	
— Solitary Vireo	r	r	r	
— • Red-eyed Vireo	c	c	c	
— • Philadelphia Vireo	o	o	o	
— • Warbling Vireo	c	c	c	
— • Black-and-white-Warbler	u	o	u	
— Tennessee Warbler	c	c	c	
— Orange-crowned Warbler	c	c	c	
— Nashville Warbler		r		
— • Yellow Warbler	c	c	a	
— Magnolia Warbler	o	o	o	
— Cape May Warbler	r	r	r	
— Black-throated Blue Warbler	r	r	r	
— Yellow-rumped Warbler (Myrtle & Audubon's)	c	c		
— Black-throated Green Warbler	o	o	o	
— Blackburnian Warbler	o	o	o	
— Chestnut-sided Warbler	o	o	o	
— Bay-breasted Warbler	o	o	u	
— Blackpoll Warbler	c	u		
— Palm Warbler	o	o		
— • Ovenbird	u	o	u	
— • Northern Waterthrush	c	u	c	
— Connecticut Warbler	r	r		
— Mourning Warbler	u	o	u	
— MacGillivray's Warbler	o	o		
— • Common Yellowthroat (Yellowthroat)	c	c	c	
— • Yellow-breasted Chat	o	o	o	
— Wilson's Warbler	u	u	c	
— Canada Warbler	r	o		
— • American Redstart	u	u	u	
— • House Sparrow	c	c	c	c
— • Bobolink	c	c	c	
— • Western Meadowlark	a	a	a	r
— • Yellow-headed Blackbird	a	a	a	
— • Red-winged Blackbird	a	a	a	o

S S F W

— • Orchard Oriole	o	o	o	
— • Northern Oriole (Baltimore & Bullock's)	u	u	u	
— Rusty Blackbird	u	u	r	
— • Brewer's Blackbird	u	u	u	
— • Common Grackle	c	c	c	r
— • Brown-headed Cowbird	c	c	c	
— Western Tanager			r	
— Scarlet Tanager	r	r		
— • Rose-breasted Grosbeak	o	r	u	
— Black-headed Grosbeak	r			
— Indigo Bunting	r	r		
— • Lazuli Bunting	o	o		
— Dickcissel	r	r	r	
— Evening Grosbeak	r	r	r	
— Purple Finch	u	u	r	
— Pine Grosbeak			o	
— Hoary Redpoll			r	
— Common Redpoll	c		c	
— • Pine Siskin	c	r	c	r
— • American Goldfinch	c	c	a	r
— Red Crossbill	r	r	r	r
— White-winged Crossbill			r	
— • Rufous-sided Towhee	u	c		
— • Lark Bunting	c	a	c	
— • Savannah Sparrow	c	a	a	
— • Grasshopper Sparrow	u	c	u	
— • Baird's Sparrow	u	c	u	
— • Le Conte's Sparrow	u	c	u	
— • Sharp-tailed Sparrow	u	c	u	
— • Vesper Sparrow	u	u	u	
— • Lark Sparrow	o	o		
— Dark-eyed Junco (Slate-colored, Oregon & White-winged)	a	a	r	
— Tree Sparrow	a	a	r	
— • Chipping Sparrow	c	u	c	
— • Clay-colored Sparrow	a	a	c	
— • Field Sparrow	o	o	o	
— • Harris' Sparrow	c	c	r	
— White-crowned Sparrow	c	c		
— White-throated Sparrow	a	c		
— Fox Sparrow	u	u		
— Lincoln's Sparrow	c	c		
— Swamp Sparrow	o	o		
— • Song Sparrow	c	c	c	
— • McCown's Longspur	r	r	r	
— Lapland Longspur	a	a	c	
— Smith's Longspur	o	o		
— • Chestnut-Collared Longspur	c	c	u	
— Snow Bunting	c	c	a	

BIRDS THAT ARE RARELY SEEN ON THE REFUGES AND OUT OF THEIR NORMAL RANGE:

Green Heron	Black-necked Stilt
White Ibis	Barn Owl
Fulvous Whistling Duck	Barred Owl
Oldsquaw	Whip-poor-will
Harlequin Duck	Scissor-tailed Flycatcher
Surf Scoter	Winter Wren
Common Scoter	Northern Parula
Red-shouldered Hawk	Townsend's Warbler
Bobwhite	Hooded Warbler
American Woodcock	Lesser Goldfinch
Whimbrel	Henslow's Sparrow
Knot	

Acknowledgments: To Dr. and Mrs. R.T. Gammell for their contribution in compiling this birdlist.

Further information about the refuges or certain species can be obtained from:

Des Lacs Refuge
Kenmare, North Dakota 58746

Lostwood Refuge
Kenmare, North Dakota 58746

J. Clark Salyer Refuge
Upham, North Dakota 58789

Upper Souris Refuge
Foxholm, North Dakota 58738

Lostwood National Wildlife Refuge
RR 2

Kenmare, North Dakota 58746
UNITED STATES

DEPARTMENT OF THE INTERIOR
FISH & WILDLIFE SERVICE



RF-Region 6



1979
GPO 849-947



Lostwood
NATIONAL WILDLIFE REFUGE

LOSTWOOD NATIONAL WILDLIFE REFUGE

Lostwood National Wildlife Refuge lies in the highly productive prairie pothole region that produces more ducks than any other region in the lower 48 states. The Refuge is a land of rolling hills mantled in short- and mid-grass prairie interspersed with numerous wetlands. Established to preserve a unique wildlife habitat, Lostwood is an important link in our nation's system of more than 390 Wildlife Refuges.



Drawing of a pair of Pintail ducks.

FROM ICE TO MANTLES OF GRASS

Ten thousand years ago, the last glacier had to climb a steep topographical rise, the "Missouri Escarpment", to continue its southwesterly path over the area now known as Lostwood Refuge. The climbing ice pushed tons of material, "glacial drift", ahead of it and deposited it just beyond the escarpment.

When the ice began to melt, glacial drift became concentrated on the ice surface and acted as an insulator to the ice beneath. As a result, the drift area retained ice long after it had disappeared from the rest of northwestern North Dakota.

Slowly, the surface of the drift-covered ice warmed, producing forests of spruce, tamarack, birch and poplar along with a myriad of lakes,

wetlands and streams. As the ice melted beneath, the drift settled creating rocky rolling hills with numerous shallow lakes and wetlands known today as the "Missouri Coteau".

As precipitation slowly decreased, forest gave way to mantles of grass. Lakes and wetlands evolved into highly productive duck hatcheries producing millions of birds every year. Bison, elk, prairie chicken, sharp-tailed grouse, grizzly bear, and wolf were also abundant.

PRESERVING A PRAIRIE HERITAGE

Settlers were spurred into western North Dakota by the Homestead Act of 1862, but they did not immediately settle in Coteau because it was difficult to farm and they dreaded the wild prairie fires. Consequently most tracts were not settled until the early 1900s.

As man "tamed" the area, wild fires were contained and eventually stopped altogether. Wetlands were drained to increase the number of tillable acres. Less desirable "brush" slowly encroached into the fireless grassland and water-dependent wildlife lost habitat.

In order to preserve our prairie heritage, Lostwood National Wildlife Refuge was established on September 4, 1935, "... as a refuge



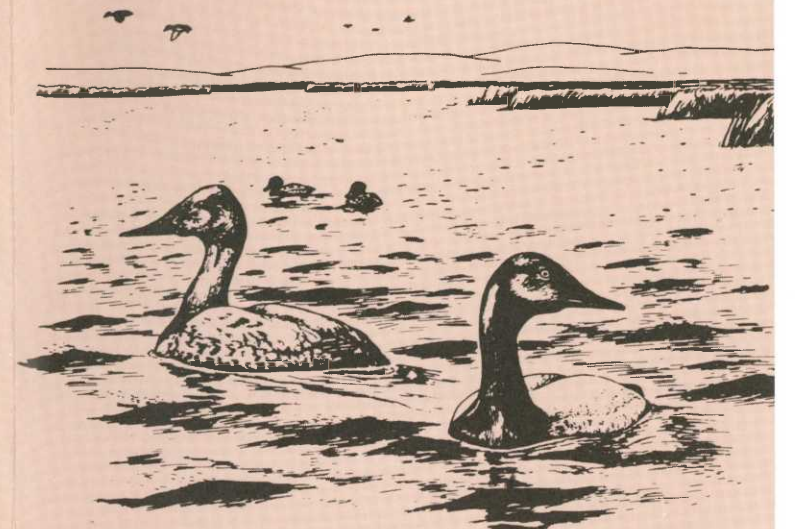
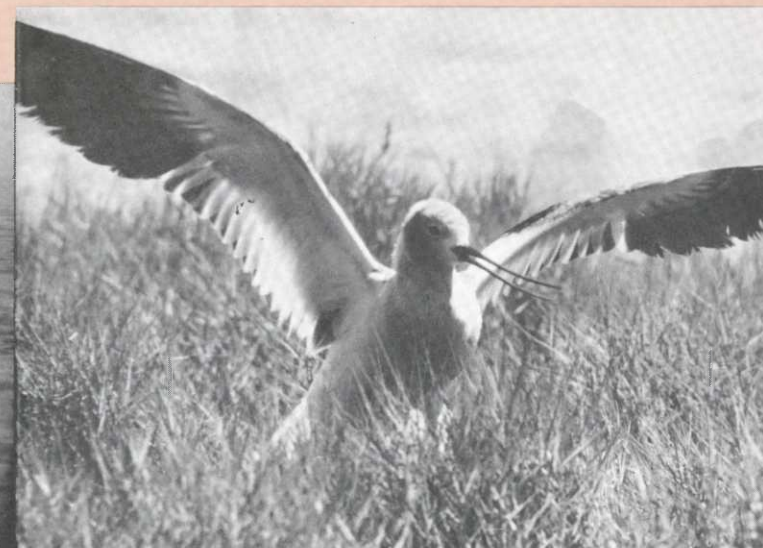
Wilson's Phalarope, photo by Karen Smith.

and breeding ground for migratory birds and other wildlife. . . ." Encompassing 26,747 acres, the Refuge is a remnant of the original prairie, although small acreages have been farmed. Fortunately, most of the wetlands remain intact, much as they were before settlement.

Congress acted further to guarantee our prairie heritage by establishing the 5,577 acre Lostwood Wilderness Area in 1975. Under wilderness management guidelines the use of natural or controlled fire to maintain and preserve native prairie is fully recognized.

Avocet. USFWS photo.

Aerial photo of Lostwood potholes by Allen Aufforth. USFWS photo.



Drawing of a pair of Canvasback ducks.

FEATHERS AND FUR

Waterfowl and other water dependent birds are highlights on the Refuge. Blue-winged teal, mallard, gadwall and wigeon occur in significant numbers while lesser scaup, redhead and canvasback are also present. Others, such as Virginia rail, marbled godwit and American avocet wade in the fertile wetlands.

LeConte's sparrow, Baird's sparrow and Sprague's pipit sing profusely to warn others of their species to stay off their home territories. In early spring, sharp-tailed grouse engage in elaborate courtship rituals on numerous dancing grounds.

Giant Canada geese, once thought to be extinct, again nest on the prairie. The majestic birds were reintroduced to their native habitat on the Refuge in 1964.

Whitetail deer, muskrat, badger, mink, weasel, and whitetail jackrabbit are common. Encroaching brush and aspen attracted the eastern cottontail, snowshoe hare, beaver, and porcupine. The howl of the wolf, however, has given way to the yodel of the coyote and the yap of the fox.

MAINTAINING NATIVE HABITAT

Prior to settlement, North Dakota's native grasslands thrived under constant disturbances such as drought, flood, fire, and massive herds of bison. The prairie was predominantly composed of native grasses, forbs, and snowberry, a brush species occupying 1 to 3% of the prairie. By the 1970's, snowberry composed 50 to 80% of the prairie, and exotic grasses such as Kentucky bluegrass and smooth brome had invaded the native grassland.

The area today remains subject to drought, flood and wind as it did in the past. Cattle have replaced bison under carefully controlled conditions. Why then, does the less desirable brush continue to spread? Fire and concentrations of grazing animals are missing. As a management tool, fire, is preferred over grazing because fire reduces snowberry, eliminates exotic grasses and stimulates native grasses and forbs. Grazing alone does not accomplish these objectives.

Prairie wetlands are managed by nature. It is as important for prairie wetlands to go dry as it is for them to be filled with water. During droughts, the bottom of wetlands are exposed to the elements, permitting decomposition of organic material. Without the dry cycle, oxygen in the water would be used to decompose the organic material. The oxygen depleted wetland would no longer support aquatic invertebrates, the prime food for ducks and shorebirds. So the dry cycle maintains the high productivity of the prairie wetlands.

Controlled burning photo by Ken Higgins. USFWS photo.



All illustrations by Karen Smith.

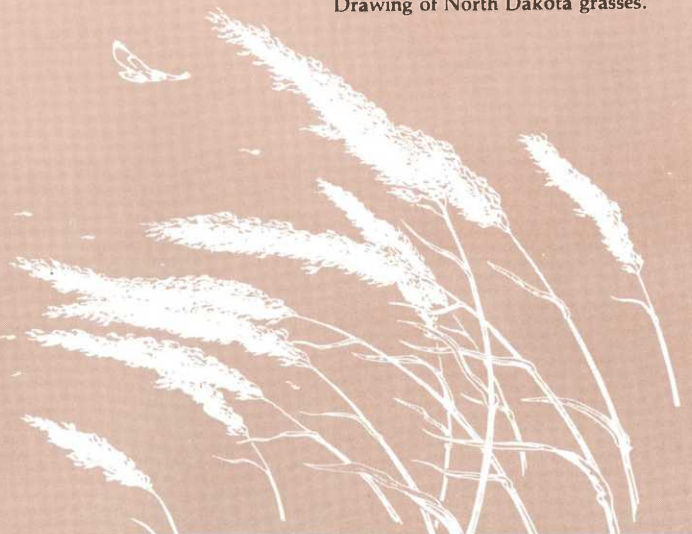
EXPERIENCE THE ESSENCE OF LOSTWOOD

Unique wetland environments are found over every hill on the Lostwood National Wildlife Refuge.

Vehicle and hiking trails provide access for the visitor during portions of the spring, summer and fall. The wilderness area offers hiking during certain months, as well as snowshoeing and cross-country skiing. Extreme caution must be used in winter because subzero temperatures and strong winds have no mercy.

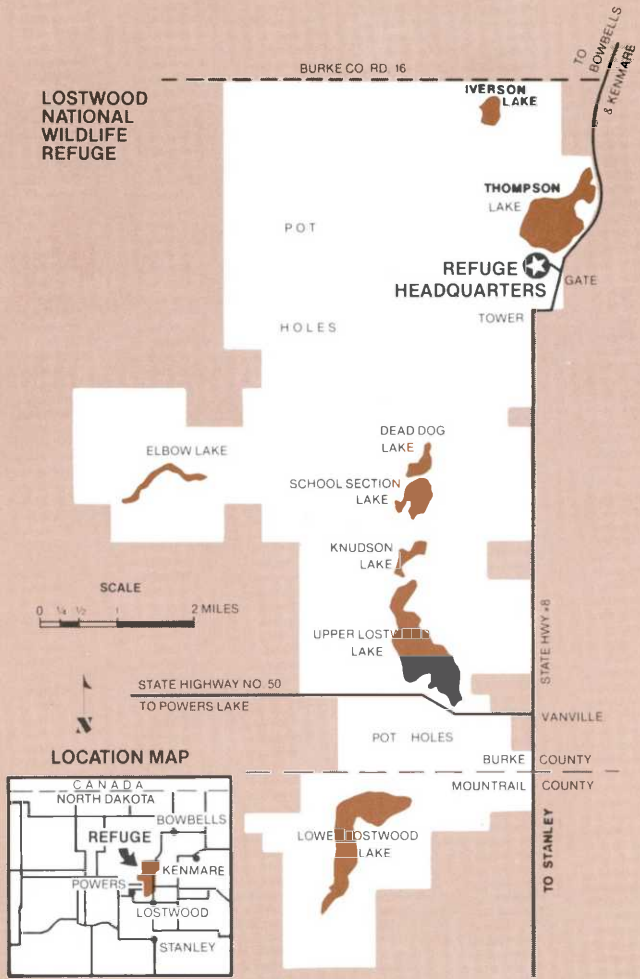
Regulations concerning wildlife recreational opportunities and hunting programs are available at Refuge Headquarters located off State Highway No. 8.

Drawing of North Dakota grasses.



ADMINISTRATION

The Refuge is administered as a part of the Des Lacs Complex with the main office located one mile west of Kenmare, North Dakota. The Lostwood Headquarters, which administers the Lostwood Refuge, is located 12 miles west of Kenmare on Ward County road No. 2 and 4 miles south on Highway No. 8. Inquiries for information should be addressed to the Refuge Manager, Lostwood National Wildlife Refuge, RR No. 2, Kenmare, North Dakota 58746.



U.S. FISH AND WILDLIFE SERVICE
 Department of the Interior



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