1994/0032 MESC, L. Piesse
#21214

BISON IN THE GREATER YELLOWSTONE

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Abstract: In the Greater Yellowstone Area, free-ranging bison occur in Jackson Hole, Wyoming, and Yellowstone National Park. The Yellowstone population is discussed, with emphasis on changes in numbers from approximately 400 in 1968 to about 3500 now. Major influences for change initially were natural; more recently the winter road system used by snowmobiles appeared to be the dominant factor. The situation is in a state of flux. Interagency planning is in progress to address management alternatives for conflicts outside the park.

Two free-ranging bison populations inhabit the Greater Yellowstone. The Jackson Hole-Grand Teton herd is managed for approximately 150-200 bison; these winter mainly on the National Elk Refuge elk feedgrounds and summer on Grand Teton National Park lands.

Yellowstone National Park presently has approximately 3400-3500 bison. After management reductions ceased in 1967 numbers increased from approximately 400 to more than 2000 in the early 1980's. Increases since then have resulted in variable but sometimes large numbers of bison exiting the park

into Montana, where they have been shot to prevent conflicts with other human interests and land management objectives outside park boundaries. As a result, the Yellowstone population has received widespread attention from a variety of agency and public interests. The presence of brucellosis in this population is partly responsible for management planning now in progress, but brucellosis is only one facet of a broader population management issue. An understanding of the biology of the population changes and bison behavior provides a basis for management perspective.

The Yellowstone bison illustrate a basic biological process that is difficult to understand in terms of human time frames and priorities, in part because opportunities to observe this process are few in the modern world. Bison, if allowed to do so, will do what any population will do. They will fully occupy their habitat, and then expand into new habitat. That is the process by which they arrived in the area after the Pleistocene ice. It does not matter if the changes that allow this are natural or man-made, the <u>process</u> is fundamental.

Initially the park population increased after the reductions ceased because numbers were far below those that would occur ecologically, recognizing that that level would vary. Population data suggested that by about 1981-1982 bison

habitat within the park was mostly occupied. Subsequent population increases resulted from a complex of both natural and man-made influences. The decade of the 1980's had milder winters compared to the 1970's, and several years of very wet summers. The drouth of 1988 followed by the slightly-above-average winter of 1988-1989 produced a major exodus from the park to the north, and fostered stress dispersal and habitat exploration within the park. On a lesser scale, this happened in 1976-1977, and again with the 1981-1982 winter (Meagher 1993).

Each time the winter conditions became relatively more harsh for the bison population levels involved, some of the bison learned to use roads. First they used the plowed road across then north end of the park, in 1976 (Meagher 1989). Later the interior bison adapted to the snow-packed interior roads traveled by oversnow machines. In doing this, they expanded their winter range within the park, and with much less expenditure of energy than would be required to break trail in deep snow. Numbers increased, the bison learned new areas, and the process continued, more bison, more range expansion, more use of energy-efficient roads (Meagher 1993).

As the use by bison of winter roads continued, numbers further increased because they could move readily from more harsh to less harsh locales. In turn, winterkill and spring

calf mortality decreased. It is apparent that use of the man-made travel routes were the major influence on recent population increases, recognizing that a complex of environmental factors contributed (Meagher 1993).

In sum, the road system provided easy energy-efficient access to new foraging areas, including serving as travel routes to exit the park. (A few bison otherwise could not have crossed Sylvan Pass in winter to Wyoming on the east boundary.) Use of new foraging areas within the park, especially on the northern range and west side represented an increase in winter range, with attendant population increases. Bison also saved considerable energy within traditional foraging areas by using roads, especially on the Firehole where the road transects many of the major foraging areas.

Roads also fostered increased shifts among population units, so that the present park population is biologically one, although uutilizing the three traditional wintering areas of the Northern Range, Pelican Valley, and Mary Mountain (Hayden Valley and the Firehole). These shifts mean that wintering numbers for a given locale as determined by early winter air surveys represented both recruitment of young animals, and major movements between winter ranges. Also, because of the shifts, a given survey is valid only for the date of the flight.

Major movements from Pelican Valley at the northeast edge of Yellowstone Lake were particularly important to the present situation because Pelican Valley is the harshest wintering environment for bison in North America (Figure 1.) Even during a comparatively mild winter, the Pelican bison moved as winter progressed, and did so by exiting the valley to the road along the shore of Yellowstone Lake. Mostly they went to Hayden Valley, crossed westward to the Firehole, and became part of the west side wintering complex. Thus the Pelican bison exerted a domino effect westward. This process began to skew the summering distributions of bison several years ago, with resultant mechanical habitat impacts and use of some winter ranges before winter begins.

The park population appears to be inflated by at least 1000 bison above the levels that would prevail without the energy-efficient road system for travel. The situation is still in flux, but cannot continue open ended. It is apparent that as the stolid-tempered bison learn the road system, they will go north from the interior of the park. The west boundary does not have suitable winter range as snow accumulates; there is only a small pocket on the Madison River (Figure 1.), and some bison are attracted to 2 private elk feedgrounds. But during the winter of 1992-1993, some cow bison learned to use the west side road section from Norris to Mammoth. This will continue, and could result in more bison north of the park

boundary than occurred in 1988-1989.

Bison behavior is a major key to this population situation. They are stolid, and as such the only large mammal that will take over the roads as a population. They are the most gregarious mammal in North America; the drive to aggregate if possible is a major factor. Finally, they are truly nomadic, and will make movements on a scale and over a distance, that even elk do not do.

The modern world has little room for a highly gregarious truly nomadic large mammal. Once beyond the boundaries of the park, conflicts occur, these would be real even if the population did not have brucellosis. Yellowstone does not have a bison overpopulation in the biological sense, but in a social and political sense, it does.

An interagency planning effort coupled with an environmental compliance process including public input in now underway to address management of bison of the Yellowstone population. This effort addresses conflicts with interests in Montana; major conflicts beyond park boundaries are not anticipated in Idaho and Wyoming, because of the environmental gradient and resultant snow depth influence on movements. The planning and EIS process are projected for completion in 1994. The topic of eradication of brucellosis in bison and elk will

require addressing the entire Greater Yellowstone Area in a separate future process.

Literature Cited

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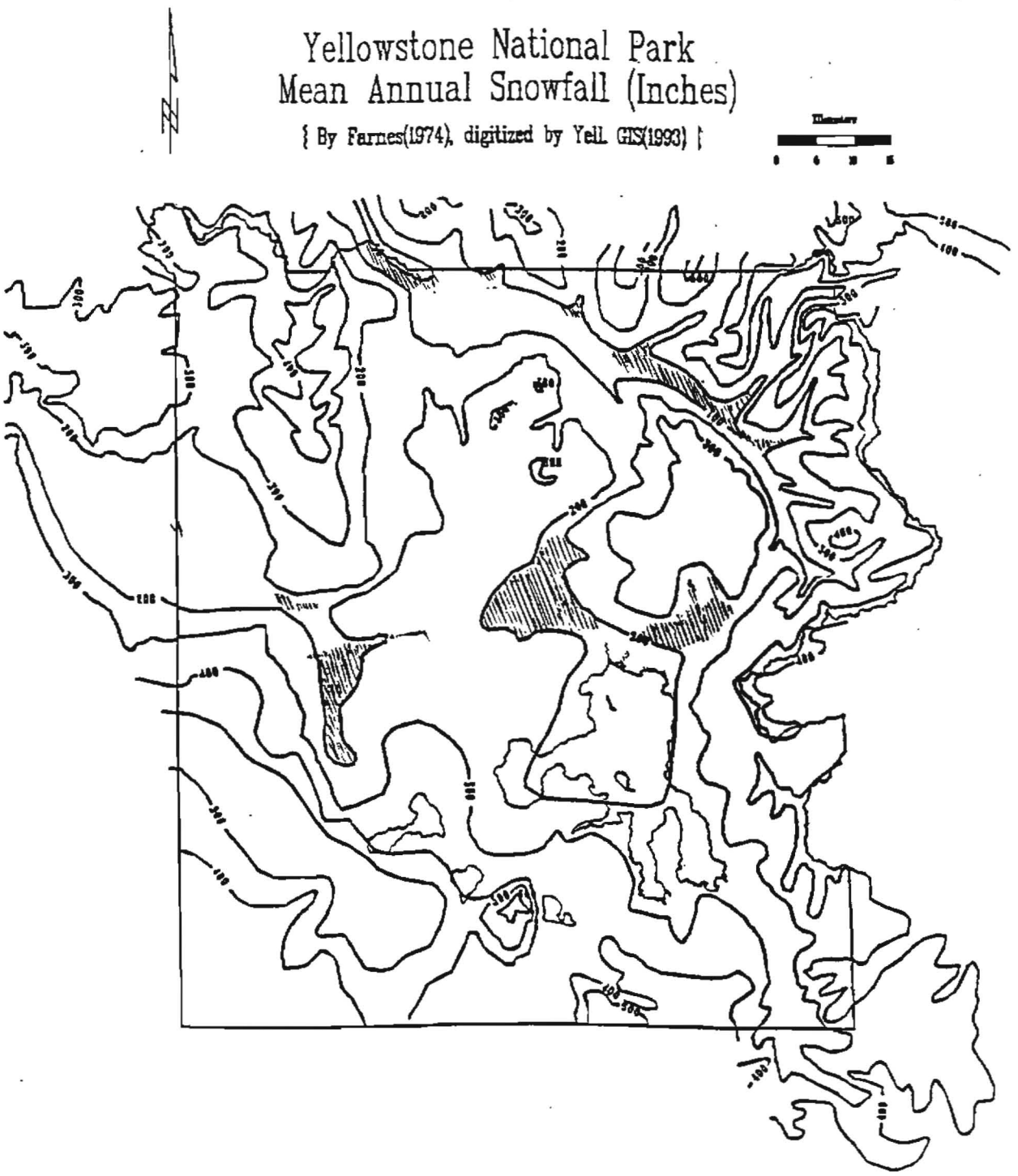

Fig. 1. Mean annual snowfall 1958-1972. Data from Farnes, adapted from Dirks and Martner, 1982. Approximate bison winter areas shaded.