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12

13

14

BRANCH OF WILDLIFE REFUGES

NARRATIVE REPORT

ROUTING SLIP

DATE January 28, 1953

Mr. Salyer _____

Mr. DeMont PAD

Mr. Krummes _____

Miss Baum _____

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~~Mr. Mosley~~ R. C. M.

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~~Mr. Davis~~ W. A. D.

see p. 18

Stenographers:

REFUGE National Bison Range

PERIOD September - December 1952

N A T I O N A L B I S O N R A N G E

Refuge Narrative Report

September 1 to December 31, 1952

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Clarence G. Young, Refuge Manager
Victor B. May, Refuge Maintenance Man (Equipment)
Deforest W. Thompson, Refuge Maintenance Man (General)
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Joseph C. Duffield, Truck Driver
Melvin C. Fitzgerald, Truck Driver
Lawrence J. Driscoll, Laborer
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Ray Clawson, Carpenter
Warren C. Perry, Laborer
Grant Hogge, Laborer
Earl S. Darlington, Rider-Horseman
Paul L. Gardner, Rider-Horseman
Cryal R. Priddy, Rider-Horseman
W. J. Bryan Melton, Rider-Horseman
Henry J. Helgeson, Butcher-Foreman

INDEX

I. GENERAL	Page
A. Weather Conditions - - - - -	1
B. Water Conditions - - - - -	2
C. Fires - - - - -	2
II. WILDLIFE	
A. Migratory Birds	
1. Population and Behavior - - - - -	2
2. Food and Cover - - - - -	3
B. Upland Game Birds	
1. Population and Behavior - - - - -	3
2. Food and Cover - - - - -	4
C. Big-Game Animals	
1. Population and Behavior	
Buffalo - - - - -	4
Elk - - - - -	6
Mule Deer - - - - -	7
White-tailed Deer - - - - -	10
Mountain Sheep - - - - -	10
Antelope - - - - -	11
Longhorn Cattle - - - - -	11
2. Food and Cover - - - - -	11
3. Disease and Parasites - - - - -	12
D. Fur Animals, Predators, Rodents and other Mammals - - - - -	13
E. Predacious Birds, Crows, Ravens & Magpies - - - - -	14
III. REFUGE DEVELOPMENT AND MAINTENANCE	
A. Physical Development - - - - -	14
B. Maintenance and Rehabilitation - - - - -	15
IV. ECONOMIC USE OF REFUGE	
A. Surplus Buffalo Disposal Program - - - - -	18
B. Surplus Deer Disposal Program - - - - -	20
C. Proceeds of Sales - - - - -	21
V. FIELD INVESTIGATION OR APPLIED RESEARCH	
A. Range Investigations - - - - -	22
B. Food Habits Studies - - - - -	22
VI. PUBLIC RELATIONS	
A. Recreational Uses - - - - -	22
B. Refuge Visitors - - - - -	22
C. Refuge Participation - - - - -	24
VII. OTHER ITEMS	
A. Photographs - - - - -	24
B. Acknowledgements - - - - -	25
Narrative Report Forms - - - - -	Appendix

N A T I O N A L B I S O N R A N G E

Refuge Narrative Report

September 1 to December 31, 1952

I. GENERAL

A. Weather Conditions

1952

	<u>Snowfall</u>	<u>Precipitation</u>	<u>Max. Temps.</u>	<u>Min. Temps.</u>	<u>Mean Temps. Max.</u>	<u>Mean Temps. Min.</u>	<u>Average Temps.</u>
September		.52	93	31	79	41	61
October		.07	83	17	67	27	47
November	.75"	.60	69	2	44	21	33
December	<u>1.50"</u>	<u>.20</u>	49	6	37	23	30
	2.25"	1.39					

1951

September		1.08	88	30	69	38	54
October	1.5"	1.26	68	20	54	34	44
November	4.0"	.42	58	9	43	23	33
December	<u>25.0"</u>	<u>1.32</u>	56	-16	31	12	22
	30.5"	4.08					

The fall season of 1952 was unusually dry and warm. Precipitation was deficient during every month and, as might be expected, average temperatures were consistently above normal. This set of conditions, while providing some very excellent autumn weather, was also responsible for one of the worst droughts we have experienced on the Bison Range in a number of years.

The total rainfall for the calendar year 1952 amounted to 7.56 inches which is substantially below the ten year average of 11.67 inches. As a matter of interest, the precipitation records for the past ten year period are given below:

<u>Year</u>	<u>Amount (Inches)</u>	
1943	12.53	
1944	8.85	
1945	8.92	
1946	9.47	
1947	17.50	
1948	16.61	
1949	8.82	
1950	13.08	
1951	13.32	
1952	7.56	
Ten Year Average		11.67

The season's first frost occurred on September 14, when the low temperature for the month--31 degrees--was recorded. Freezing temperatures at night were frequent in October and moderate to heavy frosts occurred during this and the following month. The lowest temperature for the period was 2 degrees, recorded on November 29.

Most storms occurring during the period were relatively weak and provided only light to moderate amounts of moisture. Snowfall has been quite scanty and has seldom remained on the ground for more than a few days. During the last week of December snow was entirely absent, except at higher levels on the Bison Range.

B. Water Conditions

Owing to the drought conditions which have prevailed since mid-summer, most of the soils have been extremely dry and even though some moisture has fallen in the form of rain and snow, it has not been in sufficient amounts to saturate the ground to any satisfactory degree. Due to the lack of protection by an adequate cover of snow, frost has, therefore, penetrated most soils to varying depths, depending on the moisture content.

The flow in both Mission Creek and the Jocko River was somewhat below normal for the period, but did not at any time reach critically low conditions. Altho some of the smaller seeps and potholes dried up completely, there was no serious shortage of water because most of the larger springs continued to flow, even though somewhat reduced in volume.

C. Fires

No uncontrolled fires occurred on the refuge during the period.

II. WILDLIFE

A. Migratory Birds

1. Population and Behavior

Due, no doubt, to the mild open fall, the pattern of waterfowl migration differed from previous years in that there were no extremely large flights at any period and particularly during early November. Apparently the migration through Western Montana was quite gradual and possibly even leisurely at times. While it is believed that most migrants followed their usual routes of travel, some local sportsmen contended that the generally prevailing good weather might have influenced large numbers of birds to fly directly westward over the mountains to Eastern Washington, rather than coming down the Flathead and Clarks Fork valleys as they usually do. We know of no evidence, however, to support this belief.

As usual, Mission Creek received the most intensive use by waterfowl of any of the refuge waters. Ducks commenced to congregate here at the start of the hunting season and have made moderate to heavy use of it throughout the remainder of the period. Peak numbers occurred during December, after most of the potholes and reservoirs had frozen over. At that time, an estimated 5,000 to 7,000 ducks were present. Mallards, as usual, were most abundant and comprised at least 90 percent of the species present. Others observed included green-winged teal, pintails, American golden-eyes, baldpates and American mergansers.

With the fall migration largely completed, it appears that there will be a substantial wintering population of ducks remaining in the lower Flathead Valley area this winter. No accurate estimate of their numbers is presently available, but several observers believe they are considerably more numerous than last year.

2. Food and Cover

Favored by the generally mild weather and lack of snow, food and cover conditions for waterfowl have been good throughout the period. Much use was made of grain stubble fields during November and December and, unless severe snow conditions develop later in the winter, it is expected that most waterfowl in this area will survive the season without undue difficulty.

B. Upland Game Birds

1. Population and Behavior

Ring-necked pheasants were common in the vicinity of headquarters and in other favored sections of the refuge all fall. During September they were particularly damaging to gardens maintained by refuge personnel. With the advent of upland bird hunting season, there was a marked influx of these birds into the refuge, but following the cessation of shooting, many returned to outside areas where numerous stubble fields and weed patches furnish a more attractive food supply. The principal concentrations of pheasants remaining on the refuge in late December were in the vicinity of headquarters and eastward along Mission Creek where they frequented weed and cat-tail thickets along the bottoms.

This was a good year for pheasants in the lower Flathead Valley and it was estimated that the population was even greater than last year, when an excellent crop was produced. Hunting pressure was slightly greater than last year but the average bag remained the same, namely 1.4 cock pheasants per hunter.

Hungarian partridge. Coveys of these birds were fairly common throughout the range during the period. Earlier in the fall these averaged from 12 to 15 birds, but toward the close of the period there was a generally marked reduction in numbers, with the usual covey containing on an average of 4 to 8 birds. The decimating factor is not known here, but it is presumed to be predation by eagles and bobcats.

Blue grouse. Birds of this species were seen occasionally throughout the fall until early December. As usual, they frequented the high timbered sections of the range and were seldom seen in groups larger than two or three.

2. Food and Cover

Food and cover conditions have been satisfactory for all species of upland birds.

C. Big-Game Animals

1. Population and Behavior

Buffalo

Except during roundup operations, the buffalo herd has ranged at large over the refuge. Weather and food conditions were favorable during the early fall months and, as a result, most animals were in excellent condition when checked at roundup time. The distribution of the herd was fairly satisfactory throughout the period alternating between different pastures and frequently breaking up into numerous small groups.

The annual roundup was started on October 6 this year, about two weeks earlier than has been the practice in the past. As usual, the first two days were spent gathering all buffalo into Alexander pasture. The main drive to the corrals was accomplished on the third day. This year some difficulty was experienced in getting the herd corralled, due to the fact it stampeded and scattered just before reaching the corrals. After considerable hard riding, all except a few animals were finally captured and worked through the chutes. Those remaining outside were tallied prior to the release of the main herd back on the range.

In all we accounted for 395 animals in the herd. Of this number, 57 were cut out for the butcher herd and 31 yearlings and calves were earmarked for live sales. This left a range herd strength of 307 buffalo. This total was further reduced to 305 when two young cows were transferred to the Montana State Game Commission. These are to be replaced this winter, however, with two young bulls from different blood lines.

The following tabulation shows the composition of the herd as of December 31, 1952:

<u>Males</u>	<u>No.</u>	<u>Females</u>	<u>No.</u>
10 years and older	3	10 years and older	13
4 to 9 years inc.	31	4 to 9 years inc.	49
2 and 3 years old	37	2 and 3 years old	34
Yearlings	31	Yearlings	17
Calves	<u>46</u>	Calves	<u>44</u>
	148		157

On the basis of the herd composition shown above, there should be, by next breeding season, about 102 bulls two years and older available for approximately 113 cows of breeding age. At present, there are 96 cows in the herd which are old enough to produce calves next spring. Assuming an 85 percent calf crop, this should result in an annual increase of around 80 calves.

Our calf production for 1952 was undoubtedly one of the best ever known on the Bison Range. Altogether 97 calves were produced from 104 cows of breeding age, making a 93 percent crop. Of the known total, two calves died—one shortly after birth and the other from injuries during roundup operations. All calves were vaccinated and branded, except two which remained at large with a few animals that were not corralled during the roundup.

This fall we again gathered information on the incidence of pregnancy in cows that were slaughtered. This is tabulated below:

<u>Age Class</u>	<u>No. Examined</u>	<u>Pregnant</u>	<u>Non-Pregnant</u>	<u>Wet</u>	<u>Dry</u>
2 to 9 yrs.	9	6 (66%)	3 (33%)	5 (55%)	4 (45%)
10 to 14 yrs.	3	3 (100%)			3 (100%)
15 to 30 yrs.	<u>10</u>	<u>5</u> (50%)	<u>5</u> (50%)	<u>6</u> (60%)	<u>4</u> (40%)
Total	22	14	8	11	11

The above data obviously does not include enough samples to provide an accurate trend. However, the proportion of pregnant and non-pregnant cows in the 15 to 30 year age group agrees closely with the results obtained for this class last year. The fact that 50 percent of all cows examined were dry is interesting, particularly in view of the apparently high rate of pregnancy which must have existed last year in order to produce the excellent calf crop reported above. A possible explanation of this seeming discrepancy is that many of the cows which calved earlier in the season had probably weaned their calves and had dried up by December. Thus, at that late date, the lack of milk in the udder may not be taken as final evidence that the animal did not bear a calf the preceding spring. Ovarian analysis would in this case be the only certain means of determining whether or not the animal had been pregnant. It is interesting to note that we still have a few old cows left in the herd. This year, six of the cows in the 15 to 30 year age group were found to be 20 years or older.

Some comparative data on the dressed weights of butchered buffalo were assembled this year to provide more precise information on weight differences between age classes and sexes. Data on animals killed in the 1949 and 1952 programs are compared. Unfortunately there were not enough cows in the younger age groups to provide adequate samples, so all mature cows are grouped together into one classification. Following is a tabulation showing the average dressed weights of whole buffalo and also the average weights of front and hind quarters:

Average Dressed Weight in Pounds - Whole Buffalo

<u>Age and Sex</u>	<u>1949</u>	<u>1952</u>	<u>Average for Both Years</u>
Yearling bulls	367 (10)*	383 (8)	375
2 year bulls	479 (17)	492 (18)	485
3 year bulls	--	601 (6)	601
Mature cows	546 (12)	457 (20)	501

* Indicates number of samples represented.

Average Weight in Pounds of Front and Hind Quarters - Buffalo

<u>Age and Sex</u>	<u>1949</u>		<u>1952</u>		<u>Av. for both years</u>	
	<u>Front</u>	<u>Hind</u>	<u>Front</u>	<u>Hind</u>	<u>Front</u>	<u>Hind</u>
Yearling bulls	99 (20)*	85	103 (16)	90	101	87
2 year bulls	132 (34)	107	132 (36)	114	132	110
3 year bulls			166 (12)	135	166	135
Mature cows	147 (24)	125	121 (40)	105	134	115

* Indicates number of samples represented.

It will be noted that the average weights for bulls of different ages compare rather closely for both 1949 and 1952. On the other hand, there is a rather wide difference between the average weights of mature cows for these two years. We believe much of this difference may be explained by the fact that many more aged cows were represented in the 1952 slaughter than were in 1949. These old cows fall off greatly in weight, with some individuals weighing less than 400 pounds dressed weight. It is also interesting to note the rather consistent difference in weight between front and hind quarters of all classes listed. In every instance, the front quarter is from 8 to 10 percent heavier than the hind.

This fall, on October 4 to be exact, we received four fine yearling bull buffalo from the Fort Niobrara Refuge in Nebraska. These are the first of a series we hope to secure for providing a new blood strain in the Bison Range herd. Following branding, these animals were released on the range with the main herd. In general they appeared to be about the same size as our yearling bulls and were similar in all physical characteristics, except that they seemed slightly darker in coloration of pelage.

In exchange for these bulls we provided Fort Niobrara Refuge with an equal number of yearling bulls from our herd.

One yearling bull was also shipped to Fort Niobrara for eventual transfer to Sullys Hill Game Preserve to provide new blood for that herd.

Elk

During September and much of October, there was the usual bugling and related activities associated with the elk breeding season. Bugling

reached its peak about the third week in September and then tapered gradually through October until only occasional calls were heard by the end of the month. Two instances of actual breeding by elk were observed in the headquarters exhibition pasture. The first was noted on October 5, 1952 and the other on October 11, 1952.

Most elk appeared in excellent condition at the onset of the rutting season. One bull, killed for food habits studies in early October, was found to have a total live weight of 987 pounds which, incidentally, is quite a good sized elk in any locality. Most elk, particularly the bulls, have declined somewhat in condition during the late fall months but, owing to favorable weather and ample forage supplies, they have undoubtedly fared better than usual.

Except for four adult elk--3 bulls and 1 cow--taken for food habits studies, there have been no other known losses of this species during the period. The total population estimate as of December 31 is 75 elk.

Mule Deer

Mule deer are more widely distributed on the Bison Range than any other big-game species. They inhabit virtually every section except the north and east portions along Mission Creek and in Alexander Basin.

Following our drastic reduction of these animals in early 1951, they have been increasing rather rapidly and by this fall, it was estimated that the herd numbered at least 400 head. The greatest number occupied the Pauline drainage, where it is estimated there were at least 150 deer. Good populations also occurred along the west and south sides of the range and throughout the Elk Creek and Triskie Creek drainages. On these more heavily populated sections, deer had unquestionably become too numerous and, as a result, action was taken this fall to reduce their numbers.

Following approval granted by the Central Office and the Montana Fish and Game Commission, we started in late November on a program to remove approximately 200 mule deer from the range. Since there was no need for capturing these deer alive and since public shooting was impracticable, we undertook the slaughter of this number as a Service activity. Arrangements were completed with the State Superintendent of Public Instruction to accept the carcasses for the State School Lunch Program.

The actual job of making this reduction was started on November 24. Approximately 106 deer were killed during the week November 24-29. Following this, the program was temporarily discontinued for a week to permit the buffalo slaughter to be accomplished. Then on December 8 it was resumed and continued until completion on December 12. All deer were killed by refuge personnel. They were shot on the range at various distances, mostly with scope mounted rifles in calibers

.270 and 30.06. In order to avoid spoiling meat unnecessarily, most animals were killed by shots to the head and neck. In all, 199 deer including adults and fawns were taken. The following tabulation gives the number of deer killed by sex and age categories:

<u>Sex</u>	<u>Adults</u>	<u>Immature</u>
Male	97	11
Female	<u>74</u>	<u>17</u>
Totals	171	28
Grand Total		199

At first our policy was to take all deer as they came. It was soon apparent, however, that the fawns were considerably smaller than we had anticipated, since many did not weigh more than 30 pounds dressed. In view of this, we decided to concentrate mainly on yearlings and adults in order to obtain animals with a fair amount of weight. As the result of this, relatively few fawns were killed during the last week of the program.

Since this reduction program offered an excellent opportunity to collect data on weight relationships of mule deer, we undertook to weigh all specimens. At first we secured three weights; namely (1) live weight, (2) hog-dressed weight and (3) dressed weight. Total live weight was secured in the field immediately following killing, before the animal had been eviscerated. The hog-dressed category was the weight of the carcass following removal of the viscera. Dressed weight was the final weight after the head, hide and feet had been removed. Since considerable extra time was required in the field to take live weights, we dropped this measurement after securing it for 84 animals. This number provided us with a fair amount of data for each age class. Accordingly, there are given in Table No. 1 tabulations of the average weights and weight relationships for each sex by age groups.

The deer removal program provided an excellent opportunity to determine the actual physical condition of the herd. In most instances, it was found that our animals were in poorer condition than are deer taken at the same season on outside ranges of good carrying capacity. None of our animals possessed the usual heavy layer of fat which normally covers the rump and dorsal portion of the body cavity. In fact, in most bucks and younger animals, fat was almost entirely lacking. Mature does were usually in the best condition and contained small to moderate amounts of fat. Without doubt, all of our deer would average from 10 to 40 pounds lighter in weight than comparable animals on the outside. In our opinion this deficiency is due mainly to an improper forage supply. Because of inadequate browse, mule deer on the Bison Range subsist largely on grasses and forbs, which apparently do not fulfill their dietary requirements.

TABLE NO. 1

WEIGHTS AND WEIGHT RELATIONSHIPS OF ROCKY MOUNTAIN MULE DEER
National Bison Range

<u>Age Class</u>	<u>Sex</u>	<u>No. samples Represented</u>	<u>Whole Weight</u>	<u>Hog-Dressed Weight</u>	<u>Dressed Weight</u>	<u>Visceral Weight</u>	<u>Percent of Total Weight</u>		
							<u>Hog-Dressed</u>	<u>Dressed</u>	<u>Visceral</u>
6 Months	Male	6	76.6	50.6	41.8	26.0	66.1	54.3	33.8
6 Months	Female	7	64.7	43.6	36.1	21.1	66.7	55.4	33.0
1½-2½ Yrs.	Male	26	145.8	102.3	80.9	43.5	70.0	55.0	30.0
1½-2½ Yrs.	Female	10	135.2	96.0	77.2	39.2	71.1	56.9	28.9
3½-4½ Yrs.	Male	15	209.3	162.5	124.3	46.8	77.5	59.5	22.4
3½-4½ Yrs.	Female	11	144.4	98.4	76.8	46.0	68.0	53.0	31.9
5½-10 Yrs.	Male	6	225.3	171.3	133.0	54.0	76.0	58.8	24.0
5½-10 Yrs.	Female	3	147.0	98.7	77.0	48.3	67.0	52.6	32.6

The distribution of the deer kill by areas during the reduction program was as follows:

Pauline Creek	89
Agency Springs	12
Elk Creek	31
Jocko River	25
Triskie Creek	9
Sub-Station	11
Turkey Woman Draw	5
Alexander Basin	5
Sheep Pasture	12
Total	199

The grand total of all mule deer removed during 1952 amounted to 237 head. This includes, in addition to the above mentioned 199 deer, another group of 38 animals which were killed during the year for food habits studies. It is estimated that our residual herd of this species now totals about 200 animals. Further discussion of our mule deer reduction program will be found under Section IV, Economic Use.

White-tailed Deer

This population shows no appreciable change, unless it would be that numbers have declined slightly. Each year there is a good fawn crop in evidence, but there appears to be no noticeable increase reflected in the overall herd strength except for the semi-domesticated group at headquarters. Mature bucks seem particularly scarce everywhere. Each year a number of deer, especially bucks, are known to get outside the refuge fence and it may be possible that enough deer escape this way to offset the annual increase that normally might be evident. While most deer doubtless escape through openings under and through the fence, it also seems likely that some, especially larger bucks, actually jump it.

Most white-tails seen this fall appeared in good condition and it is reasonable to believe that most will survive the winter satisfactorily. The population estimate for these deer at the period's close is 130 animals.

Mountain Sheep

We were fortunate in securing a few sight records of mountain sheep during this period. On September 25 a flock of seventeen ewes, yearlings and lambs was observed near High Point Lookout in the Alexander Pasture. Of this number, six were lambs and the rest were yearlings and ewes. During the buffalo roundup on October 7, the riders reported seeing two adult rams, making a known total of 19 sheep. It appears likely that there are at least a few more rams and possibly several ewes in addition to the above number, thus making an estimated total of about 25 sheep. This year's lamb crop of six is undoubtedly one of the largest produced in recent years and it encourages us to believe that our sheep population is continuing to increase.

Antelope

There was a total of 22 antelope present on the Bison Range at the end of December. Of this total five are fawns, 10 are adult males and 7 are adult females. Due to the absence of any approved study program, no work was accomplished on this herd during the past ten months.

These animals appear to favor the north and east sides of the refuge where they range back and forth between the Alexander and South pastures. All appear in excellent condition and it is believed that they are fully adjusted to the climatic and vegetative conditions existing here.

Longhorn Cattle

On October 4, in connection with the delivery of buffalo bulls from Fort Niobrara, we also received two fine, 3-year-old longhorn steers. These animals, secured for exhibition purposes, have adapted quite readily to their new surroundings and, as time goes on, they are expected to be a valuable addition to our exhibition herds of elk and buffalo.

2. Food and Cover

Due to the lack of adequate moisture supplies, there was very little regrowth of range grasses during the fall months. Apparently most cheat grass seed did not germinate and new green growth on the perennial grasses was quite limited. This situation deprived the various grazing animals of the green, succulent feed which they normally take during the fall months and limited them mainly to dry grass and forbs. Fortunately, there has been a good supply of dry mature grass available so no actual food shortage has developed, nor is one expected to during the winter months.

While most animals have probably not maintained as good condition on this dry range as they might have on more green forage, it is believed, nevertheless, that most are in satisfactory shape and should have no great difficulty surviving a normal winter. Fortunately up to the close of the period, there was no time when snow depths seriously limited the availability of forage.

The pattern of forage utilization, particularly by buffalo, was much the same this year as during the past several years. Areas of over-utilization occurred, as did sections where little to no use was made. Probably the overall utilization of forage was somewhat less this year because of the reduced numbers in the buffalo herd. Despite this, however, they continue to make serious overuse of many sections in the higher part of the range, with the result that these areas are, from a vegetative standpoint, steadily deteriorating. Correction of this condition depends primarily on securing better herd distribution. It is questionable, however, whether this can be accomplished without the aid of additional fences.

Moderate to heavy use was made of most browse species on all parts of the range, except along the Jocko River. Because of their relative scarcity due to years of overuse, browse species are believed to constitute only a minor part of the normal diet of deer and elk on this range.

3. Disease and Parasites

a. Buffalo

During our buffalo slaughtering operations, several representatives of the Rocky Mountain Laboratory at Hamilton, Montana stopped here to examine materials from these animals and to collect blood samples. These included Dr. William Jellison, parasitologist, Dr. Hadlow, veterinarian parasitologist, and Miss Betty Locker, technician. Endo- and ecto-parasites were collected but, to date, we have had no report on the findings in this regard. The results on the Brucella tests on the blood have been reported to us and we are quoting below Dr. Jellison's letter of December 18 giving this information, along with certain comments on the presence of tularemia:

"The serology department has just given me the results on the Brucella tests on the bloods collected December 4 and 5. The first series is by number according to your records. The second series is the samples taken for the veterinarian which gave only the age and sex of each animal killed on December 4 and 5. You will probably get a report from the State Veterinary Laboratory on the latter list also and it will be of interest to compare results:

Samples taken by Jellison, 12-5-52

<u>Buffalo No.</u>	<u>Positive at the following dilution</u>
50	1-80
51	1-40
52	1-160
53	1-160
54	1-2560
55	1-640
56	1-160
57	1-40

Samples taken for veterinarian, 12/5-6/52

3-M	1-40
2-M	1-80
23-F	1-80
12-F	1-160
2-F	1-320
1-M	1-320
1-M	1-2560
25-F	1-80
3-M	1-80
15-F	1-80
2-M	1-80
2-M	1-1280
1-M	1-40

"The two high titers appear to be in young animals and it seems to me these are very high for vaccination titers.

"When we were on the range December 6, a water sample was taken from Post Creek where it enters the Refuge. This was tested along with about 40 water samples from the Bitterroot Valley. The Post Creek sample was highly infected with tularemia. Eight mice were injected, each with 2-1/2 cc. Seven of the mice have died and a pure culture of B. tularense has been isolated. This is comparable to any of the streams in this valley. We found Post Creek positive several years ago. If you note any mortality of muskrats or ducks along the stream, be sure to save a few specimens."

As mentioned in Dr. Jellison's letter, we have also received a report from the State Veterinary Laboratory which generally confirms the results obtained by the Public Health Service Laboratory.

Both the Health Service officials and the Government veterinarian, Dr. Bonallo, stated that the herd on a whole was unusually clean and free from parasites and infectious diseases.

b. Mule Deer

During our deer slaughtering operations the same Hamilton Laboratory officials again visited the range and spent some time examining deer tissues and looking for parasites. Altho a few parasitic forms were found, the examiners expressed the opinion that the deer herd was generally quite free of parasitic infestations. We have not as yet received a report of their findings on deer. Without doubt, however, one of the most common forms present in these animals were tapeworm cysts.

D. Fur Animals, Predators, Rodents and other Mammals

Coyotes

Although very few coyotes were seen this period, it is believed they are slightly up in numbers. An increase of tracks and signs is evident following fresh snow fall at higher elevations. Two of these animals were taken during the period--one shot, and one taken by a coyote-getter.

Bobcats

Bobcats appear to be about the same in numbers this season as in past years. Although a moderate amount of sign, and several cats, have been seen, we have found no actual evidence of damage from this source. Three cats were trapped during the period by Government trapper, Mr. William McDonald.

Badgers

The usual number of badger and their fresh diggings were noted during the early part of the period. Their population seems to be about the same as last year, however.

Skunks

These animals appear in their usual numbers around headquarters, Mission Creek and the Jocko River. Little change is noticeable in numbers of this animal.

Porcupines

Since conducting the hunting and trapping program last winter for porcupines, we have noted a definite decrease in numbers seen on the range, although a moderate amount of fresh sign is still noted in some areas. It is believed if this program is continued we can properly control these animals.

Pocket Gophers

Although activities of these small mammals were noted on various parts of the range, there has been no significant buildup in their numbers during the past year.

E. Predacious Birds, Crows, Ravens & Magpies

Magpies are the most common predacious bird of this area during the fall months. Flocks containing several hundred birds are often seen along Mission Creek and adjacent areas.

Short-eared owls were noted at various times on the range during the period and the hooting of the great-horned owl was often heard in the timbered area along Mission Creek.

Hawks were present in their usual numbers. These include the marsh hawk, red-tailed hawk, goshawk, sparrow hawk and the prairie falcon. The marsh hawk is by far the most common of these predators. Golden eagles were seen occasionally on the area, also.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Only one project involving actual physical development was undertaken during the period. This is described below:

Project 170

Water Development. This job consisted of excavating tanks for four springs and enlarging and deepening three natural potholes and one reservoir. Principal excavation work was accomplished with the TD-18 dozer requiring five man days time. Following this, some hand work, involving one man day, was done on the springs, sloping banks and rock-ing up actual springheads. The combined total yardage for all excavations amounted to 1,905 cubic yards.

All developments were located in the South Pasture at sites that should help in promoting better distribution of the buffalo.

Seeding. During October, seven man days were spent in seeding "Borascu" treated, goatweed patches with perennial grass seeds. These were all places which had been treated with "Borascu" about twelve months earlier. Since most of such areas were small and scattered, it was necessary to accomplish this work by hand which, of course, made it a rather slow and costly job. Altogether about seven acres of "Borascu" treated ground were seeded and, in addition, approximately two acres of skid trails and cleared spots in the timber were likewise planted. Beardless wheatgrass (Agropyron enerme) was used on the open goatweed areas, whereas a mixture of smooth brome, timothy and white dutch clover was sown in the more moist timbered areas.

B. Maintenance and Rehabilitation

In addition to the many normal maintenance activities accomplished during the period, it was also possible to make substantial progress on several important rehabilitation and repair projects. Discussion of these activities follows:

Project 712-R

1. Timber Cleanup

Fair progress was made on this project during the period. Altogether about 20 acres, representing some of the most heavily damaged sections of the refuge, were cleaned up. This operation consisted of cutting and piling broken and badly bent trees. Where practicable, fence posts were cut. Owing to the inferior quality of most of this material, however, relatively few posts were salvaged. About 12 truck loads of wood were hauled to headquarters where part of it was sawed into stove wood lengths for firewood.

In an attempt to secure assistance with this operation, local ranchers were encouraged to cut and haul this damaged timber for their fuel wood supplies. They were permitted to take the wood without cost. Although we have no accurate estimate of the amount cut and hauled, it seems likely that at least fifty cords were taken.

One section of timber was so completely damaged that we found it cheaper and more practicable to bunch the material in large piles with a bulldozer and burn it. Following burning, the area was re-seeded with selected grasses and legumes to provide protection to the soil, as well as a future source of forage.

2. Painting Buildings

Substantial progress was made on this project during the late summer and early fall months. Altogether we completed the following jobs:

1. Complete repainting of exterior of East Garage.
2. Complete repainting of exterior of West Garage.
3. Complete repainting of exterior of Quarters No. 3-3.
4. Repainting of exterior walls and windows of Quarters No. 2.
5. Painted roof of old barn.

6. Repainting of exterior of High Point Lookout cabin.
7. Repainting of office rooms.
8. Painting and redecorating living and dining rooms in Quarters No. 2 (done on employees' time).
9. Painting and redecorating living room in Quarters No. 6 (done on employees' time).

With most of the headquarters buildings now repainted, the general appearance of the place has been greatly improved and, much to our surprise, many refuge visitors have commented favorably on the "new look" here. Altogether 56 man days were spent on this work—48 man days of temporary labor and 8 man days for refuge personnel.

3. Corral Repairs

Although work on this project was started in August, it continued through September and into the latter part of October before completion. During this time the following was accomplished:

1. New holding pen was built.
2. Certain fences were relocated and rebuilt.
3. Three new heavy plank gates were constructed and installed.
4. New cat-walks and guard rails were added over sorting pen.
5. Most new work painted to protect from weathering and improve appearance.

Altogether 66 man days were spent on this project. Of this amount, 61 days covered time of temporary labor and 5 days for permanent personnel.

4. Meadow and Pasture Development

This job was undertaken for the purpose of improving existing pastures and developing additional land for pasture and hay production. Involved in this is also the rehabilitation of the headquarters exhibition pasture. Work accomplished under this project included the plowing of approximately 20 acres of heavily sodded ground and the construction of 104 rods of division fence in the exhibition pasture. Three meadows comprised the areas which were plowed. These included the meadow directly west of Quarters No. 1, the east half of the exhibition pasture and approximately 6 acres north of Quarters No. 2 across Mission Creek. This work, including the fencing, required 38 man days of temporary labor and 9-1/2 days by permanent personnel.

5. Improvement of Heating Facilities

Funds provided for this work covered the following jobs:

1. Construction of extension to existing chimney in Quarters No. 2.
2. Improvement of low pressure steam heating system in Quarters No. 1.
3. Installation of heat ducts and fan in Quarters No. 6.

Job No. 1 was accomplished during September. A brick mason was hired for the purpose and, with the assistance of one man from the refuge staff, the job was completed in a single day. Completion of this chimney

extension permitted the operation, for the first time, of the hot air furnace installed in these quarters last spring. Total cost of this chimney extension amounted to \$62.50.

Work accomplished under Item 2 consisted of installing a condensation pump in connection with the boiler, traps on all radiators and a direct steam line to the kitchen radiator. These changes have greatly improved the efficiency of this system and it is expected that reduced operating costs will result. All work on this job was accomplished by a Missoula plumbing and heating concern. Total labor and material costs were \$412.50.

Job No. 3 involved the installation of heat ducts from the kitchen to the rear bedroom and bathroom of Quarters No. 6. A small fan was installed in the opening of the duct for the purpose of blowing warm air from the kitchen into these two other rooms. Both rooms have in the past been hard to heat. It is expected that this change will affect some improvement in the heating and circulation of air to these rooms. This work was also accomplished by the Missoula firm and total costs of labor and material were \$72.40.

Regular Maintenance Activities

1. Roundup and Disposal of Surplus Buffalo

This operation, as usual, required the greatest amount of time of any of our normal maintenance activities. Altogether 79 man days of work by regular and temporary personnel were utilized here. The roundup involved gathering the herd of approximately 400 animals, tallying each animal, branding and vaccinating calves, loading live buffalo sold to individuals and moving the butcher herd to the sheep pasture. In addition to regular personnel, six temporary employees assisted with the operation.

During butchering, 57 buffalo were slaughtered. The meat was cooled, cut into quarters, then wrapped and shipped. Hides were fleshed and salted. For this job a butcher foreman, a butcher and three helpers were employed for one week. In addition to this, regular personnel spent the entire period assisting with the program.

2. Deer Disposal

This was another big project this fall involving altogether 75 man days of labor. Of this amount, 35 man days were contributed by refuge personnel and 40 man days by temporary help. Work was accomplished during late November and early December. Regular personnel slaughtered the deer in the field. Temporary help handled the skinning and cleaning and assisted with wrapping and shipment of the meat. Further details on this operation are given under Section IV, Economic Use.

3. Deer and Elk Collections for Studies

The collection of 38 deer and 4 elk during the period was accomplished by regular personnel. This required 3-1/2 man days of time.

4. Range Management and Patrol

A total of 15 man days was spent during the period on inspection trips, by car and horseback, checking on the buffalo herd and other wildlife, forage conditions, fences and watching for evidence of trespass. Also accomplished was the placing of salt on the range.

5. Equipment Repair and Maintenance

Work under this heading includes the usual maintenance and minor repairs to trucks, tractors and other mechanical equipment. Eleven man days were spent on this activity.

6. Quarters Improvement and Maintenance

Included under this heading are the installation of new storm windows, certain additional electrical wiring and the repair of the hot water heater, all in Quarters No. 3-3. Seven man days were required for this work.

7. Construction of Feed Racks

Two large feed racks were constructed and placed in the exhibition pasture for use in feeding hay to buffalo and elk held in this enclosure. Six man days were required to construct these.

8. Miscellaneous Maintenance

Included here is a brief listing of other routine tasks that were accomplished during the period:

Breaking saddle horses	3 man days
Shoeing horses	6 man days
Feeding exhibition animals	5 man days
Removal of elk from pasture	2 man days
Construction and installation of stove in shop	2-1/2 man days
Bridge repair	4 man days
Cleanup of buildings & grounds	5 man days
Transfer of grain from Malheur	10 man days

IV. ECONOMIC USE OF REFUGE

A. Surplus Buffalo Disposal Program

✓ 1. Live Sales

Altogether 31 live buffalo were sold this fall for propagation and exhibition purposes. These consisted of the following sexes and age classes:

<u>Age Class</u>	<u>Bulls</u>	<u>Heifers</u>	<u>Total</u>
→ Calves	2	3	5
Yearlings	5	21	<u>26</u>
	Grand Total		31

In all, there were 13 separate sales involved. The number of animals sold to each individual ranged from one to five, with the maximum number being sold to a buyer in North Carolina. Buffalo this year were shipped to four different states which included Montana, California, North Carolina and Iowa. The North Carolina shipment went by rail, whereas the remainder were all trucked to their destinations. Total income realized from buffalo live sales amounted to \$5,425.00.

2. Meat Sales

Altogether 57 buffalo were butchered this year. Our final tally of this group shows that 34 of this number were bulls and 23 were cows. These are listed below by age groups:

Bulls, 10 years & over	1
Bulls, 2 & 3 years old	25
Bulls, yearlings	9
Cows, 10 years & over	14
Cows, 4 to 9 years old	5
Cows, 2 & 3 years old	<u>3</u>
Total	57

Despite the fact that our kill was the smallest in recent years, the demand for buffalo meat in 1952 was greater than ever before. We received a total of 776 orders during the year. Of this number 709 were from individuals, 45 from commercial establishments and 22 from Clubs. Including cancellations, we were able to fill about one-third of the requests.

Which applicants were eligible for meat was determined again this year by means of a drawing, held on October 14, 1952. County Commissioner, Henry Hendrickson of Moiese performed the actual drawing, while witnesses present included Mr. Ray Loman, editor of the Ronan Pioneer and Mr. E. J. Wamsley, Postmaster, Moiese, Montana. In all, we processed 173 individual orders. The allocation of meat was approximately on the basis of the percentage rates approved for our annual disposal. Some slight variation in the final totals was necessary, however, due to last minute cancellations and other changes. The final disposition of the meat was as follows:

Individuals	122	quarters
Commercial & Clubs	83	"
Regional Director	12	"
Flathead Indians	<u>11</u>	"
Total	228	quarters

As heretofore, individuals were limited to one quarter per family. Commercial establishments and clubs were held to one half animal each, with but one exception. This was the case of the Rocky Mountain Sportsmen's Association of Butte, who were allotted a whole animal on their special request. As usual, five percent of our kill, or 11 quarters, were donated to the Flathead Indians. They in turn donate the meat to different school lunch programs where Indian children are involved.

The three animals earmarked for disposition by the Regional Director were all sold and no portion of these was released for disposal by this office.

Cancellations were much more numerous this year, but inasmuch as we had a good backlog of applicants it was possible to dispose of all meat without undue difficulty. Apparently the main reason for the increase in cancellations was the fact that the higher price charged for buffalo meat this year was as much, and in some cases, more than good beef was selling for locally. At the time of our sales, beef prices were generally low.

A somewhat greater proportion of the meat was shipped this year than heretofore. Altogether 104 quarters were shipped by common carrier as compared with 124 quarters which were picked up at the slaughter house.

The entire program went off exceptionally well, with all butchering being completed in a single five day period. Meat shipment procedure was much improved over previous years since the Northern Pacific station agent drove to the slaughter house each day and billed out the shipments, following which the N. P. bus would drive directly to the slaughter house and load. As usual, the burden of supervising the operation, tallying the kill, making shipments, collecting payments and numerous tasks all fell to the regular staff of the Bison Range. Great credit is due to all of them for an excellent job.

3. Sale of Buffalo Hides and Heads

The demand for buffalo hides was somewhat below our expectations this year. Only 11 were sold as of December 31. These brought a total of \$175.00.

As usual, there were a few requests for buffalo skulls and altogether seven of these were sold for a total income of \$14.00.

B. Surplus Deer Disposal Program

This program was formulated and carried out by agreement between the State Superintendent of Public Instruction and the Fish and Wildlife Service. It had the sanction and approval of the Montana State Fish and Game Commission.

According to the agreement, we were to furnish each school, designated by the Superintendent of Public Instruction, with one or more dressed deer carcasses at a set charge of \$10.00 for adult animals and \$5.00 for fawns. All meat was to be properly dressed out, cooled, wrapped and shipped by express collect. Upon receipt by the school, it was to be utilized in their hot lunch program.

Work on this project was started on November 24, after approval from the Director. During the following three weeks' period, we filled orders from 188 schools. Apparently all meat was received in good condition and the general reaction of all schools to the program has been quite favorable.

The Superintendent of Public Instruction has expressed pleasure at the outcome of the program and has indicated that they would be pleased to participate again another year, should we undertake another reduction of this nature.

From our standpoint, the program was generally satisfactory. We were able to make substantially more than our actual cost of operation and, probably in another year, it would be advisable to reduce our prices somewhat to bring the total revenue more in line with our actual costs. As a matter of interest, we are giving below a breakdown of these costs:

1. Labor	
(a) Regular Personnel, 35 man days	\$473.90
(b) Temporary Personnel, 40 man days	490.27
2. Supplies	
(a) Wrapping materials	140.50
(b) Gasoline	40.00
(c) Ammunition	65.00
	<hr/>
Total costs	\$1,209.67

Average cost per animal - \$6.00

Total amount received for deer - - - 1,725.00

Net Profit \$515.33

As mentioned elsewhere, the fawns failed to weigh out nearly as much as we had anticipated. Instead of the 50 pound average which we had expected, they weighed closer to 25 pounds. In view of this situation, we frequently placed two small fawns together in a shipment and billed them out as a single animal. This procedure reduced the total number for which we billed the State to 188 deer.

As a result of our slaughter program this year, several hundred pounds of surplus hearts, livers, tongues, lungs and spleens from butchered deer and buffalo were donated to the Fish and Wildlife Service Fish Cultural Station at Creston, Montana for use as fish food.

C. Proceeds of Sales

Following are listed the various classes of animal products sold during the period, together with the income derived from each:

31 Buffalo - alive	\$5,425.00
54 $\frac{1}{4}$ Buffalo - butchered (2-3/4 donated)	11,665.00
199 Mule deer - butchered	1,725.00
11 Buffalo hides	175.00
7 Buffalo skulls	14.00
	<hr/>
Total Receipts	\$19,004.00

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Range Investigations

Appended to the rear of this narrative are two reports by Biologist Watson E. Beed entitled (1) Forage Production and Utilization Study and (2) The Effects of 2,4-D on Range Vegetation Resulting from St. Johnswort Control on the National Bison Range. These reports cover certain of his studies on the Bison Range.

B. Food Habits Studies

Field work on this project was virtually completed with the final collection of two elk and four mule deer in November. Arrangements are now being made for the analysis of more than 60 elk and deer stomach samples collected here over the past 12 months. This study, when completed, should provide considerable information of value on the feeding habits of elk and deer at this refuge.

VI. PUBLIC RELATIONS

A. Recreational Uses

It is estimated that at least 26,000 people visited the Bison Range in 1952--a slight increase over our estimate for 1951. There was a large number of visitors this fall after the normal tourist season had tapered off, which was probably the result of the unusually mild weather that extended until late November. Visitors come mainly as sightseers, picnickers or to pick up buffalo meat during the slaughter program. In this latter connection, several school groups and numerous individuals visited the range to observe our slaughtering operations.

B. Refuge Visitors

Sept. 4	Mr. Wm. E. Riter, Regional Supervisor, Predator and Rodent Control, Portland (Courtesy call)	1 Hour
Sept. 4	Mr. Bryan Melton, Rancher, Camas, Montana (Purchase of live buffalo)	1/2 Hour
Sept. 4	Mr. Harry McIlroy, County Weed Supervisor (Weed control)	1 Hour
Sept. 9	Mr. Kenneth MacDonald, Regional Supervisor, Refuge Division, Portland (Inspection trip)	1 Day
Sept. 15	Mr. Harry McIlroy, County Weed Supervisor (Inspection of sprayed areas of goatweed)	4 Hours
Sept. 17	Professor Melvin Morris, M.S.U., Missoula (Discussion of current research projects)	1 Hour
Sept. 21	Dr. A. B. Hatch and Messrs. Robert Bagby & Richard G. Case, New York City (Courtesy Call)	2 Hours

Sept. 23	Mr. Howard J. Sargeant, Ass't. Regional Supervisor, Portland and Dr. Morley, Central Office (Inspection of range)	1-1/2 Days
Sept. 30	Dr. Durward Allen, Ass't. Chief, Branch of Research, Washington D.C.; Mr. Paul Hickie, Chief, Section of Wildlife Research, Denver, Colorado; Mr. Jay S. Gashinler, Biologist, Public Lands Research, Portland, Oregon; Dr. Daniel Leedy, Chief, Cooperative Wildlife Research Units, Washington, D.C.; Dr. Philip Wright and Prof. Melvin Morris, M.S.U., Missoula and Mr. Lowell Adams, Biologist, Missoula, Montana (Courtesy call and short trip on range)	2 Hours
Oct. 4	Mr. John Connors, Refuge Manager, Fort Niobrara Refuge, (Delivery of longhorn steers and buffalo bulls)	2 Days
Oct. 6	Charlo High School biology class of 26 students under supervision of Supt. Grayson and Instructor Jeakins (Tour of range)	4 Hours
Oct. 8-9	Drs. Bruce Bonallo and J. E. Corcoran, Bureau of Animal Industry, Polson, Montana (Vaccination of buffalo)	2 Days
Oct. 14	County Commissioner Henry Hendrickson, E. J. Wamsley of Moiese and Ray Loman, Ronan (Accomplished drawing for buffalo meat)	2 Hours
Oct. 16	Messrs. Oren Cason and R. B. Kuebler, U.S. Indian Irrigation Service, St. Ignatius (Courtesy Call)	1 Hour
Oct. 17	Group of approximately 40 Moiese school students taken for tour of range	2 Hours
Oct. 27	Messrs. Ed Beebe, Roy Guffey and several Service trappers (Slaughter of horses for bait)	2 Days
Oct. 30	Mr. Leon C. Snyder, Refuge Manager, Bowdoin Refuge (Courtesy call)	3 Hours
Nov. 10	Mr. Ray O. Sjostrom, Regional Supervisor, Portland and Game Agent James Birch, Helena (Courtesy call)	2 Hours
Nov. 14	Professor Melvin Morris and assistants, M.S.U. (Taking samples of elk and deer for food habits studies)	6 Hours
Nov. 19	Mr. William Apgar, Forest Service, Missoula (Courtesy call)	1 Hour
Nov. 25-28	Miss Betty Locker, Technician from Hamilton Laboratory (Examining deer materials)	3 Days
Nov. 26	Drs. Jellison & Hadlow, Parasitologists, Hamilton Laboratory (Examining animal tissues and materials)	1 Day
Dec. 4	Game Agent James Birch, Helena (Courtesy call)	4 Hours

Dec. 4	Br. Stan Hamilton, Professor M.S.U., Missoula (Courtesy call)	2 Hours
Dec. 5	Drs. Jellison and Hadlow, Parasitologists, Hamilton Laboratory (Examining buffalo tissues)	1 Day
Dec. 6	Superintendent Stone, Indian Service, Dixon (Courtesy call)	1 Hour
Dec. 12	Professor Melvin Morris, M.S.U. (Collecting samples from deer stomachs)	1 Day
Dec. 14	Messrs. Wilson and Cagle, Malheur Refuge (Delivered fence posts from Pocatello Supply Depot)	1 Hour
Dec. 15	Mr. Ed Beebe, Mammal Control Supervisor, Missoula (Delivered mouse and magpie poison)	1 Hour
Dec. 16	Messrs. Hartkorn and Woodgerd, Montana Fish and Game Biologists (Counting upland game birds)	6 Hours
Dec. 16	Drs. John Craighead and Philip Wright, Montana Co-op Research Unit, M.S.U. (aging deer jaws)	4 Hours
Dec. 22	Mr. Dean Rodman, Camas Refuge (Delivered load of grain)	3 Hours
Dec. 27	Mr. Lowell Adams, Service Biologist, Polson (Regarding property transfer)	1/2 Hour

C. Refuge Participation

Oct. 2	Attended regular noon meeting of Executive Council of Western Montana Sportsman's Association in Missoula, Montana.
Oct. 15	Attended local meeting of Moiese Grange and gave illustrated talk on the Bison Range and other wildlife refuges.
Nov. 17	Attended first fall meeting of Federal Business Men's Asso- ciation in Missoula, Montana. Installed as president of organization.
Nov. 19	Refuge Manager C. G. Young attended annual fall banquet of the St. Ignatius Saddle Club as representative of the Bison Range.
Nov. 22-23	Attended 17th Annual Conference of Montana Wildlife Federa- tion at Helena, Montana. Presented paper on Management of the Bison Range.

VII. OTHER ITEMS

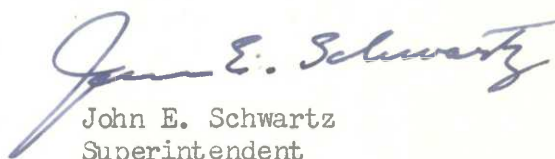
A. Photographs

Project photographs taken during the period are shown on the follow-
ing pages.

B. Acknowledgements

Appreciation is expressed to all members of the staff for their assistance in contributing information and help in the preparation of this report. Particular credit is due Mr. May for his contribution. Mr. May assembled and summarized the large amount of data on deer and buffalo weights and wrote Section II, D and E. Mrs. Young prepared Section VI, B and C and typed the report.

Respectfully submitted,


John E. Schwartz
Superintendent

January 10, 1953

Approved:


ACTING Regional Director

Wa

PUBLIC USE - C.Y. 1952

Please supply figures, or your best estimates for the following categories when applicable to your refuge:

A. National Bison Range National Wildlife Refuge.

B. Estimated total use of all types 26,000 visitor-days.

1. Hunting use (for those refuges having public or regulated hunting.)

Estimate visitor-days _____.

2. Fishing use. Estimate visitor-days _____.

3. Miscellaneous use (lump such uses as picnicking, swimming, sightseeing, birdwatching, as well as those on the area for business or official use, including economic uses such as farming or trapping.)

Estimate visitor-days 26,000.

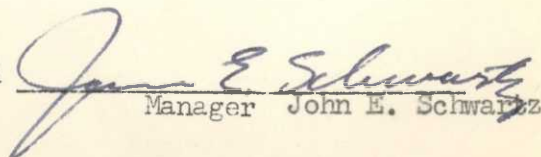
C. Remarks.

Visitor use heavier than normal during fall months probably due to the generally pleasant weather that prevailed. Some increase this year in the number of large groups taken for tours of range.

Jan. 7, 1953

Date

Signed


Manager John E. Schwarz

FORM NR-1 NOT APPLICABLE TO THE BISON RANGE.

DISCONTINUANCE AUTHORIZED IN MR. GRIFFITH'S MEMORANDUM OF APRIL 18, 1946.

UPLAND GAME BIRDS

1613

Refuge National Bison Range

Months of September to December, 1945

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'd.	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Blue Grouse	2518 A. Pine & Fir	100							25	
Ring-necked Pheasant	16,023 A. grassland Browse, etc.	40							400	
Hungarian Partridge	" "	100							150	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge National Bison Range Calendar Year 1952

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions	(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss		At period of Greatest use	As of Dec. 31	
Common Name	Cover types, total Acreage of Habitat	Number								Source			
Buffalo	15,121 A. bunchgrass, fescues, bluegrass, etc.; 2,518 A. Pine & fir; 309 A. Juniper; 40 A. Cottonwood; 61 A. Browse.	97		88					3	4 Fort Niobrara	398	305	148 B 157 C
Elk		25	4			22			4	5 Boyd Ranch	115	75	
Mule deer		100	27	185		38			21		400	200	
White-tailed Deer		30				1	2		10	1 Individual	130	110	
Mountain Sheep		6							4		24	24	
Antelope		5				3				10 Fish & Game Dept.	22	22	
Longhorns										2 Ft. Niobrara	2	2	2 B

Remarks:

Reported by

John E. Schwartz
John E. Schwartz, Supt.

INSTRUCTIONS

Form NR-3 - BIG GAME

- (1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated total number of young produced on refuge.
- (4) REMOVALS: Indicate total number in each category removed during the year.
- (5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.
- (7) TOTAL REFUGE POPULATION: Give the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.
- (8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

116000

CULTIVATED CROPS

Refuge Natl. Bison Range Year 1945

Permittee (If farmed by refuge personnel, so indicate)	Permit No.	Unit or Loca- tion	Crops Grown	Avg. Yield per Acre	Permittee's Share		Government's Share or Return				
					Acres	Bu. Har- vested	Harvested		Unharvested		Compensatory Services, or Cash Revenue
							Acres	Bu.	Acres	Bu.	
			NONE								

[illegible]

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS

Cultivated Crops Report Form NR-8 should be prepared on a calendar-year basis for all crops harvested or utilized during the calendar year and submitted with the December 31 refuge report.

Permittee - List each permittee separately. If lands of the refuge are farmed by refuge personnel or hired labor, this should be indicated in the Permittee column.

Permit No. - List the number of the Special Use Permit issued to the individual.

Use or Location - The Unit No. or name specified in the Economic Use Plan should be listed in this column.

Crops Grown - A separate line of the form should be used for each crop grown by each permittee or by refuge personnel. This is important, since if each crop grown by each operator is not specifically enumerated, the report will be of no value for statistical purposes.

Average Yield per Acre - It is important that the average yield per acre of each crop grown by each operator should be shown.

Permittee's Share - Only the number of acres harvested or utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. It is requested that all crops harvested be reduced to bushels wherever possible, or, as in the case with the harvesting of seed such as that of sweet clover, alfalfa, brome grass, etc., the total harvested crop in pounds may be shown. Timothy, alfalfa, or other hay harvested by the permittee should be shown on Form NR-10 and should not be shown in the Permittee's Share column.

Government's Share or Return - Harvested - Show the number of bushels harvested for the Government and the acreage from which this share is harvested, both for grain raised by refuge personnel and by permittees. Unharvested - show the exact number of acres of crops allowed to remain unharvested as food and cover for wildlife. An estimate of the number of bushels of grain that is available for the wildlife in such unharvested crops should be shown in the Bushels column.

Compensatory Services, or Cash Revenue - Show other services received by the Government in cooperative farming activities, the number of acres of food strips planted for wildlife, the amount of wildlife crops not otherwise reported that are planted by cooperators for the Service, or the cultivation of wildlife plantations. If the permit is on a fee basis, the total cash revenue received by the Service.

REFUGE GRAIN REPORT

Refuge National Bison Range

Months of Sept. through Dec., 1952

(1) VARIETY*	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED OR SUITABLE USE*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
OATS	160	400	560			100		460		460	
BARLEY	165	180	345			10		335		335	
WHEAT	34	120	154					154		154	

(8) Indicate shipping or collection points Grain received from Malheur and Camas Refuges

(9) Grain is stored at Bison Range grainary and barn

(10) Remarks _____

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

3-1759
Form NR-9

COLLECTIONS AND RECEIPTS OF PLANTING CHECK
(Seeds, rootstocks, trees, shrubs)

Refuge National Bison Range Year 19452

Species	Collections				Receipts		Total Amounts on Hand	Amount Surplus
	Amount	Date or Period or Collection	Method	Unit Cost	Amount	Source		
Russian Olive					50	Mont. State U		
Chinese Elm					25	Nursery		
Golden Willow					25	"		
Serviceberry					50	"		



1. Work was continued this fall on the rehabilitation of the corrals and chutes at the refuge slaughter house.



2. One of the new plank gates installed at the corrals.



3. Catwalks and handrails were built over the sorting pen to facilitate the handling of animals and to provide greater safety to personnel.



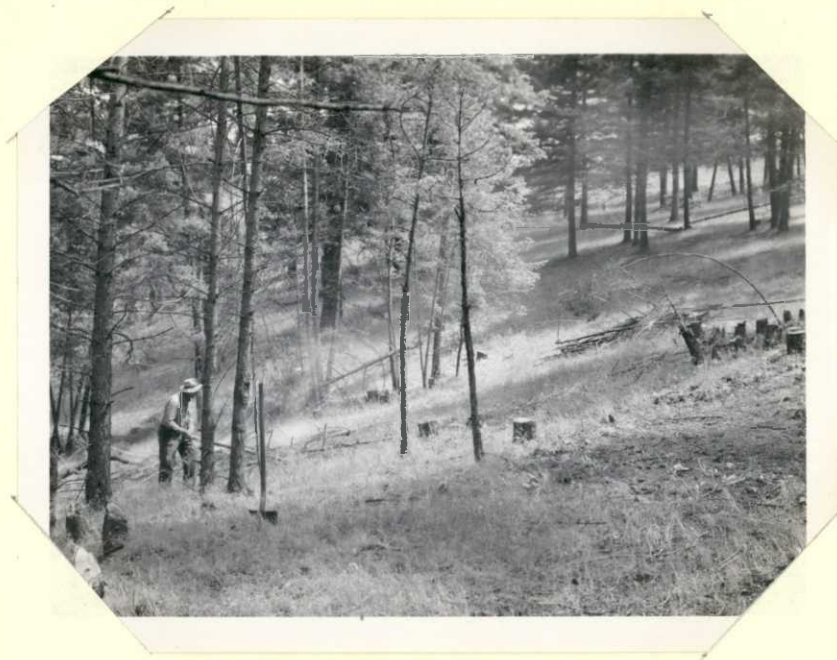
4. Work was continued during the period on the cleanup of storm damaged timber. A "22" Cat was used in skidding and piling material.



5. Typical view of the tangled mess of broken and bent trees which were removed.



6. The power chain saw greatly expedited the cleanup job.



7. Much of the cleanup work amounted to a good "thinning" job which will, unquestionably, result in a much improved timber stand.



8. In some areas damage was so great that all material was bunched and piled with the TD-18 dozer.



9. Burning piles of damaged timber. This cleared area reseeded with grass and clover.



10. Buffalo butchering operations were carried out as usual in early December. Shown in picture are Butcher Foreman Henry (Heine) Helgeson, veteran buffalo butcher, and his assistant Lawrence Driscoll.



11. Halves of buffalo carcasses in slaughter house cooling room. Only 57 buffalo butchered this year--the smallest kill in many years.



12. Wrapping quarters of buffalo meat for shipment. Shown in picture are Refuge Manager Cy Young and Maintenance Man Frosty Thompson.

THE EFFECTS OF 2,4-D ON RANGE VEGETATION
RESULTING FROM ST. JOHNSWORT CONTROL ON
THE NATIONAL BISON RANGE

A detailed remapping of the quadrats employed in this study had been planned for this fall, but since only one, Quadrat No. 6, was in the area treated with 2,4-D this season, only a brief inspection was made. There has been, however, a profound change structure of the vegetation and another mapping in complete detail will be made late next spring when specie determination is possible.

A rather extensive area near the Ravalli Gate has been treated with 2,4-D during each of the four past seasons. Practically all forbs and woody plants have been eliminated, with the exception of Yarrow and a few inconspicuous seasonal forbs. Reduced competition has given the grasses opportunity to seed well and spread, resulting in an almost pure stand of bluebunch wheatgrass and Idaho fescue.

Balsamroot, Balsamorhiza sagittata, a common weed in high mountain pasture, is quite susceptible to 2,4-D poisoning. My experiments of this spring indicate that a one percent solution is lethal. Balsamroot is a deep-rooted, robust perennial that competes with the more desirable grasses for moisture and light. A large plant often shades several square feet of ground. The plant is usually not too palatable for big-game animals, but deer do eat some of the flower heads and Mr. John E. Schwartz, Superintendent of the Bison Range, reports that on occasion elk will eat the leaves. The Range Plant Handbook, prepared by the Forest Service, does rate the plant rather high as forage for both big-game and livestock. The incidental poisoning of this weed in St. Johnswort control with 2,4-D is not serious as its loss improves the general conditions for grasses.

Quadrat No. 1 was inspected on September 23, 1952. All St. Johnswort dead and replaced with grasses. Ground cover by grasses now about 50 percent, as compared with the original mapping of about 10 percent. This increase in the grass cover is, no doubt, the result of elimination of competition from St. Johnswort. This quadrat not treated with 2,4-D this season.

The control to Quadrat No. 1 shows no change, except the invasion of a few scattered yarrow seedlings.

Quadrat No. 2 has responded much like No. 1. There is a great increase of perennial grasses and there is no St. Johnswort in the quadrat, but there are numerous seedlings in the vicinity, so treatment with 2,4-D will be necessary next year. The control for Quadrat No. 2 shows no change from the original mapping. This quadrat and control were checked October 14, 1952. They were not treated with 2,4-D this season.

Quadrat No. 3 has responded much as Quadrats Nos. 1 and 2, but the area has scattered St. Johnswort seedlings. This quadrat was not treated with 2,4-D this season but must be treated next year. Forbs greatly reduced from the original mapping. The control for Quadrat No. 3 shows little change. Checked on October 14, 1952.

Quadrat No. 4 was checked October 14, 1952. The dense stand of St. Johnswort has been mostly replaced by cheatgrass, but the perennial grasses

have shown some increase. This quadrat not treated with 2,4-D this year but treatment will be necessary next year, as scattered St. Johnswort seedlings are present.

Quadrat No. 5 has responded exactly like No. 4.

Quadrat No. 6 was checked on September 23, 1952. This quadrat is located in an area formerly a heavy stand of St. Johnswort. The area was treated May 10, 1951 with 8 pounds of borax per square rod. The area was treated this year with 2,4-D at the rate of 4 pounds of acid equivalent per acre. No living vegetation of any kind in the quadrat now. The control for this quadrat was also inadvertently treated with 2,4-D this season, but since the only forb present was yarrow, the vegetative structure is the same as when first mapped.

There is surely little to recommend borax as an herbicide on grass lands unless the treated areas are reseeded to grass after the borax has leached to a sufficient depth to permit survival of the seedlings. Otherwise, the first invaders of the treated areas are the very weeds that occasioned the poisoning.

Quadrat No. 7 was checked on September 29, 1952. There was little change. There was no evidence of beetle use. The single yarrow plant was still alive and Antennaria sp. had invaded the northeast quarter of the quadrat.

Quadrat No. 8 was checked on September 29, 1952. There is evident increase in perennial grasses. The balsamroot plant was dead. All old St. Johnswort was dead, but 48 living seedlings of this plant were present. There was no change in the control.

Quadrat No. 9 was checked September 30, 1952. This quadrat was located in one of the heaviest stands of St. Johnswort on the Bison Range. When originally mapped, the quadrat contained 259 adult plants. When checked on April 29, 1952 all St. Johnswort was dead. When rechecked on September 30, 1952, 73 St. Johnswort seedlings had invaded the area. There was a dense stand of cheatgrass, but two additional plants of Idaho fescue had managed to gain a foothold.

There was no change in the control and the heavy stand of fescue and bluebunch wheatgrass had seeded well.

It is quite clear that with continued control of St. Johnswort on the area where quadrat No. 9 is located, the reduced competition will allow the invasion of the desirable perennial grasses.

January 6, 1953

Watson E. Beed
Refuge Management Biologist

FORAGE PRODUCTION AND UTILIZATION STUDY

NATIONAL BISON RANGE

The purpose of this study were to determine the forage production utilization and composition of the vegetation on the National Bison Range on ranges grazed only by bison, elk and mule deer.

It has long been known that the bison favor the higher range, almost exclusively, in early spring. This results in heavy grazing pressure at a time when the range is most susceptible to overuse. Later in the season, the lower ranges are used, but only moderately, and some portions of the range are not used at all. Every device possible should be used to secure more equal utilization of the forage.

Two portable exclosures, with controls similar to those used by Weaver and Tomanek in their "Ecological Studies in a Midwestern Range", Nebraska Conservation Bulletin Number 91, April 1951, were used in this study. These exclosures are constructed by making a frame six feet square of three-quarter inch construction steel. Four 7' steel posts are then welded at the four corners of this frame, two inches from the bottom. The tops of the posts are then welded together. The frame is then covered on four sides with heavy woven wire. Because of the sloping sides, bison are unable to rub on or move the exclosures. The four protruding pointed two inches of the posts also help to prevent movement of the exclosure. Heavy iron stakes were driven in the ground locking the four corners of the exclosure to further insure that they would not be moved. These exclosures would exclude all large grazing and browsing animals, but would not exclude ground squirrels, mice and pocket gophers.

Exclosure No. 1 was located April 10, 1952 in heavy used, high pasture about one-half mile east of Tower No. 1, at an elevation of about 4000 feet. The exposure was southeast. The control was located about 27 feet east of the exclosure.

Exclosure No. 2 was located April 10, 1952 about one-half mile due south of the Ravalli gate in moderately used pasture, at about 3000 feet elevation. The exposure was south. The control was located 27 feet east of the exclosure.

The controls and exclosures were located by Superintendent John Schwartz and the writer and extreme care was used to be sure the samples were typical for the two pastures selected. After selection of the sites, a coin was flipped to determine which would be the exclosure and which the control.

At the time the experiments were started, the past season's remaining vegetation had been so flattened by the snows of winter and the rains of early spring, it was decided that clipping was unnecessary. It is very doubtful that past season's remaining vegetation would influence the results, but in case it did, it would be a constant.

The forage was clipped on exclosure No. 1 on October 15, 1952. The control to exclosure No. 1, exclosure No. 2 and the control to exclosure No. 2 were clipped October 16, 1952.

The clipping was done with ordinary lawn trimming shears with offset handles, so the cutting edges were parallel to the earth surface. A small amount of vegetation was cut at a time to insure a uniform length to the remaining vegetation. This method removed the vegetation about one-half inch above the ground, which would be at about the limit of utilization by bison.

With the exception of cheatgrass, Bromus tectorum and Idaho fescue, Festuca idahoensis, in enclosure No. 1 and its control, the different species could be separated at the time of clipping and placed in a labeled bag. It was difficult to separate the cheatgrass from the Idaho fescue, so they were placed together in a paper bag and later carefully separated in the laboratory. Most of the plants were dry from the prolonged drought, but some of the grasses had a few green blades. The sacks containing the plants were opened and left exposed to room temperature until they were weighed on October 24, 1952. Following is a list of the plants encountered:

Idaho fescue	<u>Festuca idahoensis</u>
Bluebunch wheatgrass	<u>Agropyron spicatum</u>
Cheatgrass	<u>Bromus tectorum</u>
Junegrass	<u>Koeleria cristata</u>
Hispid Golden Aster	<u>Chrysopsis hispida</u>
Pursh's Plantain	<u>Plantago Purshii</u>
Balsamroot	<u>Balsamorhiza sagittata</u>
Salsify	<u>Tragopogon pratensis</u>
Lupine	<u>Lupinus sp.</u>
Yarrow	<u>Achillea lanalosa</u>
Douglas' Phlox	<u>Phlox Douglasii</u>
Aster	<u>Aster sp.</u>
Western Gromwell	<u>Lithosperinum rudemale</u>

Exclosure No. 1 grasses:

	<u>Weight in grams</u>	<u>Percent of total</u>
Idaho fescue	33	40.2
Bluebunch wheatgrass	5	6.1
Cheatgrass	31	37.8
Junegrass	<u>13</u>	<u>15.8</u>
	82	99.9

Exclosure No. 1 forbs:

Hispid Golden Aster	16	14.5
Pursh's plantain	1	.9
Balsamroot	55	50.0
Salsify	13	11.8
Lupine	13	11.8
Yarrow	2	1.8
Douglas' phlox	<u>10</u>	<u>9.1</u>
	110	99.9

Control No. 1 grasses:

	<u>Weight in grams</u>	<u>Percent of total</u>
Idaho fescue	12	21.1
Bluebunch wheatgrass	10	17.5
Cheatgrass	20	35.1
Junegrass	<u>15</u>	<u>26.3</u>
	57	100.0

Control No. 1 forbs:

Hispid Golden Aster	34	16.8
Pursh's Plantain	2	.9
Balsamroot	145	72.3
Salsify	14	6.8
Yarrow	4	1.9
Douglas' phlox	<u>3</u>	<u>1.3</u>
	202	100.0

Exclosure No. 2 grasses:

Idaho fescue	71	16.5
Bluebunch wheatgrass	294	72.0
Cheatgrass	1	.5
Junegrass	<u>49</u>	<u>11.0</u>
	415	100.0

Exclosure No. 2 forbs:

Balsamroot	11	20.6
Salsify	2	4.0
Lupine	9	17.2
Yarrow	9	17.2
Aster	<u>22</u>	<u>41.0</u>
	53	100.0

Control No. 2 grasses:

Idaho fescue	67	28.6
Bluebunch wheatgrass	148	63.2
Cheatgrass	2	.8
Junegrass	<u>17</u>	<u>7.4</u>
	234	100.0

Control No. 2 forbs:

Hispid Golden Aster	10	33.3
Salsify	5	16.7
Lupine	12	40.0
Yarrow	<u>3</u>	<u>10.0</u>
	30	100.0

<u>Exclosure No. 1:</u>	<u>Weight in grams</u>	<u>Percent of total</u>	<u>Weight in lbs. per acre</u>
Forbs	110	55.3	293.424
Grasses	<u>82</u>	<u>44.7</u>	<u>218.722</u>
	192	100.0	512.146
<u>Control No. 1:</u>			
Forbs	202	78.0	538.827
Grasses	<u>57</u>	<u>22.0</u>	<u>152.044</u>
	259	100.0	690.871
<u>Exclosure No. 2:</u>			
Forbs	53	11.3	136.041
Grasses	<u>415</u>	<u>88.7</u>	<u>1107.021</u>
	468	100.0	1243.062
<u>Control No. 2:</u>			
Forbs	25	9.6	66.686
Grasses	<u>234</u>	<u>90.4</u>	<u>626.811</u>
	259	100.0	693.497

The weighing of the small samples in grams was done for the sake of accuracy. To make the results more comprehensive, the total weights per acre were transposed to avoirdupois weight.

It takes 28.3502 grams to make one ounce. Therefore, to change the weights of the samples to ounces, it was only necessary to divide by 28.3502. The exclosures exclosed 36 square feet, which is 1/1210 of an acre. We would then multiply the number of ounces in a sample by 1210 to get the total ounces and then divide by 16 to secure the total weight in pounds per acre.

It is realized that too few samples were taken and that the percentage of error would be great, but since the types of pasture selected were unmis- takable and, since the selection of the site for the exclosure and the control was by chance, the results should give us at least an index of forage produc- tion and utilization on the pasture types selected.

The structure of the vegetation of both the high, heavily used pasture and the lower, moderately used pasture was the same. The same species were encountered in both, but the percentages of the total forage production by species greatly varied. The forbs outweighed the grasses in both the exclo- sure and in the control in the high pasture, while in the lower, moderately used pasture the grasses greatly outweighed the forbs.

In the high pasture cheatgrass was the greatest producer in the con- trol and lacked only two grams of equaling the production of Idaho fescue in the exclosure. In the lower pasture, cheatgrass was relatively unimportant.

Since cheatgrass greens up in the spring much earlier than either blue- bunch wheatgrass or Idaho fescue, this may be one of the factors which cause the early use of the high pastures by bison.

Assuming our samples correct, the percentage of utilization of the grasses in both the high pasture and the lower pasture was surprisingly close. Being slightly less than 50 percent in the high pasture and slightly more than 50 percent in the low pasture.

The forbs encountered in the study are all usually unpalatable for grazing or browsing animals and, with the possible exception of balsamroot, would be taken only by accident.

Next year the study will be continued and more exclosures constructed and placed. It is suggested that in addition to the types studied, little used and non-used types be included.

It is also proposed that the validity of the results from the quadrates be checked against the Lommasson-Jensen method of "Determining the Utilization of Range Grasses from Height-Weight Tables".

Mr. Grover Elgan assisted with the mathematics for this report and Dr. LeRoy Harvey, Montana State University, confirmed my identification of the plants.

December 15, 1952

Watson E. Beed
Refuge Management Biologist