WAUBAY WETLAND MANAGEMENT DISTRICT

Waubay, South Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 1989

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

REVIEW AND APPROVALS

WAUBAY WETLAND MANAGEMENT DISTRICT

Waubay, South Dakota

ANNUAL NARRATIVE REPORT

Calendar Year 1989

Refuge Manager — May 7, 1990 — Date

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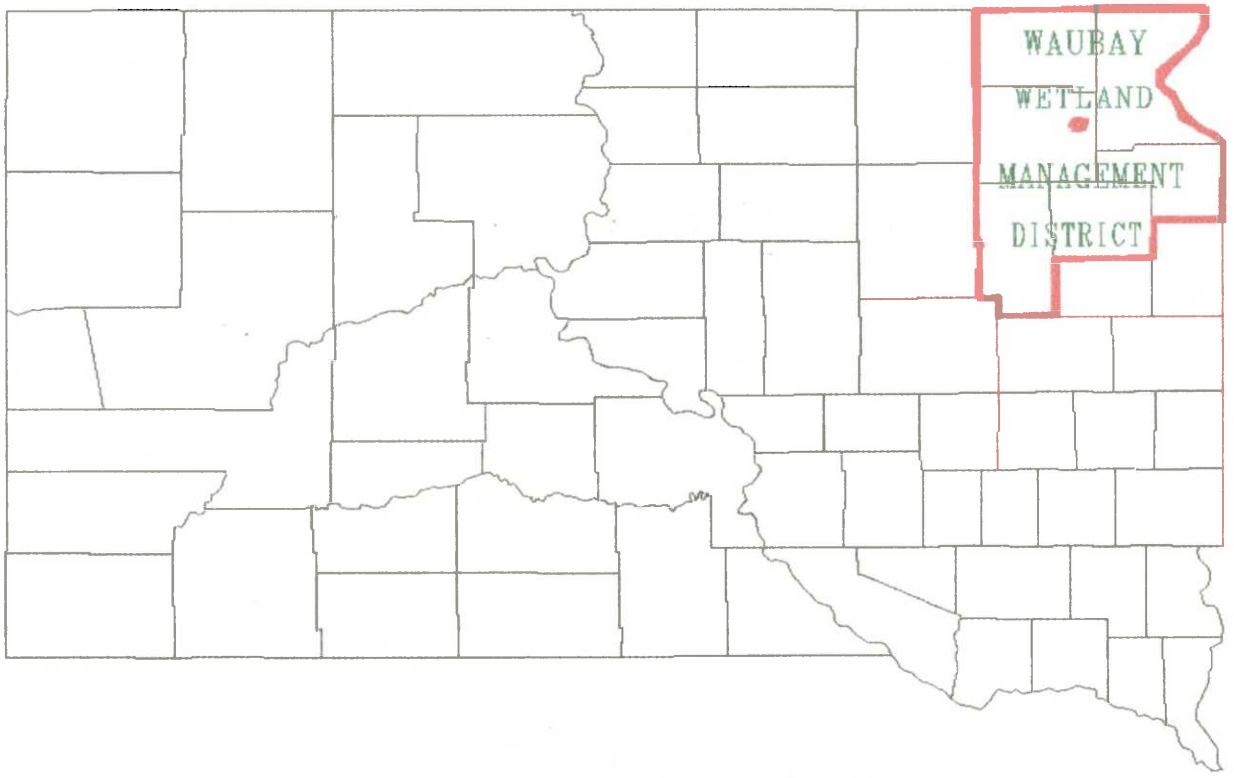

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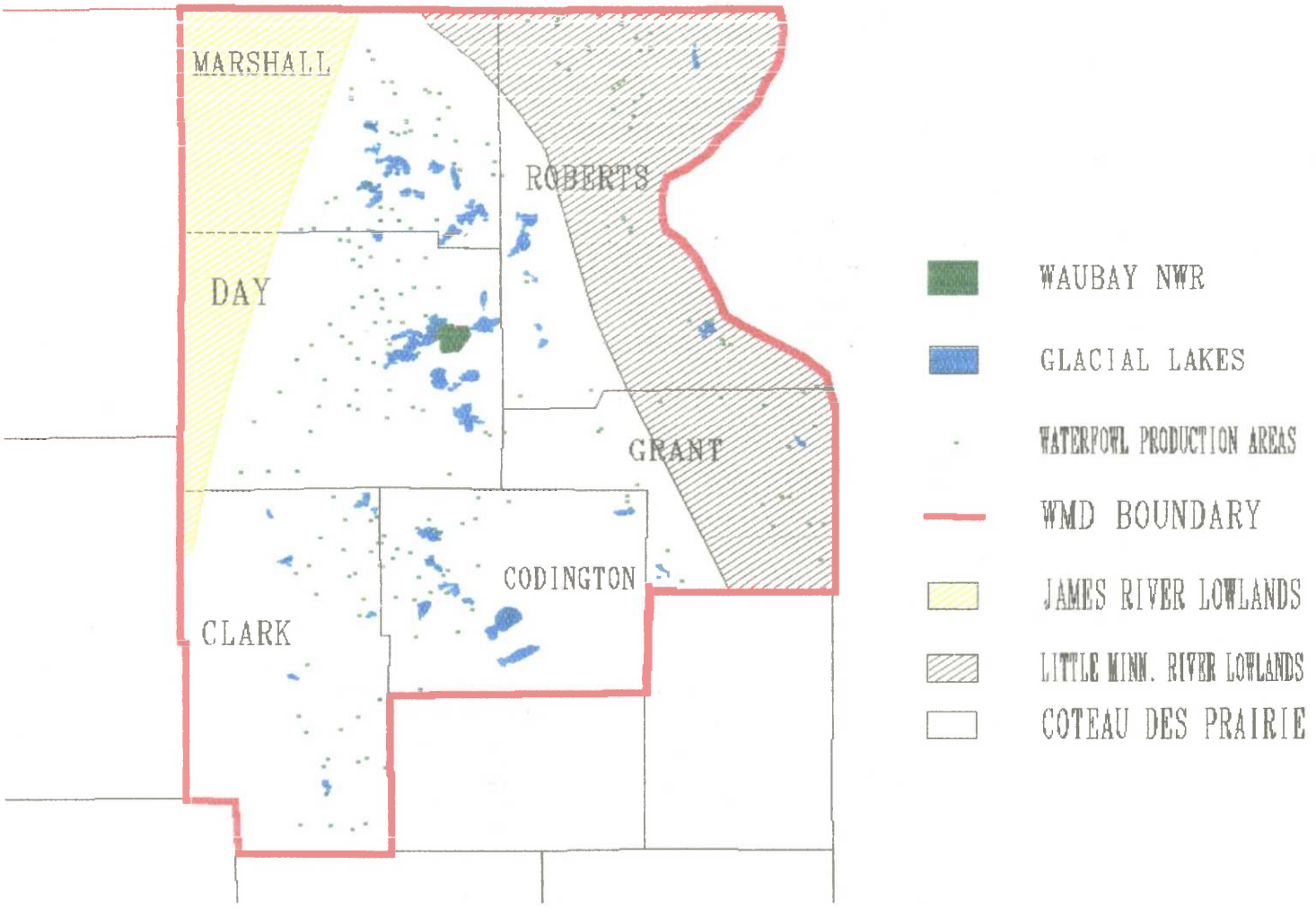
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INTRODUCTION

The Waubay Wetland Management District, administered from the Waubay National Wildlife Refuge, manages Waterfowl Production Areas (WPA's) and Easements for Waterfowl Management Rights in six northeastern South Dakota counties. The district encompasses 5,200 square miles and contains 347 WPA's comprising 38,827 acres with an additional 91,115 acres of wetlands protected under the easement program. Management on WPA's emphasizes production of quality waterfowl nesting habitat and open water areas for brood survival. Easements are enforced to protect wetlands on private lands from destruction through draining, filling or burning. Land use in the district is primarily farming of small grains and, to a lesser extent, livestock including dairy products and beef production.

There are three distinct physiographic regions within the district which provide different wetland habitat situations. The Coteau des Prairie is a series of north to south parallel terminal moraines which rise 800 feet or more in elevation above adjacent lowlands. This region constitutes nearly 80 percent of the district and contains innumerable wetland basins. To the east and west of the Coteau lie the Minnesota River and James River Lowlands, respectively. These lowland areas contain flat, fertile, agricultural land. Conflict between farming practices and wildlife management is significant in these areas.

A. HIGHLIGHTS

- Buffer zone easements are being implemented to save wetlands on Farmers Home Administration (FmHA) land. In 1989, 198 wetlands were restored on private land and nine restored on FmHA lands. (See E7a.)

- Ducks Unlimited (DU) completed four more waterfowl projects in the Waubay WMD. (See E.7a, I.1 and J.1)

- A successful giant Canada goose banding operation was completed. (See G.16)

- Canada goose depredation is a continual problem (See G.15).

B. CLIMATIC CONDITIONS

The year can best be described as normal. Precipitation received in 1989 was 20.00 inches, the 36 year refuge average is 20.06 inches. This was not enough to maintain water levels in wetlands, when you consider the higher than normal temperatures and lower than normal precipitation that were endured in 1988.

All area lakes were cleared of ice cover by April 22 and were frozen over for the duration by November 15.

July had the warmest temperatures recorded for the year, with 94°F on the 5th and 6th. August had several days in the 88°F to 91°F range. August also had one day of 91°F and the balance of the month in the mid 80°F area.

The first killing frost occurred on September 23rd when 28°F was recorded. This is about normal, as killing frost usually occurs sometime between mid- to late-September. After the killing frost occurred, October was unusually warm and dry with a high of 83°F. and only 0.40" precipitation being recorded.

December 21 and 22 recorded the coldest days for the year. The mercury dropped to -31°F. January and February also recorded several lows between -26 and -29°F.

Records of climatic conditions are maintained in cooperation with the National Weather Service. The records serve as excellent documentation of climatic conditions throughout the year for the Waubay National Wildlife Refuge and the surrounding area. Records maintained daily are maximum and

minimum air temperatures, as well as precipitation received. Also included in the cooperative effort is a record of soil temperatures at the 2, 4, 8, 40, and 72 inch level. Soil temperature information has proven very useful to the agricultural community during spring planting as different crop varieties germinate at different ground temperatures. (See table 1.)

Table 1. Record of weather recorded at Waubay Refuge

TEMPERATURE (^{0}F) and PRECIPITATION (inches) RECEIVED in 1989

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Precip.	0.51	0.45	1.69	3.19	1.63	1.58	2.15	4.85	2.89	0.40	0.66	0.00	20.00
36 yr. Ave.	0.46	0.52	0.86	1.88	2.80	3.55	2.95	2.73	1.75	1.39	0.73	0.44	20.06
High	46	36	63	78	84	89	94	91	82	83	61	42	
Low	-26	-29	-12	14	25	38	56	47	28	20	-4	-31	

C. LAND ACQUISITION

1. Fee Title

Fee title acquisition this year totalled 3,038.01 acres on eleven tracts including three tracts, totaling 1,904.98 acres in Marshall County. No land was purchased in Day or Grant Counties.

County concerns are generally the same: loss of revenue from deficit revenue sharing payments, too much land already in federal ownership and depredation problems from ducks and geese feeding on swathed grain.

Table 2 shows the fee and easement acquisition for 1989 and Table 3 shows the long term trend in fee acquisition for the Waubay WMD since the program started in 1961.

Table 2. Waubay WMD fee and easement acquisition for 1989 and total easement contracts and acres

County	Fee Tracts	Fee Acreage	1989 Eas'mts	Total Eas'mts	Total Wet Acres 1989	Grand total Wet Acres
Clark	5	869.03	10	482	277	27,723
Codington	1	132.00	0	137	0	6,122
Day	0	0.00	20	467	1,286	22,875
Grant	0	0.00	1	123	41	5,218
Marshall	3	1.904.98	2	267	161	14,475
Roberts	2	132.00	2	319	73	14,702
Totals	11	3,038.01	35	1,795	1,838	91,115

Table 3. Trend in fee acquisition from 1961-1989 at Waubay WMD

Year	Codington *	Clark	Day	Grant	Marshall	Roberts	Total
1961	0	2- 237.49	24- 1989.34	0	3- 736.71	0	29-2963.54
1962	0	0	8- 1452.25	0	3- 150.00	0	11-1602.25
1963	1- 56.99	0	0	0	0	0	1- 56.99
1964	1- 19.99	0	0	0	0	1- 80.00	2- 99.99
1965	1- 160.00	0	0	0	1- 42.66	1- 29.14	3- 231.80
1966	0	2- 273.18	1- 58.60	5- 564.05	1- 30.00	4- 239.47	13-1165.30
1967	3- 148.19	8- 536.76	1- 13.75	5- 107.64	2- 207.06	1- 119.04	20-1132.44
1968	1- 80.67	3- 242.09	7- 382.79	1- 34.00	1- 40.27	10- 755.97	23-1535.79
1969	1- 80.00	1- 40.00	3- 66.25	1- 15.04	7- 776.26	4- 172.29	17-1149.84
1970	3- 265.22	3- 200.00	4- 162.76	8- 558.60	4- 431.41	17- 936.48	39-2554.47
1971	3- 393.24	5- 406.79	12-1019.20	1- 16.90	1- 160.00	6- 646.40	27-2642.53
1972	3- 631.61	1- 160.11	0	7- 546.52	2- 120.00	6- 786.29	19-2244.53
1973	0	1- 147.59	2- 150.12	3- 357.85	3- 117.97	2- 195.07	11- 968.60
1974	0	2- 210.00	1- 75.00	0	0	0	3- 285.00
1975	2- 64.21	3- 121.22	3- 51.13	0	0	0	8- 236.56
1976	4- 658.51	0	1- 70.80	0	0	0	5- 729.31
1977	3- 445.27	1- 100.00	0	0	0	0	4- 545.27
1978	0	3- 524.11	0	0	5- 266.28	1- 75.40	9- 865.79
1979	4- 347.91	4- 727.51	0	0	*4- 566.99	3- 363.22	15-2005.63
1980	1- 153.23	0	0	3-1193.30	11- 611.07	0	13-1957.60
1981	2- 3.88	1- 75.33	0	1- 7.90	0	0	4- 87.11
1982	2- 18.45	0	0	0	0	0	2- 18.45
1983	2- 54.00	1- 80.00	1- 40.00	0	2- 440.00	1- 120.00	7- 734.00
1984	0	1- 120.00	0	0	5- 574.89	1- 89.54	7- 784.43
1985	4-1497.47	2- 315.40	0	0	10-1389.70	1- 153.91	17-3356.48
1986	1- 200.00	0	0	2- 560.81	5-1134.00	1- 160.00	9-2054.81
1987	4- 665.95	1- 32.85	0	1-1325.44	3- 525.39	0	9-2549.63
1988	1- 190.00	1- 160.00	1- 77.20	1- 80.00	5- 723.39	0	9-1230.59
1989	1- 132.00	5- 869.03	0	0	3-1904.98	2- 132.00	11-3038.01
Tracts	48	51	69	39	79	62	347
Acres	6266.79	5579.46	5609.19	5368.05	10949.03	5054.22	38,826.74
# Mgmt. Units	30	33	50	23	41	36	213
BLM	31.25	95.73	208.75	0	16.89	0	352.62
Totals	6298.04	5675.19	5817.94	5368.05	10965.89	5054.22	39,179.36

* Two tracts divested.

2. Easements

Thirty-five new easements were acquired in 1989 totalling 1,838 wetland acres. The Waubay WMD now has 91,115 wetland acres protected by perpetual easement.

3. Other

The very first Waterfowl Production Area in the nation was purchased within the Waubay WMD in 1959. This was the start of the Small Wetlands Program as we know it today. This program has preserved hundreds of thousands of acres of waterfowl production habitat in the United States since the program's start in 1959.

Concern over wide scale drainage, much of it subsidized by the SCS, was elevated to the Directors of the FWS by the manager of Waubay Refuge in the late 1940's and early 1950's. Frederic T. Staunton, manager at Waubay from 1942 to 1950, is credited with sounding the alarm which ultimately led to the end of subsidized drainage and the start of the Small Wetlands Program. Fred provided information to a conservation editor which resulted in an article appearing in the April, 1949 issue of Field and Stream entitled "Good-Bye Potholes".

On July 12, a dedication to Frederic T. Staunton was held at Waubay NWR. Sponsored by the South Dakota Chapter of the Wildlife Society, the event marked the unveiling of a laser engraved granite monument dedicated to Fred's work to stop wetland drainage in the 1940's. Approximately 200 persons attended this dedication. See Refuge Narrative for more information and pictures.

D. PLANNING

2. Management Plan

A Water Management Plan was written for a water management program on WPA's with water level management capabilities. During 1989, three DU funded projects came on line. Bids were let for two DU-funded nesting islands in December 1988 and work was completed in January 1989. After completion the unfrozen soil was seeded with a native grass mix. Snowberry and wild rose were added later in April. We now have 14 water control structures on nine WPA's.

Another project was completed this year on Overland-Korth WPA in Codington County. More about these projects as well as all the ditch plugs installed in 1989 can be found in Section F.2.

3. Public Participation

Public involvement in station programs is obtained throughout the year from various sources. We again exhibited at the Day County Farm and Home Show in Webster and the Marshall County Farm and Home Show in Britton with a booth exhibit. These two-day events attract over 2,500 people each, and provides the public with an opportunity to ask questions or voice concerns about our program. Several key contacts were made regarding restorable wetlands. An exhibit at the state fair in Huron attracted much attention. Several mallard nesting baskets were given out as door prizes.

4. Compliance with Environmental and Cultural Resource Mandates

One environmental assessment was written this year by station personnel involving the construction of three dikes on the Overland-Korth WPA. An archaeological assessment was conducted by the South Dakota Historical Society.

5. Research and Investigations

Waubay Refuge currently has two research projects ongoing with the cooperation of South Dakota Cooperative Research Unit at South Dakota State University. The following is a synopses of these studies by Kent Luttschwager and Jim Ray.

Kent Luttschwager is a graduate student studying the usage of upland nesting waterfowl on Conservation Reserve Program (CRP) land. His study is given the NR title: Waterfowl Production on Private Lands. The objectives of this study are to (1) determine waterfowl use on CRP lands, (2) determine and compare waterfowl nest densities among hayed and idle strips and idle blocks of CRP lands, and (3) to determine and compare waterfowl nest success and production among hayed and idle stripes and idle blocks of CRP lands.

Scott Benson and Patrick Beauzau helped Luttschwager conduct his field research. All three were also volunteers on the refuge and pitched in numerous times.

Due to the continued drought in 1988, the U.S. Department of Agriculture released CRP land for emergency forage with the provision that 10% be left in idle strips. Waterfowl nests were then located using the cable-chain method. In 1989, 146 upland nesting ducks (45 mallards, 19 gadwalls, 64 blue-winged teal, 9 shovelers and 9 pintails) were located in Brookings, Day, and Kingsbury counties. Of these, 48.6% (71) were located in hayed strips, 21.2% (31) in idle strips, 30.6% (44) in idle blocks. Visual obstruction rating averaged 1.0 dm for hayed strips, 2.1 dm in idle blocks. Nest densities per 40.5 ha between June 15 - 21 were 4.2 in hayed strips, 17.2 in idle strips and 18.5 in idle blocks.

This study showed that densities of duck nests were three to four times greater in idled strips and idled blocks than in hayed strips of CRP habitat. However, nest predation in idled strips is apparently density related. The idled strips attracted ducks but consequently also attracts predators. Due to extremely low nesting success, it is recommended that idled vegetation remain in blocks rather than strips. See table 4 below for Mayfield nest success.

Table 4. Mayfield nest success of duck nests found in CRP habitat in 1989

CRP Cover	Nests found	Nest Density per 100 acres	% Mayfield nest success
Hayed Strip	71	7.2	23.7%
Idled Strip	31	29.6	7.1%
Idled Block	44	24.6	21.4%
Total	146	11.6	18.4%

Jim Ray, a graduate assistant at SDSU, continued to monitor artificial nesting structures in 1989. Poor duck nesting success in the Prairie Pothole Region of the U.S. and Canada has renewed interest in the use of artificial nesting structures to provide secure nesting sites for ducks and geese. This study began in 1986 and is designed to see if waterfowl have a preference to artificial nesting structures. For the entire study area (which includes areas outside the district) in 1989, 165 nesting baskets, 224 bales, 54 culverts, and 30 self-maintaining tubs were available for monitoring, but only 133 baskets, 106 bales, 42 culverts, and 28 self-maintaining tubs were surrounded by water and considered useable. Table 5 reports results only for those structures which are located in the District. One hundred fifty-eight waterfowl nests (76 duck and 82 goose) were found on structures compared to 48 in 1988, an increase of 69.6%. This may be a reflection to better water conditions in 1989 and the installation of additional nesting structures. The evaluation continued whether treating flax straw with green color dye might attract nesting waterfowl to open-topped nesting baskets. More nest initiations occurred on green-dyed flax than on straw of natural coloration. In addition, nest initiation also averaged two weeks earlier on green than on brown. Earlier initiation on green straw supports observations that early nesting hens often select nesting sites near clumps of early green growth.

Table 5. Nests on artificial nesting structures located in Waubay Management District in water during 1989

Structure Type	Number (N) Available[1]	N(%) Use	Nest Total	N(%) Success
Baskets				
Ducks	26	2 (7.7)	3	1 (33.3)
Geese	26	6 (23.1)	6	6 (100.0)
Combined	26	7[2] (26.9)	9	7 (77.8)
Bales				
Ducks	15	4 (26.7)	5	2 (40.0)
Geese	15	5 (33.3)	5	5 (100.0)
Combined	15	7[2] (46.7)	10	7 (70.0)
Culverts				
Ducks	15	3 (20.0)	3	2 (66.7)
Geese	15	3 (20.0)	3	3 (100.0)
Combined	15	5[2] (33.3)	6	5 (83.3)
All Structures Combined				
Ducks	56	9 (16.1)	11	5 (45.5)
Geese	56	14 (25.0)	14	14 (100.0)
Combined	56	19[2] (33.9)	25	19 (76.0)

1. N (%) of structures that were in water during the May nest searches.
2. Number occupied by ducks or geese.

E. ADMINISTRATION

Figure 1. WMD Staff pictured left to right: 4, 6, 2, 5, 1, 3.
TLW 12/89

1. Personnel

1. Richard A. Gilbert, Refuge Manager, GS-12, PFT.
2. William J. Kurtenbach, Asst. Refuge Manager, GS-11, PFT.
3. Connie L. Mueller, Asst. Refuge Manager, GS-9, PFT. (EOD 5/22/89).
4. Dennis D. Okroi, Biological Technician, GS-6, PFT.
5. G. Roger Waddel, Maintenance Worker, WG-8, PFT.
6. Brian Kietzman, Biological Technician, GS-5, Not to exceed 1 year.
7. Richard Dolney, Laborer, WG-2, PPT.
8. Emil J. Gruba, Laborer, WG-2, PPT.
9. Lana J. Lunde, Biological Technician (Wldl.), GS-5, Temporary.
10. Alan R. Loterbauer, Biological Aid, GS-4, Temporary.
11. Thomas L. Wickstrom, Biological Aid, GS-4, Temporary.
12. Michael W. Dargetz, Biological Aid, GS-2, Temporary.
13. Jason Evans, SCA Volunteer. (See picture in F.7)
14. Dennis Skadsen, Volunteer.

Figure 2. Temporary Personnel 12, 10.
CLM 10/89

Figure 3. Temporary Personnel 9, 11, 8.
BDK 11/89

Connie Mueller transferred from Kirwin NWR on May 22, replacing Michael Getman as assistant manager.

Richard Dolney returned again and worked 9 months.

Emil Gruba also returned and worked approximately 7 months.

Lana Lunde returned for her sixth season, and Alan Loterbauer returned for his fifth season at Waubay.

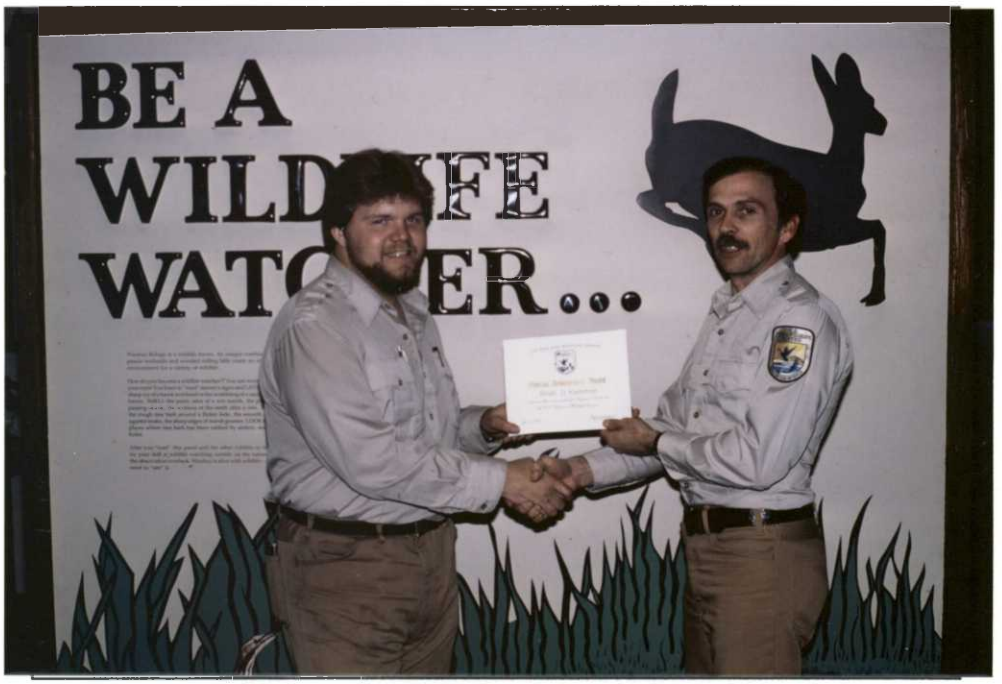

Figure 4. Brian Kietzman receiving Special Achievement Award from Manager Gilbert.
WJK 1/90

Biological Technician Brian Kietzman and Biological Aid Thomas Wickstrom received Special Achievements Award for their outstanding accomplishments restoring wetlands in the District.

Figure 5. Tom Wickstrom receiving Special Achievement Award from Manager Gilbert.
BJK 1/90

4. Volunteer Program

Jason Evans was selected as a Student Conservation Association (SCA) volunteer. Jason was a student at North Carolina State. Jason assisted with summer public use programs, conservation camps, off-site demonstrations, conducted many on-site programs and helped with a variety of other jobs. Jason was a big hit with local students because of his southern accent. See F.7 for photograph.

Dennis Skadsen, our regular volunteer, coordinates the bluebird program and provides assistance with bird watching groups/tours and on conservation camp programs. Dennis puts in a lot of time, especially on the bluebird trail. See Section G.7 of the Refuge Narrative.

Other volunteers were Kent Luttschwager, Scott Benson and Patrick Beauzau, students at South Dakota State University. They helped intermittently throughout the summer especially during times such as goose banding when we needed lots of people power.

Thomas Wickstrom volunteered in December after being laid off.

5. Funding

Waubay Refuge and Wetland Management District are funded as a single unit and operations on both are covered by one Annual Work Plan.

Total funding for 1988 was $340,000 in the O&M account and $4,500 in quarters rent monies. Table 5 shows a history of station funding over the past six years.

Table 5. Station funding from 1984 through 1989 (Money in thousands.)

FY	O&M Allotment	Construction Funds	Refuge Operation Maintenance	Rent $ 8610	Total S/D Worked	Total Salary Costs
89	315.0	-	5.0	4.0	2,345	228.9
88	340.0	-	5.0	4.5	2,158	214.2
87	318.0	-	-	2.0	2,245	203.0
86	278.0	20.1	-	2.0	2,065	175.0
85	300.0	-	-	1.0	2,045	170.0
84	266.5	40.0	-	2.1	1,995	148.0

6. Safety

Safety meetings are held monthly and are attended by all who are working at the time. Meeting topics are fitted with either upcoming station activities, the season of the year, or personnel health.

Table 6. 1989 Safety Meetings

Month	Movie Topic
January	"You and Office Safety"
February	"Home Heating With Wood"
March	"Step Right Up"
April	"The Split Second"
May	"Sharp as a Razor"
June	"Drive and Survive"
July	"Inland Water Search Rescue and Recovery" Blood Tests for Lyme's Disease Blood Tests for Pesticides
August	"Learn Not To Burn"
September	General Discussion
October	Lyme Disease VCR from the RO
November	"By Natures Rules"
December	"Winter Walking"

Quarterly safety inspections were made on all vehicles and equipment, fire extinguishers, and public use facilities.

On 2/21/89, maintenance worker Waddel slipped on the ice after getting out of a vehicle. He did not completely fall to the ground, catching himself by the vehicle door and regained his balance. He immediately heard a loud pop and felt a sharp pain in the area of the right knee. Waddel has missed a number of days of work and undergone extensive medical attention since the time of this accident.

In July technicians Kietzman, Dargetz and Wickstrom and volunteer Evans attended a Defensive Drivers Course at Sand Lake NWR.

7. Technical Assistance

Monthly precipitation records and weather summaries are maintained for NOAA with all data transmitted electronically. The Weather Service gave us an electronic encoder and the weather data are transmitted directly to their computer over the telephone. The system is called ROSA (Remote Observations System Automation). We also maintain daily records on soil temperatures.

Other technical assistance activities accomplished on an annual basis are: (1) the Waubay Refuge Christmas Bird Count conducted with the National Audubon Society, (2) nest record cards are sent to the Cornell Laboratory of Ornithology, (3) two dove routes are run annually for the Office of Migratory Bird Management, (4) shorebird census routes are run in cooperation with the Manomet Bird Observatory and (5) seasonal bird observations are sent to the South Dakota Ornithological Union for printing in the SD Bird Notes.

Waubay Refuge was chosen to participate in a botulism toxin study related to colonial nesting birds. A total of ten pelicans were collected and submitted to the National Wildlife Health Lab (NWHL) in Madison, Wisconsin. The study consisted of locating five dead or sick pelicans. Sick pelicans were euthanized and had the blood and hearts removed for study. If the bird was found dead, the heart and intestines were removed for study. All five carcasses in this part of the study were returned to water for three to seven days, or until they contained a population of maggots. On these five specimens, maggots were collected and sent to NWHL for analysis. An additional five control specimens (freshly dead or euthanized) were collected and submitted for necropsy.

The general diagnosis:

Carcasses: Three hearts tested positive for avian botulism and one was suspect; the heart from one tested negative. One specimen also had aspergillosis.

Maggots: All samples tested positive for avian botulism, type C toxin.

Blood samples: One specimen tested positive, while two specimen tested negative.

Heart blood: Two samples tested positive.

7a. Farm Bill Activities

Wetland restoration activities on non-Service lands were enacted through Wildlife Extension Agreements (WEA) and Farmers Home Administration inventoried properties. Restorations under the Wildlife Extension Program were conducted primarily on Conservation Reserve Program (CRP) lands. Landowner participation was encouraged by offering $10 per restored wetland acre, or a minimum of $50 per wetland. Wetlands are restored for 10 years or the remainder of the CRP contract. Local contractors were hired for construction of earthen ditch plugs in wetland drainage ditches. A total of 731.6 wetland acres (198 wetlands) were restored under WEA in 1989. Total cost was $40,463 ($204.36 per wetland, $55.31 per wet acre). Cost includes payment to landowner for acreage and cost to install the ditch plug.

Table 7. Wildlife Extension Program wetland restorations in 1989

County	Contracts	Number of Wetlands	Restored Acres	Total Cost
Day	8	58	166.3	$14,210
Clark	2	5	46.4	$2,473
Grant	2	10	24.9	$2,800
Roberts	5	61	146.9	$4,900*
Marshall	12	64	347.1	$16,080
Total	29	198	731.6	$40,463

*Ducks Unlimited paid for installation and seeding ditch plugs on 53 wetlands.

Figure 6. This is a typical ditch in southern Marshall County before restoration. (And typical oversized Waubay WMD sarcasm.)
BDK 8/89

Figure 7. Restoration in progress in southern Day County.
BDK 8/89

Figure 8. Completed wetland restoration in southern Day County.
BDK 8/90

Four old ditch plugs that washed out were repaired, for a total cost of $1000.

A total of fifty-three wetlands were restored in Roberts County on private land in cooperation with Ducks Unlimited. The cooperator wanted to do everything he could to improve habitat for waterfowl.

Other Farm Bill restorations were conducted on FmHA inventory lands. These lands are acquired by FmHA through forfeiture or foreclosure. The wetlands on these properties are protected or enhanced through a deed reservation. Since these wetlands are held in perpetuity through an encumbrance on the deed, entire ditch fills were done to restore the wetlands. Ditch fills were placed in 8 drainage ditches restoring 37.6 wetland acres. This year buffer zones were implemented around protected wetlands.

The three types of easements are: B, B_1, and C as described below.

B To protect wetlands that are seasonal, semi-permanent, or permanent in nature; Contain water in most years throughout the growing season; Are relatively deep; Generally contain cattails, rushes, and aquatic vegetation (i.e. predominantly persistent emergent hydrophytic vegetation). This type of easement involves total protection of area, but may be managed at Refuge Managers discretion. This year several FmHA tracts were hayed and grazed (see table below). B type easement areas are to be seeded and fenced at the expense of FWS.

B_1 Which protects wetlands that are: temporary in nature; contain water for shorter periods of time but generally not through the growing season; are relatively shallow; and generally contain smartweed, foxtail, dock, barnyard grass, and other hydrophytic annual plants. B_1 areas are to be seeded and fenced at the expense of the landowner.

C Which is a no burn, fill or drain easement. To be under a C easement four criteria must be met: 1) type I wetland less than 1 acre in size; 2) wetland must be isolated; 3) wetland must be traditionally crop; 4) frequently dry during the growing season.

These easements were not welcomed with open arms by FmHA personnel or interested purchasers. Under this program, a caretaker agreement must be signed between the FmHA and FWS before any wetland restorations can occur. At this point only one caretaker agreement has been signed. Six properties were reviewed and new easements were established. Changes were made to the original easement document in some cases to allow for B_1 or C easement areas where appropriate.

Table 8. FmHA Deed Reservation restorable wetland and potential easement - 1989

County	# Wetlands to be Protected	# Wetlands Restorable	Total wetland acres	Type of Easement B_1	B	C	Care taker agreement?
Clark #1	11	3	23.3	0	125.0	0	Yes
Clark #2	6	0	2.6	10.0	0	0	Yes
Clark #3	9	0	3.8	0	32.5	0	Yes
Clark #4	3	0	5.7	0	40.0	0	Yes
Clark #5	16	2	57.9	0	185.0	0	Yes
Codington#1	6	1	21.5	0	110.0	0	Yes
Codington#2	17	3	40.9	47.5	187.5	0	Yes
Grant	297	52	350.1	962.5	1,025.0	6.0	no*
Roberts #1	8	2	25.8	105.0	55.0	0.0	no*
Roberts #2	22	8	37.6	0.0	190.0	1.2	Yes*
Totals	395	71	569.2	1,125.0	1,950.0	7.2	

* Wetlands are restored if caretaker agreement has been signed.

Another Farm Bill activity was funding of over-water mallard nesting baskets and wood duck boxes. Thirty-nine nesting baskets and 27 wood duck boxes were erected on private lands.

Dry conditions were once again encountered by area farmers. The only two counties in the district to release CRP acres for hay were Roberts and Codington. The FWS "Piggyback" program, implemented to encourage landowners to participate in CRP, offered an additional payment of $5 per acre per year for the 10 years of the CRP contract. These FWS "Piggyback" payments were not withheld in 1989 as haying was done after July 1st.

Table 9. Special Use Permits Issued on FmHA Inventory Properties

County	Period	Type Activity	No. Acres
Clark	07/15-08/30	Haying	16.0
Clark	05/30-12/30	Control Weeds	465.0
Clark	04/28-12/30	Control Weeds	32.5*
Clark	05/16-12/30	Control Weeds	185.0*
Codington	05/09-12/30	Control Weeds	110.0*
Codington	07/15-08/30	Haying	25.0
Day	08/23-09/12	Grazing	195.0
Day	08/24-09/15	Haying	80.0
Day	07/05-07/30	Haying	63.0

* Small grains were recommended for weed control on cultivated lands.

F. Habitat Management

1. General

The Waubay Wetland Management District focuses its management primarily on increasing waterfowl production. The many habitats present allow for a variety of management practices to be applied for the enhancement of wildlife resources.

2. Wetlands

Wetland conditions deteriorated during the summer of 1989. Virtually all Type I and III's and small IV's were dry by freeze-up in November. In addition to the wetland restoration on CRP and FmHA land (see E.7a), 23 wetlands were restored on WPA's with the use of a small cat shared with Madison WMD.

Fifteen wetland basins were restored and an additional eight plugs were repaired on the Guy, Kreisch, Wike, Ruckdashel, Fagerland, McCarlson, Taylor North, Hagen, West Storley, E. Hanson and Zenk WPA's.

Another Ducks Unlimited project was completed this year on Overland-Korth WPA in Codington County. This project consisted of installing three dikes, to enhance two wetlands of 10.4 and 5.4 acres in size.

Fourteen wetlands in the WMD have water control structures in place.

Under the Wildlife Extension Program and Farmers Home Administration inventoried properties an additional 206 ditch plugs were constructed to restore 744.1 acres of wetlands on non-service lands (See E.7a).

4. Croplands

Most of the farming activities within the district are accomplished by permittee through cooperative farming agreements. The croplands provide areas for waterfowl and other wildlife to feed, which helps reduce depredations on adjacent private croplands. Some areas are farmed to prepare them for future grass seedings. In 1989, there were 455.7 acres on 13 WPA's farmed by 10 cooperators (Table 10).

In the past, the farming was performed on a 1/3:2/3's share basis. This year the district started implementing a new plan, which involves a three year rotation. The rotation consists of: first year, small grain with a sweet clover under seeding; year two, sweet clover plowed down and seeded to

sudan grass, hay millet, or milo; year three, corn with two cultivations required by the cooperator. Changes were made to incorporate nitrogen into the soil on a more frequent basis, and provide control of weeds without the use of chemicals. This rotation can easily be expanded to a four or five year or longer rotation as soil conditions (tilth, percent organic matter, fertility) and moisture dictates.

Table 10. 1989 Waubay WMD farming activities

WPA	County	Acres	Crop
Markrud-Larkin	Clark	8.0	Corn[3]
		13.6	Small grain w/alfalfa[1]
Poppen	Clark	11.0	Milo w/Sweet Clover[3]
		22.0	Small grain w/alfalfa[1]
Springer	Codington	12.0	Soybeans[4]
		28.0	Millet[1]
Roe (159, a)	Codington	9.2	Milo w/Sweet Clover[4]
		18.0	Milo[1]
		6.2	Milo[1]
		6.6	Milo[1]
Roe (Horseshoe Lake)	Codington	35.0	Milo[2]
Roe (Warner Lake)	Codington	18.0	Siberian Hay Millet[2]
Bruflat	Codington	5.0	Corn and Bean Mix[3]
Kreisch	Day	14.0	Millet and sweet clover[3]
		8.0	Cicer Milkvetch[5]
		18.0	Small grain w/alfalfa[1]
		17.0	Cicer Milkvetch[5]
Augustana	Day	39.6	Small grain[2]
Cronen	Grant	62.0	Soybeans[2]
Deutsch	Marshall	14.0	Small grain[1]
		17.0	Small grain[1]
		10.0	Small grain w/SweetClover[4]
Peterson Memorial	Marshall	47.5	Small grain[2]
Keintz (East)	Marshall	16.0	Rye[1]
	TOTAL	455.7	

[1] 100% Cooperators share.
[2] 2/3 Cooperators share.
[3] 100% FWS food plot - cooperator compensated w/2X hay.
[4] 100% FWS food plot - cooperator compensated w/ other crop.
[5] 100% FWS converted to nesting/ hay land.

5. Grasslands

A total of 228 acres, on five WPAs, were seeded by force account to a 50/50 mix of cool and warm season natives grass/legume mixture (DNC). One additional five acre piece was seeded on a WPA by a cooperator.

Twenty-five acres were seeded to cicer milkvetch as an experimental replacement to alfalfa. Milkvetch matures later, holds its leaves longer, is higher in protein and improves

with the age of the stand. It is also nonbloating and can be grazed as well as hayed.

Numerous other disturbed sites, road projects, ditch plugs, etc., were seeded throughout the district.

7. Grazing

Grazing is used as the primary management technique to improve and enhance upland nesting cover on WPA's. The 1989 grazing fee was $9.20 per AUM. A total of 5,177 acres on 31 WPA's were grazed averaging 1.15/AUM/AC. Grazing in 1989 was up 51% over 1988 and is shown in Table 11.

Table 11. Grazing activity during 1989 on the district

WPA	County	Actual Grazing Period Period	Acres	AUM/AC Rate	* Net Receipts
Giedd-Hagan WPA (299, 375)	Clark	06/01-09/18	129.2	1.37	1231.80
Kuecker WPA (252)	Clark	06/01-08/17	59.0	1.17	607.72^
Bender WPA (179)	Clark	05/20-06/30	72.0	1.17	300.56
Markrud WPA (219)	Clark	06/15-08/24	29.0	1.70	453.56^
Roe WPA (110B)	Codington	05/25-08/15	567.0	0.82	3196.36
Neal WPA (127)	Codington	05/20-06/08	52.0	1.12	395.44
Geiger-Stevens-Page (89,91,92)	Codington	05/10-06/08	42.0	1.40	226.80
Swan WPA (132)	Codington	05/26-07/02	53.8	1.23	228.04
Hansen WPA (82)	Codington	06/01-06/21	25.0	1.54	230.20
Struckman-Trumm WPAs (30, 67)	Codington	06/03-08/31	114.0	1.33	1009.48
Meuer-Orness WPAs (14, 19a)	Day	05/11-06/08	55.0	1.03	420.48
Augustana (60)	Day	05/01-05/31	98.0	0.93	753.38
Kreisch-Becht WPAs (26, 296)	Day	06/11-09/01	46.0	1.36	261.92
McCarlson WPA (15)	Day	07/23-08/24	22.0	1.40	132.28
O'Farrell WPA (24A,B)	Grant	06/01-10/16	1175.0	1.11	6743.76
Meyer-Jansen (41 & 42)	Grant	06/01-09/16	114.0	1.50	343.01
LaMee WPA (84)	Marshall	05/02-08/08	200.0	0.91	0.00
Ruckdashel WPA (11a)	Marshall	06/01-07/01	160.0	0.48	373.70
Syverson WPA (130)	Marshall	06/01-07/15	50.8	1.61	403.56
Janish-Quamen-Ottertail (171..)	Marshall	07/03-07/11	100.6	0.80	37.72
Olson WPA (10)	Marshall	06/09-08/26	68.0	1.25	552.92
Buss WPA (227)	Marshall	06/01-07/11	65.0	1.40	293.91
Ruckdashel-Hofland WPA (11)	Marshall	06/01-10/18	476.0	1.20	0.00
Ruckdashel-Hofland WPA (11)	Marshall	05/01-10/31	40.0	1.27	0.00#
Strand & Ringer (93, 217)	Marshall	05/01-10/23	200.0	1.61	1860.73
Fitting & Overberg (250, 186)	Marshall	06/10-08/10	137.5	1.27	885.00
Likness-Carlson (92a, 134...)	Marshall	06/01-09/14	200.0	1.03	350.20
Fagerland WPA (136)	Marshall	08/01-08/21	57.1	0.71	232.16
Wike WPA (187a)	Roberts	05/01-05/31	505.6	0.30	1338.54
Broze WPA (211)	Roberts	06/08-08/08	63.5	1.06	300.32
Loberg WPA (11)	Roberts	06/28-07/20	200.0	0.73	76.07
Total			5177.1	34.81	23239.62
Average				1.15	

*Permittee are compensated for activities which are necessary to accomplish the management objectives such as boundary fence maintenance, hauling water, or temporary fence construction. These receipts are after deduction of allowed compensations.

#Angora Goats

^Dates are not inclusive

This is the third year that HRM grazing projects have been implemented. This year we began monitoring by collecting data on plant composition and vigor. In future years we will report any changes from this base data. The overall grazing objectives were to reduce heavy accumulations of litter, increase vigor of the vegetation, and increase the energy and mineral cycles. In general, a high density stocking rate was used over a short time period.

Figure 9. Volunteer Jason Evens imitating a vegetation pole on the East Guy WPA, which was grazed July 3 to 6.
CLM 7/27/89

Figure 10. Wike WPA after graze.
CLM 10/5/89

Figure 11. Wike WPA closeup of ground cover.
(Note transect marker spike in center of photo.)
CLM 10/5/89

Approximately half the pastures were grazed once, the others were a twice through rotation.

A high stock density of 12 to 15 animals per acre grazed over three to seven days has proven to be the best technique to achieve uniform plant utilization. It is effective in reducing the mulch accumulation from hoof action also. In areas where litter accumulation is a problem, it is taking several consecutive years of treatment to achieve the desired result. Then the intensity and frequency of treatment could possibly be reduced. Plant composition is an important factor to determine frequency of treatment. It now appears that sites with a heavy infestation of Kentucky bluegrass may need to be treated every year or every other year to minimize litter accumulation and maintain good plant vigor. Sites dominated with native grass species where litter is less of a problem won't require treatment as frequently. Sites with smooth brome will fall somewhere in between.

Grazing trials in North Dakota indicate that grazing during the month of May possibly discourages nest initiation. Where early season grazing is not essential to achieve the objective, it is recommended that grazing be delayed until the third week of May or better yet June 1. If ducks have initiated their nest before livestock are turned in, there is less conflict as the hen is more apt to defend the nest site and continue incubation of the clutch.

One draw back to this technique is finding a competent permittee with an adequate number of livestock that is willing to rotate the cattle according to the established schedule. This is essential. A good permittee will ensure a successful graze, whereas a poor permittee will result in overgrazing of the vegetation and the objectives of the graze will not be fulfilled.

An option that may attract permittee to participate in a grazing project of this type would be the use of multi-year SUP's. Permittee have stated that they would be more receptive to the extra work if they were insured that they could receive several years of grazing privileges. A second option is a bidding system, which will be implemented on larger tracts in 1990.

On May 28th, seventy-five Angora goats and one donkey were released on the Ruckdashel WPA as an experimental control for leafy spurge. The goats were released in a forty acre parcel that contained approximately 50% spurge. The goats were removed from the area on September 9, for their fall shearing. The price for hair at that time was $3+ per pound. Up to 20 pounds of hair can be taken from mature weathers.

The results of the spurge stem counts are as follows: grazed area was reduced from 861 stems on May 31 to 386 stems on September 14, while the control area increased from 631 stems on May 10 to 680 stems on September 14. The grazed and control stem counts were done in a 16' x 16' area. In the grazed area all mature plants were striped of leaves and the tops were removed by the goats. Only one plant reached the flowering stage. The goats also controlled Canada thistle. No flowering plants were found in the grazed area. In contrast, the spurge in the control area were approximately 60% taller with 50% reaching the flowering or seeding stage. The thistle was 2 to 3 times taller and all (100%) had flowered and gone to seed.

Figure 12. Goats and Clarence amidst the spurge.
RAG 6/89

Figure 13. Spurge study plot on the Ruckdashel at the beginning of the graze.
RAG 6/1/89

Figure 14. Spurge study plot at mid-season. Note goats under tree in back ground.
CLM 7/27/89

Figure 15. Spurge study plot after graze.
LJL 9/14/89

Figure 16. Ground inside Spurge study plot after the graze.
LJL 9/14/89

Figure 17. Ground cover outside Spurge study plot after the graze.
LJL 9/14/89

8. Haying

WPA grasslands are often managed by haying. Areas are hayed to remove the mulch accumulation. This year several areas were hayed in cooperation with farming practices (See F.4). The cutting of hay is permitted after July 15th or earlier if used as a weed control (i.e. Canada thistle). Permittee are required to mow with a sickle bar mower and rake with a side delivery rake or a dump rake to remove as much litter accumulation as possible.

Table 12. Listing of WPA's and acres hayed during 1989

WPA	County	Acres
Anderson WPA (101)	Clark	25.00
Markrud-Larkin WPA (219)	Clark	10.00
Poppen WPA (324)	Clark	22.00
Neal Barton WPA (180, 4520	Clark	23.00
Bruflat WPA (135)	Codington	14.00
Geiger WPA (89)	Codington	30.00
Overland WPA (155)	Codington	32.00
Springer-Huppler WPA (66, 68)	Codington	56.00
Sandell WPA (158)	Codington	80.00
Kreisch WPA (26)	Day	28.00
Zenk WPA (319)	Day	21.00
Nicolay WPA (58)	Day	20.00
McCarlson WPA (15)	Day	18.00
Meyer WPA (41)	Grant	12.00
VanHout (59)	Grant	2.00
Price-Kaufman (82, 85)	Grant	25.00
Price-Kaufman WPA (82, 85)	Marshall	8.00
West Guy WPA (257a)	Marshall	8.40
Hellevang WPA (143a)	Marshall	29.00
Schultz WPA (260a and 260b)	Marshall	62.00
Hauck WPA (120a)	Marshall	13.00
Guy WPA (257b)	Marshall	45.00
East Keintz WPA (29a)	Marshall	12.00
Likness-Carlson-Jensen WPA (92a, 134..)	Marshall	80.00
	Total Acreage	675.40

A total of 675.4 acres on 24 WPA's were hayed this year (see Table 13).

9. Fire Management

Several areas were planned to be burned this year, but no fire management was completed due to dry conditions.

10. Pest Control

Although control of noxious weeds is mandated by State law a reduction in the use of chemicals was emphasized this year. In many cases chemical control was applied after haying or grazing an area; that way better control was obtained with less chemical use. Many areas were hayed to prevent seed production of noxious weeds (see F.8).

In May, seventy-five Angora goats and one donkey were released on the Ruckdashel WPA, in Marshall county, as an experimental control for leafy spurge. The goats were released in a forty acre parcel that contained approximately 50% spurge. See section H.7 for details.

11. Water Rights

Water rights are obtained on all control structures in the Waubay Wetland Management District. No new water permits were achieved on the district in 1989.

13. WPA Easement Monitoring

After a long battle which started with 1985 and 1986 violations, Roberts County easement 235X was finally resolved in 1989. By a judges decision issued in December of 1988, the landowner was required to restore the wetlands by removing the fill in the basins and place it in the ditches within one year following the decision. On a Sunday in November, just prior to freeze-up, using the refuge pickup headlights to see, the landowner finally finished his compliance work.

Other easement work included ground checks, correspondence, etc, for 1988 violations which included two scraper ditches, six plow furrows, three fills, and four burns.

Fall flights and follow-up ground checks in the fall of 1989 revealed seven burn, six plow furrow, and three fill violations.

G. WILDLIFE

1. Wildlife Diversity

Land use management is designed to maximize waterfowl production and optimize the diversity of wildlife.

2. Endangered And/Or Threatened Species

Bald eagles are visitors to the district during spring and fall migrations. Most bald eagles are observed in flight over the refuge, while some use the refuge for both roosting and hunting. An average of ten to fifteen eagles are observed during spring and fall migrations. This year three bald eagles were sighted on the district during the fall.

3. Waterfowl

The northeast South Dakota flock of giant Canada geese continued to expand as indicated by the South Dakota Game, Fish, and Parks annual counts. The spring nesting pair count was 871 pairs. In comparison, 1973 had 249 breeding pairs. As expected, crop depredation complaints from landowners have increased with the population expansion of this flock.

Spring migration began about April 1 with the arrival of the first flock of Canada geese and peaked between April 15-20. The first snow geese were seen approximately April 2 with the peak of migration occurring April 15-20. The first fall snow goose sighting was on September 30. Canada geese remained in

the district until after freeze up. About 15,000 Canada geese wintered around the Big Stone power plant in eastern Grant County.

Ducks began arriving about April 7 with migration peaking the third week of April. The fall migration was first noticed in mid-August with the departure of many blue-winged teal and arrival of the first northern birds. Fall migration peaked during the first week of November. The late season migrants such as mallards, lesser scaup, and mergansers remained until November 20.

Duck breeding pair count surveys (Quarter Section Method) were performed in May to collect data to estimate duck production on the district. This year's pair count survey revealed an estimated 6,786 breeding pairs on WPA's, a 3.7% increase from 1988. Total duck production on the district based on breeding pair count data was estimated at 18,322 (6,786 breeding pairs X .45 assumed productivity X 6 average brood size), An assumed productivity of .45 was used based on three years of nest drag data. The 11-year average for duck production on the district is 16,024. Table 13 (see next page) shows the number of ducks produced annually on the district during the last eleven years.

No nest dragging data was completed in 1989.

A 4-square mile waterfowl breeding pair count was conducted in conjunction with Northern Prairie Wildlife Research Center (NPWRC). The purpose of this survey is to standardize a process for assessing status and trends in waterfowl breeding populations and production on FWS lands and surrounding lands in the Prairie Pothole Region. One hundred sixty-five wetlands on nineteen, 4-square mile plots were counted twice for breeding waterfowl. Approximately 23 man-days were spent on the survey during early May to mid-June. On the first count, 43% of the wetlands surveyed were dry. On the second count, 57.8% of the wetlands surveyed were dry. Summaries of the number of breeding pairs counted in 1987 to 1989 are listed in Table 14. When compared to the three year average there was an increase of 110 breeding pairs. On a percentage basis, five species declined when compared to the average. These were: mallard (11.3 %), widgeon (57.1 %), blue-winged teal (3.6 %), pintail (24.4%), woodduck (41.7%). Five species also showed an increase during this period. These were: gadwall (13.7%), redhead (35.8 %), canvasback (15.3 %), and scaup (46.3).

Table 13. Number of Ducks Produced - Waubay WPA's

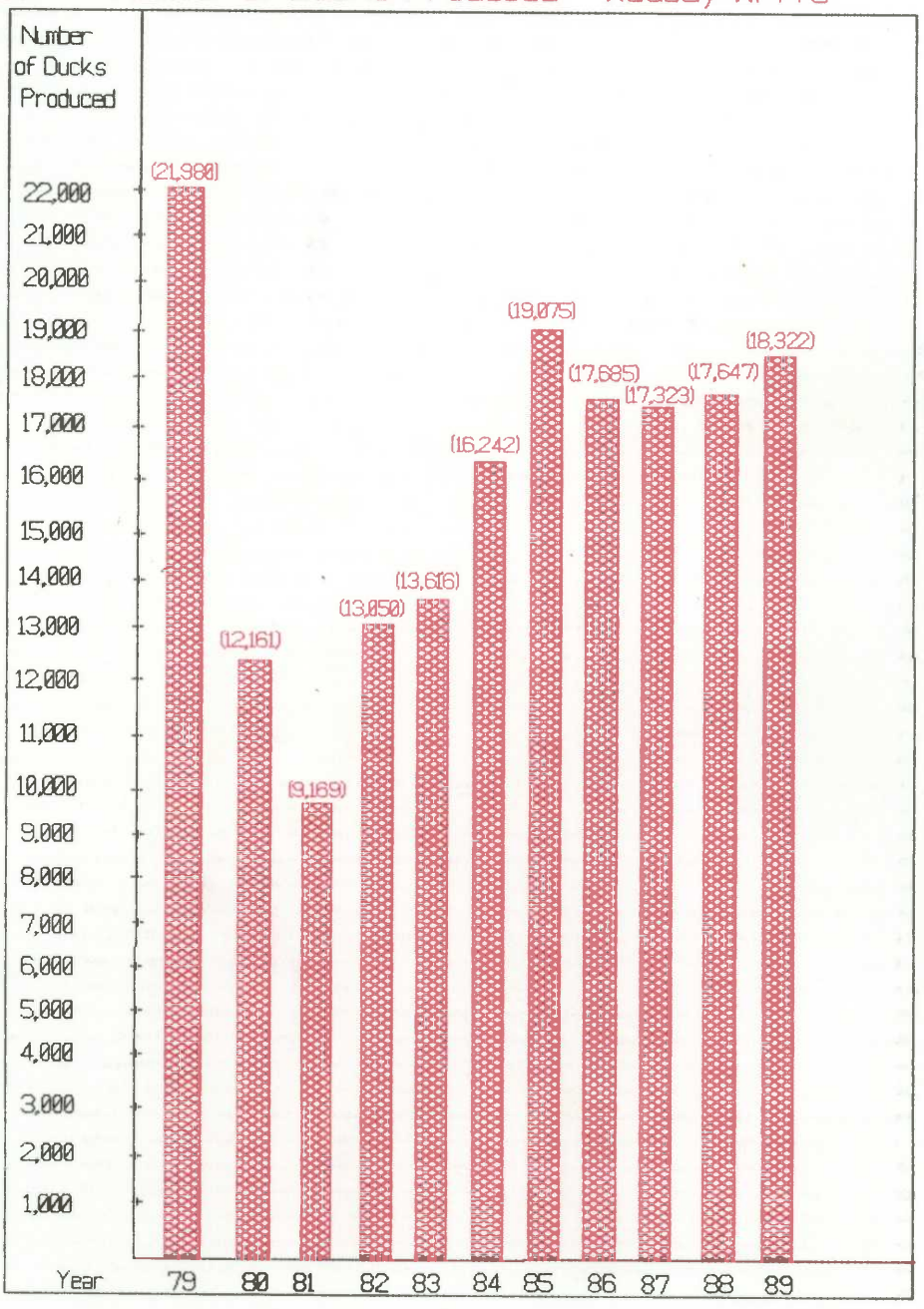

Table 14. Summary of four-square mile breeding pairs

Species	1987	1988	1989
Mallard	196	214	172
Gadwall	107	114	139
Widgeon	9	8	3
Green-winged teal	6	11	7
Blue-winged teal	476	253	345
Shoveler	64	35	51
Pintail	62	30	31
Woodduck	5	25	7
Redheads	135	62	212
Canvasbacks	18	41	39
Lesser scaup	28	15	69
Ruddy duck	67	62	109
Ring-neck duck	22	4	13
Bufflehead	0	0	1
Hooded merganser	0	0	1
Total	1,195	874	1,199

4. Marsh and Water Birds

White pelicans, double-crested cormorants, and several species of grebes and egrets were commonly seen throughout the summer. Four of the six known rookery islands in South Dakota used for nesting by white pelicans are located in the district.

Waubay WMD was chosen to participated in a avian botulism study related pelicans. (See E.7).

5. Shorebirds, Gulls, Terns and Allied Species

Various species of shorebirds, gulls, and terns were regularly seen along shorelines of larger lakes. The numbers of these species on the district were up from the previous years because lower water levels have provided additional shoreline habitat.

6. Raptors

Raptors common to the district are the great horned owl, American kestrel, Northern harrier, red-tailed hawk and Swainson's hawk. Other less common species include the bald eagle, golden eagle, goshawk, ferruginous hawk, broad-winged hawk, Cooper's hawk, and sharp-shinned hawk.

7. Other Migratory Birds

Refuge personnel participated in two mourning dove coo counts. A 20 mile survey with stops at 1-mile intervals was completed in Day and Marshall counties in May. In Day County a total of 76 doves were heard, 43 were seen, while in Marshall County 53 were heard and 62 seen. Numbers are higher when compared to the ten year average of 54.1 heard, 41.7 seen in Day County and 49.6 heard, 61.2 seen in Marshall County.

Five participants braved the cold weather (high of -9°F) to conduct the 21st annual Christmas Bird Count on December 18. This year 33 species were observed, one short of the all time high of 34 recorded in 1986. A total of 1,789 individual birds were counted. Two new species observed this year were the eastern bluebird (4) and a northern shoveler (1).

8. Game Mammals

The South Dakota Game, Fish, and Parks has curtailed the expanding white-tailed deer population in northeastern South Dakota with liberal hunting seasons. This reduction was necessary due to the amount of crop damage caused by the large population of deer. The winter of 1989-90 has been exceptionally warm and snow free. At years end, deer have not experienced problems feeding or finding adequate cover and are in excellent physical condition.

Several moose visited the district, this year. One was poached in Roberts County, near the refuge.

10. Other Resident Wildlife

The muskrat population remained low due to low water levels in wetlands.

Ring-necked pheasant and gray partridge populations increased considerably due to three consecutive mild winters and the additional cover provided by CRP lands.

The populations of red fox, raccoon and striped skunk are high. Coyote populations are increasing.

15. Animal Control

With an increasing number of geese using the area, the number of depredation complaints continues to escalate. Area landowners started notifying the refuge that Canada geese were eating their small grain crops in May, when new shoots appeared.

The problem increases after hatching and during the molt. Geese from Missouri, Iowa and Nebraska as well as local geese use northeastern South Dakota during the molting season.

In 1989, wet fall weather compounded the problem after millet was swathed and could not be combined.

For the first time, since depredation responsibilities were transferred to U.S. Department of Agriculture, Animal Damage Control (ADC) personnel actually spent time working in the Waubay area with depredation complaints. ADC managed to spend

four weeks working on a 16 week problem responding to farmers complaints. Refuge personnel carried the activities for the remaining 12 weeks with no funding or manpower for this activity.

Due to a lack of depredation equipment in 1989 to handle all the complaints, a letter was sent to area farmers who have used equipment over the past two years. The letter recommended that they should buy their own equipment and that ADC had the primary responsibility for depredation problems. This letter was not favorably received and led to several meetings with the Day County Commissioners and the public.

ADC continues to maintain that the should not carry the burden of responsibility and have proposed a cooperative approach that would place about one third the cost on ADC.

16. Marking and Banding

The district provided personnel and equipment to assist the South Dakota Game, Fish, and Parks on a Canada goose banding project. Objectives of this project, which will be continued for several years, are to gather information on migration patterns, wintering location of the northeast South Dakota restoration flock, and to determine the attractiveness of the Waubay Lake vicinity as a molting area for non-breeders and adults without broods. Flightless birds were herded by boat and guided toward wing nets which funneled them toward a holding pen. In one mourning of trapping, 2,482 geese were captured on Waubay Lake, of these 300 were recaptures and 25 were young of the year.

H. PUBLIC USE

1. General

The district received a considerable amount of news media attention throughout the year which focused mainly on the Wildlife Extension Program (see Section E.7a), Frederic T. Staunton Memorial Dedication, and the use of goats for spurge control. Newspapers, radio stations, and TV stations provided complete coverage of these activities. The refuge is fortunate to have excellent news media personnel with which to work. Although a considerable amount of staff time was spent providing information to reporters, it appears to be a very successful method of informing the public about local FWS activities.

Numerous releases were prepared and published in twelve local newspapers to notify the public about district activities and

opportunities. Information was provided weekly during October and November for radio reports on fall waterfowl populations, hunting opportunities, and the status of migration.

Public appearances and/or meetings were attended by the staff pertaining to district activities. Appearances varied from professional meetings and waterfowl identification presentations to sportsmen's clubs, visits to schools during National Wildlife Week and sponsoring booths at two farm and home shows.

The "Take Pride in America" theme was incorporated in all district activities, presentations, and environmental education programs. Efforts were made to remind visitors about the wise use of public lands and on how each citizen should appreciate and respect these properties and the opportunities they provide.

Public involvement in station programs is obtained throughout the year from various sources. An exhibit at the state fair in Huron attracted much attention. Several mallard nesting baskets were given out as door prizes. We again attended the Day County Farm and Home Show in Webster and the Marshall County Farm and Home Show in Britton with a booth exhibit. These two-day events attract over 2,500 people each, and provides the public with an opportunity to ask questions or voice concerns about our programs. Several key contacts were made regarding restorable wetlands.

7. Other Interpretive Programs

Numerous interpretive or general information talks were presented to school classes and youth groups throughout the six-county district. Programs were given to explain various WPA management practices of crowd grazing, prescribed burning, improvement of wetland habitats and waterfowl management in general. Also presented were waterfowl identification seminars prior to the waterfowl hunting season.

Several wildlife management classes from South Dakota State University visited for programs on techniques used in waterfowl management. A tour was also presented on the various grazing practices incorporated on the district to improve nesting conditions for waterfowl.

8. Hunting

The quality of waterfowl hunting across the district was good. Duck hunters experienced good success all season. Canada goose hunters had the overall bag being average. Shooting hours for ducks changed from the sunrise opener to one-half hour before sunrise. The harvest of snow geese was above

average due to the large number of birds present during the entire season.

There was a noticeable increase in the number of pheasant hunters afield, probably due to a good population of pheasants. WPA's were hunted hard the entire season.

A rifle deer season was held from November 25-December 3. Seasons and number of licenses were established on a county basis. Deer populations were higher in Day, Marshall, and Clark counties, but stable in Codington, Grant, and Roberts counties. The number of licenses issued fluctuated according to county populations. Hunter success was 77.9 % according to the state figures. WPA's in the district are excellent deer hunting areas due to good cover conditions.

9. Fishing

Warm water fishing for northern pike and yellow perch takes place on three WPA's - Strand in Marshall County, and Wike and Eneboe in Roberts County. Fishing was fair for yellow perch at Strand and Eneboe WPA's. Wike was good for small northerns.

10. Trapping

All WPA's are open to public trapping in conjunction with State regulations. Red fox, raccoon, and muskrats are the main species pursued. Trapping pressure was light this year due to low fur prices.

17. Law Enforcement

Law enforcement patrols were conducted on weekends during the waterfowl season. On opening weekend for waterfowl, a combined effort between FWS and South Dakota Game, Fish, and Parks, placed ten law enforcement officers in the field. The purpose was to show hunters the intent of enforcing the waterfowl hunting regulations. Eleven citations were issued by refuge officers during the hunting seasons.

Table 15. Law Enforcement Activities by Refuge Personnel

Date	Violation	Status
10/7	Juvenile hunting geese on refuge	State/$35 fine
10/7	Juvenile hunting geese on refuge	State/$35 fine
10/7	Hunting geese on Refuge	$35 fine
10/7	Waterfowl hunting w/o Federal Stamp	$50 fine
10/7	Waterfowl hunting w/o State Stamp	$50 fine
10/7	Vehicle trespass on State Game Area	State/$45 fine

I. EQUIPMENT AND FACILITIES

1. New Construction

A total of 7.2 miles of fence was constructed force account on the district. The following WPAs received some new fence this year; Sandell, Smith, Ruckdashel, Meyer Lake, Weeks, Fitting, Janish-Quamen, North LaMee, C. Guy, E. Fagerland, and Carlson-Likness-Fagerland-Jensen-Fagerland.

Ducks Unlimited funded the construction of two nesting islands which were completed in January. Another Duck Unlimited project was completed this year on Overland-Korth WPA in Codington County. More about these projects as well as all the ditch plugs installed in 1989 can be found in Section F.2.

2. Rehabilitation

A new sign was installed on the McCarlson WPA, the first in the nation, to commemorate Frederic T. Staunton's insight to loss of wetlands during the 1940's. See Section D.3 of Waubay Refuge Narrative.

4. Equipment Utilization And Replacement

A small cat (JD 550), shared with Madison WMD, was utilized to restore wetlands and bury junk piles. A total of twenty-three wetlands were restored on WPAs, fifteen of these involved ditch plug repair, while eight new ditch plugs were installed. This cat was used to restore a total of eight wetlands on FmHA tracts. On FmHA inventory lands ditch fills are done for the entire length of the ditch. Two additional wetlands were restored on CRP land under a Wildlife Extension Agreement. Heavy equipment operator Meyers (Sand Lake NWR), provided training and certification for refuge personnel.

Berle Meyers did considerable work on WPA's burying junk, old buildings, and installing ditch plugs etc.

Table 16. Heavy Equipment Work by Meyer on WMD - 1989

County	WPA	Activity
Clark	Herker (471)	junk, machinery, fence
Clark	Neal-Barton (180)	junk, foundations, well
Codington	Springer (68)	junk pile
Marshall	East Guy (257b)	2 ditch plugs, machinery
Marshall	Schlekewy (47)	junk, old bldg, machinery

6. Computer System

Waubay NWR continued to bridge the computer age in 1989. Manager Gilbert is on the committee for Map Info. and so spent time at meetings throughout the year. He also had adequate amounts of key punching time to learn how to make the system work. The maps at the beginning of this narrative were all generated using Map Info.

The station now has three desk top and two lap top computers. On many occasions up to four machines were in use consecutively. The station also has five printers which accommodate maps, draft text and laser letter quality copies. Okroi continues to expand his knowledge and use of different software including Library, Addresselope and Formworks.

J. OTHER ITEMS

1. Cooperative Programs

Ducks Unlimited dedicated work on the Mud Lake Project on September 7, 1989. This project consisted of approximately 15 miles of canals to facilitate dewatering and allow for complete drawdowns when necessary on Mud Lake. Previously under drawdown conditions many pools remained in the several thousand acre wetland which aggravated vegetation management and carp control operations. These canals will also promote watering of previously dry extremities of the marsh system. The spoil removed was used to construct many islands within the marsh.

3. Items of Interest

The following training was accomplished by station personnel this year.

Month	Course	Personnel
February	LE In-Service Recertification Marana, AZ	Gilbert, Okroi, Kurtenbach
March	S-390 Fire Behavior Training Denver, Co	Kurtenbach
June	Heavy Equipment Training Waubay NWR	Waddel, Gruba, Dargetz, Wickstrom Loterbauer
July	Defensive Driver's Training Aberdeen, SD	Kietzman, Evans Dargetz, Wickstrom
	Dealing With Difficult People Denver, CO	Mueller

Figure 18. Mud Lake DU Project dedication. Pictures from left to right Harry Knight, DU President, Rick Warhorst, DU Biologist, Richard Berrington, Sec. SD GF&P, John Schenden, Chrysler Motors.
CLM 9/7/89

4. Credits

Wickstrom - compile and type.
Gilbert - edit and review.
Kurtenbach - edit and review.
Mueller - edit and review.
Kietzman - edit and review.
Credits for photos are designated individually.

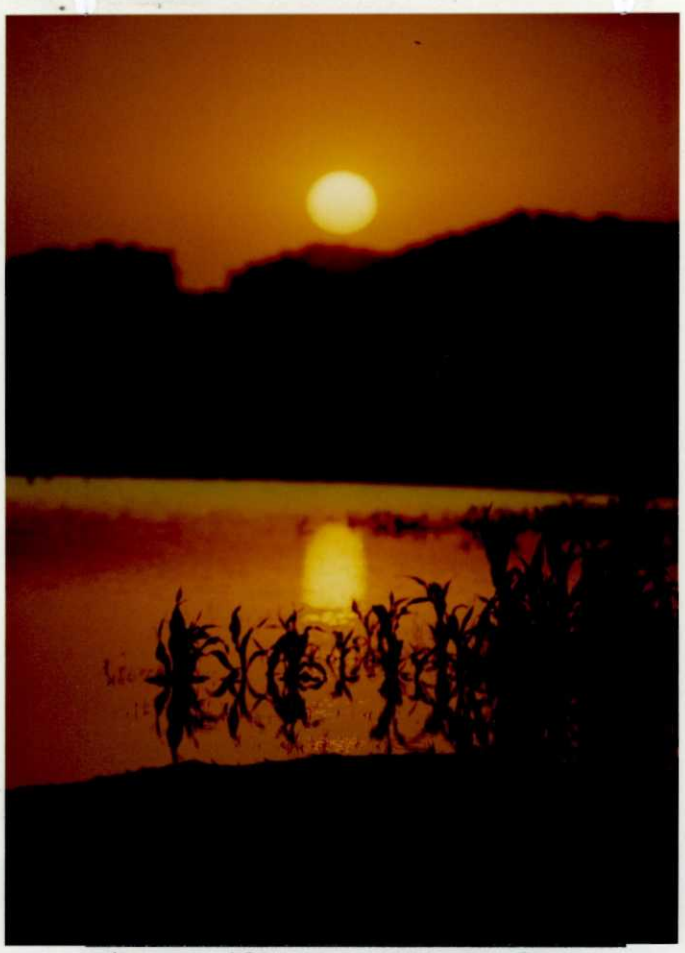

Figure 19. Our reason for existing: Sunset over a restored wetland.
BDK 8/90