REVIEW AND APPROVALS

BENTON LAKE NATIONAL WILDLIFE REFUGE

Great Falls, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1989

Project Leader — Date: 4/18/90

Associate Manager Review — Date

Regional Office Approval — Date

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INTRODUCTION

Benton Lake is a 12,383 acre refuge located on the western edge of the northern Great Plains some 50 miles east of the Rocky Mountains and 12 miles north of Great Falls, Montana. Benton Lake proper is a 5,000 acre glacial lake bed which is the terminus of a 350 square mile watershed. Refuge terrain is gently rolling with shortgrass native prairie being the predominant vegetation. Three mountain ranges are readily visible from the refuge; the Highwood Mountains to the east, the Big Belt Mountains to the south and the Rockies to the west.

The climate is generally temperate with wide fluctuations in temperature and precipitation. Summer highs may soar to near 100 degrees F while winter lows may reach -50 degrees F. Rain and snow are erratic with the area averaging only 12 inches of precipitation a year. Extremely windy conditions occur in the fall through spring, due to frequent Chinook winds blowing from the southwest along the Rocky Mountain front.

The refuge was established by Executive Order in 1929 as "a refuge and breeding ground for birds". Little development of the refuge occurred until the station was staffed in 1961. At about this same time, a pumping station was established 30 miles to the west to bring return irrigation flows to the refuge. This additional water source has helped eliminate the boom and bust cycle of the refuge marshes, generally assuring some water even in times of severe drought. Waterfowl production has averaged about 20,000 in the past several years.

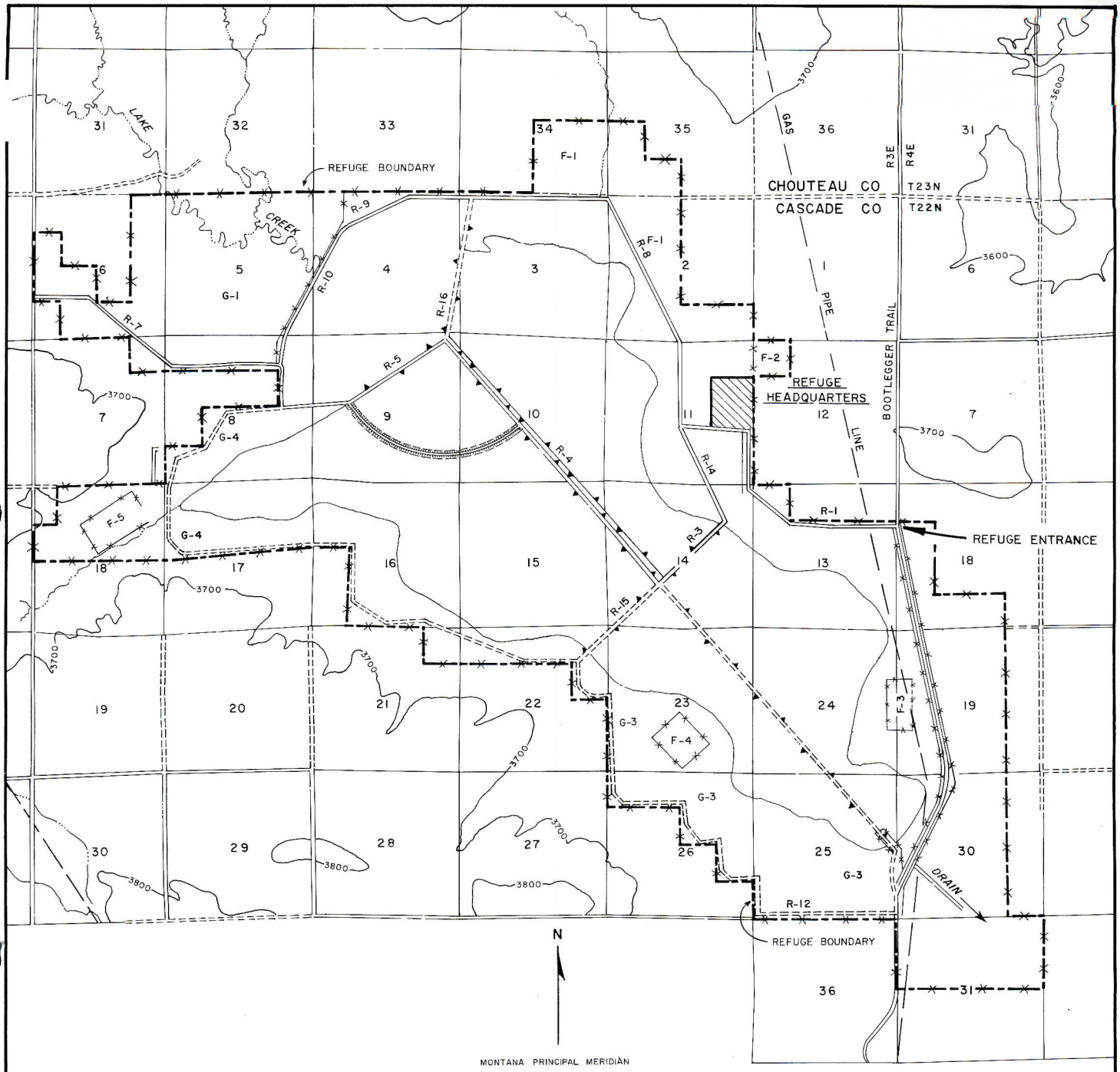
The lake itself has been divided into eight marsh units to provide better water control for the enhancement of submergent and emergent vegetation and limit botulism outbreaks. Water management is generally by gravity flow, although an inter-unit pumping system allows for great flexibility, especially in the advent of a botulism outbreak.

Refuge wildlife is dominated by water birds including most major species of ducks, Canada geese, gulls, terns and various shorebirds. Mallard, gadwall and pintail are the major duck nesting species. The refuge is an important migration stop during spring and fall with up to 100,000 ducks, 5,000 tundra swans, 40,000 snow geese and 3,000 Canada geese present. Bald eagles are commonly seen in spring and fall.

Other refuge wildlife includes twenty different species of mammals such as jackrabbits, muskrat, mink, raccoon, weasel, coyote and a limited number of white-tailed deer, mule deer and pronghorn. Only a handful of reptile and amphibian species are present, and no sizeable fish due to the shallowness of the marshes.

Land use around the refuge is intensive agriculture with wheat the principal crop grown. The area from Great Falls north to the Canadian border is known as the "Golden Triangle" of Montana. The fallow cropping system employed over much of the area is causing problems with refuge water quality by accelerating salinity and trace element accumulation. Changing private land use practices in the watershed is a major challenge of the years ahead.

The Benton Lake Wetland Management District covering 10 counties is also administered from the refuge. Details are found in the District narrative following the refuge section.



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

BENTON LAKE NATIONAL WILDLIFE REFUGE

CASCADE AND CHOUTEAU COUNTIES, MONTANA

REVISED: RJS900205

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INTRODUCTION

TABLE OF CONTENTS

Page

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

Page

J. OTHER

BENTON LAKE NATIONAL WILDLIFE REFUGE

you guys are great!
P. Gonzales

Editor's Note
The Dollhouse is
Now in R3!

Refuge permanent staff just prior to departing for Human Relations training in the Regional Office

The clown is now the Director, and the pirate is ahead of OMB. f

Hi Don —
From another ND
transplant!
MTR

Hi Gary S.!
98

BENTON LAKE NATIONAL WILDLIFE REFUGE

Hi Betty. Jim

Hello Everyone!
Great report on one of refuges best Kept Secrets.
Keep up the good work! Lanice

11 5 3 13 6 12 2 10 4

Nice report Don - how's the bowling game? CDS

PERMANENT PERSONNEL

1. Robert L. Pearson, Refuge Manager - GS-11 - 08/27/77 - 06/03/89
2. Donald G. Hultman, Refuge Manager - GS-11 - EOD 08/03/89
3. Stephen J. Martin, Primary Assistant Manager - GS-9 - EOD 01/29/89
4. Gary L. Sullivan, Wetland Manager - GS-9 - EOD 02/01/87
5. Elizabeth A. Benway, Refuge Assistant - GS-5 - EOD 07/28/68
6. Vincent J. Marko, Eng. Equip. Operator - WG-10 - EOD 04/30/62
7. Patrick T. Nies, Maintenance Worker - WG-7 - 09/28/88 - 05/30/89

TEMPORARY PERSONNEL

8. Clarke A. Dirks, Bio Aid - GS-4 - 02/13/89 - 05/19/89
9. Kristi DuBois, Bio Aid - GS-4 - 02/27/89 - 04/21/89
10. Tim Cramer, Bio Tech - GS-5 - 06/07/89 - 09/30/89
11. Jack Kobaszair, Bio Aid - GS-4 - 06/12/89 - 09/30/89
12. Melinda Meade, YCC Enrollee - 07/03/89 - 08/25/89
13. Scott Kimmerle, YCC Enrollee - 07/03/89 - 08/25/89

A. HIGHLIGHTS

After a few dry years, spring runoff was good and summer rains heavy to ensure excellent marsh conditions, but also caused a botulism outbreak (Sec. F.2 and G.17).

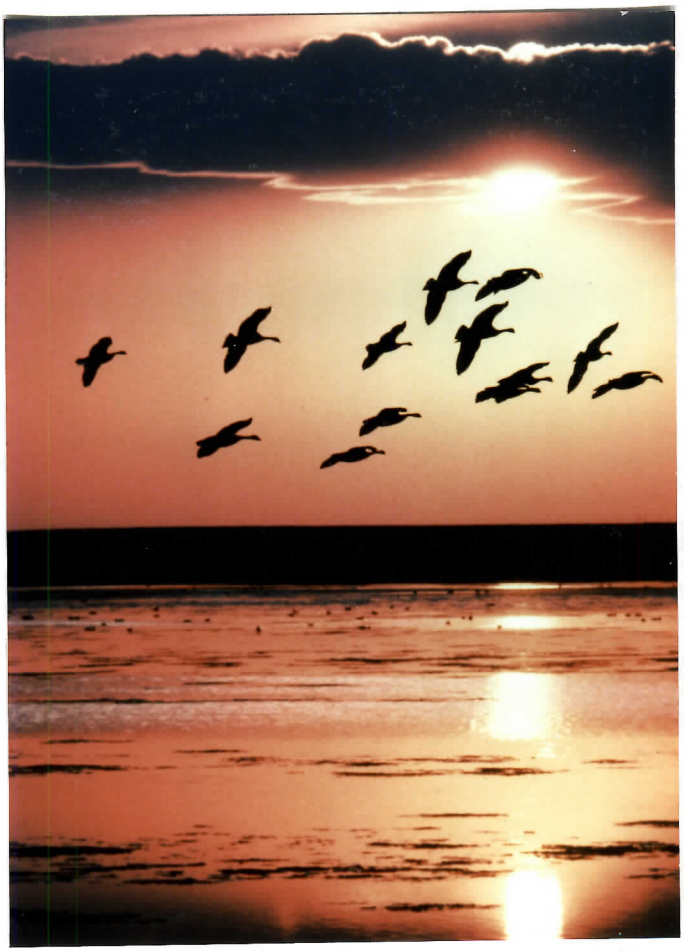
Refuge Manager Bob Pearson retired to sunny Arizona after 32 years with the FWS and the last 12 at Benton Lake NWR. Several other permanent staff changes occurred in 1989 (Sec E.1).

Waterfowl and other water bird production was excellent. An estimated 23,000 ducks were raised to flight stage (Sec. G., 3).

Continued contaminant monitoring programs showed little to no problems with wildlife reproduction, at least for now (Sec. D.5).

The first grassland enhancement practices in over 10 years were initiated (Sec. F. 5).

Refuge equipment and vehicles upgraded thanks to reduced water pumping costs (Sec. I. 4).



Beautiful picture! GW

NM 09/89

B. CLIMATIC CONDITIONS

The drought that has plagued this area for several years was finally broken in 1989 when the fourth wettest year on record was experienced.

Temperatures were cooler than normal and for the fourth year temperatures did not reach the century mark. Many records were broken during the year with the welcome precipitation accounting for most of the new records.

January brought a record high temperature of 62 degrees and February a record low of -35 degrees. Maximum temperatures for the first four days of February never climbed above 20 below zero. A record 24.2 inches of snow was received in March.

April and May brought above normal precipitation with a record 11.6 inches of snow received Memorial Day weekend. June was drier than normal but July made up for it with the 8th wettest on record. August and September were cooler than normal with above normal precipitation. August was the 4th wettest on record.

October and November provided good hunting weather for both waterfowl and big game. December was warmer than usual with above normal precipitation and strong winds. Snow was received the week before Christmas, but with the strong chinook winds, most of it moved on to North Dakota leaving us with a mostly brown Christmas.

The weather information on the following table was provided by the National Weather Service at Great Falls International Airport, some 18 miles southwest of the refuge. There are considerable differences in both temperatures and precipitation between the two locations.

TABLE I

WEATHER TABLE - 1989

	GREAT FALLS				REFUGE
	Temperature (F)		Precipitation		Precipitation
	High	Low	Total	Depart	Total
January	62	- 23	.96	- .04	.72
February	51	- 35	1.19	.44	1.26
March	62	- 14	1.38	.45	1.36
April	82	17	2.41	.72	2.47
May	79	32	2.41	- .11	1.92
June	94	38	1.70	-1.05	1.84
July	97	45	3.03	1.93	3.54
August	92	39	4.88	3.57	5.29
September	83	29	1.87	.84	.67
October	76	18	.41	- .41	.58
November	64	11	.81	.07	.47
December	57	- 23	1.32	.52	1.04
1989	97	- 35	22.37	7.13	21.16

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

The refuge hunting program was reviewed for NEPA compliance and the annual Section 7 review (endangered species).

5. Research and Investigation

The Use of Artificial Nests as an Index to Natural Nest Success in Upland Nesting Ducks. Victoria L. Kurnat, University of Montana, Missoula, MT

Benton Lake served as one of seven sites for this Montana Cooperative Wildlife Research Unit study. Areas searched on the refuge, with a cable chain drag, included two native grassland and one dense nesting cover field totaling 242 and 67 acres respectively.

Preliminary results from the 1989 Progress Report include the following comments. "A total of 112 natural nests were located with 55 and 57 in DNC and NGL respectively. Mayfield success for these natural nests was 83% and 96% respectively. Artificial nests totaled 96 and 90 in DNC and NGL respectively with a respective Mayfield success of 96% and 89%. Natural nest success on the seven sites ranged from 0 to 96% and artificial nest success varied from 4 to 96%. Sample sizes of natural nests were small on several areas where predation was heavy, and precision of the estimates was low. Preliminary plots of the data suggest that the relationship between natural and artificial nest success is significant, but with substantial variation."

"Success rates of scented artificial nests (57%) and of unscented artificial nests (56%) did not differ significantly. Success of artificial nests was higher during the first exposure period (70%) then during the second (46%)."

"Identification of tooth impressions in wax eggs and of recovered egg shell fragments is underway. Further analysis will investigate the effects of increased nest density on predation, and the relationship between placement of nest and home range behavior of predators."

"The second and final field season will begin in May, 1990. Increased emphasis will be placed on the identification of predators using scent stations and hair catchers."

Contaminant Biomonitoring At The Benton Lake National Wildlife Refuge In 1988. D.U. Palawski, W.E. Jones, K. DuBois and J.C. Malloy. 1990. USFWS, Fish and Wildlife Enhancement, Montana State Office, Helena, MT 59pp.

The USFWS's Environmental Contaminant Division in Region 6 initiated this study in 1988 to determine the degree and extent of trace elements, particularly selenium and boron, and organchlorine contamination of sediment and biota of the Refuge. Results presented are for 1988 data. Data was also collected in 1989 but results are not available at this time. The specific objectives and condensed results of the draft preliminary report are as follows:

1. Quantify sediment contaminant levels and determine temporal variations among Refuge Units I, II and IVc

Eight sediment samples contained copper, nickel, selenium and zinc concentrations greater than the respective western U.S. geometric means. Selenium concentrations did not exceed the western U.S. maximum (4.3 ug/g dry weight) but approached it (1.3 to 4.1 ug/g dry weight). Selenium residues were slightly higher at the mouth of Lake Creek (main watershed) and Unit II in 1988 compared to 1986 sediment samples, but were lower in Unit IVc in 1988 in relation to the 1986 data.

None of these trace element concentrations are believed to represent unusually elevated levels. No western U.S. geometric mean was reported for cadmium. In general, trace element concentrations were higher in sediment samples from Unit IVc than from Unit I.

Unit I and Unit IVc were the only locations sampled to determine organcholorine and PCB residues in sediment. Neither organchlorines nor PCBs were detected in sediment samples.

2. Evaluate food chain contamination by monitoring contaminant residues in aquatic plants and aquatic invertebrates;

Aquatic plants - Concentrations of arsenic, cadmium, lead, molybdenum and selenium in water milfoil and sago pondweed were lower than concentrations in aquatic plants from the San Joaquin Valley in California and lower than dietary concentrations believed to be harmful to waterfowl.

Maximum boron, copper, manganese and nickel concentrations exceeded those reported from contaminated sites in the San Joaquin Valley. Maximum boron concentrations in sago pondweed approached the boron dosage in mallard diets that caused reduced hatching success in laboratory studies.

Aquatic invertebrates - In general trace element concentrations in midge larvae exceeded concentrations in amphipods and waterboatmen. Midge larvae are sediment dwelling organisms that may accumulate trace elements as a result of direct sediment contact, exposure to sediment pore water and/or consumption of trace element-tainted dietary items associated with sediments. The biogeochemical ratio, defined as the trace element residue in midge divided by the corresponding trace element concentration in sediment, can provide an estimate of whether bioaccumulation of a trace element is occurring. A ratio of greater than 1.0 indicates that bioaccumulation from sediments may have occurred. Selenium was the only trace element that consistently exhibited a ratio of greater than 1.0.

3. Monitor contaminant levels in young-of-the-year American coot and eared grebe liver tissue

A total of seven eared grebe and seven American coots were collected and their livers tested for trace element concentrations. Trace elements detected in all liver samples included copper, iron, magnesium, manganese, selenium, strontium and zinc. Selenium levels

in eared grebe livers from Unit I exceeded levels found in mallards that experienced reproductive problems in other studies.

4. Evaluate trace element residues in eggs of waterbirds species nesting at Benton Lake NWR

A total of 19 eared grebe, 36 American coot and 75 waterfowl eggs were analyzed to determine the presence and concentrations of 20 trace elements.

Aluminum, beryllium, boron, cadmium, chromium and nickel were near or below analytical detection limits in all egg samples. Considering the frequency of occurrence and the low concentrations of these six elements in waterbird eggs, the potential of these elements to adversely affect hatchability or survival of young is considered to be remote.

Inorganic elements detected in all egg samples included: barium, copper, iron, magnesium, selenium, strontium and zinc.

Mean barium levels were highest in gadwall eggs. The general residue trend exhibited in waterbird eggs was: gadwall > mallard and blue-winged teal > lesser scaup and redhead > American coot > northern shoveler and pintail > eared grebe.

The mean magnesium concentrations in eared grebe eggs from Unit IV appeared elevated relative to concentrations detected in coot and waterfowl. The toxicological significance of the magnesium concentrations detected is presently unknown.

Selenium concentrations were higher in grebe and coot eggs from Unit I and lower in eggs from Unit IV. The pattern of mean selenium concentrations in waterbirds eggs was: eared grebe (Unit I) > eared grebe (Unit IV) > mallard > pintail > coot (Unit I) > lesser scaup > coot (Unit IV) > redhead > northern shoveler > blue-winged teal > gadwall. Mean concentrations in eared grebe, American coot, mallard and pintail exceeded the natural background reported by other researchers. The mean levels in mallards was slightly above the threshold concentrations that caused adverse effects to mallard embryos during controlled experimental studies.

Strontium levels detected exhibited wide variation within each bird species sampled. No scientific information is available on the maximum acceptable strontium concentrations or adverse effect level in bird eggs.

5. Determine if nesting duck populations at Benton Lake NWR exhibited any symptoms of selenium toxicosis by examining rates of egg infertility, embryo death, or embryo malformations in unhatched eggs

A total of 438 duck nest were located during the 1988 duck nest survey. Of these, 205 (47%) had eggs remaining after termination. The number of eggs remaining totalled 607 of the estimated 2880 eggs laid in monitored nests.

The eggs remaining were considered in the following analysis. Most of the nests with eggs remaining were successful nests. Of the 607 eggs, 536 from 179 nests were collected and examined in the lab by refuge personnel. Of these eggs 40%, 37% and 23% were classified as fertile, unfertile or unknown respectively. Species composition of the eggs was similar to species composition of the nest located during nest searches. Some eggs were too badly decomposed to determine if they were infertile or contained a very small embryo, so the numbers of fertile and infertile eggs was underestimated. The rates of infertility recorded in the study are only for general information. They should be interpreted with caution until a more detailed study of fertility rates is undertaken.

Of the estimated 2880 duck eggs laid, a minimum of 243 (8.4%) eggs contained dead embryos and 3 (0.1%) contained abnormal embryos. This compares to 14.6% of 1681 American coot eggs with dead embryos and 6.3% with abnormalities at Kesterson. Successful nests (337) with fertile eggs remaining, indicating embryo death, totaled 17.2% compared to 41% at Kesterson NWR. The even distribution of embryo death rates between the refuge units, and the low level of selenium concentrations of most Benton Lake duck eggs compared to Kesterson indicate that other factors may have caused the high rate of embryo death. Other possible causes of embryo death include; 1) the hen leaving the nest prior to hatching of the entire clutch, 2) improper care of the eggs by an inexperienced hen, 3) handling of eggs by researchers during nest inspections, 4) contamination by substances other than the ones being tested for in this study, and 5) other environmental conditions such as extreme temperatures. The abnormally hot and dry weather at Benton Lake during 1988 may have been a major factor in the high rates of embryo death.

Eleven eggs (collected from 10 different nests) contained embryos with suspected abnormalities. These embryos were sent to Patuxent Wildlife Research Center and examined prior to chemical analysis. Dr. David Hoffman concluded that three were abnormal, five normal and three too badly deteriorated to determine. Two of the abnormal embryos, a blue-winged teal and a gadwall, exhibited short upper mandibles. The third embryo was a lesser scaup with multiple deformities identified as spoonbill, lower mandible shorter than upper, extreme microphthalmia of eyes, left foot deformed with four toes webbed together in front and right foot normal, but with long hind toe. Similar deformities were observed in embryos from 20% of the nests studied at Kesterson NWR. Although these embryos were similar to Kesterson deformities the selenium levels within the Benton Lake embryos would be within the range of residues in waterbird eggs collected at uncontaminated wetland reference sites. Selenium residues in the three deformed embryos do not appear to be elevated in relation to the measured concentration at contaminated sites.

The expected percentage of abnormal embryos in a sample of artificially incubated or naturally reared birds is less than 1%. The percentage of abnormal embryos in this study was within that range.

Selenium, Boron, Arsenic and Mercury Concentrations and Reproductive Success in Waterfowl and Other Birds Nesting near Stillwater Wildlife Management Area(WMA), Nevada, Seedskadee National Wildlife Refuge(NWR), Wyoming, and Benton Lake National Wildlife Refuge, Montana. Dr. Charles Henny and Robert Grove, Patuxent Wildlife Research Center, Corvallis, Oregon.

Benton Lake was chosen by Patuxent Wildlife Research Center as a study area for their drainwater contaminant program. The primary focus of this study involved evaluating hatching success of nesting ducks. Duck nest searches were conducted on foot along dikes and wetland edges. A total of 262 duck nests were located and monitored until fate was determined. Mayfield nest success averaged 49%. This figure is lower than the 83-96% success reported for refuge uplands (V.Kurnat study). High nest parasitism, 37%, by redheads was one factor that contributed to the lower nest success along dikes and wetland edges.

Hatching success was also evaluated with an incubator study. Three eggs were removed from approximately 100 nests. One egg was placed in an incubator to determine hatchablity. Preliminary results indicate hatching success of nearly 80%, indicating healthy embryos in those nests sampled. The other eggs were removed for chemical analysis. Results on 73 eggs revealed selenium geometric concentrations of 4.17 ppm (dry wt). The highest concentrations found in any duck egg was 13.6 ppm with 11.8% of the eggs containing greater than 8 ppm selenium. At this time, no statistical work or comparisons with incubator hatchability has been done, awaiting the analysis of remaining eggs.

E. ADMINISTRATION

1. Personnel

Several staff changes took place during 1989. Steve Martin, Refuge Biologist at Medicine Lake NWR, MT was selected for the Primary Assistant Manager position vacated by Dave Linehan in the fall of 1988. Steve and his family reported to Benton Lake January 29, 1989.

Maintenance Worker Pat Nies resigned in May after about a year and a half with the refuge and the Fish and Wildlife Service. He transferred to the Dept. of Justice, Bureau of Prisons.

Project Leader Bob Pearson retired from the FWS on June 3, 1989, after 32 years of service. Bob had been at Benton Lake since August, 1977. He was responsible for developing and fine tuning the water management program on the refuge which led to higher wildlife production and reduced botulism losses. Bob also guided several construction projects through the system which will be welcome to refuge staffs that follow for years to come.

In August, Don Hultman, Manager at Valley City WMD and the Chase Lake Prairie Project in ND assumed the Project Leader position.

Temporary and YCC positions are detailed under the staff photo at the beginning of the narrative.

Below is a summary of the staffing pattern at Benton Lake NWR (including the wetland district) over the past five years:

TABLE II

PERSONNEL

FY	Full Time	Temporary	YCC	Total FTE's
1989	6	4	2	7.5
1988	6	3	2	8.2
1987	6	2	2	6.3
1986	5	3	2	6.0
1985	5	2	2	5.9

FTE's does not include YCC

Training

Course	Where	Hrs.	Staff
LE In-service.....	Marana, AZ	40	Pearson, Martin, Sullivan
Fire, S-390.....	Jamestown, ND	40	Sullivan
Water Control Structure Insp. and Maintenance...	Great Falls, MT	8	Pearson, Martin, Sullivan
WordPerfect 50....	Vo-Tech, Great Falls, MT	16	Benway

2. Youth Programs

YCC enrollees Melinda Meade and Scott Kimmerle started work on July 3 and worked through August 25, the standard eight week program. Melinda and Scott were responsible for general maintenance projects and assisted with botulism patrol/clean-up and duck banding.

4. Volunteer Programs

Volunteers during 1989 included the following groups or individuals:

Allen Nelson	Spent time on the refuge photographing wildlife and donated slides to refuge
Boy Scouts	Eagle Scout activity, planted wild rose shrubs on DU island in Unit III
Audubon Chapter	Planted shrubs on DU islands in Unit IVb
Vince Galli	Put up 15 bluebird houses on refuge and will ensure future monitoring and maintenance

Servicemen and women from Malmstrom Air Force Base in Great Falls again offered to help with duck banding, but heavy rains in August coupled with the botulism outbreak that followed altered schedules to such an extent that their services could not be used.

Vince Galli, also known as "Mr. Bluebird," put out 15 nest boxes in December. Another volunteer from the local Audubon chapter will monitor and maintain the boxes each year.
DGH 12/89

5. Funding

Below is a five-year funding summary for Benton Lake Complex which includes the refuge and Wetland Management District.

FUNDING SUMMARY

FY	1260	Quarters Maint.	YCC	Total
89	330,000a	11,000	3,000	344,000
88	400,000b	8,400	3,000	411,400
87	347,000c	8,780	3,000	358,780
86	355,700d	5,500	3,000	364,200
85	325,000e	3,000	3,000	331,000

a Includes 45K Flex funds (maintenance)
b Includes 70K Flex funds and 30K resource problem funds
c Includes 42K ARMMs and 40K resource problem funds
d Includes 121K ARMMs and 40K resource problem fund
e Includes 90K ARMMs and 40K threats and conflicts

As usual the past few years, special funding programs allowed the refuge and WMD to stay above the "fixed cost" level. As described in the wetland section, pumping costs were substantially reduced in 1989 due to good spring runoff, and more importantly, 4.5 inches of rain over a short period in August. This savings allowed the purchase of needed equipment and vehicles as noted in Section I.4.

6. Safety

Safety meetings were held on an irregular basis until fall when monthly meetings were once again initiated. Meetings usually involved a safety film or hands-on training with a piece of equipment such as table saws. No accidents occurred in 1989.

All employees underwent pre- and post-tick season Lymes Disease screening. All tests came back negative.

In the 1988 Narrative it was reported that refuge staff underwent blood tests for selenium after Manager Pearson's selenium level was above normal. Results of the first testing were received in January 1989 from the Mayo Clinic and showed that four of five employees had selenium levels in their blood above normal. Follow-up testing by U.S. Department of Health specialists familiar with selenium toxicity showed normal or below normal levels of selenium. No further testing is planned.

7. Technical Assistance

Manager Pearson met with the Cascade County Weed Board to provide information on purple loosestrife which had taken a foothold on an island in the Missouri River. The board placed the weed on its noxious weed list and sprayed the plot with Rodeo.

8. Other

As is normal with a change in managers after many years, a complete purge of refuge files was completed late in the year. A new file system was also developed, along with various other administrative and housekeeping changes for better office organization and work flow.

?
out with the old + in with the new!
A new person may not realize the value of some of that "old stuff" - may wish you had some of it down the line. fw.

I hope you followed the admin manual filing system otherwise ©??*:!!@

The refuge file system was completely cleaned out and a new system developed. The accumulation of outdated material in the files filled many a garbage bag.
DGH 12/89

F. HABITAT MANAGEMENT

1. General

Two shrub planting projects designed to establish duck nesting cover were completed in 1989. Bare root Rosa spp. shrubs were obtained from a nursery in North Dakota and planted by volunteers.

The local Audubon chapter planted 500 shrubs on a three acre man-made island in Unit IVb. Shrubs planted in May and examined in July appeared to have experienced high mortality. An ocular estimate indicated that 80% of the shrubs had no green leaves. Large cracks that developed on the island may have exposed the roots causing desiccation and eventual death.

A local Boy Scout troop planted 500 shrubs on an artificial three acre island in Unit III. These shrubs experienced high survival with an estimated 80% alive in July. This island did not develop the cracking that occurred on the Unit IVb island.

2. Wetlands

Wetland conditions at Benton Lake are contingent on spring runoff and rain showers during summer and fall. Runoff from spring snow melt and summer rains contributed to a total of 9710 acre feet, the 3rd highest amount in 19 years. Total wetland acres at year's end amounted to 4626, double the amount in 1988.

Spring runoff began on March 18 and by mid-May a total of 7301 acre feet had entered the refuge. This runoff filled all units to management level and provided ideal conditions for spring migrants and nesting waterfowl.

Unit II water control structure delivery of spring runoff to the inter-unit canal.
RLP 4/89

Water levels were excellent for emergent plants and stands of alkali bulrush were stimulated in Units III, IVc and VI. Unit III was filled for the first time in three years and received high waterfowl use during spring, summer and fall. Unit V responded poorly to ideal water levels for alkali bulrush. A factor that contributed to the poor vegetative response was the development of large expansive algae mats. These mats developed in early June and completely covered the water surface by August. Algae mats prohibited light penetration and prevented alkali bulrush sprouting and growth.

Water levels were also conducive to invertebrate populations as evidenced by the Fish, Wildlife and Enhancement contaminant study (See D.5). Population levels of midge, fresh water shrimp and daphnia varied between marsh units but levels detected were considered outstanding and provided ample food supplies for young ducklings.

Lower than normal summer temperatures and winds kept evaporation rates well below the 30 inch average. Water storage was adequate until late August when pumping from Muddy Creek was initiated, on August 25, to replenish 1700 acre feet. After 2 days of pumping, with water not yet reaching the refuge, a major rain storm dropped 4 1/2 inches of rain, resulting in local flooding and a refuge inflow of 2409 acre feet. This runoff event saved the refuge an estimated $20-30,000 in pumping costs but aggravated a botulism outbreak (See G. 17) and complicated mallard banding efforts (See G. 16).

The winter carry over of nearly 5000 acre feet will be adequate for beginning 1990 marsh levels and spring pumping can be avoided.

Fall water conditions of six refuge marsh units.
SJM 11/89

5. Grasslands

The first Dense Nesting Cover (DNC) rejuvenation on the refuge in 11 years was initiated with a cooperative farming agreement. Refuge neighbor Lawrence Suek signed the three year agreement to rejuvenate 56 acres of DNC field 3. Eight decadent strips were broken during the fall and will be planted to small grain in 1990 and 1991. The cooperator agreed to prepare a weed free seed bed for force account planting of DNC in the spring of 1992.

DNC rejuvenation began on a 56 acre smooth brome dominated field. The plan is to rejuvenate all DNC fields on a rotational basis over the next ten years.
DH 11/89

10. Pest Control

Herbicide use, for noxious weed control, was reduced from 12 pounds of active ingredient applied to seven acres in 1988 to 0 in 1989. The chemical reduction did not reflect a lack of weeds, but rather a shortage of personnel due to staff changes. Noxious weed control was limited to non-chemical treatment of Canada Thistle. Rotary mowers were employed along refuge roads and dikes. YCC employees utilized string trimmers and hand pulled thistle around the refuge headquarters and auto tour route.

G. WILDLIFE

1. Wildlife Diversity

Wildlife diversity is enhanced by management practices that emphasize waterfowl production and maintenance. Diverse plant communities ranging from xeric grasslands to mesic wetlands provide habitat characteristics essential to species that breed on the refuge or require a refueling layover during migration.

2. Endangered and/or Threatened Species

Bald eagle sightings were most numerous during spring migration. Single eagles, including six subadults and two adults, were sighted on eight occasions during March. It is not known if these sightings represent re-observations of the same birds or eight different individuals.

Bald eagles were also sighted during fall migration in October, November and December. The first fall sighting, a lone adult, was made on October 7. Two subadults and one adult were sighted throughout October and November and one adult sighting occurred in December.

Peregrine falcon sightings occurred on the 3rd, 10th and 17th of May and once on September 15th.

3. Waterfowl

Ducks

Spring migrants began arriving in early March with 25,000 pintails and 2500 mallards present at the end of the month. Peak duck numbers, 40,000, occurred during the first two weeks of April with pintails totaling 35,000.

Refuge duck production estimates since 1985 have been based on results obtained from nest dragging studies. Mayfield nest success, by species and habitat, was determined on a representative sample and expanded to the entire refuge.

Funding constraints in 1989 did not allow for the hiring of seasonal personnel to conduct nesting studies. Duck production estimates this year were based on refuge studies conducted by Patuxent Wildlife Research Center and the University of Montana (See D.5). Problems associated with using data generated in these studies to make production estimates include: PWRC data were collected as incidental nests, no systematic searches were conducted, nest densities were not determined and areas searched included only wetlands or dikes immediately adjacent to water. University of Montana data were collected late in the nesting season which underestimated mallard and pintail nesting. Mallards and pintail comprised 30-40% of the total duck nests found on the refuge from 1986-88. In addition, nest drags were not replicated with the same frequency so that density estimates were not valid.

Mayfield nest success data, from these two studies, revealed nesting success of 83%, 96% and 49% for Dense Nesting Cover (DNC), Native Grassland (NGL) and shorelines/dikes respectively.

This year's density estimates for DNC and NGL were best guess estimates using data for 1986-88. DNC densities ranged from a high of 3.6 nests/acre in 1986 to a low of 1.5 in 1988. NGL densities for the same period ranged from .47 to .07. Shoreline densities ranged from 1.2 to 3.15. Density values chosen for 1989 estimates were those from 1987 and included 3.28, .4 and 2.51 for DNC, NGL and shorelines respectively. These figures were selected because of similar spring water levels for 1987 and 1989. These figures may actually be low estimates since marsh unit surface acres were greater in 1989.

Total refuge duck nests on dikes and islands were best guess estimates based on incidental observations.

Production estimates used the density and nest success to determine the number of successful nest for each habitat type. The number of successful nests was multiplied by a brood success constant of 75% and an average number of ducklings to flight stage of 5.41. The resultant figures for each habitat were combined to arrive at an overall estimate of duck production. Production estimates for 1989 totaled 23,000 ducklings to flight stage. This estimate does not include estimates for overwater nesting ducks such as redhead, canvasback, ruddy ducks and some mallards.

Marshes were teeming with invertebrates that provided ducklings with abundant food supplies.
DH 8/89

Fall duck numbers peaked during the first week of October with 40,000 birds. Mallard and pintail comprised 50% of the total with gadwall, northern shoveler and green-winged teal the majority of the remainder. Duck numbers during November peaked at 15,000 with mallard and pintail comprising 75%. Numbers at the end of November were 2000 with 75% mallard and 25% common goldeneye. Most waterfowl had departed the refuge by the first week in December and the last birds sighted were 75 mallards on 20th.

Dark Geese

Canada geese were first sighted on January 19 in flight over Unit VI. Geese began arriving in March and totaled 230 by the 31st. Nest searches during May and June revealed the presence of 152 nests, the most ever recorded for the refuge. Production to flight stage was estimated at 400.

A special delayed goose hunting season has been in affect for the refuge and the three surrounding counties since 1981. The refuge requested the later opening in an attempt to minimize hunter harvest of resident birds until an objective level of 100 nesting pairs was reached. Upon meeting the objective level this spring the refuge requested that the delayed opening be eliminated and the Montana Department of Fish, Wildlife and Parks agreed to remove the special regulation.

Fall goose numbers peaked at 1200 during the last week in October. Goose numbers ranged from 800-1000 until the 20th of December.

White Geese

Migrant snow geese began arriving on March 30th and peaked at 8000 during the second week of April. Also during April a flock of 1500 Ross' geese were sighted in Unit I. Accompanying them was one cackling Canada goose. Cackling geese are the smallest race of Canada goose and seldom sighted outside their migration corridor along the Pacific Coast. whoops

Fall snow geese peaked at 10,000 during the last week in October and 5000 remained in the vicinity of the refuge until mid November.

Swans

Tundra swan are common refuge visitors during spring and fall migration. Swans began arriving on March 18th and peaked at 1000 during the second week in April. Fall swan numbers peaked at 5000 and 3000 during mid October and November respectively.

4. Marsh and Water Bird

Marsh and water birds known to nest on the refuge include: eared grebe, pied-billed grebe, western grebe, black-crowned night-heron, double-crested cormorant, sora and Virginia rail and white-faced ibis. Formal surveys are not conducted on any of these species.

The first known nesting of western grebes occurred this year. No nests were found but two broods of chicks were observed during July in Unit I, riding on their parents backs.

A snowy egret, an unusual visitor to the refuge, was sighted throughout June and July in Units I and II.

5. Shorebirds, Gulls, Terns, and Allied Species

California and Franklin's gulls nest on the refuge but formal surveys are not conducted. California gull numbers are apparently increasing on the refuge and are threatening to take over a Duck's Unlimited waterfowl nesting island in Unit IVb. Control was not implemented this year but may be needed in 1990 (See G.15).

Franklin's gull colonies were located in Units I and IVc. Breeding populations probably exceeded 10,000 birds.

Common and black terns also nest on the refuge but population estimates are not made.

6. Raptors

Raptor nesting confirmed on the refuge this year included: Swainson's hawk, northern harrier and burrowing owl. Short-eared owls normally nest on the refuge but no nests or young were seen.

Raptors sighted included, bald eagle and peregrine falcon (See G.2), golden eagle, gyrfalcon, prairie falcon, merlin, American kestrel, northern goshawk, Cooper's hawk, sharp-shinned hawk, red-tailed hawk, ferruginous hawk, rough-legged hawk, great-horned owl and short-eared owl.

7. Other Migratory Birds

A new species, pine siskin, was added to the refuge bird list. Six siskins were sighted at the refuge headquarters during November. Pine siskins are common in coniferous forests throughout Montana but are not often seen in the prairies.

Two sandhill cranes visited the refuge during fall migration. Cranes are seen infrequently on the refuge at two to three year intervals.

8. Game Mammals

Big game animals that occasionally use the refuge include pronghorn antelope and mule and white-tailed deer.

Small bands of pronghorn, usually less than 10, were sighted at three locations on the refuge. Movements on the refuge are considered transitory but fawning may have occurred in grasslands along Unit I.

Deer were sighted less frequently than pronghorn. One mule deer buck was sighted in the refuge headquarters shelterbelt. White-tail does were sighted in the headquarters shelterbelts and several times in Units I and II. Sightings of white-tailed bucks included one near

Unit III and one in the old shelterbelt along Unit IVa. No deer fawning was known to have occurred on the refuge.

10. Other Resident Wildlife

Resident gamebirds found on the refuge include ring-necked pheasant, gray partridge and sharp-tailed grouse. Formal surveys to census these species are not conducted.

A sharp-tailed grouse dancing ground located along the auto tour route during the spring of 1988 was again active this year. Counts of displaying males peaked at 12 birds on April 4th.

Plenty of coyotes at RRL, MT, not many fox - seems to hold up here too. D Gomez

Kurlenbach trapped quite a few fox when he was there. Red Rocks that is. M. Rabenberg

Ready to pounce on a duck nest.

Coyotes are believed responsible for keeping red fox off the refuge and consequently helping to keep duck nesting success at high levels.
DH 9/89

15. Animal Control

Refuge predator control was initiated in 1986 with a four year experimental control study. The main objective was to increase duck nesting success by removing the primary mammalian nest predators; striped skunk and raccoon. Removal of these predators was accomplished with 220-size conibear traps placed in cubby box sets and live traps baited with salvaged fish from a local state hatchery. Only upland habitats were trapped with most sites located along roads and dikes. Live-traps were utilized in areas frequented by refuge visitors.

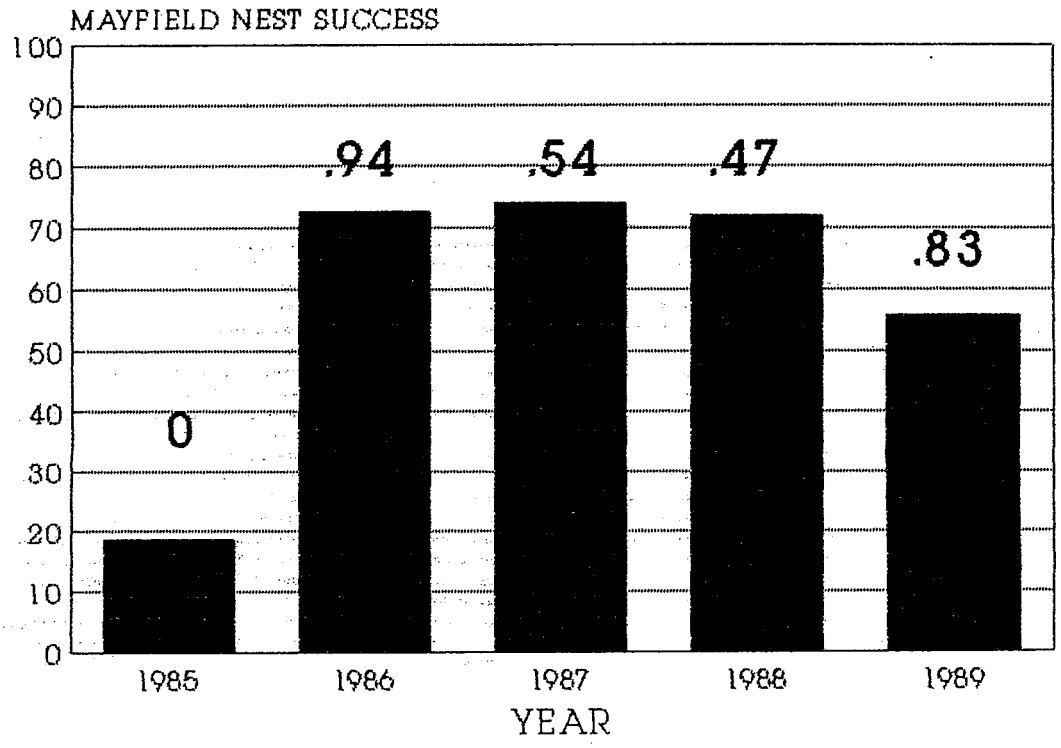
Predator trapping in 1989 commenced on March 6 and continued until May 12. Trapping was terminated during 2 weeks in March due to heavy snow and wet roads.

Trap numbers ranged from 7-30 and 2-16 for conibear and live-traps respectively. Trapping effort totaled 1886 trap nights including 1348 conibear and 438 live-trap. Target animals trapped included 10 striped skunk, 6 males and 4 females, and 5 raccoons, 4 males and 1 female. Non-target animals captured included 12 Richardson's ground squirrels, 2 yellow-bellied marmots, 1 white-tailed jackrabbit and 2 cottontail rabbits.

Nineteen eighty-nine was the last year of the experimental control program. Table III graphically displays the relationship between the number of animals trapped (skunks and raccoons) and the Mayfield nesting success for ducks. The number of animals caught were converted to the number of animals caught per 100 trap nights because the number of traps and length of time they were utilized varied between years. The number of animals caught/100 trap nights represents an index to the relative abundance of skunks and raccoons. An apparent relationship exists between the number of skunks and raccoons and duck nesting success. As numbers of predators decrease the duck nesting success increases. Conversely as the number of predators increase the nesting success decreases.

TABLE III

DUCK NEST SUCCESS AND NUMBER OF
ANIMALS (SKUNKS AND RACCOONS)
TRAPPED PER 100 TRAP NIGHTS, 1985-89



Predator control plans for 1990 will include duck nesting studies and no predator control. After next field season an environmental assessment will be prepared to provide the refuge with an approved predator control plan.

California gulls have been controlled on the refuge since 1980. Gull control is sanctioned by an approved plan that limits gulls to 200 nesting pairs. California gulls have become established on the Duck's Unlimited nesting island in Unit IVb. Populations will be monitored closely in 1990 and control will be implemented if numbers exceed 200 nesting pairs.

16. Marking and Banding

Mallards were banded during August utilizing salt plains style traps. A total of 427 mallards were banded compared to 1424 in 1988. Banding was complicated by a major botulism outbreak that required the banding teams efforts in daily cleanup patrols. Rising water levels due to the heavy rain showers in late August contributed to delays in the trapping effort.

Mallards typically are easily attracted to baited banding sites but the heavy rains created ideal feeding sites adjacent to the refuge. Flooded grain fields were attractive to feeding mallards and apparently "pulled" mallards off the refuge making them more difficult to attract to banding sites.

Carousel band holder held strings of bands for separate age and sex classes which simplified banding and record keeping.
DH 9/89

Slick!

TABLE IV

1989 DUCK BANDING RESULTS
AGE-SEX-SPECIES COMPOSITION

	AHY-M	AHY-F	HY-M	HY-F	TOTAL	% COMP.
Mallard	85	171	81	90	427	86
Pintail	4	8	11	17	40	8
Redhead	0	1	16	14	31	6
TOTAL	89	180	108	121	498	

17. Disease Prevention and Control

A major avian botulism outbreak occurred on the refuge during June-September. Bird losses were first noticed during the week of June 25th with 31 dead birds found. Specimens submitted to the National Wildlife Health Lab (NWHL) confirmed the suspected botulism mortalities. Total losses for the year are shown in Table V.

TABLE V

SPECIES, SEX AND NUMBER OF BIRDS
LOST TO BOTULISM - 1989

SPECIES	MALES	FEMALES	SEX UNKNOWN	TOTAL
Mallard	10	17	4	31
Gadwall	15	17	5	37*
A.Wigeon	5	1	0	6
G.W. Teal	204	117	24	345
B.W. Teal	58	42	8	108
N. Shoveler	28	29	18	75**
N. Pintail	46	83	14	143
Wood Duck	0	1	0	1
Redhead	1	4	0	5
Canvasback	0	1	1	2
Lesser Scaup	1	7	1	9
Ruddy Duck	0	0	1	1
UID Duck			115	115
UID Duckling			349	349
Canada Goose			1	1
Western Grebe			2	2
Eared Grebe			34	34
Pied-billed Grebe			1	1
American Coot			552	552
California Gull			34	34
Franklin's Gull			66	66
UID Gull			1	1
Common Tern			1	1
White-faced Ibis			1	1
Sora Rail			2	2
Wilson's Phalarope			7	7
Marbled Godwit			6	6***
American Avocet			34	34
American Killdeer			2	2
Greater Yellowlegs			7	7
Lesser Yellowlegs			30	30
Spotted Sandpiper			1	1
UID Shorebird			3	3
Northern Harrier			1	1
Yellow-headed Blackbird			4	4
UID songbird			8	8
TOTAL				2025

UID = Unidentified
* 1 Gadwall confirmed with aspergillosis
** 1 Shoveler confirmed as predator mortality
*** 1 Marbled godwit confirmed with lead poisoning

Most losses by mid August were young of the year and the botulism outbreak appeared to be minor. Evaporation and transpiration during early and mid-summer were believed responsible in keeping losses to a minimum, by removing water from vegetation around the marsh edges.

Units III and IVc experienced the greatest losses and accounted for 79% of the early summer mortality.

Unit III had been completely dry for 2 years and spring runoff had inundated nearly 1200 acres of vegetation. Unit IVc also received more spring runoff this year resulting in flooded vegetation along the marsh edges.

A major rainstorm on August 24th and 25th brought 4 inches of rain to the refuge resulting in local flooding and raising of water levels by 3 inches. The resultant increases in water levels flooded vegetation along the marsh edges and botulism losses increased dramatically. Losses during the next 2 weeks totaled over 1200 birds with 88% of the mortality in Units III and IVc. Drawdowns with inter-unit pumps to dewater units with botulism was not feasible since all units were full and pumping would have aggravated the losses by reflooding marsh vegetation.

Little botulism mortality occurred after September 6th. The last patrol on September 26 resulted in the pickup of 26 birds, most of which probably died earlier in the month.

A marbled godwit lead poisoning mortality, the first known in North America, was recorded on the refuge.
AN 6/89

Lead poisoning was discovered in a marbled godwit that was picked up on July 21st, during routine botulism patrols. The bird was found dead in Unit IVb and submitted with other specimens to the NWHL. Necropsy on the godwit revealed the presence of 17 moderately worn

lead shot in the gizzard. Lead concentration in the liver was 51.7 ppm wet weight. Cause of death was identified as lead toxicosis, the first ever reported for the marbled godwit. The source of the lead shot was not known. The bird was a non-breeding adult female that may have ingested the lead in an area other than the refuge. Interestingly no steel shot was found in the gizzard.

Refuge shorebirds collected during botulism patrols have not routinely been submitted to the NWHL. Shorebirds collected in the future will be submitted to the NWHL for necropsy to determine if lead poisoning is occurring on an annual basis.

Are you requiring steel shot for all bird hunting? If not, do it! We all! (non CMcl. Lake)

↓ Yes!
Sullivan

H. PUBLIC USE

1. General

Public use on Benton Lake National Wildlife Refuge is strictly wildlife oriented if one dismisses the occasional "parkers" that find there way into the refuge late at night. Wildlife observation, wildlife photography, environmental education and waterfowl hunting are the main activities.

In 1989 use levels were about normal with an estimated 4,000 people visiting the refuge from spring through late fall.

This year marked the first full year of operation as a fee area for public use from spring through early fall. A total of 1,020 persons registered at the refuge entrance kiosk and paid a total of $720 in entrance fees. Compliance with the fee requirement was estimated at about 50 percent. No serious enforcement of the program was done, mainly because rumors of its discontinuance cropped up early in the year. Fees are $2.00 per vehicle per day, a current federal duck stamp or one of the other national passes available.

At year's end the fee program was being evaluated as to whether it should continue based on the costs of administration.

2. Outdoor Classrooms

The Great Falls School District again used the refuge for its annual environmental education curriculum for third and seventh graders. Approximately 1,200 students and teachers took part in the program which examines soils, shelterbelts, wetlands and wildlife.

The "Prairie Marsh Drive" provides refuge visitors with the opportunity to view marsh wildlife.
DH 11/89

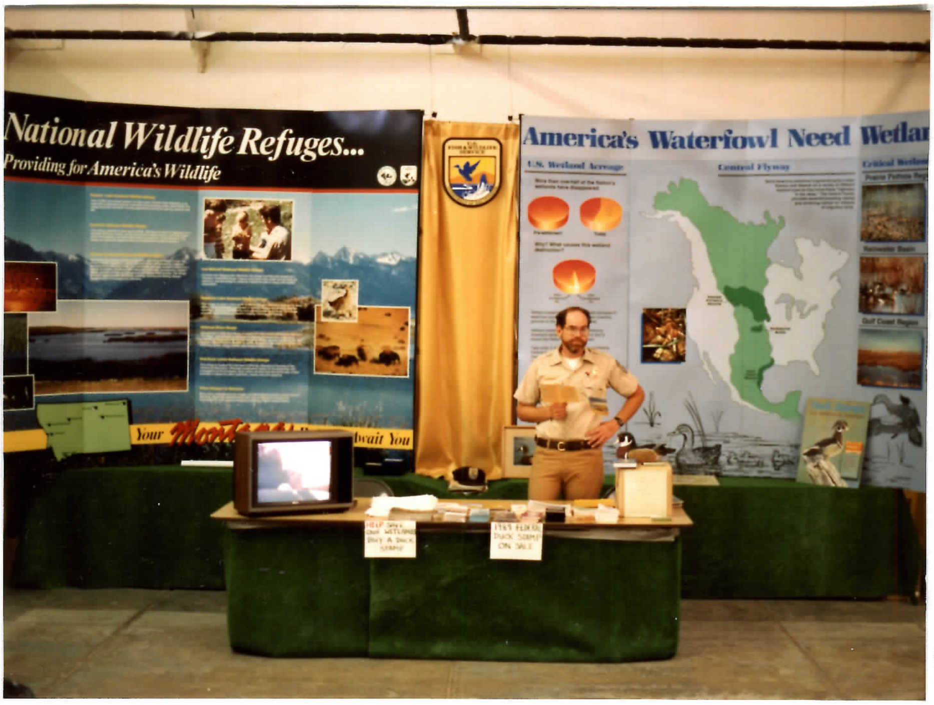
5. Interpretive Tour Routes

The Prairie Marsh Wildlife Drive, a self-guided tour route covering nine miles of prairie and refuge marshes, was open March through December. The tour remains the most popular form of public use on the refuge with approximately 2,500 visits. In April, the two-way traffic portion of the tour route was widened and regravelled.

Nice job staff
Betty
MG

6. Interpretive Exhibits/Demonstrations

Benton Lake coordinated a "Montana Refuges" exhibit and information booth July 28 through August 5 at the Montana State Fair in Great Falls. This was the first year for a display and interest by fairgoers was high with several thousand stopping to see exhibits or chat with refuge staff. The display was honored as the Best Educational Exhibit at the fair. Refuge staff from Bowdoin NWR and Charles M. Russell NWR assisted.



Maytag repairman DR

Jim does look like he's selling something! ws

Refuge staff from Benton Lake, Bowdoin and C. M. Russell NWRs helped run a booth at the 1989 Montana State Fair in Great Falls. The display earned a plaque as the "Best Educational Exhibit" of the fair.
GLS 8/89

8. <u>Hunting</u>

Approximately 40 percent of the refuge is open to the hunting of waterfowl, gray partridge and pheasant. Most hunting centers around waterfowl and 1989 provided excellent opportunities due to increased duck production and ample fall water levels. Opening day of the duck season brought approximately 50 hunters out to the refuge who harvested an average of 3.0 ducks each. Total harvest for the season was approximately 575 ducks and 25 geese. Only a few dozen persons hunted upland game birds due to a continued low population and ample opportunities elsewhere.

A few changes were made in the hunting program to better match state regulations. These included:

1. Opening of the refuge goose season in conjunction with the state season on Sept. 30. The refuge had a delayed opener since 1981 to help the resident flock grow to the goal of 100 nesting pairs. That goal was reached in 1989.

2. Extension of the refuge waterfowl and upland game bird season until mid-December instead of November 30 to once again match state regulations. There was no biological reason for the early closure.

3. Creation of a handicapped access program which allows handicapped persons a place to drive in, unload equipment and hunt after their vehicle is returned to the designated parking area.

As continental duck numbers continue their decline, Canada geese continue to increase, providing excellent hunting in the area. These hunters were hunting over decoys in stubble a half-mile from the refuge on opening day.
DGH 10/89

I. EQUIPMENT AND FACILITIES

1. New Construction

The following construction projects were completed force account in 1989:

1. Pouring a concrete floor and installation of drain field pipe for the pole barn service building built in 1986.

2. Construction of a new equipment loading dock next to the existing dock which was too high for many trailers.

In conjunction with the new concrete floor in the service/storage building, pipe was laid to the site of a new drain field to be installed in 1990 or 91.
RLP 5/89

2. Rehabilitation and Major Maintenance (combined)

Rehabilitation projects during the year included:

1. Replacing guard rails and decking on interunit pump station.

2. Replacing guard rails on some control structures along the auto tour route.

3. Upgrading of the two refuge houses as follows:

   Quarters 81 - Painting and wallpapering certain rooms, repair refrigerator, clean carpets, new carpeting, new electric range, repair and clean furnace, replace yard fence with chain link, and two new picture windows.

Quarters 82 - New picture windows, painting inside garage and stairwell, clean furnace and miscellaneous repairs.

4. Building storage cabinets and installing electric overhead door openers in office two-stall garage.

5. Constructing concrete pad and sidewalk in front of office garage for access to handicapped ramp.

6. Widening, reshaping and gravelling of one mile of auto tour route and the entrance roads to refuge quarters.

A new concrete pad was poured in front of the office garage to cut down on gumbo (clay) being continually dragged into the office. At the same time a sidewalk was installed in front of the retaining wall and the handicapped ramp was widened.

DGH 10/89

The driveway leading to the two refuge houses was straightened, reshaped and gravel added late in the year. The improvements will alleviate problems with snow accumulation and plowing experienced in past years.
DGH 11/89

4. Equipment Utilization and Replacement

Major repairs to equipment during the year included air boat engine tear-down to replace drive parts, gaskets and the rear main seal, as well as fiberglassing of worn hull areas. The 200-hp electric pump purchased in 1988 was returned to the factory for warranty work to replace the drive shaft and bearing damaged by a faulty seal and oiling system. Refuge staff did the removal and reinstallation of the huge pump, one of three at the Muddy Creek pump station.

Equipment surplused during 1989 included a 1979 Chevy Luv pickup and a 1979 Dodge pickup (GSA sale), an old tow-behind dirt scraper (transferred) and a Colt .357 pistol (transferred). As is normal in property management, several items scheduled for surplus were in various stages of the process.

New equipment purchased during 1989 included a 20" TV/VCR all-in-one combo, a six-ton full vehicle floor hoist, and an 8 foot by 25 foot equipment trailer with fold-down ramps. Vehicles ordered in September included a Jeep Cherokee to replace the 1979 Suburban and a 4X4 1/2 ton pickup to replace the 1979 Chevy Luv pickup. Delivery of the vehicles is expected in mid-1990.

5. Communications System

In February the refuge was hooked into the Region's VAX electronic mail system. After dinking around for over a month, the system became fully operational.

Circuit or surge protectors for the refuge Merlin phone system were replaced late in the year. The protectors had melted during an electrical storm earlier in the year.

Telephone line switches for a facsimile (fax) machine were installed and a fax brought in with the new manager was put on-line. The fax is not used too often, but is most helpful when dealing with special deadlines, congressional inquiries and the like.

6. Computer System

Benton Lake truly entered the computer age in 1989. Although equipment had been on hand for a couple years, some components were missing and the system was not able to be used to its full potential. However, the transition into the computer age was not without trials and tribulations as staff struggled through faulty equipment, partitionings, retrofitting and program loading to make things work. Asst. Manager Steve Martin (the lead for computers at the refuge) suggested in a report to the Regional Office that "the refuge return to the use of an abacus and a dictaphone, a vast improvement from the previous 30 days of computer technology." By year's end all systems were operating smoothly.

Additions to the refuge computer system in 1989 were: two Zenith laptop computers, a Win desktop computer, Casper color monitor for the Win, and the installation of a 3 1/2 inch disk drive for the existing Zenith desktop. The only software acquired during the year was WordPerfect 5.0.

Refuge Assistant Betty Benway was part of a region-wide team charged with coming up with a new computer-based budget tracking system for refuges. The new system was in place in October with several small bugs being worked out through the remainder of the year. Betty also provided assistance to other refuges in Montana as they worked with the new system.

J. OTHER

3. Items of Interest

A saline seep/water quality awareness tour was conducted by the Montana Salinity Control Association (MSCA) in Cascade, Teton and Pondera Counties. A portion of the tour was held on the refuge and Brumwell Waterfowl Production Area. Participants included Congressional staffers and State Directors for the Soil Conservation Service, Agriculture Stabilization and Conservation Service, Environmental Protection Agency, Water Quality Bureau, Department of State Lands and Montana Grain Growers Association. Discussions centered on changes in Department of Agriculture policies which are necessary to address saline seep problems and potential solutions for resolving seeps that are affecting the refuge and WPAs.

Several staff members received special achievement awards for their outstanding contributions in 1989 or earlier. The awards were:

Vince Marko Betty Benway Patrick Nies	Each received an award for superior work on the force account remodeling of the refuge office completed late in 1988.
Steve Martin	For doing an excellent job as acting project leader during 1989 on top of his regular duties.
Don Hultman	Chosen as outstanding GS employee in Region 6 for 1989 in recognition of work on the Chase Lake Prairie Project in North Dakota.
Gary Sullivan	Recognized for his accomplishments with Farm Bill and Wildlife Extension Programs in the WMD.

Great effort again from GARY! DL

4. Credits

Martin wrote sections D.5, F and G; Hultman sections A, D, E and H through J; and Benway wrote the climate section, deciphered everyone's WordPerfect mess, retyped, did layout and assembled the report. Special credit goes to the maintenance crew who didn't have to write this, but without them we'd have little to write about.

K. FEEDBACK

As I sit down to write this, scores of refuge management and administrative issues come to mind. Yet, I have to wonder what is the use in raising many of the issues that are of concern to refuge staffs across the country. The narrative instructions in the Refuge Manual instruct us to include an extra copy of the Feedback section in the copy that goes to Washington so that it can be routed to the appropriate staffer for action/resolution. But, in all the years I've been raising legitimate issues in this section, not once has anyone ever contacted me, nor have I seen much improvement in some of the areas mentioned. Yet, if we don't speak out, there is certainly no hope of change. So here I go again, and below are just a few of the issues I'd like to see addressed.

BUDGETS. It is now March 24, 1990 and this narrative is certainly behind schedule. Yet, we are nearly six months into the fiscal year and I have not received a written account of my budget. I have been given figures over the phone, but like all cautious managers, I kind of like to see things in writing. Each month we get numerous requests for reports with definite deadlines that are firm. Doesn't anyone in the Region or Washington have a deadline for getting the budget together?

COMPLEXITY. Each year it seems refuge and wetland management district management gets more complex. For example,if you want to burn a 40 acre field surrounded by black ag. land on the prairies, you must go through all the hoops that a manager in the southeastern pine forests must of necessity go through. You must write a lengthy burn plan, hope for the right weather that meets "prescription", then call and get a burn number, then do a follow-up report to satisfy the system. All this for a burn that could not possibly go anywhere if the humidity was 10 percent and the wind howling at 50 mph. In many cases the paperwork needed to do the burn takes longer than the burn itself!

This is just one example of the many things we must do because of the worst incident that ever happened anywhere in the refuge system. Other examples abound: equipment operator certification, law enforcement training, cultural resources, imprest fund management, and on and on. Part of the problem lies in our ever increasing specialization in Regional Offices. If your job is to be fire, heavy equipment, law enforcement or environmental assessment coordinator, you can bet that the task at the field level will become more complex.

If we hire a manager let him or her manage and hold them accountable for their actions, but don't burden the rest of the system because of isolated errors of judgement or outright negligence. We must constantly strive to keep things simple, lest the process takes precedence over the practice.

No coward here (maybe suicidal) to broach this "unbroachable" subject. A volatile and divisive issue that has conveniently been unmentioned and undiscussed. Maybe a Pandora Box to be left unopened. BA

EEO. EEO stands for "Equal Employment Opportunity." To me, that means that all persons, regardless of sex, age, race or religion, have an equal chance of being selected for a position. However, we have made a mockery of that very program title. There is nothing "equal" about having to select a woman or minority that is not as well qualified as other applicants so that we can meet a percentage or quota. What we are seeing now is just a numbers game. Regions recruit minorities or women currently working for the service in other regions to bolster their numbers, but the end result is the same number in the FWS. It is all much like the FTE game played 10 years ago when permanent employees worked 50 weeks so they could be dropped at the end of the fiscal year to meet the FTE ceilings.

DON THIS IS A.A. JL

used to be

Furthermore, such an unwritten policy demeans those minorities and women that have gone through the trials and tribulations to join what truly is the premiere resource agency in the country. If we want to remain the premiere agency, which in the end benefits the wildlife and land resources we manage, then we should continue to hire only the best people, regardless of their sex, race, age or religion.

Well put, TM

If the Service had aggressively attempted to create and fill lower level positions 20 years ago we would have well qualified candidates at all levels and this issue would be a non-issue. It is not fair to well qualified employees for them to be considered as having been selected because of status. Let people like Maggie be proud of the abilities they have earned

Bill Geiger

EEO: An emotionally charged issue that touches everyone. The process of change is painful, and over the past 20 years the service has been changing, and we (everyone) are all victims of this transition. There are no easy solutions, mistakes have been made and more will be made. We all want to be, and should be judged on professional merit. Preferences to a particular group are not new to the FWS, prior to Affirmative Action many qualified white males and some females lost out to Veterans or those who have political influences. I've been quick to criticize how our agency has gone about reversing the "inequities" - unfortunately, I have not been very helpful in offering suggestions for improvement. I am concerned that if communications, on this issue, between coworkers does not improve, the tension between the females/minorities and white males is going to increase. White males are understandably frustrated by this system and feel threatened, with good reason. Females don't want to bring it up, because they want to blend in. Like it or not, we are in this together. I've asked females, 10+ years of service, if they felt we still needed Affirmative Action. In general, the reaction was - they wish we did not, but there is still a feeling discrimination would set in. A male manager, with 20 years in service, said we needed AA for 20 years, because there were too many from the old school or social philosophy still around! (I hope not, I want things normal soon) Personally, I didn't appreciate the recent memo on AA, 2-22-90. don't feel comfortable when my coworkers are forced to call me u and ask me if I had considered applying for a position - I can read a greensheet for heavens sake! And I don't like the uncertainties a memo, like this, creates in my mind when I finally do apply for a job. With a directive like this, even if were to get a job on merit, there would always be that element o doubt, and would any of my coworkers believe I got the job on merit? Not likely. This affects my self esteem and tends to @#$ me off. A reaction, I'm sure, shared by the extremely qualified white male, who knows or feels, he doesn't have a 'snowballs chance' if a minority or female have applied for the same job he has. I hope in the near future AA will be a ~~policy of the past~~ and EEO will be taken literally. WE all want to feel good about our work, comfortable with our peers, and selected for a job because we were the best qualified. I appreciate your bringing u such a sensitive issue - in writing no less! Maggie Anderson

I was selected for a job about 10 years ago that Maggie got. I'm a white male, and I was not happy about it. Sounds like she wouldn't have been either.

INTRODUCTION

The 25,000 square mile Benton Lake Wetland Management District (WMD) is located in north central Montana and includes a wide diversity of habitat types. Spread over ten counties, the district encloses an area roughly the size of West Virginia, making it the largest WMD in the country (Figure 1). Topography in the western part of the district is dominated by the Rocky Mountains and includes glaciated valley wetlands and extensive riparian habitat. The northern Great Plains cover the eastern portion which consists of large expanses of agricultural land interspersed with small isolated mountain ranges and short grass prairie.

The district was established in 1975 and is administered by the staff at Benton Lake National Wildlife Refuge. Approximately 48,000 acres have been delineated for fee purchase proposals. To date, some 12,604 acres have been acquired in eight counties. Nineteen waterfowl production areas (WPA's), ranging from 80 to 3,734 acres in size, are widely scattered across the district. Thirteen WPA's are located over 100 miles from headquarters making effective management of these units somewhat challenging. Perpetual wetland easements have been obtained in all ten counties, protecting some 7,088 acres of wetlands.

UNITED STATES
DEPARTMENT OF THE INTERIOR

WATERFOWL PRODUCTION AREAS

UNITED STATES
FISH AND WILDLIFE SERVICE

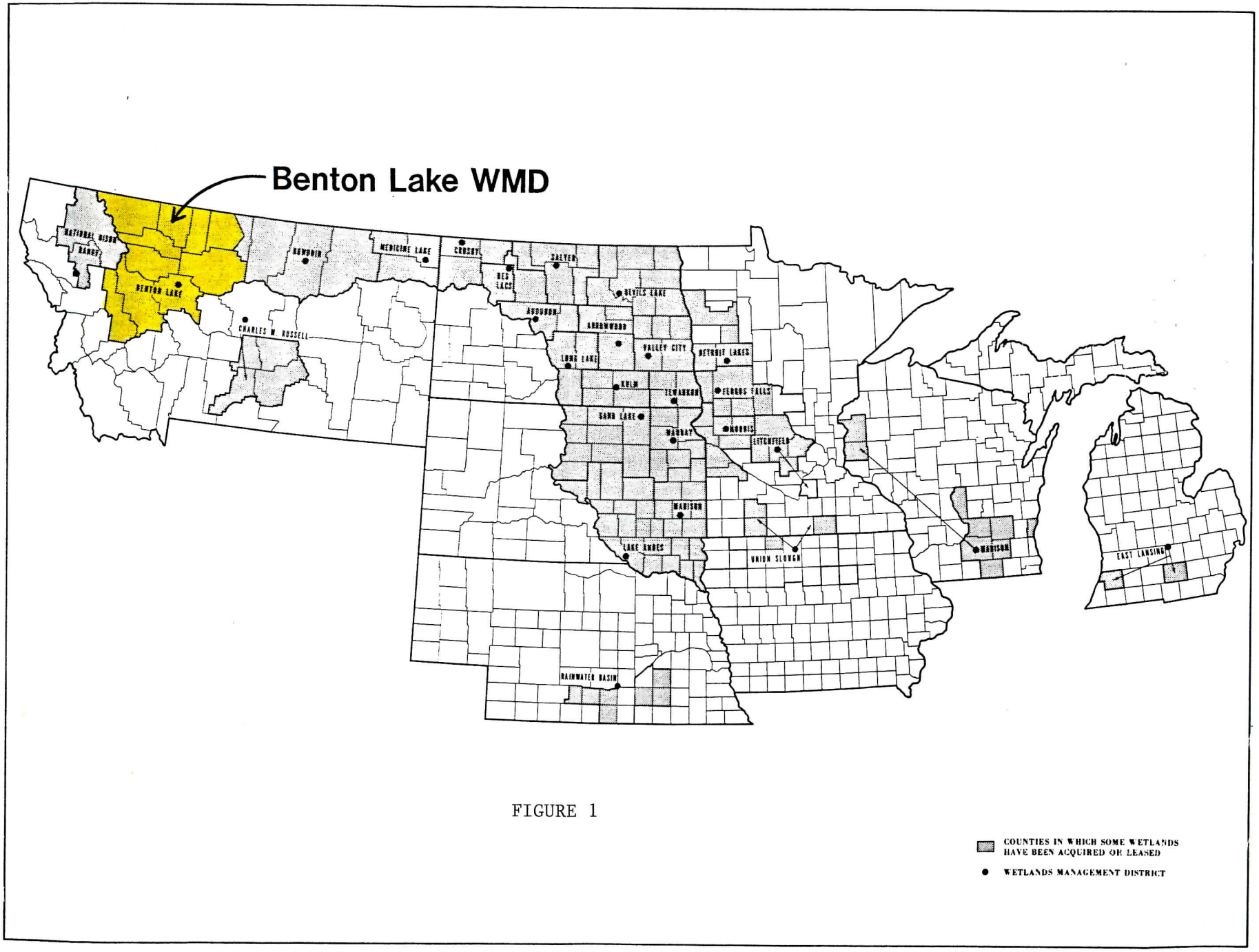


FIGURE 1

COUNTIES IN WHICH SOME WETLANDS HAVE BEEN ACQUIRED OR LEASED

WETLANDS MANAGEMENT DISTRICT

COMPILED IN THE DIVISION OF REALTY

WASHINGTON, D.C. SEPTEMBER 30, 1981

0 100 200 300 MILES

BENTON LAKE WETLAND MANAGEMENT DISTRICT

O Benton Lake National Wildlife Refuge

▪ Waterfowl Production Areas

1.	Furnell	1995.00 Ac	
2.	Ehli	475.24 Ac	
3.	Danbrook	327.00 Ac	
4.	Dunk	80.00 Ac	
5.	Brown	260.60 Ac	
6.	Long Lake	645.66 Ac	
7.	Blackhurst	320.12 Ac	
8.	Cemetary	108.58 Ac	
9.	Peterson	94.20 Ac	
10.	Hingham Lake	280.00 Ac	**
11.	Jarina	640.00 Ac	
12.	Savik	397.00 Ac	
13.	Sands	378.93 Ac	
14.	Brumwell	251.50 Ac	
15.	Hartelius	307.22 Ac	
16.	Big Sag	349.58 Ac	*
17.	Kingsbury Lake	3733.69 Ac	*
18.	Schrammeck Lake	420.24 Ac	
19.	Blackfoot	1539.60 Ac	
		12,604.16 Ac	

* These tracts contain acreage held under BLM and State ownership

** Leased from the State of Montana

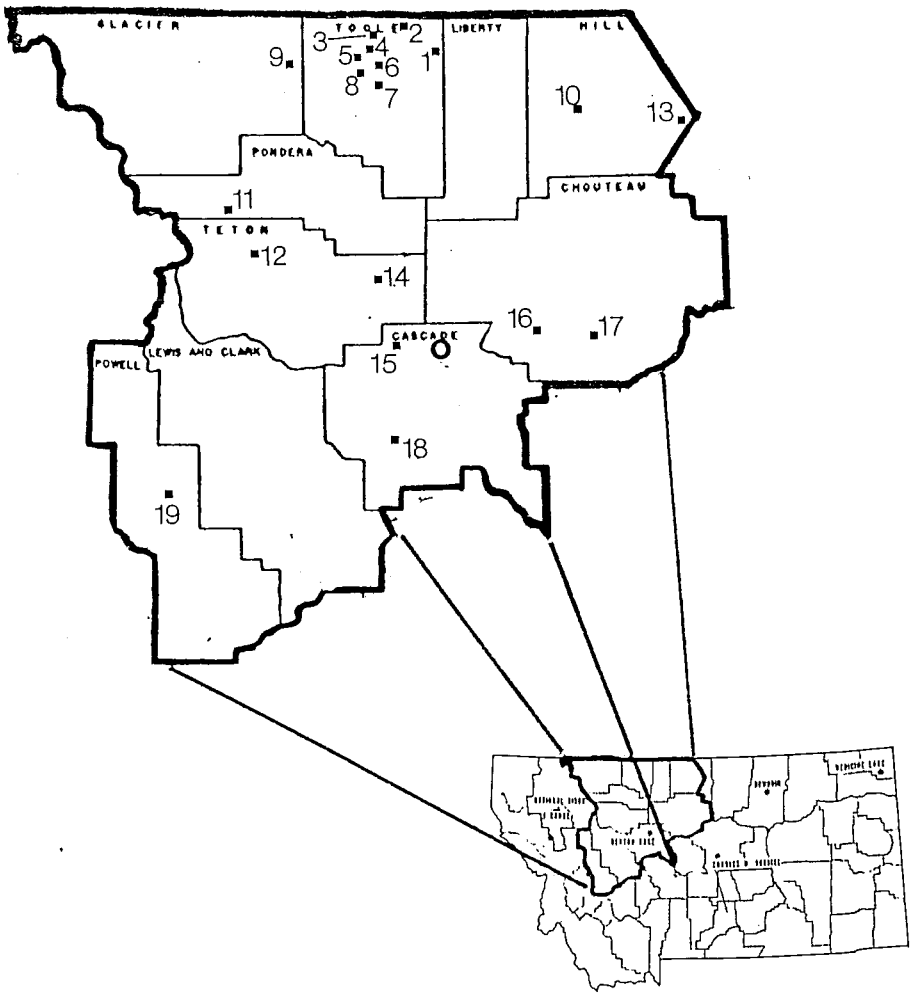


FIGURE 2

INTRODUCTION

TABLE OF CONTENTS

Page

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

A. HIGHLIGHTS

After nearly six years of drought, good wetland conditions returned to Montana's prairie pothole region (F.2).

Grass seed harvesting on three WPA's yielded a district share of some 4,150 pounds of clean seed (F.5).

Trespass grazing continues to be a problem on several WPA's in the district (H.17).

Three fencing contracts and force account work resulted in the construction of 6 miles of new fence on four WPA's (I.1).

Several major junk and abandoned building sites were cleaned up on three WPA's (I.3).

Considerable staff time was devoted to the Farm Bill and Wildlife Extension Program (E.7).

B. CLIMATIC CONDITIONS

Specific climatic conditions are discussed in the refuge narrative report. However, due to the size of the district, conditions vary considerably across the ten county area. The only weather data collected for the WMD are precipitation records from National Weather Service (NWS) reporting stations near WPA's (Table I).

TABLE I

PRECIPITATION RECORDS FOR SELECTED NWS REPORTING STATIONS

County	(Station)	1989 Total	Normal	Percent of Normal
Cascade	(Cascade)	21.30	15.27	139 %
Chouteau	(Geraldine)	23.24	15.55	149 %
Glacier	(Cut Bank)	19.48	11.99	162 %
Hill	(Havre)	16.18	11.16	145 %
Lewis-Clark	(Augusta)	18.55	13.64	136 %
Liberty	(Chester)	18.18	10.65	170 %
Pondera	(Swift Dam)	30.00	**	**
Powell	(Ovando)	16.23	13.67	119 %
Teton	(Choteau)	13.69	11.36	121 %
Toole	(Sunburst)	19.59	11.94	164 %

** Unofficial reporting station - no 30 year average available.

The first significant spring runoff in five years provided good wetland conditions throughout the district, including this basin on Hartelius WPA.
GLS ? 5/08/89

Impressive!
Only a puddle in '85
Lanier

After nearly six years of drought Montana was finally blessed with a wet year in 1989. Above normal amounts of precipitation in March, April, July and August resulted in the fourth wettest year on record. We hope this is the beginning of our wet cycle.

C. LAND ACQUISITION

1. Fee Title

No new fee acreage was optioned or acquired during 1989. Since 1974, some 10,382 acres have been purchased in eight counties under the Small Wetlands Acquisition Program. An additional 2,222 acres of Bureau of Land Management (BLM) and state lands are managed within the boundaries of three WPA's.

Acquisition efforts this year were limited to work on a potential roundout of the Savik WPA in Teton County. The unit cannot be effectively developed until the upper end of Foster Creek marsh is acquired. A number of contacts were made with an adjacent landowner who wants to sell a 579 acre tract. Only 160 acres are needed for management purposes and we hope to persuade him to split the acreage.

TABLE II

FEE TITLE ACREAGE BY COUNTY

County	Acquisition Goal	Number of WPA's	Total Acres
Toole	4,675	8	4,212.20
Chouteau	2,500	2	2,140.79*
Cascade	2,000	2	727.46
Hill	1,000	2	378.93**
Teton	2,251	2	648.50
Pondera	2,000	1	640.00
Powell	1,300	1	1,539.60
Glacier	2,096	1	94.20
Liberty	2,000	0	0
Lewis & Clark	500	0	0
Totals	20,322	19	10,381.68

* An additional 1,942.48 acres of State and BLM lands are contained within WPA boundaries.

** An additional 280 acres are leased from the State of Montana (Hingham Lake WPA).

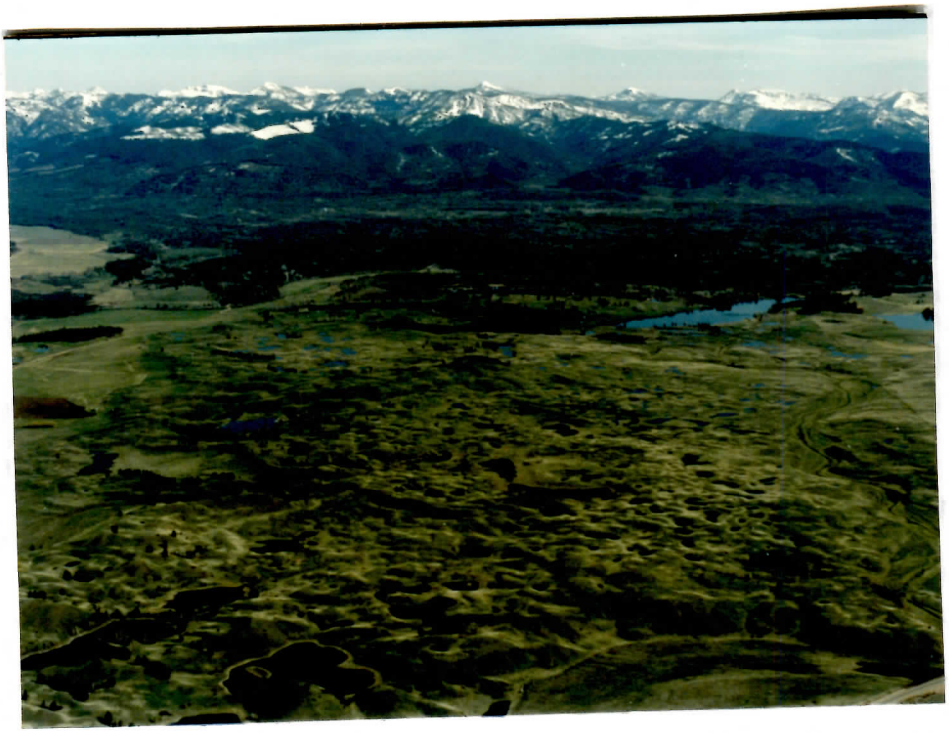
2. Easements

No additional wetland easements were obtained in 1989. Easements are scattered throughout all ten counties of the WMD, protecting 7,088 wetland acres on 133 tracts (Table III).

TABLE III

EASEMENT ACRES BY COUNTY

County	Easement Tracts	Wetland Acres
Toole	56	2,933
Glacier	44	1,816
Liberty	9	428
Pondera	8	601
Hill	6	407
Cascade	4	78
Powell	2	507
Lewis & Clark	2	247
Teton	1	50
Chouteau	1	21
Totals	133	7,088



Nice Country

Some of best wetland complexes in the state are located in Powell County where much of the native rangeland remains intact. Wetland conditions were excellent on this tract (Powell County 11X) near Upsala Lake.
GLS 5/01/89

3. Other

Only one Farmers Home Administration (FmHA) inventory property was evaluated for a possible conservation easement in 1989. The 167 acre parcel was located in Pondera County and contained no significant resources. To date, only one conservation easement has been recorded in the district involving the protection of a tributary of Muddy Creek in Teton County. WM Sullivan provided assistance with inspections and easement proposals on two additional properties outside the district in the southern portion of the state.

Thanks for the help! MG

The BLM initiated a process to dispose of their small isolated parcels of land in the district. Six 40-acre tracts within the boundaries of Kingsbury Lake WPA and a 120 acre portion of Big Sag WPA were identified for disposal. We requested that the tracts be removed from the disposal list and remain in federal ownership. We hope to acquire the 360 acres through a future land transfer.

A cadastral survey of the Blackfoot WPA was partially completed by personnel from the Aberdeen (South Dakota) Acquisition Office. Bad weather postponed the remaining survey work until next spring. Our thanks to the Aberdeen and C.M.R. realty staff for their assistance with this project.

D. PLANNING

2. Management Plans

Routine plans completed and approved for the district included a prescribed burning and annual work plan.

4. Compliance with Environmental and Cultural Resource Mandates

A cultural resource evaluation of the Jarina WPA homestead completed last year was finally approved by the Montana Historical Society. Our recommendation to the State Historic Preservation Officer (SHIPO) was to dispose of the buildings since they lacked the physical integrity and historical significance for listing on the National Register of Historic Sites. Their approval gave us the green light to proceed with a major WPA clean up project (refer to section I.3 for details).

An application for a Nationwide #3 Section 404 permit was granted from the Corps of Engineers to cover an island rehabilitation project on Sands WPA (refer to section I.2 for details).

5. Research and Investigations

Monitoring of saline seeps on two WPA's continued in 1989. Saline seeps pose a serious threat to both public and private lands in north-central Montana. These low volume springs form as native rangeland is converted to cropland. Seeps result from the inefficient use of annual precipitation on up-slope fallow cropland, known as recharge areas. Excess water moves down through the soil profile of recharge areas leaching out soluble salts and heavy metals which discharge down slope. This often results in the degradation of water quality and sterilization of soil in adjacent wetland basins.

Saline seeps continue to degrade wetlands in the district. Salts and heavy metals are being discharged into Long Lake WPA as a result of adjacent farming practices on private land.
GLS 5/08/89

Initial efforts to control large seeps on two WPA's began in 1981 as a cooperative project between the Service and the Montana Salinity Control Association. A series of shallow cased wells were drilled on Brumwell and Long Lake WPA's for the purpose of monitoring sub-surface water tables. Wells are measured twice annually to track changes in ground water levels as a result of reseeding part of the recharge areas to permanent cover (DNC). Unfortunately, the remaining recharge areas are located on adjacent private land where fallow cropping practices continue to aggravate seeps on the WPA's.

One positive note towards the reclamation of saline seeps in Montana is the conversion of some 2.7 million acres of cropland to permanent cover under the Conservation Reserve Program (CRP). Many seep recharge areas are being enrolled in this program, including some 1200 acres of private land adjacent to Long Lake and Brumwell WPA's. Revegetation of these areas should help reduce the discharge of saline water into WPA wetlands while also improving the surrounding upland nesting cover.

E. ADMINISTRATION

1. Personnel

The ten county district is administered by personnel at Benton Lake NWR and does not receive separate funding. Effective management of the district is difficult, due to the small staff and logistical problems associated with managing WPA's located over 100 miles from headquarters.

A temporary biological technician was hired this year to assist with district and Farm Bill projects. Clarke Dirks entered on duty February 13 but soon resigned on May 16 to take a permanent biologist position with the Department of Army. Although his appointment was short, Clarke did an excellent job on a number of wildlife extension and WPA clean-up projects.

For additional information on training, meetings and other personnel matters, refer to section E.1 of the refuge narrative report.

5. Funding

Although the district is not funded separately, $ 45,000 of 1262 Flex funds were earmarked for the WMD in FY 89. Funds were used to complete three WPA fencing contracts and purchase several pieces of new station equipment.

6. Safety

There were no lost time accidents associated with district projects this year. "Tailgate" safety meetings are held prior to the start of all major force account projects to review the proper use of equipment and any necessary safety precautions.

7. Technical Assistance

A major portion of the district work load involved activities associated with the Farm Bill and Wildlife Extension program. WM Sullivan continued to work statewide with the Montana Farm Bill Coordinator during the year.

It proved to be both a frustrating and rewarding experience. As with any new program, numerous issues cropped up which often required a deluge of memos, meetings and phone calls to various USDA agencies. Assistance was provided to SCS and ASCS on a number of wetland issues including 8 wetland determinations, 2 minimal effect consultations (both denied) and 2 commenced determinations (one pending appeal to the State Committee).

Too frequently this happens where FWS must train SCS personnel for their own programs! MG

A number of workshops and meetings were held to assist SCS and ASCS field staff with wetland and wildlife issues. During the year we participated in five SCS workshops involving wetland identification and wildlife habitat development, and two ASCS Swampbuster training sessions.

Farm Bill activities included our participation in a number of SCS wetland training workshops in the district.

GLS 10/12/89

The Wildlife Extension Program was well received by local agencies and private landowners in the district. Presentations were given to a number of state agencies including the Montana Department of Fish, Wildlife and Parks and Montana Water Rights Bureau. Information about the program was sent to nearly 900 landowners enrolled in the Conservation Reserve Program in six counties of the district. Eleven drained wetlands and six reservoirs were restored on CRP lands. Other waterfowl enhancement projects included the placement of 10 artificial nesting structures and the planting of 700 Wood's rose seedlings on three nesting islands constructed last year.

Engineering Equipment Operator Marko coring out a ditch plug to restore a small Type I wetland on CRP in Chouteau County.
GLS 10/89

The Conservation Reserve Program (CRP) has been responsible for putting over three quarters of a million acres of highly erodible cropland back into permanent cover in the district (Table IV). Unfortunately more than half of this acreage was seeded to monotypic stands of crested wheatgrass.

TABLE IV

TOTAL CRP ACREAGE WITHIN
BENTON LAKE WMD

County	Acreage
Hill	146,379
Chouteau	145,258
Toole	138,213
Liberty	83,432
Teton	73,590
Cascade	66,151
Glacier	64,604
Pondera	33,196
Lewis & Clark	7,388
Powell	0
Total	758,211

Artificial nesting structures were placed on a number of private reservoirs in Toole County including this one in the Sweetgrass Hills. We took advantage of low water levels to install this cone before the unit was refilled from a nearby creek.
GLS 3/20/89

A number of problems surfaced with swampbuster and sodbuster in the state. A wetland on private land in Pondera County was not identified by SCS for protection under Swampbuster. According to the local office the site was evaluated in 1988 and did not meet SCS wetland criteria. WM Sullivan requested a reevaluation of the site since it contained numerous hydrophytic plants, not to mention several duck broods. SCS refused to call it a wetland since it did not show evidence of any hydric soils. Fearing the determination might be changed, the landowner began dirt work to drain the basin. We used old photos and crop records to show the necessary frequency and duration of ponding to meet their criteria. The decision was finally reversed by the State Conservationist, much to the dismay of the local SCS staff and the landowner. Hopefully, swampbuster protection will discourage the completion of this drainage project.

SCS refused to identify this typical prairie pothole in Pondera County as a wetland for protection under Swampbuster, despite the presence of bulrush and numerous duck broods. Needless to say we put up a fight ... and won.
GLS 8/04/89

Sodbusting continues to be a major problem in the state. In most cases it's being done under approved SCS conservation plans to shore-up cropland base acreage. We requested an estimate from SCS of the acreage broken up since sodbuster was implemented. We were told that this was not tracked, so to get a better handle on the problem we examined SCS files in five prairie pothole counties along the Hi-Line (portions of Bowdoin and Benton Lake WMD's). As we suspected, nearly 57,000 acres of native prairie have been plowed up in just five counties since 1987. To make matters worse, 33% of those individuals who broke native sod are also enrolled in the CRP program. This information was used to prepare a report which should help strengthen sodbuster as the 1990 Farm Bill is put together in Washington.

looks like SD

Extensive soil erosion adjacent to the Savik WPA makes us wonder if the conservation provisions of the 1985 Food Security Act are really working. The state highway department ended up using snowplows to keep the soil off Highway 87.

GLS 4/20/89

8. Other Items

Fiscal Year 1988 revenue sharing checks were delivered to county commissioners in Toole, Cascade, Chouteau, Teton and Pondera counties. This year's payment amounted to 71% of full entitlement. Fortunately in Montana, this deficit appropriation still exceeds the personal property taxes which would have been paid by private landowners. Consequently, commissioners in the district are generally supportive of our small wetlands program. Due to lack of time and the long travel distances involved, checks were mailed to commissioners in Glacier, Hill and Powell Counties.

Other miscellaneous projects completed during the year included a reorganization of the district filing system and development of mylar overlays to map locations of CRP lands, delineated wetland tracts and previous easement violations in the WMD.

F. HABITAT MANAGEMENT

1. General

Long term management goals for the district correspond to those of the Small Wetlands Acquisition Program. Management efforts are directed towards reducing the limiting factors to waterfowl populations in this portion of the prairie pothole region. In most cases this involves improving the availability of adequate nesting cover on WPA's in the district.

Short range development plans for newly acquired WPA's involve protecting native upland cover from grazing and converting cropland to dense nesting cover (DNC). Periodic manipulations, including prescribed burning, haying, grazing and small grain rotations, are necessary to rejuvenate DNC stands.

Overall, habitat conditions improved dramatically from the record drought of 1988. Above normal precipitation recharged wetlands and provided ample soil moisture during the growing season.

DNC stands in the district responded well to the above normal precipitation in 1989.
GLS 8/16/89

2. Wetlands

The drought of the 1980's ended as water returned to Montana's prairies. Runoff in March and April resulted in the best spring wetland conditions since 1979. Seasonal and permanent basins dotted the landscape throughout the district. All WPA's, except the Sand's unit, had good early water, but soil dry from last year's drought quickly soaked up much of the runoff by mid-summer. Unusual summer rains during August did help to recharge wetland basins in late summer.

A Ducks Unlimited (DU) project involving wetland development on the Blackfoot WPA was approved and is scheduled to be completed next year. Four drained wetlands totalling 110 acres will be restored and enhanced by constructing three small dikes and two water control structures. Surveying and engineering work was completed by a local contractor in July.

3. Forests

The only significant forest habitat is located on the Blackfoot WPA in Powell County. The unit includes approximately 220 acres of ponderosa pine located on the west side of Marcum Mountain. This portion of the WPA represents some of the most important elk winter range in the Blackfoot Valley. Management of the area is geared towards protecting the tract from adjacent grazing and logging activities.

An additional 50 acres of riparian habitat on the WPA, consisting of aspen, cottonwoods and willow, are found along the Blackfoot River. Efforts to exclude this area from adjacent livestock grazing have proven to be difficult. The Blackfoot River crosses the boundary of the unit in several spots, making fence construction and maintenance nearly impossible during annual spring floods.

4. Croplands

A cooperative farming program is utilized to establish and rejuvenate DNC stands in the district. Some 369 acres were farmed on two WPA's in 1989.

A 69 acre field on Sands WPA was seeded to Sudan grass by a local cooperator. This was the first time that an annual forage crop had been planted on a WPA. The field had been infested with cheatgrass in past years and was lightly disced in the fall of 1988 and again this spring. Sudan grass was seeded in May and was fairly effective in outcompeting weeds and reducing the amount of chemicals needed to control cheatgrass. A total of 93 round bales were harvested in September on a share basis. The WMD share was used for artificial nesting structures on the unit. The field will be reseeded to DNC next year.

Sudan grass seeded on the Sands WPA served as a fairly effective annual crop which out-competed weeds and firmed up the seedbed for our scheduled DNC seeding next spring.
GLS 10/03/89

Approximately 300 acres on the Blackfoot WPA were farmed under a one year cooperative farming agreement. Cropland on the new roundout had grown up in weeds prior to completing the acquisition. Spring wheat was planted to clean up the seedbed but the overall yield was poor. Our share was harvested to prevent further seedbed problems with volunteer grain. Approximately 80 acres of cropland will be seeded back to native grasses next spring.

Approximately 12 acres of cropland on the FmHA conservation easement in Teton County was converted to permanent cover. The site was seeded to DNC in May to provide a buffer zone along a tributary of Muddy Creek.

5. Grasslands

The Benton Lake Wetland Management District manages 4,906 acres of native grassland. The majority of this lies in the eastern portion of the district and is dominated by western wheatgrass and green needlegrass. An additional 1,987 acres of cropland has been converted to tame grass (DNC) on 15 WPA's. Grasslands are monitored and treatments prescribed when plant vigor begins to decline. No grazing, haying or controlled burning occurred in 1989.

Above normal precipitation provided excellent growing conditions for DNC in the district. Grass seed was harvested on three WPA's in Toole County under a cooperative agreement with a local farmer. Approximately 300 acres of intermediate wheatgrass was cut and yielded a total of 10,375 pounds of clean seed. The WMD share amounted to 4,150 pounds which will be used for future DNC seedings.

10. Pest Control

Fortunately we don't have any major problems with noxious weeds in the WMD. Most WPA's have good competitive stands of cover, although a few small patches of Canada thistle are beginning to take hold on several units. The recently acquired Blackfoot WPA also includes an area infested with spotted knapweed. No pesticides were used in 1989, but we'll need to take an integrated approach to weeds next year involving mechanical, chemical and biological control methods.

nia s fund Dm

Intermediate wheatgrass seed was harvested from three WPA's in Toole County.
GLS 9/89

Refuge Manager Hultman loading up the district's share of cleaned seed (4,150 pounds) from the cooperator's seed cleaning facility.
GLS 10/05/89

11. Water Rights

Efforts were made to exercise a water right (2 c.f.s.) on Furnell WPA in April. Runoff from Trail Creek was moved through an old delivery ditch system which has not been used for years. The ditch washed out in several spots before any water made it to the WPA. A major rehabilitation of the delivery system is necessary to make it functional. Infrequent runoff, senior water right problems upstream and costs to repair the ditch may force us to abandon the project.

Regional Water Rights Specialist Cheryl Williss and Hydrologist Mike Brewer spent two days looking at water rights issues in the district. Flow rates of an artesian spring on the Blackfoot WPA were measured to assess the potential impacts of an adjacent highway widening project. The spring will be used to restore several wetlands on the unit. Options to exercise our water right on Trail Creek for Furnell WPA were also inspected during their trip. Willis is continuing to work on the adjudication of new claims on Trail creek which may impact the Service's water rights.

Hydrologist Mike Brewer and WM Sullivan measuring flow rates of an artesian spring on Blackfoot WPA. The water source will be used to restore and enhance four wetlands on the unit.
CW 5/17/89

13. WPA Easement Monitoring

Easement work in the district is challenging since tracts are scattered over 25,000 square miles. Isolated 40 and 80 acre easements are often difficult to find from the air since many areas don't have discernable section lines or other surface features. Both spring and fall flights were flown with only one burning violation noted (Toole County 60X-2). Follow-up work continued on three possible violations from last year. These include "old" fill or ditches which were not adequately documented when the easement was taken. Needless to say these have caused us a lot of headaches. Landowner contacts to resolve the cases are planned for next spring.

G. WILDLIFE

Specific information on wildlife populations is limited, due to the small staff and size of the district. Surveys are usually done incidental to district work projects. The average distance from headquarters to the WPA's is 93 miles, making it difficult to efficiently collect accurate and timely biological information.

1. Wildlife Diversity

The Benton Lake WMD stretches from the Rocky Mountains to the short grass prairie of the northern Great Plains. A wide diversity of wildlife habitat occurs in this 25,000 square mile area of the state. Waterfowl habitat is found in three distinct regions of the district. Most WPA's are located in the intensively farmed portion of Montana's Hi-Line referred to as the Golden Triangle. The Furnell WPA lies in the higher elevations of the Sweetgrass Hills near the Canadian border and is characterized by rolling glaciated prairie. The western portion of the district includes intermountain glaciated wetlands and extensive riparian habitat represented by the Blackfoot WPA.

2. Endangered and Threatened Species

Several sightings of bald eagles and peregrine falcons were noted throughout the district this year.

Bald eagle use is common along some of the major rivers in the WMD. The Blackfoot River portion of the Blackfoot WPA continues to receive heavy use by eagles. The birds are attracted to road kills (primarily deer) along Highway 200 which runs through the Blackfoot Valley. The Montana Department of Fish, Wildlife and Parks continued to place deer carcasses on an isolated portion of the WPA to reduce the number of eagles killed by vehicles on the highway. A peak of 37 birds were seen using the site in January. An active bald eagle nest is located approximately 2 miles east of the WPA.

We continue to hear reports of grizzly bear use on or adjacent to Jarina WPA. Although we haven't observed any bears, the local Montana Fish, Wildlife and Parks biologist has confirmed the presence of bears in the area.

A number of wolves have been sighted in Glacier County. These animals have moved down from Canada into an area along the front range near the Jarina WPA. No sightings have been confirmed on the WPA to date.

Candidate species sighted on several WPA's in the district included Swainson's and ferruginous hawks. The latter has been known to nest on Kingsbury Lake WPA in past years.

3. Waterfowl

Waterfowl habitat improved significantly in the district as water returned to Montana's prairies. Unfortunately, no formal production surveys were conducted on WPA's due to a skeleton spring staff (3 vacancies) and Farm Bill commitments. Based on partial breeding pair counts and observations made incidental to district maintenance work, production on WPA's was estimated at 2,100 ducks and 30 Canada geese.

Ten large round bales were placed on Sands WPA in Hill County. Nine Canada goose nests were confirmed on structures at Schrammeck Lake (4), Long Lake (3), Hartelius (1) and Blackfoot (1) WPA's.

4. Marsh and Water Birds

A diversity of marsh and water birds have been observed on WPA's in the past. This year's sightings included great blue herons, eared grebes, pied-billed grebes, red-necked grebes, coots, sora rails and sandhill cranes. Pied-billed, horned, eared and red-necked grebes have all been known to nest on WPA's in the district. Crane nesting has been documented on both the Blackfoot and Savik WPA's.

5. Shorebirds, Gulls, Terns and Allied Species

Improved wetland conditions provided better habitat for shorebirds in the district. Species observed on WPA's in 1989 included killdeer, spotted sandpipers, avocets, willets, marbled godwits, long-billed curlews, common snipe, Wilson's phalaropes, California gulls, and black terns. Small colonies of Franklin's gulls and black terns have nested on Schrammeck Lake and Blackfoot WPA's in past years.

6. Raptors

Raptors that were seen on WPA's during the year included golden eagles, prairie falcon, osprey, Swainson's hawks, short-eared owls, burrowing owls, rough-legged hawks, American kestrels, marsh hawks and great horned owls. Raptors known to nest on several WPA's include the red-tailed hawk, short-eared owl, marsh hawk and American kestrel. The first record of a burrowing owl nest on a WPA was confirmed on the Kingsbury Lake unit in May.

8. Game Mammals

Mule and white-tail deer populations continue to do well throughout most of the district. Mule deer were seen regularly on several WPA's. White-tails thrive in the riparian habitat of the Blackfoot WPA where some 200 were observed in April. Pronghorn antelope herds continue to grow in the Sweetgrass Hills area with fairly heavy use occurring on Furnell WPA.

The rolling prairie of the Furnell WPA includes habitat favored by resident species such as pronghorn antelope.
GLS 9/9/89

Elk winter on both the Furnell and Blackfoot WPA's. The latter includes some of the most important elk and mule deer winter range in the Blackfoot Valley. Up to 200 elk and 150 mule deer were observed using the WPA during January and February.Sightings of a single cow elk were noted on Ehli WPA in October and Jarina WPA in June.

The Blackfoot WPA also harbors a diversity of other game including bobcats, black bear, and an occasional moose.

10. Other Resident Wildlife

Sharp-tailed grouse, Hungarian (gray) partridge and ring-necked pheasants are found throughout the eastern portion of the district. With such extensive farming in the area, our WPA's often provide some of the best (and only) cover for upland game birds. Lack of sufficient winter cover in the form of shelterbelts or other woody vegetation is the primary limiting factor to game bird populations in this area.

Hungarian partridge and sharptail numbers increased throughout much of Montana in 1989. They seem to have responded well to the recent and additional cover available on CRP lands in the state. Sharp-tailed grouse leks are located on Jarina, Brown, Ehli and Long Lake WPA's. Ten sharptails were observed dancing on the Long Lake lek in early May.

Pheasants have become established on the Danbrook WPA from bird releases in nearby Canada. Pheasant populations appear to be doing well in the area. Small groups of 5 to 10 birds were observed on the WPA during April and May.

Coyotes, red fox, raccoon, badger, striped skunks, mink, weasel, marten and prairie rattlesnakes are also found in the district.

H. PUBLIC USE

1. General

Monitoring public use on the district is difficult due to its size and the widely scattered locations of WPA's. Waterfowl production areas are open year round to park and walk activities including hunting, trapping, wildlife observation, photography, hiking and other wildlife oriented recreation. The use of motorized vehicles, over-night camping and fires are prohibited on all WPA's.

Most of our information regarding public use is received indirectly from hunters or adjacent landowners. Hunting and trapping are the two primary public use activities on WPA's in the district.

7. Other Interpretive Programs

We continue to support the efforts of the Marias River Landowner-Sportsman Association in the northern part of the district. The group consists of local residents who have developed a park and walk hunting program for lands along the Marias River and the nearby Sweetgrass Hills. The goal of the program is to reduce off-road travel and hunting from vehicles while providing more public access to private land. To date, the park and walk area contains some 65,000 acres including the 1995 acre Furnell WPA. Representatives from the Montana Department of Fish, Wildlife and Parks, BLM and our office attend quarterly meetings to provide input and assistance to the group.

8. Hunting

All WPA's, except the Sand's unit, are open to public hunting in accordance with state regulations. Monitoring the degree of hunting pressure and success on WPA's is difficult due to their distance from headquarters. Poor wetland conditions during the past five years has resulted in little or no hunting pressure on WPA's during the waterfowl season. Fall wetland conditions were fair but waterfowl hunting was limited. Canada goose hunting on Schrammeck Lake WPA continues to be popular with residents from the nearby town of Cascade.

Most of the hunting pressure occurs during the upland game bird season. Waterfowl production areas generally provide good hunting opportunities for sharp-tailed grouse and Hungarian partridge. Kingsbury Lake and Furnell WPA's are also popular hunting spots for mule deer and pronghorn antelope. The Blackfoot WPA offers some excellent archery-only hunting for white-tailed deer along the Blackfoot River. Elk and mule deer hunting is also popular on the Marcum Mountain portion of this unit.

9. Fishing

The Blackfoot WPA is the only unit with a fishery resource. Trout fishing is locally popular on the Blackfoot River, which winds its way across the south end of the WPA.

10. Trapping

All units except the Sand's WPA are open to trapping in accordance with state law. Trapping of muskrats and coyotes has been popular on several WPA's, but the recent decline in pelt prices has substantially reduced trapping in the state.

The Blackfoot WPA still receives relatively heavy trapping pressure according to the local state warden. Most trapping is done along the Blackfoot River for beaver, mink, bobcat and an occasional lynx. Unfortunately, Montana law permits open bait sets which often lead to the death of some non-target species, including bald eagles which winter along the river. To prevent this, we are planning to propose a special trapping regulation which would prohibit open bait sets on the WPA. The local warden fully supports the idea and has agreed to handle enforcement of the special regulation if approved.

15. Off-Road Vehicling

Off-road vehicle trespass continues to be a problem on several WPA's. Most of the activity occurs on WPA's which are not fenced. Catching the culprits has proven to be difficult.

Past vehicle trespass problems on Furnell, Savik and Kingsbury Lake WPA's were resolved this year with additional fencing and signing. A total of 1.5 miles of fence was constructed under contract on Furnell WPA. The new fence parallels a private driveway that bisects the unit and should eliminate off-road travel and trespass grazing problems which have plagued the WPA in the past. Other improvements included the development of two parking areas and the placement of "No Vehicles Permitted Off Road" signs.

Gates along public roads into Savik and Kingsbury Lake WPA's were rebuilt and locked to prevent further vehicle trespass. Appropriate signs indicating foot access only were also installed. Future plans call for the development of additional parking areas on these two units.

17. Law Enforcement

Trespass grazing continues to be the most frequent problem on WPA's in the district. Trespass cattle were found on Jarina, Savik, Kingsbury Lake, Furnell and Blackfoot WPA's in 1989. In most cases it was a result of gates being left open or boundary fence in poor condition. The most flagrant incident occurred on Kingsbury Lake WPA where some 220 head of cattle spent an estimated 2 months before being discovered.

Trespass grazing is often discovered during routine aerial inspections of WPA's in the district. Some 200 head were discovered on the Kingsbury Lake WPA during this May flight.
GLS 5/01/89

Landowners are contacted to remove their livestock as soon as we discover a problem. Again, its difficult to monitor WPA's on a weekly or even monthly basis when most are scattered over 100 miles from headquarters. The best solution is to construct and maintain good boundary fences. With a change in management this year, the district finally received its fair share of funding to address this problem. A total of 6 miles of fence was constructed on Furnell, Jarina and Kingsbury Lake and Savik WPA's. In addition to fencing, periodic aerial inspections were initiated to monitor WPA's for grazing or other unauthorized uses. Most of the WPA's can be flown in a day, saving a substantial amount of staff time and hundreds of miles of driving.

Routine law enforcement patrols were conducted on a portion of the district during opening weekends of the waterfowl and upland game bird seasons. WM Sullivan worked private lands and WPA's in Cascade and Chouteau counties. Hunting pressure was light and no violations were detected.

I. EQUIPMENT AND FACILITIES

1. New Construction

This year's new construction efforts focused on a backlog of fencing projects. Approximately 6 miles of fence was constructed by force account and contract (Table V). Fences were built to reduce trespass grazing problems on four WPA's.

TABLE V

WMD Fence Construction in 1989

WPA	Length (miles)	Type
Furnell	1.60	Contract
Jarina	1.50	Contract
Kingsbury Lake	1.75	Contract
Savik	.25	Force Account
Jarina	1.00	Force Account

The district fencing contract was submitted to Contracting and General Services (CGS) for bid solicitation in May. After nearly two months of delays involving the Small Business Administration (SBA), a minority contractor submitted a bid that exceeded the engineering estimate by $ 15,000. We protested the matter and convinced SBA to let us go out on the open market. Contracts were awarded to three local contractors who completed the 4.85 miles of fence before freeze up. Considerable staff time was also spent on fence line staking, surveying, preconstruction meetings, delivering materials and follow-up inspections.

2. Rehabilitation

General fence maintenance is a never ending task on a district that includes some 65 miles of WPA boundary fence. Approximately 2 miles of fence was repaired on Savik and Kingsbury Lake WPA's during the year.

Ten nesting islands on the Sand's WPA were rehabilitated using the paddle wheel scraper from Charles M. Russell NWR. Engineering Equipment Operator Marko did an excellent job resurfacing the badly eroded islands while also deepening the surrounding moats to provide a more effective barrier to predators. Four of the ten islands were reseeded to DNC, with the remaining seeding to be completed next spring.

3. Major Maintenance

Several major clean-up projects were completed on three WPA's during the year. Approval was received from the SHIPO to proceed with the disposal of the Jarina WPA homestead. Nine buildings were burned/buried and some 12 tons of scrap iron was removed by Weismann's Salvage of Great Falls. The disturbed areas were resurfaced with topsoil and will be

reseeded to DNC next spring. Old corrals, grain bins and small junk piles were also buried on the Brown and Blackfoot WPA's. These projects eliminated a number of predator dens and improved the aesthetics of the units.

A major clean up project of the Jarina WPA homestead involved the burning and burial of nine buildings on the unit. Bio Aid Clarke Dirks looks on as the main house goes up in flames.
GLS 3/20/89

The project also involved the removal of nearly 12 tons of scrap iron from the WPA by Weismann's Salvage of Great Falls.
GLS 7/18/89

All building sites were resurfaced with stockpiled topsoil and will be reseeded to DNC next spring.
GLS 7/19/89

J. OTHER ITEMS

1. Cooperative Programs

A right-of-way request was received to install a small 12.4 KV powerline across the Brown WPA in Toole County. We convinced the local Rural Electric Cooperative to place the line underground where it bisects the WPA to minimize bird strikes on the unit. The request was approved and a right-of-way issued by the Regional Office.

Coordination continued with Fish, Wildlife and Enhancement (FWE) and the Montana Department of Highways on two proposed highway widening projects through the Blackfoot and Big Sag WPA's. Efforts to minimize the impacts to wetlands on the units include shifting the locations of existing roadways and steepening roadside fill slopes. Additional on-site mitigation may be necessary.

4. Credits

This report was written and typed by Sullivan, edited by Hultman and assembled by Benway.