MEDICINE LAKE NATIONAL WILDLIFE REFUGE
LAMESTEER NATIONAL WILDLIFE REFUGE
MEDICINE LAKE, MT.

ANNUAL NARRATIVE REPORT

Calendar Year 1980

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

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PERSONNEL

1.	Jay R. Bellinger, Refuge Manager	GS-12	PFT
2.	Steven W. Breeser, Ass't. Refuge Manager	GS-9	PFT
3.	Frances K. Larson, Refuge Assistant	GS-5	PFT
4.	Kermit E. Bolstad, Automotive Mechanic	WG-10	PFT
5.	John E. Snellman, Maintenance Worker	WG-8	FT - CS
6.	Carl S. Kampen, Maintenance Worker	WG-7	PPT
7.	Dennis C. Nelson, Motor Vehicle Worker	WG-6	PPT
8.	Ellen Lipp, Student Intern, Colo. St. University	6/1 - 8/31 - 1980	
9.	Mary Ann Bird, Student Intern, Colo. St. University	6/1 - 8/31 - 1980	

REVIEW AND APPROVALS

Jay R. Bellinger 2/13/81 Robert W. Ballou 3/13/81

Submitted by: Date Area Office Date

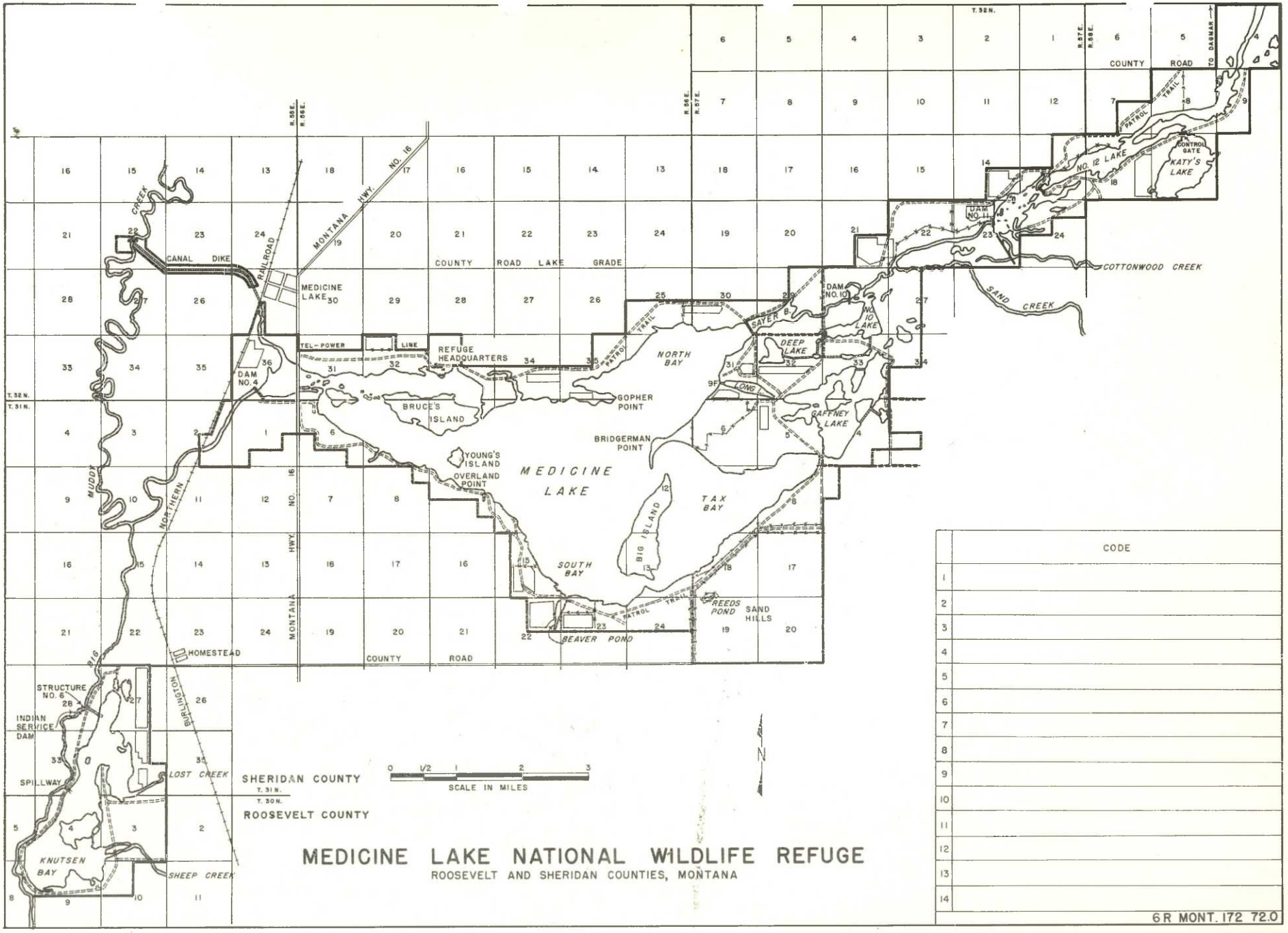
Gerald J. Wilson 5/11/81

Refuge Regional Office

SPEDY Summer Program

1. Robin Tischmak

2. Terry Tischmak



MEDICINE LAKE NATIONAL WILDLIFE REFUGE

ROOSEVELT AND SHERIDAN COUNTIES, MONTANA

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I. GENERAL

MDL-1980 C-R 10.2 Photo by S.W.B.

A sunrise before the storm.

A. Introduction

Medicine Lake Refuge lies on the southern edge of the last glacial moraine. It is superimposed over an old Missouri River channel formed when the Missouri flowed into Hudson Bay. Medicine Lake is located in extreme northeastern Montana, between the Missouri River and the Canadian Border. Vegetation is primarily of the mixed-grass prairie type with trees non-existent except in planted shelterbelts and along major river drainages.

The refuge encompasses 31,457 acres which includes 13,546 acres of open water and marsh, 14,354 acres of grasslands, and 3,557 acres of cultivated lands (primarily former croplands). Surrounding private ground is intensively farmed for small grains, mainly spring wheat and durum. The refuge lies within the rapidly expanding Williston Oil Basin, which is the most active basin in the lower 48.

Medicine Lake Refuge also administers the Lamesteer National Wildlife Refuge, which is a small easement refuge located in Wibaux County and the Northeast Montana Wetlands District which includes the three counties of Sheridan, Roosevelt, and Daniels.

B. Climate and Habitat Conditions

Weather conditions were good in respect to temperature but poor in precipitation. Winter weather was in sharp contrast to the 78-79 winter of record breaking cold. Very mild temperatures were experienced during the January to March period with record breaking 90 degree weather experienced in April. The low temperature for the year was -32 degrees on December 24th while the high temperature was 102 degrees on July 23rd.

The winter of 80-81 shows every sign of being as mild as that of 79-80. No sub-zero readings were recorded until the 1st of December which is very unusual. Snowpack at the end of the reporting period was only one inch.

Drought conditions from 1979 carried on into the first half of 1980. All of extreme eastern Montana was classified as a severe drought area. Total snowfall for the winter of 79-80 was only 13 inches which contributed very little run-off.

Although over three inches of rain fell in June, drought conditions were really not broken until August when significant rains fell. During a 10 month period from August 1, 1979 until May 31, 1980, this station only received 3.18 inches of moisture.

Precipitation for this year totaled 12.25 inches which is almost normal. However, well over half of this came after the 1st of August which was of limited value to the growing season. Snowfall to the end of December has totaled 17 inches but warm weather has left only one inch of snow on the ground.

Spring water elevations on the main lake started out 1.2' below operational level. With little contributing run-off, the lake elevation at freeze-up was 1940.28 or 2.74' low. Water deficiency in the spring was 14,872 A/F. Run-off for the spring totaled only 2,477 A/F which did little to help our water shortage. Water deficiency this fall has risen to 32,497 A/F and with no snowpack so far this year, we may be looking at the worst water conditions since the dust bowl days when the refuge was completely dry.

The ice went off the main lake on April 11th which was normal and the lake refroze on November 23rd which was two weeks later than normal.

The open winters provided excellent conditions for the survival of resident game. Pheasants and white-tailed deer which experienced winter losses during the winter of 78-79 never did concentrate in their usual winter ranges. The mild weather and lack of snow also permitted good oxygen conditions and no fishery loss was noted.

Water conditions for returning spring waterfowl were very poor and they worsened as the spring progressed. Small wetlands and marsh edges were dry throughout most of the refuge, drastically reducing critical pair habitat.

Dry soil conditions resulted in almost no growth of the cool season grasses. These same conditions proved harmful to our DNC plantings which sprouted but then wilted. Spring green-up never occurred until August. The good fall moisture will be beneficial to next spring's grasses but without ample snowfall for run-off, our water supply will be almost non-existent.

MDL-1980 C-R 8.3 Photo by S.W.B.

Fallout from Mount St. Helens

Although we are well over 1,000 miles from Mount St. Helens, the affects of the eruption were quite evident. At 4:00 P.M. on the afternoon of May 19th the volcanic ash cloud drifted over the area. The ash filled the air for approximately 36 hours and gave everything a dusting.

C. Land Acquisition

1. Fee Title

Nothing to report.

2. Easements

Nothing to report.

3. Other

Nothing to report.

D. Systems Status

1. Objectives

The only revision necessary for the refuge's output objectives deals with the Recreation-Wildlife consumptive program which is being impacted by an expanding fishery program. The objective calls for 4360 AH. During 1980 in fishing alone, we accumulated 7385 AH. Total outputs for this objective were 11,276 AH for the year.

2. Funding

The trend in O&M monies has been upward over the last few years (see Table I). However, this upward trend in funds has not kept pace with inflation. The percent of our budget required to meet fixed cost and salary for FY-78 through FY-80 was as follows: FY-78 - 85%, FY-79 - 86.3%, FY-80 - 82.5%. In FY-81, fixed cost and salary will "eat-up" approximately 92.6% of our annual budget.

TABLE I. Medicine Lake NW Refuge and Northeastern Montana Wetlands Funding for FY-76-81

Activity	FY-76	FY-77	FY-78	FY-79	FY-80	FY-81
1210	119,000	101,000	160,800	193,000	172,000	203,000
1240	1,000	2,000	2,500			
1240			15,000	15,000	12,000	10,000
1400		900	1,000	1,000		
1500	15,000	14,500				
3100	3,000		4,000			
6810			4,000	2,500	6,000	7,000
Total	138,000	118,400	187,300	211,500	190,000	220,000
BLHP		8,600	174,710	220,320	135,000	300,000
REHAB	15,000	50,000				

The BLHP funding resulted in several projects being accomplished as follows:

Water Facilities Rehab - PDW #3 - FY-79

Originally this package was funded at $212,000 and included raising three miles of the Homestead dike, rebuilding the diversion canal control structure, cleaning 3,900 cu. yds. of silt from the channel between the diversion canal structure and structure #1 and cleaning approximately 25,000 cu. yds. of silt from feeder canals in the Gaffney's,Deep and #10 lake areas. However, $75,000 of this project went to cover an overrun on Bowdoin Refuges' headquarters bid, $16,500 went for a design contract and $14,000 vanished into thin air. The $106,500 remaining in the project was enough to cover the Homestead dike renovation and the rebuilding of the diversion structure (poor design of this structure resulted in an add-on of $6400 which came out of the FY-80 Sayer Bay project).

Wetlands Fencing - PDW #11 - FY-79

Originally this package was listed at $134,700, however, YACC labor reduced the estimated cost to $67,000. The YACC camp folded before it got a good start and they were not able to build the 45 miles of fence included in the project (the camp did furnish most of the fence materials). A contract was issued for fence construction and we were able to build 36 miles of new fence (the refuge had to purchase $6,000 in materials out of O&M funds to finish the job).

Marsh Development - PDW #7 - FY-80

This project for the construction of the Sayer Bay dam originally contained $190,000. However, engineering took $31,000, the add-on for the diversion structure took $6400 and $17,600 had vanished by the time the bids were opened. The $135,000 that remained was not enough to cover the low bid of $195,000. The project is now being redesigned to bring the cost down and will be let in the spring of 1981.

II. CONSTRUCTION AND MAINTENANCE

A. Construction

Three BLHP projects were completed during the calendar year. One of these projects (wetlands fencing) will be reported in the wetlands narrative.

Two projects were completed this year which dealt with our water facility rehabilitation plan. The west dike along the Homestead Unit was upgraded and leveled for a distance of 17,500 feet. The roadbed on top of the dike was raised an average of one foot along

the entire length. The road surface was then covered with four inches of gravel. In addition to the dike work, a 200 foot emergency spillway was placed on the south end of the project to handle flash flood waters which enter the Homestead Unit.

The refuge's main water diversion structure was also repaired this year. The original structure was built in 1957 to control inflow water from the Big Muddy Creek. Its primary purpose was to by-pass silt laden waters from entering the refuge. However, the top of this structure was 18" lower than the top of the spillway on the main control dam - so it was in effect quite useless. With BLHP monies we were able to add an additional four feet to the diversion structure and we now feel it will serve its purpose.

MDL - 1979 C-R 8.11 Photo by S.W.B.

Diversion Structure Before Addition

MDL - 1980 C-R 11.5 Photo by S.W.B.

Diversion Structure After 4' Addition

One main project, the Sayer Bay Dam, was not started because of a lack of funds.

MDL - 1979 C-R 8.14 Photo by S.W.B.

Homestead Unit Road and Dike Before Rehabilitation

MD1 - 1980 C-R 12.12 Photo by S.W.B.

Same Picture After Dike Work

The refuge finally received its main entrance sign from the National Sign Shop. The stone masonry base had been completed the previous year under local contract. In looking at the sign, it's hard to believe the four pieces of wood cost more than the base. The sign cost $1,400 and the base cost $1,300.

MDL - 1980 C-R 3.19 Photo by S.W.B.

Our new main entrance sign.

Force account construction work included building two new nesting islands and rehabilitating the old nesting islands in #11 lake. The old islands were built by the CCC in the late 30's and were not high enough to withstand spring flood waters. Approximately 1,650 cubic yards of dirt and rock were utilized in this project.

In an attempt to duplicate the phenominal nesting success of the island on Miller's Lake in North Dakota, we started building a two-acre island in Katy's Lake. Our object was to create a similar island located in similar surroundings. As with almost all of our island construction, the work is done in winter on top of the ice. We waited for the ice depth to reach 30" before starting work. The island was to be approximately 300'x300'. The 1st row on one side had been completed when it slowly started settling. By the next morning the dirt had settled to the bottom of the lake and

the ice had actually bent with the weight - not a drop of water came into the depression. It was obvious that 30" of ice wasn't enough support for 150 tons of dirt and rock. The project has been delayed pending a very cold winter.

MDL - 1980 B&W 1.17 Photo by S.W.B.

Did you ever see ice 30" thick bend??

Major rehabilitation projects were necessary on a number of water facilities. Reed's Pond, which is located in our wilderness area,was rebuilt after tentative approval of the Wilderness Management Plan. The job required over 200 cubic yards of clay to plug a washout in the dam which occurred in the spring of 1979.

Bank stabilization was completed along an 800 yard section of the Diversion Canal. This is a continuing effort which will always keep us busy during our slack periods. The stretch finished this year required 1,750 cubic yards of rock and we still have a mile and one-half to complete.

A 150 yard stretch of road along Sayer Bay was raised an average of two feet and graveled. This stretch of road was subject to overflow each spring from a small coulee. This overflow made the road spongy enough that heavy equipment couldn't go over it.

B. Maintenance

Minor rehabilitation of existing facilities included the refacing of a coulee dam with clay in Andreason's pasture in an effort to stop water seepage, the installation of new water guages at M.S.L. on all water impoundments, the placement of a trickle culvert in the road crossing Lodahl's Coulee, and the digging of a stockwater dugout in Rueter's pasture.

A rock fence, consisting of large boulders individually placed, was built around the recreation area to keep vehicles on the trail and off the surrounding hillsides. These rocks stopped the problem and look aesthetically pleasing.

The office-shop building and two residences received extensive remodeling during the year. The office-shop building is your common everyday, cinder block, 4-stall refuge building. Two of these stalls were enclosed, insulated, and paneled. The energy savings from this project itself is expected to pay for the expense in one year's time. These two stalls will become office space and double as a conference room.

The manager's residence (Quarters #1) had the dining room closet removed, the dining room ceiling lowered, one bedroom ceiling lowered, part of the hallway was made into a closet, and a wood burning stove was installed.

General maintenance was carried out on 32 miles of improved refuge roads and over 77 miles of boundary fence. Twenty miles of boundary was reposted with new refuge signs in our continuing effort to update the signing.

Equipment breakdowns are a very serious matter when you are attempting to complete objectives. In 1979, every piece of equipment broke down at least once. However, during 1980, we had much better luck. Listed below are major equipment repairs completed during the year:

1964 International 2706 tractor - replaced rear engine seal, checked rods and bearings.

1978 Dodge 4X4 pickup - Pulled and repaired starter, replaced temperature sending unit, overhauled front wheel bearings, replaced front power shaft, trunion and rear seal.

1966 GMC 5yd dump - replaced complete wiring harness, (Had to build the harness because they didn't make them anymore).

Aircat Airboat w/200 hp Lycoming engine - complete overhaul of engine and replacement of engine block.

TD-14 crawler tractor - welded hair-line crack along transmission case.

C. Wildfires

Nothing to report on the refuge but it should be mentioned that there were a great number of wildfires in eastern Montana during the year. One fire near the Glendive area burned over 86,000 acres in two days. This fire was fanned by 40 mph winds and jumped the Yellowstone River which was at least 200 yards wide at that point.

III. HABITAT MANAGEMENT

A. Croplands

The refuge carries out a cooperative farming program on 731 acres. The program has seven permittees but one retired during the year. The 47 acres which this individual farmed has been withdrawn from the program and will be planted into dense nesting cover (DNC).

Since precipitation is in short supply and weeds are a real problem, the common farming practice is crop rotation with summer fallow. The majority of the grain crop grown in this area is wheat and barley with sunflowers just starting to make their appearance.

On the refuge, total grain plantings consisted of 354 acres while 377 acres were summer fallowed.

TABLE II. REFUGE CROP UTILIZATION

Crop	Acres Planted	Permittee's Share	Refuge Share	Use of Refuge Share	
				Left in Field	Harvested
Spring wheat	253	187	66	51	15
Barley	101	49	52	52	0
TOTALS	354	236	118	103	15

Because of drought conditions, yields were significantly down but varied considerably depending on planting dates and depth of planting. Some fields in the area produced over the county average while an adjacent field planted a week to ten days later yielded almost nothing. The fifteen acres of harvested wheat on the refuge produced 295 bushels or just short of 20 bushels/acre. This was a 20% production loss from 1979. By using the 20 bushel figure, the farming program produced about 62 tons of food that is left standing for wildlife consumption.

The grain left for wildlife is always totally utilized. This year, all standing grain disappeared before the end of the year which is

unusual. We felt that the drought probably contributed to this because there was very little natural seed production or grass growth.

Migrating waterfowl, mostly mallards, fed heavily on refuge crops in the Long Lake and Lake Creek Flats area. All of the grain in these fields was totally utilized before freeze-up.

Our present farming plan presently utilizes the same farmfields year after year. In the near future, we will be rotating croplands with DNC fields which need rehabilitation and the croplands will be planted into DNC. By using this approach, fertilzers and herbicides should be kept to a minimum.

The initial part of the refuge's 4-year DNC program was completed this year. With the breaking of 350 acres of crested wheatgrass fields, we are finishing up the conversion of 1265 acres of low potential grasslands into DNC. Our DNC mixture includes 8 lbs. intermediate wheatgrass, 2 lbs. Ladak alfalfa, and 1 lb. yellow-blossum sweetclover per acre with 10 lbs. of barley for a first year nurse crop.

Spring planting of DNC was completed on 150 acres which had initially been broke in the spring of 1978. There was enough moisture in the soil to sprout the seed but prolonged drought until June hurt the plantings. An analysis will have to be conducted in the spring of 1981 to see if replanting will be necessary.

To take advantage of fall moisture and hopefully next springs moisture, an additional 100 acres were fall seeded. This will leave 525 acres to be seeded in the spring of 1981 and 350 acres to be seeded in 1982 when the DNC conversion program will be mostly completed.

In addition to the planted DNC, we have hundreds of acres of former hay lands - mostly old alfalfa and brome fields. Many of these old fields have been encroached with crested wheatgrass and others have declined in vigor. After talking with Ken Higgins (NPWRC), we decided to try some scarification treatments as an alternative to completely rehabilitating and reseeding these run-down areas. A trial field was selected in 1978. Half of this field was fall spiked. The results in the spring of 1979 were very encouraging as both vigor and height/density readings increased. Robel readings taken in the spring of 1980 showed an average height of 2.35 decimeters in the unspiked portion while a reading of 3.26 decimeters was the average for the spiked portion.

In the spring of 1980, an 80 acre alfalfa field was spiked. In addition, 175 acres of crested wheat invaded alfalfa fields were hayed in July under emergency haying provisions and then were spiked. The abundant fall moisture encouraged alfalfa growth and results look promising.

MDL - 1979 Photo by Ken Higgins

Old alfalfa field showing increased vigor (right side) after scarification.

During this calendar year, robel height/density readings were established on all DNC and former hayland fields. By collecting the data on these fields, we will be able to determine when they will be candidates for rehabilitation. The lines were set with fixed starting and ending points so the data will come precisely from the same area each year. Average readings ranged from a high of 4.98 decimeters to a low of 1.72 decimeters with an overall average of 3.04 decimeters.

B. Grasslands

Although the grassland management plan has not yet been completed, enough work has been done on collecting information that some techniques are going to be implemented in the spring of 1981.

With over 14,000 acres of grasslands on the refuge, of which more than half is native prairie, it was imperative that we start taking a closer look at this habitat. Since these grasslands evolved under a fire and grazing system the plan will incorporate both, either singly or in combination.

The refuge has been broke up into different habitat units separating various grass communities from each other. Each one of these units was sampled by the S.C.S. in a range-site and condition survey. The information collected from this

recent survey compared to the climax vegetation tells us what species have to be increased (or decreased) and how bad the area has been invaded by exotics.

The invasion of exotics, primarily crested wheatgrass and to a lesser extent Canada and Kentucky bluegrass, is a major grassland problem. The crested wheatgrass and Canada bluegrass are invaders of the drier upland sites while the Kentucky bluegrass is limited mainly to the wetter sub-irrigated areas.

The problem of working with crested wheatgrass has been studied very little and what work has been done indicates that it may be a problem that isn't easily solved. We had planned on burning some crested areas this spring but the early drought held back even this persistant grass and conditions were never favorable for fire. Both fire and intensive early season grazing will be utilized on sample plots in the spring of 1981.

Five separate areas have been set aside for intensive spring grazing in 1981. Three of the areas have old crop fields within them which are almost 100% crested. One area has an encroachment of crested into native grasses and the other area has encroachment of Kentucky bluegrass in native grasses. The planted crested fields were hayed so that the first growth of crested would be easily accessible to the cattle.

The first year will be more or less experimental. The grazing season will be 5 weeks long - starting no later than the last week in April. The stocking rate will vary with each area depending upon the forage which is annually produced. The forage was calculated from clipping samples. Generally, about 2/3 of crested wheatgrass growth occurs during the first five weeks of the growing season. The grazing rate will average about 1 cow/calf pair per acre.

Two of the five areas will be surrounded by electric fence to keep the animals concentrated on the problem areas. The other three areas are located in larger pastures but we feel that the cattle will concentrate on the crested wheat areas because they are the first to green-up.

In addition to the control areas set up on the refuge, two crested wheatgrass fields were hayed in existing grazing allotments (Homestead and Gaffney Lake). By removing the residual crested wheatgrass we are attempting to make the new growth more readily available and attractive during the early part of the growing season. This will concentrate the cattle on these areas and hopefully resting the remainder of the pasture.

A haying program was carried out on the refuge for emergency drought relief. However, all the areas hayed were scheduled for cutting because of our grazing and scarification programs. A total of 525 acres were hayed by 12 permittees. Of this total, 350 acres were

crested wheatgrass and 175 acres were an alfalfa and crested combination. There were 291 tons of hay removed at a cost of $3,283.00. The price per ton was $8.00 for crested and $15.00 for the alfalfa.

Season long grazing on the refuge was cut further this year in preparation for implementing the grassland management plan. Two permittees were dropped through attrition. During CY-80, seven permittees grazed 230 head of cattle for a total of 919 AUM's. A rate of $5.88 was charged per AUM for a collection of $5,406.00. The grazing rate should have been $6.40 but was limited by the presidents 7% rate increase. The grazing acreage decreased from 6,350 acres in 1979 to 5,800 acres this year.

Range conditions could only be described as fair to poor. Cool season grasses barely had enough moisture to start before they dried up. Warm season grasses got a slight boost from June rains but quickly dried up as drought conditions returned in July. August rains brought the first real green-up to the rangelands. Above average moisture throughout the fall will provide a good start for grasses in the spring of 1981.

Robel height-density readings were continued on native grasses both in grazed areas and idle areas. Readings from 10 selected areas showed an increase from .86 decimeters in the spring of 1979 to an average of 1.01 decimeters in 1980. This increase is due mainly to the lack of snow cover during the 79-80 winter rather than to the vegetative growth during 1979. Since there was no snow pack, lodging did not occur resulting in higher readings.

In comparing grazed versus idle areas in native grass, from 1979 to 1980, robel readings increased from 1.03 to 1.30 decimeters for a 26% increase in idle areas while the grazed areas increased 11% from .79 to .88 decimeters.

C. Wetlands

After near record water flows in 1979 (98,000 A/F) the spring flows of 1980 showed the affects of our drought. Only 2,477 A/F of water entered refuge impoundments and we felt lucky to receive that amount. Our main tributary,the Big Muddy Creek, contributed 1,560 A/F, all of which went into Medicine Lake. As this lake contains 8,700 surface acres, this run-off was not significant. Only two impoundments were filled to operational level, #10 Lake and #12 Lake. Cottonwood Creek, which is a main tributary for the eastern edge of the refuge flowed only 48 A/F and the two tributary streams for the Homestead Unit contributed a combined total of 1/2 A/F!!

Since the Homestead Unit is one of our best production areas, we released 775 A/F of water from Medicine Lake to bring that unit's water level up by half a foot. This provided enough water for pairing and early brood habitat but by mid-July the area was 1/3 dry and by freeze-up the lake was 2/3 dry.

MDL - 1980 C-R 12.20 Photo by S.W.B.

The lower end of Homestead Lake was completely dry.

Gaffney Lake, which covers 450 acres, received no spring run-off and was four feet below operational level at freeze-up. This lake actually became three lakes as submerged land bridges were exposed for the first time since the water control structure was built in the late 30's. Very few broods were observed on this lake as all of the protective vegetation along the shorelines and in the shallow bays was left high and dry.

Lake Creek Flats and #10 flats were dry throughout the spring. Both of these areas contain hundreds of shallow depressions which normally provide excellent pair and brooding habitat.

Low water in the Katy's Lake impoundment left our largest earred grebe nesting colony high and dry. The grebes normally utilize the bullrush and sedge in one of the eastern bays.

The two lakes which were filled during spring run-off provided abundant submerged vegetative growth, mainly sago pondweed and coontail. Both of these lakes also contained extremely high invertebrate populations.

All of the waters on the refuge produce extensive amounts of filamentous green algae during the summer and fall periods. Minor blue-green algae blooms were noted on Medicine Lake during August.

Water chemistry readings were initiated on all refuge impoundments and all tributary streams this year. Salinity readings in parts/1000 and conductivity readings in micromhos/centimeter are taken with a YSI Model 33 S-C-T meter. Readings were taken in March before ice-out and then again in December after freeze-up in the impoundments. Even though very little fresh water was received and evaporation rates were high, the salinity only increased from 1.1 to 1.5 in Medicine Lake while the conductivity went from 1510 to 1600. Those lakes which received spring flow showed a corresponding drop in readings. The freshest lake on the refuge, #12 Lake, went from a salinity reading of 1.2 down to 1.0 while the conductivity went from 1600 down to 1300.

The highest salinity readings on the refuge were in Homestead Lake and Katy's Lake which had readings of 8.0 and 6.0 respectfully.

D. Forestlands

The main shelterbelt around refuge headquarters continues to provide excellent food and cover for resident game and migrating passerines. Russian olive and carragana trees provide food for pheasants, sharp-tailed grouse, and Bohemian waxwings. Warblers and sparrows utilize the cover during spring and fall migrations and mourning doves concentrate in the thickets for nesting. The shelterbelt also provides winter cover for deer and pheasants.

E. Other Habitat

Nothing to report.

F. Wilderness and Special Areas

The Wilderness Plan was submitted for approval in December 1979, to date, it has not been approved by the Regional Office. Major management provisions would allow us to use motorized equipment for disease control (botulism), prescribed burning on the larger islands for grassland management, maintenance of water facilities in the Sandhills Unit with motorized equipment, and water level manipulation within the main lake.

Approval was granted from the area office for the use of motorized equipment this year when a botulism outbreak occurred around a series of islands and also for the rebuilding of Reed's Pond.

The Medicine Lake Wilderness Area comprises 11,366 acres which takes in all of Medicine Lake east of Montana State Highway #16 and the 2,320 acre Sandhill Unit. Included along with the lake are all of the islands within it.

A bottleneck seems to have developed over the presence of windmills within the Sandhills Unit. Without the windmills, we can't effectively manage the grasses through a grazing program since they provide the only water within the interior of the hills. Prescribed burning could possibly be used but is a poor alternative because the hills are made up of fine sands and the complete removal of the vegetative cover could prove disastrous.

The entire wilderness area has been designated a Class I area under the Clean Air Act. In cooperation with the University of California-Davis we maintain an air monitoring station which collects fine particulate matter. The results of this study should show the affects of the drought on non-point pollution and also the affects of a new electric coal generating plant in Coronach, Saskatchewan. This plant came on line in the fall of 1980. We have been maintaining the station since the summer of 1979.

G. Easements for Waterfowl Management

Nothing to report.

IV. WILDLIFE

A. Endangered and/or Threatened Species

Medicine Lake Refuge is a stopover place for three endangered species during their migration - the whooping crane, northern bald eagle, and Arctic peregrine falcon.

All of Sheridan County, within which most of the refuge is located, has been designated as critical habitat for the whooping crane because of the numerous sightings which have occurred in the area. However, sighting the whoopers is a hit or miss operation. In 1979 we had 7 whoopers stop but in 1980 none were seen. With the large expanse of rolling country that surrounds the refuge, it is very probable that the whoopers sometimes stop and we never see or hear of them.

The northern bald eagle is seen nearly every spring and fall. Dead fish, primarily carp, attract the eagles in the spring, while fish and crippled waterfowl attract them in the fall. Eagles were observed along the south side of the main lake and the Homestead unit during spring and around the main lake and Gaffney Lake during the fall. A peak population of six bald

eagles was observed in both the spring and fall periods with a total of 149 use days recorded.

Peregrine falcons also make brief appearances during spring and fall migration. A single bird was observed the first part of May and again in mid-September flying over the Homestead Unit.

According to the PPBE Handbook, we have five threatened bird species which inhabit or visit the refuge. Two of these species, the western burrowing owl and ferruginous hawk, are known to nest on the refuge and both were confirmed nesters during 1980.

A single osprey was observed flying over the refuge in the Katy's Lake area during August.

Prairie falcons are commonly seen hunting throughout the refuge all year round. During the month of January, four sightings were made from just casual observations.

One new species was added to the list in 1979 but was not reported in the last narrative. Nine white-faced ibises were present for a three week period on the Homestead Unit. This was a first time sighting for the refuge. None were seen during 1980.

B. Migratory Birds

1. Waterfowl

Returning spring waterfowl were right on schedule. A small flock of 15 Canada geese was first sighted on March 15th and the first ducks (mallards and pintails) were spotted on March 18th.

The main spring migration began the 1st week of April and peaked the 3rd week of April at 53,500 ducks. Lesser scaup made up almost half of this total (22,300). This spring's duck peak was 75% higher than in 1979 but still shows the downward trend that has been experienced for the last six years.

The Canada goose migration peaked the first week of April when there were 3,130 present on the refuge.

One note of special interest was the presence of two pair of wood ducks. One pair was observed on the diversion ditch on 5/1 and another pair was observed during pair counts on 5/22 along the creek channel just north of Lake Grade Road bridge.

Goose production was adversely affected by low water levels. Many of the nesting islands used by the Canada's were left high and dry, especially in the Homestead Unit. In the Sheep Creek bay alone, there were 12 islands that were not utilized. Total nests in the Homestead Unit fell from 41 in 1979 to 23 in 1980.

The fact that these islands were not utilized this year but had been used previously shows the importance of a secure nesting site for geese. Out of the 208 nests actually counted, only two were not located on islands or muskrat houses.

Overall goose nesting dropped from 270 nests in 1979 to 239 nests this year or a 12% decrease.

TABLE III Five Year Summary of Canada Goose Nests by Area

AREA	1980	1979	1978	1977	1976
Homestead	23	41	35	12	15
Main Lake					
Gull Islands	8	13	23	9	6
McDonald's Island	2	9	12	0	4
Bruce's Island	7	6	9	2	6
Young's Island	14	16	50	29	13
Big Island	53	38	22	63	39
Remainder of lake	3	8	7	3	11
Gaffney Lake	15	18	20	12	18
#11 Lake	45	58	34	39	22
#12 Lake	24	16	10	4	9
Katy's Lake	3	4	14	6	4
Remainder of refuge	11	8	8	6	5
TOTAL	208	235	244	185	152
15% Expansion Factor	31	35	37	28	23
Total Goose Nests	239	270	281	213	175

An actual ground count of goose nests was initiated on Young's Island this year because a brush overstory makes it difficult to aerial census. The aerial count revealed 14 nests while the ground count revealed a minimum of 34 actual nests or an increase of 143%. Young's Island has 17 acres of upland so it is easy to cover. Another island which has woody overstory is Big Island. This island however, is over 200 acres in size and is not feasible to ground count. The ground count on Young's Island shows that our 15% expansion factor is not excessive.

Out of the 18 new and rebuilt islands in the #11 lake area, eight had goose nests. This lake now contains 40 man-made islands along with three natural ones and is consistantly one of the highest goose producing areas.

Nesting cover for returning ducks was in good condition but available water areas were much reduced from 1979. The numerous small wetlands which are necessary for a good production year were completely absent. Refuge pair counts showed an increase which was expected because of the drought. However, production was down significantly for one of those unexplainable stress related problems which is encountered when you have too many ducks competing for available pair habitat.

Our production is based solely upon pair count data taken from a 20% sample of the entire refuge. Brood/pair index information was dropped from the computations because of the high variability that we encountered in aerial brood flights. This year however, being a severe drought year, we had an abnormal variable thrown at us which raises havoc with our computations. A single early brood flight (June 30) has been continued over the entire refuge to give trend data. We used the percent reduction from this count to figure the percentage drop in our production. This isn't quite hoyle but its the only yardstick we had to use. Actual broods counted dropped from 517 in 1979 to 381 in 1980 for a decrease of 26%. We know from personal observations that the number of broods were down significantly from what they should have been.

We normally figure production from our pair counts by using an average productivity rate of 45%. The average ducks to flight stage/brood are taken from Hammond and Kortwright. This years figures will show the 26% reductions.

TABLE IV. Waterfowl Production Summary

Year	Total Duck Pairs	Production Ducks	Total Pairs Nesting Geese	Production Geese
1980	13,949	31,239**	239	956
1979	11,911	33,125	270	1,080
1978	11,307	31,531	281	1,124
1977	11,953	32,987	213	852
1976	10,660	13,419	175	700
1975	8,730	32,557	240	960
1974	6,470	13,935	134	550
1973	*	20,464	236	944
1972	*	10,591	112	448
1971	5,635	15,849	152	608
1970	4,220	11,394	122	488

* Pair counts were not taken
** Reduced by 26% because of drought

Lesser scaup and canvasbacks faired quite well for the year but redheads declined mainly because of the loss of their habitat in the Homestead Unit. Pintails were not only down in production but were conspicuously absent during spring migration. Gadwalls were the only puddle ducks which showed a strong increase for the year.

TABLE V. Duck Production to Flight State by Species

Species	1980	1979	1978	1977	1976	1975	1974	1973
B-W Teal	1980	8792	7368	5705	3619	9250	4000	4288
Mallard	5185	4702	3194	5166	2820	3875	2240	4490
Pintail	1924	4420	2717	2838	708	1900	900	1040
Gadwall	4672	3603	4641	5772	1890	3980	2825	5725
Shoveler	2346	3359	4471	6852	1350	5105	2300	2884
Lesser Scaup	4575	2577	3872	1926	1092	2120	300	840
Redhead	1471	2142	1570	744	558	1140	500	188
Am. Wigeon	1879	1457	1480	1656	330	1220	600	404
Ruddy Duck	752	812	1586	384	488	1640	90	176
G-W Teal	1273	724	262	1378	294	340	100	225
Canvasback	702	405	270	565	230	630	80	204
Bufflehead	20	61	100	--	40	85	--	--
C. Teal	21	30						
R-N Duck	51	27				45		

MDL-1980 C-R 9.3 Photo by S.W.B.

Canvasback nest located on #10 Lake

MDL-1980 C-R 7.5 Photo by S.W.B

Coot nest located on #12 Lake

A major botulsim outbreak occurred on the main lake (Wilderness Area) during the month of August. After several dead ducks were noticed washed up along the south shoreline, we started picking up birds daily along the main lake by walking. However, we could never see the light at the end of the tunnel with over 30 miles of shoreline. We finally got approval to use an airboat on the main lake which greatly facilitated our pick-up methods.

The outbreak was tied to the water areas around colonial bird rookeries and was no doubt directly attributable to the natural death of birds in these colonies. Young pelicans and cormorants that are sick or diseased must seek out water before they die because the majority of these dead birds will be found along the beach. Before long these rather large birds are nothing but a hot, foaming mass of maggots which loafing waterfowl find to be a delicacy. The botulism bacteria is ever present and only needs an anerobic media like this in order to grow.

By the time we got the outbreak under control, we had picked up 1800 waterfowl, mainly ducks, and estimated a total loss of 2000 waterfowl.

This was the first year in which a loss of geese could really be attributed to botulism. Eighteen Canada geese were picked up - three of which we banded as young birds during July and two of which were neck banded. A return on one of the neck banded birds showed it had been banded in July of 1977 as a young bird near Marsh, Montana, by the Montana Dept. of Wildlife and Parks.

The birds were easy to spot along the gravel shorelines and without vegetation to hamper our efforts we were able to clean up almost 100% of the carcasses. Two trips were necessary to clean up additional dead pelicans after the primary outbreak had ceased.

Fall migration of ducks was almost non-existant this year. Ruddy ducks and shovelers made up the bulk of the migration and they moved through this area quite early. A peak duck population of 94,335 birds was reached during the last week of September. Populations steadily declined throughout October and early November even though there was favorable weather. This small fall flight would indicate reduced production from the Canadian prairies.

The mallard build-up reached only 19,500 birds which was 30% less than 1979. The biggest reduction was noted in lesser scaup which fell from 33,000 to 5,800 or a reduction of 82%.

Goose migration peaked during the 1st week of October at 2,890 birds. Of this total, 2,110 were white-fronts, 760 were Canadas, and 20 were snows.

MDU-1980 C-R 10.9 Photo by S.W.B.

This cannon net shot on Bridgeman Point netted 56 Canadas.

MDL-1980 C-R 10.6 Photo by S.W.B.

From the look of determination - this must be an adult.

TABLE VI. Comparison of Peak Duck Populations and Total Duck Use-Days

Year	Spring Duck Peak	Fall Duck Peak	Total Duck Use-Days
1980	53,500	94,335	14,143,050
1979	30,686	86,246	11,857,950
1978	35,934	64,355	8,532,810
1977	46,960	167,781	11,668,993
1976	38,813	36,012	7,446,270
1975	34,020	127,300	9,247,800
1974	156,024	184,350	18,301,200
1973	83,600	206,000	21,120,810
1972	109,000	235,200	15,896,940

Coot production dropped this year mainly as a result of dry conditions in the Gaffney Lake and Homestead Units. Estimated production fell to 1,057 birds to flight stage. This figure represented a 47% decrease from 1979.

Whistling swan populations also took a nose dive during migration. A peak population of 580 was recorded the 4th week of October. These swans have been steadily increasing in this area and last year we had a peak of 1,752 birds which was the highest count ever made. Water conditions because of the drought may have shifted the swans out of this area.

Waterfowl banding objectives were finally met this summer. Our mallard quota calls for 500 birds (250 were to be banded of each sex). We banded a total of 741 mallards, the additional mallards were banded so that the eastern Montana quota could be reached. The classification of birds by age and sex included: 206 AHY-M, 323 AHY-F, 70 HY-M, and 142 HY-F. In addition to the mallard banding, we banded 132 Canada geese from the refuge flock, 57 of these birds were young of the year.

2. Marsh and Water Birds

Medicine Lake has always been well known for its colonial nesting birds. The refuge is home for one of the largest white pelican rookeries left in the United States. Production in the rookery returned to previous levels after suffering a severe setback in 1978 when it was harassed by predators. During 1978 only 60 birds were fledged. Last year the colony made a strong comeback with 660 birds produced and this year we had a total of 2,450

pelicans fledged. The whole rookery is actually separated into four distinct nesting colonies. The north point colony produced 1,080 young, the north point colony #2 produced 950 young, the central colony produced 170, and the west shore colony produced 250 young.

Double-crested cormorant rookeries were completely censused this year. The cormorants nest on Big Island in conjunction with the pelicans and also on a very small island called Gull Island. The colonies on Big Island fledged 480 birds and the colony on Gull Island produced 419.

Great blue herons also maintain rookeries on Big Island and a few nest on the highway islands. A total of 85 active nests were counted on Big Island while the few nests on the highway islands produced 19 young. We had an estimated production on the refuge of 170 birds.

Other marsh and water birds which nest in significant numbers on the refuge include horned grebes, earred grebes, western grebes, pied-billed grebes, black-crowned night herons, American bittern, Virginia rails, and Sora rails

We still have a lot of ground work that has to be accomplished before we locate all of the different nesting colonies which exist in this area.

TABLE VII Marsh and Water Bird Production

Year	White Pelicans	D-C Cormorants	G. Blue Herons	Horned Grebes	Earred Grebes	Western Grebes
1980	2,450	899	170	60	650	400
1979	660	210	50	60	900	400
1978	60	80	40	60	800	400
1977	830	140	50	100	500	500
1976	3,050	324	51	150	1,350	600
1975	1,180	80	12	*	*	*
1974	2,300	200	55	100	250	400
1973	2,400	200	55	100	450	1,000
1972	1,700	350	90	100	500	1,100

* No data available.

3. Shorebirds, Gulls, Terns, and Allied Species

The refuge has large colonies of ring-billed and California gulls that nest on the highway islands. Production this year, based on an actual count, included 600 California gulls and 2,100 ring-billed gulls. These gulls nest on three small islands which collectively total about one acre in size.

Other nesters include the common tern, black tern, Wilson's phalarope, and avocets. All four of these species nest in large numbers but no data has been collected on their production. Common terns are known to nest on Gull Island and many of the man made islands in the Homestead Lake. Avocets nest in large numbers on many of the exposed sandbars. In one confined area on Big Island which measured about 40' by 10', we counted seven avocet nests.

Although Franklin's gulls are not known to nest on the refuge, they stage here in large numbers before heading south. By mid-August, we had over 26,000 Franklin's on the refuge. These birds were feeding primarily on midges and grasshoppers.

In late May, a pair of long-billed curlews were seen on the south-east side of Gaffney Lake. These birds are rarely seen on the refuge but they have been listed as nesting just five miles south of the refuge. Although not confirmed, we have reports from reliable observers that they do indeed nest in this area.

4. Raptors

Common nesters include the marsh hawk, Swainson's hawk, great horned owl, and western burrowing owl. Other raptors which nest in smaller numbers include the ferruginous hawk, red-tailed hawk, and short-earred owl.

This year for some reason, there was a complete absence of nesting short-earred owls. In 1979, there was a minimum of 20 nesting pairs on the refuge and this year we didn't locate one nest. We didn't even see any of these owls until later on in the fall. Why these birds were absent is not known but again the drought probably had an affect.

Migratory visitors include the goshawk, rough-legged hawk, kestrels, snowy owls, and sharp-shinned hawks.

5. Other Migratory Birds

The mourning dove is a very common nester in the headquarters shelterbelt and in the scattered tree groves around the refuge. Estimated production for the refuge was 440 birds. Nesting densities of these birds may be much larger than we estimate. In some areas of the refuge,such as Gopher Point and the Barsness Pond, there seems to be a dove nest in almost every tree.

The refuge is a virtual paradise for ground nesting sparrows and longspurs. Avid birders come from all over the United States to observe such species as the Baird's sparrow, LeConte's sparrow, clay-colored sparrow, McCown's longspurs, and chestnut-collared longspurs. They also come in search of the elusive Sprague's pipit which is supposed to inhabit this area.

C. Mammals, Non-migratory Birds and Others

White-tailed deer are the only big game specie currently found on the refuge. We had a resident herd of antelope until the winter of 1978-79 when they died of starvation. We have had reports of mule deer and elk but they are transients from other areas.

The deer herd is larger than we would like to carry and is getting larger each year. The winter range is the only limiting factor for the herd. The last winter and this winter have been extremely mild and have kept many of the deer from crowding into this habitat. Because there has been less pressure on the traditional winter range, it has recovered to a degree. However, the winter range is still too small to handle the size of the deer herd.

In winters with moderate to heavy snow accumulation, approximately 75% of the refuge and surrounding area deer herds concentrate in the sandhills. The sandhills area covers about 20 square miles of which four square miles are located on the refuge. Out of the total area in these hills, only about one-third of the acreage has heavy enough brush to provide food and cover.

The number of actual deer counted from aerial flights by State Biologist Ron Stoneberg has risen from 880 in 1976 to over 1400 this winter.

During the last harsh winter (1978-1979), the winter kill was estimated at 10% of a then much smaller herd (approximately 765 head).

Because of the limited amount of available winter habitat, we initiated browse analysis surveys in 1977. In the spring of 1977, we found that over 73% of the browse had been utilized. This survey followed a rather severe winter. In the spring of 1980, which followed a very mild winter, we found that 29% of the browse had been utilized.

This analysis will have to be modified in winters of heavy snow because much of the browse is not available due to snow coverage.

Besides the overbrowsing that is occurring on the woody plant community in the Sandhills Unit, we have also noticed significant damage showing up in DNC plantings. Many of the DNC fields provide excellent cover for white-tails. Moderate to heavy damage, mainly in the form of trails, has occurred to DNC stands in the Beaver Pond area, Katy's Lake area, and headquarters area. These deer trails act as predator lanes which are reducing the effectiveness of this cover for nesting.

This year's winter count of 1,420 deer represented a 41.4% increase over the winter of 1979-80. This is the highest deer count ever recorded on the refuge. With the mild winter which we are having during 1980-81 the count may reach close to 2,000 head by next fall. With a tough winter we can see the handwriting on the wall.

The importance of the refuge and adjacent sandhills for winter range can be seen when comparisons are made between fall and winter counts. A late October flight (pre-hunting season) conducted by State Biologist Stoneberg, showed a total of 790 deer in the area, this same flight coverage in January, 1981 showed 1,420 deer (and this is an extremely mild winter).

The October flight revealed a ratio of 114 fawns/100 does which was a 29.6% increase over the 1979 flight. Twin fawns are the rule in this area and in a good year triplets are more common than single fawns!!

Natural predation by coyotes on the deer herd has always been minimal and probably never will be a limiting factor in this part of the state. High fur prices have kept their populations very low.

The major problem that is encountered in controlling the refuge deer herd is that of removing enough animals every year through hunting. We do not have enough hunters living within the area to result in an adequate harvest. In cooperation with the State of Montana, we have been conducting special hunts for the last two years in a newly set up hunting district which includes the refuge. During the 1979 hunting season, there were 100 antlerless "B" tags available which would allow an additional deer. During this year's season, 200 "B" tags were available. The first year that the antlerless tags were issued they were hard to sell because of local sentiment against doe hunting. This year all 200 of the tags were sold as people became more aware of the deer overpopulation and more conscious of the price of beef.

Hunting pressure dropped slightly on the refuge as did the deer kill. Hunting pressure in the private sandhills increased substantially when they were all opened to hunting by the general public. These private landowners joined together and modeled a hunt similar to that which is utilized on the refuge. They agreed to set up a public hunting area on their land if it was a walk and hunt situation. They had become so incensed with people tearing up their land with vehicles that most of the area had been closed to hunting.

The deer hunters were excited about hunting this "new" territory and followed regulations very well. The large number of deer

that inhabited these hills made for some very fine hunting and the over-all kill of the deer herd was quite a bit higher than last year (Note: no data was collected off-refuge but from personal observations it was evident that the kill was much higher and a large percentage of the increase was accounted for by does and fawns.)

Although good deer hunting occurs throughout much of the public hunting area on the refuge, most of the activity takes place in a few locations. The Sandhills Unit had hunter activity during the full two weeks of the season and produced many of the deer taken. Other favorite areas included the Beaver Pond and Lake Creek Flats.

TABLE VIII. Deer Hunt Data at Medicine Lake

Year	No. of Visits	Total Deer Kill	Opening Day Success
1980	310	84	32%
1979	375	96	21%
1978	342	89	26%
1977	295	107	36%
1976	160	41	26%
1975	170	61	36%

Two deer check stations were again operated on the opening day of the season to collect kill data. The effect of the B tags was quite noticeable on the composition of the kill. In 1977 and 1978, bucks made up 73% of the kill. In 1979 they made up 68% of the kill but this year they accounted for only 46% of the kill.

Mammals Other Than Big Game

The refuge contains many other mammal species but very little if any data is collected on them. Visual observations generally supply population levels for these species

Both red fox and coyotes were almost eliminated on the area due to high hunting and trapping pressure. Red fox seem to be staging a comeback mainly from fall dispersal but the coyote hasn't shown any upswing so far.

Raccoons, an invader to this area, seems to be holding their own if not slightly increasing. Very few are actually seen but their tracks seem to be showing up everywhere. We view the coon as a potentially dangerous predator to the colonial nesting birds. An all out control program may be necessary to keep the raccoon in check.

Fur bearing water mammals have been adversely affected by the drought. Gaffney Lake and Homestead Lake which used to hold good populations of muskrats showed very little rat activity this year. Those lakes which received spring run-off water maintained large rat populations.

The low water levels don't seem to be affecting beaver populations. In one case, an active beaver lodge was sitting high and dry and the beaver didn't seem to mind it at all. It was obvious however, that there was some movement to areas that had good water. The #10 Lake which had two lodges last year had six lodges this fall.

Striped skunk populations seem to be at an all-time low as they are seldom if ever seen. The high fox trapping pressure had a major impact on the skunk because they are accidentally taken in fox traps.

Numerous observations continue to be made of long-tailed and least weasels. A picture was taken of a least weasel on the #11 Lake area and may possibly have been the first photographic record in Montana.

MDL-1980 C-R 2.12 Photo by S.W.B.

A least weasel gorging himself on a deer gut pile.

MDL-1980 C-R 4.2 Photo by S.W.B.

An active fox den near Katy's Lake.

White-tailed jackrabbits are still showing an increase. Populations in some areas of the refuge are high enough that rabbit trails are beginning to look like established cow trails.

An increase in the number of mountain cottontails has been noted around the headquarters shelterbelt.

3. Resident Birds

The drought had varying effects on the three upland game bird species which inhabit the refuge. Ring-necked pheasants and Hungarian partridge showed little change in their production levels but sharp-tailed grouse production declined sharply, possibly as much as 70% of normal.

Sharptails are the only native upland game bird found in this area. Population levels had been increasing over the last few years but the affects of the drought were and will be noticeable. Breeding population levels, established from spring dancing ground counts, indicated a 47.3% increase over 1979. In addition to the increase in displaying males, there was also an increase in the number of dancing grounds. Eight new grounds were established in areas where they hadn't existed the previous year.

TABLE IX Dancing Ground Counts of Displaying Male Sharptail Grouse

Ground Number	1977	1978	1979	1980
1	29	16	14	20
2	14	17	18	30
3	16	13	15	26
4	71	44	48	22
5	28	19	17	8
6	35	32	28	33
7	52	28	33	28
8	31	15	27	38
9	20	22	14	21
10	48	26	22	24
11	14	5	3	10
12	48	26	37	27
13		7	5	NA*
14			6	NA*
15			9	19
16				21
17				11
18				6
19				5
20				30
21				16
22				19
23				6
24				16
TOTALS	406	270	296	436

* Not Active

Sharptail broods were very scarce throughtout the spring and summer. Those broods which were observed, had very few chicks. One bag check during the hunting season of two hunters who had hunted over the weekend, revealed only four sub-adult birds out of 16. In a normal year, the age/sex ratio should be just opposite.

Pheasant crow counts were initiated on the refuge in 1978 in order to collect population data. They were also started so we could measure the response of pheasant to the extensive DNC work which is being done on the refuge. The routes were selected so they would pass through the areas where new DNC is being established

Pheasant numbers have been steadily increasing since 1978. Despite the severe winter of 1978-79, pheasant crows increased that year by 44%. Two survey routes are run on the refuge, the main lake route showed a 31% increase while the northeast route increased by 169%. The DNC has undoubtedly helped in producing

more pheasants but the mild winter probably had more of an influence on the count in 1980. The most crows heard at one stop was 69 during a two minute count.

TABLE X. Pheasant Crow Counts (Crows/Stop)

Route	1980	1979	1978
Main Lake*	17.7	13.5	9.4
Northeast**	11.3	4.2 (1st year)	

* 20 mile route
** 10 mile route

MDL-1980 C-R 2.3 Photo by S.W.B.

Gathering in the olives.

Hungarian partridge have made a remarkable comeback after suffering a near complete loss in the winter of 1978-79. Coveys with over 20 birds were not uncommon. This winter's observations again indicate a good survival rate. One covey was seen in the Sayer Bay area in late December that still contained 18 birds.

4. Other Animal Life

Good to excellent water conditions along with open winter carried

our fish populations into the spring in good shape. No winter kill was noticed. Even though water levels this fall are lower than they have ever been, the open winter again this year will pull all of our fish through in fine shape.

Fish plantings during the year included 133,000 northern pike fingerlings and 135,000 walleye fingerlings. All of the fish were received from the Garrison National Fish Hatchery.

All of the northerns were planted in Medicine Lake. One-third of the walleyes were planted in #12 lake and two-thirds were placed in Medicine Lake.

Since the spring of 1978, we have planted a total of 947,000 northern pike in the waters of Medicine Lake in an effort to reduce the carp population. Numerous reports have come in this year from fishermen telling of carp being found within stomach contents of the pike. Whether or not the predator fish can control the carp population is debateable but they are a help.

A tremendous sport fishery has developed on refuge waters during the winter months. Limits of pike in the 6 to 8 pound range were the rule rather than the exception. Numerous fish were taken over 14 pounds and there was one unconfirmed report of a 26 pounder.

V. INTERPRETATION AND RECREATION

A. Information and Interpretation

1. On-Refuge

The refuge provides for the public a fourteen mile self-guided tour route with ten information stops, wildlife observation blinds, a 100 foot observation tower, three information stations, a picnic/interpretive area, two native prairie study areas, a native grass display, and a wilderness area.

Visits on our auto route almost doubled over 1979. There were 1,805 recorded visits compared to 907 last year or about a 100% increase. Most of this increase can be attributed to the early spring and mild fall. Approximately one-fifth of these visits are from surrounding schools. Visits from bird watching enthusiasts continued to decline probably due to the high price of gas.

Observation blinds were set out on sharptailed grouse dancing grounds and were available to the public. Response was higher this year with almost 30 people taking advantage of watching this spring ritual.

MDL-1980 C-R 4.17 Photo by S.W.B.

A young Hunter SAFETY student learning the fundamentals.

MDL-1980 5.12 Photo by S.W.B

Another class of young Montana hunters that successfully completed this course.

The Montana Hunter SAFETY course for this area was again conducted by Manager Bellinger and Mechanic Bolstad. Fifteen young hunters-to-be attended the course which is a requirement for young hunters in Montana. Classes were held at the refuge headquarters and a field day was held on the firing range to which all the parents were invited. The refuge has been hosting hunter education since 1964.

The Regional Soil Conservation Service Staff used the refuge this year to show different range conditions to all the area classes of Future Farmers of America. This tour included about 65 young people. The refuge is used because of its varied grassland communities.

2. Off-Refuge

Refuge personnel participated with and presented programs to numerous sportsman's groups and civic organizations in the tri-county area. National Wildlife Week materials were distributed to area schools.

Several news releases were issued to area newspapers regarding current events on the refuge.

B. Recreation

1. Wildlife Oriented

Since the refuge is located in a sparsely populated area and is not adjacent to any major travel lanes, most recreation comes from local residents. The main drawing card to the refuge has always been hunting but this year the fishing visits far outweighed all other activities. Out of the 7,430 total public use visits to the refuge, 3,010 or 41% were fishing visits. Total hunting visits for the year totaled 1,240 which was almost identical to the total visits for 1979.

Waterfowl hunting visits showed a 13% increase over 1979. This year we estimated 370 visits for this activity.

As mentioned under the big game section, total hunter visits for deer hunting were down slightly.

Upland game bird hunter visits increased by 14% over 1979. The number of people going after grouse dropped significantly but the high pheasant population brought enough hunters onto the refuge to more than make up for the decrease in grouse hunters.

Trapping permits were issued to five local residents. Only one trapper had a good year. His catch consisted of 1 fox, 3 skunks 7 mink, and 325 muskrats.

A couple of the locals met with success on their first duck hunt.

2. Non-wildlife Oriented

Nothing to report.

C. Enforcement

With the low public use on the refuge, enforcement has never really been a problem. Knowing that there was going to be a significant increase in fishing visits during the fall and winter months, we started an information blitz on the surrounding area. By the time the fishing really got started people were well aware of all the regulations and the program is working beautifully so far.

An active enforcement program is initiated mainly in the fall during hunting seasons.

Two refuge officers participated in a Canadian Border check of returning U.S. fishermen at the Port of Raymond. The two day effort netted six violators (or everyone that had fish). All of the violations were written for no species identification. Approximately 70 pounds of filleted walleye and northerns were confiscated and turned over to the local nursing home.

VI. OTHER ITEMS

A. Field Investigations

Three studies are currently being carried out on the refuge. Results will be summarized in this section when the data becomes available.

1. A DNC study on height/density is being carried out by Ken Higgins, a research biologist from the Northern Prairie Wildlife Research Center.

2. A grasshopper research project is being carried out by George Hewitt, a research entomologist from Montana State University. His study is dealing with precipitation and forage production.

3. Air sampling of particulate matter is being collected by refuge personnel for the Air Quality Group out of the University of California at Davis. The people are working under a grant from the EPA.

B. Cooperative Programs

The refuge provides technical advice to the Sheridan and Daniels County ASCS offices in analyzing proposed water bank areas. We also serve as wildlife consultants for the Roosevelt and Sheridan County SCS District boards during their annual planning meetings.

Three hundred bee hives were placed on the refuge adjacent to DNC plantings. A token fee of twenty-five cents per hive is charged. We get as much benefit out of the bees as the beekeeper gets honey.

One special use permit was issued for seismographing on the refuge. Normally, we have not allowed any seismic activity because we thought we held all the mineral rights. It so happened, however, that when lands controlled by the State of Montana were annexed to the refuge - the State withheld the mineral rights. One section of land and three other small parcels are all that is involved.

Payment for this permit ($200.00) is still pending since the company went bankrupt soon after it did the drilling. A claim has been filed with the U.S. Bankruptcy Court.

C. Items of Interest

We were very fortunate this year to have Ellen Lipp and Mary Bird as student interns from Colorado State University. Both girls were exceptionally hard working and took great care in their assignments. Almost all of the work on the goose nesting ground checks, colonial bird surveys, and cover typing on WPA's were carried out by them.

The girls got college credits but no pay for their work. This is a very beneficial program for both the refuge and the students.

MDL-1980 B&W 1.3 Photo by S.W.B.

Manager Bellinger presenting Mechanic Bolstad with his 20 year certificate and pin.

Kermit Bolstad, our auto mechanic, received his 20 year pin and certificate in January of this year. His service comp date is 12/29/59. Kermit has spent his entire Service tour at Medicine Lake and we hope he continues to provide his excellent work for many years to come.

Assistant Manager Breeser wrote the narrative report except for Section I, D. 2 which was written by Manager Bellinger. The report was edited by Manager Bellinger and Clerk Larson diligently typed the report, corrected the english, and put the whole thing together.

D. SAFETY

SAFETY meetings were held monthly throughout the year. During these meetings, current SAFETY problems were discussed and remedies sought regarding the day-to-day operations on the refuge. A primary topic is presented through the use of films, hand outs and oral presentations at the meetings with everyone taking a turn

as a discussion leader.

Since a minor accident in October of 1979, this station has rebuilt its accident free record to 2,152 man-days.

LAMESTEER NATIONAL WILDLIFE REFUGE

WIBAUX, MONTANA

This 800 acre easement refuge is located 20 miles southeast of Wibaux, Montana, and 160 miles away from the headquarters at Medicine Lake National Wildlife Refuge. The distance factor makes visits, much less biological record keeping, very difficult on this satellite.

The easement status of the refuge concerns only the water and the hunting rights. The upland continues to have a history of overuse from cattle grazing and now the new landowner has set up a sprinkler irrigation system. The water for this system is supposed to come out of the reservoir and it is perfectly legal for him to have a water right on the reservoir since it was originally built for wildlife and irrigation purposes.

However, a complex permit has been issued to the landowner by this office which allows him to irrigate at certain water elevations. These elevations were computed from prior water data. In effect, he can irrigate if there is excess water in the reservoir. During 1980, he was not able to irrigate and is now contemplating selling the whole works to the U.S. Fish and Wildlife Service.

The biological potential on Lamesteer Refuge is quite low, however, it is still valuable as wetland habitat in this semi-arid part of the state. The capacity of the reservoir has decreased by over 60% over the years and accelerated land use practices in the area will only increase the siltation rate.

If the area was bought outright, habitat manipulation could be carried out to make the area a better producer of wildlife. However, the purchase price will probably be prohibitive for the wildlife values that could be realized.

Two trips were made to Lamesteer during the year, one was to talk over the irrigation permit and the other dealt with water rights on the reservoir.

A plan was submitted to the area office regarding opening of the refuge to hunting. Since there is no way to enforce the hunting closure on the area, it might as well be open or as open as private land can be. No drastic changes in wildlife populations are expected to result from this action.