J. CLARK SALYER NATIONAL WILDLIFE REFUGE

Upham, North Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 1987

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

REVIEW AND APPROVALS

J. CLARK SALYER NATIONAL WILDLIFE REFUGE

Upham, North Dakota

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Robert L Howard 4/29/88 D Henry 5-4-88

Refuge Manager Date Refuge Supervisor Review Date

Ralph F. Fine 5/4/88

Regional Office Approval Date

INTRODUCTION

The J. Clark Salyer National Wildlife Refuge is located along the Souris River in Bottineau and McHenry Counties of north-central North Dakota. The Refuge was established by Executive Order Number 7170 on 4 September, 1935, under the Migratory Bird Conservation Act (45 Stat. 1222), as a refuge and breeding ground for migratory birds. The 58,700-acre refuge extends from Canada southward for approximately 45 miles. The nearest town is Upham, North Dakota, located about three miles from refuge headquarters.

Included within the refuge are 36,000 acres of upland habitat composed of native and introduced grasslands, thick woodlands, shrub thickets and croplands. The northern portion is basically confined to the river valley with a narrow band of adjacent upland habitat. The southern portion of the refuge contains about 16,000 acres of native prairie interspersed with aspen and brush covered sandhills and 4,200 acres of wooded river bottom.

Wetland habitats include high value managed deep and shallow marshes within the Souris River flood plain. Five dikes with water control structures have restored 21,000 acres of open water, marsh and wet meadow habitat for waterfowl production and migration use.

While the primary objective of the refuge is waterfowl production, the area has a very diverse population of other bird species. More than 250 species have been noted, ranging from sharp-tailed grouse on their dancing grounds in spring; Swainson's hawks in great numbers in fall; a wide variety of waterbirds, including five species of nesting grebes; and relatively rare small birds such as Sprague's pipits and Baird's and LeConte's sparrows.

More than 125 species nest on the refuge, some in great numbers. Up to 17,000 Franklin's gulls and colonies of hundreds of double-crested cormorants, great blue herons and black-crowned night herons are found. In an average year about 18,000 ducklings are produced, including pintail, mallard, gadwall, green-winged teal, blue-winged teal, American wigeon, northern shoveler, black duck, wood duck, redhead, ring-necked duck, canvasback, lesser scaup, and hooded merganser. White pelicans are present on the refuge all summer, while thousands of sandhill cranes, tundra swans and snow geese use the refuge as a feeding and resting area during migration.

The entire refuge lies within an area which was once Glacial Lake Souris. The surrounding area is old lake bottom with extremely flat topography and a high density of temporary wetlands. These are important for waterfowl production and

natural flood storage which improves water quality in the Souris River. Unfortunately, a substantial portion of the original wetlands have been drained.

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A. HIGHLIGHTS

Several staff changes occurred during the year (E.1).

Estimated duck production remains about 28 percent below the most recent 10 year average (G.3).

Botulism was a problem in two refuge pools (G.17).

Ruffed grouse hunting was opened on the southern part of the refuge (G.10 and H.8)

Outdoor related programs were presented to over 1,200 people (H.1).

A contract was awarded for a new office heating system (I.1).

Planning continued on the Souris Basin Flood Control Project (J.1).

B. CLIMATIC CONDITIONS

A refuge weather station was maintained during 1987 as an official weather record for the National Oceanic and Atmospheric Administration.

Snowfall for the winter of 1986-87, for the period November through March was 39 inches. Snow depth during the period averaged 10 inches. Greatest water content measured was 2.77 inches in a reading taken on March 2.

Temperatures during Janaury and February were generally mild and made conditions easy for wildlife. The spring melt began on March 20 and by March 30 all snow was gone. Refuge pools were ice-free on April 14.

Precipitation through March was about one inch above normal. Hot and dry weather arrived in April and lasted into June. Precipitation for these three months was almost three inches below normal. Last frost of the spring was on May 22 with a reading of 27° F.

Heavy rains arrived in July when we received more than double the average. As a result precipitation from July through September was almost two inches above the normal. This put us back on normal for the year. Highest reading of the year was 100° on June 16. First frost of the fall was 32° on August 31. A killing freeze did not come until October 2 when the temperature dropped to 19°. Refuge pools froze over November 17.

The fall and early winter were very dry and mild. Only 0.17 inch of precipitation fell during the last three months compared to the normal of 2.00 inches. We ended the year with a total of 14.85 inches or 1.76 inches below the normal of 16.61 inches. Coldest temperature of the year was a -14 on January 15. Total snowfall for 1987 was 23.8 inches.

D. PLANNING

4. Compliance with Environmental Mandates

Most refuge projects this year were determined to be categorical exclusions from environmental assessment requirements. Compliance activaties included:

a. Section 7 certification of the refuge hunting program was completed.

b. An environmental assessment for proposed competitive oil leasing on refuge tracts which were suffering drainage was completed and approved through the Regional Office.

c. An environmental assessment was developed and right-of-way was granted to McHenry County for replacement of the Freeman Bridge and realignment of the roadway.

d. Input was provided for the Corps of Engineers EIS on the Souris River Basin Flood Control Project, and data gaps relative to a refuge compatibility evaluation were identified (Section J.1.).

5. Research and Investigations

Nest Density and Hatching Success in Relation to Predator Control on Islands at the J. Clark Salyer NWR.

Introduction

The three-year waterfowl nesting study initiated in 1985 was completed this year. During 1985 extensive nest searches were completed on islands in Pools 320 and 326. Predator management was carried out on Pool 320 while the effects of no management were evaluated on Pool 326. In 1986 extensive nest searches were conducted in Pool 332 on 14 islands. Pools 332 and 326 received intensive predator management. In 1987, the intensive nest searches were eliminated since baseline data had been completed. Efforts were shifted towards intensive predator management from mid-April through May. Investigative nesting disturbances were reduced by doing only a post-season island check for estimated success.

Methods

During the spring trapping period water levels were high enough to allow regular visitation of all islands for setting and

checking traps. Roaming male mink, red fox, and raccoons still pose a major problem to the island nesters. Many of the islands are close to cattail corridors and to other islands, making depredating visits fast and easy for these animals. Trapping visits will have to be increased to catch a higher percentage of these animals.

Island access became difficult by late summer due to low water levels. Islands in Pool 332 could not be reached, and only 73.3 and 24.5 percent of the islands in Pools 320 and 326 were searched, respectively.

Results & Discussion

Apparent nest success derived from the post-season nest search was 62.7 and 82.4 percent for ducks on pools 320 and 326 and 81.2 and 90.9 percent for geese. (Tables I & II).

TABLE I

Nest success for islands in '87
based on post-nesting
season searches: Ducks

Pool 320

Island	Island Acres	Total # Nests Found	Total Successful	Apparent Successful %
Varty	0.93	2	0	0.0
Flat	3.30	40	22	55.0
Ding	6.40	24	20	83.3
Near	0.95	7	6	85.7
Cormorant	1.64	12	7	58.3
Badke	0.73	6	3	50.0
Otto	0.83	2	1	50.0
Bernie	1.14	2	1	50.0
Tern	2.16	10	4	40.0
Gadwall	1.97	29	20	68.9
TOTAL	20.05	134	84	62.7

Pool 326

Island	Island Acres	Total # Nests Found	Total Successful	Apparent Successful %
Blip	0.62	8	7	87.5
Scaup	0.83	9	7	77.7
Mary's	1.25	68	60	88.2
Wilmer	0.77	19	14	73.6
Willow Clump	1.03	8	7	87.5
Goosepen	1.96	19	13	68.4
TOTAL	6.46	131	108	82.4

TABLE II

Nest success for islands in '87 based on post-nesting season searches: Geese

Pool 320

Island	Island Acres	Total # Nests Found	Total Successful	Apparent Successful %
Varty	0.93	1	1	100.0
Flat	3.30	17	16	94.0
Ding	6.40	8	7	87.5
Near	0.95	2	2	100.0
Cormorant	1.64	3	1	33.3
Badke	0.73	5	4	80.0
Otto	0.83	3	3	100.0
Bernie	1.14	1	1	100.0
Tern	2.16	0	0	0.0
Gadwall	1.97	8	4	50.0
TOTAL	20.05	48	39	81.2

Pool 326

Islands	Island Acres	Total # Nests Found	Total Successful	Apparent Successful %
Blip	0.62	1	1	100.0
Scaup	0.83	4	4	100.0
Mary's	1.25	7	7	100.0
Wilmer	0.77	3	3	100.0
Willow Clump	1.03	3	2	66.6
Goosepen	1.96	4	3	75.0
Total	6.46	22	20	90.9

An estimated total number of waterfowl nests and the number of successful nests for islands in pools 320 and 326 were extrapolated based on island acreages (Table III). Results may be slightly biased toward unsuccessful nests because they were much easier to find than the successful clutches, expecially the earlier hatches which were exposed to rain and overgrown vegetation.

TABLE III

Estimated total nests and production for all islands:

Pools 320 & 326 for Ducks

Pool 320	Total Nests	Successful	Apparent Success %	Estimated Production
-14 islands (27.33 acres)	183	114	62.3	684
-Numbers extrapolated based on 73.3% of island acres searched				
Pool 326				
-18 islands (26.39 acres)	535	440	82.2	2640
-Numbers extrapolated based on 24.5% of island arces searched				
TOTAL	718	554	77.1	3324

Pools 320 & 326 for Geese

Pool 320	Total Nests	Successful	Apparent Success %	Estimated Production
Same info as above	65	53	81.5	239
Pool 326	90	82	91.1	369
TOTAL	155	135	87.0	608

Predator management had a positive impact on nest success for Pool 326 (Table IV). Observed success increase 24 percent for ducks from 1985 to 1986. Due to low water levels in Pools 320 in 1986 and 332 in 1987, the effects of predator removal on nest success is difficult to assess.

TABLE IV

Summary of three-year study on
Pools 320,326,332

Pool	Year	# Islands Searched	Total Nests	Total Successful Nests	Observed Success	Mayfield Percent	Pred Mgt	Number Predators Removed
320	1985	12	364	268	73.6	46.8	yes	2
	86	(in drawdown)						
	87	10	134	84	62.7	-	yes	4
326	1985	16	257	150	58.4	20.9	no	-
	86	4	228	158	69.0	-	yes	1
	87	6	131	108	82.4	-	yes	2
332	1985	-	-	-	-	-	no	-
	86	14	301	129	43.0	41.47	yes	10
	87	-	-	-	-	-	yes	5

E. ADMINISTRATION

1. Personnel

This was a year of change in staff with two retirements and five transfers.

Bill West started the action on February 28 by transferring to Des Lacs NWR.

Anna Vos started in the refuge manager (trainee) position on March 2.

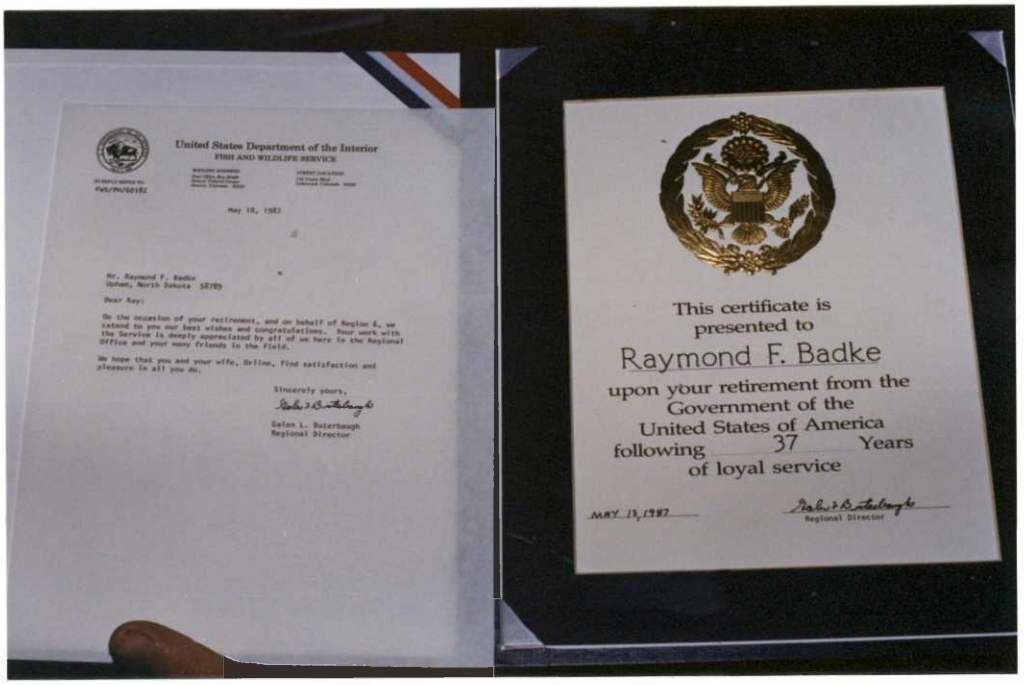
Fred Giese moved on to the project leader position at Tewaukon NWR, and Greg Siekaniec headed west to the assistant manager position at Jordon, MT on March 14.

Bill Berg shifted from the wetland manager position to the primary assistant refuge manager position.

Kathy West entered on duty as a PPT Clerk-Typist on March 30. She transferred to a job closer to home at the Minot Wetlands Acquisition Office on August 8.

Ray Badke retired on June 6 after 37 years of government service. He was honored at a retirement party at the Holiday Inn in Minot. Ray received a Special Achievement Award for modification of the Dam 332 gates. He was also awarded the Department's Superior Service Award shortly after his retirement for his many years of excellent service.

A few of the many people that turned out for Ray's retirement party. Pictured Left to Right: Roy Hiller, Leo Latendresse, Ray Badke, Don Gray, Bud Hill, Fred Giese and Dale Henry. GAE



Ray Badke's retirement party was attended by 80 people. We quickly found how difficult it is to replace a person of Ray's knowledge and experience. GAE

Ham Benson also opted for retirement on July 4 after over 15 years with the refuge.

Hamilton Benson was honored at a farewell retirement picnic after 20 years of service. GAE

Gary Erickson arrived from Tewaukon on August 2 to fill the wetland manager position.

Nancy Smette was hired as Clerk-Typist on September 13.

J. Clark Salyer staff as of January 15. Left to Right top row: Greg Siekaniec, Bill Berg, Ray Badke, Fred Giese, Bob Howard. Bottom row: Jay Peterson, Bill West, Gary Eslinger Not pictured Leo Latendresse Edwin Zeretzke, Hamilton Benson and Wanda Opdahl.

1. Robert L. Howard, Refuge Manager, GS-12, PFT
2. Fred Giese, Assistant Refuge Manager, GS-11, PFT, transferred to Tewaukon 3/87
3. William J. Berg, Assistant Refuge Manager, GS-11, PFT, EOD 3/87
4. Gary Erickson, Wetlands Manager, GS-9, PFT, EOD 7/87
5. William West, Assistant Refuge Manager Trainee, GS-7, PFT, transferred to Des Lacs 2/87
6. Anna Vos, Refuge Manager Trainee, GS-5, PFT, EOD 3/87
7. Gary Eslinger, Biological Technician, GS-7, PFT
8. Gregory Sieckaniec, Clerk/Typist, GS-3, PPT, transferred 3/87
9. Wanda Opdahl, Refuge Assistant, GS-6, PPT.
10. Kathy West, Clerk/Typist, GS-3, PPT, 3/87 - 7/87
11. Nancy Smette, Clerk/Typist, GS-3, PPT, EOD 9/87
12. Raymond Badke, Automotive Mechanic, WG-10, PFT, retired 7/87
13. Hamilton Benson, Maintenance Worker, WG-7, CS, retired 6/87
14. Edwin C. Zeretzke, Motor Vehicle Operator, WG-7, CS, 4/87-12/87
15. Leo J. Latendresse, Engineer Equipment Operator, WG-8, CS, 4/87-12/87
16. Andra Buchl, Biological Aid, GS-3, Temporary
17. Mike Grabow, Biological Technician, GS-5, Temporary
18. Patricia Knupp, Biological Aid, GS-3, Temporary
19. Jay Peterson, Biological Technician, GS-5, Temporary

Refuge clerical staff, Nancy Smette (left) and Wanda Opdahl.

Summer Temporaries Left to Right: Mike Grabow, Andra Buchl, Patti Knupp, and Jay Peterson.

2. Youth Programs

YCC Enrollees Scott Goodman and Lila Akan rebuilt the botulism recovery pen in July. PK

The J. Clark Salyer Complex was staffed with two YCC enrollees. One enrollee was terminated after 10 days because of lazyiness and for reporting late to work on several occasions. He was replaced immediately by a alternate candidate. As has been the case the last three years we had excellent interest in our YCC program. Forty one teenagers representing six schools in the are applied for the two available positions a. Along with the help of Biological Aid Patty Knupp, YCC Enrollees Lila Akan and Scott Goodman accomplished many worthwhile projects. A list of a few of the projects follows:

1) Constructed, landscaped and installed a PVC pipe drain in botulism recovery pen.

2) Painted 12' metal gates prior to placing on refuge access trails.

3) Repaired and painted pump house, boat storage building and banding equipment shed.

4) Assisted with weeding 2,200 rose bushes on Round Lake WPA island.

5) Placed wood chips on headquarters nature trail.

6) Assisted with island nest searches, goose tub checks, wood duck box checks, botulism clean-up and brood surveys.

In addition to the above accomplishments the enrollees were responsible for recreation area maintenance and mowing around headquarters.

4. Volunteer Programs

During the year, 78 different volunteers assisted with refuge projects. A total of 698 hours of service were contributed with the majority being expended during the waterfowl banding operations. As in the past the wildlife class of North Dakota State University - Bottineau Branch assisted with banding several mornings. Their assistance and donuts are appreciated. Retired mechanic Ray Badke was also a great asset to 1987 operations. Because of the absence of two maintencance people through most of the summer season Ray spent many recreational hours blading trails and operating the semi-tractor when needed. He is still a welcomed face around the refuge and it seems he is always there when needed.

5. Funding

A schedule of funding for the refuge and WMD over the past five years is as follows:

Fundings	FY-83	FY-84	FY-85	FY-86	FY-87
1210	308,000				3,000(YCC)
1220	11,500				
1240	12,000				
1260		380,000	433,100	478,000*	479,000
6860		3,000	5,000	5,000	5,000
6810	3,500				
O & M	335,000	383,000	438,100	483,000	487,000
1510	28,225		1,895	573	
6410	125,000				
6450	140,000				
8610		10,700	12,000	11,000	8,800
2821	127,000	107,000		10,575	176,568
TOTAL	755,225	500,700	451,100	505,148	672,368

* Includes $115,000 of Resource Problems, small ARRMS and special project funds.

6. Safety

One accident occurred during 1987. An employee strained a muscle and tendon in his forearm while attempting to start a chain saw. One day of sick leave was used.

Monthly safety meetings were held throughout the year. Topics included poisons, winter survival, noise pollution, ATV use, tractor safety, water safety, and proper storage of explosive materials.

A defensive driving course in Minot was attended by four staff members.

7. Technical Assistance

Assistance was provided to Bottineau County Commissioners for a 404 application on a road project.

8. Other Items

Revenue sharing checks were presented at the April County Commission meetings. The two counties received about 60 percent of full entitlement. Following is a summary of revenue sharing payments over the last four years.

County	1987	1986	1985	1984
Bottineau	20,803	22,294	34,635	20,298
McHenry	27,286	29,242	45,428	30,455

The payment in lieu of taxes covers 21,574 acres of refuge and 2,150 acres of WPA's in Bottineau County and 37,119 acres of refuge and 4,163 acres of WPA's in McHenry County.

As can be expected, county officials usually have a valid complaint about inadequate revenue sharing payments. Until the discrepancy is corrected, the FWS will have a difficult time acquiring additional acreage in North Dakota.

F. HABITAT MANAGEMENT

2. Wetlands

The refuge's ultimate water management goals are identified in the Service's June 1985 report entitled, "Impacts of the White-Spur Stone Creek and Russell Diversion Drainage Projects on the J. Clark Salyer National Wildlife Refuge and Wetland Management District," in which management of the pools allows for a range of conditions which vary from Class I through Class V wetlands. The report presents some management plan options based on a 5-year drawdown cycle and recognizes that up to three years of

year drawdown cycle and recognizes that up to three years of high water may be needed to kill cattail and prepare for drawdown. The drawdown phase allows for soil aeration and subsequent growth of aquatic vegetation. While the report's basic philosophy is being followed, we have not yet reached the point where the entire model flooding-drawdown schedule can be maintained.

A warm, dry winter and early thaw caused local runoff to begin in late February. River break-up occurred March 15 to 20. Moderate flows occurred throughout the year except after two heavy rains in July and August. High flows following this precipitation made it difficult to stabilize pools at proposed levels. Although the annual precipitation was 1.88 inches below normal, river flows were more than adequate for management objectives and for the 20 cfs Canadian allotment.

Inflow at Bantry for March through May was 68,250 acre-feet, 12,030 acre-feet (21 percent) more than the same period in 1986. Peak inflow for the year was 1,200 cfs on April 13.

Total inflow at Bantry was 103,400 acre-feet for the calendar year or 62 percent of the 50-year average of 165,780 acre-feet. Measured inflows at Willow Creek, Stone Creek, Deep River and Boundary Creek were 25,700; 5,300; 14,750 and 13,040 acre-feet, respectively. Total measured inflow to the refuge from all sites was 162,190 acre-feet. Approximately 2,000 acre-feet were released from Lake Darling between September 5 to 19 to partially reflood Pool 326 for the fall waterfowl migration.

Total outflow measured at Westhope for 1987 was 182,860 acre-feet. The peak release for the year was 2,260 cfs on April 15. Total outflow was 20,670 acre-feet more than the total measured inflow.

The Souris River flows south to north through the refuge, and 22,500 acres of water are impounded by five major dams and various cross dikes which form subimpoundments (see map).

Rubble Masonry Unit

This 300-acre unit was kept at normal operating level of 1424.0 by use of stoplogs in the rubble masonry dams #1 and #2. Due to ample flows, water was routed through this unit all year.

320 Unit

This pool was to be held at 1422.7 or Year 2 of the water management cycle to provide shallow water for optimum dabbling duck production habitat. Strong summer flows and local rain storms made stabilization at the planned level difficult. Minor raises in pool level and flooding of flats are believed to have triggered a botulism problem in this unit.

Benson Subimpoundment

This 800-acre unit was nearly dry for the spring and summer. Water was withheld from the unit to allow final work on water control structures installed by Ducks Unlimited and to allow mechanical cattail control. The unit was prescribe burned in late October.

Benson Subimpoundment following a late October burn. We accomplish a more complete burn on the cattails where the back fire crept into oxbows (grey area in center of photo). WJB

Remaining cattail and phragmites were mowed, and a sheepsfoot packer was used on portions of the unit in an attempt to inhibit cattail growth and create openings for waterfowl use.

Cattail stalks were mowed in December followng our October burn. WJB

A sheepsfoot packer was rented to see if compacting and perforating the marsh bottom will drive the frost down, killing cattail roots and opening up large dense stands of cattail in the Benson Sub-impoundment. WJB

A close up view showing perforations after packing. WJB

In addition, six large flax bales were placed in the unit for nesting structures.

326 Unit

This pool was to be in drawdown for 1987. Complete dewatering of the unit in one season is currently not possible because several low areas have inadequate drainage routes. Strong flows during spring and early summer hampered dewatering of Pool 326 until Pool 332 was lowered an additional 1.5 feet in June. Another problem was the heavy rainfall received in July and August. The channel capacity through portions of this unit is about 150 cfs, and increased flows from rain events re-flooded the drying mudflats several times. The pool was well drained by September. Emergent plant growth was fair to good in higher portions and very poor in areas that were prematurely reflooded. Sago pondweed was excellent in parts of the river channel and areas that remained ponded for most of the summer. With the help of 2,000 acre-feet of water from Lake Darling, the unit was partially reflooded in September for migratory bird use. Waterfowl response was excellent. The pool was maintained at this level until November 9, when the gates were opened to prepare for freeze-up.

A minor botulism outbreak occurred in a portion of the pool shortly after the problem was discovered in Pool 320.

Cranes, Canada geese, mallards, and northern pintails all took advantage of the reflooded vegetation in Pool 326. WJB

Redhead Marsh

Screw gates at Highway 14 were closed after spring runoff to hold water in this subimpoundment somewhat above the level of Pool 332. The level slowly receded through the summer since the only inflow to the unit is from Pool 326.

Gates were opened up on November 3 to prevent ice damage.

332 Unit

For continued cattail control, this pool was to be held as high as possible without interfering with the drawdown of Pool 326. The unit was lowered an additional 1.5 feet in June to facilitate the Pool 326 drawdown. Gates were opened on October 29 to prepare for freeze-up. Pool elevation at freeze-up was 1416.4.

341 Unit

The Corps of Engineers projected construction starts for Souris River Basin Project features and dam safety features on Dam 341 in 1988. The proposed level for the unit was 1415.3 or high phase to prepare for a drawdown in 1988 to coincide with construction activities. The high level was maintained throughout the summer. Gates were adjusted in November to lower the pool one foot for freeze-up and ice-cutting to protect the gates.

357 Unit

The proposed level of 1414.0 was reached in late June. This high level was in preparation for drawdown and anticipated construction of Souris River Basin Project features. Gates were adjusted in November to bring the pool to winter elevation.

An agreement between the State of North Dakota and the Province of Manitoba states, "North Dakota shall deliver from any available source during the months of June, July, August, September, and October 6,069 acre-feet of water at the Westhope crossing, regulated at the rate of 20 cubic feet per second... No account shall be taken of water crossing the boundary at a rate in excess of said 20 cfs". Maintenance of minimum flow into Canada is the responsibility of refuge staff.

Ice damage to the low-flow structure on this unit was discovered when operation was attempted in early summer. Due to delays in getting the proper parts, the structure is still not functional. With the high summer flows, there was no problem maintaining flow above the required minimum to Manitoba.

The U.S. Geological Survey (U.S.G.S.) maintains a stream flow gauging station to monitor flows of the Souris River into Canada. An automated telephone activated readout is used to monitor daily or even hourly changes in stream flow. A new weir constructed by U.S.G.S. in the fall of 1986 has greatly improved the reliability of readings. High flows during the spring overtopped the west bank just upstream from the weir, reopened a diversion channel used to supply minimum flow during construction and quickly washed out a large channel around the weir. Repairs were made promptly by U.S.G.S.

4. Croplands

A total of 900 acres was farmed by nine cooperators in 1987. Of the total, 137 acres were farmed biologically by one cooperator. An average production of 24 bushels per acre of barley and 8 bushels per acre of wheat was obtained on refuge lands. Because of hot, dry spring conditions and late summer rains pigeon grass accounted for as much as 35 percent of the crop. An additional 35 acres were farmed force account as part of our native grass seeding program.

1987 Crop Summary

Crops	Total Acres	Bushel Prod.	Refuge Share	Unharvested Acres
Barley	423	10,000	4,216	5
Wheat	269	2,160	50 large round bales	80
Corn	48	cut for sileage	10 ac left standing	10
Oats/DNC	45	900	0	0
Summer Fallow	75	0	0	0
Sweet Clover	40	0	0	0
Total	900			

About 2,100 bushels of barley were used at refuge banding sites and 830 bushels were used during the winter to maintain turkey, pheasant and deer feeders. In December 150 bushels of barley were transferred from the Kramer elevator to the Westhope elevator for a Wildlife Club winter pheasant feeding project. In addition a 2,500 bushel elevator transfer was made to Red Rock Lakes NWR for the Trumpeter Swan feeding program.

5. Grasslands

During the months of September and October, 4.2 miles of fire break were established around large DNC fields. This was done to allow prescribed burning to be used as a tool to manipulate DNC plantings. Hopefully this will prolong DNC plantings and reduce the number of years a DNC field will be in crop. It will also assist with our weed control efforts by establishing a more uniform growth rate of leafy spurge and allow mowing to be used as a weed control tool.

An additional 2.5 miles of fire break were put in around several four year old or less native seedings. The maintenance of these firebreaks will increase the efficiency of our prescribed burning program.

The refuge again cooperated with the Soil Conservation Service's Plant Materials Center to maintain a multi-variety warm season native grass plot. The plot was burned in mid May and treated with atrazene following the burn. This was supposed to be the last year of the four-year study which will determine the survivability of several varieties of warm season grasses. The SCS has requested a two year extension to further test drought resistance and effects of haying on forage production.

Plant Materials Center (SCS) native grass plots near headquarters. WJB

7. Grazing

A total of 4,535 acres was grazed on a rest rotation system during 1987. Ten permits covering 17 individual livestock producers were active. Approximately 80 percent of the acreage is crowd grazed from April 15 to June 15. Grazing rates varied from 0.8 to 1.25 AUM's per acre. Two units were grazed from May 15 to July 15 at approximately 0.75 AUM's per acre. This was the last year of the four-year permits. A new drawing will be held in the spring of 1988.

Arnold Kruse (NPWRC) toured the refuge in October to look over our current and proposed grazing program. Over the next few years, we want to put more pressure on the woody species that are expanding in the sandhills area of the refuge. We hope to use a combination of prescribed burning and intensive grazing to reduce aspen densities on current grazing units. Mid to late summer burns will also be utilized in an attempt to reduce woody invasion.

Grazing fees on the refuge are calculated annually based on USDA reported price for beef cattle and calves sold at West Fargo. In 1987 the fee was $7.65/AUM which generated $13,424.82 in refuge grazing income. Total receipts were reduced by $7960.20 for grassland improvements performed by permittees. This two-year experimental program was very beneficial to our weed control program. In addition to buying chemicals cooperators were given credit in their respective grazing units for treating noxious weeds.

8. Haying

A total of 24 cooperators hayed approximately 1,100 acres of wet meadow in 1987. The 24 hay permittees removed 996 tons of hay at $6.00 per ton for a total of $5,986. Haying is done to keep willow and dogwood from invading the wet meadow zone.

In addition to the regular hay permits, eight emergency hay permits were issued after the Governor declared a drought emergency for 15 northcentral counties in the state. A total of 270 acres was hayed after July 20. All areas were decadent stands of DNC that needed some form of manipulation.

9. Fire Management

Prescribed burning is currently being used to enhance native grassland, control woody species, thin out dense cattail stands and stimulate native grass seedings. Six separate burns totaling 1,827 acres were accomplished in 1987.

10. Pest Control

In order to better manage our noxious weed problems, an extensive mapping effort was undertaken in 1987. Approximately 20 staff days were spent mapping 75 percent of the refuge uplands. The time consuming task should be complete in 1988. The information will be very helpful when staff changes occur and to keep our noxious weed control boards informed of control efforts. This information along with existing soils information will help determine which areas are suitable for various control techniques.

As in 1986, approximately 50 percent of our weed control costs were covered by the experimental grassland improvement program described in Section F. 7.

11. Water Rights

Upper Souris and J. Clark Salyer staff met in March at Upper Souris refuge with the Eaton Irrigation Board to discuss spring operation. Since more than the District's 10,000 acre-feet water right had already passed through their leaky control structure, the Board was told no supplemental releases from Lake Darling would be made. As it turned out, ample flow in the Souris River below Lake Darling provided more than enough water for Eaton's use in spite of a leaky dam.

G. WILDLIFE

2. Endangered and/or Threatened Species

Nine Bald eagles were observed using the refuge during the spring and fall migrations. They were usually associated with large numbers of snow geese using the refuge as a migratory stop.

No whooping cranes or peregrine falcons were observed on the refuge in 1987. Several observations of piping plovers occurred on pool 320 during August. Extensive shorebird use of this pool was related to the partial drawdown.

3. Waterfowl

a. Ducks

Duck use recorded during 1987 was 10,081,415 use-days, 22 percent less than the 10-year average of 12,996,896. Duck numbers peaked during the first week of November with an estimated 38,300 birds. Of this amount 30,000 were mallards.

b. Duck Production

Duck production for 1987 was estimated at 12,445, a 0.9 percent decrease from the 1986 level of 12,536 and 28 percent below the most recent 10-year average of 17,434.

The brood count method used to estimate refuge duck production was developed by Merrill Hammond in the 1950's. The continued use of this method provides a consistent comparison with past years' production estimates, but many variables make the estimates inaccurate. Species percentages are inconsistent with nest drag and island searching results. Most of the brood transects were established in deeper portions of the pools and in the river channel itself. Varying water levels in the pools and river flows affect the counts dramatically.

In 1985 and 1986, no wood duck use was recorded for the refuge duck boxes. This year three successful nests were found in boxes on the river channel. In past years, more wood duck use has occurred in boxes along river oxbows. The remainder of the nesters were hooded mergansers.

Of the 99 boxes available, 41 percent were used, a decrease of 8% percent from 1986. Although fewer boxes were used, there was a 30 percent increase in success of the attempted nests. Only two clutches were destroyed by predators this year, with the remainder of unsuccessful nests being dump nests (Table V).

Nine new boxes were installed after the nesting season had begun, making a total of 108 boxes available of the 1988 nesting season.

The refuge is located on the northern edge of the wood duck's nesting range, and they are seen on the refuge throughout the summer and early fall. In the past, low box use by wood ducks was partially attributed to hooded merganser competition. Since over half of the boxes were not used by either species, this seems unlikely. Evidently there are enough natural cavities available for the few birds that nest here.

Table V

Duck Box Production 1987

	River	Oxbows	Total
Number of available nests	40	59	99
Number of Boxes Checked	40	59	99
Number of Boxes Used	16	25	41
Percent Used	40	42	41
Number of Successful Nests	14	19	33
Percent - Nest Success	87.5	76	80
Number of Dump Nests	2	4	6

c. Geese

Six giant Canada geese were the first spring migrants, arriving on February 10, two weeks earlier than past years. The peak spring goose population occurred on April 10 with an estimated 75,000 snow, 1,500 giant Canada, and 5,200 lesser Canada geese recorded.

Five snow geese stayed on the refuge for the entire summer. Fall migration of snow geese was first noted on September 10 when 200 birds were sighted. A peak of 115,300 snow and geese was recorded on November 4 during our aerial census.

Refuge snow goose population peaked on November 4 just prior to freeze-up. WJB

d. Canada Goose Production

Canada goose production in structures was estimated at 622 for 1987, a 48 percent increase from 1986 (Table VI). Gosling production on islands of pools 320 and 326 was estimated at 608 (See Section D.5).

Table VI

Canada Goose Production in Structures for 1987

Unit	Pool	Avail	Checked	Used	Successful	% Used	% Nests Succesful	Est Prod
A	Hay M	30	30	15	13	50	87	58
C	Hay M	15	15	7	7	47	100	32
D	Hay M	14	14	10	8	71	80	36
E	320	43	43	40	38	93	95	171
F	Benson	3	3	2	2	67	100	9
G	326	58	58	52	51	90	98	230
H	332	19	19	19	19	100	100	86
I	341	1	0					
TOTAL		183	182	145	138	79	95	622

e. Swans

Spring migration of tundra swans was first noted on April 4 with the peak observation for the season of 100 birds. Fall migration peaked at 475 on November 4.

4. Marsh and Water Birds

A total of 1,753,750 use-days was recorded for marsh and water birds on the refuge for 1987. Common nesters include eared grebes, American coots, American bitterns, black-crowned night herons, double-crested cormorants and pied-billed grebes. It is common to see flocks of 200 to 300 white pelicans feeding on the refuge, but they do not nest here. Two nesting areas occur in the Turtle Mountains approximately 35 miles northeast of headquarters.

Large numbers of fall migrant sandhill cranes occurred in 1987, as in 1986. In late September an estimated 5,000 birds were present. Most use occurred in Pool 326 which was in drawdown during the summer and reflooded in September.

5. Shorebirds, Gulls, Terns, and Allied Species

Franklin's gulls were the most numerous shorebird species on the refuge with two active colonies. Extensive mud flats in Pools 320 and 326 provided excellent habitat for a variety of species (Table VII).

The headquarters lawn provided good nesting habitat for this vociferous Charadrius. GAE

Table VII

Shorebirds at Salyer - 1987

	Peak Population
Ring-bill Gull	500
Franklin's Gull	25,000
Forster's Tern	150
Common Tern	2,000
Black Tern	5,000
Red-necked Phalarope	30
Wilson's Phalarope	6,000
Avocet	1,500
Common Snipe	1,700
Long-billed Dowitcher	5,000
Pectoral Sandpiper	1,000
Baird's Sandpiper	1,200
Least Sandpiper	20,000
Semipalmated Sandpiper	5,000
Hudsonian Godwit	100
Greater Yellowlegs	1,200
Lesser Yellowlegs	2,000
Solitary Sandpiper	500
Willet	500
Upland Sandpiper	500
Black-bellied Plover	500
Golden Plover	200
Killdeer	2,000
Spotted Sandpiper	500
Ruddy Turnstone	250

6. Raptors

Raptors known to nest on the refuge include red-tailed hawk; northern harrier; Swainson's hawk; American kestrel; and short-eared, long eared, and great-horned owls. Wintering species include snowy and great-horned owls, golden eagle and northern goshawk. Bald and golden eagles were seen during spring and fall migration.

The Raptor Rehabilitation Center established in 1986 at Fargo, NDSU Veterinary School was utilized by the refuge for three injured raptors this fall. Birds brought in to the refuge with minor injuries were treated here, while seriously injured birds were sent on to Fargo by way of Burlington Northern Railroad. Railroad employees have volunteered to transport birds from Minot to Fargo. Species brought in to the refuge include three red-tailed hawks, two American kestrels, one snowy owl and a golden eagle. X-rays in Fargo revealed four shot pellets lodged in the eagle's brain. The impact had caused detached retinas, leaving the bird blind. The Raptor Rehabilitation Center now uses the eagle for a traveling wildlife exhibit.

7. Other Migratory Birds

The refuge is rich in bird life with eastern and western North American avifaunas coming together in this region. Over 290 species have been recorded on the refuge. These include the numerous wood warblers, Baird's sparrow, LeConte's sparrow, Sprague's pipit and mountain bluebird to name a few.

The annual Audubon Christmas bird count was conducted on December 18. Thirteen species and 166 individual birds were observed.

In 1984, 43 bluebird nest boxes were constructed and erected by YCC enrollees. An additional 21 boxes were installed in 1986. Due to high use, 15 more boxes were erected in 1987 for a total of 79 boxes available. Of these, 97 percent were used.

Although tree swallows were more likely to abandon their nests than bluebirds, they were much more agressive in competing for nesting sites. In five instances, swallows had nested over bluebird clutches. The number of eastern and mountain bluebird nesting attempts increased dramatically from 1986, 86 percent and 80 percent, respectively.

1987 Bluebird Box Use

Species	# Attempted Nests	# Successful Nests	% Nest Success
Eastern Bluebird	22	18	82
Mtn. Bluebird	5	3	60
Tree Swallow	50	35	70
TOTALS	77	56	

8. Game Mammals

The refuge wintering white-tailed deer population continues to decline. An aerial count in March found approximately 500 deer, a 55 percent decrease from 1986 and a 62 percent decrease from 1985. The state's extended deer season is considered one of the reasons for lower numbers. Also the past two mild winters have forced fewer deer to the refuge.

10. Other Resident Wildlife

a. Resident Birds

Thousands of acres of CRP land in North Dakota should cause dramatic increases of all resident game birds. In McHenry County alone, over 40,000 acres have been enrolled.

1. Sharp-tailed Grouse

The sharp-tailed grouse census was conducted on traditional dancing grounds between April 7 and May 7. One new ground was located in the northern part of the refuge with twelve birds present. A total of 290 birds were counted (9.1 males/ground). This is a 5.8 percent increase from 1986.

2. Ring-necked Pheasants

The ring-necked pheasant population is increasing slightly due to the last two mild winters, but numbers are still very low. During the cock crow count only three cocks were heard on two routes with a total of 40 stops.

The Westhope Wildlife Club maintained feeding stations at the north end of the refuge during the 1987 winter. The club also raised and released approximately 500 birds in the vicinty of the refuge. To assist their project, the refuge donated several rolls of used chicken wire for pen construction. Also, 150 bushels of feed barley were given to the club for their winter feeding program.

The Westhope Wildlife Club built and maintained seven winter feeding stations on the north end of the refuge. WJB

3. Gray Partridge

No official census was taken on gray partridge, but their numbers are increasing. Large numbers of coveys were frequently seen along roadsides.

4. Turkeys

A stocking program to introduce wild turkeys on the refuge was undertaken in 1980 and 1981. This was a joint venture between the Service and the North Dakota Game and Fish Department. The species has adapted very well to the hardwood river bottoms and wooded sandhill areas of the refuge. Good production occurred this year, and numerous young birds were observed in fall flocks on or adjacent to the refuge. The winter population is estimated at approximately 450 turkeys.

Three-week spring gobbler seasons have been held since 1983. In 1987, the unit was expanded to private land, and 100 permits were issued from 359 applications through a lottery drawing conducted by the North Dakota Game and Fish Department. Fifty-four gobblers were harvested by 100 hunters. Of the birds harvested, 42.1 percent were sub adults as compared to the statewide average of 25 to 35 percent.

For the fifth year in a row a turkey hunting seminar was given prior to opening day. This course is well attended and very important since many successful applicants have never hunted turkeys before. Subjects covered included calling and hunting techniques, safety, ammunition, and gobbler identification. Approximately 75 license holders attended this year's seminar.

5. Ruffed Grouse

Ruffed grouse were introduced onto the refuge during the summers of 1980 and 1981. The breeding population is estimated by a spring drumming survey of males on activity centers. Based on past research, a state upland game survey index of 0.75 drums/stop or above indicates a thriving population.

This spring refuge staff coordinated with the state upland game biologist for hunting season recommendations since the 1987 count showed 2.05 drums/stop, a 68 percent increase from 1986. The area south of the Upham-Willow City Road was open to ruffed grouse hunting for the first time this fall. Indications from ND Game and Fish Department hunting surveys show about 15 birds were harvested on the refuge with very little hunting pressure.

b. Other mammals

Porcupine, coyote, red fox, squirrels, cottontail rabbit, white-tailed jackrabbit, snowshoe hare and various small mammals are common on the refuge. Sightings of three moose and

two mule deer bucks were reported during the fall. No elk sightings were reported in 1987. Coyote numbers appear to be increasing on the refuge with the majority of the refuge being occupied.

11. Fishery Resources

Northern pike remained at good levels in 1987. Fishing reports were good from the public who used the thirteen available sites on the refuge. Bullheads and walleye remained stable. Ice fisherman had good catches of 3/4 to 1 1/4 lb yellow perch in December below 326 structure. Also, limits of walleye were taken below Dam #1 and the 326 structure during the year.

Ice fishing is a popular winter sport. WJB

15. Animal Control

Barley was distributed to several locations on the refuge to accommodate the waterfowl banding program and resident wildlife. Blackbird and waterfowl depredation was not a problem this fall due to an early harvest of small grains.

16. Marking and Banding

The 1987 preseason banding quota was set at 4,000 mallards (1,000 of each age and sex), 500 pintails, and any incidentals.

Birds were banded throughout the month of September. Rocket nets were used at four sites from September 1 through 29.

This year's mallard total was 2,707, up from the 12-year average of 2,105 (Table VIII). Twenty-nine percent of the mallards were immatures, up from the 12-year average of 21.5 percent.

As in 1986, we had high numbers of wigeon and green-winged teal. Also, more wood ducks were banded than in past years. The warm fall may have caused a delayed migration of these birds.

Table VIII

1987 Banding Results

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total
Mallard	1,145	775	378	409	2,707
Northern Pintail	197	250	175	118	640
American Wigeon	124	200	51	107	482
Green-winged Teal	26	75	48	29	178
Wood Duck	21	2	1	0	23
Blue-winged Teal	0	0	0	2	2
TOTAL					4,032

The giant Canada goose flock at Salyer has grown to over 1,000 adults. Although band returns have been received from western Nebraska, very little is known about overall migration patterns or if summer molt migration take place. Efforts to use drive traps and rocket nets to capture these birds have met with little success. Two airboats equipped with generators and a battery of night lights were used to capture geese in 1987.

Ninety-nine geese were captured and banded on two southern refuge pools and the river channel between 320 and Dam # 1. All of these birds were transplanted to Lake Alice National Wildlife Refuge in the Devils Lake WMD.

17. Disease Prevention and Control

Botulism was a statewide problem in North Dakota during 1987. Salyer was no exception with an estimated 3,400 birds lost. (Table IX).

A spot check on July 27 revealed the initial outbreak in Pool 320. Dead birds were first found in Pool 326 on August 1. Peak losses occurred from July 28 to August 3 and August 17 to August 20. Before both of the peak outbreaks, heavy rains occurred on the refuge or within nearby drainages which caused water levels to rise. Precipitation for the month of July was more than double the normal, and on August 14, nine inches of rain were recorded just east of the refuge.

Pool 320 was held at the proposed operating level during the early summer which allowed some mudflats to be exposed. Pool 326 was being drawn down. In July and August, the dramatic change in the Souris River flows (ie 20 cfs to 500 cfs within 10 days) made it difficult to keep Pool 320 at a stable elevation and to get Pool 326 into drawdown. As a result mudflats were reflooded, intensifying the outbreak. Historically, Pool 320 has been the site of botulism outbreaks. It is the first pool to receive Minot's sewage effluent. As in past years, the site of the outbreak occurred in pool areas with poorly circulated water. In 1986, a much more severe outbreak occurred in Pool 326, with an estimated loss of 15,000 birds. Pool 320 was in drawdown while 326 was held at a high level. This left Pool 326 to receive Minot's effluent first. In 1987, 84 percent of the losses occurred in Pool 320 and 16 percent in Pool 326.

Anna Vos demonstrated some of the finer techniques of push starting an airboat during our botulism clean-up efforts. GAE

Daily removal of carcasses and pool checks were made via airboat. Maggot ducks were buried in a pit. Sick birds were transported back to the refuge compound and treated with 0.5 cc botulism antitoxin. Leaches were also removed from nostrils and each bird received fresh water. Birds were held in a pen with fresh water and food until recovery. The survival rate of treated birds was 75 percent.

Table IX

Estimated Botulism Losses
at J. Clark Salyer - 1987

Spp or Group of Spp	Number Picked Up Pool 320	Pool 326	Est. Total Loss	# Rehabilitated
Mallard	89	24	280	27
Green-winged Teal	198	85	700	53
Blue-winged Teal	215	20	590	50
Gadwall	35	16	130	15
Pintail	83	8	90	27
Wigeon	15	2	40	1
Shoveler	87	4	230	23
Coot	257	32	725	-
Gulls, Other Shorebirds	25	10	90	2
Unknown	203	12	535	10(other)
TOTAL	1,207	213	3,410	200 treated 151 survived

H. PUBLIC USE

1. General

The number one public use activity on J. Clark Salyer is waterfowl hunting followed by deer hunting. Other recreation activities that generate signficant numbers of visits are fishing and bird watching.

Refuge staff presented a variety of outdoor related programs throughout the year to over 1,200 people. Following is a list of programs given in 1987:

Organization	Topic	Month
Minot Air Forse Base Newcomers	FWS Programs Regulations Etc.	Every 6 weeks
Upham PTO	Alaska	January
Maxbass 4-H Club	Waterfowl ID	January
Minot AFB Boy Scouts	Winter Camping	January
Washburn Teachers	Project Wild Workshop	February
Glenburn High School	Science Fair	March
Minot Grade School	Trapping	March

Granville Biology Class	Refuge Tour	April
Spring Turkey License Holders	Turkey Hunting	April
Grand Forks Field Biology Class	Refuge Management	April
Towner Grade School	Refuge Tour	May
ND National Wildlife Federation Youth Camp	Refuge Ecosystems, Trapping(2 programs)	June
Bismarck Summer Biology Class	Refuge Tour	June
Metigoshe 4-H Youth Camp	Wildlife Biology	June
Minot Teachers	Outdoor Workshop	June
ND Natural Science Society Annual Meeting	Habitat Management	July
Minot AFB Day Camp	Refuge Tour	August
Upham High School	Field Biology	September
Bottineau High School (SCS Cons. Day)	Wildlife Management	September
NDSU - Bottineau	Waterfowl Banding (2 classes, 2 days)	September
KMOT - TV	Waterfowl Banding, ID and Canoe trail (4 progams)	
Minot AFB Sportmans Club	Waterfowl ID	September
Velva Teachers	Project Wild Workshop	November
Westhope Girl Scouts	Badge Fair	November
Minot Hunting Seminar	Steel Shot	September
Westhope High School	Refuge Tour	October

2. Outdoor Classrooms

This area is included in above table.

Youth from the North Dakota Wildlife Federation Conservation Camp spent a day learning about wetland and wildlife value. MG

Hands-on experience was gained sampling invertebrate life in one of the refuge marshes. MG

4. Interpretive Foot Trails

The refuge has two foot trails that receive public use approxiately four months out of the year. The Sandhills Walk consists of an access point off the scenic trail. It offers visitors a chance to view the mixed aspen, burr oak, and grassland community that make up about 8,000 acres of the south end of the refuge. There is also a 1/10 mile foot trail at headquarters that meanders through a native grass seeding to a marsh overlook observation tower.

5. Interpretive Tour Routes

There are two auto tour routes available to the public. A five mile Grassland Trail, which parallels a portion of Pool 341, offers visitors a good opportunity to view grassland wildlife and scenery. Many avid birdwatchers go to this area in order to observe the Baird's sparrow. Another 22-mile auto tour route begins at headquarters and meanders south along Pools 326 and 320 before heading into the sandhills area of the refuge. The scenic trail has an 18-station interpretive pamphlet which highlights many refuge activities and historical sites. In June, new guide signs were installed to accompany the new brochure which was produced in late 1986 (Sample of Auto Tour Guide is in back cover pocket).

Signs and sign posts are popular for perching birds in many areas of the refuge. RLH

Our new Scenic Trail guide signs are of a birdproof design that appears to be working very well..... RLH

...at least on the front side. RLH

In addition to the two auto tours, the refuge offers a 13-mile canoe route. The route begins at the Johnson Bridge and winds downstream through hardwood river bottom to a take out point just above Dam I. An alternate take out point at the Thompson Well shortens the route to 5 1/2 miles. In 1985 the 13- mile canoe route was designated as part of the National Trails System. A Souris River Canoe Trail brochure is provided to canoeists at headquarters and the Johnson Bridge launch area.

6. Interpretive Exhibits/Demonstration

Refuge personnel helped staff a FWS display booth at the North Dakota State Fair in Minot. Waterfowl identification workshops and FWS/Minot AFB Orientation sessions were given throughout the year (see section H. 1). Personnel from Upper Souris and J. Clark Salyer NWR's participated in Minot's annual Law Enforcement Day with a display and information booth.

7. Other Interpretive Programs

Refuge staff offer a 14-hour North Dakota Hunter Safety Class each May. From 10 to 20 students ranging in age from 10 years to 21 years are certified each year.

Prior to each year's spring turkey season the refuge hosts a Turkey Hunting Seminar. Because of the increased number of permits (50 in 1986 - 100 in 1987), the seminar was moved from refuge headquarters to the Upham School cafeteria. This year's seminar was attended by about 75 interested sportspersons. Local turkey calling experts were invited in to demonstrate hunting techniques. A video on turkey calling was shown along with presentations on sex identification, refuge regulations and hunter safety.

8. Hunting

a. Waterfowl

There are 9 designated public hunting areas on the refuge and 15 waterfowl retrieval zones along the boundary. Waterfowl hunting accounts for more public use than any other activity on the refuge. In 1987, 4,050 visits were recorded.

Due to a very mild fall, large numbers of ducks and geese stayed in the area through the second week of November. Duck hunters had good success, but field decoy hunting and pass shooting for snow geese was poor. Mild weather, abundant food supply and a larger percentage of adults in the flocks contributed to the poor hunting.

b. Upland Game

Hunting is allowed on nine designated public hunting areas and south of the Upham-Willow City Road for sharp-tailed grouse, ruffed grouse, ring-necked pheasant and gray partridge. After

deer season closes, the entire refuge is open for the remainder of the upland game state season. Spring turkey hunting and ruffed grouse hunting are allowed south of the Upham-Willow City Road during the state seasons.

Hunting pressure was up with fairly good success reported for sharp-tailed grouse and pheasant. The last two mild winters have helped boost the numbers of these game birds.

c. Deer

The entire refuge, with the exception of the headquarters area, is open to archery and firearm deer hunting. Four hundred permits (160 antlered, 240 anterless) were issued for the first 1 1/2 days. The remaining 22 days of the season were open to anyone possessing a state permit for Unit 3A4. The state issued 3,400 permits for Unit 3A4. Twenty-five percent of these were second antlerless permits to help control depredation problems on private lands. That is currently not a problem near the refuge. Since the aerial survey numbers have been declining for the last several years, only one deer per hunter was allowed to be taken on the refuge.

Hunters reported seeing fewer deer than in past years. A very warm fall and no snow made locating deer more difficult. The longer season increased hunting pressure, but left fewer hunters on any given day to move the deer around.

Sometimes hunting the Salyer marshes gets to be alot of work... WJB

...but sometimes hard work pays off. WJB

A post-season survey was sent out to a 10 percent random sample of refuge permit holders and Unit 3A4 permit holders to get an estimate of the refuge harvest. According to the results, an estimated 407 deer were taken. Past years' estimates have been in the 100 to 200 deer range. Peak deer hunter use occurred on the first sunday when 659 hunters were recorded on the refuge.

9. Fishing

Thirteen public fishing areas provided enjoyment for 2,255 visitors in 1987, compared to 2,685 in 1986. Fishing pressure was high at Dam # 1, Freeman Bridge and 326 structure when fish were active. Ice fishing was very popular in 1987. Up to 10 ice houses were counted near the Newburg crossing in December. Most common fish taken were 1 to 5 lb northern pike with up to 3 lb walleye and 1 lb perch being less common.

10. Trapping

Announcements were placed in several local newspapers, for experienced trappers of fox, raccoon, mink, skunk, muskrat and beaver. Interest for refuge trapping was low again this year with only four trappers showing an interest.

Three special use permits were issued for the taking of fur-bearers on the refuge in accordance with state regulations. A $300 fee was charged.

The rebate system established in 1983 to increase trapping pressure on skunks and raccoons was used again this year. After the first ten animals trapped, a $5 rebate was subtracted from the total permit fee for each additional animal taken.

Total numbers of animals trapped has declined over the past ten years due to lower fur prices (Table X). Reevaluation of the present rebate system may be needed to put even more trapping pressure on skunks and raccoons since this year's catch was only 53 percent and 68 percent of the ten-year average for raccoons and skunks, respectively.

Table X

Species	Recent Ten Year Average	# Trapped in 1985	# Trapped in 1986	# Trapped in 1987
Badger	7	3	7	6
Beaver	54	116	7	111
Coyote	2	2	9	1
Fox	89	84	49	60
Mink	148	58	18	46
Muskrat	640	1	2	57
Raccoon	41	49	21	22
Striped Skunk	98	50	41	67
Weasel	23	1	0	2
Total	1102	244	154	271

11. Wildlife Observation

Over 5,900 visitors were recorded for 1987 at the refuge. Fall and spring waterfowl migrations account for the most visits. Wildlife photography and serious "birders" looking for game and nongame species are increasing. The grassland trail attracts many out-of-staters looking for prairie sparrows.

14. Picnicking

Picnicking occurs at most fishing areas, refuge headquarters, the sandhills tower and the Thompson Well. Only light use is observed during the summer and fall.

17. Law Enforcement

Most law enforcement work is done during the waterfowl, big game and summer fishing seasons. A summary of 1987 violations is listed below:

Violation	Fine
No Duck Stamp	$ 50.00
Exceed the daily limit(canvasback)	$ 50.00
Taking or attempting to take migratory waterfowl with the aid of a motor vehicle	$ 50.00
No fishing license	$ 50.00
Exceed daily limit(pintails)	$ 50.00
Illegal entry and use	$ 50.00
Violation of State law - no deer tag in possision	$ 50.00

I. EQUIPMENT AND FACILITIES

1. New Construction

The woodchip trail near the headquarters area observation tower was started by YCC in 1986. It was completed this spring by student volunteers from the Environmental Science Class at NDSU-Bottineau and by our YCC crew.

After a review of heating problems and cost in the headquarters building, Engineering recommended installation of rooftop propane furnaces as a primary heat source and retention of existing electric forced air units as backup. Air Ranger, Inc. of Golden, CO was the successful bidder for the project at $23,970 and began work on October 30. Delays in obtaining the furnace units and the 1,500 gallon propane tank specified in the contract put the project at a standstill by mid November.

2. Rehabilitation

Finish work around three water controls installed in the Benson Subimpoundment of Pool 326 by Ducks Unlimited in 1986 was completed. These improvements allow better water management on up to 800 acres in the subimpoundment when the remainder of the pool is in drawdown.

A major identifier/directional scenic trail sign which had been pushed over and damaged by vandals was rebuilt and reinstalled. The new scenic trail guide signs received late in 1986 were also installed.

A washout around the new gauging weir which was installed at Westhope by U.S.G.S. in the fall of 1986 occurred during the peak of runoff this spring. U.S.G.S. completed the repairs.

The road to the Westhope gauge was gravelled, and we continued to work on improving the Scenic Trail by reshaping the shoulders and gravelling.

Metal pipe gates were installed at ten major service access points to replace old wire field gates. Additional gates were acquired for installation in 1988.

The east half of the old office building was lined with hardware cloth and sheet metal to provide a mouse proof seed storage area.

Our nine public hunting areas were reposted with up-to-date "Public Hunting Area" and "Retrieval Zone" signs.

The propane tank for the "Barn" was relocated and the septic tank for this facility was replaced after the old tank began to cave in.

Approximately 250 cubic yards of rip-rap were delivered to the headquarters area for placement on Pool 326 islands during the winter.

3. Major Maintenance

Vacancies in two maintenance positions had a definite impact on our maintenance program. We managed to keep up with routine equipment and facility maintenance, but major projects were limited. Approximately $17,000 were expended on routine maintenance items.

Our airboat was subjected to extensive use during botulism patrols in 1986 and received an engine overhaul this spring. Several blown oil lines were experienced after the overhaul. Fortunately shutdown was accomplished before any damage was done.

The TD-18 received major clutch repair before it was loaned out to the Minnesota Wetlands Complex. Estimates for repair of our TD-6 exceeded our purchase authority and pocketbook, and repairs were not accomplished this year.

4. Equipment Utilization and Replacement

About $2,000 was expended for small equipment replacement. Larger items included:

1. An updated telephone system was purchased to replace our old leased equipment.

2. The lawn tractor used for headquarters lawn maintenance and snow removal was replaced.

3. Two twenty-year-old refuge radios were replaced and an additional state radio was purchased for law enforcement work.

4. Our high maintenance copier was replaced.

5. One 4x2 pickup was replaced, and a 4x4 ordered in 1986 finally arrived at the end of the year.

6. New holding crates for our duck banding operation were constructed by a local welding shop.

7. Four rocket nets were replaced.

8. A 1940's vintage boat trailer was replaced, and an additional trailer was purchased.

9. An eight foot chisle plow was purchased.

10. The plastic conference room chairs which were obtained from surplus property during a furniture freeze were replaced.

5. Communications Systems

New POETS telephone equipment was purchased and installed at the beginning of the year. The system seems to be very versatile and has plenty of room for expansion. Along with the new equipment, instate and out-of-state WATTS lines were installed and have resulted in a savings on long distance calls.

6. Computer Systems

The station's Digital Rainbow 100A continues to receive heavy use. An attempt was made in mid summer to acquire a new system with funds from salary savings and deferred moving expenses. However, the Regional Office already had a back log of orders, and the equipment could not be obtained.

7. Energy Conservation

After an evaluation of heating problems and costs in the headquarters building, Engineering recommended installation of a new heating system (See I.1).

J. OTHER ITEMS

1. Cooperative Programs

Cooperative planning with the Corps of Engineers on the Souris River Basin Flood Control Project continued through the year. This project to provide 100 year flood protection for Minot was authorized by the 1986 Water Resources Development Act which allows the United States to study reservoir projects in Canada for flood protection in the United States and to spend up to

$41.1 million to purchase flood storage behind the Rafferty and Alameda Dams in Saskatchewan. If an agreement between the United States and Canada cannot be consummated, the Corps of Engineers is directed by the act to raise the dam at Lake Darling on Upper Souris NWR by approximately four feet and to implement upstream and downstream flood control measures as directed by the Energy and Water Development Appropriation Act of 1982.

The first half of the year was devoted to information gathering by the Corps of Engineers to write an Environmental Impact Statement and to further refine the proposed operating plan for the Canadian reserviors and Lake Darling for flood control. An agreement in principle on the proposed operating plan was signed in May by key government officials on both sides of the border.

In August, the Souris Basin Development Authority released a multivolume Environmental Impact Statement addressing the construction of the Rafferty and Alameda Dams in southeastern Saskatchewan. This EIS addressed only the construction of the dams. It did not address important project related impacts such as impacts to the United States from reduced water supply, the potential for increased wetland drainage to augment water supplies to the reservoirs and resulting effects on North American waterfowl, and water quality impacts. The discussion of impacts to wildlife placed emphasis on future studies and very little on firm mitigation measures.

A three-person Board of Inquiry, appointed by Saskatchewan Premier Devine, held public hearings in Saskatchewan to gather public information in order to make a recommendation to the Department of Environment regarding licensing of the construction. At the end of the year, the Board had not made its recommendation.

A separate EIS covering construction of the proposed Shand Power Plant in Saskatchewan was also released. The plant will depend on the Rafferty reservoir for cooling water.

The Corps of Engineers released a draft EIS in late November on the flood control operation of Lake Darling and the Canadian dams. As with the Canadian EIS, this document failed to address the water supply impacts created by the construction of Rafferty and Alameda and development of Saskatchewan's ability to retain its legal (under treaty) 50 percent of the natural flow of the Souris River as measured at the Sherwood border crossing. The Corps' EIS also fell short in addressing flood control impacts on Upper Souris and J. Clark Salyer National Wildlife Refuges. With input from the Fish and Wildlife Service, the Corps began rewriting sections of the EIS at year's end to include all impacts. The Service agreed to take responsibility for a low flow analysis. The objective of this rewrite is to have thorough documentation of both flood control and low flow impacts and mitigation requirements which will

allow the Fish and Wildlife Service to make the necessary compatibility determination to allow construction of project features on the two refuges.

Following release of the three Environmental Impact Statements, environmental groups on both sides of the border became involved in writing position statements and letters of concern to both governments. Most groups are calling for a delay in the projects until a comprehensive environmental analysis which deals with all aspects of the projects can be completed and subjected to public review. Major groups involved include the Saskatchewan Wildlife Federation, the National Wildlife Federation, the North Dakota Wildlife Federation, the North Dakota Chapter of The Wildlife Society and the Dakota Chapter of the American Fisheries Society.

2. Other Economic Uses

An environmental assessment was developed for proposed competitive oil leasing on three refuge tracts determined by the Bureau of Land Management to be suffering from drainage. One tracted was leased with a no surface occupancy stipulation.

4. Credits

Anna Vos wrote Sections D.5, E.6, F.2, G. and H.8-11, Bill Berg wrote Sections E.2, 4, 7, 8, F, H. 1-7, 14, 17, and I. 3-4. Gary Eslinger wrote Section B. Bob Howard wrote the Introduction; A; D.1-3; E.1; I.1,2,5,6,7 and J. 1-4 and edited the report. Nancy Smette typed and assembled the report.

K. FEEDBACK

ADMINISTRATION

J. Clark Salyer National Wildlife Refuge is administered by the Fish and Wildlife Service, U.S. Department of the Interior. Headquarters is three miles north of Upham and can be reached by turning off U.S. Highway 2 at Towner, North Dakota and proceeding 26 miles north on State Highway 14.

Inquiries should be mailed to the Refuge Manager, J. Clark Salyer National Wildlife Refuge, P.O. Box 66, Upham, North Dakota 58789.

OUR NATIONS'S WILDLIFE

The National Wildlife Refuge System is a collection of lands and waters which was begun in 1903 when Theodore Roosevelt established tiny Pelican Island refuge in Florida. Now almost 400 National Wildlife Refuges enable you to catch a glimpse of a unique wildlife heritage, and provide you a yardstick against which you can contrast the quality of your own environment. Over 45 million acres of land and water afford opportunities conditioned only by your care and discretion for experiencing wildlife habitat of unequaled variety.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

RF6-62620-1 GPO 854-427 Revised 1987

J. CLARK SALYER

NATIONAL WILDLIFE REFUGE
NORTH DAKOTA

DOUBLE-CRESTED CORMORANT COLONY

OTHER WILDLIFE

Although waterfowl concentrations of spring, summer and fall are spectacular, the attention of bird observers is also directed to other birdlife making use of the vast and varied habitat. Salyer Refuge is in the geographical zone which separates eastern and western species and, therefore, hosts birds from both areas.

Many species of shorebirds and grebes, the white pelican, sandhill crane, lark bunting, longspurs, and the sparrows—including Baird's and LeConte's, are among the list that take summer residence on the refuge. A double-crested cormorant colony is located in the southern portion of the refuge.

The management of upland areas for waterfowl nesting habitat and food production also has benefitted upland game birds. The sharptailed grouse, which has been declining in many areas outside the refuge, has responded favorably. Ring-necked pheasants are able

FUR HARVEST

to cope with the rigorous North Dakota winters and produce young in the upland management areas. Gray partridge, ruffed grouse, and wild turkey are also occupants of the uplands.

Many interesting mammals can be found on the refuge. Beaver are plentiful along parts of the river. Other native fur animals such as the mink, raccoon, weasel, and skunk can be found at home in the marshes. The higher ground, which includes the sandhills area in the southern third of the refuge, harbors such animals as the white-tailed deer, coyote, red fox, badger, porcupine and rabbit.

ECONOMIC USE

The refuge is involved with many aspects of land management. Neighboring farmers grow crops on nearly 1,000 acres. Refuge share of the crop is either left standing or harvested for wildlife feeding programs. Haying is permitted on 2,500 acres after the waterfowl nesting season. Grazing is used as a management tool on about 4,000 acres annually.

Oil wells were first drilled on refuge lands in 1965 and today several wells are in operation along the boundary. Fur trapping is carried out on a limited basis with mink, muskrat, red fox and raccoon being taken. Other small scale uses include wood harvest for firewood and bee colony operations.

J. Clark Salyer II (1902-1966) was chief of the Division of Wildlife Refuges, U.S. Fish and Wildlife Service from 1934 until 1961. His vision and hopes of a national wildlife refuge system are reflected here.

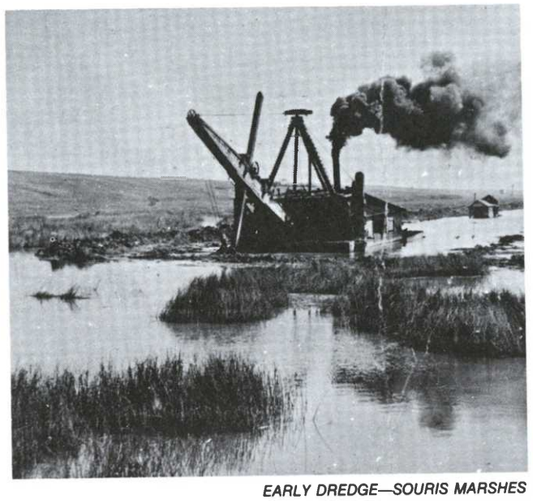
This refuge, containing 58,700 acres, was established in 1935 along the lower reaches of the Souris River in the United States. It serves as an important feeding and resting area for hundreds of thousands of waterfowl which annually migrate through the Central Flyway. The refuge also has been developed into one of the important duck production areas in the United States.

A HISTORY OF MISUSE . . .

Prior to 1900 the prairies of North Dakota abounded with buffalo, waterfowl and vast expanses of grasslands that will never be known again. Shortly after 1900 man began breaking the sod and draining valuable lowlands with expectations of fabulous crop production. The marsh areas, however, did not lend themselves to complete agricultural use and many crop failures occurred.

Finally, most farming efforts were abandoned and the land was allowed to endure Nature's whim. The drought period of the 1930's added its devastating effect, and desolation of wildlife habitat was the ultimate result. Thus, man had once again initiated and aided complete destruction of valuable waterfowl habitat with an ill-conceived plan to produce cash crops on land entirely unsuited for this purpose.

During these critical times the Federal Government stepped in to establish refuge areas for the preservation, propagation and protection of waterfowl.



EARLY DREDGE—SOURIS MARSHES

. . . THEN MARSH RESTORATION

To accomplish restoration of the marshes, a series of five low dikes were erected to create pools along the 75 miles of river included within the refuge boundary. Prior to flooding, nesting islands were constructed. Then, as the waters of the Souris River slowly inundated the valley once again, tons of aquatic plant seeds, stems, tubers, and roots were gathered from still-existing water areas many miles away and planted in these new marsh areas. Improved water conditions finally returned and large flocks of waterfowl responded to this haven for marsh-loving wildlife

The refuge has now become a favorite spot for birds of all descriptions to stop on their migrations north and south. More than 250 species of birds have been observed since the refuge was established. Nearly 125 species have been found nesting.

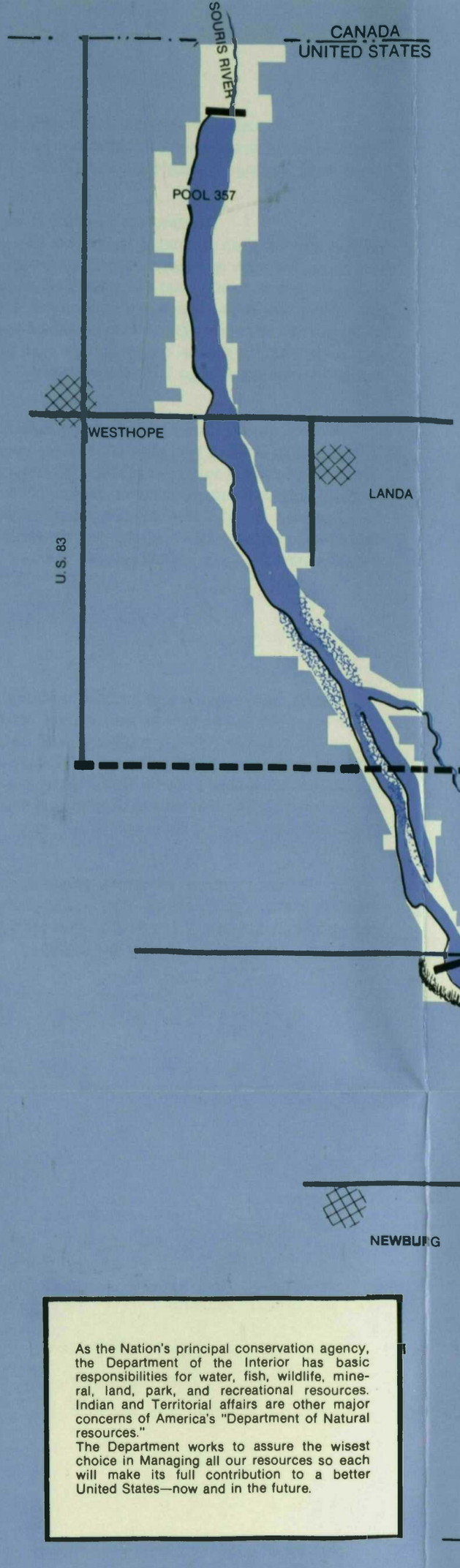
DUCKS IN SOURIS MARSH TODAY
ED BRY

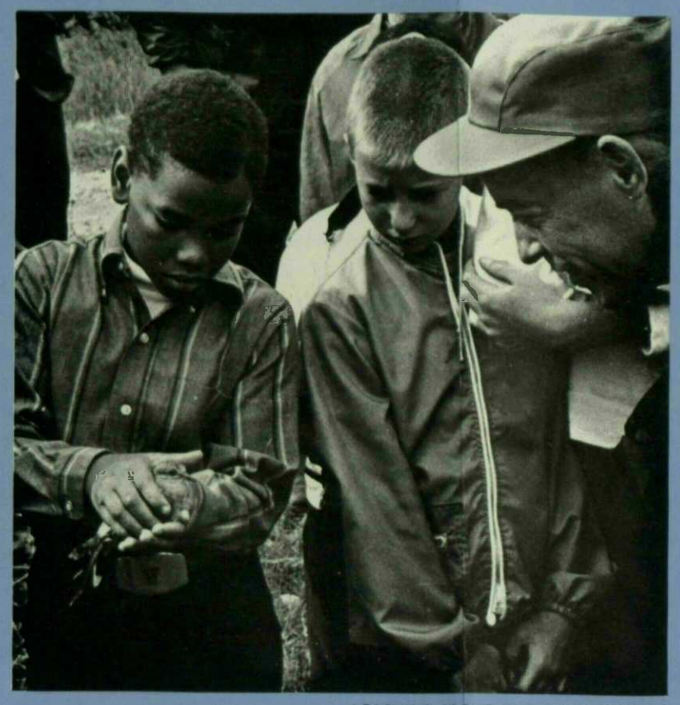
WATERFOWL TODAY

Peak waterfowl numbers of more than 200,000 birds have occurred during the spring and fall migrations, with more than 100,000 being the normal influx. During the summer, breeding waterfowl and their young are joined by thousands of moulting adult ducks from smaller water areas as far as 100 miles away, seeking the protection of the sheltered bays during their moult. They are flightless for several weeks during this period.

Refuge marshes contain 50 natural and man-made islands which provide excellent nesting habitat for waterfowl. Recent studies show up to 80 nests per acre may be found on some islands, and overall nesting success is much greater than on upland habitat adjacent to the marshes. While their total area is only about 75 acres, these islands may account for up to 30 percent of the total refuge duck production in some years. Relatively high security from predation by mammals is the major factor in the hatching success of waterfowl nests on the islands. Gadwall, blue-winged teal, mallard and Canada goose are the most numerous island nesters.

A good example of the response of wildlife to a well planned management program is the re-establishment of the Canada goose as a breeding summer resident. History indicates that these magnificent birds were once nesters in this area but probably were eliminated during the homesteading era by overshooting. A small flock of captive birds was transferred here in 1937. Goslings which hatched from these few pairs have survived subsequent hunting seasons to return and raise young of their own. The nesting flock of wild "honkers" has gradually increased so that now from several hundred goslings are produced each year.





LEARNING ABOUT OUR ENVIRONMENT

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural resources."
The Department works to assure the wisest choice in Managing all our resources so each will make its full contribution to a better United States—now and in the future.

J. CLARK SALYER
NATIONAL WILDLIFE REFUGE
UPHAM, NORTH DAKOTA

SCENIC TRAIL
GRASSLAND TRAIL
CANOE TRAIL
PAVED HIGHWAY
IMPROVED PUBLIC ROAD
VILLAGE OR CITY
WATER AREA
MARSH
OBSERVATION TOWER

FOR YOUR OUTDOOR ENJOYMENT

Scenic Trail A 22-mile auto trail beginning at headquarters and winding through the southern portion of the refuge before ending at State Highway 14 helps explain wildlife management programs and describes the marshland, wooded river bottoms and sandhills along the route. Trail is in generally good condition from early May through September.

Grassland Trail A five-mile auto trail leading north from the Newberg Road is open to the public. The trail goes through prairie grasslands and travels along the river marsh. Usually the trail is open from May 1 to September 15 — Travel not advised during wet weather.

Canoe Trail A unique 13-mile stretch of natural river bottoms rich in beauty, woodlands and wildlife. Floaters have the choice of traversing the entire length or a 5½-mile portion. An interpretive refuge leaflet is available for your use. (This trail is a designated National Recreation Trail.)

Photography and Birdwatching Many opportunities exist for interested amateur and professional people. Observation towers at headquarters and in the sandhills are open. The varied habitat attracts more than 250 species of birds and wildlife photography often is rewarding. Refuge bird lists and information on specific species are available at headquarters.

Hunting Upland game, big game and waterfowl hunting are provided in accordance with State seasons and regulations. Contact Refuge Manager for information on specific areas, yearly dates and regulations pertaining to hunting on a National Wildlife Refuge.

Fishing in Summer Fishing and boating shall be in accordance with all State laws and federal regulations. Fishing is permitted on 900 acres of refuge waters. Contact the Refuge Manager for information on the 13 open areas.

Winter Ice Fishing Ice fishing is permitted on all refuge waters between the dates of December 15 and the end of the State fishing season.

Picnicking Three picnic areas are located on the refuge.

Fires Open fires are prohibited.

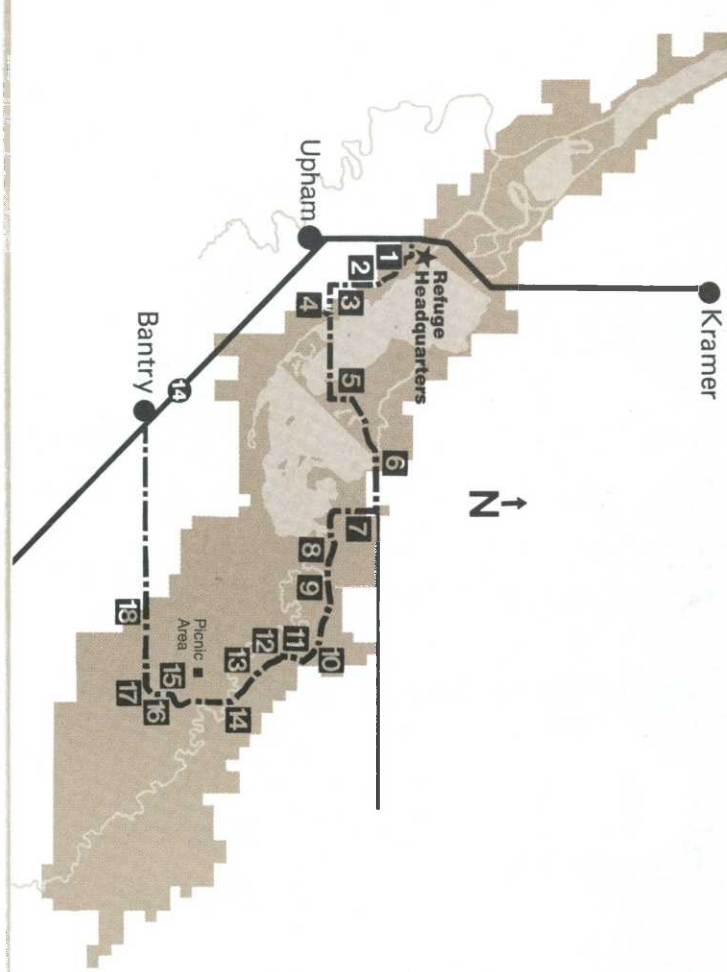
Hours Refuge areas are open between 5:00 am to 10:00 pm daily.

** Contact Refuge Manager or check state proclamation for yearly dates and regulations pertaining to hunting and fishing. State license is required.*

WOODED-MEANDERING RIVER BOTTOM

Auto Tour Guide

J.Clark Salyer National Wildlife



*U.S. GOVERNMENT PRINTING OFFICE: 1986-0-676-167/40004

WELCOME to J. Clark Salyer National Wildlife Refuge.

Established in 1935 for the preservation and propagation of migratory waterfowl and other wildlife, the refuge is nearly 59,000 acres in size, extending along the Souris River for 50 miles between Bantry, North Dakota and the Manitoba border. Originally called Lower Souris Refuge, it was renamed in 1967 in honor of J. Clark Salyer II, who was a biology teacher in Minot, North Dakota and went on to become the Chief of Refuges for the U.S. Fish and Wildlife Service.

The name "Souris" is French for "mouse." Before 1800, French explorers found the Indians calling the stream "the mouse river" because of the great number of mice found in the meadows on the banks of the river.

A 22-mile tour covering marshes, wooded river bottoms and sandhills of the refuge starts here and ends north of Bantry on Highway 14. Kramer is the nearest source of gasoline.

Nursery

This tree nursery to your left was established in 1935, and from it the Civilian Conservation Corps planted most of the trees now at headquarters. This nursery and similar tree groves are valuable winter habitat for pheasants, deer and small animals as well as being attractive summer nesting areas for songbirds.

Pool 326

A dam north of Headquarters forms Pool 326 to the left (east). Farmers of the early 1900s drained the natural marsh that was here for farming, but such operations failed. The dam impounds the water, thereby restoring the marsh. Water levels are controlled to stabilize marsh vegetation, prevent flooding of nesting areas and encourage growth of food-producing aquatic plants.

Also notice the wildlife observation and photo blind where ducks, geese and water birds such as the American avocet or eared grebe can be seen. Please feel free to walk down and use the blind except when the banding sign is in place. This indicates that refuge personnel are banding waterfowl.

Refuge personnel band about 4,000 ducks each year. Band returns have been received from South America, Mexico, Canada and from all regions of the United States.

To the left is a typical refuge wildlife cover patch, established by seeding a Dense Nesting Cover mixture of sweet clover, alfalfa and two types of wheatgrass on a former farm unit. These patches maintain good vigor and provide excellent wildlife cover for 5-10 years after establishment. Some type of manipulation is then required to rejuvenate the cover. This is often done by farming the areas for a few years before reseeding.

Grain from the farming operations keeps ducks on the refuge during harvest season, attracts ducks to banding sites, and is winter food for pheasants, partridge, grouse and deer.

Marshland Wildlife

The Scenic Trail continues left on the Upham-Willow City road. To the left in Pool 326 are small platforms on poles in open water areas where wild Canada geese nest, safe from flooding and predators such as raccoons. The refuge marshes contain over 200 of the artificial nests where several hundred goslings are produced annually. Visitors may see different species of ducks in the road ditches ahead. The tour route continues straight ahead to stop 5.

Leconte's Sparrow

Refuge visitors may find Leconte's sparrow in one of its few habitats in the midwest. This small, interesting bird, which is uncommon and difficult to see, seeks meadows with tall grassy areas like those directly ahead.

Pool 320

Dike and water control structure 320, directly ahead, extends southwest for nearly three miles, creating a pool and marsh of 4,300 acres. Here visitors can observe ducks and many other water birds. Visitors are welcome to walk up on the dike and look out over the marsh. Canada geese and many ducks use the islands to nest. Gates of the control structure may be raised or lowered to achieve desired pool water levels. PLEASE REFRAIN FROM DRIVING ON THE DIKE OR GOING NEAR THE CONTROL STRUCTURE — IT IS A DANGEROUS PLACE.

Refuge dikes and the pools behind them are numbered (320, 326, etc.) to correspond with the number of river miles from where the Souris River enters North Dakota from Canada. The last 75 of 358 river miles within the state are in the refuge.

The main road brings travelers across the Freeman Bridge, named for a pioneer family in this area, to one of 13 public fishing areas on the refuge. Diving ducks and cormorants (large black birds) may also be visible.

Follow the county road ahead for 1½ miles and turn right at the "Scenic Trail" marker. This is a dry weather road only. Fire danger may be high so please be careful if you smoke.

"End of the Woods Crossing"

Ahead, where the timber along the river ends, was once a crossing well travelled by Indians, fur traders and explorers. They call it "End of the Woods." From here north was open prairie. In 1852, Charles Cavelier, a customs collector, camped here for 21 days. About 40 Indian families were also living here. Cavelier recorded that their hunters killed more than 400 buffalo in one chase during his stay.

Grazing units are located on both sides of the trail. Refuge neighbors have grazing privileges on 12,000 acres. Refuge managers permit cattle to graze early in the growing season to retard growth of grasses less valuable to wildlife. This encourages growth of warm season native grasses of more value to wildlife.

River Oxbow

To the right is a river oxbow slough, a good place to see ducks. The meandering river forms these water areas by changing its channel over the years, which isolates an oxbow, or loop, in the river. The oxbow is habitat for tree-nesting ducks and their broods. Across the slough is a cedar nesting box erected to attract tree-nesting ducks such as hooded mergansers and wood ducks.

Water Control

To your right, Dam #1 crosses the river. It was built in 1936 to divert water to the marsh on the left. The dam also maintains water levels in the river, filling old oxbows to the south. Water diverted at Dam #1 flows back into the river near Dam #2. This is where the Canoe Trail ends.

There are 25 hay units on the refuge. Each unit is about 100 acres and the hay permittee cuts one-half of the unit each year. Haying of the 2,500 acres is used, along with burning, as a technique to control the invasion of brush species (such as willows).

Willow Creek

The woods follow Willow Creek, a name the Indians gave the small stream. Porcupine and deer are common here. Wood ducks are sometimes seen along this wooded creek.

Twining Expedition

On September 8 and 9, 1869, Captain W. J. Twining of the U.S. Engineers Corps camped near here. He was making a reconnaissance of northeastern North Dakota, including the Souris River and Red River valleys. From here Twining's party made a circle of the southeast back to Ft. Totten, where he arrived on the 18th of September.

Just ahead by the spruce trees is the Thompson Place, a farm home before establishment of the refuge. Visitors will find here picnic tables and a well with good drinking water.

Prescribed burning is used by wildlife managers to control monotype stands of grass and the invasion of brush species. To your right is an area that is prescribed burned every three to four years. Notice how sparse the willows are, compared to the area on your left which has not been burned for many years.

Johnson Bridge

The Scenic Trail now crosses the Souris River on the Johnson Bridge. Historians believe the Indians used a crossing about 100 feet to the right of the bridge. Beaver inhabit this part of the river. Look for red squirrels, wood ducks and hooded mergansers. This is also the beginning of the refuge canoe trail.

Early History

The Scenic Trail now leaves the river bottom and enters the sandhills. An early day cattle operation, the famous Stevens Ranch Company, based its headquarters on the first sand ridge entering the sandhills. Texas longhorn cattle were shipped here around 1900 but were not hardy enough to withstand the cold North Dakota winters. Some say these Texas herds furnished the foundation stock for nearly all the cattle produced in this area.

Two miles southeast is the Cole Ford, another famous crossing used by Sioux, Chippewa and Assiniboine Indians, fur traders, trappers, explorers and even cars in more recent years. The late historian Dana Wright said of it, "This was a well established rendezvous known to every plainsman on the northern prairies."

Sandhills

These tall sand ridges were a beach of glacial Lake Souris in the last ice age, about 10,000 years ago. Wind formed the ridges by sweeping loose sand into dunes at the edge of the lake. The sandhills are home for deer, turkeys, ruffed grouse, sharp-tailed grouse, red squirrels, snowshoe hares, many songbirds and coyotes.

Visitors are welcome to park and walk into the sandhills. The view from the sand ridges is beautiful. Note the many grasses and forbs to be found here. The blue three-petaled spiderwort and prairie wild rose, state flower of North Dakota, are common. The tiny ball cactus may be spotted on close inspection. Watch for poison ivy, a creeping plant with three leaflets, found mainly beneath trees and shrubs. TAKE CARE NOT TO BECOME LOST.

Tower and Picnic Area

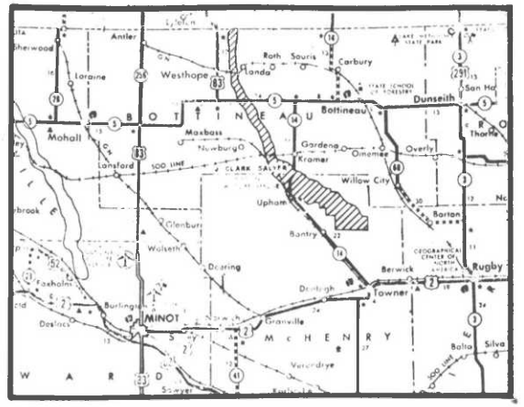
A side trail leads to the sandhills tower and picnic area, which has picnic tables and a well with good water. Again watch for poison ivy. Please cooperate in keeping the picnic area clean; waste barrels have been provided. After detouring to the tower, return to this point and continue on the Scenic Trail.

Historic Trail

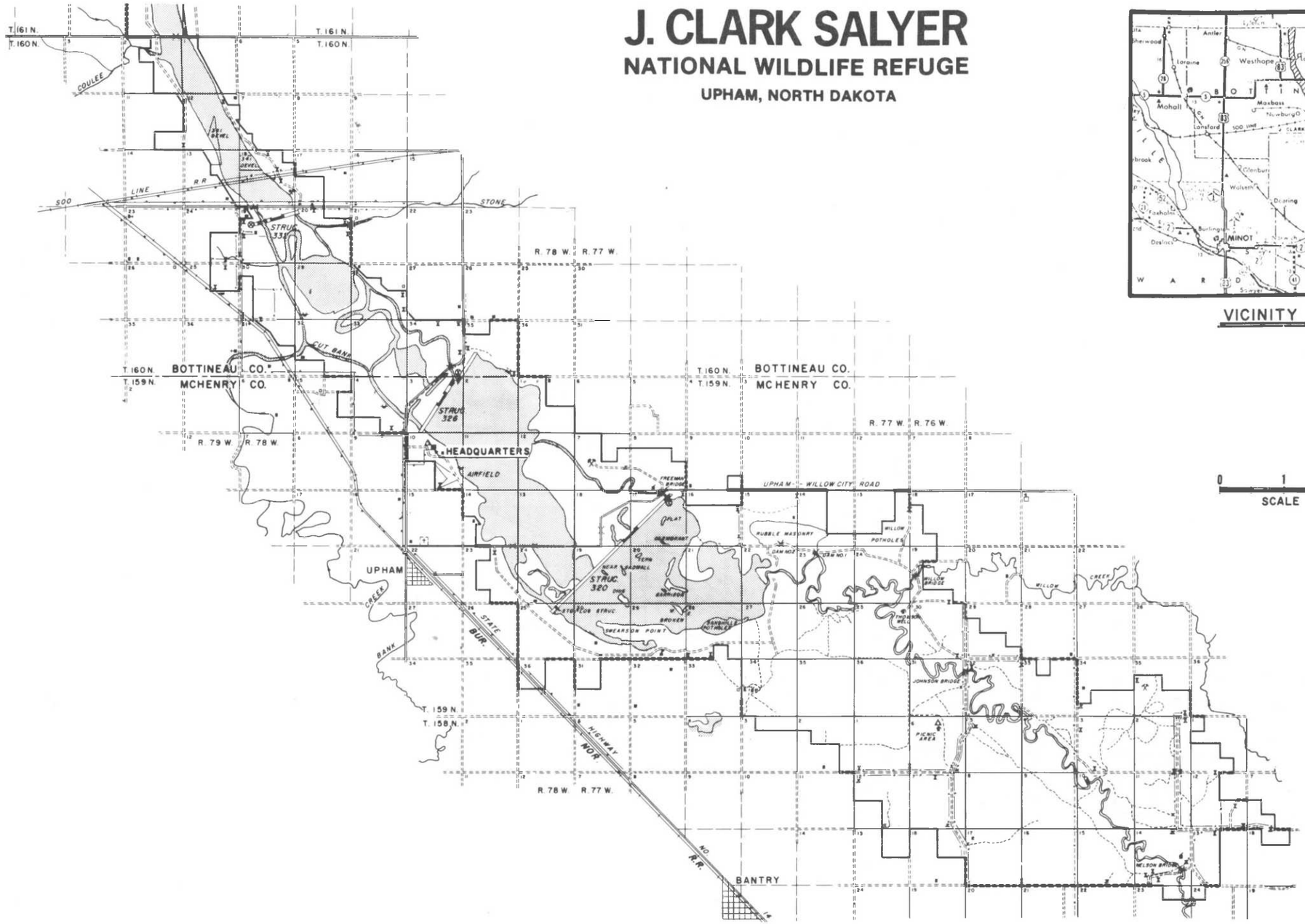
Here the trail crosses the Red River Hunters Trail, also used by Captain Twining in 1873. This trail comes from the Red River across the Cole Ford and goes into Canada, leaving the U.S. at the Hill of the Murdered Scout near Portal, North Dakota.

The Scenic Trail is a reminder of the rich history and a look at the wildlife habitats of J. Clark Salyer National Wildlife Refuge. Continue west four miles to Highway #14 and turn right four miles to Upham or go left 17 miles to Towner. We hope you return soon to the J. Clark Salyer National Wildlife Refuge!

J. CLARK SALYER
NATIONAL WILDLIFE REFUGE
UPHAM, NORTH DAKOTA



VICINITY MAP



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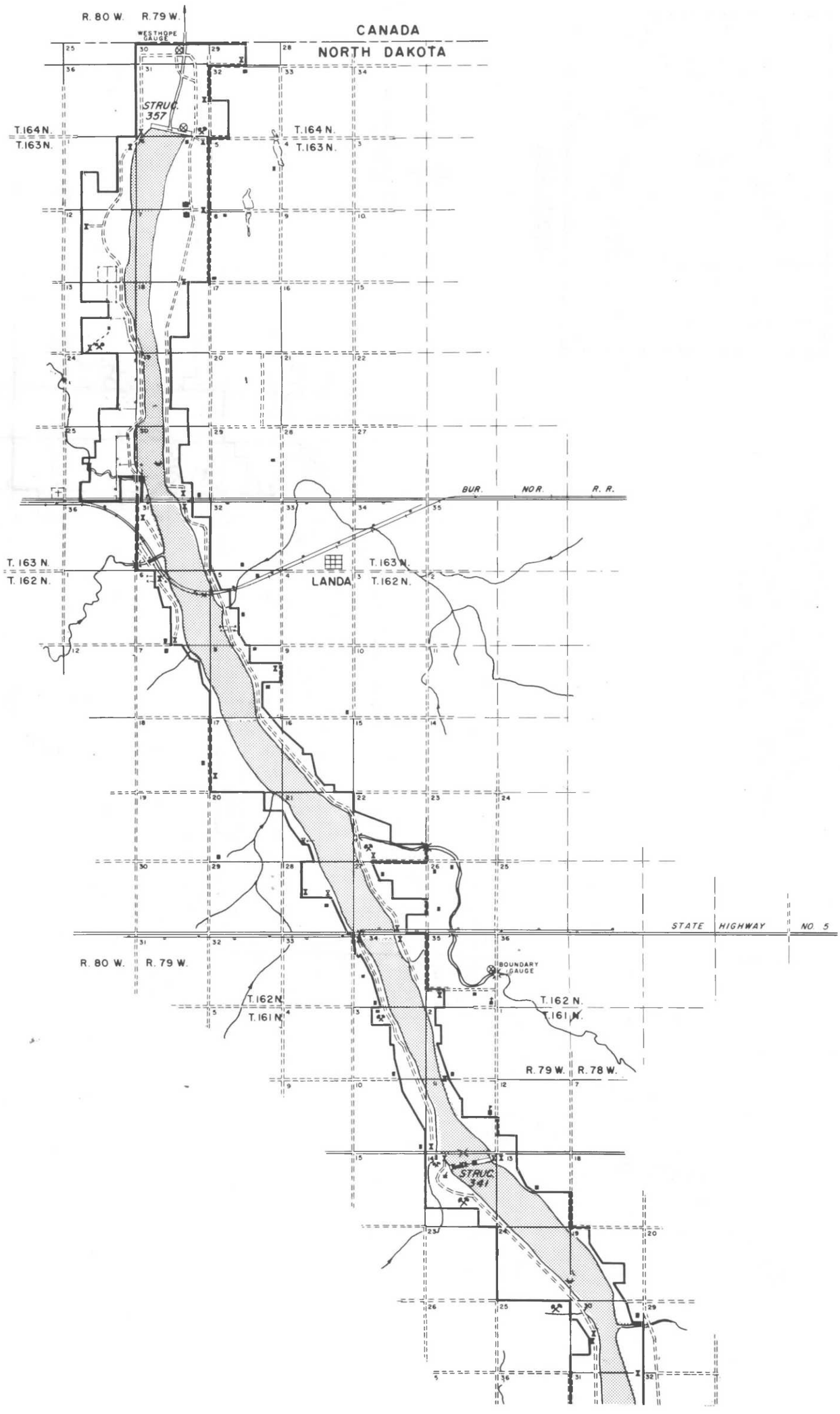
R. 80 W.
R. 79 W.
CANADA
NORTH DAKOTA
WESTHOPE GAUGE
STRUC. 357
T.164 N.
T.163 N.
T.164 N.
T.163 N.
BUR. NOR. R. R.
T. 163 N.
T. 162 N.
LANDA
T. 163 N.
T. 162 N.
STATE HIGHWAY NO. 5
R. 80 W.
R. 79 W.
BOUNDARY GAUGE
T.162 N.
T.161 N.
T.162 N.
T.161 N.
R. 79 W.
R. 78 W.
STRUC. 341