

NATIONAL BISON RANGE
ANNUAL NARRATIVE REPORT
Calendar Year 1991



NATIONAL BISON RANGE

Moiese, Montana

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Calendar Year 1991

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

REVIEWS AND APPROVALS

NATIONAL BISON RANGE

Moiese, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1991

Jon M. Malcolm
Refuge Manager

4/17/92
Date

Dante W. Schuch
Refuge Supervisor Review

4/24/92
Date

[Signature]
Regional Office Approval

4/24/92
Date



This report is dedicated to Ed
Krantz.

INTRODUCTION

The National Bison Range, located in Sanders and Lake Counties, Montana, near Moiese, includes an area of 18,497 acres. It was established by Acts of Congress of May 23, 1908, primarily for the preservation of the animal for which it was named.

The overall mission of the National Bison Range is to maintain a representative herd of American bison, or buffalo, under reasonably natural conditions, to ensure the preservation of the species for continued public enjoyment.

Since establishment, however, other big game animals have been introduced onto the area and current management emphasis is directed toward species diversity. Other big game animals currently inhabiting the area include Rocky Mountain elk, bighorn sheep, mule deer, white-tailed deer, pronghorn antelope, and mountain goats.

Range elevation varies from 2,585 feet at headquarters to 4,885 feet at High Point on Red Sleep Mountain, the highest point on the Range.

The portion of the Flathead Valley in which the Range is located has a microclimate usually characterized by relatively mild winter temperatures and little wind. Snow cover melts quickly at lower elevations. Sub-zero weather is uncommon. Summer temperatures seldom exceed 100 degrees. Precipitation averages 12.74 inches annually at Range headquarters with slightly more at higher elevations. The growing season averages 90-110 days. Freezing conditions generally occur from late November through March.

The Range is essentially a small, low-rolling mountain connected to the Mission Mountain Range by a gradually descending spur. Much of the Range was once surrounded by prehistoric Lake Missoula which was formed by a glacial dam on the Clark Fork River. The lake attained a maximum elevation of 4,200 feet. Old beach lines are still evident on north-facing slopes.

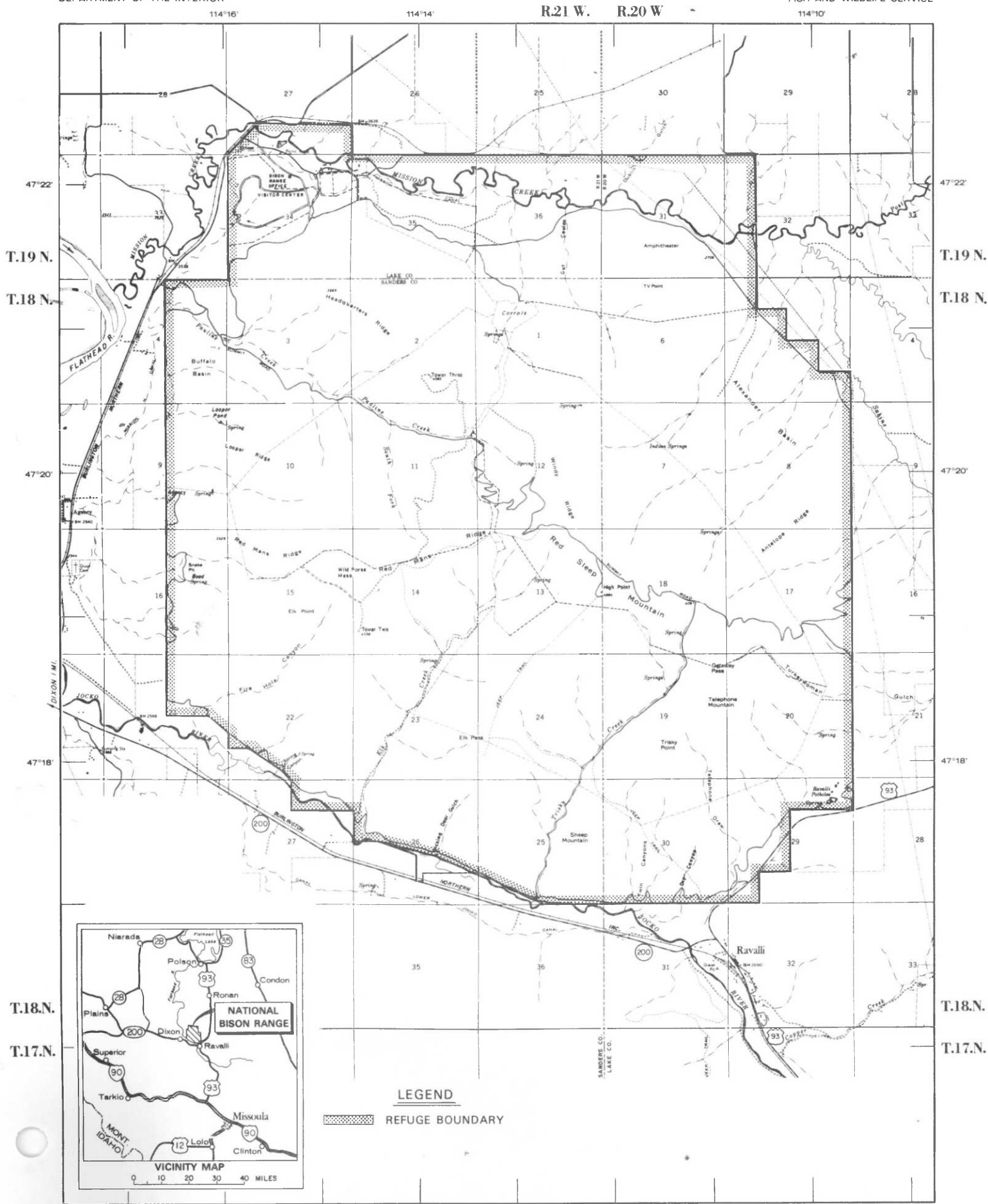
Topsoil on the Range is generally shallow and mostly underlain with rock which is exposed in many areas, forming ledges and talus slopes. Soils over the major portion of the Range were developed from materials weathered from strongly folding pre-Cambrian quartzite and argillite bedrock. These soils were well drained, steep, and range from very shallow to moderately deep in parent material. They have a loamy surface horizon with near neutral pH, high organic matter content, and varying degrees of rock fragment. Except for surface soils, lower horizons have a loamy texture with rock fragment dispersals. Water percolation rates are high, thus soil erosion rates are minimal.

NATIONAL BISON RANGE

UNITED STATES
DEPARTMENT OF THE INTERIOR

LAKE AND SANDERS COUNTIES, MONTANA

UNITED STATES
FISH AND WILDLIFE SERVICE



LEGEND

REFUGE BOUNDARY

COMPILED IN THE DIVISION OF REALTY FROM
SURVEYS BY THE BLM, USGS AND FWS

PRINCIPAL MERIDIAN

0 2640 5280 7920 10560 FEET

True North
Magnetic N
20°

MEAN
DECLINATION
1975

DENVER, COLORADO

AUGUST 1985

6R MONT. 58-1 403

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Information Packet.....(Inside back cover)



"Buffalo jams" were common place on the auto
tours this year.
NBR-91-1,, MB-6/91

A. HIGHLIGHTS

Maintenance Foreman Ed Krantz, the last of the old-timers on the maintenance crew, retired at year's end (Section E-1).

Volunteer activity reached another all-time high of 277 volunteers contributing 4,765 hours of work (Section E-4).

Goatweed mapping showed that acreage remained stable, but density of stands increased. However, most of the leaves on many plants were striped by adult *Chrysolina* beetles and plants were stressed (Sections G-5, 10).

A new biological control for spotted knapweed, the moth *Agapeta* sp. was introduced (Section F-10).

Due to last year's excellent calf crop, a record 102 bison were sold in the sealed bid sale, bringing in \$113,304 (Section G-13).

A new record of 156,000 visitors were recorded through the main gate (Section H-1). Participation by teachers in Outdoor Education Workshops and other visits by school teachers also set a record of 725 visits and a record 4,688 students took part in the Education Program (Section H-3).

An agreement to resolve a jurisdictional conflict over hunting and fishing on the Flathead Reservation reached by the Confederated Salish and Kootenai Tribes and the State of Montana in 1990 was implemented this year (Section J-3).

B. CLIMATIC CONDITIONS

The year started out dry and cold with a low of -18 recorded on the 29th of January. A total of 11" of snow fell during the month but the snow was light and dry yielding only .44" of moisture or 50% of the 41-year mean. February was milder but continued dry with only .24" of precipitation (41% of the 41-year mean). Ice began melting off the wetlands and reservoirs on the 18th.

Ten inches of snow fell in March and precipitation totaled 1.63" which was 226% of the 41-year mean. April brought a return to dry conditions and a number of cold, windy days dried up surface moisture, however subsoil moisture remained good.

May and June brought above average rainfall and cool conditions. Light frosts were recorded as late as June 18th. Grasses and forbes, including noxious weeds, made excellent growth. Mission Creek was running very muddy and bank full by the end of June.

July, August and September were all hot and dry with below average rainfall. The range remained slightly green through the end of July due to the heavy June rainfall but it dried out in August and fire danger was very high. By the end of September many of the small wetlands in the valley went bone dry.

A warm, dry and dusty spell of Indian Summer weather with times of extreme fire danger marked the first half of October. The Red Sleep Mountain drive was closed at noon on the 16th due to high fire danger and extremely strong winds. Temperatures cooled off at mid-month and it quickly turned to winter. There was no significant precipitation until the 26th when 3" of snow fell. The high temperature for the month was 85 degrees and the low was 8 degrees.

November started and ended with subzero temperatures and snow on the ground, with periods of milder weather between. A low of -5 degrees was recorded on the 2nd and another of -3 came on the 30th. Snowfall totalled 6.5" and the total moisture for the month was 1.35" or 175% of the 41-year mean.

The year ended with mild, dry, cloudy weather. Highs were mostly in the 30's and 40's. Only .07" of precipitation fell which was 9% of the 41-year mean.

Although 1991 was characterized by moisture extremes which varied from only 9% of average moisture for December to over twice the average rainfall in March and June, the total precipitation for the year was 12.01" which was only slightly below the 41-year Average.

Table 1. 1991 weather conditions.

MONTH	TEMPERATURE		PRECIPITATION		SNOW
			1991	41-Yr. Avg.	
JANUARY	53	-18	0.44	0.87	11.00
FEBRUARY	55	17	0.24	0.58	
MARCH	68	8	1.63	0.72	10.00
APRIL	76	18	0.15	1.00	
MAY	80	23	2.31	1.83	
JUNE	85	31	4.10	1.96	
JULY	94	40	0.13	1.02	
AUGUST	98	37	0.43	1.10	
SEPTEMBER	90	29	0.77	1.12	
OCTOBER	85	8	0.48	0.82	
NOVEMBER	59	-5	1.35	0.77	4.00
DECEMBER	55	12	0.07	0.83	6.50
TOTALS			12.10	12.62	31.50

C. LAND ACQUISITION

1. Fee Title

The land exchange to divest the Service of a 1.25 acre tract at the Moiese Store adjacent to the NBR entrance was completed early in the year. The Service purchased approximately 15 acres adjoining the Kickinghorse WPA from Moiese Store owner Jim Largent as part of the exchange. Restrictive covenants that will protect the integrity of the Bison Range entrance area were placed in the deed that Largent received for the store tract.



New owners of the Moiese Store wasted no time in sprucing it up. They removed the old warehouse/garage at the south (near) end of the store and replaced it with a small drive in. NBR-91-2, JM-12/91

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

An Environmental Assessment was prepared and approved on Blackfoot Telephone Company's application for a permit to bury a fiber-optic communications line through a 1.25 mile strip just inside the boundary fence at Ravalli Hill on the southeast edge of the Range.

5. Research and Investigations

The Conservation of Genetic Resources in Bighorn Sheep - John T. Hogg, Craighead Wildlife-Wildlands Institute, Inc., Missoula, MT.

Objectives of this study, which was initiated in 1988 are to:

1. Determine whether reduced genetic variation generates detectable deleterious effects in current environments and in natural populations of bighorn sheep.
2. Provide managers with the means for identifying those herds that are vulnerable to the erosion of their genetic resources.
3. Provide managers with guidelines for using population size enhancement and artificial migration as tools for preventing loss of variation in those herds determined to be at risk.

Portions of the study were conducted on bighorn herds at Sheep River and Ram Mountain in western Alberta, and at Whiskey Basin in Wyoming. Progress during 1991 on the NBR part of the study was as follows:

Tissue samples were taken on all lambs born and on 3 adults not previously sampled. Samples are now in hand for all 32 adult sheep in the Bison Range population, plus 28 lambs born from 1989-91. Lab work on DNA samples is expected to allow assignment of fathers to lambs based on DNA probes, as confirmed by field observations. This will hopefully lead to future assignment of fathers to lambs based only on analysis of DNA probes.

Development of DNA technologies for genotyping study sheep by Dr. Scott Woodward of Brigham Young University continued, but the process has been more time consuming than anticipated. Additional personnel have been added at the lab, and their efforts in 1992 will focus on determining paternity for Bison Range and Sheep Mountain lambs.

In 1991, a second phase of the research was initiated. Jack Hogg and other members of the team ultimately hope to design a management scheme for sheep populations along the Rocky Mountain East Front from Waterton Park in Canada south to Rogers Pass in Montana. Dr. Roly Redmond, Director of the Montana Biodiversity Project joined the team this year and will supervise satellite mapping aspects of this phase.

Consequences of Natural Variation in Early Experience
(Pronghorns) - John A. Byers, University of Idaho.

This was the tenth year that John Byers and his assistants have conducted pronghorn research here. The work has been largely basic behavioral research attempting to relate the experience of pronghorn fawns during early development to social organization, dominance and reproductive success during their adult life. They have concluded that the first born fawns each year become dominant in the pronghorn social structure throughout their lives.

Byers and crew were on the area only during the month of September this year, and their research was limited to tracking movements of females during the rut and recording their choice of mates. They obtained records on 38 females. Female mate choice activity and distribution of matings among bucks were essentially the same as in recent years. The most dominant buck was involved in about 22% of the matings, while the remaining bucks accounted for 3-10% of the matings each.

Grasshopper Research - Gary Belovsky and Jennifer Slade, University of Michigan.

Long-term studies of grasshopper population dynamics and the effects of their avian predators continued at several sites on NBR and the surrounding area. The research work was again funded by the USDA/APHIS Grasshopper Integrated Pest Management Program, co-sponsored by USFWS, USFS, NPS and BLM. Belovsky also continued studies of new dectid or wingless grasshopper discovered last year. He also shifted emphasis to study of spring grasshopper species and their effects on summer species.

He has found that the larger early season species are more competitive and tend to reduce numbers of the smaller, late season species. However, this impact on late season species is moderated because the larger early season species are more vulnerable to avian predation.

Pine Needle Abortion Test in Bison - Dr. R. E. Short, USDA-ARS, Fort Keogh Livestock and Range Research Laboratory, Miles City, MT.

We cooperated with Dr. Short in a test to determine whether bison are susceptible to pine needle "abortion". This problem is common among domestic cattle that graze on western ranges in ponderosa pine country. The problem usually occurs late in pregnancy, and is not really an abortion, but a premature birth triggered by a substance in the needles that causes interruption of the blood supply through the placenta.

Bison on ponderosa pine ranges have normal calving rates and no unusual incidence of abortions, so it was believed that they might be immune to the effects of pine needles. If this were true, it was thought that bison might be useful experimental subjects in research to better understand the biological mechanisms involved in pine needle abortion.

A group of bison cows was cut out from one of the herds during the spring grazing unit move. In the test, 2 groups of 6 cows each were pregnancy tested and penned in the corrals. Both groups were put on a ration of 20 lbs. total forage per day, with the test group receiving pine needles in their ration, starting at 1 lb. per day and increasing to 5 lbs. per day. All cows fed pine needles had premature births ranging from 5.5 to 9 days after the start of rations including pine needles. Even though premature, all of the calves from cows fed pine needles survived. All of the cows fed pine needles were treated with antibiotic injections for retained placentas after the premature births. One of the premature calves was rejected by her 3-year old mother, but was saved by bottle feeding and sold to a local rancher. Cows in the control group were fed hay only, and had normal births 16 to 28 days after start of the test.

Bison are the first of grazing ruminants other than cattle that have been shown to be affected by pine needles. Even though the test showed that bison are susceptible to pine needle abortion when force-fed, it is believed they can still be considered as an alternative to cattle on ponderosa pine ranges. Available evidence indicates they are not

affected under natural conditions, and they probably avoid eating pine needles when there is enough preferred forage available.

An article on this test was submitted to and published by both the National Buffalo Association and the American Bison Association. A manuscript has also been submitted to the Journal of Animal Science.



The six calves born prematurely to cows fed pine needles were small and weak, but all survived. Cow on the left is ready for birth.
NBR-91-3, JM-4/91

E. ADMINISTRATION

1. Personnel

1. Jon Malcolm, Refuge Manager, GS-12, PFT
2. William West, Assistant Manager, GS-11, PFT
3. Marcella Bishop, Outdoor Rec. Planner, GS-9, PFT
4. Susan McCollum, Refuge Assistant, GS-5, PFT
5. Edward Krantz, Maintenance Foreman, WS-6, PFT
6. Robert King, Heavy Mobile Equipment Mechanic, WG-10, PFT
7. Loren Clary, Maintenance Worker, WG-8, PFT
8. Darren Thomas, Maintenance Worker, WG-6, Career Seasonal
9. Lynn Clark, Biological Technician, GS-7, Career Seasonal
10. Barry Tarbet, Law Enforcement Officer, GS-5,
11. Timothy Driscoll, Animal Caretaker, WG-5, TFT
12. David Fitzpatrick, Park Ranger, GS-5, TPT
13. Paul Toussaint, Animal Caretaker, WG-5, TFT
14. Delbert Palmer, Animal Caretaker, WG-5, TFT
15. Brent Woodger, Animal Caretaker, WG-5, TFT



1	2		7					
		11	8	6	16	19	5	
10	3	4	14	9	20			

Youth Programs

16. Kyle Gilleard, YCC, 6/03/91 - 8/30/91
17. Rachael Sykes, YCC, 6/03/91 - 9/25/91
18. Jennifer Palmer, YCC, 6/03/91 - 8/16/91
19. Mac Dean, YCC, 6/03/91 - 8/14/91
20. Patrica Dougherty, Human Resources, 6/14-7/26/91

Ed Krantz, Maintenance Foreman, retired on December 28, 1991, after 32 years of service to the Bison Range. He certainly is missed. Bob King was temporarily promoted to fill the vacant position.

Barry Tarbet was detailed to the Bison Range for the summer to fill the position of law enforcement officer. Barry is a police officer at San Francisco Bay Refuge and was detailed here during their slow season. He came in early May and left in late October.

Three temporary maintenance people were hired in September to assist with the fall roundup and MMS projects.

Table 2. Five year comparison of NBR personnel.

	Permanent		Temporary
	Full-time	Part-time	
1991	7	3	5
1990	5	6	2
1989	5	6	1
1988	5	4	4
1987	6	3	5

2. Youth Programs

The Youth Conservation Corps (YCC) program continued as an important contribution to the work force this year. Rachael Sykes and Kyle Gilleard returned as crew leaders. Jennifer Palmer was selected to work with Rachael in the Visitor Center and Mac Dean worked with Kyle under the maintenance staff. Trish Doty was rehired through the Northwest Montana Human Resources Program for Employment Training. All five young people did an excellent job and should be commended.

Jennifer and Rachael were invaluable in the operation of the Visitor Center by assisting visitors at the information desk, performing light maintenance, and assisting the Outdoor Recreation Planner with special projects and Day Camps. Kyle, Trish and Mac assisted with timber stand improvement, litter pickup, grounds maintenance, weed control, haying, and construction of a trail for people with physical disabilities.

Total YCC program costs were \$6,631.00, while appraised project values amounted to \$10,462.00. There was no cost to the refuge for youth hired under the Northwest Montana Human Resources Program. It is estimated that the value of services to the refuge under this program was \$2000.

Safety-consciousness was stressed throughout the program through monthly safety meetings and daily job related sessions.

4. Volunteer Program

The volunteer program continued to be an important source of supplemental manpower for Bison Range activities. Kelly Hagerman, a recreation major, from Clemson University interned at the Range and volunteered 400 hours from mid-May through July. She worked in the Visitor and Education Center, prepared and taught parts of the Summer Day Camps, upgraded the Environmental Education Library, and assisted with other public use and biological duties. Two couples volunteered to staff in the Visitor Center during evening, weekend and late season hours. Clarence and Gail Trout contributed 450 hours and Manuel and Janet Benavides stayed through Roundup and worked 520 hours. The Benavides were also volunteers here in 1989 when they contributed about 900 hours and were National Take Pride in America Awards finalists for their efforts.



Intern Kelly Hagerman of Clemson University,
assisted with Summer Day Camps for area
youth.

Volunteers -

Janet and Manuel Benavides



and -

Clarence & Gail Trout

A total of 277 individuals put in 4,765 volunteer hours on the Bison Range this year.

Table 3. Volunteers and volunteer hours for 1991.

Activity	Number of Volunteers	Volunteer Hours
Wildlife Census	84	704
Bison Roundup	38	601
Education Program	33	698
Habitat Improvement	30	165
Antler Collection	40	816
Visitor Center	5	1370
Goat Transplant	32	283
First Aid Class Instruction	5	20
504 Training and Evaluation	6	24
Biological	3	81
Guided Tour	1	3
	277	4,765

Some individuals worked on several activities, but most participated in one favorite project. Retired Range staff continued to return as volunteers in their favorite projects, especially for the roundup. Included were Jack Lampshire, Grant Hogge, Ernie Kraft and Marv Kaschke. Most of the 38 volunteers who worked on roundup averaged about 16 hours of hard work each. Of these, 19 helped with corral work and herded buffalo, while 18 herded the people who came to watch. A total of 58 people worked on this year's roundup, including staff, temporary staff, veterinarians, volunteers and stand-by ambulance crew.

The annual game count in March had 83 participants, primarily University of Montana Wildlife students. They contributed 664 hours as a part of count teams working on foot to cover the entire Range.

Joel Meyer and Cal Tassanari and their University of Montana Natural Resources students donated 90 man-hours, clearing and piling brush. A group of 15 scouts also put in 75 hours on brush work.

Volunteers were again the backbone of our education program and 33 teaching professionals spent 704 hours on course preparation and instruction time for Teacher Workshops, Day Camps and ACCESS programs.

An awards dinner was held for education volunteers on April 20th, during Volunteer Week, so that these dedicated people could see the State and National Take Pride in America Awards the education program received in 1990. Each was presented a Volunteer Award and a Montana Wildlife Viewing Guide. Lynn Kelly, one of our long time education volunteers could not attend because she was at the Montana Wildlife Federation conference accepting the Montana Environmental Educator of the Year Award. Volunteers working in other activities were recognized at Roundup time, at a summer picnic and at Christmas time.

5. Funding

Table 4 lists funding for the Complex which includes the National Bison Range, Ninepipe, Pablo, and Swan River NWR's, and the Northwest Montana Wetlands Management District.

Table 4. A five-year comparison of funding for the NBR Complex.

FY	1261-2 Base	6860	ARMM/ 1262 FLEX	O & M Total	8610	YCC
92	397,000	42,000	105,500	544,500	10,500	8,400
91	428,000	42,000	76,000	546,000	10,500	6,500
90	436,000	41,300	30,000	507,300	8,600	6,000
89	416,000	42,000	-----	458,000	7,000	6,000
88	457,000	42,000	-----	499,000	10,600	3,000

There are \$8,400 in Wetland Education, \$8,500 in Watchable Wildlife and \$15,000 Challenge Grant funds in the FY92 targets not included in the above figures. However, these funds are not included in the Base and there is no guarantee they will be available in future years.

Note that base funding for FY92 is down 13% from FY88. This has occurred despite that fact that nearly 2,500 acres of new Waterfowl Production Areas have been added to responsibilities of the complex and visitor use on the Bison Range has increased by 24% to 156,000. Salaries, which represent about 75% of the total funding, have increased about 16% and are scheduled to go up another 4% again. We are currently trying to determine how we can continue to operate with the target figures provided for FY92. Without a funding increase to offset increased salary costs and annual inflation, the time is nearing when we will be forced to reduce operations and service to the public.

Increases in the 1262 Flex funding are definitely welcome and needed, but they do little to alleviate the operating deficit that has built up in total responsibility and base funding.

6. Safety

Monthly safety meetings were conducted throughout the year and safety themes generally reflected seasonal work activities. Safety films were shown and safety notices and information bulletins from the Regional Office were discussed. Special topics were substituted for films when appropriate.

March	Discussed the list of items which had been completed in the Hazard Abatement Plan and those that still needed to be addressed.
April	Step tests were administered to all fire fighters. A boating safety course was taken by all required personnel.
June	Orientation meeting for summer staff.
July	Fitzpatrick taught staff First Aid and CPR. The St. Ignatius ambulance crew presented a session on how to assist their crew and what to do before the ambulance arrives.
August	Lifelight Helicopter Ambulance came in for a briefing on how to best help them land and load.
November	Video "Tank Closure Without Tears" An Inspectors Safety Guide.

There was one reportable accident for the youth employees. This accident occurred when one of the employees who was working on the nature trail stepped off the trail, tripped and hit his leg on a rock. A blood vessel was broken inside the muscle and he was treated for abnormal buildup of pressure in the muscle. He was assigned 3 days of restricted duty.

There were two incidents on the Range in which visitors sustained injuries and were assisted by Range personnel. A Washington state family escaped serious injury when the brakes failed on their pickup camper and it turned over on the last

switchback coming down the auto tour. Officer Tarbet responded to the accident and an ambulance was dispatched at his request. All persons were treated and released at the scene except for a four year old girl who was transported to St. Lukes Hospital for observation.

The second incident involved a boy who cut himself on glass when he fell with a jar of water. The boy was treated for major bleeding by Malcolm and Hagerman.

Officer Tarbet responded to a serious head-on vehicle accident on Highway 200 outside the Range. He assisted the Highway Patrol, Tribal Police, Lake Co. Sheriff's Department, Polson Fire Department and 3 local ambulance services with extrication and rendering first aid to six victims.

ORP Bishop assisted at an accident involving two injuries on Highway 93.

Bishop completed 80 hours of First Responder and ambulance course work for FRA designation. Bishop, Tarbet, and Fitzpatrick completed the FAME Council Extrication Course in Kalispell.

Corrective and preventive safety measures in 1991 included:

- (1) All fire extinguishers were professionally tested and recharged in April.
- (2) Restroom with shower and eyewash was completed for the shop.
- (3) National Bison Range patrol vehicle was equipped with flashing lights and a siren.
- (4) A new directional sign was installed across the highway from the main gate in hopes of reducing congestion at the entrance area.
- (5) The bleachers at the corrals "Hide House Theater" were remodeled to lower the pitch of climb and provide more solid footing and greater safety.
- (6) First aid jump bags were upgraded for patrol vehicles and ORP's vehicle.
- (7) Major emergency bag and equipment including, oxygen, neck collars, and extrication equipment were acquired.
- (8) Station backboards were modified to fit on the lifelight helicopter.

- (9) Hazard analysis was completed for spraying operations.
- (10) A cabinet was installed for flammable containers.
- (11) Shelves in the shop were all anchored and all miscellaneous items were organized in a safe way.
- (12) GFI electrical outlets were installed in several buildings where required.
- (13) Hazard analysis book was completed and moved to the shop for employee use.

7. Technical Assistance

We again responded to numerous telephone and written requests from individuals, organizations, and agencies for information on buffalo management, husbandry, facilities, sources of meat, breeding stock, by-products and sale prices. Continued nationwide publicity on the health benefits of buffalo meat, along with promotion by the National Buffalo Association and American Bison Association have kept the inquiries at a high level. The movie "Dances with Wolves" also created additional nationwide interest in bison this year.

The Bureau of Indian Affairs began a Bison Management Initiative which also resulted in increased interest among Indian Tribes. As a result, we provided technical assistance at various times throughout the year to the Crow, Blackfeet and Ft. Belknap Tribes in Montana and to the Kalispell Tribe in Washington. In addition, 15 copies of the North American Bison Workshop Proceedings we sponsored in 1987 were provided to the Native American Fish and Wildlife Society.

On-site tours and assistance were provided for personnel from Utah State Parks at Antelope Island State Park, the Ted Turner Ranch in Montana, the Star B Buffalo Ranch in California and Elk Island National Park in Canada. About 75 color slides of individual bison bulls and cows were provided to Canadian Wildlife officials who are attempting to develop an identification guide to several public bison herds based on phenotypic differences.

Other technical assistance was provided for several colleges, universities and groups of foreign natural resource managers as described in the Public Use section of this report. Assistance on Environmental Education was provided area teachers and educators on numerous occasions in addition to the Teacher Workshops. Special assistance was given the

Hungry Horse School in developing an Outdoor Education Center adjacent to the school.

Manager Malcolm served as a referee for a Wildlife Society Bulletin paper on conflicts between migratory birds and powerlines.

8. Other

Revenue sharing checks were delivered in April to county officials in Lake County (\$30,727) for NBR, Swan River NWR and Lake County WPA's, and in Sanders County (\$14,554) for NBR. The checks for both counties increased substantially from 1990, due partly to recent increases in revenue from bison sales. Payments to both counties are now larger under the 25% of receipts formula than when computed using the updated land value formula.

Table 5. Receipts collected at NBR in 1991 for deposit to the National Wildlife Refuge Fund.

Item/Activity	Receipts
Bison Sales	\$113,604.00
Antler Collection Fee (Boy Scouts)	298.10
Special Use Permits (Photo Access)	875.00
Sale of Deer Hides	106.14
Concession Contract (Moiese Store)	807.93
Other Special Use Permits	70.00
Total	\$115,761.17

Total receipts, as shown in Table 5, were up \$5,602 or 5%, from 1990 due an increase in revenue from bison sales.

Jon Malcolm, Bill West and Ray Washtak attended Area 1 Project Leaders Workshops in February and September at Billings. Bill West attended MapInfo Training at Bozeman. Lynn Clark completed Basic Law Enforcement Training this year at FLETC. Susan McCollum attended Administrative Training in Denver. Malcolm and Marcy Bishop attended Accessibility Training held here.

Associate Manager Barney Schranck visited for a day in February and was also present on the Complex for 3 days at roundup time. Other visitors from the Regional Office included Frank Bryce who visited for the spring Teachers'

Workshop, Accessibility Training session, and also for the roundup. Sheri Featherman and Lisa Langelier made an orientation visit and reviewed the public use program.



We gave Associate Manager Barney Schranck his turn in the barrel during his visit at this year's bison roundup. NBR-91-16, MB-10/91

Malcolm paid courtesy calls to offices of Senators Baucus and Burns, and Congressman Williams in Missoula. Their aides, Julie Altemus, Suzanne Lagoni, and David Blair were also provided a tour of the Bison Range in June. Debbie Weatherly, aide to Congressman Dade of the House Interior Appropriations Committee, was given a brief tour of the Range in August.



Missoula Office Assistants to Congressman Pat Williams (David Blair, left), Senator Max Baucus (Suzanne Lagoni, Center), and Senator Conrad Burns (Julie Altemus) were provided a tour and briefing in May.
NBR-91-11, JM-5/91

Orientation tours were also provided for 2 new Regional Supervisors for the Montana Department of Fish, Wildlife and Parks, Dan Vincent of Region 1 and Rich Clough of Region 2.

Special administrative projects this year included 2 revisions of the Maintenance Management System discs; initial completion of computer programs for the Refuge Operating Needs System; completion of questionnaires and providing information for the Refuge Compatibility Review; completion of questionnaires on water rights and the Refuges 2003 planning effort; and completion of request forms for FY92 Special Project funding.

F. HABITAT MANAGEMENT

1. General

Habitat management measures continued to feature operation of the deferred-rotation grazing system for two herds of bison among eight range units, removal of surplus animals of several species to prevent habitat degradation, and control of noxious weeds by biological, mechanical or chemical means.

2. Wetlands

Permission was continued for hydrologists of the Tribes to operate a stream gauging station on Mission Creek at headquarters. Their streamflow information is summarized in Table 6.

Table 6. Mission Creek instantaneous flow measurements at NBR headquarters for 1991.

Date	Instantaneous Flow (cfs)
01/23	122
02/21	143
03/21	118
04/15	100
05/23	124
06/26	284
08/15	181
09/19	145

Average monthly flow was 152 cfs, down 36% from that of 1990.

Oxbow wetlands on the Mission Creek bottom, the Nature Trail Display Pond, Ravalli potholes and ponds in several riparian draws all provided habitat for ducks and a variety of other marsh and waterbirds.

3. Forests

Some of the forested areas in higher portions of the Range have become overgrown with thick stands of small, second-growth Douglas-fir. Early in the year, the maintenance crew thinned approximately 16 acres of this second-growth adjacent to the long auto tour just above Elk Lane. Slash was hand-

piled early in the spring with assistance of 20 volunteers from a wilderness class at the University of Montana. Slash piles were burned in December.

There are approximately 300 acres of second-growth Douglas-fir that are in need of some thinning or clearing treatment. We have attempted prescribed burning in some of these stands, but have had problems getting a fire to go through them under weather conditions that allow for adequate control. The labor intensive and expensive hand clearing or thinning is the only effective treatment we have found for these sites to date. Regional Fire Management Officer Herb Troester, Fire Ecologist Keith Blair, and Land Use Specialist Milt Suthers toured the area this year to view the problem. We also had Forest Service Ecologist Kevin Ryan and U of M Forestry Professor, Ron Wakamoto, look at the situation. The consensus was that we need to try more prescribed burning for fuels reduction or there will be a major fire in the future.

We plan to inventory of the Range's forest resources and began updating the Forest Management Plan in 1992.

5. Grasslands

Despite well below normal precipitation for 8 months of the year, above normal rainfall in key growth months for the cool-season grassland community resulted in good grass growth. March moisture was over double the long-term mean and grass growth got off to a good start in April, even though that month was very dry. Above normal moisture in May and the 4.1" of precipitation received in June created lush stands of bunchgrasses at maturity in late June.

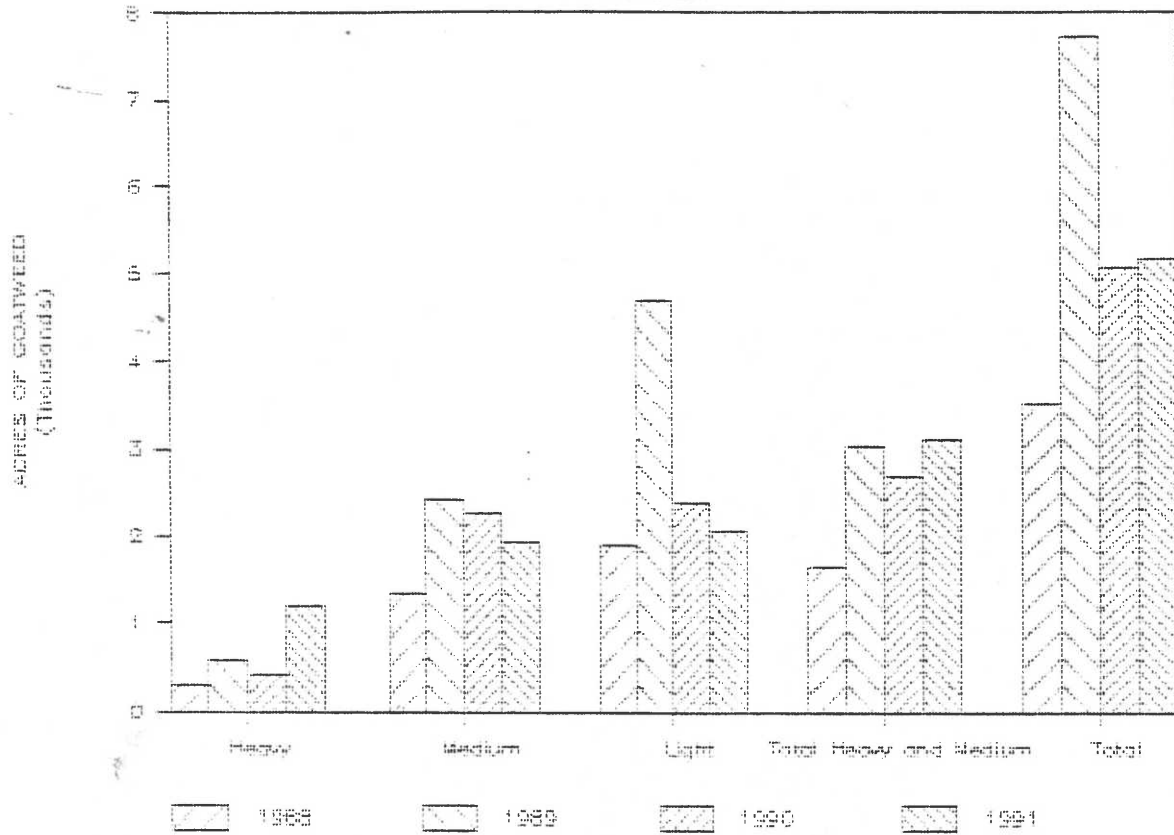
Unfortunately, the moisture patterns this year also seemed to favor the growth of noxious, exotic weed species. The growth and spread of Dalmation toadflax was particularly discouraging. Goatweed growth was also excellent on much of the Range, and mapping results showed an increase in stands with moderate and heavy canopy cover (Section F-10). However, Chrysolina beetles were noted to strip leaves from many of the goatweed plants and a good share of the stands were stressed by the end of summer.

7. Grazing

We attempted to regulate bison grazing according to the schedule in Table 7, but buffalo broke through fences several times and were scattered over several range units part of the time. AUM's listed for each unit are therefore approximate.

TOTAL GOATWEED NATIONAL BISON RANGE

17555 ACRES



	1988	1989	1990	1991
Total All Pastures				
Heavy	311	585	432	1203
Medium	1336	2433	2264	1917
Light	1890	4697	2397	2042
Total Heavy and Medium	1647	3018	2696	3120
Total	3537	7715	5093	5162

Figure 1

Table 7. Grazing unit rotation for bison herds in 1991.

Herd	Oct.90-Mar.91	Apr.-June	July-Sept.	Oct.91-Mar.92
1	Upper South 983 AUM's	Lower West 491 AUM's	Upper North 649 AUM's	Northside 993 AUM's
2	Alex. Basin 862 AUM's	Southwest 431 AUM's	Upper West 568 AUM's	Lower South 837 AUM's

Actual utilization by bison during the 1991 Calendar Year came to approximately 2,130 AUM's for Herd 1 and 1,850 AUM's for Herd 2, for a total of 3,980 AUM's. Other big game species utilized approximately 1,900 AUM's, bringing total grazing utilization to 5,880 AUM's.

In other regulated grazing, 15 bison were kept in the 200-acre East Display Pasture intermittently from April through September, using an estimated 45 AUM's of forage. Gates were opened between this unit and the Northside Unit after roundup, and an estimated 30 AUM's were utilized the last 3 months of the year. Bison grazing was deferred in the West Display Pasture this year. The only regulated use there was by 2 elk cows and their calves, along with a yearling bull that utilized approximately 12 AUM's from April through September.

8. Haying

Approximately 35 acres of meadows in the headquarters area were cut for hay in early July. The yield was approximately 14 tons of brome/bluegrass hay. The hay was baled and stored in the barn for horses and to feed buffalo in the Exhibition Pasture.

9. Fire Management

Despite the hot, dry conditions in August, September and October, there was only one wildfire on the Range in 1991. Lightning struck a pine tree and smoldered for about 36 hours before it ignited nearby grasslands. The fire was reported to Refuge Officer Tarbot at about 5:40 PM August 2nd. The fire burned one acre of hillside below the Bitterroot Trail and above Elk Creek.

A prescribed burn on 15 acres of native grassland in the Triskey Creek drainage went uncompleted for a second year. The burn was prescribed to remove one to two foot tall Douglas-fir

seedlings. Because the site is steep (40% slope), and northwest facing, we don't get conditions within prescription until mid-afternoon. Upslope winds are often too strong by that time of day. The difficulty in burning such sites has contributed to the preponderance of dog hair Douglas-fir referred to in Section F-2.

10. Pest Control

This station has a variety of weed problems that require considerable staff time to address. Rangeland weeds are not our only problem. Several cropland weeds and the dreaded purple loosestrife are problems on satellite refuges or on Waterfowl Production Areas (WPA's). Pest control on those areas is discussed in narrative reports covering Ninepipe and Pablo NWR's or the Northwest Montana Wetland Management District. Weeds that plague eastern states are here and weeds from western states are here. The problems on the Bison Range by order of magnitude are:

- Goatweed or St. Johnswort (*Hypericum perforatum*)
- Dalmation toadflax (*Linaria dalmatica*)
- Spotted knapweed (*Centaurea maculosa*)
- Sulfur cinquefoil (*Potentilla recta*)
- Canada thistle (*Cirsium arvense*)
- Musk thistle (*Carduus nutans*)

(Leafy spurge is only 2 miles from our fence)

A variety of methods are used to combat rangeland weeds including modifications to the bison grazing systems, mowing, grubbing, herbicides and biological agents. The current methods have evolved over several years of trial and error plus research results from elsewhere. Just a few examples include the thousands of acres of goatweed aerial sprayed without solving that problem. Roadside weeds such as musk thistle and Canada thistle have been controlled relatively well by mowing yet, knapweed thrives when mowed. Bison Range grazing systems have been kind to the land for over 80 years and much of the Range is native grassland, but weeds are still outcompeting native plant communities.

Regional Office direction has encouraged us to seek alternatives to herbicides. Environmental concerns and personal health issues have also caused us to seek other methods, and for some weeds we have found workable alternatives. But all current methods require extensive manpower to accomplish. There has to be a better way to contain weeds and there is, - - - but those alternatives are not being aggressively pursued by FWS or by other land management agencies.

The potential solution is biological control agents. Insects, fungus or diseases that kept these plants in check in their native lands but were never introduced to North America. Several universities and The U.S. Department of Agriculture, Agriculture Research Service, are actively researching several bio-agents but there are many bottlenecks in the system. Many of the top priority weeds are those that affect agriculture lands, while wildland weeds are not addressed. Research on many new agents is done on a shoestring so there are real opportunities falling through the cracks. We are attempting to increase FWS support for such bio-agents while pursuing cooperative ventures with local governments.

During 1991 the Bison Range cooperated with Montana State University and the Confederated Salish and Kootenai Tribes to introduce a defoliating moth (Caliphysia lunula) to control Dalmation toadflax. They were released on tribal land adjacent to the Range. A cage was placed over the release site to prevent birds from preying on larvae.

Several years of cooperation between the University's Western Montana Agriculture Research Center, Corvallis, Montana, and Lee Metcalf National Wildlife Refuge, resulted in propagation of several thousand moths to control spotted knapweed. The Bison Range received 171 of those insects (Agapeta zoegana) in September. They were released at the Jocko River Fishing Access.

A description and update on each bug on the Range follows:

Chrysolina quadrigemina and Chrysolina hypericum - Goatweed beetles- Both were released on the Range in 1948. They provide excellent cyclic control; some years good, other years poor. Apparently the beetles have no alternative host and their relative abundance follows the abundance of the weed, similar to the lynx and the snowshoe hare. The beetles seem to have more impact in wet years, or at the least, after a wet fall. Goatweed was abundant in 1991 and the beetles did extensive damage on western slopes but eastern slopes were not impacted.

Aplocera plagiata - Goatweed moth - 400 larvae were released on the Range in June 1989. This is a dry weather insect that should complement the beetle. Most damage to the plant should be from the larvae eating the vegetation. The release has not been successful as yet and no larvae have been observed in 1990 or 91.



Adult (above) and larvae (below) of the
goatweed moth (Aplocera plagiata).
NBR-91-5&6, BW-10/91



Agrilus hyperici - Goatweed root borer - Released in the 1950's, this insect is thought to have died out, but we recently discovered some borers that might be Agrilus. USDA-ARS entomologist Norm Rees, will identify these new borers during a spring 1992 visit.

Urophora affinis - Knapweed seedhead gallfly - Released in the U.S. in the 1950's. Six hundred were released on the Bison Range in 1975, and another release was done in 1981. They are well established.

Urophora quadrifasciata - Knapweed gallfly - Released in Canada in 1950's. Both Urophoras have been identified on the Bison Range, however, only about 50% of the seeds are destroyed by these two agents. The remaining seed is still viable so knapweed is still expanding.

Aqapeta zoeqana - Knapweed root and rosette mining moth. Jim Story of the Western Montana Ag. Research Center, Corvallis, MT, has been rearing this insect on the Lee Metcalf NWR and he released 171 on the Range in September 1991.

Rynocyllus conicus - Musk thistle seed-head weevil - 6,000 transplanted to the Range from the Gallatin Valley between 1975-1980. This insect has provided moderate to good control. Weed densities appear to have stabilized except near roadsides. We have accomplished acceptable control on roadsides with periodic mowing and hoeing. Spraying of musk thistle was terminated eleven years ago.

Ceutorhynchus litura - Canada thistle stem mining weevil - Released 1,400 on seven FWS locations in 1988. Rechecked sites in 1989, 1990 and 1991. They were abundant at the release sites in 1991 and insect damage was noted as far as five miles from the release sites. Up to 90% of the stems had been invaded at some release sites.

Calophsia lunula - Dalmatian toadflax defoliating moth. Two hundred were released on the Bison Range in 1990 without the protection of a cage. Another 200 were released in 1991 under the protection of a cage. A similar release near Missoula, Montana, in 1983 has thrived. Several wild larvae were found on the Range and on adjacent tribal land in 1991.

Weeds in the intermountain west and on the Bison Range are imports from Europe and Asia. They were accidentally introduced to this continent without their evolved natural enemies. These natural enemies kept the plants under control in their homeland. Introduced European insects have shown

great promise as biological controls, but researchers believe it will take a complex of several insects to control any particular weed.

All insects have undergone extensive testing prior to their introduction into North America. All insects are approved by the U.S. Department of Agriculture for release against their target weed. Current quarantine procedures and insect starvation tests on any conceivable alternate host plant prevent unwanted releases.



Adult of the stem mining weevil (Ceutorhynchus litura) introduced in 1988 for control of Canada thistle. NBR-91-7, BW-7/91



Larve of the defoliating moth (Calophasia lunula) introduced to help control Dalmatian toadflax. This larvae was one of several wild specimens found in the area, indicating our releases have been successful.

NBR-91-8, BW-7/91

Goatweed is not only one of the most common and widespread weeds on the Range, it is also one of the most highly visible. Goatweed beetles have proven very useful in controlling the weed in wet years. Table 8 shows the relative abundance of goatweed from 1985 to 1991. High beetle populations in 1986 virtually eliminated the weed from the Range. The subsequent beetle die-off allowed the goatweed to recover and spread until it peaked in 1989. The number of acres infested with goatweed did not change from 1990 to 1991, however the density of the weed in the affected areas was heavier. This was especially true on the east side of the Range where many areas that had only a light infestation of weed in 1990 were almost solid this year. Large concentrations of beetles were observed on some of these areas throughout the summer and we hope that these stands will show a decrease next year.

Table 8. Relative abundance of Goatweed (Hypericum perforatum) 1985-1991.

Goatweed Abundance	1985	1986	1988	1989	1990	1991
Heavy	1076ac.	160	311ac.	585ac.	432ac.	1203ac.
Moderate	1784ac.		1336ac.	2443ac.	2264ac.	1917ac.
Light	<u>1408ac.</u>		<u>1891ac.</u>	<u>4697ac.</u>	<u>2331ac.</u>	<u>2042ac.</u>
Total	4268ac.	160ac.	3539ac.	7715ac.	5027ac.	5162ac.



Goatweed continued as the primary problem noxious weed species here, particularly on eastern parts of the refuge. Yellow blossoms and rusty color of foliage as it dries in late summer makes it stand out like a sore thumb. NBR-91-9, JM-9/91

Our control programs for most weed species still include herbicide use. The herbicide of choice is usually 2,4-D but Tordon is used to combat Dalmation toadflax. Herbicides are used because multiple stress strategies or integrated pest management are not feasible on our steep rocky ground or when our principle grazing animals are wild and relatively unmanageable. That is, most sites are not accessible to mechanical methods. Also, grazing or burning strategies are not feasible or conflict with wildlife management goals. Biological controls are working consistently only for musk thistle. The goal of our current strategy is to prevent weed hot spots from spreading and to pursue bio-agents with

all our abilities. Table 9 summarizes chemical control efforts in 1991.

Table 9. National Bison Range herbicide use in 1991.

Target Species	Herbicide	Rate*	Acres	Application Method
Dalmatian toadflax	Picloram Tordon 22K	1 #/acre	20	Ground-hand
S. Knapweed, cinquefoil & hoary cress	2,4-D	1.9 #/acre	160	Spot spray Ground boom & wand

* Pounds acid equivalent

Forty acres of road side weeds were mowed in late June.

Bison Range staff also participated in the Lake County effort to control purple loosestrife. Loosestrife has invaded over 90 wetlands in the past few years and it threatens the Ninepipe National Wildlife Refuge. For an account of the control effort see the Narrative Report for Northwest Montana Wetland Management District.



Bill West led a tour of Dalmation toadflax control work for Kristi Neimeyer, (left) of the Lake County Leader newspaper. This patch is on tribal ground adjacent to the refuge fence. NBR-91-10, LC-7/91

G. WILDLIFE

1. Wildlife Diversity

The National Bison Range has a wide inherent diversity of habitat types and wildlife species. Special measures taken to increase diversity over the years include the development and maintenance of watering troughs and ponds, and the installation of nesting structures for Canada geese along Mission Creek.

The most recent project to increase diversity has been the installation and maintenance of 57 bluebird nesting boxes with volunteer assistance from area Boy Scouts.

An addition was made to the bird list on October 17 when Marcy Bishop observed a wild turkey in the Nature Trail area.



Gray partridge, brown-headed cowbirds, and bison. NBR-91-12, JM-6/91

2. Endangered and/or Threatened Species

Bald eagles were present along Mission Creek and the Jocko River during the winter months. In addition, 3 adults and 2 juvenile bald eagles were seen feeding on elk gut piles in lower Pauline Creek in December.

A peregrine falcon was observed near headquarters on 10/30.

3. Waterfowl

a. Ducks

Mallards were common along Mission Creek during the fall and winter, with 178 counted there in December. Breeding pair counts of ducks were made in May on Mission Creek and at Ravalli ponds. Production estimates were calculated based on nest success data from Pablo NWR nesting studies, as there was no control of nest predators either there or on the Range. An estimated hen success of 23% (from the 10% Mayfield success recorded at Pablo) was therefore used in the calculations. Results are in Table 10.

Although pair numbers were up 21% from 1990, the estimated production decreased by 40% due to the lower estimated hen success.

Table 10. 1991 NBR breeding duck pairs and estimated production.

Species	Number Breeding Pairs	Estimated Production
Mission Creek		
Mallard	50	41
Cinnamon Teal	18	15
Wood Duck	8	7
Hooded Merganser	1	1
Common Merganser	1	1
Shoveler	1	1
Green-winged Teal	1	1
Gadwall	1	1
Blue-winged Teal	1	1
Subtotal	82	67
Ravalli Ponds		
Redhead	7	6
Ruddy Duck	6	5
Gadwall	9	7
Mallard	3	2
Cinnamon Teal	4	3
Shoveler	2	2
Pintail	1	1
Green-winged Teal	1	1
Wigeon	1	1
Bufflehead	3	2
Subtotal	37	30
Total	119	98

Production estimates were calculated using 10% nest success (23% hen success), average brood size of 5.1 and a duckling survival rate of 70%.

b. Geese

There were 13 breeding pairs of Canada geese recorded along Mission Creek during the aerial breeding pair count on April 18. During the duck breeding pair count in May, 39 goslings were counted in 7 broods.

On the June aerial brood census, there were 46 goslings seen on Mission Creek. We estimate production was 50 goslings for the Bison Range. Mission Creek meadows, especially those in the closely spring-grazed headquarters horse pasture, continued as an excellent brooding area. It appeared that some broods hatched off the Bison Range were moved to the Mission Creek area for the brooding season.

4. Marsh and Water Birds

Great blue herons were observed along Mission Creek throughout the year. There were 2 double-crested cormorants tallied during the pair count and a few birds made feeding flights from Ninepipe NWR to Mission Creek throughout the summer. At Ravalli Ponds, 3 American coots were tallied on the duck pair count. Sora rails were seen several times during summer on ponds in Pauline Creek and apparently nested there.

5. Shorebirds, Gulls, Terns and Allied Species

Common snipe and killdeer nested in and around oxbows and wet meadows along Mission Creek and in riparian draws higher on the Range.

6. Raptors

Common nesting species included great horned owls, red-tailed hawks, northern harriers and northern kestrels. Single ospreys were seen flying over Mission Creek once in May and once in September.

Single golden eagles were seen several times during the spring and summer, but there was no confirmed nesting on the Range this year.

Other raptor observations this year included a northern goshawk seen at headquarters in January and again in March. There were 4 sightings of single prairie falcons recorded January, November and December. A sharp-shinned hawk was seen at the residences on 11/6. Short-eared owls were commonly seen in Alexander Basin.

7. Other Migratory Birds

Species commonly seen at headquarters bird feeders during the winter were evening grosbeak, English sparrow, northern flicker, downy woodpecker, hairy woodpecker, black-capped chickadee, house finch, goldfinch, dark-eyed junco and black-billed magpie. Bohemian waxwings were the most numerous birds on Mission Creek during winter, with groups of up to 300 commonly seen. Cedar waxwings were recorded at the houses again June. Other birds seen rarely or occasionally at feeders or in yards this year included Clark's nutcracker, northern shrike, common redpoll, varied thrush and white-crowned sparrow. Red-winged, yellow-headed and Brewer's blackbirds were common residents of the headquarters area during spring and summer, as were both eastern and western kingbirds, and a number of warbler species. Rufous hummingbirds, along with a Bullock's oriole, were regular users of hummingbird feeders at the residences.

Bill West and Lynn Clark counted Mission Creek on NBR as part of the Ninepipe area Audubon Christmas Bird Count on 12/15. They counted 1,382 birds of 26 different species as follows:

Mallard - 178	Black-billed Magpie - 32
Canada Goose - 131	Common Raven - 2
Common Goldeneye - 45	Northern Flicker - 10
Bufflehead - 1	Rough-legged Hawk - 1
Golden Eagle - 1	Red-tailed Hawk - 5
Ring-necked Pheasant - 3	American Robin - 5
Townsend's Solitaire - 7	Song Sparrow - 2
Merlin - 1	American Goldfinch - 41
Bohemian Waxwing - 700	House Sparrow - 110
Evening Grosbeak - 40	Hairy Woodpecker - 1
Black-capped Chickadee - 11	House Finch - 41
Dark-eyed Junco - 47	Great-horned Owl - 1
Red-winged Blackbird - 1	Common Redpoll - 1

8. Game Mammals

a. Annual Winter Big Game Drive Census

The winter big game drive census was conducted on March 9 with the assistance of 83 volunteers who were mostly students from the University of Montana and Salish Community College. Results are shown below:

Table 11. Results of the 1991 NBR annual winter big game drive census.

Unit	Number Counted					
	Elk	Mule Deer	White-tailed Deer	Pronghorn	Bighorn Sheep	Mountain Goat
1	3	5	87	--	--	--
2	3	24	28	29	--	--
3	3	3	--	50	--	--
4	2	20	--	--	10	5
5	46	11	--	--	3	5
6	49	45	12	--	22	27
7	78	40	5	7	6	--
8	12	--	34	16	--	--
All 196*	148		166	102	41	37

*130 in pre-count estimate from 1990 year-end estimate. Probable duplication in this count.

Other species recorded on the count included 30 coyotes, 1 bald eagle, 15 gray partridge, 1 bobcat, 2 great-horned owls, 1 goshawk, 1 Cooper's hawk, 1 sharp-shinned hawk, 3 red-tailed hawks, 2 northern harriers, 6 blue grouse and 1 ruffed grouse.

As seen in the annotations to the count results, we had problems reconciling the elk census figures with our year-end estimates from 1990. Elk counts later in the year indicated that the 1990 year-end estimate of 130 was more accurate than the winter census figure, so the records were adjusted accordingly.

b. Elk

The year began with 130 elk on the population estimate records. Natural mortality during the year included 5 older bulls and 1 cow found dead on the range.

Early fall composition counts indicated that 63% of the adult population were cows, 30% were branch-antlered bulls and 7% were yearling bulls. The ratio of 43 calves/100 cows from the composition counts was down from the 11-year mean of 54/100.

In early December, Tribal members were legally hunting a group of elk just outside the west boundary of the refuge. They wounded 3 elk that managed to jump the boundary fence into the Bison Range where it crosses the Mission H irrigation canal. The wounded elk were tracked down by Range personnel and put down. One was returned to the man who shot it and reported the incident to us, while meat from the other 2 was donated to the Tribal Elders, Lake County Senior Citizens and Lake County Youth Guidance Home. It appeared from tracks that at least 3 other elk that were not wounded jumped into the refuge at the time of this incident.

The year-end elk population was estimated at 165, as follows:

Table 12. 1991 NBR year-end elk population estimates.

Classification	Number
Adult Bull	39
Yearling Bull	9
Cow	82
Calf	35
Total	165

Trapping and removal of 35 elk to bring the population to base herd objective levels was scheduled for December, but was not accomplished due to foggy weather, elk locations and scheduled maintenance on the Montana FWP helicopter. The trapping operation will be rescheduled for early 1992.

c. Mule Deer

There were 148 mule deer counted in the winter big game drive census. There were no records made of any natural mortalities this year. Fall composition counts indicated that 62% of the adults were females, with a fawn:doe ratio of 62:100. The fawn:doe ratio was well above the average of 51:100 recorded over the past 10 years. The fall population estimate was 196, including 48 fawns. Since the base herd population objective is 200, there were no removals this year.

Table 13. 1991 NBR mule deer year-end population estimates.

Classification	Number
Buck	56
Doe	92
Fawn	48
Total	196

d. White-tailed Deer

There were 166 white-tailed deer counted in the winter big game count. The only recorded natural mortality were a doe found dead along Mission Creek in February and a buck found dead in the same area in October. Fall composition counts yielded an estimate of only 24 fawns/100 does. This was well below the 11-year mean of 51, and the lowest since 1984. Coyote predation of fawns is the most likely reason for the decline this year.

The fall population was estimated at 199. There were 20 animals removed in early December to bring the population down to base herd objective level.

Table 14. 1991 NBR white-tailed deer year-end population estimates.

Classification	Pre-Removal Population	Removals	Post Removal Population
Buck	30	8	22
Doe	136	12	124
Fawn	33	--	33
Total	199	20	179

e. Pronghorn

The year began with an estimated 114 pronghorn in the herd, and 102 were tallied in the winter big game census. There were no records of natural mortality of adults this year.



Pronghorns had it rough during January, but conditions moderated and winter mortality was nil. NBR-91-13, JM-1/91

Coyote predation on fawns was very heavy. Most fawns were killed by coyotes within the first 2-3 weeks of birth. There 51 does which nearly all dropped twin fawns, but only 5 fawns survived until late August. The high coyote predation was due to a high coyote population resulting from the abundance of meadow voles prior to the 1991 fawning season. The vole population crashed in February, forcing coyotes to seek alternate food sources the remainder of the year.

One of the surviving fawns disappeared in mid-September, with evidence indicating it was taken by a golden eagle. Bart O'Gara of the Montana Cooperative Wildlife Research Unit took 2 adult bucks and 1 adult doe in the fall for specimens and also for photos for his forthcoming book on pronghorns.

The year-end population was estimated at 106 animals based on information supplied by pronghorn researcher John Byers.

Table 15. 1991 year-end pronghorn population on NBR.

Age	Male	Female	Total
Fawn	1	3	4
1	15	11	26
2	3	3	6
3	1	8	9
4	8	3	11
5	9	1	10
6+	8	34	42
Total	44	62	106

f. Bighorn Sheep

Slow decline of the bighorn sheep population continued. The year began with 39 sheep known present on the Range. Known mortality included 2 ewes found dead in March. Observations by research personnel in October indicated another 4 sheep had died or disappeared since the 1990 rut season.

Another adult ram disappeared late in the year, and a 2 year-old ram was sacrificed in November when it escaped the Range and came in contact with domestic sheep.

The one bright spot in the bighorn sheep story this year was the excellent lamb survival. There were 7 lambs surviving to year's end from 12 lambs born. This compared to the mean of 5 for the past 11 years, and only 1-2 surviving lambs in some years when over 20 ewes had lambs. The increased lamb survival was puzzling in light of poor survival of pronghorn and white-tailed deer fawns. It appeared that 2 coyotes taken on the north edge of the sheep lambing area in early May could have been key animals in predation on the bighorn lambs.

Even though lamb survival was improved, the recruitment was offset by losses and the known sheep population decreased by 1 this year. The number of females in the population is now low enough that it will be difficult to maintain stable numbers without augmentation of the breeding female segment. Plans to bring in additional females went awry this year when attempts by Montana FWP to trap excess sheep from Wildhorse Island in Flathead Lake were unsuccessful. At year's end, we continued to seek a source of additional female bighorns.



The ram segment of the bighorn population is in good shape, and provided viewing opportunities like these a good share of the time during summer.

NBR-91-14 & 15, JM-7/91



Table 16. 1991 NBR year-end bighorn sheep population.

Sex	Age												
	Lamb	1	2	3	4	5	6	7	8	9	10	14	Total
Male	4	1	2	6	1	1	1	-	1	2	2	1	22
Female	3	-	1	5	3	1	-	-	1	-	2	-	16
Total	7	1	3	11	4	2	1	-	2	2	4	1	38

The number of breeding ewes is likely below the minimum needed to maintain a stable population. No more than 13-15 ewes are expected to lamb next year. Research Biologist Jack Hogg believes that we will have to augment the population with new ewes, and increase the base population to about 80 animals in order to maintain population stability. Plans are to begin augmentation of the population in 1992-3, with a transplant of at least 7 young ewes and 3 rams from Wildhorse Island in cooperation with Montana FWP.

g. Mountain Goats

Mountain goats continued as the most difficult big game species to census. There were 37 mountain goats counted in the winter big game drive census. Highest count obtained following that was 35 spotted from High Point in 3 different groups in September.

Known mortality included an adult billy found dead on the south boundary in January, a yearling billy found dead in Agency Draw in July and an adult nanny that was sacrificed in October due to blindness resulting from pinkeye and injury.

Recruitment was estimated at 10 kids, and the year-end population was an estimated 45 goats.

h. Black Bear

Although no denning was confirmed this year, black bears were commonly observed throughout the summer by Range staff and visitors. Sightings were more numerous than in previous recent years, and the black bear population appeared up in this general region. There were at least a half dozen sightings of bears near the entrance, residences and Visitor Center this year. One observation of black bear tracks was made as late as November 7. Peak population during the summer was estimated at 8-10 bears.

i. Mountain Lion

Although the mountain lion population was up in the general area, there were no observations of mountain lions or their tracks recorded on the Range this year.

j. Bobcat

A bobcat was observed on the tour road switchbacks below the Bitterroot Trail on 11/14.

10. Other Resident Wildlife

a. Bison

The year began with 371 bison in the two main herds. Herd 1 had 195 head and there were 176 in Herd 2. In addition, there were 1 bull and 3 cows in the Exhibition Pasture at headquarters.



One of the main bison herds was in the Lower West Unit, spending a part of their time near headquarters where visitors could see a bunch in a short time.

NBR-91-17, JM-6/91

The herds were rotated among range units according to the schedule shown in Section F-7. However, buffalo continued their habit of breaking through range unit division fences. There were up to 75 stray bison in at least one unscheduled range unit most of the time throughout the year.

A small herd of 15 buffalo were trapped in the East Display Pasture in late March, but they were hard to confine in that 200-acre pasture and were in and out of the unit several times throughout the summer.

The first buffalo calf of the year was seen on April 14, somewhat later than usual, in the Lower West Unit. The majority of the calves were born during the first 2 weeks in May. At roundup, we tallied 103 calves from 131 breeding age cows, for a 79% calf crop. This was down from the 86% recorded in 1990 and the past 35-year mean of 88%.

Recorded natural mortality this year included 2 special-branded cows (coming 21 and 25 years old) that had been left in the Northside Unit during the 1990 roundup. Both were found dead during the March winter big game census. A bull, coming 2, was also found dead in the same unit. Calf mortality included a late 1990 calf found dead in January, a calf found dead in May that was likely stillborn and an orphaned calf that died in May. A 4-year bull was found dead in the Lower West Unit and a 10-year bull died in the Upper North Unit late in the summer. These could have been deaths from breeding season fights.

Range personnel and volunteers rode vacant pastures to gather stray bison the last week in September. A bull missed in sweeping the Northside Unit and 4 bulls missed in the Upper West were tallied on the range. In addition, a special-branded 23-year cow in poor condition was left in the Upper West Unit rather than subject her to the rigors of corral work. The main herds were moved into Elk Lane on October 2-3.

The two herds were worked through the corrals on October 7-8. The work was dry and dusty, and a water truck was again used to sprinkle the wing leading to the corrals and much of the corral working area. Calves were branded with a 1 on the right hip and heifer calves were vaccinated for brucellosis. All bison were given an annual 5-way booster vaccination for leptospirosis.

All except two of the bison run through the corrals were weighed, and the results are summarized in Table 17.



Roundup work was again very dry and dusty.
NBR-21-18, MB-10/91

Table 17. Bison weights at the 1991 NBR roundup.

Age	Males			Females		
	Weight Range	Number Weighed	Average Weight	Weight Range	Number Weighed	Average Weight
Calf	180-410	54	323	180-380	47	306
Yrlg.	420-800	70	657	425-695	47	600
2	830-1150	22	977	680-995	21	871
3	1100-1410	17	1248	725-1015	24	894
4	1310-1685	16	1523	825-1150	22	980
5	1630-1885	10	1744	825-1100	20	994
6	1565-1885	8	1724	865-1180	13	1029
7	1790-1975	4	1865	825-1130	11	1025
8	1685-2120	7	1818	995-1185	10	1074
9	1695-1970	5	1865	870-1130	10	1005
10	1710-1945	2	1828	1080-1165	4	1111
11	1675-1860	4	1751	975-1120	7	1064
12	1690-1895	2	1792	970-1090	2	1030
13	-----	-	----	-1010	1	1010
14	-----	-	----	-1150	1	1150
15	-2030	1	2030	-----	-	----

This year's calf weights were up 3% from those of 1990, while weights of older animals were down by 3%.

There were 19 special-branded buffalo identified during this year's roundup as shown in Table 18. In addition, 2 calves out of cows brought in from the Maxwell Herd in Kansas in 1984 were special-branded this year.

Table 18. Special-branded bison identified at 1991 NBR roundup.

Special Brand	Age	Sex	Weights		1991	Comments
			1989	1990		
Bar Over 1	Calf	Bull			400	Kansas Mother
Bar Under 1	Calf	Heifer			320	" "
Bar Over 0	Yrlg	Bull		310	735	" "
"D" Right Hip	Yrlg	Bull	---	---	500	1990 Orphan
19	2	Bull	260	680	900	" "
Bar Under 9	2	Bull	280	700	955	" "
91	Yrlg	Heifer	320	675	920	" "
18	3	Bull	580	885	1125	" "
81	3	Bull	---	960	1215	" "
17	4	Cow	905	---	1080	" "
7 Left 8 Right	4	Cow	730	780	825	Non-Vaccinate
Bar Over 7	4	Bull	1015	1290	1475	Kansas Mother
Bar Under 5	6	Bull	1335	1600	1715	
Bar Over 4	7	Cow	995	1100	1010	From Kansas
Bar Over 4	7	Cow	985	1010	1010	" "
Bar Over 4	7	Cow	810	840	825	" "
Bar Over 4	7	Cow	---	965	955	" "
Bar Under 4	7	Cow	1005	1030	975	
1 Left 4 Right	9	Cow	---	1000	1010	
1 Left T Right	9	Cow	910	940	950	
1 Left X Right	9	Cow	960	970	975	
Bar Under 7 Rt	14	Cow	1095	---	1150	White Eyelash
Bar Left 8 Rt.	23	Cow	1028	N.W.	N.W.	Not Weighed*

*Left in Upper West Unit just prior to roundup.

Cows brought here as calves from the Maxwell State Game Refuge in Kansas in 1984 were special-branded. Their offspring have been special-branded when we could identify them at roundup since 1987 in order to insure keeping the new blood in the herd. Other animals have been special-branded as a means of keeping individual weight and longevity records. They are not removed from the herd in the annual sales and are allowed to live out their natural lives. As noted previously, special-branded cows that were 20 and 24 years old at the 1990 roundup were left on the range then and died during the winter. Another 23-year

special-branded cow was left in the Upper West Unit this year and will likely not make it through the winter.



For obvious reasons, we attempt to get bulls separated as soon as possible after they enter the corrals.

NBR-91-19, MB-10/91

Following initial roundup corral work, we assisted local veterinarian Dave Weinandy in pregnancy testing 23 breeding age cows that buyer Bob White had purchased. Weinandy found only 17, or 74%, of the cows pregnant.

At year's end there were 364 bison in the main herds, 198 in Herd 1 and 166 in Herd 2. For 1992 there will be 125 breeding age cows in the herds. The overall sex composition of the herds was 56% females and 44% males.

Table 19. Composition of NBR bison herds on December 31, 1991.

Age	Herd 1			Herd 2			Total			Percent
	Sex Male	Sex Female	Total	Sex Male	Sex Female	Total	Sex Male	Sex Female	Total	
C	31	23	54	24	24	48	55	47	102	28.0%
1	14	13	27	10	18	28	24	31	55	15.1%
2	10	16	26	11	5	16	21	21	42	11.5%
3	5	13	18	8	10	18	13	23	36	9.9%
4	6	10	16	4	8	12	10	18	28	7.7%
5	5	6	11	2	7	9	7	13	20	5.5%
6	4	5	9	4	4	8	8	9	17	4.7%
7	1	7	8	3	2	5	4	9	13	3.6%
8	4	5	9	3	2	5	7	7	14	3.8%
9	3	5	8	2	5	7	5	10	15	4.1%
10		2	2	1	3	4	1	5	6	1.6%
11	2	2	4	1	3	4	3	5	8	2.2%
12	2	1	3		1	1	2	2	4	1.1%
13		1	1					1	1	0.3%
14		1	1					1	1	0.3%
15				1		1	1		1	
18			1						1	0.3%
23		1	1					1	1	0.3%
Total	87	111	198	74	92	176	161	203	364	100.0%

The above table does not include 1 bull (6 year) and 3 cows (13, 14, and 18 years) in the Exhibition Pasture. Also not included is a heifer calf that will be turned out with Herd 1 in April, 1992.

b. Coyotes

The coyote population was the highest in the past 10 years, and likely as high as ever seen here. Although the tremendous population of meadow voles crashed in February, coyotes entered the breeding season well-fed on voles. The 30 coyotes counted during the Winter Big Game Census was way up from the 10-15 normally recorded. Reproduction was excellent, and litters were large.

The meadow vole population crashed in February, causing coyotes to seek alternate food sources. Coyote predation on deer and pronghorn fawns was consequently very heavy.

Range personnel again took 12 coyotes in the authorized control program. At year's end, coyote observations seemed down some from the first of the year. We estimate the year-end refuge population at 45 coyotes.



Although we have a coyote control program, elimination is not the intent and coyotes will always be a part of biological diversity in this ecosystem.
NBR-91-19, JM-9/91

c. Grouse

Adult blue grouse were commonly seen along the auto tour route in the spring. Several broods were seen in higher portions of the range during summer.

Ruffed grouse were seen only once this year when one was recorded during the Winter Big Game Census.

d. Gray Partridge

Populations and brood production of gray partridge were excellent this year. Large broods were seen during spring and summer at numerous locations throughout the refuge.

e. Ring-necked Pheasant

Pheasants were commonly seen in the brushy riparian habitat along Mission Creek, Pauline Creek and Sabine Creek.

f. Rabbits

Cottontail rabbits have been on the increase the past few years, and were commonly seen along the Auto Tour and at cattleguards near headquarters this year. One family continued to reside under the woodsheds behind the Office/Visitor Center.

A few snowshoe hares inhabit timbered areas in higher parts of the Range, but aren't seen very often. Only 1 observation was recorded by Range personnel this year.

11. Fisheries Resources

Mission Creek continued to support good populations of rainbow trout, squawfish, whitefish and suckers. Anglers along open portions of the creek caught rainbows up to 18" long in season.

13. Surplus Animal Disposal

a. Live Bison

A heifer calf that was refused by her 3-year mother during the pine needle abortion experiment in May was saved by bottle-feeding and sold to a local rancher for \$300.

Bid sheets for the annual sealed bid sale of live bison were issued August 6 and bids were due back in by September 10. There were 102 animals offered.

Results of the sale are shown in Table 20. There were only 14 bidders participating this year, down from 16 last year and 28 the year before. Successful bidders numbered 8 this year, compared to 7 last year. The overall average price of \$1110.82 down \$59 from last year's average of \$1169.83. Even with the drop, the average price here was the second highest of 8 public herd sales for 1991.

Table 20. Summary of 1991 NBR sealed bid bison sale results.

Group	Number Sold	Successful High	Bids Low	Average	Total Revenue
Yrlg. Heifers	16	\$1,100.00	1,100.00	1,100.00	\$17,600.00
3 Yr. Cow	1	1,275.00	1,275.00	1,275.00	1,275.00
4 Yr. Cows	4	1,261.00	1,261.00	1,261.00	5,044.00
5 Yr. Cows	7	1,261.00	1,261.00	1,261.00	8,827.00
6 Yr. Cows	4	1,261.00	1,261.00	1,261.00	5,044.00
7 Yr. Cows	2	1,261.00	1,261.00	1,261.00	2,522.00
8 Yr. Cows	3	1,191.00	1,191.00	1,191.00	3,573.00
10+ Yr. Cows	2	851.00	851.00	851.00	1,702.00
Yrlg. Bulls	44	975.00	927.00	929.45	40,896.00
2 Yr. Bull	1	1,059.00	1,059.00	1,059.00	1,059.00
3 Yr. Bulls	3	1,379.00	1,251.00	1,336.33	4,009.00
4 Yr. Bulls	6	1,389.00	1,334.00	1,365.00	8,190.00
8 Yr. Bull	1	1,503.00	1,503.00	1,503.00	1,503.00
9 Yr. Bull	1	1,641.00	1,641.00	1,641.00	1,641.00
10+ Yr. Bulls	2	1,752.00	1,752.00	1,752.00	3,504.00
Total	102	1,752.00	851.00	1,110.82	\$113,304.00

Table 21 shows disposition of the buffalo sold this year. Largest buyer this year was Ted Turner of Gallatin Gateway, MT who bought 16 yearling heifers and 20 yearling bulls for a total of \$35,600. M&S Meats of Rollins, MT purchased 22 breeding age cows, a 3-year bull and a 5-year bull for \$29,466. White's Meats took 23 yearling bulls, a 2-year bull, two 3-year bulls and a 3-year cow for \$26,173.

Table 21. Disposition of 1991 NBR sale buffalo.

State	Breeding	Slaughter/Feedlot	Total	%
Montana	57	43	100	98
Washington	--	2	2	2
Total	57	45	102	100

The proportion of bison purchased for breeding purposes decreased to 56% this year, compared to 64% in 1990.



We assisted the buyer in pregnancy testing this sale pen of 23 breeding age cows. The vet found 17, or 74% pregnant.
NBR-91-20, MB-10/91

In addition to the buffalo sold, we donated 2 yearling bulls, a 2-year bull and a 3-year bull to Antelope Island State Park in Utah for increasing genetic diversity in their herd.

b. Deer Removals

Range personnel removed 20 white-tailed deer in November to bring populations in line with base herd objectives. The deer were shot, field-dressed and taken to the slaughterhouse where they were hog-dressed for donation to 7 area school lunch programs.

14. Scientific Collections

Big game animals or their parts are donated to various agencies or schools as they become available. The Refuge maintains a working list of potential recipients prioritized by date of request. During 1991 the following animal parts were donated:

<u>Item</u>	<u>Purpose of Donation</u>
1 sick Mtn. goat & 2 pronghorn antelope	MT Coop Wildlife Res. Unit
8 misc. antlers	Education -Two Eagle River HS.
Bighorn sheep Ram skull & bison skull	Montana Natural History Center
Bison skull	Palm Springs, CA High School
Bison skull	Nevada State Prison's Sweat Lodge (Native Am. Religion)

17. Disease Prevention and Control

The practice of vaccinating bison heifer calves for brucellosis was continued at roundup this year. We also continued giving bison of all ages an annual booster shot of 5-way leptospirosis vaccine.

About half of sale animals at roundup were tested for brucellosis and the 4 bulls going to Utah were also tested for tuberculosis. The tests were all negative.

H. PUBLIC USE

1. General

Visitors through the front gate reached an all-time record of 156,000 in 1991, up 18% from last year's record of 132,000. New counters installed at the Ravalli Hill Viewpoint along Highway 93 counted an additional 29,000, making the final total of Bison Range visitors 185,000 for this season. Glacier and Yellowstone National Parks also had record visitation but were up only 4% to 5% over 1990. Visitation trends since 1968 are shown in Figure 2 and monthly visitor patterns are displayed in the graph in Figure 3.

VISITOR USE 1968 TO 1991

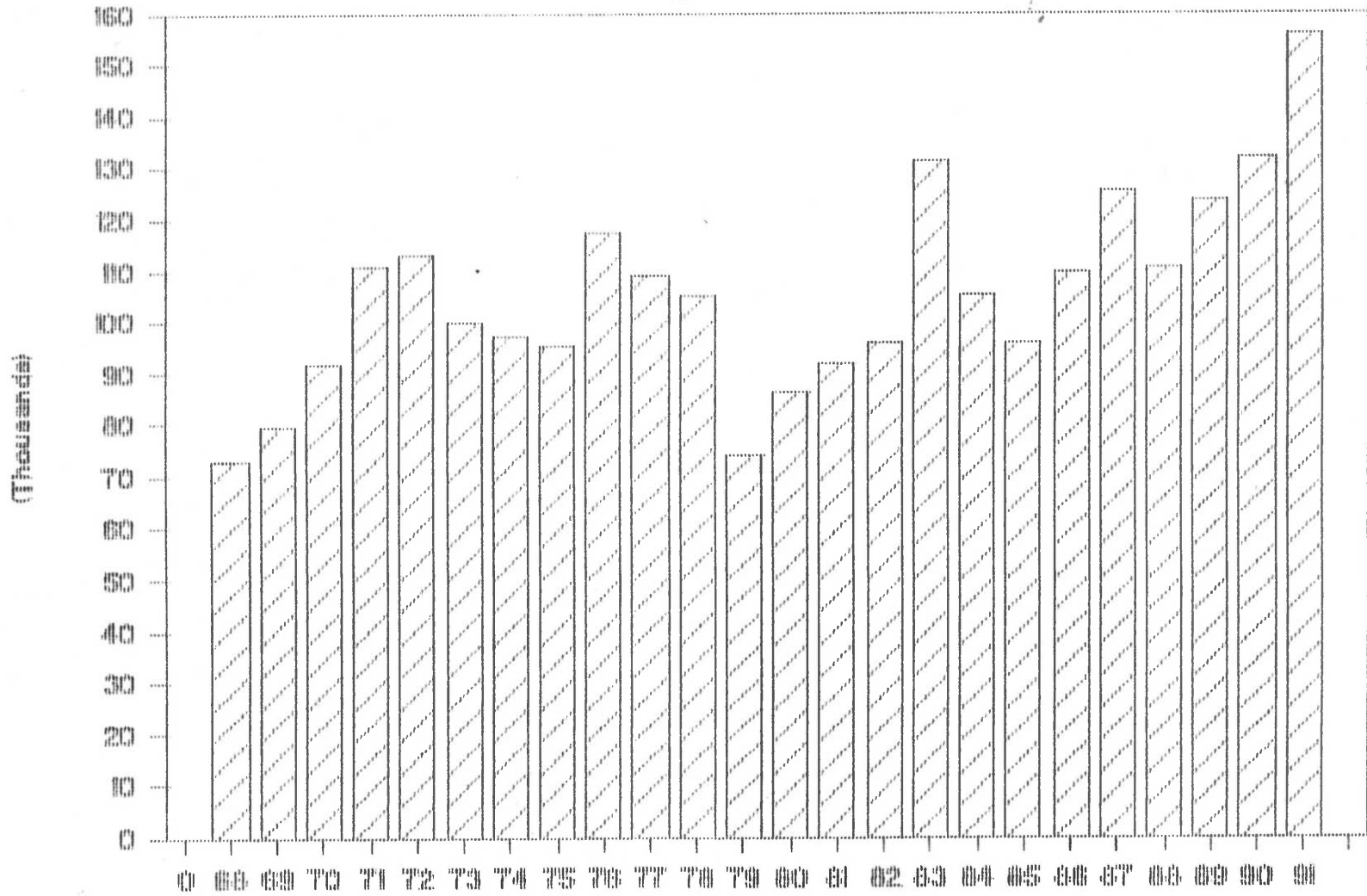


Figure 2.

VISITOR USE

Monthly Use Patterns

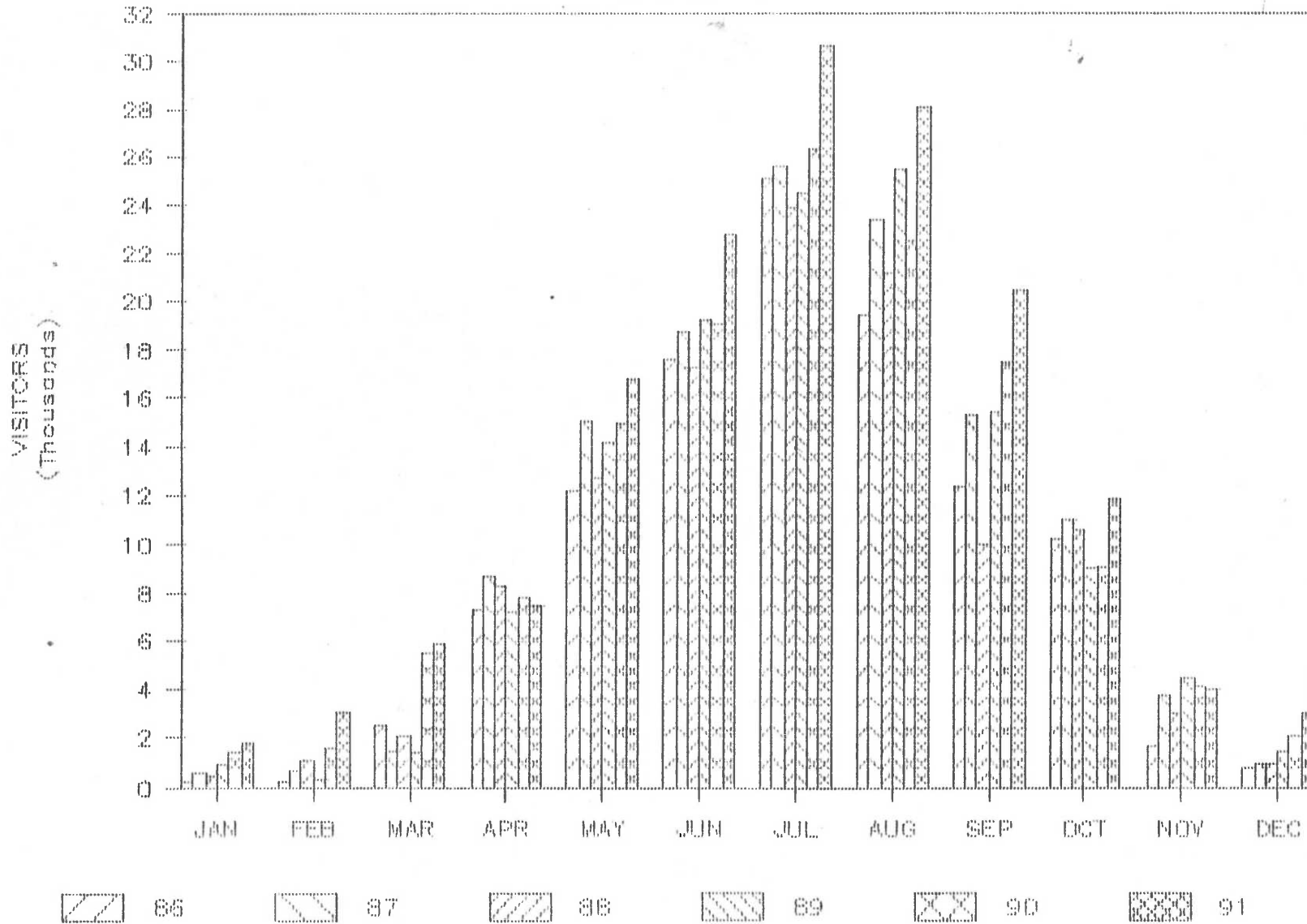


Figure 3.



Visitors' modes of transportation included both the old and the new.
NBR-91-21, JM-5/91

The increase in visitors taxed staff and facilities to the maximum. The Visitor and Education Center was overcrowded much of the time from May through August. Visitors averaged 625 per day in July, with as high as 1,130 recorded in one day. The Center became a mass of milling humanity. Three days had over 1,000 people and broke the previous single-day record of 1,042 set in 1990. Prior to that time 800 had been the record for single-day use. Visitor surveys, done in 1981 when the Visitor and Education Center was first completed, estimated that display area overcrowding occurred with 50 people present. This summer there were up to 210 people in the Center at one time and well over 200 per hour on a fairly regular basis during peak hours.

The theater, with 20 chairs, has always been a problem, as groups and schools arrive by the bus load of 40 to 60. Of the 218 organized groups and schools using the theater, 77% exceeded the seating capacity, 39% were more than double and 14% tripled the capacity. There were 8 groups with 100 to 150 people. School children were able to sit on the theater floor but 43% of the groups were made up of senior citizens

who could not. Some groups were divided into smaller sections for the theater but most tours and schools were on a limited time schedule so they just crowded in. The extended waiting time for groups that were split led to additional overcrowding in the display area. Where possible, waiting groups were provided with alternate activities, which increased the work load of an already stressed staff. At most, Visitor Center personnel at any given time consisted of one staff person and two YCC's or volunteers. On some days it was down to only one person.

Over 60% of the visitors were from outside the intermountain west, with about 30% from eastern states and foreign countries. Organized tour groups were also up from last year. There were 3,320 individuals who visited as a part of 98 organized tours. Saga, Allied, and Cosmos Tours made regular trips to the Range and accounted for 1,392 of these visitors. Some 428 people were part of 17 foreign tour groups.

Special events drew a number of visitors. The annual Bison Roundup attracted 3,450 viewers. Some 300 riders toured the Range on horseback on the annual Mission Rangers Saddle Club Ride, supervised by Range personnel. The ACCESS program for people with disabilities served 178 people. Day Camps and Teacher Workshops had 310 participants and instructors.

Local use on summer holiday weekends brought increased visitation. Holiday visitor figures this year were: Mothers Day, 2,100; Memorial Day, 3,700; Father's Day, 2,200; Fourth of July, 4,887; and Labor Day, 3,420. Holiday use was up 17%.

A number of special guests visited the Range. Four members of an Agricultural Exchange Group from Kazakhtan, Soviet Union, were briefed on management of the Range by West. Bishop guided two groups of wildlife managers from Tanzania and Botswana. Exchange program scientists from Mexico and Australia were brought by their hosts at the University of Montana.

The Bison Range also hosted an interagency Watchable Wildlife Conference on Interpretation organized by Region 1 of the Forest Service. The 56 participants included Forest Service, Fish and Wildlife Service and Bureau of Land Management personnel from all over the country.

Bishop attended a Regional Environmental Education Meeting held in Denver and was selected as one of 5 people from the Region to participate in a National USFWS Education Meeting with Office of Training and Education personnel in St. Paul.



Bill West led a tour for a group of Russian farmers and farm experts. NBR-91-22

The Bison Range Education Program received an Environmental Achievement Award from the National Environmental Awards Council. These awards were given for outstanding environmental projects and have not usually been for education programs. We did not know that the program had been recommended for this award or who submitted it.

The receipt of a 7-passenger Dodge Caravan was welcomed for the public use and education program. It replaced a 1979 Ford Fairlane station wagon. Day Camp students assumed that it was just for them, screamed with delight and made up a song titled "We've got a New Van."

Accessibility received continued attention this year. We requested input by an evaluation team in April. This group included: Michael Regnier, Accessibility Evaluation Specialist for Summit Independent Living Center; Paul Hengel director of Mountain Dog, an outdoor recreation group

for people with disabilities; LaDonna Fowler director of AWARE a disability group within the Confederated Salish and Kootenai Tribes; and two additional individuals from Summit. We also participated in a Summit survey of accessible facilities in the area in May. Maryetta Bauer formerly of Summit, and currently manager of an employment program for people with disabilities, assisted with the final review for completion of the 504 reports. Staff from Lee Metcalf also participated in this review.



Michael Regnier, Paul Hengel, LaDonna Fowler and their drivers during 504 evaluation.
NBR-91-23, MB-4/91

The evaluation team was generally pleased with our efforts and with the availability of tactile, natural materials for the visually impaired. They confirmed that the entrance walk to the Visitor Center is too steep for its length. At this pitch, 1:12, it should be no more than 40 feet long or it should have at least three rest areas. The alternative would be a more gradual pitch of 1:16. It also needs a handrail. Visitor Center restrooms were not built to code at the time they were constructed in 1981. Doors of the size used were authorized only for retrofit by the 1973 code. Restroom door problems can be corrected. Entrance walk problems will require major redesign as a part of Visitor Center expansion, if and when that is done.

The Bison Range was chosen as the site of the first 504 workshop in Region 6. This was held on August 7 and 8.

Sessions were conducted by Frank Bryce from the Regional Office and Carol Hunter of PAW (Public Access to the Woods). Malcolm and Bishop participated along with personnel from Lee Metcalf N.W.R, Creston Hatchery and the Regional Office. Wheelchair experience during the course and information from volunteer Maryetta Bauer, who uses a wheelchair, helped the group understand the problems faced by people with disabilities.

2. Outdoor Classrooms - Students

A total of 4,700 students in 121 school groups spent 16,000 activity hours on the Bison Range. Demand required scheduling of school groups at both the Visitor and Education Center and at the Nature Trail outdoor activity site. On days of peak demand we also used a pond area near the Environmental Education Campsite for school activities. Several days had over 200 students engaged in outdoor learning projects on the Range, with a record day of 5 classes totalling 282 students. An additional 839 students in 21 school groups came to see roundup.

All school groups saw the introductory video and had a question and answer period. Skulls, skins, bird mounts and other natural materials were provided as teaching props. Teachers were encouraged to conduct their own programs but a staff person was always available if they needed assistance. Teachers did all of their own outdoor activities, using materials from our Environmental Education Library or the Teacher Workshops. University and secondary level science classes often had specific requests for talks and guided tours and were accommodated. Special Education classes and students with disabilities also received presentations suited to their needs.

University classes totaled 362 students. A Recreation and Resource Class of 17 people from the University of Montana spent a day piling brush in exchange for information on our interpretive and management programs. A mammology class spent 3 days at the EE Campsite while doing small mammal trapping. The Range was also included in the educational tours for 65 students from foreign Universities and Secondary Schools.

The annual Summer Day Camps, held in early July, had 68 area children participating in 2 camps of 2 days each. Two YCC's, an intern from Clemson University and 5 volunteers assisted with the camps. Each camp consisted of one day of learning activities and a one day discovery hike. The 6, 7 and 8 year-old group learned about animal communication while the second camp for 9, 10 and 11 year-olds studied

weather and viewed the solar eclipse with reflective devices made during the camp.



Day Camp participants look at the solar eclipse through safe reflective devices made at the camp.

NBR-91-24, MB-7/91

The ACCESS program for people with disabilities served 178 individuals. Groups were arranged through Special Education and Resource classes, Special Citizens Centers, Summit Independent Living Center and Mountain Dog. Blue Spruce Lodge, a Trout Creek area guest ranch for people with disabilities, continued to bring regular small groups. Programs were presented on several topics and at a wide variety of interest and ability levels, for hearing, visual, learning or mobility impaired individuals. Sessions used the newly paved Accessible Nature Trail.

3. Outdoor Classrooms - Teachers

A total of 725 teachers spent approximately 4,660 hours participating in outdoor education activities at the National Bison Range. Of these, a record 190 took part in four Teacher Workshops. Both spring and fall regular workshops were filled to capacity and two additional special request workshops were given.

The regular spring workshop had 82 participants. A team of 14 volunteer instructors led teachers through an exploration of their choice of four different habitats. The 68 teachers participating in the fall workshop learned to use and prepare natural materials as teaching aids and to conduct productive discovery walks. There were also sessions on Project Wild and Project Learning Tree. The fall workshop had 12 volunteer instructors. A special workshop on Wildlife Adaptations to Winter was given for 32 Missoula County Rural Teachers at the request of Rachel Velleux, Missoula County Superintendent of Schools. A two-day workshop on Elk and Elk Management was held in cooperation with the Montana Department of Fish, Wildlife and Parks, Project Wild and the Rocky Mountain Elk Foundation. Classes were held at the RMEF Visitor Center on the first day and field studies were done at the Bison Range on the second.

Education Program instructors were drawn from the University of Montana, Flathead Valley Community College, Salish Kootenai College, University of Idaho, area high school science programs and the Bison Range staff. They included 33 volunteer teaching professionals.

The Environmental Education Library was completely renovated by Clemson summer intern Kelly Hagerman with the help of 2 YCCs. This library of folders filed by subject and grade level is available for loan to teachers giving them ready-to-use classroom and field trip lesson plans. This year teachers from 20 area schools borrowed 50 folders. Teaching aids were also available for teachers using the Range. These included bird and mammal skulls, fur samples and study skins, insect and plant collections, bird nests, water test equipment, pond nets, trays, hand lenses and a dissecting scope and instruments.

4. Interpretive Foot Trails

The Nature Trails located in the day use area were popular as usual this season. They were heavily used by school groups for outdoor education activities. In addition approximately 15,600 visitors walked and viewed wildlife along the ponds and in the riparian habitat traversed by these trails. Portions of the Teacher Workshops and Summer Day Camps were done in this area. Interpretive signs enhanced public understanding but weather has taken its toll. New signs have been planned but await funding.

The Accessible Nature Trail was paved this summer through a grant from the Glacier Natural History Association and a matching service Challenge Grant. The trail was used by the 178 individuals who participated in our ACCESS program and

by other people with disabilities. Senior citizens also enjoyed this level grade trail which passed through wetland and riparian areas. The donation of a bridge for fishing access has been promised by the Public Access to the Woods organization with the cooperation of the Corrosion Resistant Materials Company.

Montana's State Flower, the Bitterroot, was exceptionally showy along the Bitterroot Trail, a hiking trail adjacent to Red Sleep Mountain Drive. Although the first 100 yards of this trail was widened and regraded in 1988, providing easier access for partially disabled visitors and seniors, more work is required for improved accessibility. Accessible restrooms and an alternative viewpoint site for wheelchair bound visitors await funding.

5. Interpretive Tour Routes

Approximately 136,000 people drove the tour roads in 1991. About 56,500 took the 19-mile Red Sleep Mountain Drive and the balance drove the shorter Buffalo Prairie Drives or the Winter Drive. Of the visitors traveling the long tour about 28,000 used the self-guiding tour leaflet. An additional 230 received guided tours as a part of workshops or special classes or tours.

The Red Sleep Mountain Drive was opened in the spring on May 11 and was closed for the season on October 26. The only fire closure was for about half a day, on October 16 when dry conditions and high winds made fire danger extreme. Evening rains made it possible to reopen the road the next morning. The only other road closure was for a brief time during round-up. Early season demand for this road has been high. In most years it has been free of snow and could have been opened by mid-March. Additional patrol staff costs precluded earlier opening.

The shorter Buffalo Prairie Drives were popular with organized tours and others whose schedules did not permit the two hours required to complete the long drive. Groups traveling in large buses were also confined to the shorter drives because they were unable to negotiate the grades and switchbacks on the Red Sleep road. Visitors on these short drives usually had an opportunity to see buffalo, elk, deer or pronghorns.



A good share of folks driving the auto tours saw bison on or near the road.

NBR-91-25, MB-6/91

The Winter Drive, consisting of the 5-mile lower portion of the Red Sleep Mountain Drive, was open to two-way traffic during the winter months. It provided a 1-hour round-trip with excellent wildlife viewing opportunities. Bison herds were in grazing units bisected by the route for most of the winter months.

6. Interpretive Exhibits/Demonstrations

A record 70,000 visitors viewed displays on bison and their history in the Visitor Center. Approximately 30,000 saw the interpretive video on the Range and its management. The Visitor Center was open daily from 8 a.m. to 8 p.m. from mid-May through roundup in early October. During the balance of the year it was open during regular office hours, from 8 a.m. to 4:30 p.m. on weekdays only.

One part time staff person, two YCC's, a student intern and 4 volunteers assisted the Outdoor Recreation Planner with interpretation and receptionist duties. None of these aides were present for the entire summer. The visitor season runs from April through October. The intern worked from mid-May through July. YCC's worked from early-June through late-August. The volunteers, two couples, started in July and

August and worked about two months each. The seasonal staff person and one of the YCC's were each gone for 3 to 4 weeks for course work. This made for complex work scheduling.

The public information radio station digital voice recorder installed in 1987 continued to give us trouble free operation. Winter and summer messages were used. Messages were quickly reinstalled from a tape for seasonal changes or if lost during long power outages. An internal battery back-up covered short term power loss. The equipment could hold and run two messages and additional messages were added for roundup and a fire closure.

Outreach activities included off-refuge talks and programs presented by Malcolm, West, Bishop and Clark to 20 groups totalling about 400 people. Recipients included civic, resource and sportsmen's groups plus 4-H and garden clubs. West participated on the State Purple Loosestrife Planning Team and the traveling purple loosestrife display was provided for several meetings. He also was a member of the Review Committee for week-long meetings on Tribal Natural Resource Planning. Bishop presented a paper titled "Double-crested cormorants and great blue herons: Management for biodiversity," at a Non-Game Symposium held in conjunction with the Wildlife Society meeting. She also presented a poster paper, "The National Bison Range Education Program," for the Montana Environmental Education Association Meeting later that same week. Clark served as a Lake County Junior Fair judge for 4-H wildlife and range management exhibits. Bishop judged the St. Ignatius Science Fair and conducted bird walks for Audubon and for a Regional Nature Conservancy Conference. Fitzpatrick spent two days manning the FWS booth at the State Fair in Great Falls.



This display on the Bison Range Education Program was shown at the Montana Environmental Education Association Annual Meeting and USFWS National EE Meeting in St. Paul. NBR-91-26, MB-9/91

Media crews filmed several events on the Range. KPAX-TV, (CBS) and KECI-TV (NBC) out of Missoula and KXLY-TV from Spokane did several news spots here. Chief topics were workshops, day camps and bison and their history. A cable network shot a segment for "Outdoor Magazine" a television special feature and a Japanese crew filmed part of a documentary on bison for Japanese Public Television. Ron Shade did a segment for BBC-TV. Freelance authors continued to write about bison and the Bison Range with varying degrees of success and accuracy. We tried to guide them when we had the opportunity but they rarely asked, they just wrote. Usually the first indication was when the questions started pouring in. Bill and Laura Riley worked on upgrading their refuge handbook and John Hollingsworth was here several times taking photographs for a book he is doing on refuges.

9. Fishing

Fishing in accordance with state regulations, was permitted along portions of Mission Creek and the Jocko River that lie within the boundaries of the Bison Range. State regulations required the Joint State and Tribal Conservation License with a Joint fishing stamp for lands within the Flathead Indian Reservation. However, due to an error in the published Joint Fishing Regulations no license was required for fishing on the Bison Range this season. Even though water remained muddy fairly late in the season an estimated 350 individuals fished in Mission Creek. Rainbow trout were the most commonly caught species.

A portion of the newly paved Accessible Trail was extended to a bridge site along Mission Creek. A donated fishing bridge has been promised by Public Access to the Woods, to be installed in early summer, 1992.

11. Wildlife Observation

Visitors spent an estimated 180,000 activity hours observing wildlife along the Bison Range scenic drives. Bison, elk, pronghorn and deer were the most visible. Bighorn rams frequented areas near the tour road at higher elevations for much of the summer and were special favorites with visitors. Coyotes or badgers were enjoyed by those who came early in the morning. The Red Sleep Mountain Drive also rewarded visitors with an occasional sighting of a mountain goat or black bear.



Bison, bighorn sheep and pronghorn have become accustomed to vehicles, and provide visitors with frequent close-up viewing.
NBR-91-27 & 28, JM-7/91



Bears were more visible than in most seasons and about 8 or 10 different bears were sighted along the tour roads. They were also seen at much lower elevations than usual. Two brown phase yearlings and a black female were observed near the Visitor Center. Individual bears were seen in the entrance area and along Mission Creek on several occasions.

The Refuge bird list was updated to accommodate the many birders who visit the Range. The day-use area offered riparian wildlife and birds. The four habitat types on the Range provided for a diverse bird community. Species most sought for life lists were Lewis' woodpecker, grasshopper sparrow, yellow-breasted chat, Clark's nutcracker and blue grouse. Casual visitors and birders new to the west were most attracted to golden eagles, magpies and a healthy crop of gray partridge. Winter visitors were delighted by Townsend's Solitaires, singing to defend their juniper berry feeding territories along Mission Creek.

12. Other Wildlife Oriented-Recreation

Visitors to roundup this year totalled 3,450 and included 839 students as part of 21 school groups. For safety reasons, grade levels were again restricted to fourth grade or above. Younger children, high risks for accidents, were not turned away but were offered other programs or were invited to come during loading operations later in the week when there were no crowds.

We continued to use mounted volunteers for roundup visitor parking and vehicle control in addition to the volunteers who assisted with visitor information and bison handling. A video program at the corrals explained activities in progress and gave information about the Bison Range and its management to approximately 1,200 students and other visitors. Another video on bison biology and behavior was shown at the Visitor Center to all schools and to any others who were interested. A schematic drawing of the corrals with work station descriptions was available as a handout for visitor orientation. The Charlo PTA again provided a food booth for visitors and staff in the corral area.

A total of 39 photographers pre-registered to use roundup photo sites not accessible to the general public. Catwalk improvements and extra volunteer coordinators improved photographer handling and reduced congestion in the work areas.

Wildlife photography continued to be popular. In addition to those attending roundup, 78 professional or semi-professional photographers spent 190 man-days and approximately 1,100 hours on wildlife photography. They worked under special back-country access permits or by hiking along the fishing access areas for whitetail. Elk, bighorns and deer with big racks were the most sought after subjects. These are the photos that are most saleable to feed the continuous demand from sportsmen's magazines.

13. Camping

Camp grounds for the general public are not provided on the Bison Range. However, there is a small Environmental Education Campsite which is available to educational groups working on a planned curriculum. This year the area was used by 30 University of Montana Students engaged in a small mammal trapping projects, and an honors biology class from Lincoln High School. Area Boy Scouts camped on the Range one or two nights while engaged in antler pickup.

14. Picnicking

Approximately 58,000 visitors had picnics in our picnic area. The shaded site provided a pleasant break for visitors after spending two hours on the warm, dusty tour route. Well marked accessible restrooms and picnic tables were available just across the road from the newly paved accessible nature trail.

17. Law Enforcement

The intensity of active Law Enforcement at the National Bison Range has increased over the years due to a steady increase in visitation on the Range and the acquisition of several thousand additional acres of Waterfowl Production Areas in Lake County.

The majority of summer enforcement is handled by a seasonal Refuge Law Enforcement Officer GS-1802. This position was filled in May by Officer Barry Tarbet who was assigned on a detail from San Francisco Bay NWR. Officer Tarbet served as the primary Law Enforcement Officer for the Range until late October.

There are three additional Refuge Officers at the National Bison Range. Biological Technician, Lynn Clark, acts as the primary L.E. officer in the absence of the 1802 and does active law enforcement two days a the week during the busy

summer months. Maintenance man Bob King and Refuge Operations Specialist Bill West provide backup and are on call year round. Officers Clark and West live on the Refuge.

Law Enforcement duties during the summer months consist of patrolling the auto tour roads and the picnic area, checking fishermen on Mission Creek and the Jocko Fishing Access, patrolling the boundaries and back country, and closing the auto tour and the Range nightly. The Law Enforcement Officers are also responsible for enforcement on Ninepipe and Pablo NWRs and over 3000 acres of Waterfowl Production Areas in Lake County. In the summer months, the officer on duty will patrol these areas as time permits. In the fall, with the opening of waterfowl and pheasant seasons, all officers are busy checking hunters on Fish and Wildlife Service lands and assisting the state wardens. Further information on law enforcement activities for these areas can be found in the Narratives on Ninepipe, Pablo and The NW Montana Wetland Management District.

Most violations are handled by verbal or written warnings; However, violation notices are issued based on Refuge policy and at the Officers discretion. "Hiking away from the vehicle", which constitutes a trespass, continues to be the most commonly violated regulation. This regulation helps minimize disturbance to the wildlife and is important for the safety of the public, however for many visitors the temptation to get just a little closer to a wild bison or elk is just too great and all warnings are forgotten. Other common violations include; driving the wrong direction on the one-way Red Sleep Mountain Drive, careless driving, speeding and fishing without a license.

Violation	No. of Cases	Bond	Disposition
Trailer on Auto Tour	1	\$50	Posted bond
Wrong Way on 1-Way	1	\$40	Pending
	3	\$40	Posted bond
Fishing Without License	1	\$50	Posted bond
Hiking Away from Vehicle	2	\$50	Posted bond
Careless Driving	1	\$50	Posted Bond
Totals	9	\$410	8 posted bond

Visitors are made aware of regulations by several different means. These include brochures, personal contacts and a video theater presentation at the visitor center, extensive signing on the auto tour roads, and an AM radio channel that is broadcast on the range.

Law enforcement expenditures in 1991 included a new siren with PA system, and new flashing lights for the front and rear of the patrol vehicle.

Training received in 1991 included; seasonal 40 hour refresher at Marana for King and West, a preseason law enforcement and firearms qualification session conducted by Special Agent Branzell prior to the opening of waterfowl and pheasant seasons, and 12 weeks of police training at The Federal Law Enforcement Training Center in Glynco, GA, for Officer Clark.

18. Cooperating Associations

The book sales outlet in our Visitor Center was operated in cooperation with the Glacier National History Association. Books and wildlife prints were offered. Total sales were \$18,924. Book sales increased by 15% over 1990 while visitor use increased 18%. In the past, sales increases have exceeded visitor increases. We feel that the difference this year was due to the extreme crowding in the Visitor Center. The below-eye-level sales display was not readily apparent when the room was filled with people. Crowding at the service desk also discouraged purchases.

The most popular items were still the \$1.75 Cassidy Wildlife Prints which brought in \$6,302. The "Home on the Range" book published for us by the Association continues to sell well. GNHA authorized a price reduction from \$7.95 to \$5.95 and proceeds doubled to \$2,771.

Donations by the Association for fiscal year 1991 totalled \$6,000 which was used as the matching fund for a Service Challenge Grant to pave the Accessible Nature Trail. This paving was completed in August. The donation promised for 1992 will be approximately \$2,800.

This and future donations will be at the rate of 15% of our sales. Donations in prior years have varied but were generally about 30% or 40%. Glacier Park can no longer provide GNHA with building space. They will renovate the old Belton Railroad Station in West Glacier for quarters. Their purchase and increased operating costs will necessitate reduced donations to both Glacier Park and the other stations they supply.

Bishop represented the Bison Range at four GNHA Board Meetings and presented a report at the annual meeting. The Association has continued to be most helpful and cooperative and have made every effort to promptly provide us with appropriate stock and to respond to our needs to the best of their ability. We have maintained an excellent working relationship.

19. Concessions

A land exchange, divesting the Service of ownership of 1.25 acres and concession interests in the Moiese Store, was completed this year. Although the Service no longer has a concession interest at the store, the deed to the now privately-owned tract contains restrictive covenants which will protect the integrity of the Bison Range entrance area.

I. EQUIPMENT AND FACILITIES

1. New Construction

Maintenance Management System funds were used to dismantle a 36' X 60' metal equipment shed from a Waterfowl Production Area in the Bowdoin Wetland Management District near Dodson. The building was transported here, a concrete slab was poured and the structure was erected force account to provide much needed cold storage space for various units of farm and heavy equipment.

Construction of a bathroom in the shop was completed and the underground fuel storage tank from the Visitor Center/Office was reburied at the shop for a sewage holding tank. MMS funds were also used for this force account project, and it was a major item on the list of safety deficiencies identified in the 1990 Safety Inspection.

Other new construction included a Challenge Grant project in cooperation with the Glacier Natural History Association to pave approximately 2,200 feet of the Nature Trail near the Picnic Area. Each entity provided \$6,000 for this project. We provided force account trail preparation and purchased the asphalt on a supply contract, while GNHA contracted for laying the asphalt.

A new directional sign was built and installed on Highway 212 at the main entrance to help alleviate congestion at the Moiese Store and Bison Range entrance area.

Quarters funding was used in a force account project to build a new bedroom in the basement of Quarters 63.



One major project was moving this metal equipment shed from a WPA near Dodson, MT, and setting it up in the maintenance area. NBR-91-29 & 30, JM-9/91





Another major project for the maintenance crew this year was paving of the Nature Trail under a Cooperative Challenge Grant with Glacier Natural History Association.
NBR-91-31, JM-8/91

2. Rehabilitation

MMS funds were used to correct a number of safety deficiencies identified in the 1990 Safety Inspection. Major items included installation of GFI's in all refuge buildings and quarters where required and purchase of a steel cabinet for storage of flammable in the shop.

Other MMS projects were replacement of decking on the Center Bridge over Mission Creek, repair of the domestic well at the Visitor Center/Office, repair/upgrading of the intrusion alarm system at the same building, hauling and grading of 520 cubic yards of gravel on the Auto Tour road and clearing of downed timber on 5 miles of horse trails in higher parts of the Range.

MMS work at the corrals included rebuilding the hide house theater bleachers to eliminate safety hazards. Several loads of steel I-beams and angle iron were also hauled from the State Highway Department in Missoula for use in rehabilitating a portion of the old wooden bison corrals.

New metal roofing was installed on 4 outhouses at the corrals and 8 outhouses in the Picnic Area.

3. Major Maintenance

Major items included frequent checking and repair of boundary and interior fences, blading of the tour roads and patrol trails several times as needed, repainting of signs, repair and preparation of the corrals for roundup and shoeing and care of the horse string. Mowing, trimming and sprinkling of the Picnic Area and headquarters grounds also took a good share of the summer maintenance time.

A new water heater was purchased and installed at the corrals apartment. Lights and a siren were bought and installed on the primary patrol vehicle.

4. Equipment Utilization and Replacement

Vehicle replacements received included a 3/4 ton Dodge 4X4 from a FY90 order to replace a 1984 Dodge 4X4. FY91 orders received included a Dodge minivan to replace the 1978 Ford Station Wagon and a 4X4 3/4-ton Chevy to replace the 1979 Dodge 4X4. The Chevy was assigned to the Creston satellite station.

We purchased 2 new John Deere rear-steering, riding lawn mowers for use in the Picnic Area, headquarters grounds and residence yards. A John Deere 350 7-foot sickle bar mower was also purchased for use in weed control on all Complex areas.

Fire presuppression funds were used to purchase a winch for the fire pumper truck and a high volume trash pump for use in filling the pumper.

There were 3 gelding horses, 6-8 years old, added to the Range horse string. They replaced older geldings which had become unsound and marginal for safe use here.

The TD-9 crawler tractor that broke down in 1990 was put on surplus and disposed of through GSA sale.



This TD-9 crawler tractor, in service here since 1954, broke down for the last time and was sold for salvage.
NBR-91-32, JM-2/91

5. Communications Systems

A Motorola Desktrac base radio was purchased with fire funds to replace the old base station which went out and was not economically repairable. The new unit has frequencies for FWS, Montana FWP Region 1 and Statewide, Lake County primary and State Mutual Aid.

Another Motorola base station radio was obtained from Seedskaadee NWR, and will be installed in the shop.

6. Computer Systems

A Tripp Lite battery supply backup system was purchased and installed to protect the 2 most used computers in the office.

A Fujitsu dex530 fax machine was bought and put in service late in the year.

J. OTHER ITEMS

1. Cooperative Programs

We continued active participation in the Flathead Valley Cooperative Canada Goose Committee, with Manager Malcolm continuing as Chairman. The committee met in December to discuss the 1991 status of the valley's goose population. The consensus was that the Committee's population goal of approximately 1,100 breeding pairs of Canada geese has been met and the population is stable or still increasing. In light of this, the committee will disband, with any future technical decisions or recommendations on geese to be handled through alternate means.

Discussion at the goose meeting shifted from geese to the proposal for a Five Valleys Joint Venture in support of the North American Waterfowl Management Plan. Assistant Manager Bill West and Joe Ball of the Montana Cooperative Wildlife Research Unit have headed up the proposal and we hope to see it operational before long.

Permission was continued for hydrologists of the Confederated Salish and Kootenai Tribes to maintain a stream gauging station on Mission Creek at headquarters.

The cooperative antler salvage effort with the Charlo Boy Scout Troop and the Glacier National History Association continued for the seventh year. This year, 30 scouts and 10 leaders spent parts of 12 work days totalling 891 work hours collecting and selling over 1,000 lbs. of elk and deer antlers. Dropped elk antlers from the current year averaged about \$9.80. The sale grossed \$5,962, with a permit fee of \$298.10 going to the Service, a donation of \$3,875.31 going to GNHA and the Boy Scouts getting \$1,788.61 for their treasury.

Other cooperative programs we were active in this year included:

- Colonial Nesting Bird Survey - Bishop and Clark
- Mourning Dove Coo Counts - West
- Soil Conservation Service - Soil Monitoring Sites
- Breeding Bird Census - Arlee, St. Regis and Polson
- Routes - Bishop and Clark
- Glacier Park Bald Eagle Project - Radio Tracking - Bishop
- Resident Bird Count at The Nature Conservancy's Safe Harbor Marsh - Bishop

3. Items of Interest

Tribal/State Jurisdiction over Reservation Fishing and Hunting

The 4-year agreement between the State and Flathead Tribes described in last year's report was implemented this year. Manager Malcolm was appointed as alternate Fish and Wildlife Service representative to the Flathead Reservation Fish and Wildlife Board which was set up as part of the agreement.

The Board held 8 separate meetings during the year, with Malcolm representing the Service at 7 meetings due to the absence of primary representative Ron Skates. The Board spent considerable time on orientation, Reservation tours, reviewing the agreement and generally getting up to speed. The first year went fairly smooth, and the Board managed to recommend Joint Tribal/State Regulations for bird hunting and fishing within the exterior boundaries of the Reservation that were subsequently approved by both the Tribal Council and the Montana Fish and Game Commission.

Wolves Visit Dixon Area Within 1 Mile of the Bison Range

At the end of March, 4 wolves from an orphaned pack in the Ninemile Valley about 15 miles southwest of here moved northeast over the Reservation Divide to the Dixon area just a mile southwest of the Bison Range. The wolves killed a yearling steer on a ranch just outside of Dixon. We received the first report from the rancher, made the initial investigation and contacted Endangered Species personnel at the FWE office in Helena.

After the wolves killed a second steer a few days later, Endangered Species and Animal Damage Control personnel located them in an open meadow at Ravalli near the southeast corner of the Range. All four were tranquilized from a helicopter, but one escaped before it could be caged. The other 3 were transferred to Glacier National Park, and later met untimely deaths.

We had a report of a lone wolf seen west of Dixon during the summer, and received several unconfirmed reports of a wolf on the Bison Range throughout the year.



Neighboring rancher, Jerry Hamel, had fun with wolves this spring on his reader board sign. Bison Range in left background.
NBR-91-33, JM-4/91

Other Staff Activities and Participation

Activities of staff members not covered in other sections of the report were as follows:

Jon Malcolm

Was an active member of the Charlo Lions Club. Was active in the Montana Chapter of the Wildlife Society, National Buffalo Association, American Bison Association, Rocky Mountain Elk Foundation, Pheasants Forever and Ducks Unlimited.

Bill West

Was an active member of the Charlo Lions Club, and took over the reins as President in July. Served on the Lake County Purple Loosestrife District Committee, and drafted a portion of a Statewide Purple Loosestrife Control Plan. Assisted personnel of the Lake County Weed Control Office in administration of a grant from State Noxious Weed Trust Fund.

Marcy Bishop

Served on the Advisory Board of the Glacier Institute.
 Was a licensed Bird Rehabilitator and Master Bird Bander.
 Was an active member of the American Ornithologist's Union,
 Cooper Ornithological Society, Wilson Ornithological
 Society, Glacier Natural History Association, Montana
 Chapter of the Wildlife Society, Soroptomist International,
 ional Association of Bird Rehabilitators and the Western
 Bird Banding Association.

Marcy also became a Charter Member of the Montana
 Environmental Education Association and served on the Board
 of Directors. She was also a member of the National
 Association for Interpretation and the North American
 Association for Environmental Education.

Rachael Sykes

Participated in a 3-week Young Scholars Science Program at
 the University of Montana. Placed second in the State
 Science Fair. Competed in the International Science Fair in
 Florida and received an Air Force Award.

Dave Fitzpatrick

Received a grant to participate in a 3-week Science
 Education Program at Montana State University.

4. Credits

Jon Malcolm	- Sections A; C; D; E5,7-8; F1-8; G1-13,17; I5-6; J; K and editing.
Bill West	- Sections B, E2,6; F10; G14; H17.
Marcy Bishop	- Sections E4, H1-16, 18-19.
Susan McCollum	- Section E1, assisted with word processing and assembly.

K. FEEDBACK

Annual Budgets

Why can't we get Station Budgets allocated early in the
 Fiscal Year instead of having to operate in the fiscal dark
 for 4-6 months each year?

Vax Mail

Max Vactor was touted as being quicker, with a lot less key strokes required than the E Mail we were originally using. We have found the reverse to be true, and we don't care for Max. Rather frequent problems in receiving Regional Office communications through the Vax continued this year.

Region 6 Budget Tracking System and the new Federal Financial System

We had problems with the Budget Tracking System, particularly when it came time to switch over to a new fiscal year. In addition, the printouts we are receiving from the Finance Center have contained many errors and have been almost useless in trying to reconcile financial information with our records.

**Mammals
of the**

**NATIONAL
BISON
RANGE**

MOIESE, MONTANA





The National Bison Range lies in the Flathead Valley of western Montana, approximately 50 miles (80 km) north of Missoula and 30 miles (48 km) south of Flathead Lake. It was established in 1908, with the aid of the American Bison Society, for the preservation and maintenance of a representative herd of American bison, or buffalo. This area, one of the oldest wildlife refuges in the nation, is administered by the U.S. Fish and Wildlife Service.

Bison and other big-game animals are restricted to the refuge by heavy-woven wire fence, which surrounds the 18,541 acres (7504 ha) that make up the range. Principle habitat types are the *palouse prairie* (wheatgrass-fescue mixture) and the *montane forest* (Douglas fir-ponderosa pine mixture). The Bison Range varies in elevation from 2,585 feet (788 m) above sea level at headquarters to 4,885 feet (1489 m) at the Highpoint Lookout.

The following list contains 40 species observed on the range. Anyone detecting errors in this list, or positively identifying species not included here, is urged to contact the refuge office.

SHREWS

Vagrant Shrew (*Sorex vagrans*). Abundant along stream bottoms and in moist, heavily vegetated areas. Less abundant in the montane forest belt.

BATS

Little Brown Bat (*Myotis lucifugus*). Commonly found in old buildings and attics, hollow trees, and rock ledges. Most often seen flying over or near water on summer evenings.

Long-eared Myotis (*Myotis evotis*). Present, but status unknown; there is one specimen from the refuge preserved in the Zoology Department of Montana State University.

Silver-haired Bat (*Lasionycteris noctivagans*). A specimen was collected in 1959 and another in 1960. Other bats believed to be of this variety have often been seen along the Jocko River. This species is believed to be more common than the two positive records would indicate.



BEARS AND RACCOONS

Black Bear (*Ursus americanus*). From 3 to 7 individuals are year-round residents of the Bison Range. At times, they feed heavily on thornapple and chokecherry fruit.

Raccoon (*Procyon lotor*). A recent arrival to the Flathead Valley. Presence on the range was first indicated by tracks found in 1960.



WEASELS, SKUNKS & BADGERS

Short-tailed Weasel (*Mustela erminea*). Found throughout the refuge, although they are rather scarce.

Long-tailed Weasel (*Mustela frenata*). Found in limited numbers throughout the refuge; more common than *erminea*.

Mink (*Mustela vison*). Fairly common along the main water courses.

Striped Skunk (*Mephitis mephitis*). Fairly common at lower elevations but appear to be subject to population fluctuations.

Badger (*Taxidea taxus*). Found occasionally in prairie habitat where rodents are common.

DOGS

Coyote (*Canis latrans*). Present throughout the refuge. Feeds heavily on small mammals.

Red Fox (*Vulpes fulva*). Very few observations of this species have been recorded on the range. First record was in 1936 when one was trapped. A recent observation was made in 1975.

CATS

Mountain Lion (*Felis concolor*). Rare at best, and then only a transient. The first recorded observation was in 1932 when one was trapped on the range. One was observed in 1975 by a refuge visitor.

Bobcat (*Lynx rufus*). Found in limited numbers in the more rocky areas and in the creek bottoms.

RODENTS

Yellow-bellied Marmot (*Marmota flaviventris*). Common in suitable rocky localities, especially in the vicinity of the Snake Pit and in the clay banks along Mission Creek.

Columbian Ground Squirrel (*Citellus columbianus*). Found in varying numbers in the grasslands. The species is subject to rather drastic population fluctuation. It is a favorite food for badgers.

Yellow Pine Chipmunk (*Eutamias amoenus*). Common to abundant in forested, brushy, and rocky areas.



Red Squirrel (*Tamiasciurus hudsonicus*). Found in moderate numbers in the Douglas fir-ponderosa pine belt.

Northern Pocket Gopher (*Thomomys talpoides*). Common in grasslands and scarce to absent in forested areas.



Beaver (*Castor canadensis*). Occasional along Mission Creek and the Jocko River.

Deer Mouse (*Peromyscus maniculatus*). Abundant throughout the refuge.

Bushy-tailed Woodrat, or Pack Rat (*Neotoma cinerea*). Found occasionally in old buildings and rocky areas.

Meadow Vole (*Microtus pennsylvanicus*). Common in grasslands at lower elevations. The population of this species fluctuates quite widely on a 3- to 5-year cycle.

Long-tailed Vole (*Microtus longicaudus*). Found at higher elevations, mainly in damp wooded habitat.

Mountain Vole (*Microtus montanus*). Common in grasslands, usually at higher elevations than *M. pennsylvanicus*.

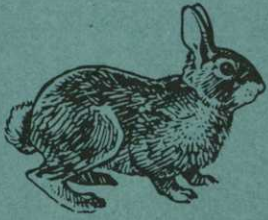


Muskrat (*Ondatra zibethica*). Occurs in quieter waters along the main watercourses and in some ponds.

House Mouse (*Mus musculus*). Common in and around human habitations.

Porcupine (*Erethizon dorsatum*). Seen occasionally in timbered areas and creek bottoms.

RABBITS AND HARES



Varying or Snowshoe Hare (*Lepus americanus*). Quite uncommon; restricted to the Douglas fir-ponderosa pine forest.

White-tailed Jack Rabbit (*Lepus townsendi*). There are few, if any, jack rabbits left in this valley although they are reported as having been fairly common at one time.

Mountain Cottontail (*Sylvilagus nuttalli*). Occasionally seen but mainly at the lower elevations.

HOOFED MAMMALS



Elk (*Cervus canadensis*). Found mainly in the Douglas fir-ponderosa pine forested areas. A herd of about 75 animals is maintained. These Rocky Mountain elk were introduced from Idaho and Wyoming during the years 1911-1916.

Whitetail Deer (*Odocoileus virginianus*). Although white-tailed deer habitat is somewhat limited, the herd is estimated to vary from 150 to 200 animals. These deer were first introduced to the refuge in 1910, a gift from the City of Missoula.

Mule Deer (*Odocoileus hemionus*). These animals were introduced into the Bison Range from Yellowstone Park in 1918. The present herd is maintained at about 200 to 300 animals, which range at higher elevations.

Moose (*Alces alces*). Although moose are not uncommon to western Montana, there is only one record for the refuge. This was a single cow that managed to find its way into the refuge in August 1958. It was seen frequently for about 2 or 3 weeks after which it apparently found its way out.

Pronghorn, or Antelope (*Antilocapra americana*). Pronghorns were first introduced in 1910 but apparently did not prosper; the last of these animals disappeared in 1926. The present herd is the result of introductions started in 1951 for research purposes. This herd will likely be maintained at about 100 head.



Bison, or Buffalo (*Bison bison*). Bison were introduced when the refuge was established in 1908. The present herd is kept at between 300 and 500 head, depending upon range conditions and the season of the year.

Bighorn Sheep (*Ovis canadensis*). Bighorn sheep were introduced from the Rocky Mountains Park, Banff, Alberta, in 1922. The herd is maintained at between 50 and 100 animals. Bighorns frequent the higher and rockier country, mainly on the south of the refuge.

Mountain Goat (*Oreamnos americanus*). Introduced on the range May 22, 1964, from the Sun River area of Montana. They spend most of their time on the south side of the range where there is a mixture of Douglas fir-ponderosa pine forest and open rocky slopes. Their numbers are kept between 14 and 18.

The National Bison Range is administered by the U.S. Fish and Wildlife Service as part of the National Wildlife Refuge System. For further information, contact the Range Manager, National Bison Range, Moiese, Montana 59824. Telephone: (406-644-2211).

NOTES

DATE _____ TIME _____



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



RF-661540-3
Reprinted March 1990



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MAP
AND
VISITORS GUIDE

**NATIONAL
BISON
RANGE**

**MOIESE
MONTANA**



THE NATIONAL BISON RANGE

Located in western Montana, the Range protects one of the most important of the remaining herds of American bison or buffalo. Within these lands of the beautiful Flathead Valley, in the "Land of the Shining Mountains," from 300 to 500 of the great shaggy animals roam over nearly 19,000 acres of grassland and park-like patches of timber.

This is an area of steep hills and narrow canyons at the southern end of the Flathead Valley, which lies in the shadows of the majestic Mission Range, northwest of Missoula in western Montana. Though snow piles into huge drifts in nearby hills, the Bison Range is so located that it is scantily covered in winter. Even in the worst weather, bison are ruggedly self-sufficient, and can find forage by rooting through the snow.

Besides the bison, the Range holds herds of whitetail and mule deer, elk, bighorn sheep, and pronghorns. There are also a few Rocky Mountain goats.



"Oh give me a home where the buffalo roam..."

One of these small herds was the outgrowth of a hunting expedition by Indians. In 1873 a party of Pend d' Oreille Indians went from the Flathead Valley to the plains east of the Rockies for their meat supply. One of them, Walking Coyote, brought back four young bison calves. Descendants of these animals comprised the famous Pablo-Allard herd, part of which eventually became the Conrad herd at Kalispell, Montana.

PLANT COMMUNITIES

The Range possesses several distinct plant-cover types, but is primarily a grassland area composed largely of Palouse Prairie vegetation, with bluebunch wheatgrass, rough fescue, and Idaho fescue as principal species. The upper hills sustain small park-like stands of Douglas-fir and western yellow pine. Creek bottoms are a veritable jungle of alders, junipers, aspens, birch, cottonwoods, thorn apples, and willows.

Range condition, as governed by climate and use, determines the number of animals the area can support. The herds vary in size from year to year, but generally contain from 300 to 400 bison, 75 to 100 elk, 100 to 200 mule deer, 100 to 200 whitetails, 40 to 100 bighorn sheep, and 50 to 100 pronghorns. Badgers, or their diggings, may be seen, and there are other fur animals such as the mink, beaver, muskrat, and weasel. Bobcats and coyotes are present in limited numbers and black bears occasionally use the area. The most conspicuous rodents are the yellowbellied marmot, the Columbian ground squirrel, and the mountain cottontail.

In order to keep the herds in balance with their food supply, a number of each species, approximately equal to the annual increase, must be removed each year. Surplus buffalo are removed in October. All are sold alive for exhibition, propagation, or meat. The sale of surplus range products makes the Bison Range partially self-supporting. A portion of the



Bighorn Sheep

NEAR EXTINCTION

American bison originally ranged from Great Slave Lake in Canada to Mexico, and from Nevada and Oregon to Tennessee and Pennsylvania. Great herds containing perhaps 50 million animals wandered over the prairies in the early 1800's. The 40-year period, ending around 1880, marked a slaughter of big game such as the world had never seen. Millions of these great beasts were shot, and stripped of their hides. Sometimes only the tongues were taken.

Carcasses were left to rot in the prairie sun. By 1883 bison were practically gone, and by 1900 only 20 wild bison were known to exist. Fortunately, there were a few privately owned throughout the country — pitiful remnants of the once majestic herds. From these scattered bands the Bison Range herd was started.

RECOVERY AFTER...

This Range, one of the oldest big-game areas in the country, was established May 23, 1908. The action came as an outgrowth of public sentiment — largely inspired by efforts of the American Bison Society, then under the leadership of the famed naturalist Dr. William T. Hornaday. President Theodore Roosevelt obtained appropriations to acquire and fence an area for the protection and preservation of the vanishing American buffalo. The American Bison Society raised more than \$10,000 by popular subscription to buy 34 bison from the Conrad estate. These animals, with seven donated bison — two from Montana, two from Texas, and three from New Hampshire — started the Bison Range herd. The first bison were released on the Range on October 17, 1909. Land now in the Range was purchased from the Flathead Indians.

These bottom lands are favored by whitetail deer, while mule deer frequent the higher slopes and ridges.

Plants at higher altitudes include the bitterroot, which is Montana's state flower, paintbrush, clarkia, and several penstemons. Patches of balsamroot and lupine brighten the hills in season, and larkspur, yellowbells, and asters bloom on nature's schedule. Clematis drapes over some of the many miles of big-game fences on the area.

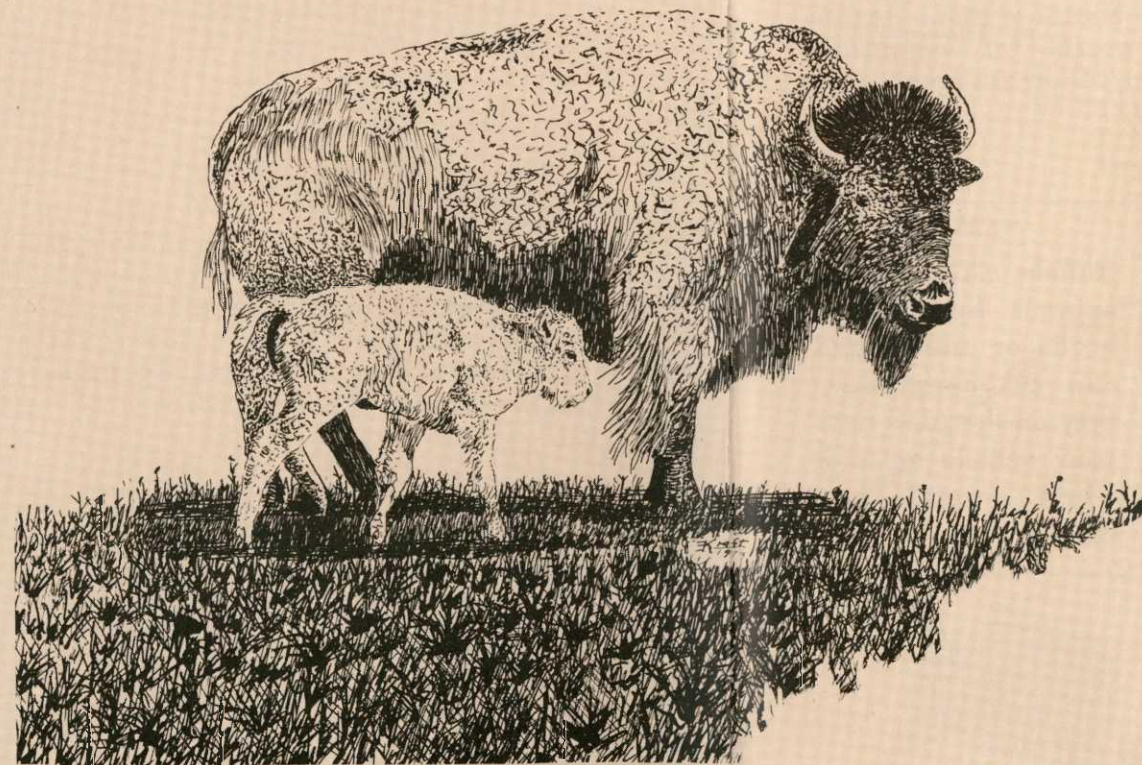
May and June are the best months to see the display of wild flowers. Shrubs of the Range include currant, Juneberry or serviceberry, chokecherry, mockorange, and wild rose, whose seed pods, or hips, are relished by some varieties of wildlife.

revenue is shared with Sanders and Lake counties in which the Range is located.

After the Range was established as a big-game area, management practices so increased its value for other kinds of wildlife that an Executive Order in 1912 established it also as a Federal bird refuge. Ring-necked pheasants and gray partridges are numerous, while lesser numbers of blue and ruffed grouse are present. In fall and winter, wild ducks congregate on Mission Creek which flows through the northern part of the range. Many songbirds nest or migrate through the area. A publication on birds is available at headquarters.

The National Bison Range also serves as an outdoor laboratory for research in the fields of wildlife and range management, and as a "classroom without walls" for teachers and students of all ages and grade levels.

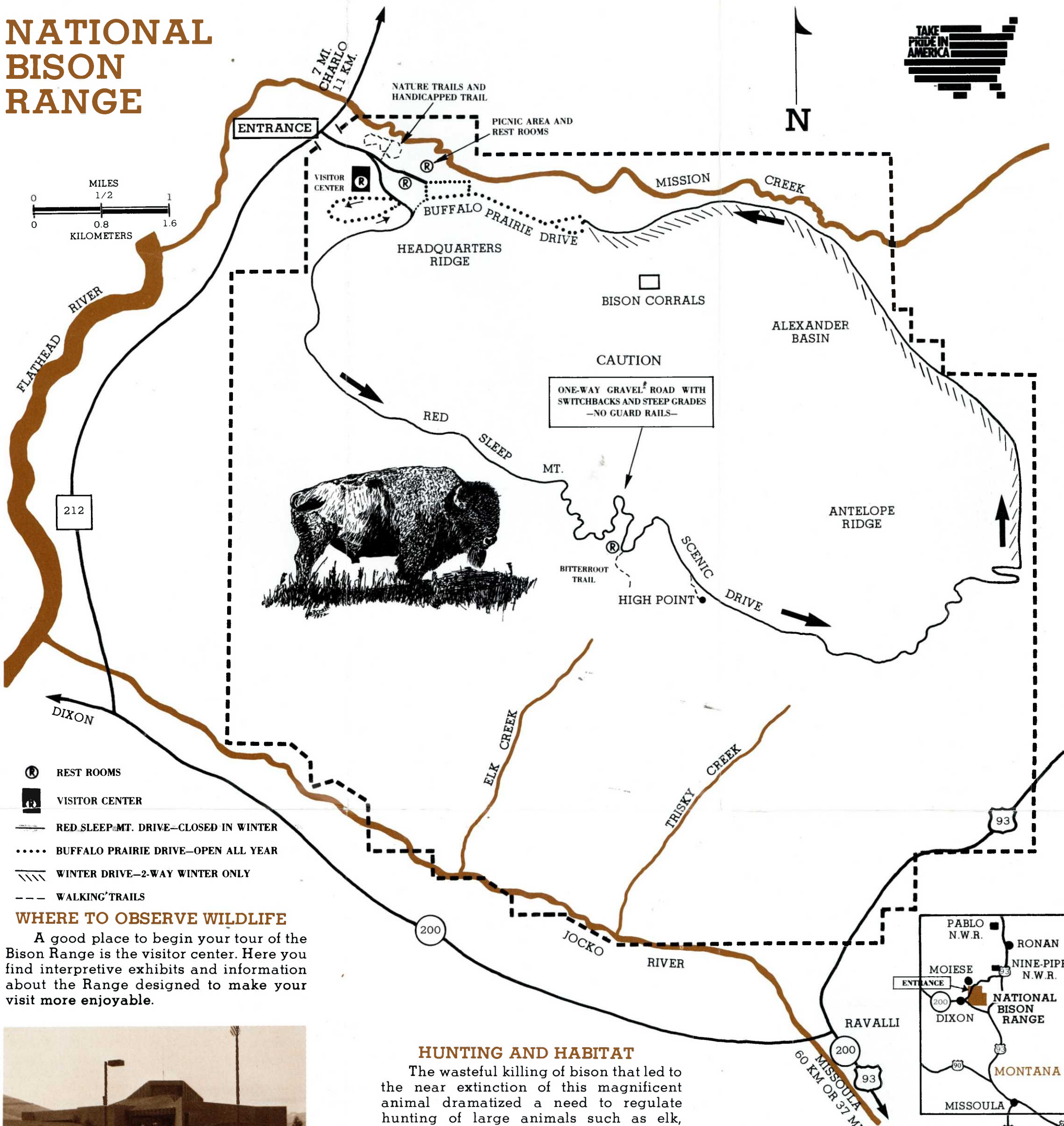
"Where the deer and the antelope play..."



Bison illustrations by Ernie Kraft



NATIONAL BISON RANGE



- Ⓡ REST ROOMS
- Ⓡ VISITOR CENTER
- RED SLEEP MT. DRIVE—CLOSED IN WINTER
- BUFFALO PRAIRIE DRIVE—OPEN ALL YEAR
- //// WINTER DRIVE—2-WAY WINTER ONLY
- WALKING TRAILS

WHERE TO OBSERVE WILDLIFE

A good place to begin your tour of the Bison Range is the visitor center. Here you find interpretive exhibits and information about the Range designed to make your visit more enjoyable.



Visitor Center

The highlight of a visit to the Range is the two hour Red Sleep Mountain self-guided drive. A short tour, the Buffalo Prairie Drive, is also available for those with less time. Both tours begin and end at the visitor center. It is recommended that you check with refuge personnel regarding hours of operation.

OTHER PUBLIC USES

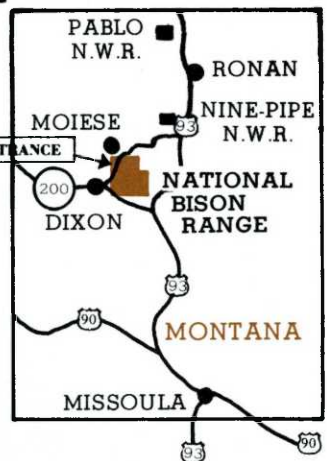
Picnic sites and a nature trail are available in the Day Use Area. Public fishing is permitted along Mission Creek as posted, and on the Jocko River where it flows through the south edge of the Range. The Jocko River fishing access is located 3 miles (5 km.) west of Ravalli on State Highway 200. Compliance with all applicable state regulations is required.

Special tours are provided for organized groups if arrangements are made in advance. Otherwise, visitors are restricted from the open range. This is a precaution for the safety of visitors, and to minimize the adverse impacts of overuse.

HUNTING AND HABITAT

The wasteful killing of bison that led to the near extinction of this magnificent animal dramatized a need to regulate hunting of large animals such as elk, antelope, and deer. This eventually led to the establishment of modern game regulations, enforced throughout the country today, which closely regulate harvest of big game permitting ample numbers to remain and perpetuate their kind.

The most serious problem confronting wildlife today is a result of land use changes which have a detrimental effect on habitat or areas occupied by wildlife.



LOCATION

To survive, wildlife need adequate water, food, and cover. National Wildlife Refuges such as the National Bison Range help meet these needs for numerous wildlife helping assure their survival in the years ahead.



Bull Elk

WARNING

Buffalo, elk, and other animals have sharp horns or antlers and can be dangerous. Stay on the road near your vehicle or in it when animals are close.



REGULATIONS

- Remain at your car and on the road at all times
- Vehicles must remain on the main roads.
- Motorcycles and bicycles are prohibited on all tour routes.
- Trailers or other towed units are not allowed on Red Sleep Mountain Drive.
- Firearms must be unloaded and dismantled or encased.
- All pets must be on a leash.
- All regulations are strictly enforced.

ADMINISTRATION

The National Bison Range is administered by the U.S. Fish and Wildlife Service as a part of the National Wildlife Refuge System. Further information can be obtained from the Range Manager, National Bison Range, Moiese, Montana 59824. Telephone: 406-644-2211.

U.S. FISH AND WILDLIFE SERVICE Department of Interior



RF-661540-1



REPRINTED MARCH 1990

SELF-GUIDED AUTO TOUR

NATIONAL BISON RANGE





Bison



Tour Route Habitats



Elk



Ninepipe National Wildlife Refuge

RED SLEEP MOUNTAIN DRIVE

[19 miles (30.5 Km)—Driving time 2 hours]

This drive takes you over the top of Red Sleep Mountain and gives you access to areas where you may observe some of the many bird and mammal species that inhabit the Range.

Your chance of seeing wildlife depends on the weather, time of day (early morning and evening hours are best), the habits of each species, the speed at which you drive and your ability to "spot" birds and animals. You will find binoculars or a spotting scope helpful. We hope you have a pleasant drive.

* CAUTION *

- One-way road has switchbacks and steep grades—No guard rails—Go at your own risk.
- Rattlesnakes are common. Be careful. Stay on roadway.
- Bison and elk are unpredictable and can be very dangerous.

* REGULATIONS *

- Remain at your car and on the road at all times.
- Vehicles must stay on the main roads.
- Firearms must be unloaded and dismantled or cased.
- All regulations are strictly enforced so please read and adhere to all signs.
- All pets must be on a leash.



HABITATS

What is a habitat? A habitat is a place that provides a living creature with everything needed for survival. Habitats can be as small as a drop of pond water for some microscopic organisms, or as large as a continent for migratory waterfowl. The Bison Range is capable of supporting a wide array of wildlife because it provides a wide variety of suitable habitats. You will travel through three major habitat types: grassland, forest, and streamside thickets. Each of these can be observed from this site. Point of interest, 2.7 miles.

tory waterfowl. The Bison Range is capable of supporting a wide array of wildlife because it provides a wide variety of suitable habitats. You will travel through three major habitat types: grassland, forest, and streamside thickets. Each of these can be observed from this site. Point of interest, 2.7 miles.

Elk Lane

Originally constructed to aid in live-trapping of surplus elk which were used to restock other areas. It leads to a set of corrals and loading chutes about 1 mile north. The lane is now used principally for the annual buffalo roundup. Next stop 2.6 miles.

**WATCH FOR THE
NUMBERED SIGNS**



THE ECOTONES

When two or more habitats overlap, an edge or ecotone is the result. In these ecotonal areas, plant species from each of the habitat types reside together. These are important wildlife areas because not only are animals from more than one habitat represented, but species unique to the ecotone are also present.

than one habitat represented, but species unique to the ecotone are also present.

Here at station two, you will have an opportunity to stretch your legs while walking through an ecotone. The trailhead is situated on a moist, cool, north-facing slope. This habitat type is dominated by the short-needed Douglas fir tree. The end of the trail is located on a dry, warm, south-facing slope. This habitat type is dominated by the grasses, and the long-needed Ponderosa pine. In the spring, the yellow-flowered "balsamroot" turns the slopes a showy yellow.

Between these two distinct habitat types, the trail crosses over a ridge. You will probably notice that both the short-needed Douglas fir and the long-needed Ponderosa pine grow in this area along with the grasses. This is an ecotone, a good place to quietly watch for birds and small mammals. Next stop 0.7 miles.



OF GLACIERS AND DUCKS

Twelve thousand years ago, a massive glacier covered the valley below. As the glacier receded large blocks of ice were left buried in the glacial till. These ice blocks gradually melted leaving depressions in the landscape which then filled with water. These glacial potholes, now ponds surrounded by cattails, provide critical habitat for waterfowl. The Flathead Valley supports one of the largest breeding populations of redhead ducks on the continent and a good resident population of Canada geese.

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Ninepipe National Wildlife Refuge, administered by the Bison Range is visible 8 miles to the north and is part of an effort to save the valley's habitat resources.

Ancient Lake Missoula

As the glaciers melted an ice dam formed on the Clark Fork River near the Montana/Idaho border and created prehistoric Lake Missoula. The High Point of the Bison Range was an island in the lake which reached a level of 4,200 feet in elevation and covered 3,300 square miles of western Montana. Marks of old shorelines can still be seen on the hillsides along the tour.



American Pronghorn Antelope



White-tailed Deer



Blue Grouse



GRASSLANDS

Although beautiful, grassland habitats are by no means gentle. More often than not, it is a harsh environment, making great demands on its inhabitants and exacting a merciless toll on those who fail. Although the Flathead Valley is characterized by a relatively mild climate, dry spells can extend into drought, temperatures can at times be extreme and fine soils are blown away if not protected by plant life.

Wild creatures of the grassland reflect the rigors of their environment. Each has adapted its own unique strategy for survival; consider the lack of cover on a grassland and the resulting lack of protection during severe winters. Bison, the prairie masters, carry their shelter with them in the form of a thick, shaggy coat; pronghorns seek the cover of brushy draws, ground squirrels burrow underground, away from the torturous elements; and finally, migratory birds avoid the problem altogether by flying south. Next stop 2.4 miles.



RIPARIAN ZONES

Of all the refuge habitats, perhaps none is richer in life and diversity than the riparian, or streamside, communities. Riparian zones abound in broadleaf plantlife, in contrast to the dryer surrounding rangelands where the predominate plants are slender-leaved grasses.

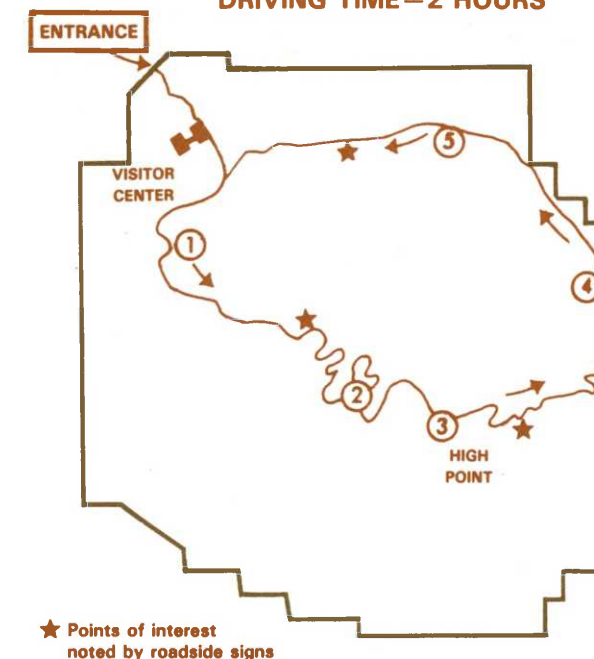
The thickets and marshes of the riparian zones and the resulting ecotones provide ideal habitats for a wide variety of wildlife including: white-tailed deer, songbirds, small mammals, birds of prey, and waterfowl. During the winter, diving ducks and mallards may concentrate along this stream within the Bison Range. Common summering waterfowl species include mallard, common merganser, wood duck and Canada geese. Point of interest 1 mile.

● Bison Corrals

The buffalo herd is worked here during the annual roundup in October. A predetermined number of animals are sold by sealed bid each fall to maintain a proper balance with the available food supply.

RED SLEEP MOUNTAIN DRIVE

ONE-WAY — 19 MILES
DRIVING TIME — 2 HOURS



YOUNGSTER'S

WILDLIFE GUIDE

NATIONAL
BISON
RANGE



THESE ARE SOME OF THE ANIMALS
AND BIRDS YOU MIGHT SEE TODAY IF
YOU WATCH CAREFULLY. PUT A
CHECK MARK (✓) BY EACH ANIMAL
OR BIRD YOU SEE.



Bison _____



Marsh Hawk _____



Rattlesnake _____



Kestrel _____



Mourning Dove _____



Killdeer _____



Pronghorn _____

PINE/FIR
FOREST



Coyote _____



Chickadee _____



Elk _____



Clark's
Nutcracker _____



Muledeer _____

STREAM BOTTOMS & PONDS



Whitetail Deer _____



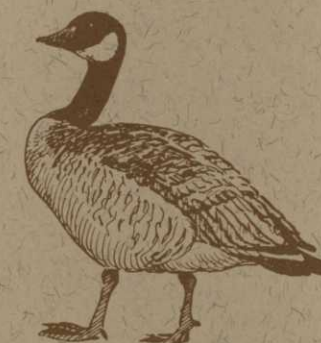
Redwing
Blackbird _____



Mallard _____



Great Blue Heron _____



Canada Goose _____



NOW

ASK YOURSELF THESE QUESTIONS!

1. What animals did you find most interesting. Why?
2. Grasses and flowers grow on much of the Range. How many can you identify?
3. Do some animals prefer grasslands and others forested areas? Why?
4. Why do so many different kinds of animals make their home on the Range?

NOTES

Draw or write something about the things you saw—



We're very happy you could visit the Range today. It's one of more than 390 National

Wildlife Refuges managed by the U.S. Fish and Wildlife Service to furnish wildlife with suitable homes or habitat.

If you would like to know more about the Bison Range or other refuges, contact the Refuge Manager, National Bison Range, Moiese, Montana 59824. Telephone: 406-644-2211.



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



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BIRDS



NATIONAL BISON RANGE

The National Bison Range is one of the oldest big game refuges in the United States. Although originally established in 1908 for the preservation of the American bison, the Range was also designated as a refuge for native birds in 1921. As a part of the National Wildlife Refuge System, it is administered by the U.S. Fish and Wildlife Service. Since it was established, 205 bird species have been recorded. Common names and list order are based on the Sixth Edition (1983) and the 36th Supplement (1987) of the American Ornithologist's Union's Checklist of North American Birds. Seasonal occurrence, abundance, and habitats frequented are shown according to the following key. If you detect any errors or omissions or would like further information, please contact Refuge Manager, National Bison Range, 132 Bison Range Road, Moiese, MT or Phone 406-644-2211.

Season: S S F W = Spring, Summer, Fall, Winter

Abundance: A = Abundant. Large flocks or seen on every visit.

C = Common. Seen on most visits.

U = Uncommon. Seen on about half the visits.

O = Occasional. Seen on 1/3 or less visits.

R = Rare. Seen on rare occasion.

T = Transient. Passing through, 5 or less sightings.

H = Historical. Historic record, no recent sightings.

2 = Any numeral signifies number of sightings if 3 or under.

Habitat: G = Open grasslands.

F = Montane conifer forest.

B = Brushy draws.

J = Cottonwood-Juniper bottomlands.

T = Stream-side thickets.

R = Rivers and streams.

P = Ponds or lakes.

C = Rocky cliffs and banks.

M = Marshy areas.

SPECIES	NESTS *	SEASON S S F W	HABITAT
GREBES			
— Pied-billed Grebe		R R R R	P
— Red-necked Grebe		R R R —	P
— Eared Grebe		R R R —	P
— Western Grebe		R — R —	P
CORMORANTS			
— Doubled-crested Cormorant		O U O —	R, P
HERONS			
— American Bittern		R R R —	P, R, M
— Great Blue Heron		U U U U	P, R,
GEESE, SWANS			
— Tundra Swan		O R — R	R, P
— Snow Goose		U — U —	P
— Canada Goose	*	C A A C	P, R, J
DUCKS			
— Wood Duck	*	U O O —	P, R, J
— Green-winged Teal	*	U O U O	P, R
— Mallard	*	C C A A	P, R
— Northern Pintail	*	U U U O	P, R
— Blue-winged Teal	*	U U O —	P
— Cinnamon Teal	*	O O O —	P
— Northern Shoveler	*	O O O —	P
— Gadwall	*	O O O R	P
— American Wigeon	*	U O C R	P, R
— Canvasback		R — R —	P
— Redhead	*	O O O —	P
— Ring-necked Duck		R — R —	P
— Lesser Scaup		O — R —	P
— Common Goldeneye	*	C U C C	R, P
— Barrow's Goldeneye		O R R —	P, R
— Bufflehead		R — R —	P
— Hooded Merganser	*	U O U O	R
— Common Merganser	*	C U C C	R
— Ruddy Duck	*	R R R —	P
VULTURES, HAWKS, FALCON			
— Turkey Vulture		R R — —	G
— Osprey		O U O —	R
— Bald Eagle		O O O O	R, J
— Northern Harrier	*	C C C O	G
— Sharp-shinned Hawk	*	O O O O	J, T
— Cooper's Hawk		O O O R	F, J, T
— Northern Goshawk		O O O R	F, J, T
— Swainson's Hawk		R O R —	G
— Red-tailed Hawk	*	C C C O	G, F, J
— Ferruginous Hawk		R R R —	G, J
— Rough-legged Hawk		C — C C	G
— Golden Eagle	*	C C C C	G, F
— American Kestrel	*	C C C U	G, T, J
— Merlin		O R O R	T
— Peregrine Falcon		R R R —	F, G, C
— Gyrfalcon		— — — R	J, G
— Prairie Falcon	*	O U U R	G, C

SPECIES	NESTS *	SEASON S S F W	HABITAT
GROUSE			
— Gray Partridge	*	C C C C	G, B
— Chukar	*	H H H H	G, B, F
— Ring-necked Pheasant	*	U U C U	G, B
— Blue Grouse	*	C C C C	F
— Ruffed Grouse	*	O O O O	F, J
— Sharp-tailed Grouse	*	H H H H	G, B

RAILS			
— Virginia Rail		R R R —	M
— Sora	*	O O O —	M
— American Coot	*	O O O R	P

SHOREBIRDS			
— Black-bellied Plover		R — R —	P
— Semipalmated Plover		R — — —	P
— Killdeer	*	C C C O	G, P
— American Avocet	*	O O — —	P
— Greater Yellowlegs		U O U —	P
— Lesser Yellowlegs		O R R —	P
— Solitary Sandpiper		R R — —	P
— Willet		R — — —	P
— Spotted Sandpiper	*	U U U —	R, P
— Long-billed Curlew		R R R —	G
— Marbled Godwit		R R — —	P
— Semipalmated Sandpiper		R — — —	P
— Least Sandpiper		R — R —	P
— Baird's Sandpiper		R — R —	P
— Long-billed Dowitcher		O R R —	P
— Common Snipe	*	C C C O	P, M, G
— Wilson's Phalarope	*	U U U —	P
— Red-necked Phalarope		R — — —	P

GULLS, TERNS			
— Ring-billed Gull		O O O U	R, P
— California Gull		— O O —	R, P
— Common Tern		R R — —	P
— Forster's Tern		R R — —	P
— Black Tern		R R — —	P

DOVES			
— Mourning Dove	*	A A A O	G, J

CUCKOOS			
— Black-billed Cuckoo		— R — —	J, T, F

OWLS			
— Western Screech Owl		T T T T	J, F
— Great Horned Owl	*	C C C C	J, F, T
— Snowy Owl		— — — R	J, G
— Northern Pygmy Owl	*	O O O O	T, J
— Burrowing Owl	*	R R R —	G
— Barred Owl	*	O O O O	J
— Long-eared Owl	*	U U U R	J, T
— Short-eared Owl	*	U U O R	G
— Northern Saw-whet Owl	*	O U O O	T, J

SPECIES	NESTS *	SEASON S S F W	HABITAT
NIGHTHAWKS, SWIFTS			
— Common Nighthawk		— C — —	G, J
— Black Swift		R O R —	G, M, R
— Vaux's Swift		— O — —	R

HUMMINGBIRDS			
— Black-chinned Hummingbird		— R — —	T, J, H
— Calliope Hummingbird	*	R U — —	T, J, H
— Broad-tailed Hummingbird		— R — —	T, J, H
— Rufous Hummingbird	*	R U — —	T, J, H

KINGFISHERS			
— Belted Kingfisher	*	U U U O	R

WOODPECKERS			
— Lewis' Woodpecker	*	C C U —	F
— Red-naped Woodpecker	*	C C C —	J, T
— Downy Woodpecker	*	U U U U	J, F
— Hairy Woodpecker	*	U U U U	J, F
— Northern Flicker	*	C C C U	J, F, T
— Pileated Woodpecker	*	O O O O	J, F

FLYCATCHERS			
— Western Wood-Pewee	*	— C — —	J, F, T
— Willow Flycatcher	*	— O — —	M, T
— Hammond's Flycatcher	*	— U — —	F
— Dusky Flycatcher	*	— C — —	B
— Western Flycatcher		— O — —	T, J
— Say's Phoebe	*	O O O —	C, T, G, H
— Western Kingbird	*	U C O —	G, J
— Eastern Kingbird	*	C A U —	G, B

LARKS			
— Horned Lark		O O O U	G

SWALLOWS			
— Tree Swallow	*	C A C —	R, P, J, G
— Violet-green Swallow	*	C C U —	R, P, M, C
— Northern Rough-winged Swallow	*	U C — —	R, P, C, H
— Bank Swallow	*	C C U —	C, P, R
— Cliff Swallow	*	C C U —	C, P, R, H
— Barn Swallow	*	C A U —	P, R, H

JAYS			
— Gray Jay		— — R R	F
— Steller's Jay		R R O O	F
— Clark's Nutcracker	*	C C C C	F
— Black-billed Magpie	*	C A A C	G, T, J
— American Crow		U R U —	G, T, J
— Common Raven	*	C C C C	G, J, F

CHICKADEES, NUTHATCHES, CREEPERS			
— Black-capped Chickadee	*	C C C C	J, F, T
— Mountain Chickadee	*	U U U U	F
— Red-breasted Nuthatch	*	C C C C	J, F
— White-breasted Nuthatch		O O O O	F, J
— Pygmy Nuthatch	*	U U U U	F
— Brown Creeper	*	O O O O	J, F

SPECIES	NESTS *	SEASON S S F W	HABITAT
WRENS, DIPPERS			
— Rock Wren	*	C C C —	C
— House Wren	*	U C U —	J, T, H
— Marsh Wren	*	O O O R	P, M, T
— American Dipper		O O O O	R
KINGLETS			
— Golden-crowned Kinglet	*	O O O O	F, J
— Ruby-crowned Kinglet	*	U U U R	F, J
THRUSHES			
— Western Bluebird		T — — —	G
— Mountain Bluebird	*	C C C R	G
— Townsend's Solitaire	*	U U C C	J, T, C
— Veery		— R R —	F
— Swainson's Thrush	*	O O — —	F
— Hermit Thrush		— R — —	J, T
— American Robin	*	A A A O	J, T, F, H
— Varied Thrush		R — — R	F
MOCKINGBIRDS			
— Gray Catbird	*	O O O —	T, J
— Northern Mockingbird		3 1 — —	B, T
PIPITS			
— Water Pipit		U — U —	G
WAXWINGS			
— Bohemian Waxwing		U — U A	J, T
— Cedar Waxwing	*	O U U O	J, T
SHRIKES			
— Northern Shrike		U — U U	G, T, B
— Loggerhead Shrike		— R — —	G, T, B
STARLING			
— European Starling	*	C C C U	J, H, T
VIREO			
— Solitary Vireo		C C — —	F
— Warbling Vireo	*	C C U —	F, J, T, B
— Red-eyed Vireo	*	C C U —	J, F, T
WARBLERS			
— Orange-crowned Warbler		U U O —	F, J
— Nashville Warbler		R R — —	F, J
— Yellow Warbler	*	C C O —	J, T
— Yellow-rumped Warbler		U O U R	F, J
— Townsend's Warbler		— O — —	F
— American Redstart	*	— O — —	F, J
— Northern Waterthrush		— R — —	T, M
— MacGillivray's Warbler	*	O C — —	T, B, J
— Common Yellowthroat	*	O U O —	M, T
— Wilson's Warbler		— O R —	T, J, B
— Yellow-breasted Chat	*	O U — —	B, G, T
TANAGERS			
— Western Tanager	*	O U O —	J, F, T

SPECIES	NESTS *	SEASON S S F W	HABITAT
BUNTINGS, TOWHEES, SPARROWS			
— Black-headed Grosbeak		— O — —	F, J
— Lazuli Bunting	*	U C — —	T, B
— Rufous-sided Towhee	*	C C O —	T
— American Tree Sparrow		— — O U	G
— Chipping Sparrow	*	U C U —	T, B, J
— Brewer's Sparrow		— R R —	G, B
— Vesper Sparrow	*	A A C —	G
— Lark Sparrow		U U O —	T, B
— Lark Bunting		T T — —	G
— Savannah Sparrow	*	U U O —	G, B
— Grasshopper Sparrow	*	C C — —	G
— Fox Sparrow		R R R T	T, J
— Song Sparrow	*	C C C O	T, M
— Lincoln's Sparrow		O — — —	T, B
— White-crowned Sparrow		O O U R	T, B
— Harris' Sparrow		— — — R	T, J
— Dark-eyed Junco			
— Oregon race	*	C C C C	F, J
— Slate-colored race		— — — O	F
— Lapland Longspur		— — — R	G
— Snow Bunting		O — O O	G
BLACKBIRDS			
— Bobolink		R R — —	M
— Red-winged Blackbird	*	A A C O	M, P, T
— Western Meadowlark	*	A A A O	G
— Yellow-headed Blackbird		O O O —	M, P
— Brewer's Blackbird	*	A A A O	G
— Brown-headed Cowbird	*	U U — —	T, J, F, G
— Northern Oriole	*	— C — —	J, T
FINCHES			
— Rosy Finch			
— Gray-crowned race		O — O U	G, B
— Gray-headed race		O — O U	G, B
— Pine Grosbeak		O R R O	F
— Cassin's Finch		O O O C	F, J
— House Finch		— — R C	J, F
— Red Crossbill	*	O O O O	F
— White-winged Crossbill		— — R —	F
— Common Redpoll		— — C C	G
— Hoary Redpoll		— — — R	G
— Pine Siskin	*	U U U O	F
— American Goldfinch	*	O O U U	J, T
— Evening Grosbeak		U — U C	J, F
WEAVER FINCHES			
— House Sparrow	*	C C C C	H, J, G, T

(National Bison Range, 132 Bison Range Road, Moiese, Montana 59824 or telephone 406-644-2211.)



This image shows a single sheet of cream-colored paper with horizontal blue or grey ruling lines, typical of notebook paper. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

