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Management of Elk in Yellowstone National Park

by

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A Thesis

Presented to the Faculty

of the

School of Forestry

Oregon State College

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JAN 7 1958
OREGON STATE COLLEGE

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Science

June, 1943

Approved:

[redacted]

Professor of Forestry

ACKNOWLEDGEMENTS

Three persons have helped in the course of the preparation of this thesis. To Mr. J. W. Emmert, acting Superintendent of Yellowstone National Park, I am greatly indebted for subject material and certain pictures obtained from the Park Service files. For critical reading of the manuscript, I am indebted to C. H. Willison, Professor of Oregon State College, and to J. B. Long, Professor of Fish and Game at Oregon State College.

Keith M. Clark

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Introduction:

This thesis is an attempt to place in the hands of sportsmen and recreationists reliable information relating to management of the Yellowstone Elk (Cervus canadensis nelsoni), so that they will be able to understand some of the problems encountered by the administrators who work with this game animal in the Park.

There are many factors of importance that can be better understood through the study of the biology of the Wapiti or Elk. Certain interesting facts concerning the management of this elk in its changed habitat will be presented. Through a better understanding of these, it is hoped that a fuller appreciation of this animal will be gained by the reader.

The general public is not familiar with the reasons behind certain management, policies, and practices administered by the personnel of the Park. Although some of these policies seem to be detrimental to the general welfare of the animals, much experimental date is accumulated and correlated before any policy is determined or put into action. It is my desire to enable individuals to realize that these management practices, impractical, as they sometimes appear, may be necessary to keep these game animals intact as a normal and healthy population.

Nomenclature:

There are many common name for the species of elk found in Yellowstone National Park. Some of these are Wapiti, Elk, Canada Stag, American Red-Deer, Round-Horned Elk, and Gray Moose. (1:5)

The word "wapiti" is derived from the Algonquin Indian words "wab" (meaning white) and "atik" (meaning deer). (1:5)

The scientific name of the Rocky Mountain elk is Cervus canadensis nelsoni. The word "Cervus" means "a stag" and "canadensis" means "of Canada". (1:5)

The ladder of scientific nomenclature for this animal is as follows:

Kingdom: Animal
Phylla: Chordata
Sub-Phylla: Vertebrata
Class: Mammalia
Order: Ungulata
Sub-Order: Artiodactyla
Family: Cervidae
Genus: Cervus
Species: canadensis
Sub-Species: nelsoni

Description:

In regard to the general characteristics of this animal; the male elk has massive antlers which are shed annually. The female is antlerless and smaller. A record symmetrical antler on one bull measured 66 inches along the beam. (2:4)

The male has a total average length of 8 feet, and 8 inch tail, and is 5 feet tall at the shoulder. (2:4) The female has a total average length of 7 feet. (2:4)

The male elk weighs between 600 to 700 pounds. (2:4) The female elk normally weighs about 500 pounds. (3:38) A record kill weighed (or was estimated to weigh) 850 pounds for the Yellowstone Park area. (3:38)

The pelages of both sexes are essentially similar in coloration, with the coat of the female being generally somewhat paler than that of the male. The general body color of tawny-brown may vary with the individual. (2:4)

The dental formula of the Rocky Mountain Elk is

	Incisors	Canines	Premolars	Molars
upper jaw -	0	2	6	6
lower jaw -	8	0	6	6

= 34 total

Elk tracks are approximately 4½" long, and are somewhat similar to the mule deer's track, but are more rounded, closely resembling domestic cattle tracks. The dung is in the form of round, hard pellets in the winter; and confluent and bovine in the spring and early summer. (1:45)

Early History:

The local history of the Yellowstone game herds seems fairly well known and is very ably outlined by M. P. Skinner, former Yellowstone Park naturalist, in Roosevelt Wild Life Bulletin, Vol. 4, No. 2, as follows:

"When pioneers first entered the western plains and mountains they found there a wonderful aggregation of large animals, especially on the broad, wide open prairies

and plains. In the mountains, all of the different species were represented by more scattered individuals, probably because the mountains did not contain such a superabundance of food so widely distributed. In later days, wild life was more abundant in the mountains. This was not so originally because we find evidence of this from a careful perusal of Lewis and Clark's journals. While they were on the plains, and right up to the time they entered the mountains, these explorers were able to supply themselves with an abundance of fresh meat. But after they entered the mountains, game practically ceased; and when they met the Shoshoni Indians on the headwaters of the Jefferson River even the Indians had only salmon and berry cakes to trade to them. A little later, on September 12, Lewis and Clark speak of the 'scantiness of game' and relate that the Indians had to peel pine trees 'to procure the inner bark for food'. On September 14, they 'killed a colt, on which they made a hearty supper'. And after that, Lewis and Clark were forced to depend on horses secured of the Indians, and even on dogs purchased from the same source, for their only food supply.

"And this condition was prevalent all through the mountains; traveller after traveller speaks of the abundance of the buffalo plains and contrasts that abundance with the comparatively gameless mountains in those early and primitive days.

"At a later date, when the hunters and settlers worked steadily west of the Missouri, the larger game

animals were forced to retreat toward the mountains. Under these conditions not less than 90 per cent of all the big game remaining between the Mississippi Valley and the Pacific Coast has been forced to retreat to the mountains traversing that vast region. There among the rugged peaks and forest-covered slopes which characterize our remaining wilderness are sheltered the survivors of the wonderful hosts of big game animals which once graced so large a part of the continent." (3:11-12)

From Mr. Skinner's research into the literature bearing on the early game animal history of the Park area and from the Superintendent's reports it is seen that (1) the Park area) was not originally heavily stocked with game animals, (2) the numbers of elk and other animals increased to such an extent that they were forced to migrate from the Park in search of food, and (3) extremely heavy losses occurred in the elk herd during the severe winters. (3:26)

Historians differ as to the origin of the Northern elk herd, but the concensus of opinion is that the remnants of the elk that survived the early day plains hunter adapted themselves to the mountainous environment.

According to Mr. C. K. Skinner of the Park Service, elk were scarce in Yellowstone Park up to 1890, after which they began to increase in numbers. In 1908 the records indicate that winter storms and deep snows in the park drove large bands of elk into the valleys of the Madison and Gallatin Rivers.

Between 1890 and 1906 the present winter elk range was grazed heavily by range livestock. In 1908 the first area in Montana to be set aside for big game was closed to grazing by the Forest Service. This game range was located on the Bacon Rind, Snowslide and Monument Creeks of this winter area. Heavy livestock grazing continued over other portions of the range, however, until 1917. Since 1917, the numbers have been gradually reduced. The result has been the removal of serious conflicts on the winter elk ranges. (4:57)

Breeding and Care of Young:

The Rocky Mountain Elk is polygamous by nature. (2:5) The harem of the male usually consists of six females of varying age classes. The gestation period is from 249 to 262 days (approximately 8 months). (1:5) These elk breed in the late summer and early fall; usually between September 15th, and October 10th. This breeding season varies but little, if any, from year to year. Probably 90% of the cows are bred between these dates, mostly before September 15th. Some very few cases have been observed as late as November 4th. This later date would cause the birth of the calf on July 4th and none have been found later than June 10th. (3:33)

The parturition period (calving period) may take place anytime between may 15th and June 10th. The young are often born in spots where there is no protective cover, such as on closely grazed areas, side roads, old lake beds, alkaline areas, and in one case in a plowed field. Within an hour

or so the mother encourages the calf to move to a more inconspicuous spot. Wooded areas are not favored, the calves often being found in the grass or sagebrush within a hundred yards of the edge of the woods. Small aspen groves are sometimes selected as hiding places but the greatest number favor the open prairie for the first few days. (3:29)

One calf averaging 37 pounds is born annually. The average calf measures 40 inches in total length from tip of nose to tip of tail and 29½ inches high at shoulder. Protective coloration, lack of scent and the mother's aggressiveness is the calf's protection for the first few days. (29:31)

The young are weaned by December 15, although the calves usually stay with their mothers until the following spring, often to within a month of the calving period. (3:31)

The Rocky Mountain elk is essentially a grazing animal of the plains and prefers the forage that grows on the open range land, mountain meadows and parks. In the Yellowstone region the high grassy ridges and the numerous mountain parks are favorite feeding grounds as are also the great open stretches of the Hayden Valley and Pelican Creek. The elk, however, takes full advantage of the timberlands surrounding the open areas for shelter from storms in the winter and for shade in the summer. It is not an animal that frequents the swampy areas, as does the moose, nor the high, inaccessible spots such as the mountain sheep or goat favors. On the other hand, the elk does not insist on a

strictly prairie range as does the antelope. This animal seems to prefer the prairie type of forage, but prefers to be near the timber for protection against adverse weather conditions. (3:28)

The minimum breeding age for the female elk is 2 years. (3:34) However, the minimum for the male is 3 years. (1:32)

Distribution:

The home of the Northern Yellowstone elk herd is at the headwaters of the Yellowstone River, principally within the Yellowstone National Park. The Northern elk herd ranges in summer through most of Yellowstone National Park south to Thorofare Creek and Snake River. Occupying a much smaller area in winter, the animals concentrate on a winter range which lies along the northern boundary of the park both within the park and in the adjacent Absaroka National Forest. (5:1)

The home of the Gallatin elk herd lies in an area which includes both sides of the upper reaches of the Gallatin River. The principal winter range covers a total of approximately 60,000 acres and extends 20 miles down the Gallatin River from the Yellowstone Park boundary. (4:57)

The home of the Jackson Hole elk herd lies in that part of the Snake River Valley between Jackson Lake and the mouth of Hoback or Fall River. It is a basin about 40 miles in length from north to south and averaging about 15 miles in width. It extends in a north-northeast and south-southwest direction. Snake River, after issuing from Jackson Lake,

traverses the valley. (6:9)

Preble, in his 1911 report on the Jackson Hole elk herd, says, "Careful consideration of all the data obtained leads me to esimate that from 20,000 to 25,000 elk habitually range in the region drained by the Snake River south and west of the Continental Divide in the southern part of the Yellowstone National Park, most of which spend the winter in the Jackson Hole region as defined above." (6:12)

The data obtained during 1932 and 1933 has definitely settled the fact that there are more that 20,000 head of elk in the Jackson Hole region. The Department estimate of the herd at the present time is between 25,000 and 26,000 head. (7:8)

Food:

The Rocky Mountain elk adapts itself to what forage is available; grass, weeds, or browse to the thickness of one or two inches, bark of trees, dried weeds, conifer needles and twigs, and even the dried leaves of such trees as aspen, cottonwood and maple. They can subsist for weeks on this sort of diet. (8:27)

The purpose of the "elk reduction program" is to protect the so-called "northern herd" in Yellowstone National Park by bringing its total number within the limits of the available winter food supply. The question of furnishing meat to any agency or group is purely incidental although it is considered desirable not to waste food of this type in time of shortage.

For over 25 years, the question of conservation and management of this herd has been debated. Widespread discussion started about the time of World War I because of the enormous "winter kill" of animals. These losses ran into the thousands; in the winter of 1919-20 about 60% of the 25,000 animals in the herd succumbed to starvation and hunting. The so-called winter range was in a continuously depleted state and was widely cited as a classic example of overuse.

The great drought of the early 1930's forced a realization that the northern elk herd was destined for another large reduction in numbers. In 1934 the Department of the Interior decided that immediate steps should be taken to prevent the loss of many animals by starvation on the drought-stricken range. The program had the full support of a large number of conservation organizations, including the Federal Elk Commission, Americal Game Association, Isaak Walton League, Montana and Wyoming Game and Fish Commissions, Game Conservation Society, American Humane Association, National Association of Audubon Societies, National Parks Association, Ecological Society of Mammologists, American Bison Society, the Permanent Wild Life Protection Fund, and the Emergency Conservation Committee. With the cooperation of the Montana Fish and Game Commission, it was agreed to take 3,000 elk each winter until the herd could be stabilized at about 6,000 head. This objective was to be approached as closely as possible by (1) trapping and shipping live animals to other ranges where feasible; (2) hunting outside of and adjacent to

the park, and (3) shooting the remaining surplus by park authorities and distributing the meat to Indians.

Since adoption of this plan in 1934-35, the results have been as follows: In eight winters, a total of 16,682 elk were removed from this herd (exclusive of deaths due to natural causes). Of this number, 14,067 were killed by hunting outside of the park, 1,730 were live-trapped and shipped to restocking projects and zoos, 617 were officially shot in the park for food for Indians, and 268 were removed by other means. It became evident that the hunting kill had not been large enough to effect an actual reduction; it had not even prevented a substantial increase. The total official kill for food for Indians was relatively small. Annual offers of meat to the Montana relief agency have been declined. Despite the average elimination of about 2,100 elk per year, the herd is now estimated to number almost as many animals as in 1934. The "reduction" program to date has merely removed the annual increase, and has not solved the problem of overpopulation.

The herd now numbers about 13,000 animals, according to National Park Service estimates. Studies by the Yellowstone National Park staff over a 10-year period indicate that the depleted range is capable of supporting only about 7,000 elk in addition to the bighorn sheep, bison, deer and antelope also using it. Some increase in volume of forage has been noted. Any improvement, however, has been due to unusually favorable weather rather than to a reduction in the

potential load on the range. Range recovery has been only partial and is now threatened by a large surplus of elk.

It would not be logical to allow this herd to increase in size, thereby further depleting the range, and imperiling the food supply of the bighorn sheep and other animals using the same area. At the same time, the elk herd would build up to such a point that, with a severe winter, hundreds, if not thousands, would perish from starvation. Recent reports from Yellowstone indicate that winter set in earlier that usual this year and that the winter range is now covered with layers of crusted snow through which it is impossible for the elk to dig for food. Thus the herd, as a whole, is faced with the immediate threat of starvation.

It is more logical to protect the range for the animals it is capable of supporting and to remove all surplus animals yearly than to lose the greater portion of the herd at a later date. With improvement of the range, the herd can then increase safely. The National Park Service, therefore, has decided upon an effective program of reduction of the elk herd in order to bring it within the carrying capacity of the range during the next several years. It is desirable that public hunting outside of the park accomplish as much reduction as possible, but restrictions on ammunition and travel may render this method even less effective than previously. As in the past, elk are available for stocking ranges where forage is available, providing consent of the landowners and the state game authority is obtained.

MONTANA.

ELK RANGE

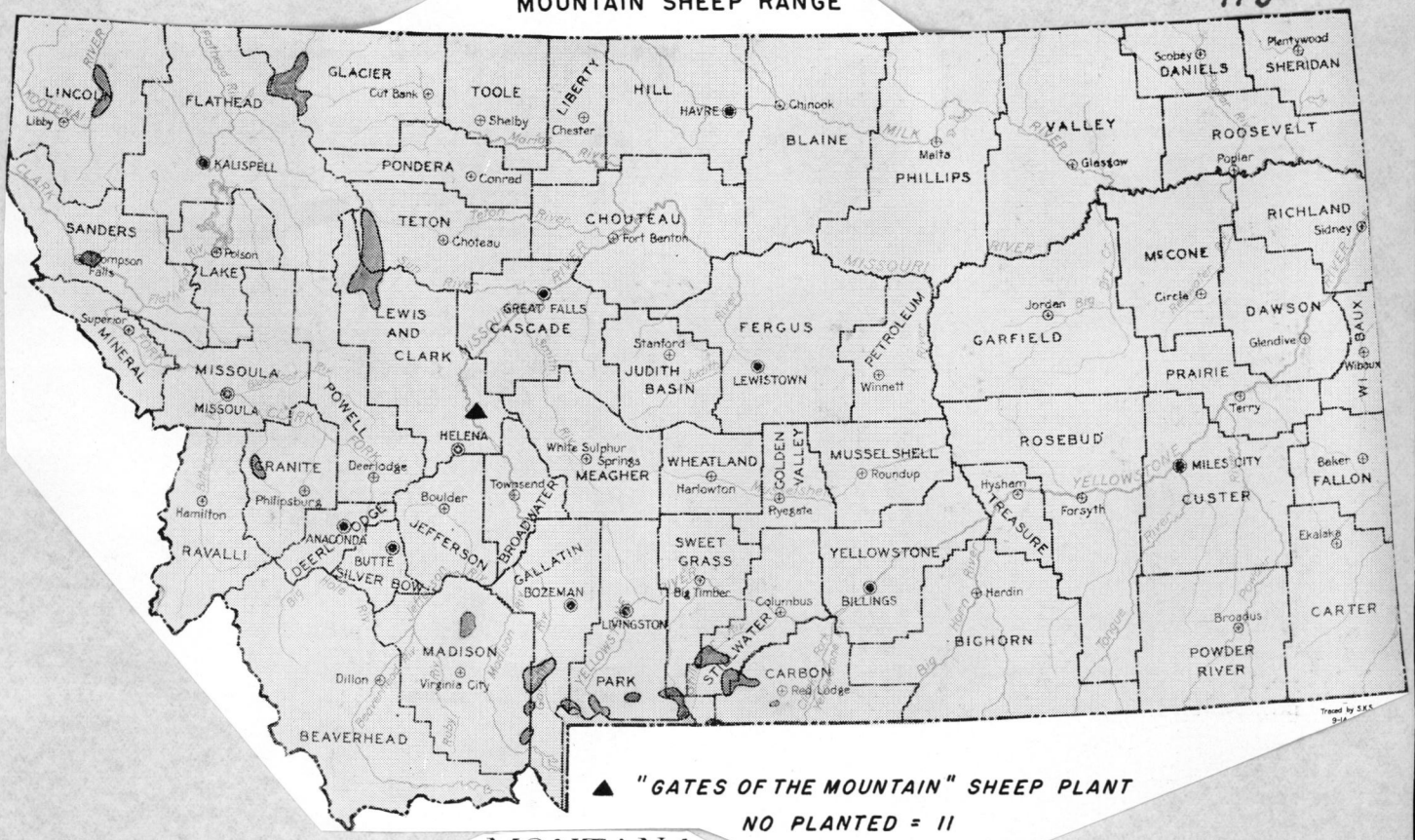
MONTANA.

ANTELOPE RANGE

Chart #1

MONTANA.

MOUNTAIN SHEEP RANGE



▲ "GATES OF THE MOUNTAIN" SHEEP PLANT

NO PLANTED = 11

1942

MONTANA.

MOUNTAIN GOAT RANGE

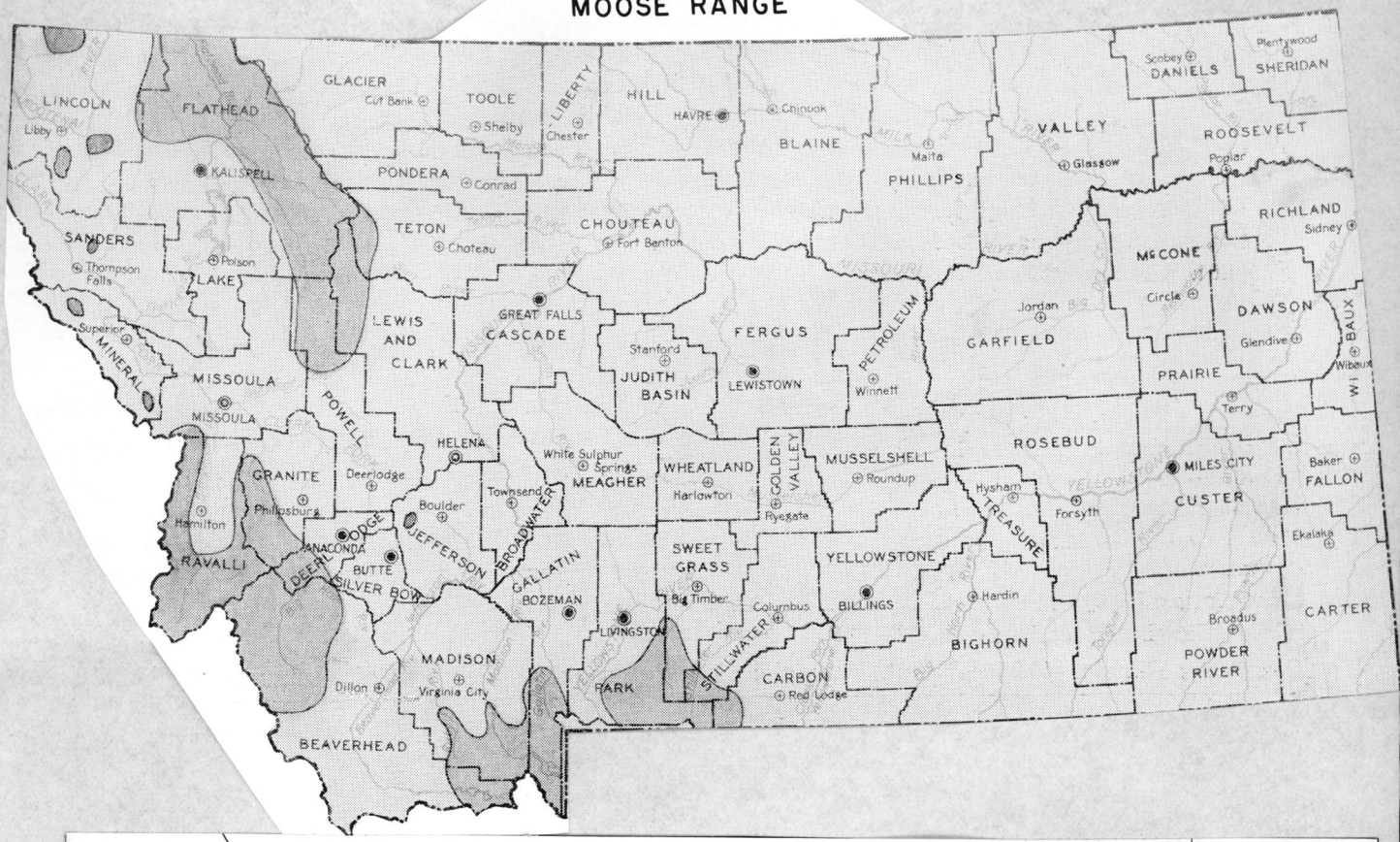
▲ CRAZY MOUNTAIN GOAT PLANT 1941 NO. PLANTED = 10

★ BEARTOOTH RANGE GOAT PLANT 1942 NO. PLANTED = 12

Chart #2

MONTANA.

MOOSE RANGE



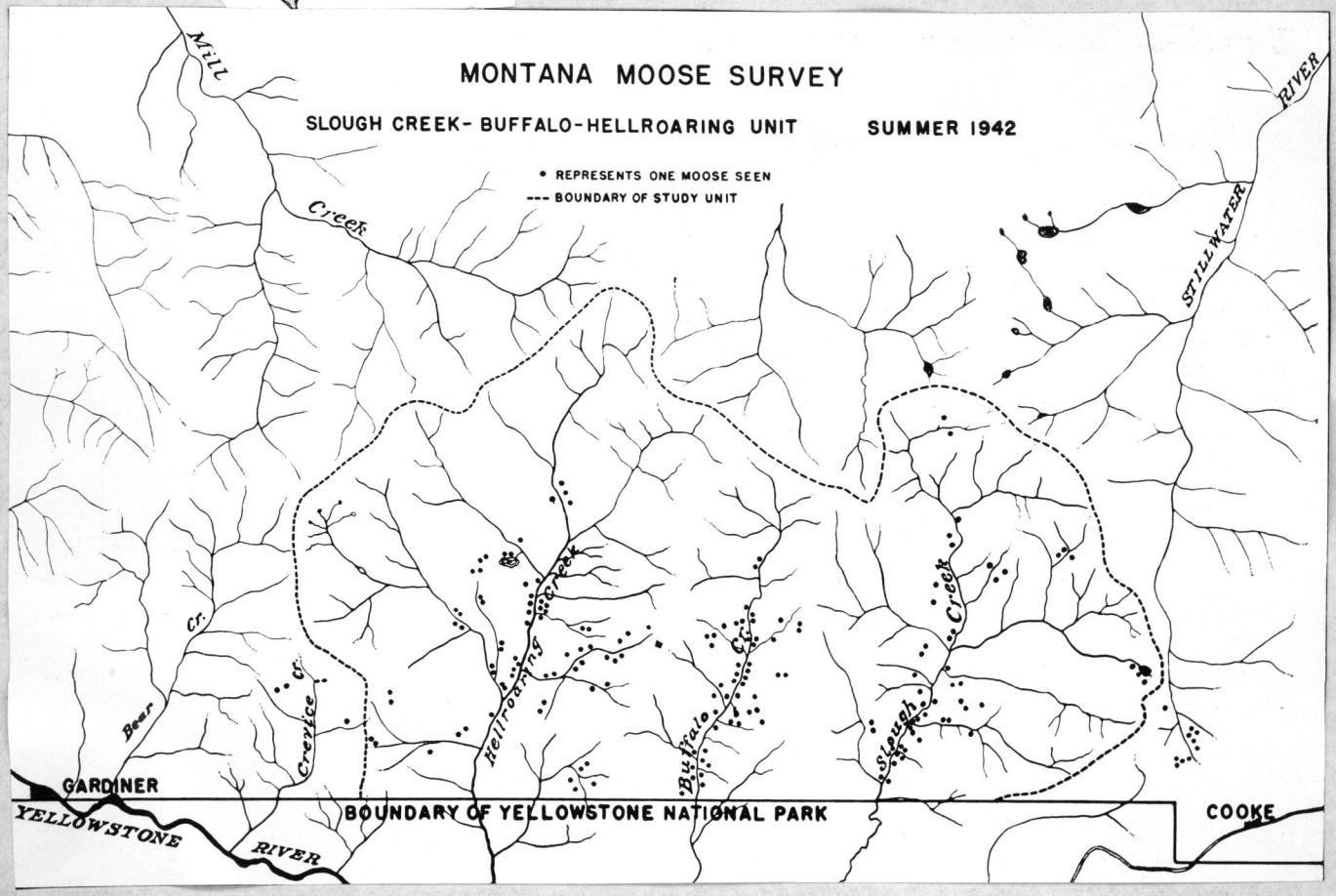


Chart #3

MONTANA.

GRIZZLY BEAR RANGE

Chart #4

From experience, however, it is doubted that range for an appreciable number of elk can be found. The park staff, therefore, has undertaken, as a last resort, to shoot elk within park boundaries. Orders have been issued to proceed with the killing of surplus elk and to fill a number of requests from Indian agencies for carcasses.

At a time when our domestic meat supplies are so restricted, no food should be allowed to go to waste. Exhaustive inquiry was made of public agencies which might furnish an outlet for the meat. Because it had sufficient labor and funds, the War Relocation Authority was considered as a possible outlet, but this plan has been abandoned. Through the Montana Fish and Game Commission, the National Park Service is ready and anxious; now, as in the past, to make any or all of the meat resulting from killing of surplus elk available to any legitimate official public welfare agency. (5:1-3)

Food is recognized as the most important requisite of a game range and the one that is most difficult to maintain in a natural state.

The tendencies of game to use certain ranges and the difficulty encountered in changing those habits indicates that game ranges should be considered on a herd, rather than a land, basis. Each herd should be controlled separately as the conditions of food, environment, and land use indicate.

On each herd range there are certain areas that provide the major part of the game food. These areas should be

considered as the basis for determining range conditions, utilization of forage, carrying capacity, general management, and for investigations. Their use and management is the key to the production of the entire range, hence, they are called key areas.

Over-utilization of concentration spots and of limited yardage areas will have to be accepted as inevitable in the maintenance of maximum populations on a sustained basis.

On the key areas, there is a limited number of plant species that furnish the major part of the forage. These are species upon which the game population depends for more than 60 per cent of its food. The species selected as keys to range use should be highly palatable, fairly abundant, able to stand reasonably heavy use, have about the same utilization factor, be perennials, and suited to the class of game using the range. They should be the basis for judging range condition, forage utilization, trends in vigor and production, and carrying capacity. The percentage of use of key species is determined by comparing utilization of the current growth with plants ungrazed or previously measured. An average of the percentage of use of key species will give an average use for the key area and an average of key areas will show the percentage of utilization for the herd area. (9:146)

The keys species for elk in the Yellowstone Park are the Wheatgrass species, Pine grass, and Willow. Other plants or shrubs utilized for food are Sedge, June grass,

Blue grass, Lodgepole pine, Serviceberry, and Mt. Maple. (10:36)

Elk have two general feeding periods daily. One occurring during the early morning hours, the other in the late afternoon and evening. In the winter, elk will paw through 15 to 24 inches of snow, if it is not too badly crusted, to get to the forage underneath. They can subsist in deeper snow that any animal except the moose. (3:35)

Elk move about considerably during the day. In the summer time it is not unusual for them voluntarily to range over an area of several miles in extent between sunrise and sunset feeding here and there along the way. In the winter they do not move around as much, oftentimes staying in one small area until all the food is exhausted. (8:28)

The plant densities in 1941 are almost the same as those of 1933 when the range reconnaissance work was done to obtain the forage acre factor of .16, which was used in computing the forage acres and carrying capacity of the winter range. Accordingly, very little increase in the carrying capacity of the range over that of 1934 to 1938 can be justified by the 1941 studies.

Forage volume, as indicated by clippings from the volume plots in 1941, is slightly more than double the average of the years 1934-1938. Increased forage volume will increase the carrying capacity of the range for this winter, but forage volume is subject to considerable fluctuation as a result of changes in precipitation and temperature. For this reason the increase in forage volume

should not cause too much optimism. (5:5)

The marked improvements in forage plant growth that took place during the growing season of 1937 failed to prevent an acute forage shortage during the following winter on the winter range within Yellowstone Park. This took place despite a very substantial reduction in the number of elk by hunters, live shipments, and the migration beyond the park boundaries by a larger than usual number of elk.

The forage shortage was proven by the depletion of the herbaceous plant cover and the abnormally large amount of browse utilization. The number of dead animals that were found on the range during the winter of 1937-1938 was also sharply greater than those found there during the three preceding years and, while no doubt a number of these animals died of old age and disease, it can be quite safely assumed that malnutrition or starvation was the major contributing cause.

Serious overgrazing occurred in many winter range areas and particularly in the important Gardiner winter range region. The adverse influence of this overgrazing is at least in part responsible for the smaller amount of range improvement shown for that area as compared with that of the remainder of the winter range.

There was a marked general improvement in the plant growth on the winter range, as a whole, during the summer of 1938. But this range recovery, although it has been in progress for two consecutive growing seasons, must

still be considered as being in a primary stage. Many of the plants that represent the improvement or increase in the vegetative cover consist of transitory species having small forage value. These will be replaced by better forage plants only after nearly complete recovery of the range. There is no assurance, however, that favorable climatic conditions, mainly responsible for the improvement of the range plant cover, will continue. A recurrence of drouth conditions, before a more permanent cover of good forage plants has reestablished itself on the winter range, will result in rapidly nullifying the range improvement that has taken place during the last two years.

It is believed that 7,334 elk, which number is estimated to be the average elk carrying capacity of the winter range over the last four years, represents the maximum number of animals that the winter range in its present condition can sustain. Some injury to the plant cover will occur even with this or perhaps a lesser number. Any injury to the range that may be occassioned by this number of elk will not be excessive to the extent of denuding sizable areas of their plant cover, but it probably will bring about a change in the type of plant cover on the winter range. This change in plant climax is believed to be inevitable as long as large numbers of game animals utilize this range and should not be considered an unnatural condition.

There were 10,838 elk counted on the main body of the winter range during the general count in March, 1938.

At least 400 of these elk are known to have died since that count. Therefore, the number of mature elk that used the winter range in 1938-1939 was approximately 10,400 head. This year's calf crop, conservatively estimated, brought the herd up to 12,000 head. It is evident that since the carrying capacity of the winter range for the average winter was found to be 7,334 elk, this range was again heavily overstocked. A reduction in the number of elk must therefore be made to prevent injury to the range plant cover and needless suffering among the animals. It was not anticipated that the reduction that could be effected during the winter of 1938-1939 would reduce the elk to the number given as the range carrying capacity; however, it was believed that the reduction could be of sufficiently large proportion to be within reaching distance of a carrying capacity of the range that may have been increased by continued favorable climatic conditions during the next growing season. (5:14-16)

The high mountain meadows and open slopes of Yellowstone provide magnificent summer pasturage for considerably more than the 10,000 elk or wapiti of the northern herd. (11:357)

Elk and domestic stock compete for food on both the summer and winter ranges. Food competition between deer and elk on winter concentration areas is often severe. Deer are no match for the larger elk and usually must move or die of starvation.

Inimical Factors:

Another Park policy connected with game protection was excessive control of predators. Cougars, lynx, bobcats, wolves, and wolverines were greatly reduced or even exterminated in some of the parks. Although this may have been compensated for in some cases by an increase of coyotes, the effect was to remove operation of a natural check or brake when the elk were again becoming abundant. Wide-ranging predators, such as the wolf and cougar were destroyed outside a number of parks, by legal trapping or hunting and this had a detrimental effect on maintenance of a healthy park fauna and biotic balance. A result of the widespread destruction of predators has been an abnormal increase of grazing mammals within the parks and accelerated range destruction. (11:358) Cougar, bear, wolf and coyote are the principal enemies of the elk. Black bear and coyotes usually take the younger animals. Grizzly bear and cougars often take adults as well as the young. (8:31)

The disease of the elk are as follows:

(1) Parasites: Larvae of Bot fly, tapeworms, lungworms, liver flukes, ticks and scab mites.
(2) Bacteria: Calf diptheria (Nectroptic stomatitis) and blindness (Keratitis) (2:95-96)
(3) Deficiency: Osteomatacia, softening of the bones (2:96)
(4) Traumatic: Gun-shot wounds, mouth injuries, etc., lead to secondary infections. (2:97)

Today the elk is well protected by law in most places. Several western states now have yearly open season on elk. Hunts are usually regulated. The limited license method for controlling the kill is quite generally in use.

There is nothing very sportsmanlike about the slaughter

which takes place each year at the "firing line" near Gardiner, Montana. Shooting is not permitted until 8:00 A. M., when a whistle at Jardine is the signal for the firing to commence. The ground is rough, broken, and covered with huge boulders which provide the hunters with protection. The elk are usually in groups of several hundred and thoroughly frightened by the hunters behind every rock. When the shooting starts, they plunge in all directions, and some even pass through the "firing line". But more typical, all or nearly all are killed.

After the shooting is over, or sometimes before, the scramble to get to an elk and tag it starts. The custom is that the first man to get his tag on an elk is the owner. This results in footraces, arguments, and occasionally a fight. The fact that a man shot an elk doesn't mean a thing if there is another man nearby who is a better runner and decides that he wants it. Of course, the fellow who shot it may not look at it that way and then there may be trouble.

January 1, 1938, will probably stand as an all-time record for the number of elk killed in one day. There was no possibility of making an accurate check, but the number was estimated at 1,100. The crowd was estimated at 1,500 people, and there were from 1,500 to 2,000 head of elk out in the firing line area split into several bunches. Many elk were killed in inaccessible places in the Yellowstone and Bear Creek canyons and left where they fell. Some of these had been dressed out, apparently

with the intention of taking them out, but the effort proved too great. (12:38-39)

Present and Past Status and Economic Summary:

At the present time the elk in North America is nowhere near their primitive abundance. (1:15) However, they are more than four times as abundant now as in 1907. (1:20) The 1941 census shows 15,500 elk for the Yellowstone National Park area.

Correction of the surplus of elk in the park may be accomplished by various methods. The winter range should be extended by purchase of lands and elimination of uses that would conflict with the welfare of the animal. Some of this area would become a part of the park, while others would be federal or state lands to which national park protective policies would not necessarily apply. Rights-of-way for migration should be provided where necessary. In long-settled areas, however, the accomplishment of such a program is, of course, extremely difficult. (11:359)

Hunting should be by the limited license or controlled hunting mentod. (3:81)

Numerous successful elk transplantations have been made, i.e., California (13:465-475), Oregon (14:4)

The elk is important as a game animal where it occurs in sufficient numbers to support hunting. "For a steady diet, no meat tastes better or is more nourishing than elk venison." (15:175)

Sufficient available winter range is the limiting factor in Yellowstone National Park. The larger herds are short on winter range. (3:79)

Limits of elk population will be determined by the extent to which man is willing to dedicate suitable range for this purpose. The propagation of this species is primarily a land use problem and secondarily a game management problem; the chief competitors for suitable range being domestic stock. (8:36)

Management:

The migrations of the Rocky Mountain Elk within the Park are slow deliberate movements to or from the wintering grounds, occuring mostly at night. (3:34) Migrations between summer and winter range vary according to the locality from a few miles to nearly a hundred miles. These migrations are occasioned wholly by the food supply. In spring the return movement is to take advantage of the better forage in the high mountains. (8:29)

The policy of the National Park Service does not sanction the winter feeding of elk. Only the buffalo are artificially fed during the most severe winter months--usually February and March.

Following are some of the reasons why artificial feeding is not recommended:

(1) The feeding at Gardiner and the Game Ranch attracts the elk from the Park early in the season. In 1930,

elk were on the Game Ranch October 11th; and in 1931, seventy-five elk were there on September 28th, and 200 elk on September 30th.

(2) Under present hunting laws it is very undesirable to attract elk from the Park early in the fall season.

(3) Elk quickly become dependent on feeding and do not rustling for themselves, thus becoming "paupers."

(4) Congestion on the feeding grounds favors the transmission of diseases, not only amongst elk but the deer and antelope also as these animals frequent the elk feeding grounds. The close proximity of elk, deer, antelope and horses on such a small area as a feeding ground day after day is an unnatural relationship, unhygienic and is bound to show unfavorable results to, at least, some of the species sooner or later.

(5) The artificially fed animals are in a poorer physical condition in the spring than the ones who rustle all winter. This is especially noticeable in the deer herd at Mammoth where the deer are fed hay and cottonseed cake all winter. The fawns especially are in much poorer condition than the fawns seen away from Mammoth, who have not been fed at all.

(6) Foxtail grass (Hordeum Jubatum) is present in practically all of the hay produced in the Western states and it has been shown that this grass is extremely harmful to all species of hay eating animals. It seems particularly harmful to elk and deer, probably because the mouth tissues of these animals are more tender than in other animals. The

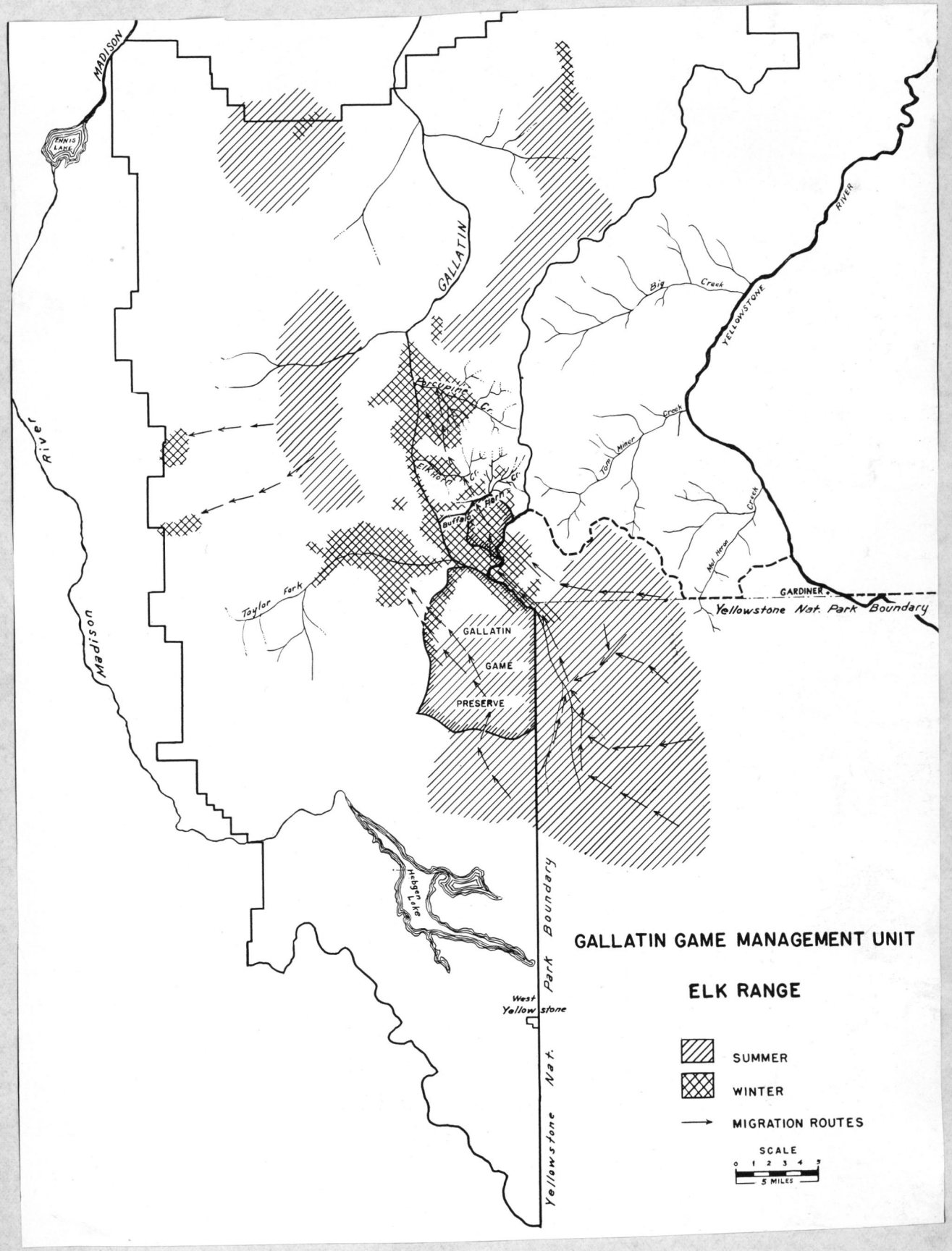

MADISON
ENNIS LAKE
GALLATIN
Big Creek
YELLOWSTONE RIVER
Bacon Rind Cr.
Elk Horn Cr.
Buffalo Horn Cr.
Tom Miner Creek
Mol Heron Creek
Madison River
Taylor Fork
GARDINER
Yellowstone Nat. Park Boundary
GALLATIN GAME PRESERVE
Hebgen Lake
West Yellowstone
Yellowstone Nat. Park Boundary
GALLATIN GAME MANAGEMENT UNIT
ELK RANGE
SUMMER
WINTER
MIGRATION ROUTES
SCALE
0 1 2 3 4 5
5 MILES

Chart #5

disease of necrotic stomatitis results from bacterial infection of the lesions produced by foxtail grass. Probably also Staphylococcus pyogenes infections many times result from the same cause. (3:66)

The Northern Yellowstone elk herd was reduced by 7,230 this winter.(1942) Hunters' kills north of the park accounted for 6,539, while 691 were slaughtered by the National Park Service in the Park.

A census of this herd was taken on February 28th, and March 1st, 1942. Thirty-five men representing the Montana Fish and Game Commission, the Forest Service, and the National Park Service participated and counted 4,966 outside the park and 3,269 inside making a total of 8,235 in the Northern Yellowstone herd. The winter losses to be determined later must be deducted from this figure.

No control of predatory animals is practiced in the National Park except that some bears which prove vicious or troublesome are disposed of when necessary. They are not controlled because of any toll they may take of game animals.

Since the State of Montana controls the hunting seasons which largely keep the size of the herd in check, and the Forest Service administers an important part of the winter range; these two agencies cooperate closely with the National Park Service in the management of the Northern Yellowstone elk herd.

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Yellowstone National Park
Yellowstone Park, Wyoming
1941

Following are the most recent counts and estimates of the larger animals of Yellowstone National Park. In providing public information and answering questions, the figures given below should be used.

	Actual Count	Estimate
BEAR		
American Black	199	510
Grizzly	93	320
BIGHORN	200	300
BISON		
Lamar Valley	674	700
Pelican Valley	217	255
Hayden Valley	13	15
Fountain Flat	43	150
Total Count	947	1120
DEER	No Count	1200
ELK		
Northern Herd	No Count	12000 - 12500
Gallatin Herd	No Count	2600
Park Interior	No Count	700
	Total Elk	15,300 - 15,800
MOOSE	No Count	700
PRONGHORN	784	900

Chart #6

Management plans for the immediate future contemplates maintaining the herd at a size where the available forage on the winter range will support the elk and at the same time avoid overuse and allow the range to improve. (16:1-)

Summary:

1) Sufficient available winter range is the limiting factor in the Park area. The larger herds are short on winter range. (3:79)

2) Limits of elk population will be determined by the extent to which man is willing to dedicate suitable range for this purpose. (8:36)

3) The propagation of this species is primarily a land use problem and secondarily a game management problem; the chief competitors for suitable range outside the Park being domestic stock. (8:36)

Conclusions:

Scientific management of the Northern Elk herd is necessary for the following reasons:

1) To justify the Act of May 26th, 1926, and the investment of 350,000 dollars for the purchase of additional winter range.

2) To arrest further depletion of a large area of range land in the Yellowstone Park.

3) To promote sportsmanlike hunting of elk.

4) To secure proper utilization of this great elk

herd from economic and recreational standpoints--all of which are predicated on the assumption that the land used by the game herds in this vicinity is being put to its highest use in producing game animals. (3:83)

Recommendations:

1) Control of range destroying rodents.

2) Local and seasonal predator control to a limited extent.

3) Disease investigations.

4) Correct land use.

5) Proper utilization of herds from economic and recreational standpoints.

6) Reduction of competition between deer and elk for available food supply through wise management.

In closing, I should like to use David M. Newell's 'Something to think about'--"To permit an increase of any wild bird or animal over and above the available food supply is to destroy that bird or animal just as surely as by overshooting."

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GLOSSARY

Antler: Antlers differ from the horns of other ungulates in that they are solid, generally branched, bony outgrowths, shed and renewed annually. Usually they are present only on the male, but also on the female in the reindeer and caribou.

Biology: Life history.

Browse: The tender shoots or twigs of trees and shrubs fit for the food of cattle and other animals; green food.

Census; Estimates of the number of animals in a given area.

Fauna: Animal life within a given region.

Gestation Period: Period of time from conception to delivery in which the young is developing.

Herbaceous Plants: Plant whose stem does not develop a woody tissue.

Inimical Factors: Factors having the disposition or temper of an enemy.

Key Area: Certain areas that provide the major part of the game food.

Key Species: Limited number of plants that furnish 60% or more of the forage on the key areas.

Migration: Seasonal movement from one climatic region to another.

Nomenclature: Classification of plants and animals to bring about relationship and exactitude.

Parturition Period: Period in which the calving takes place.

Pelage: The fur or hair covering of an animal.

Polygamous: Having more than one mate at the same time.

Predator: Animal that lives or preys upon other animals.

YELLOWSTONE NATIONAL PARK

6 Each winter large herds of elk concentrate along the valleys and open hillside meadows on the northern side of Yellowstone National Park. The large band shown here have been feeding at the junction of the Soda Butte Creek and the Lamar River. This picture was taken March 1940 but could have easily been duplicated in December 1942.

FOR THIS PICTURE PLEASE CREDIT:
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Oberhansley p

9 BUFFALO AND ELK ON THE WINTER RANGE

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