

UNION SLOUGH NATIONAL WILDLIFE REFUGE
Titonka, Iowa

ANNUAL NARRATIVE REPORT
Calendar Year 1991

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


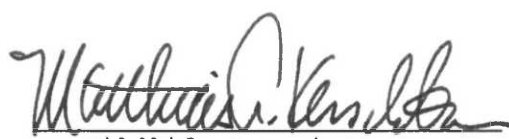

REVIEW AND APPROVALS

UNION SLOUGH NATIONAL WILDLIFE REFUGE

Titonka, Iowa

ANNUAL NARRATIVE REPORT

Calendar Year 1991

	<u>3/27/92</u>		<u>3.31.92</u>
Refuge Manager	Date	Wildlife Associate Manager	Date
		<u>3-31-92</u>	
Regional Office Approval		Date	

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Dewel and Fraser (1) give us some interesting history of the Union Slough area. In 1854 state surveyors reported the northern half of Kossuth County, Iowa nearly covered with water and so hilly that it would be useless for farmland. Deep flowing artesian wells spread water from creek to creek. In wet weather a slough covered some 8,000 acres.

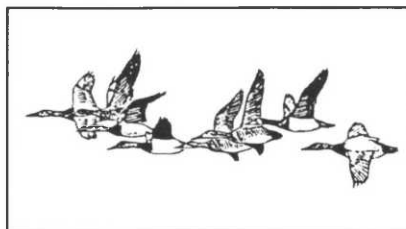
This slough, a unique geological curiosity, was known as Union Slough because it joined the sources of the Blue Earth River and the east fork of the Des Moines. Extending from an upward-curving loop of Buffalo Creek some ten miles north Union Slough divided the upper half of Kossuth County. It was so nearly level that the direction of the wind determined which way the slough water flowed. Here, Indians named it Mini-Akappan-Kaduzza, meaning water which runs both ways. It was thought to be the remains of a preglacial river bed.

For some years after the settlers came the slough was practically a lake, filled with high cane brake and abounding in waterfowl, fish and upland game. Many of the species of which are now extinct or nearly so. Other forms of wildlife were plentiful on the prairie, but most of them are now gone. The only buffalo shot in the county was killed on Buffalo Creek near Titonka in 1855. No elk herds were seen after the severe winter of 1856-57, although a lone straggler was killed in 1867.

If those state surveyors were to return today they should be no more chagrined than conservationists are over the changes that have taken place in northern Kossuth County. Section after section of high producing corn and soybean fields now extend over the lands that were once covered by the great Kossuth marsh, then a breeding habitat of most all waterfowl indigenous to Iowa. Hundreds of miles of tile drains now carry the water under the ground where acres of water once flowed over its surface. In 1913-14 land speculators even attempted to drain the entire Union Slough into the Blue Earth River, but gravity and silt prevented them from succeeding. The surrounding hills were cultivated without regard for slopes so silt poured off the hills into the tiles and ditches and soon the more level drains grew less efficient.

Due to the efforts of a zealous Kossuth County Conservation League and such leading Iowa Conservationists as Ding Darling, Ira Gabrielson, Joe Lowe and H.M. "Slim" Smith, Union Slough National Wildlife Refuge was established by Congress in 1937 for the protection of waterfowl.

Since then, 2,845 acres of land and water have been acquired and eight dams with assorted water control structures have been constructed to rehabilitate the slough. Under normal conditions the refuge contains 450 acres of surface water, 850 acres of marsh and 1,545 acres of diverse uplands. Marginal steep lands are reserved as wildlife areas. Rolling hills are managed to provide upland nesting cover for waterfowl and other wildlife and gentle-sloped lands are sometimes contour farmed for wildlife food production.



(1) Dewel and Fraser Who's Who in Iowa "Kossuth County" 1940.

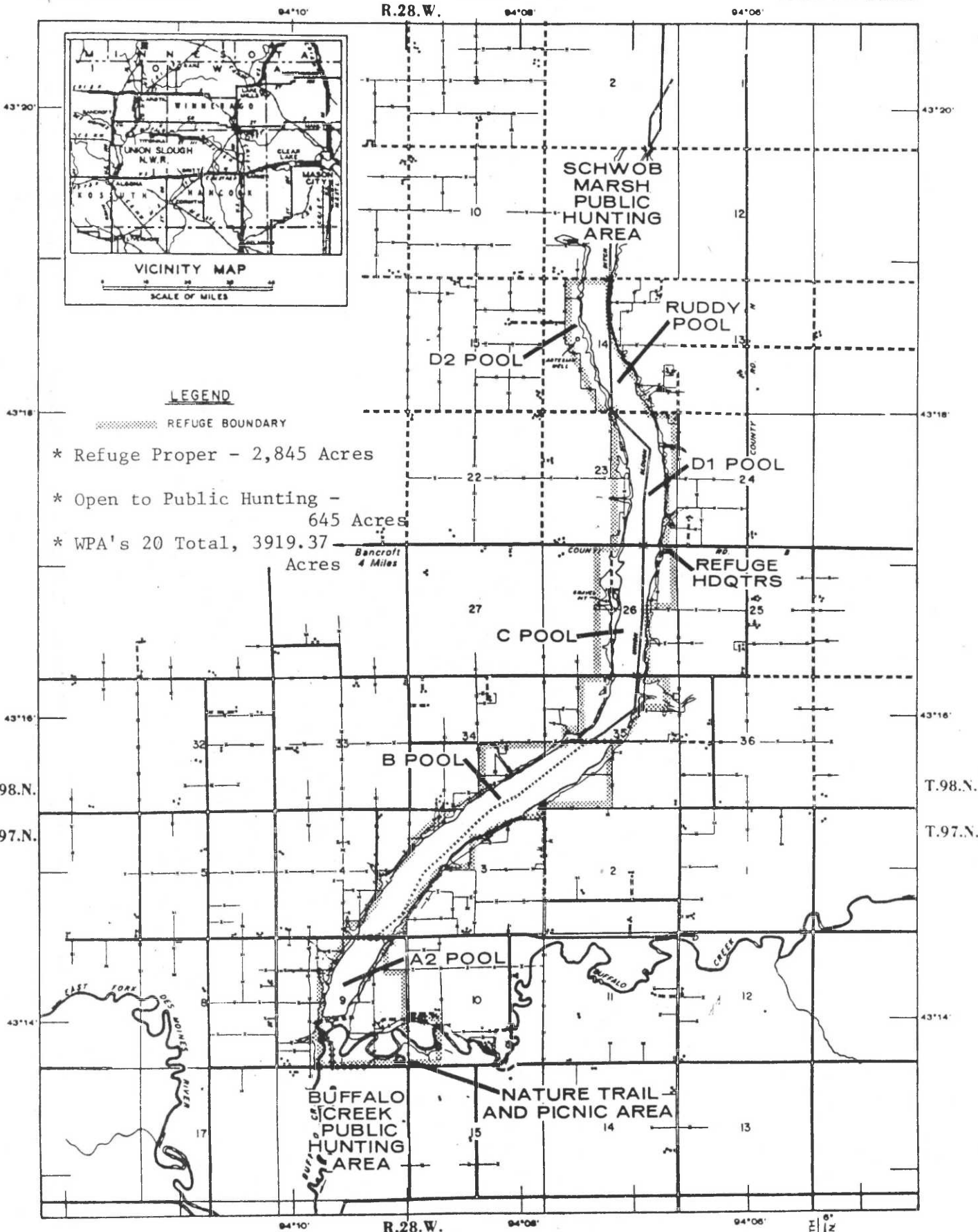
UNION SLOUGH NATIONAL WILDLIFE REFUGE

UNITED STATES
DEPARTMENT OF THE INTERIOR

KOSSUTH COUNTY, IOWA

UNITED STATES
FISH AND WILDLIFE SERVICE

R.28.W.



LEGEND

REFUGE BOUNDARY

* Refuge Proper - 2,845 Acres

* Open to Public Hunting - 645 Acres

* WPA's 20 Total, 3919.37 Acres

COMPILED IN SURVEYS AND MAPS
FROM SURVEYS BY USGS AND FWS

DENVER, COLORADO
Revised, March 1978

FEBRUARY, 1978

FIFTH PRINCIPAL MERIDIAN

0 1 2 3 4 MILES
0 1.609 3.218 4.827 6.436 KILOMETERS

TRUE NORTH
MAGNETIC N

MEAN
DECLINATION
1978

6R IOWA 223 403

TABLE OF CONTENTS

	<u>Page</u>
A. <u>HIGHLIGHTS</u>	1
B. <u>CLIMATIC CONDITIONS</u>	2
C. <u>LAND ACQUISITION</u>	
1. Fee Title.....	2
2. Easements.....	4
3. Other.....Nothing to report.....	7
D. <u>PLANNING</u>	
1. Master Plan.....Nothing to report.....	7
2. Management Plan.....	7
3. Public Participation.....Nothing to report.....	7
4. Compliance with Environmental and Cultural Resource Mandates....	7
5. Research and Investigations.....	7
6. Other.....	14
E. <u>ADMINISTRATION</u>	
1. Personnel.....	14
2. Youth Programs.....Nothing to report.....	15
3. Other Manpower Programs.....Nothing to report.....	15
4. Volunteer Program.....Nothing to report.....	15
5. Funding.....	15
6. Safety.....	15
7. Technical Assistance.....	18
8. Other.....Nothing to report.....	18
F. <u>HABITAT MANAGEMENT</u>	
1. General.....	18
2. Wetlands.....	18
3. Forests.....	23
4. Croplands.....	23
5. Grasslands.....	23
6. Other Habitats.....Nothing to report.....	24
7. Grazing.....Nothing to report.....	24
8. Haying.....	24
9. Fire Management.....	24
10. Pest Control.....	24
11. Water Rights.....Nothing to report.....	24
12. Wilderness and Special Areas.....Nothing to report.....	24
13. WPA Easement Monitoring.....Nothing to report.....	24

G. WILDLIFE

1. Wildlife Diversity.....	24
2. Endangered and/or Threatened Species.....	25
3. Waterfowl.....	25
4. Marsh and Water Birds.....	25
5. Shorebirds, Gulls, Terns and Allied Species.....	26
6. Raptors.....	26
7. Other Migratory Birds.....	26
8. Game Mammals.....	26
9. Marine Mammals.....Nothing to report....	26
10. Other Resident Wildlife.....	26
11. Fisheries Resources.....	27
12. Wildlife Propagation and Stocking.....	27
13. Surplus Animal Disposal.....	27
14. Scientific Collections.....Nothing to report....	27
15. Animal Control.....Nothing to report....	27
16. Marking and Banding.....	27
17. Disease Prevention and Control.....Nothing to report....	27

H. PUBLIC USE

1. General.....	29
2. Outdoor Classrooms - Students.....	29
3. Outdoor Classrooms - Teachers.....Nothing to report....	29
4. Interpretive Foot Trails.....	29
5. Interpretive Tour Routes.....	29
6. Interpretive Exhibits/Demonstrations.....	29
7. Other Interpretive Programs.....Nothing to report....	30
8. Hunting.....	30
9. Fishing.....	30
10. Trapping.....	30
11. Wildlife Observation.....	30
12. Other Wildlife Oriented Recreation.....Nothing to report....	30
13. Camping.....Nothing to report....	31
14. Picnicking.....	31
15. Off-Road Vehicling.....Nothing to report....	31
16. Other Non-Wildlife Oriented Recreation Nothing to report....	31
17. Law Enforcement.....	31
18. Cooperating Associations.....Nothing to report....	31
19. Concessions.....Nothing to report....	31

I. EQUIPMENT AND FACILITIES

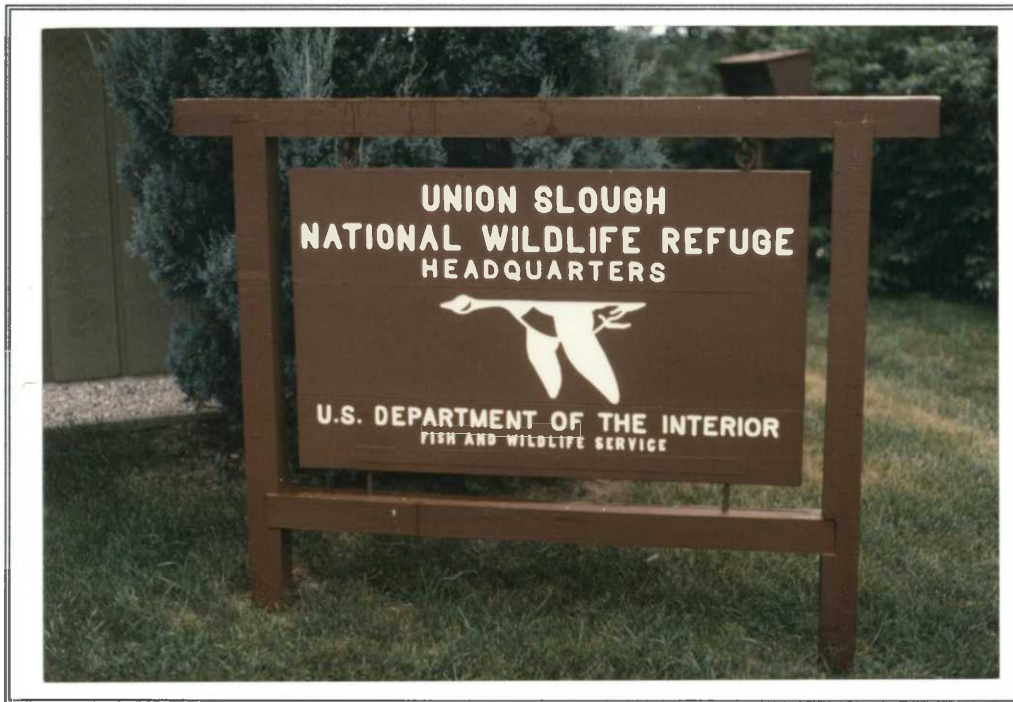
1. New Construction.....	31
2. Rehabilitation.....	31
3. Major Maintenance.....	32
4. Equipment Utilization and Replacement.....	32
5. Communications Systems.....	32
6. Computer Systems.....	32
7. Energy Conservation.....	32
8. Other.....Nothing to report....	32

J. OTHER ITEMS

1. Cooperative Programs.....	32
2. Other Economic Uses.....Nothing to report....	34
3. Items of Interest.....	34
4. Credits.....	35

K. FEEDBACK

35



A. HIGHLIGHTS

The wettest spring on record (Sec. B).

Iowa WPA acquisition continues to expand (Sec. C.1).

Yet another phenomenal year for wood ducks (Sec. D.5).

Refuge staff receive awards (Sec. E).

Refuge staff expands (Sec. E).

Farm Bill work continues (Sec. F.2).

B. CLIMATIC CONDITIONS

1991

Weather Summary Table

Month	Monthly Precip.	Normal Precip.	Snowfall	Temperature (°F)	
	(Inches)	(Inches)	(Inches)	Max.	Min.
January	.34	.66	7.0	36	-20
February	.24	.77	2.0	40	- 8
March	2.93	1.80	10.0	74	7
April	4.82	2.84		90	28
May	7.97	3.90		90	49
June	8.02	4.37		96	61
July	4.99	4.05		96	51
August	5.48	4.19		87	49
September	2.46	2.99		85	28
October	.90	2.06	1.0	79	25
November	3.92	1.42	14.0	49	14
December	.92	.90	1.0	38	22
Annual				Extremes	
Totals	42.99	29.95	35.0	96	-20

The first quarter of the year brought cold temperatures and near normal precipitation. January was one of the coldest on record, with fourteen days of temperatures below zero. Precipitation during the quarter totalled 3.51 inches. March rains were the beginning of the wettest spring on record in Iowa.

Second quarter precipitation totalled 20.81 inches, 9.7 inches above normal. The Iowa State Climatologist stated that April and May were the wettest on record. All of the refuge impoundments were filled to capacity by the end of May. Approximately 7.97 inches of rain fell in May and 8.02 inches fell in June. Water inundated the roads on the southern portion of the refuge and some refuge trails were under water. The refuge pools averaged one to two feet above normal levels by the end of the period. A road bridge along the west side of the refuge was partially washed out, and a culvert washed out on one of the dikes. Wet conditions made it impossible for local farmers to plant crops and no refuge food plots had been planted as of 5/31.

The third quarter brought some relief from precipitation with quarter totals at 12.93 inches, 1.16 inches above normal. Four inches of rain fell in one and one half hours in early August, however, after this rain storm, no extensive rains fell for the remainder of the quarter and pool water levels began to decrease.

Precipitation in the fourth quarter was only .64 inches above normal. Refuge pools were still slightly above normal, but beginning to drop to planned levels. An early frost hit the area on September 18 and 19, which may have been the signal for an early winter. The first measurable snow fell on 10/18. Winter came in full force on 10/31 and 11/1 with a major storm which began with sleet and freezing rain and eventually dropped approximately 14 inches of snow on the area. Many local residents were without power for several days.

The annual totals for 1991 show 42.99 inches of precipitation, 16.04 inches above normal. The highest thermometer reading was 96°F occurring in both July and August, and the coldest reading was recorded in January at -20 °F.

C. LAND ACQUISITION1. Fee Title and Waterfowl Production Area (WPA) Acquisition Program

Union Slough National Wildlife Refuge proper contains 2,845 acres of marsh and upland in north-central Iowa. Two executive orders in the fall of 1937 first authorized acquisition for a refuge and breeding grounds for migratory



#2 - Iowa experienced the wettest spring on record, causing water to inundate roads in the southern portion of the refuge. (TS, 4/91)



#3 - An early snow storm, dubbed the "Halloween Mega Storm" by local meteorologists, dumped fourteen inches of snow on the area by the time it ended on 11/2. (BM, 10/91)

birds and other wildlife. The State of Iowa Enabling Act of 1924 also authorized land acquisition for the refuge.

In 1979-80, two WPA's were purchased in Iowa and placed under Union Slough's jurisdiction. For nine years following, WPA acquisition was nonexistent. Since November 1988, and in conjunction with the North American Waterfowl Management Plan, WPA acquisition within Iowa has been stepped up. Union Slough now has under its jurisdiction 20 WPA's in ten counties encompassing a total of 3919.37 acres. These newly acquired lands were purchased under a 15 year FWS commitment of funds (\$800,000 annually) to be matched by the Iowa Department of Natural Resources.

Under the WPA Acquisition Program, Iowa DNR is granted use and management of involved lands under FWS direction. A Memorandum of Understanding and Procedural Agreement between both agencies (revised August 1991), serves as a guideline for development of purchased areas. Each WPA is described in detail in a Cooperative Management Agreement drawn up and approved by both parties. Waterfowl Production Areas are open to public hunting, trapping, wildlife observation and other activities, thus providing valuable public land and wildlife habitat within a highly winter barren and agricultural community.

Current Listing of WPA Acquisition in Iowa

<u>Name</u>	<u>County</u>	<u>Acres</u>	<u>Date of Acquisition</u>
Union WPA	Cerro Gordo	320.00	July 91
Dan Greene WPA	Clay	124.20	June 91
Dewey's Pasture WPA	Clay	262.30	June 89
Spring Run WPA	Dickinson	432.85	Jan. 89; Sept. 91
Jemmerston Slough WPA	Dickinson	403.69	Jan., Sept. 89
Kettleson Hogsback WPA	Dickinson	140.00	Sept. 90
Dugout Creek WPA	Dickinson	160.00	Sept. 90
West Swan Lake WPA	Emmet	149.65	Sept. 79
Twelve Mile WPA	Emmet	160.00	Sept. 88
Ingham Lake WPA	Emmet	393.45	May 89; Feb. 90; June 91; Sept. 91
Four Mile WPA	Emmet	287.99	Nov. 88
Cheever Lake WPA	Emmet	131.78	Aug. 89; Mar. 80
Meredith Marsh WPA	Hancock	143.66	May 89
State Line Marsh WPA	Kossuth	109.57	Jan. 89
Iowa Marsh WPA	Kossuth	71.20	May 90
Fallow Marsh WPA	Palo Alto	60.13	Nov. 88
Kiowa Marsh WPA	Sac	80.00	Oct. 89
Tomahawk Marsh WPA	Sac	49.50	Sept. 89
Elk Creek WPA	Worth	401.20	Sept. 90; Jan. 91
Olaf WPA	Wright	38.20	Jan. 91

2. Easements

The year 1991 marked the beginning of the Iowa Wetland Easement Program. The program is a cooperative effort between the Iowa Department of Natural Resources (DNR), Ducks Unlimited and the Service. Easements of highest priority are those which will preserve wetlands located within three miles of a Waterfowl Production Area (WPA) and/or State of Iowa Wildlife Management Area (WMA). However, wetlands located near County Conservation lands or other lands with acceptable nesting cover will also be considered. Under the terms of a wetland easement, the Service purchases the rights to burn, drain or fill the wetland. Easements will be taken on some marshes that had earlier been identified for fee roundout of a WPA/WMA to avoid possible drainage.

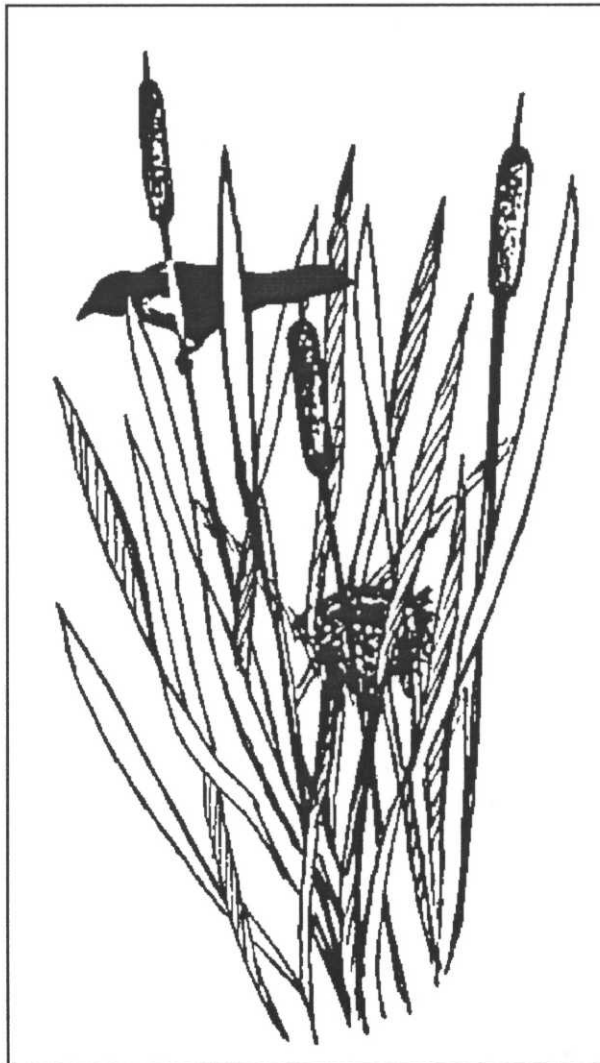
Initial contact to determine willing landowner interest is done by Iowa DNR and Union Slough personnel. Service Realty will then appraise the land, make offers and take options of these properties. Restoration work will be conducted by Ducks Unlimited and/or their designees. The perpetual easements will then be held, managed and enforced by the Service.

EASEMENT PROGRAM STATUS
1991

<u>County</u>	<u>No. of Easements</u>	<u>Wetland Acres</u>	<u>Total Easement Acres</u>
Emmet	3	42	200
Osceola	1	4	40
Palo Alto	4	58	295
Total	8	104	535

Funding for the 1991 Wetland Easement Program was as follows:

Service	\$ 50,000	Inkind support
Iowa DNR	\$ 50,000	Inkind support
Ducks Unlimited	\$ 25,000	Restorations
North American Waterfowl Conservation Act	\$ 25,000	Restorations
	\$ 50,000	Acquisition
Migratory Bird Fund	\$125,000	Acquisition





#4 - Jemerson Slough WPA Dickinson, County, IA. (PS, 7/91)

3. Other

Nothing to report.

D. PLANNING

1. Master Planning

Nothing to report.

2. Management Plan

Union Slough National Wildlife Refuge was established in 1937, primarily to assist with the production and management of waterfowl in the Mississippi Flyway. Management programs are designed to encourage maximum use of the area by nesting waterfowl and to provide a resting and feeding area for migratory birds during their long migration flights. Grassland management, water management, prescribed burning and other refuge programs combine to help accomplish these goals while providing for a diversity of habitat beneficial to many species of wildlife.

Waterfowl Production Areas serve to maintain or improve wetland and/or upland habitat for the production of waterfowl. Few of these areas when bought resemble their once natural, undisturbed condition. Most have been influenced by man in some way; whether by grazing of cattle, modification of the water supply or by local farming practices. Through increased acquisition efforts, easements where applicable, wetland restoration and sound habitat management, we can in part at least, restore traditional waterfowl nesting areas and enhance other wildlife populations as well.

Under the Prairie Pothole Joint-Venture (PPJV) of the North American Waterfowl Management Plan, Iowa DNR personnel and other members have developed a four-county and 31 county plan which outline goals for the preservation and restoration of wetland complexes in northwest and north-central Iowa. These plans identify specific project sites within 35 counties, and outline management techniques necessary to increase waterfowl production.

The primary goal is to acquire 30,000 acres of land from willing sellers during the next 15 years beginning in 1988. The estimated 1.8 million dollars required annually for these projects will come from the FWS, Iowa DNR, various conservation organizations, private businesses and concerned citizens.

3. Public Participation

Nothing to report.

4. Compliance with Environmental and Cultural Resource Mandates

Preliminary work on drafting a Predator-Habitat Management Plan and environmental assessment was undertaken in 1987. The plan was approved and modifications were made in 1988. The plan and modifications were implemented in 1989, 1990 and 1991. Striped skunk, raccoon and red fox were the major targeted species.

5. Research and Investigations

Union Slough NR 91 - "Wood Duck Nesting Study" (33580-1)

The annual wood duck nest box survey was conducted mid-April through latter July, 1991. Location of nest boxes permitted easy checking by foot in most cases. A total of six new canister style nest boxes were added over 1990's

total bringing the number of available nest boxes to 412. A summary of the survey is as follows:

Of 412 available nest boxes, 278 (67%) were used by wood ducks and/or hooded mergansers and 134 (32%) received either no use or use by other nesting species i.e. tree swallow, kestrel, starling, screech owl and house wren. From the 255 nest boxes used exclusively by wood ducks, 270 wood duck clutches resulted of which 229 clutches were successful. Fifteen nest boxes were used during a second nesting attempt. The best wood duck hatch occurred in nest box #429 with 25 of 27 eggs hatching. A total of 3,941 wood duck eggs were laid of which 2,966 (75%) hatched and 975 (25%) were unhatched. Thirty-seven ducklings died on the nest leaving 2,929 to fledge nest boxes successfully.

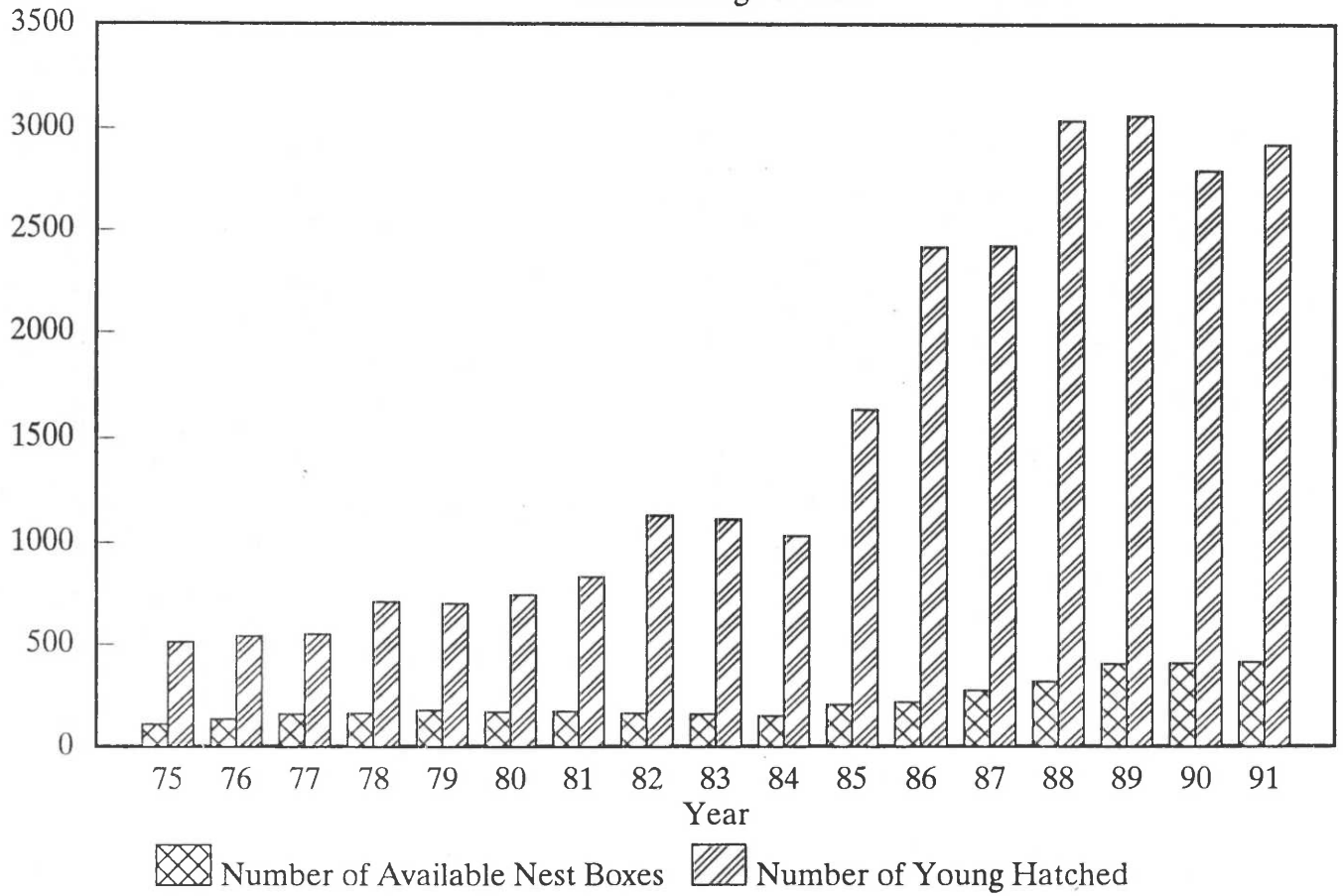
One-hundred forty-one refuge nest boxes were of "Mingo style" design with sheet metal construction and cone shaped lids. An additional 271 nest boxes were fabricated from discarded 30 lb. freon canisters. Of the 412 total, 288 were mounted apartment style or four to a pole. All, however, are of metal construction with predator proof brackets. All nest boxes are located along fringe areas of refuge pools where they are unaffected by ice action and facilitate easy checking.

Both wood ducks and hooded mergansers started laying a few eggs by the last week of March. Nesting was in full swing in April. By mid May hatching started and continued until July 17.

In 1991 hatching success was the best ever recorded at the refuge with three out of every four eggs hatching. Therefore, even though the total number of eggs laid was down by 4.1% from the previous year, 127 more ducklings fledged nest boxes in 1991 than in 1990. Table 1 and Figure 1 illustrate the successful expansion of the refuge wood duck nest box program, most notably since 1985.



Figure 1.
Wood Duck Data
Union Slough NWR





#5 - Constructing canister style wood duck houses is a winter project at the refuge. (GW, 2/91)



#6 - In 1991, 239 hooded merganser young fledged from wood duck houses on the refuge. (GW, 6/91)



#7 - Maintenance Worker Welp checks wood duck houses, documenting use and hatching success. (JG, 4/89)



#8 - Two hundred and seventy-one wood duck nest boxes are mounted apartment style. (DT, 6/89)

Table 1.

Wood Duck Nesting Success at Union Slough NWR (1985-1991).

	1985	1986	1987	1988	1989	1990	1991
No. of houses	202	217	275	315	401	406	412
No. of clutches	166	219	251	336	374	326	270
Successful clutches	140	180	198	233	247	258	229
%Success	84	82	79	69	66	79	85
Total eggs	2,492	3,994	3,833	5,736	5,702	4,110	3,941
Eggs hatched	1,667	2,439	2,468	3,119	3,115	2,830	2,966
%Hatched	67	61	64	54	55	69	75
No. to leave nest	1,632	2,422	2,427	3,041	3,067	2,802	2,929
%to leave nest	98	99	98	97	98	99	99
No. unhatched	825	1,555	1,365	2,617	2,587	1,280	975
%Unhatched	33	39	36	46	45	31	25
Dead ducklings	35	17	41	78	48	28	37

Annual harvest of wood ducks on adjacent public hunting areas has helped maintain a relatively stable breeding population of wood ducks in the past at Union Slough. Iowa's early waterfowl season has typically occurred in mid September and wood duck harvest has been significant at this time due to the fact that the birds are still occupying the area. The 1988, 1989, 1990 and 1991 waterfowl seasons were restricted and early waterfowl seasons were closed in Iowa. It remains to be seen what the impact of the reduction in local harvest will have on wood duck production at Union Slough in the future.

Union Slough NR 91 - "Predator Management and Waterfowl Recruitment at Union Slough NWR" (33580-2)

In cooperation with the Iowa Cooperative Research Unit, 1989 marked the final year of a two year Predator Management/Waterfowl Recruitment Study at Union Slough NWR. The study concerned control of major predator species (striped skunk, red fox and raccoon) and documented the results in relation to waterfowl nesting success. In 1990 and 1991 the predator management/waterfowl recruitment study was continued by refuge staff. A seasonal trapper was hired to perform the trapping duties and refuge staff conducted nest search operations. The Iowa Cooperative Research Unit at Iowa State University in Ames, Iowa analyzed the nest data gathered.

Predator trapping was conducted from 4/22 to 6/28 in 1991. Leg hold and box traps were used to capture 171 predators. Predators captured included: 5 red fox, 79 raccoons, 42 skunk, 34 opossum, 7 housecats, 3 badger and 1 coyote. Non-targeted species, such as badger, were released unharmed.

Nest searches of approximately 440 acres of nesting cover on the refuge were conducted 5/20-24 and 5/30-31. These searches were accomplished by using chain drag and four-wheel ATV's. A total of 92 nests were found. Of the 92 nests located all were monitored and 56 were used in calculating nest success (14 mallard, 38 blue-winged teal and 4 shoveler). Data was analyzed and Mayfield estimates were calculated by Iowa State University.

The data generated thus far indicates that predator trapping can be used as a management tool to boost waterfowl hatching success at Union Slough NWR. In 1984-85, Joe Fleskes estimated an overall hatch rate of 11.9% for upland nesting ducks (primarily mallard and blue-winged teal) on Union Slough. No predator management was in effect. In 1988, under our first attempt at

seasonal predator management, overall hatch rate was to 17.7%. Modifications in the trapping program were implemented in 1989 and overall hatch rate climbed to 26.5%. 1990 was a phenomenal year with an overall hatch rate of 52%, however factors other than trapping may have been influential in obtaining such a high hatching success in 1990. In 1991, overall hatching success was 14.1%, the lowest nest success since the start of the predator management program in 1988. Extremely wet weather may have been responsible, at least in part, for poor hatching success. Trapper Fred Fox found trapping to be very difficult as a result of poor weather conditions. Fox trapping was particularly troublesome as it was difficult keeping leg hold traps lured and in working order. Heavy spring rains also caused a late start to the trapping season and made accessibility to favored trapping sites difficult. In addition, wet conditions also resulted in many nest being flooded out and abandoned by the hen.

6. Other

In cooperation with Iowa State University, research student Susan Galatowitsch developed a study to monitor vegetational response on wetland restorations in northern Iowa, southern Minnesota and south-eastern South Dakota. The study concerns sampling of 100 wetland restoration sites. Three sites are located on Union Slough NWR, but most basins are on private lands enrolled in the Conservation Reserve Program. Since most of the restored basins have been farmed continuously for many years, native wetland plants will need to grow from seed still present, or dispersed into basins by waterfowl or wind. Susan will be studying how these plants will recolonize restored basins while looking at proximity to other wetlands, soil type, water depth through the growing season and how long the site had been drained. Susan visited the refuge and surrounding area on 7/9 to follow up on her study.

E. ADMINISTRATION

Personnel

Immanuel Johnson	Refuge Manager	GS-11	EOD	12/17/90	PFT
Bobbi Webber	Refuge Oper. Spec.	GS-9	EOD	11/17/91	PFT
David Trudeau*	Refuge Oper. Spec.	GS-9	EOD	07/08/84	PFT
Glen Welp	Maintenance Worker	WG-7	EOD	01/21/63	PFT
Barbara Meyer	Administrative Tech.	GS-6	EOD	06/18/73	PFT
Pam Steinhaus**	Biological Tech.	GS-5	EOD	06/17/91	PFT
Tom Skilling	Biological Tech.	GS-5	EOD	04/8/91	TFT

*Transferred to Necedah NWR 5/20/91

**Transferred from Morris Wetland Management District 6/17/91

STAFFING OF UNION SLOUGH NWR OVER A TEN YEAR PERIOD

Permanent

<u>Year</u>	<u>Full-Time</u>	<u>Part-Time</u>	<u>Temporary</u>	<u>Total FTE</u>
91	5	0	1	6.0
90	3	1	0	3.8
89	3	1	0	3.8
88	3	1	0	3.8
87	3	1	0	3.8
86	3	1	0	3.8
85	3	1	0	3.8
84	3	1	0	3.8
83	3	1	0	3.8
82	3	1	0	3.8
81	3	1	0	3.8

Refuge staff currently consists of five permanent full time employees (Manager, Refuge Operations Specialist, Maintenance Worker, Administrative Technician, and Biological Technician) and one temporary full-time employee (Biological Technician).

On 12/13 Manager Johnson presented Maintenance Worker Welp with a recognition plaque from Regional Director Gritman for his outstanding contribution to the wood duck program from 1953 to 1991.

On 12/13 Administrative Technician Meyer and Maintenance Worker Welp were presented with Special Achievement Awards.

Refuge Operations Specialist Trudeau transferred to Necedah NWR in Wisconsin effective 5/20/91. Refuge Operations Specialist Manager Webber entered duty on 11/17.

On 6/17 Biological Technician Steinhaus lateralled to Union Slough NWR from Morris Wetland Management District, Morris, MN.

2. Youth Programs

Nothing to report.

3. Other Manpower Programs

Nothing to report.

4. Volunteer Programs

Nothing to report.

5. Funding

Total approved funding for FY 91 equaled \$386,836.

A breakdown of funding is as follows:

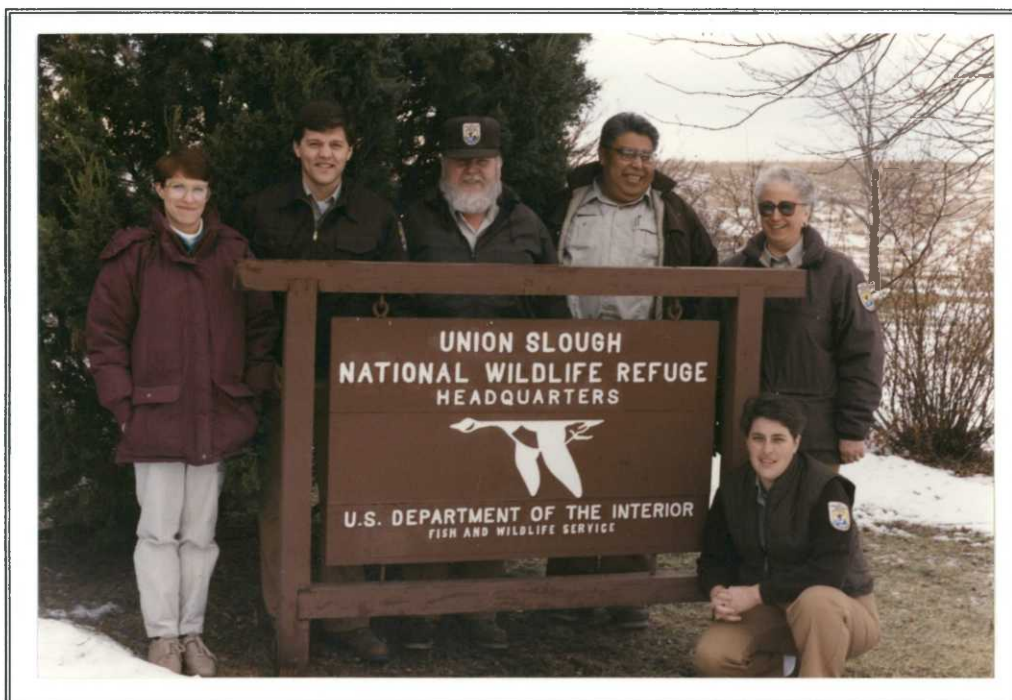
Basic Operations and Maintenance (1261 & 1262)	\$186,126.00
Maintenance Mangement System	\$ 30,000.00
Fire Management Funds (9120)	\$ 700.00
Drug Investigation (1221)	\$ 1,010.00
Wetlands (1120-3030)	\$131,000.00
Survey Means for Easements (30135-3110)	\$ 5,000.00
Wetlands funds from R.O. (30137-1230-3030)	\$ 38,000.00
Ducks Unlimited funds	\$ 25,000.00
Total FY 1991 funding	\$386,836.00

Funding for the period was adequate to accomplish most of the projects planned for FY 91.

6. Safety

Regular scheduled Safety Meetings were held throughout the year. Safety related topics covered included: hazards of bridge washouts, power saw safety, winter survial and winter driving tips, tornado safety, and the hazards and signs of heat stress.

Safety related items accomplished during the period included: periodic checking of fire extinguishers, review of special safety information received through the mail, completion of step test requirements by Refuge Manager and Refuge Operations Specialist, and repairs to refuge 4x4 and equipment. Several pairs of hearing protectors, safety goggles and steel toed boots were purchased. Additional items purchased included: four back pack fire pumps, four tires for the Chevy Luv pickup and three medical source First Aid kits.



#9 - Refuge personnel (from left to right) Bobbi Webber, Tom Skilling, Glen Welp, Manny Johnson, Barb Meyer, and Pam Steinhaus. (JJ, 12/91)



#10 - Maintenance Worker Welp and Administrative Technician Meyer received Special Achievement Awards in 1991. (JJ, 12/91)



#11 - Manager Johnson presented Maintenance Worker Welp with a Recognition plaque from Regional Director Gritman for his outstanding contribution to the wood duck program.
(JJ, 12/91)

The headquarters well system pipes were checked by a well specialist and found to be in excellent condition with no structural leaks.

In July a security system was installed in the office building and sensor security lights were also installed on the buildings exterior.

In October the refuge staff received a station Safety Award for an outstanding safety record in FY 91. No lost time accidents were recorded.

In November refuge staff completed the safe driving test. Also in November refuge staff were tested for Lyme disease, all tests were negative.

On 3/1, arrangements were made with the County Engineers to lower the speed limits crossing the refuge from 55 mph to 45 mph. This should reduce the number of collisions with deer and other wildlife and also increase the safety of fisherman and the wildlife viewing public who often park along these roads.

7. Technical Assistance

Refuge staff work closely with members of the Iowa Department of Natural Resources, various local organizations and numerous individuals in making recommendations and providing assistance of a technical nature when requested. Examples include: beaver complaints, control of woodchucks, assistance with prescribed burning activities or advice (whether private, county, or state), answering deer depredation complaints, coordinating land acquisition efforts among agencies and required permit work, and involvement in local hunter safety programs.

An active Farm Bill program has necessitated a great deal of coordination between numerous FWS offices/personnel, Iowa DNR staff, local SCS and ASCS technicians, FmHA, various conservation organizations and other private interest groups.

8. Other

Nothing to report.

F. HABITAT MANAGEMENT

1. General

Union Slough National Wildlife Refuge, located in north central Iowa, consists of 2,845 acres of marsh and upland. It provides a resting and feeding area for migratory birds as well as a breeding ground and nesting area for several species of ducks and the Canada goose.

The refuge is divided into seven distinct habitat units consisting of 1,300 acres of wetland, 985 acres of grassland, 130 acres of cropland and 430 acres of brush and timber.

2. Wetlands

In the early 1800's, the northwest and north central portion of Iowa contained wetland areas totaling nearly four million acres. Today, this once vast resource has diminished to a mere 27,000 acres state wide. Union Slough NWR is an important link to this unique marsh ecosystem. It is high in aesthetic value and contains irreplaceable plant and animal life common to this area.

Water sources for Union Slough's impoundments are limited to precipitation, tile drainage from surrounding farm fields, and water diverted from Buffalo Creek, located at the south end of the refuge. Water from Buffalo Creek can

be backed into refuge impoundments using A-1 water control structure located south of A-2 Pool. The radial gate structure on Buffalo Creek Public Hunting Area (located farther south) is more frequently used for water control and the southern two or three refuge pools are often managed as a single unit.

The year 1991 was much different from the past several in terms of water management. In early spring all refuge pools were filled for the first time in about two years. Record rainfalls in April filled all refuge pools to capacity. Record precipitation continued to fall in May and June. Water inundated many roads and refuge trails were underwater in many places. Refuge pools averaged one to two feet above normal through the summer months. We were unable to conduct drawdowns on any of the pools. By early fall water levels began to decrease and reach near normal levels.

Buffalo Creek Public Hunting Area Impoundment - Total drawdown from January to May allows for release of spring run-off. Summer drawdown produces good stands of nodding smartweed and wild millet. Moist soil plants grown during summer drawdown are then flooded prior to waterfowl season to attract waterfowl. Fall flooding of this area was stipulated as a condition of the land exchange agreement when this unit was acquired from the Iowa DNR. Due to extremely high water conditions in 1991, we were unable to conduct a summer drawdown on A-1 pool.

Water levels on A-1 Pool were well above the planned level through the end of the waterfowl hunting season. The radial gates were reopened on 11/19. Drawdown of impounded water following waterfowl season and prior to the deer season opening provides an additional 200 acres of huntable habitat open for public use. Public lands are very limited in both size and number locally and public use is quite intensive.

A-2 Pool - In recent years, A-2 Pool has been drawn down annually to promote growth of moist soil plants prior to fall flooding for waterfowl use. Due to unusual water conditions through the period we were unable to conduct a drawdown a A-2 Pool in 1991.

Waterfowl use of A-2 Pool during spring migration was low, but increased significantly during the fall migration period. Dabblers utilized the pool heavily from July through October.

B-Pool - Maintenance of B Pool at or near a 6.5 level provides adequate brood habitat, reduces dike damage by muskrats and wind erosion, maintains an open lake-type area desired by many species of waterfowl during migration or nesting periods, and allows edge vegetation to develop during the summer growing season. It has been shown over the years that this management scheme is very desirable when combined with rough fish eradication.

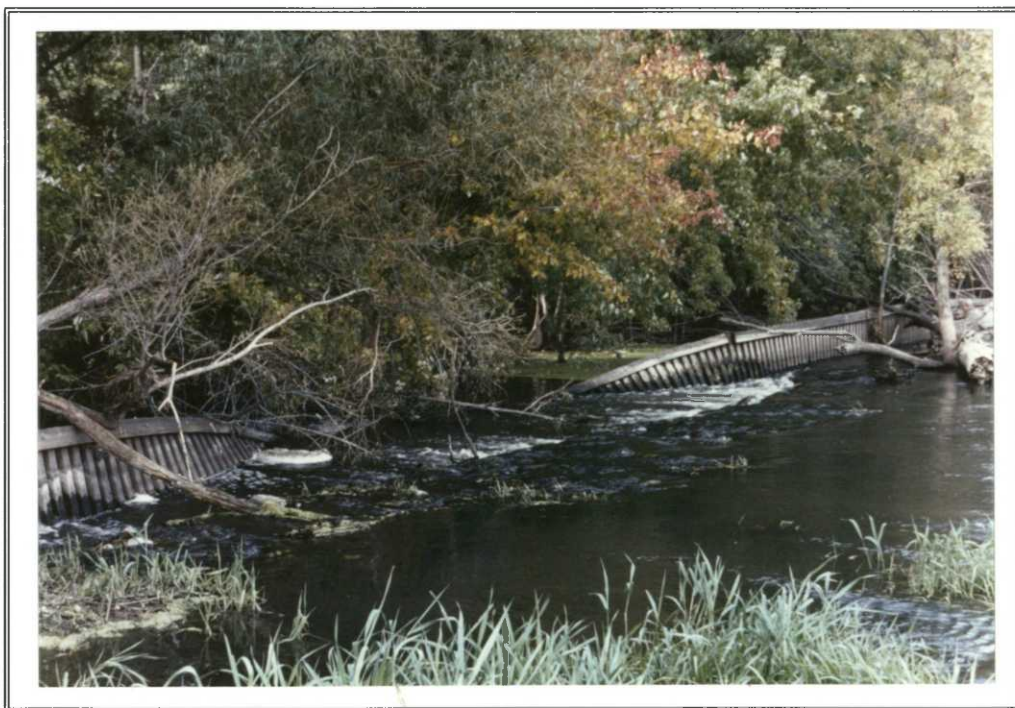
Edge vegetation consists primarily of cattails, biddens, wild millet and arrowhead in this area of the refuge. Flooded shoreline receives heavy use by waterfowl broods, especially wood ducks, during the critical early summer brood rearing period. Sago pondweed is produced annually to provide an available food source for the broods using this pool during the summer months.

Dabbling and diving ducks used B Pool during spring migration in 1991. B Pool is generally used as a staging area for early fall migrants, but use during early fall was very low in 1991.

C Pool - C Pool is now in a state of 50% vegetation and 50% open water. The vegetation in C Pool consists primarily of cattails, threesquare, nodding smartweed and hard stemmed bulrush. Rough fish were nearly absent from the pool, so water quality was excellent as reflected in the waterfowl use on this pool. Dabblers, divers and geese used the pool extensively in April.



#12 - Record level spring and summer precipitation brought refuge pools as much as two feet above normal levels.
(GW, 6/91)



#13 - High water levels caused the spillway to break at the Buffalo Creek Public Hunting Area located at the south end of the refuge.
(PS, 8/91)

D-1 Pool - D-1 Pool held water in the spring for the first time in two years. Water levels were above planned levels for the entire year. This pool was used quite extensively by diving ducks during spring migration. Canada geese also used D-1 Pool heavily in spring and again in fall. Edge vegetation consisted of cattails, smartweed, and biddens.

D-2 Pool - In 1991, D-2 and Ruddy Pools were managed as a single unit. Muskrat activity prior to the recent drought years left these pools with a good ratio of open water to vegetation.

Waterfowl use was excellent during the spring, summer and fall. Wood duck and hooded merganser use was notable in the nest boxes along Ruddy dike.

Emergent vegetation along these pools include cattails, nodding smartweed, threesquare, biddens and hard stemmed bulrush.

Farm Bill Activities

Refuge staff was again busy with Farm Bill wetland restorations during the year. Restoration work encompassed both private and public lands. Recent CRP sign-ups were screened and landowners were contacted by FWS or DNR personnel. Wetland Development Agreements were negotiated for those interested in marsh restoration or enhancement. On private CRP lands there were 28 basins restored totalling 71.5 acres. Activity on public land involved restoration work on some of our newly acquired WPA's, lands owned by the Iowa DNR and several County Conservation Boards. Seventy-eight basins encompassing 426.9 acres were restored or enhanced on public lands in 1991. In cooperation with the Iowa DNR, an additional 46 non-CRP basins (139.5 acres) were restored or enhanced.

Refuge staff continued to evaluate FmHA tracts for wetland restoration possibilities, floodplain protection and unique or special habitat features. Easements were proposed on one tract encompassing 145 acres during the period, and this tract is still pending FmHA approval. Currently we have seven FmHA conservation easements encompassing 129.4 acres under our jurisdiction. Previously FmHA screenings have been handled by the Rock Island field office, however, we are now screening all of the properties that come into inventory in our Refuge Management District out of the Union Slough office.

Work was accomplished by a number of means. Most of the restorations were contracted out to private equipment operators but refuge personnel also participated in restoration activities. In addition, Mark Cunard from Desota NWR, assisted with wetland restoration activities for eight days during the period.

Expenses for this years' restoration activities totalled \$131,000. This dollar amount can be broken down into the following categories:

Equipment and Repairs	\$11,914.51
Diesel, Gas & Oil	\$ 1,544.05
Telephone	\$ 122.11
Travel Vouchers	\$ 444.66
Contractor Payments (Work & Supplies)	\$81,911.26
Miscellaneous Supplies	\$19,103.95
Salaries	\$15,959.46

Miscellaneous expenses included such items as tile, water control structures, drill rental, couplers, pipe, bands, concrete, weld wire, film/developing, filter cloth, county maps, plat books and file supplies.

Average cost of wetland restoration in Iowa works out to be a little under \$200/acre restored. Most of the private landowners sign a ten year



#14 - Wetland restoration activities may involve both removing or installing drainage tile. (DT, 5/90)



#15 - Heavy equipment is often used to build dikes, etc. as part of the wetland restoration process. (PS, 8/91)

agreement, but on some of the larger projects, landowners have been willing to sign 15 or even 20 year agreements. All of the restorations on public lands are perpetual.

Other activities generated by the Farm Bill included the following: Iowa office in mapping northern Iowa counties, consulting with SCS on Swampbuster violations and reviewing FmHA inventory properties.

3. Forests

Two baited moth traps were set out from June to mid-September to sample refuge woodlands for the presence of gypsy moths. As in past sampling, no gypsy moths were detected.

4. Croplands

There are currently 92 acres of cropland on Union Slough NWR. Thirty-three acres of cropland consist of alfalfa/brome hay ground which is available for annual harvesting if desired by refuge cooperators. This hay ground can be cut following nesting season (mid-July) in return for refuge thistle control, food plot establishment or other custom farming needs.

Seven acres of hay ground in the Schwob Marsh Public Hunting Area was mowed in 1991. The cooperator for this unit controlled Canada thistles on the Schwob Marsh uplands in exchange for two cuttings of hay from Field No. 2 located in Farm Unit A-1. A second cooperator harvested the first and second cuttings of alfalfa from Fields No. 1,3 and 4 in Farm Unit A-1 also in exchanged for thistle control and refuge custom farming needs.

All refuge hay fields are maintained as nesting cover and serve to diversify wildlife habitat. Hay fields are cut by cooperators in early to mid-July depending on the year, to help maintain stand vigor and avoid nesting wildlife as much as possible.

Three nine acre food plots were farmed force account. Each food plot consisted of three acres planted to corn/sorghum sudan grass, three acres planted to oats and hay pasture mix (40% alfalfa, 30% red clover, 15% timothy and 15% alsike clover) and three acres of oats/hay pasture mix planted the previous season for fall plow down. Winter wheat generally is used as a cover crop on fields that are fall plowed. Oats may be used when winter wheat is not locally available.

A six acre food plot located on Buffalo Creek Public Hunting Area that has shown only minimal use in recent years was seeded to native grasses in early June of 1989. Response appears to be good with switchgrass, little bluestem, big bluestem and Indiangrass becoming established.

5. Grasslands

One of the primary purposes for establishment of Union Slough NWR in 1937 was for waterfowl use as a nesting area. Grassland management, in conjunction with water management, is our most important management program.

In recent times the grassland management program has consisted of interseeding monotypic stands of non-natives (primarily smooth brome) with hay/pasture mix and switchgrass. A few one to two acre plots of pure switchgrass have also been established for winter cover. As these seedings have matured they have added significantly to upland diversity throughout the refuge.

Another important tool in our grassland management program is prescribed burning, which is addressed later under Fire Management.

wildflowers and forbs are abundant throughout the native grassland communities found refuge wide. Butterfly milkweed, rattlesnake-master, downy gentian, compass plant, gayfeather, purple-coneflower, leadplant, grayhead coneflower and purple prairie clover are among the many varieties present.

6. Other Habitats

Nothing to report.

7. Grazing

Nothing to report.

8. Haying

As mentioned previously in the Croplands Section, as part of our cooperative farming agreements, thirty-three acres of refuge hay ground were harvested by cooperators during the period in return for spraying thistles, planting refuge food plots or custom farming needs.

9. Fire Management

Prescribed burning has been used over the years to restore warm season native grasses as the dominant vegetation type in most habitat units. The refuge fire management program is designed to suppress the invasion of undesirable woody species in upland habitat types and maintain existing grassland types as optimum nesting cover. No prescribed burns were conducted in 1991.

10. Pest Control

Canada thistle is classified as a noxious weed in Iowa and treatment is required by law. Spraying 2,4-D for the control of Canada thistle began on the refuge in late June. Noxious weed control was completed on 80 acres that were either sprayed or mowed during the period.

Glyphosate (Round-up) was used for general weed control around refuge buildings and parking areas, and for control of quackgrass in refuge food plots where desired.

11. Water Rights

Nothing to report.

12. Wilderness and Special Areas

Nothing to report.

13. WPA Easement Monitoring

Nothing to report.

G. WILDLIFE

1. Wildlife Diversity

Union Slough NWR attracts an abundance of wildlife species, both resident and migratory that use the area at various times during the year. Thirty-four species of mammals, 219 species of birds and 11 species of reptiles are common to the area.

The water management program at Union Slough contributes greatly to the diversity of wildlife present. Drawdown of refuge impoundments exposes mudflats that are attractive feeding areas for shorebirds, wading birds and

waterfowl. As pools are revegetated and flooded they attract additional marsh dwelling wildlife as well as seasonal migrants.

The grassland management program which includes reseeding and interseeding native grasses and legumes as well as prescribed burning has helped to break up monotypic stands of cool season grasses and improved the diversity of wildlife habitat. Variation within the prairie ecosystem has lead to a greater abundance of wildlife species present.

2. Endangered and/or Threatened Species

Bald eagles are normally seen during spring and fall migration periods, usually in small numbers. Two bald eagles were observed on 11/18, and another adult was sighted near Dear Meadow Picnic Area on 12/22.

3. Waterfowl

No waterfowl overwintered on the refuge, as refuge pools were completely frozen over. A negative report was submitted for the mid-winter waterfowl survey conducted on 1/3.

Overland flights of geese began stopping in the area on 2/20, flocks of 20 to 50 Canada geese were observed. On 3/5 approximately 400 mallards, 300 snow geese and 2000 Canada geese were utilizing the refuge. Canada geese numbers peaked at approximately 4000 birds near mid month.

The spring white-fronted goose survey was conducted on 3/19. No geese were present at this time. One overflight flock of 30 was sighted the week prior to the survey period.

Diving ducks began arriving on the refuge in early March. Other migrants began showing up around mid-month. Spring migration peaked in early April with 4426 divers (11% ring-neck, 60% scaup, 17% canvasback and 7% other). Dabbling duck populations peaked at 17,093 in April. Dabbling ducks were composed of 61% mallard, 11% blue-winged teal, 9% gadwall, 8% green-winged teal, 7% pintail and 4% other.

The fall waterfowl population peaked during mid October with approximately 6000 ducks present on the refuge. Canada goose numbers peaked at about 1000 birds during the last week of October. Five tundra swans were on the refuge on 10/23. An early winter storm on 10/31 and 11/1 pushed birds out of the area rapidly and numbers remained extremely low for the remainder of the year.

An abundance of water, due to the heavy rainfall received during spring and summer, undoubtedly had an effect on waterfowl use of the refuge. It is felt that waterfowl were more spread out over the landscape and not concentrated on the refuge as in the past two to three years of drought.

4. Marsh and Water Birds

Several species of marsh and water birds utilized refuge pools over the course of the year. Shallow pool conditions attract an abundance of great blue heron, black-crowned night heron, American bittern, common egret and white pelican.

Approximately 150 white pelicans were present on the refuge from late July through August. Lesser numbers of the species utilized the refuge until mid October when they migrated south.

The refuge coot population peaked at around 3,500 birds in April during spring migration. The fall population peaked at 1,300 birds in mid October.

5. Shorebirds, Gulls, Terns and Allied Species

In 1991, shorebird use was relatively low during both spring and fall migration periods, less than 1,000 peak population. Since pools were above proposed levels and no drawdowns occurred, there was little shorebird habitat available. On 9/23 approximately 7000 Franklin's gulls were seen on the refuge.

6. Raptors

Bald eagle and osprey sightings are documented under endangered species. A snowy owl was sighted near the refuge on 11/28. Red-tailed hawks, rough-legged hawks, northern harriers and American kestrels are common to the area and were observed throughout the year.

Great horned owls are common refuge residents. On 12/4 a short-eared owl was observed at Schowb Marsh Public Hunting area located at the north end of the refuge.

During fall migration hawk numbers rose significantly. Red-tailed hawks were very abundant. In addition, one broad-winged hawk and five northern harriers were seen on the refuge.

7. Other Migratory Birds

Mourning doves are present during the spring and summer months where they nest in plum thickets along refuge pools. The refuge population numbered about 300 birds. The annual mourning dove coo count was conducted on 5/28. The survey area, located nine miles south and west of Titonka, is a 20 mile route with three minute stops scheduled each mile. Seventeen doves were heard and five doves were sighted. This contrasts with last year's survey when eleven doves were heard and two were sighted along the survey route.

8. Game Mammals

Based on December censuses, Union Slough's wintering white-tailed deer herd numbered 250 to 300 animals. Most of the deer from the area surrounding Union Slough move onto the refuge during the winter months where food and shelter are much more abundant than on adjacent cropland. Hunting pressure during December shotgun seasons also accelerates this influx.

The refuge fox population is estimated at 25 animals. Five fox were live trapped and removed from the refuge by the seasonal trapper during the waterfowl nesting season. Coyotes are becoming more common in the area and the seasonal trapper captured one coyote pup and observed an adult on the refuge in May.

The refuge raccoon population is estimated at 200 animals. The seasonal trapper removed 79 raccoons from April - June. Forty-two skunks, 34 opossum, and 3 badger were also trapped during the period.

The drought conditions of the last two to three years have caused a decline in the muskrat population. Populations were estimated at 5,600 muskrats in 1987, 750 in 1988 and 250 in 1989 and less than 100 in 1990 and 1991. High water conditions should be favorable for muskrat populations to rebound in the next few years.

9. Marine Mammals

Nothing to report.

10. Other Resident Wildlife

Mild winters coupled with desirable nesting conditions have lead to a

substantial recovery in pheasant numbers in the past few years. In 1991 an early snow storm occurring on 10/31 and 11/1, which was accompanied by freezing rain and extremely cold temperatures, caused substantial mortality of ring-necked pheasants in northern Iowa. A second ice storm on 11/28 was also detrimental to pheasant survival. Cattail and marsh grasses on the refuge provide excellent cover for pheasants. In addition, food was readily available in adjacent farm fields and it appears that survival of the refuge pheasant population during 1991 was good. It is estimated that the current refuge pheasant population is approximately 1500 birds.

Hungarian partridge are also present on the refuge but numbers appear to be lower than in past years.

Wild turkeys are becoming a common sight along the timbered areas in the southern portion of the refuge. Small flocks of up to a dozen birds are seen regularly throughout the winter months. Hens are now beginning to nest on the refuge and can occasionally be seen with poults in June and July.

11. Fisheries Resources

Union Slough offers only limited fishing opportunities. In order to minimize disturbance to migratory birds, fishing is confined to areas along county roads which travel through the refuge or in Buffalo Creek, either at the Deer Meadow Picnic Area or in Buffalo Creek Public Hunting Area. In the spring of the year there is a small run of northern pike and some fishing opportunity exists where northerns congregate at D-2 water control structure and at Buffalo Creek radial gates. Carp and bullhead make up the catch in most other portions of the refuge open to fishing.

12. Wildlife Propagation and Stocking

Nothing to report.

13. Surplus Animal Disposal

When requested, refuge personnel are occasionally involved in the removal of nuisance animals or birds. There are 20 to 30 deer involved in vehicle collisions on or near the refuge annually. These carcasses must be disposed of and since the nearest state conservation officer is 50 miles away, most road kills in the local vicinity are handled by refuge personnel.

14. Scientific Collections

Nothing to report.

15. Animal Control

Nothing to report.

16. Marking and Banding

After several days of pre-baiting the refuge trap site, wood ducks were trapped and banded on 8/5, 8/9, 8/12, 8/29 and 9/4. A total of 400 birds were banded. Results by sex and age class were as follows: 72 adult females, 87 adult males, 105 hatching year females and 136 hatching year males. The refuge quota of 25 of each age/sex class was met this year.

In 1991, wood duck bands were returned by hunters in the following states: one from Minnesota, one from Mississippi, one from Illinois, and one from Ohio.

17. Disease Prevention and Control

Nothing to report.



#16 - A total of 400 wood ducks were trapped and banded in
August of 1991. (GW, 8/91)

H. PUBLIC USE

1. General

Each year an estimated 5,000 visitors view Union Slough NWR through Deer Meadow Picnic Area/Nature Trail, the refuge fall Auto Tour, Vanishing Prairie Grasslands Area or by stopping at refuge headquarters. A much larger number of individuals view the area from numerous county roads which bisect or run adjacent to Union Slough.

Refuge public use programs are designed to cater to a network of small towns and communities within the local area. All major population centers are at least one hour distant. The nearest town of moderate size is Algona, Iowa with a population of 6,300 some 23 miles to the southwest. The refuge continues to receive positive support from the local community. Ongoing programs and events are conveyed to the public through news releases, slide talks, scheduled tours, and meeting attendance when required.

2. Outdoor Classrooms - Students

A formal environmental education program does not currently exist at Union Slough. Students, teachers and other interested individuals are briefed on refuge programs, management techniques, wildlife, etc. prior to touring the area. Slide talks/tours were given to approximately 300 students and teachers during the period.

3. Outdoor Classrooms - Teachers

Nothing to report.

4. Interpretive Foot Trails

Deer Meadow Picnic Area and adjacent Indian Bluff Nature Trail were open April 15 through September 30. An estimated 1,500 visitors spent nearly 2,400 activity hours picnicking and walking the one mile nature trail. A variety of wildlife can be viewed from the trail including white-tailed deer, ring-necked pheasant, raptors and various song birds plus many species of plant life. Interpretive signs are placed throughout the walk explaining points of interest.

Vanishing Prairie Grassland Area was open from July 15 through September 30. The latter opening date minimizes visitor conflicts with nesting waterfowl. During daylight hours only, hikers are welcome to mingle on foot through one of the few native prairies left in the state of Iowa. Interpretive signs portray a history of the area and the varieties of native grasses and forbs that can be found there.

5. Interpretive Tour Routes

A news release was issued 9/9 informing local residents about the upcoming auto tour. The auto tour opened on 9/13 and ran through 9/22.

6. Interpretive Exhibits/Demonstrations

Exhibits explaining refuge programs and an excellent assortment of mounted wildlife specimens are on display in the refuge visitor contact station located along County Road A-42, six miles east of Bancroft, Iowa. Numerous brochures, DNR publications and other available FWS information are obtainable also.

7. Other Interpretive Programs

Nothing to report.

8. Hunting

Of 623,360 acres found in Kossuth County, Iowa, 1,724 acres or less than one-half of one per cent are open to public hunting. Lack of public hunting land has plagued area sportsmen for years. Intensive farming techniques have compounded the problem and increased value of existing wildlife areas tenfold. Schwob Marsh and Buffalo Creek Units of Union Slough NWR provide 645 acres of public hunting ground, but use is heavy. No hunting is permitted on other portions of the refuge.

Schwob Marsh is predominately grassland and provides good upland gamebird hunting. Buffalo Creek Public Hunting Area, located at the southern most tip of the refuge, contains a radial gate water control structure capable of diverting Buffalo Creek's flow to form a shallow 200 acre lake. Waterfowl hunting had been good in past years, especially during Iowa's "experimental" early duck season in September. Wood duck, blue-winged teal and mallard make up the primary waterfowl species bagged. Dry conditions in recent years have resulted in reduced harvest and Iowa's early season was closed in 1988, 1989 1990 and 1991. In 1991 The duck season was split, running from 10/5-6 and 10/19-11/15. Harvest was quite low this year as waterfowl use was not heavy in this portion of the flyway and an early winter storm at the end of October moved birds out of the area rapidly. In addition, interest in waterfowl hunting has declined in past years with drought conditions and low waterfowl populations.

The Iowa Canada goose season opened 9/28. A few hunters in the vicinity of the refuge were successful in bagging their daily limit of Canada geese.

Iowa's shotgun deer seasons ran from 12/7-11 and 12/14-22. Special muzzleloader season was held from 10/12-22 and 12/23 to 1/10/92. White-tailed deer harvest during open season was estimated at 70 deer taken within refuge public hunting areas and the immediate refuge vicinity.

9. Fishing

Refuge fishing opportunities are limited because of the shallow nature of pools and low numbers of game fish present. Good to excellent fishing for northern pike is common at refuge water control structures when water is released during spring spawning runs. Carp, bigmouth buffalo and bullhead are abundant in local streams and ponds.

10. Trapping

Seasonal trapping of primary waterfowl nesting predators was conducted from April to July for the fourth straight year under an approved Predator/Habitat Management Plan. Due to lack of muskrats on the refuge during the period, public trapping was not offered through a permit system. The Public Hunting Areas were open for trapping as in past years.

11. Wildlife Observation

Most wildlife observation occurs from county roads which bisect or run adjacent to the refuge in numerous locations. The Deer Observation Area, open year around, continues to be a popular spot for viewing white-tailed deer in good numbers during early morning or evening hours.

12. Other Wildlife Oriented Recreation

Nothing to report.

13. Camping

Nothing to report.

14. Picnicking

Deer Meadow Picnic Area, located adjacent to Indian Bluff Nature Trail within Union Slough NWR, receives limited use by refuge visitors from April 15 through September 30.

15. Off-Road Vehicling

Nothing to report.

16. Other Non-Wildlife Oriented Recreation

Nothing to report.

17. Law Enforcement

Manager Johnson and Refuge Operations Specialist Trudeau attended Law Enforcement Refresher Training held at Camp Dodge near Des Moines, IA 3/25-29.

On 6/25 the back window of Maintenance Worker Welp's trucks was shattered by a passing motorist throwing a rock. The rock narrowly missed the left side of Welp's head and neck.

On 9/17 Manager Johnson and Special Agent Walt Kocal participated in a Marijuana surveillance flight over the refuge and surrounding areas.

On 9/17 Manager Johnson requalified at the Police Department in Garner, IA for L.E. requirements.

18. Cooperating Associations

Nothing to report.

19. Concessions

Nothing to report.

I. EQUIPMENT and FACILITIES

- [1. New Construction
- 2. Rehabilitation

No major construction or rehab projects were scheduled during 1991. Maximum effort was expended towards Farm Bill work including organizing and directing a wetland restoration team, coordinating restoration efforts with the Iowa DNR and other agencies, local landowner contacts, completing wetland inventories and needed survey work.

Minor construction/rehabilitation projects undertaken during the year included:

- (1) Construction of several canister style wood duck houses for use during the upcoming nesting season. These will be almost entirely replacement houses.
- (2) Overhead garage door openers were installed in six bays of the shop.

3. Major Maintenance

Considerable staff time was spent on maintenance of existing equipment and facilities. Nonusable or expendable items were excessed, additional items were replaced with better used equipment or through new purchases. Buildings and facilities received annual maintenance checks and required repairs. Maintenance projects accomplished during the period included: repair of refuge wood duck nest boxes, boundary fencing and posting, mowing of parking areas and access roads, noxious weed control (mowing and/or spraying), levee and water control structure repairs as required, general vehicle and equipment maintenance and snow removal.

4. Equipment Utilization and Replacement

On 4/18 a 1991 Dodge Dakota pick-up truck was delivered to the station and was assigned Government license plate #I-156967. Cost of the vehicle was \$12,000. Undercoating, speed control, trailer wiring, mats, guards and a topper with lights were added at an additional cost of \$1,338.50.

On 4/10 the station's Jeep Scrambler (I-136401) was transferred to the Minnesota Wetlands and Waterfowl Management Complex in exchange for a 1980 Chevy Luv Pick-up (I-123787)

On 4/16 a Honda four wheel drive ATV was transferred from the Iowa Co-Op research Unit to the refuge.

5. Communications Systems

A two line telephone answering machine was installed on 2/27 to handle calls during the field season and to better coordinate wetland restoration construction activity with the Iowa DNR and Ducks Unlimited.

6. Computer Systems

Our present station computer system is currently upgraded and functional at the writing of this report. Only minor problems have been experienced to date, however, continual upgrades and needed supplies have added to the cost of operation. In 1991, a new CompuAdd computer, including printer and supplies was added to the refuge computer system.

7. Energy Conservation

Efforts to reduce station energy use continue from year to year with new and better ideas replacing old ones. Energy conservation practices such as setting back office and shop thermostats, caulking, door stripping, turning off lights when room is not in use, etc. are ongoing.

Refuge vehicles and equipment used 3526 gallons of unleaded gas, regular gas and diesel fuel during the period or 426 gallons above our FY 91 allotment of 3100 gallons. Wetland restoration activities accounted for more than half of the total station fuel use.

8. Other

The headquarters building was cleaned by contract. This is a very important service to the refuge, particularly during period of heavy public use. Other service contracts include, computer, copy machine and security system.

J. OTHER ITEMS

1. Cooperative Programs

One Beekeeping Permit was issued to Dave Segar of Fairmont, Minnesota in 1991 for a total cost of \$11.



#17 - On 4/18 a 1991 Dodge Dakota pick-up truck was delivered to the station. (BM, 4/91)



#18 - The back window of the stations 1986 Dodge pick-up was shattered by a passing motorist throwing a rock. (BM, 6/91)

One Special Use Permit was issued to Kevin Saxton, a photographer of Algona, IA at no charge.

Considerable cooperation and support was received from many different organizations and individuals relating to wetland restoration activities during the period.

The Refuge Revenue Sharing Act provides for yearly payments to local units of government. These units are the primary collectors for general purpose real property taxes on lands under the administration of the U.S. Fish and Wildlife Service. Funds for these payments are derived from revenue received from the sale of products from these lands plus a supplemental congressional appropriation. Refuge revenue sharing checks totalling \$21,068.00 were received on 5/18 for payment in lieu of property tax losses in 1990. These were distributed to seven counties where we have refuge or WPA fee title lands. Emmet county received \$5,467.00, Kossuth county \$7,591.00, Clay county \$2,634.00, Dickinson county \$3,488.00, Hancock county \$771.00, Palo Alto county \$326.00 and Sac county \$791.00.

2. Other Economic Uses

Nothing to report.

3. Items of Interest

Manager Johnson, Refuge Operations Specialist Trudeau and Administrative Technician Meyer attended a Regional Conference entitled "Common Sense Management in the 90's" on 2/3-8 in Minneapolis, MN.

On 2/27 Manager Johnson attended the Iowa DNR's Annual Conference at Springbrook, IA.

Manager Johnson attended the Region III Management Training Program held at Minnesota Valley Visitor Center from 3/11-15.

Maintenance Worker Welp attended a four hour course entitled "Roadside Weed Management" in March.

Administrative Technician Meyer received a Notary Public license in April. This will be useful for new employee's entering on duty as well as wetland restoration signing.

Administrative Technician Meyer and Refuge Operations Specialist Trudeau attended a six week computer course in Beginning Lotus offered through Iowa Lakes Community College in Algona, IA.

On 4/1-2 Manager Johnson and Refuge Operations Specialist Trudeau attended a Wetland Values and Function Workshop presented by the Iowa Wildlife Society.

Manager Johnson attended a Management Training Program at Minnesota Valley National Wildlife Refuge on 5/6-11.

On 6/7 Outdoor writer Larry Stone from the Des Moines Register visited the refuge for a personnel interview with Maintenance Worker Welp regarding the wood duck nest box program. An article regarding Welp and wood ducks appeared in the Des Moines Register on 6/16. In addition, on 7/22 the outdoor magazine Field and Stream requested information and photographs on the wood duck program. An article was published in the December, 1991 issue of Field and Stream magazine.

On 7/15-16 Manager Johnson attended Management Training in Bellaire, MI.

On 11/3-8 Administrative Technician Meyer attended a "Common Sense Administration" workshop in Minneapolis, MN.

On 11/3-10 Manager Johnson attended the 13th Annual American Indian Science and Engineering Society's Convention in Albuquerque, NM.

On 11/7 Biological Technician Steinhaus attended a Leadership and Supervisory Skills Seminar in Minneapolis, MN.

On 12/17 Manager Johnson, Refuge Operations Specialists Webber, and Biological Technicians Steinhaus and Skilling attended the Pesticide and Human Health training held at the Agricultural Extension office in Algona, IA.

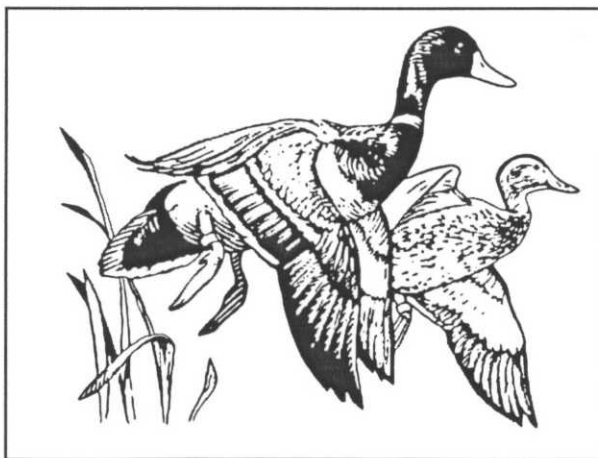
Manager Johnson attended the WAM JAM meeting at Springfield, MO on 9/23-26.

On 9/30-10/4 Manager Johnson completed and graduated from the Region III Management Training program which was held at Minnesota Valley National Wildlife Refuge in Minneapolis, MN.

4. Credits

Refuge Operations Specialist Webber wrote all sections of this report and various photo legends. Manager Johnson, Biological Technician Steinhaus, Maintenance Worker Welp and Administrative Technician Meyer assisted in organizing and compiling needed information and editing this report.

K. FEEDBACK



BIRDS

Union Slough National Wildlife Refuge Iowa



Legend

This bird list contains 219 species which have been recorded on the refuge since 1938. An additional 8 species, listed under "Accidental" birds, have been reported but are not normally expected to be present.

S—Spring March-May
s—Summer June-August
F—Fall September-November
W—Winter December-February

a—abundant—common species that is very numerous
c—common—certain to be seen in suitable habitat
u—uncommon—present but not certain to be seen
o—occasional—
r—rare—seen at intervals of 2-5 years

*Indicates birds which nest locally
solid lines indicate ORDERS

Birds	S	s	F	W
Common Loon	o	r		
Pied-billed Grebe*	c	c	c	
Horned Grebe			r	
Eared Grebe	o	r		
Western Grebe	o			
American White Pelican	c	u	c	
Double-crested Cormorant	c	u	c	
American Bittern*	u	c	u	r
Least Bittern*	o	c	o	
Great Blue Heron	c	c	c	r
Great Egret	o	c	u	
Little Blue Heron		r		
Green-Backed Heron*	c	c	c	
Black-crowned Night-Heron*	c	c	c	
Yellow-crowned Night-Heron		o	r	
Tundra Swan	o		o	
Greater White-fronted Goose	c	r	c	
Snow Goose	c	r	c	o
Ross' Goose	r		r	
Canada Goose	c	u	c	o
Wood Duck	c	a	c	
Green-winged Teal*	c	u	a	r
American Black Duck*	c	o	c	o
Mallard*	a	c	a	c
Northern Pintail*	a	u	a	r
Blue-winged Teal*	a	c	a	
Northern Shoveler*	a	u	a	
Gadwall*	c	u	c	
American Wigeon*	a	u	a	
Canvasback	c	o	c	
Redhead*	c	u	c	
Ring-necked Duck	c	u	c	
Lesser Scaup	a	u	u	
Common Goldeneye	u			
Bufflehead	c		u	
Hooded Merganser*	c	u	o	
Common Merganser	c			
Red-breasted Merganser	r			
Ruddy Duck*	c	c	c	
Turkey Vulture	o	r	r	
Osprey	r	o	o	
Bald Eagle	o		u	r
Northern Harrier*	u	c	c	o
Sharp-shinned Hawk	o	o	o	
Cooper's Hawk*	o	o	o	o
Northern Goshawk	r		r	
Red-shouldered Hawk	r			
Broad-winged Hawk	c	o	c	
Swainson's Hawk*	u	u	u	
Red-tailed Hawk	o	c	c	o

Birds	S	s	F	W
Rough-legged Hawk	u		c	r
Golden Eagle	r		c	r
American Kestrel*	c	u	c	o
Merlin	u		u	
Peregrine Falcon		r	r	
Gray Partridge*	c	c	c	a
Ring-necked Pheasant*	a	a	a	a
Northern Bobwhite*	r	r	r	
King Rail*		u	u	
Virginia Rail*	u	c	c	
Sora*	c	c	c	
Common Moorhen*	r	c	c	
American Coot*	a	c	a	
Sandhill Crane			r	
Black-bellied Plover	c	u	c	
Lesser Golden-Plover	o	u	o	
Semipalmated Plover	o	u	o	
Killdeer*	c	c	c	o
American Avocet	r	r	r	
Greater Yellowlegs	u	u	c	
Lesser Yellowlegs	u	c	c	
Solitary Sandpiper	r	c	r	
Willet	r			
Spotted Sandpiper*	o	c	c	
Upland Sandpiper*	u	u	o	
Hudsonian Godwit	o	u	u	
Marbled Godwit	o	u	u	
Ruddy Turnstone	r	r		
Sanderling	r	r	r	
Semipalmated Sandpiper	c	c	o	
Least Sandpiper	r	u	r	
White-rumped Sandpiper	r	u	r	
Baird's Sandpiper	u	u	u	
Pectoral Sandpiper	c	c	c	
Dunlin	r	o	r	
Stilt Sandpiper	c	c	c	
Long-billed Dowitcher	u	o	a	
Common Snipe*	u	o	c	r
American Woodcock	r	r	r	
Wilson's Phalarope*	u	u	u	
Franklin's Gull	c	u	a	
Bonaparte's Gull	u	u	u	
Ring-billed Gull	c	u	c	
Herring Gull	u		u	o
Caspian Tern		o	u	
Common Tern	c	u	c	
Forster's Tern	c	c	o	
Least Tern				
Black Tern*	c	c	c	
Mourning Dove*	c	c	c	u

Birds	S	s	F	W
Black-billed Cuckoo*	c	c	c	
Yellow-billed Cuckoo*	c	c	c	
Eastern Screech-Owl*	c	c	c	c
Great Horned Owl*	c	c	c	c
Snowy Owl				r
Barred Owl*	u	u	u	u
Long-eared Owl*	u			
Short-eared Owl			u	u
Northern Saw-whet Owl	o	o	o	o
Common Nighthawk*	u	u	u	
Chimney Swift*	c	u		
Ruby-throated Hummingbird		u		
Belted Kingfisher*	u	c	c	
Red-headed Woodpecker*	u	c	c	
Red-bellied Woodpecker				u
Downy Woodpecker*	c	c	c	c
Hairy Woodpecker*	u	u	u	u
Northern Flicker*	c	c	a	c
Olive-sided Flycatcher	u	u	u	
Eastern Wood-Pewee*	u	c	c	
Willow Flycatcher*		u	c	c
Least Flycatcher	c			
Eastern Phoebe*	o	u	u	
Great Crested Flycatcher*		u	u	
Eastern Kingbird*	c	c	u	
Horned Lark*	c	c	c	c
Purple Martin*	o	u		
Tree Swallow*	c	c	a	
Northern Rough-winged Swallow*		u	u	
Bank Swallow*	c	c	c	
Cliff Swallow*	c	c	c	
Barn Swallow*	c	c	c	
Blue Jay*	u	c	c	o
American Crow*	c	c	c	c
Common Raven			r	
Black-capped Chickadee*	c	c	c	c
White-breasted Nuthatch*	c	u	u	c
Brown Creeper	o			
House Wren*	u	c	c	
Sedge Wren*	c	c	u	
Marsh Wren*	u	c	c	
Golden-crowned Kinglet	u		u	
Ruby-crowned Kinglet			c	
Eastern Bluebird*	c	c	c	
Gray-cheeked Thrush	c			
Swainson's Thrush	o		u	
Hermit Thrush	o			
American Robin*	c	c	c	r

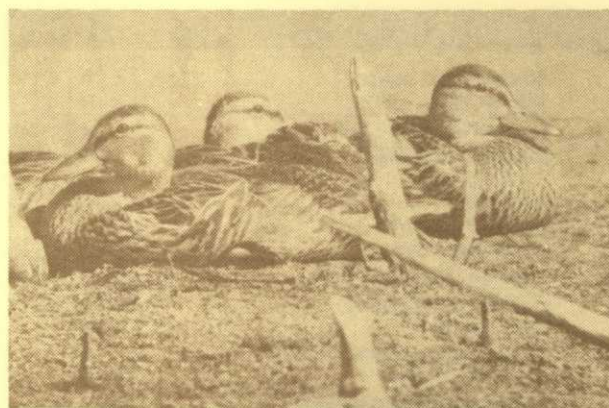
Birds	S	s	F	W
Gray Catbird*	c	c	c	
Brown Thrasher*	c	c	c	
Water Pipit	u			
Cedar Waxwing	c	c	c	u
Northern Shrike			u	u
Loggerhead Shrike*	u	o	u	
European Starling*	c	c	c	c
Solitary Vireo			u	
Yellow-throated Vireo	o			
Warbling Vireo*	o	c	u	
Philadelphia Vireo			u	
Red-eyed Vireo	u		u	
Tennessee Warbler	c			
Orange-crowned Warbler			c	
Nashville Warbler	u			
Yellow Warbler*	c	c	c	
Chestnut-sided Warbler	r		r	
Magnolia Warbler	u			
Yellow-rumped Warbler	c		c	
Black-throated Green Warbler			o	
Blackburnian Warbler			o	
Palm Warbler	c			
Bay-breasted Warbler			o	
Blackpoll Warbler	u			
Black-and-white Warbler	c		u	
American Redstart	c		c	
Ovenbird	u		o	
Northern Waterthrush	c		u	
Mourning Warbler	u		c	
Common Yellowthroat*	c	c	o	
Wilson's Warbler	o		c	u
Canada Warbler				u
Yellow-breasted Chat	u	u		
Northern Cardinal*	o	u	u	o
Rose-breasted Grosbeak*	o	u	u	
Indigo Bunting*		u		
Dickcissel*		c	c	u
Rufous-sided Towhee				
American Tree Sparrow			u	c
Chipping Sparrow*	u	u		
Clay-colored Sparrow	c			
Field Sparrow	u	u	u	
Vesper Sparrow*	u	c	c	
Savannah Sparrow*		u		
Grasshopper Sparrow*	u	c		
Le Conte's Sparrow	u			
Fox Sparrow			u	
Song Sparrow*	c	c	c	u
Lincoln's Sparrow	u			
Swamp Sparrow*	c	c	c	

Birds	S	s	F	W
White-throated Sparrow	C		U	
White-crowned Sparrow	C		U	
Harris' Sparrow	C		U	
Dark-eyed Junco	C		C	C
Lapland Longspur	U		U	C
Snow Bunting			C	C
Bobolink*	C	C	C	
Red-winged Blackbird*	C	a	a	C
Western Meadowlark*	C	C	C	U
Yellow-headed Blackbird*	C	C	C	
Rusty Blackbird	C		C	U
Brewer's Blackbird	C		C	U
Common Grackle*	U	a	a	U
Brown-headed Cowbird*	U	C	C	
Orchard Oriole*	U		C	
Northern Oriole*	C	C	U	
Common Redpoll			U	U
American Goldfinch*	C	C	C	U
House Sparrow*	C	C	C	C



Accidental Birds

- Red-necked Grebe
- Roseate Spoonbill
- Black Vulture
- Prairie Falcon
- Long-billed Curlew
- Western Kingbird
- Gyrfalcon
- Surf Scoter



Sighting Notes

Date _____

Time in Field _____

Weather _____

Observers _____

Species Total _____

Location _____

Sighting Notes

Visiting Tips

Birdwatching is encouraged.
Please check at the refuge office
for times and places of entry.
PLEASE OBEY POSTED SIGNS.

FOR FURTHER INFORMATION CONTACT:
REFUGE MANAGER
UNION SLOUGH NWR
R#1 BOX 32B
TITONKA, IOWA 50480



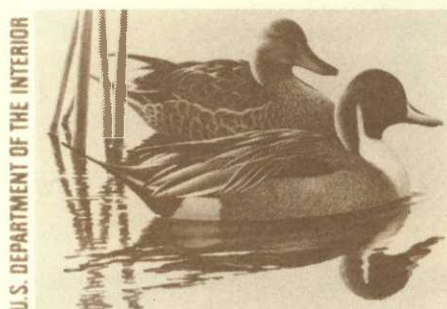
DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

RF3-33580-2-8/83

Location

The refuge office is located six miles east of Bancroft, Iowa on County Road A-42. Office hours are Monday through Friday from 7:30 a.m. to 4:00 p.m. The map included in this leaflet shows the specific location of the refuge.

Union Slough National Wildlife Refuge is one of a system of refuges administered by the U.S. Fish and Wildlife Service under the Department of the Interior and is dedicated to the preservation and conservation of wildlife. The financial base for this system was established in 1934 through the passage of the Migratory Bird Hunting Stamp Act. This Act requires waterfowl hunters to purchase an annual migratory bird or "duck stamp". Funds collected from duck stamp sales have been used to purchase numerous refuges that provide habitats necessary to sustain a variety of wildlife for both hunters and nonhunters to enjoy.



1983-84 Duck Stamp—Phil V. Scholer

For Further Information...

Contact the Refuge Manager, Union Slough National Wildlife Refuge, Route 1 Box 32-B, Titonka, Iowa 50480.

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".



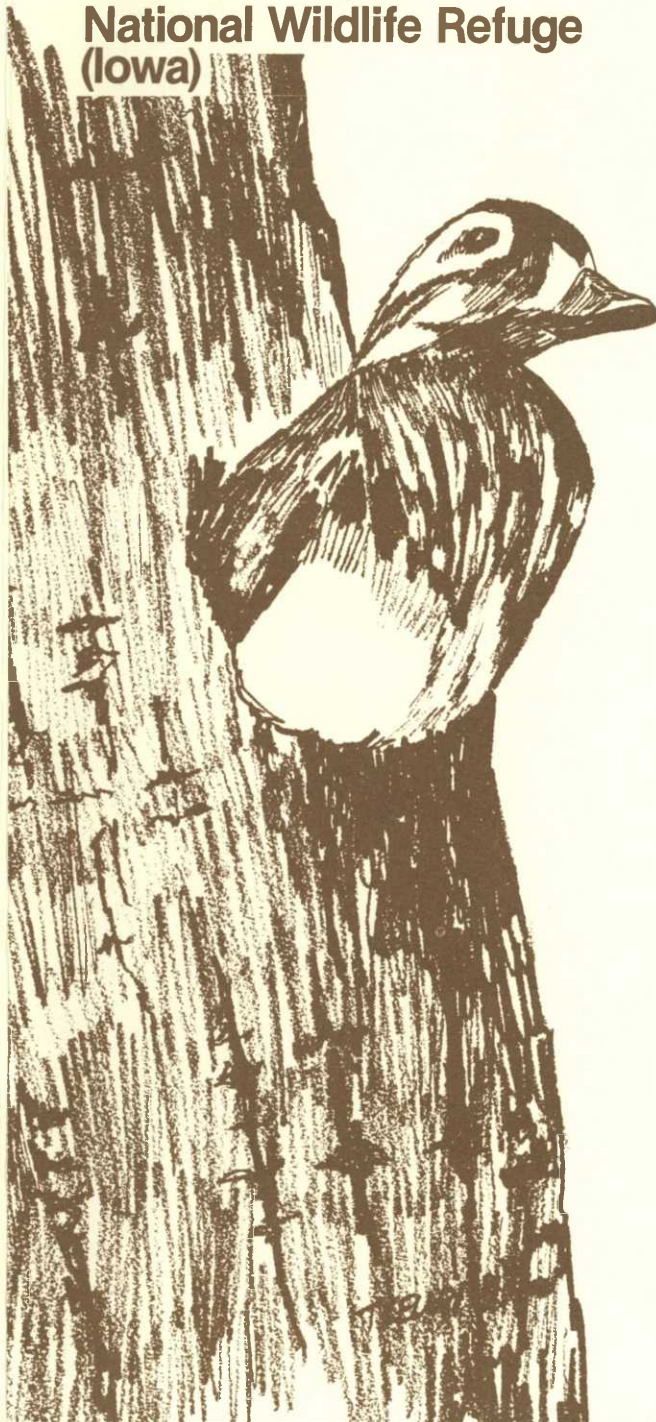
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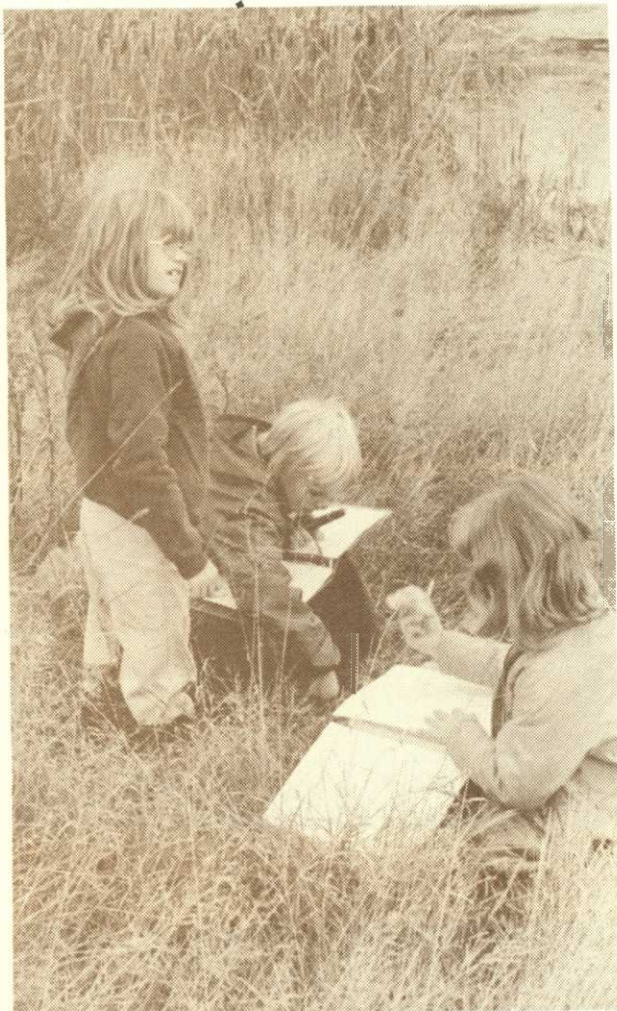
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Union Slough

National Wildlife Refuge
(Iowa)



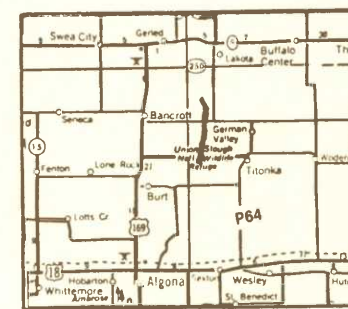
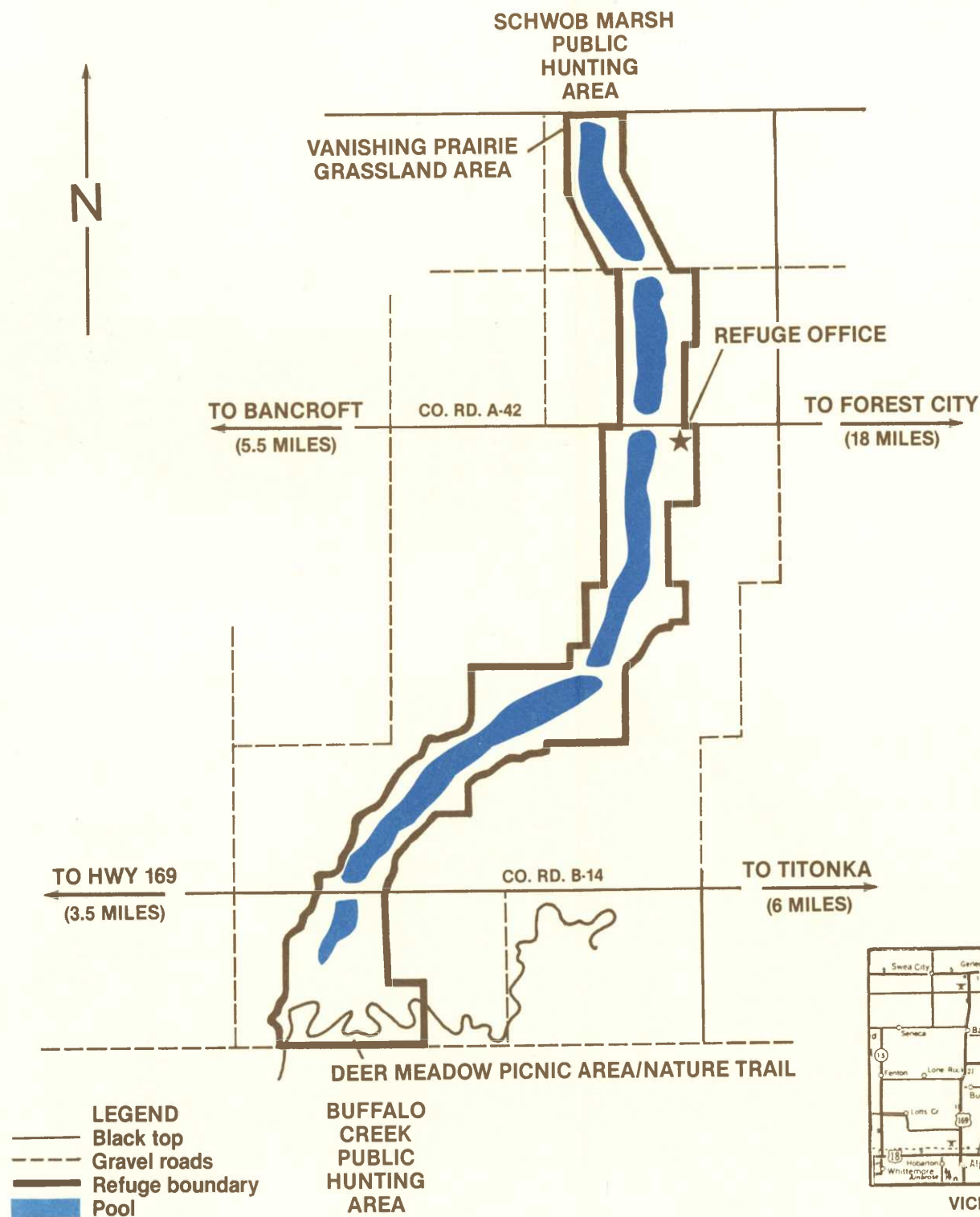


Public Use

The refuge is an excellent place to observe wildlife under natural conditions throughout much of the year. A variety of facilities are provided for the visitor, with the Vanishing Prairie Grassland Area and the Indian Bluff Nature Trail being particularly popular. The Deer Meadow Picnic Area, near the beginning of the trail, offers accommodations for educational groups, fishermen and trail users.

Hunting is not permitted on the refuge. However, an occasional deer season is necessary to prevent these animals from increasing to a level where habitat damage and depredation problems result. Fishing is permitted on refuge waters in accordance with state seasons and is governed by both state and special refuge regulations. Bullhead, carp and northern pike are common species to the area.

UNION SLOUGH NATIONAL WILDLIFE REFUGE



VICINITY MAP

UNION SLOUGH NATIONAL WILDLIFE REFUGE was established in 1938, primarily to assist with the production and management of waterfowl in the Mississippi Flyway. The refuge extends about eight miles along Union Slough and Buffalo Creek in Kossuth County, in north-central Iowa, and contains 2,200 acres.

Union Slough is all that remains of a pre-glacial riverbed. Actually, the area is a connection or "Union" slough between two watersheds; that of the Blue Earth River of Minnesota and the East Fork of the Des Moines River. It is so nearly level that originally the wind determined the direction of flow. During the early stages of settlement in the region, the slough area which now contains the refuge, covered approximately 8,000 acres and was considered useless for farming. Waterfowl, upland game and fish were found in abundance.

Efforts to restore a part of the slough to its original natural values were started soon after the refuge was acquired. Marsh habitat was restored by providing water control structures and related dams and dikes, thus dividing 1,100 acres of refuge wetlands into six separate manageable units. The resulting aquatic food plant production and water management benefits waterfowl and other wildlife.

Union Slough Refuge is on the eastern edge of the Northern Great Plains. Common native range plants are bluestem, gramas, Indiangrass, cone-flower, butterfly milkweed and leadplant; while green ash, cottonwood and willow are the dominant trees of the stream banks. Bluegrass and brome grass were introduced on the range by the early settlers, who also brought silver maple and other non-native trees to the farm groves.

The varying types of land on the refuge require a variety of management methods. To prevent erosion and provide nesting habitat for waterfowl and upland game mowing, planting of food plots, rotating farm crops, haying, planting native grasses and prescribed burning are management techniques used.



Wildlife

Although Union Slough is one of the smaller refuges administered by the U.S. Fish and Wildlife Service, it provides shelter for large numbers of waterfowl. During spring and fall migrations, ducks and geese generally peak at numbers in excess of 35,000. Ducks make up the bulk of waterfowl using the refuge in the spring and fall. Some mallards, blue-winged teal, wood ducks and occasionally other species stay to nest and rear their young. With improved habitat, duck production has steadily increased, to near 1,500 annually. As high as 4,000 snow, Canada and white-fronted geese use the refuge at one time during migration periods. A few whistling swans usually stop each year to rest and feed during their long migratory flights.

White pelicans, great blue herons, double-crested cormorants, black-crowned night herons and sora rails are common residents during the spring, summer, and fall. A variety of shore birds are also common during these seasons as are ring-billed gulls, Franklin's gulls, and black terns. The winter months bring different birds to the refuge. Several kinds of hawks and owls are common then, as are horned larks, snow buntings, and some overwintering mallards in the open water areas.

The ring-necked pheasant and gray partridge have benefited from the grassland management program as have upland nesting waterfowl. Good populations of these birds exist on the refuge.

Local trappers, under a restricted permit trapping program, harvest surplus muskrats as well as waterfowl predators like red fox, mink, skunks and raccoons. Small populations of muskrats are desirable on a waterfowl refuge because their eat-outs break up solid stands of vegetation. However, excessive numbers are capable of completely destroying large stands of aquatic plants needed as food and cover for waterfowl. Muskrats also tunnel into and through refuge dikes and cause damage to water control structures.

