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October 1981

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BISON DEPREDATION ON GRAIN FIELDS IN INTERIOR ALASKA

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INTRODUCTION

The reported value of grain damaged by bison (Bison bison) may exceed \$100,000 annually in the vicinity of Delta Junction, Alaska. This paper reviews the history and present status of bison and their relations to agriculture around Delta Junction. A number of management options are discussed that may reduce conflicts between bison enthusiasts and farmers.

BACKGROUND

A close relationship has existed between bison and agriculture in North America since the 1500's when settlers began to farm inland from coastal areas. Bison provided a dependable food supply in most pioneer farming communities until crops could be planted and herds of domestic livestock established (Roe 1970). Damage to newly established crops by bison was common, but short-lived, since bison were usually extirpated in farming areas within a few years following settlement.

Millions of bison occurred in North America until the late 1870's and early 1880's when commercial hunters eliminated the last of the large herds (McHugh 1972). By 1889 probably less than 1,000 bison existed in North America. The remaining plains bison (B. bison bison) were in Yellowstone National Park and several private herds; only one group of wood bison (B. bison athabasca) survived in the vicinity of Great Slave Lake, now Wood Buffalo National Park (Roe 1970).

Plains bison were present in Alaska until about 500 A.D. (Guthrie, pers. comm.). Bison were absent from that time until 1928 when plains bison were transplanted to Alaska from the National Bison Range in Montana. Twenty-three bison, six males and 17 females were shipped to Alaska during June 1928. Nineteen were released near present Delta Junction (Figure 1) in 1928 with two dying soon after being released. The remaining bison were held at the University of Alaska for feeding research. Two of them were released in 1980 (Burris and McKnight 1973).

The free ranging herd near Delta Junction increased to about 500 in the 1940's, then decreased to approximately 250 animals in the early 1950's. Three hundred and fifty-two bison, including 51 calves, were counted during an aerial survey in summer 1981, and a few more bison were probably in the area (Johnson, pers. comm.). Limited harvests were permitted from 1951 through 1953, 1961, 1963 through 1965 and 1968 through 1981. Interest in hunting bison has been high. For example, in 1978 over 4,000 persons applied for 25 permits available for the Delta herd (Alaska Department of Fish and Game 1980).

Delta bison migrate seasonally in a generally counter-clockwise pattern. Most bison spend the spring and summer on gravel bars along the Delta River,

approximately 30 km south of Delta Junction (Figure 1). Cows give birth in this area. During August and September bands of bison move north and disperse north and east of Delta Junction. Scattered bands winter from the confluence of the Delta and Tanana Rivers as far east as Healy Lake. Foraging sites during winter include wetlands surrounding lakes and ponds, recently burned areas, cropland clearings, forage plantings established for bison, the Trans-Alaska Oil Pipeline right-of-way, and until it was moved during 1981, the local landfill. During late winter and early spring bison move southwest toward the Delta River, then return south to the gravel bars for the summer.

CONFLICTS BETWEEN BISON AND AGRICULTURE

Conflicts between bison and agriculture started during the 1950's when farms were developed near favored bison wintering areas along a dry channel of Jarvis Creek and along Clearwater Creek (Alaska Department of Fish and Game 1980). Farming gradually increased on homesteads east of Delta Junction through the 1960's (Figure 1).

By the mid-1970's there was political pressure in Alaska to diversify the economy of the state to reduce financial dependence upon oil and gas. Expansion of agriculture including grain, red meat and dairy industries was widely recommended (Weeden 1977). The State of Alaska initiated a project involving approximately 60,000 acres near Delta Junction in the late 1970's to test the feasibility of commercial grain production (Palmer 1977). The location of this project is shown in Figure 1.

Serious damage to grain crops may result from bands of bison moving through and feeding, bedding, or wallowing in fields before grains are harvested. Damage to barley by bison during 1980 was estimated at \$100,000 (Thomas, pers. comm.). During 1981 damage by bison was minimal, due largely to efforts by personnel of the Alaska Department of Fish and Game to frighten bison from croplands.

A number of factors contribute to bison depredations on grain fields. One factor is the location of the Delta Barley Project in bison wintering areas. Another factor has been delays in harvesting barley. If grain crops are mature and harvested by mid-August, damage by bison is minimized since bison generally do not depart their summer range until mid-August. McKendrick (1981, 1982) suggested that bison might remain on their summer range later into autumn if adequate forage was available. Annual forage supplies are exhausted by mid-August along Delta River gravel bars and this shortage of feed may trigger the autumn migration. The condition of summer range is gradually deteriorating due to erosion of soil and succession from favored grasses and forbs to shrubs (McKendrick 1981).

Control of fires has resulted in a reduction of available winter foraging sites. Historically, fires were responsible for periodic removal of mature forests. Patches of grasses and forbs were present for several years following burns. In recent years fires have been controlled by the Bureau of Land Management and the State of Alaska Department of Natural Resources. Instead of scattered stands of herbaceous vegetation, scrub forests predominate in the absence of fires. This reduction in natural food sources probably contributes to increased use of croplands by bison.

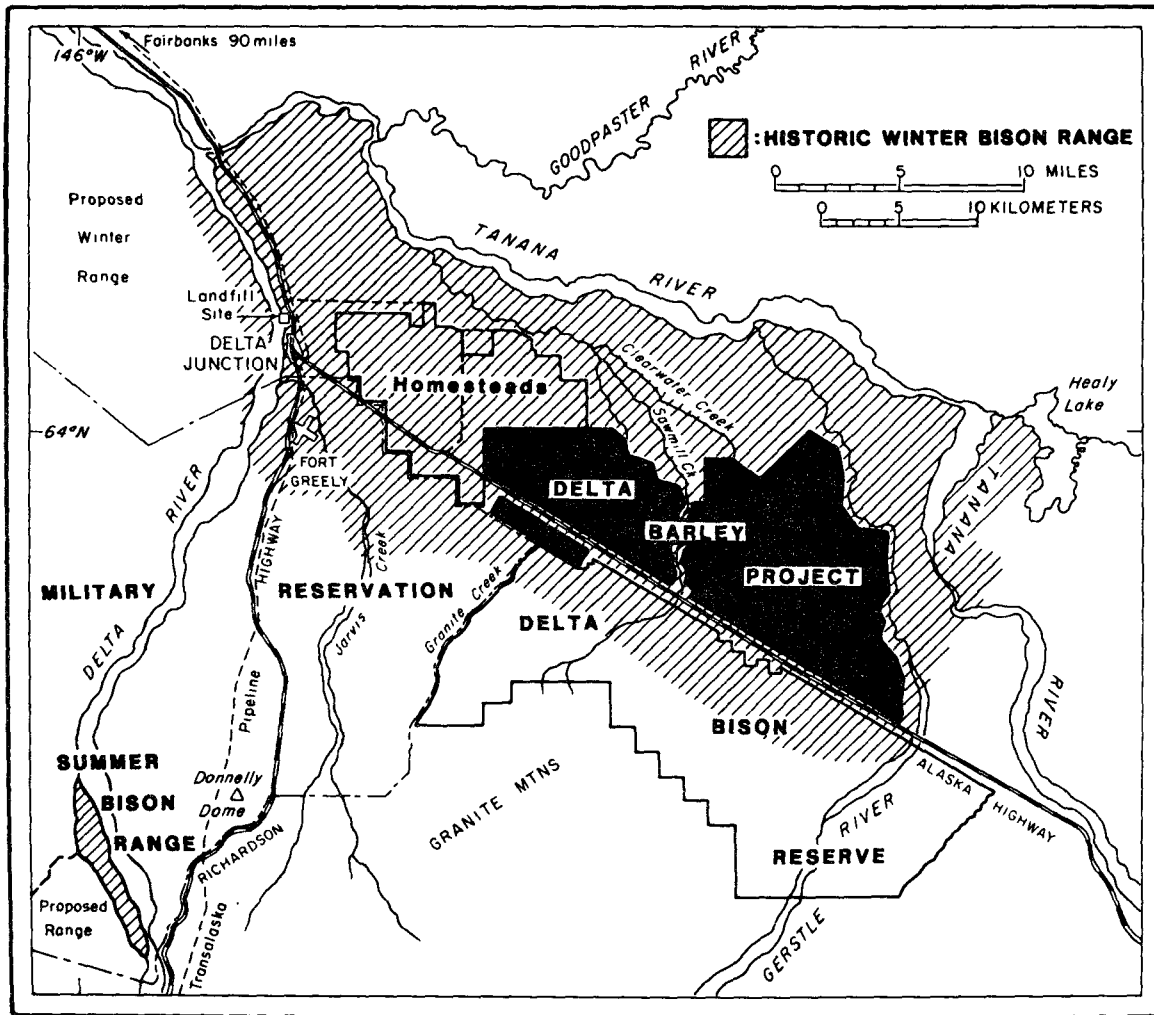


Figure 1. Range of the Delta Bison Herd. Top of the Figure is North. Bison migrate during August and September from the summer range along the Delta River, north and east to overwinter between Healy Lake and the confluence of the Delta and Tanana Rivers. During late winter bison return southwest toward the Delta River, then south along the river to calve and spend the summer on gravel bars about 30 km south of Delta Junction.

MANAGEMENT OPTIONS

The long term solution to conflict between barley production and bison probably must include increasing forage available to the herd. A major step would be improving and/or expanding the summer range. Biologists from the Alaska Department of Fish and Game (Johnson, pers. comm.) and Fort Greely Army Base (Spires, pers. comm.) propose to improve summer range along the Delta River by burning brush and scrub stands of spruce. An interagency team visited an area west and south of the present summer range during summer 1981 and recommended that the area be burned to create additional summer range (Figure 1). The summer range is well suited for controlling burning. The woody vegetation is predominantly spruce (*Picea mariana*, *P. glauca*), willow (*Salix alaxensis*), silverberry (*Elaeagnus commutata*), and cottonwood (*Populus balsamifera*) and the area is bounded by streams so fire could be controlled with minimum effort.

Developing additional winter range for bison would also reduce depredations to grain fields. Forage plantings are being established on the bison reserve south of the Alaska Highway and on Fort Greely Army Base as part of a cooperative bison management plan between the Alaska Department of Fish and Game (1981) and U.S. Army (Kiker and Fielder 1980). Wintering areas west of the Delta River could also be established (Figure 1), possibly attracting many bison out of the vicinity of croplands.

Clearing forest lands through burning or mechanical means and seeding them to grasses is probably the best way to establish new winter range for bison. This will be costly whether it is done on the Bison Preserve, on Fort Greely, or on new areas west of the Delta River. Once new winter foraging areas are developed, it will be important to maintain them in grasses and prevent reinvasion of shrubs and trees. One method of offsetting costs would be to lease the grassland for hay harvest with a contract that only the first crop of hay would be harvested each year, with the harvest timed to permit a second growth for fall and winter grazing by bison. A soil fertilization program also would be needed to maintain grass stands. Game managers would be involved primarily in administration of contracts rather than developing bison range. A side benefit would be to increase the hay supply for local markets.

Fences could be employed to direct movements of bison away from croplands, to exclude bison from individual grain fields, or to confine bison. A fence along the Alaska Highway extending from Delta Junction eastward beyond the Gerstle River (Figure 1) would keep most bison from grain fields. However, installation of such a fence is probably not practical because of the high costs of the fence and because of opposition to obstructing movements of moose and other game animals. Fencing individual fields could exclude bison. Difficulties with this option are the high costs of suitable fences, and bison would be eliminated from fields throughout the winter. Most farmers do not object to bison being present on fields after crops are harvested, and harvested fields presently provide important winter range for bison. Harvested fields probably will continue to be important use areas until alternate wintering ranges are developed.

The herd could be confined to a fenced range similar to the National Bison Range in Montana. This proposal has generally been resisted by hunters and other wildlife enthusiasts. Establishment of a large fenced bison range

is complicated by the land ownership pattern in the region. The calving area, summer range and migratory routes between summer and winter ranges are on Fort Greely Army Base. The Bison Preserve and most adjacent lands south of the Alaska Highway are owned by the State of Alaska. The Delta Barley Project lands and other lands around Delta Junction are privately owned and the Bureau of Land Management administers most other lands in the region.

Harassment of bison on or near grain fields is a short term solution to grain depredations, but almost continuous patrol of croplands is required. During 1981, radio transmitters were placed on several bison by personnel of the Alaska Department of Fish and Game. By monitoring locations of radio-tagged bison, biologists were able to determine when bands of bison were approaching grain fields and chase them away.

A crop insurance program to compensate farmers for losses to bison has been suggested by local farmers. This could be accomplished through a State of Alaska program, federal crop insurance, or through private insurance coverage. Grain producing areas of Alaska are being considered for inclusion in the U.S. Department of Agriculture Federal Crop Insurance Program (Lasley 1981).

Other possible management options include reducing the size of the herd or eliminating bison from the region. Local opponents of bison point out that bison presently in the Delta Junction area are alien to the region and could be removed without negative impacts upon native wildlife and vegetation. Bison became extinct in interior Alaska hundreds of years ago and bison presently in the area were introduced from breeding stock in the lower 48 states. Elimination of the herd appears to have little support in Alaska. The Alaska Department of Fish and Game Management Plan for the Delta Herd (1981) calls for maintaining a precalving population of approximately 275 bison with regulation of herd size accomplished through public hunting.

One additional option that may have merit is replacement of the present Delta Herd of plains bison with wood bison from Wood Buffalo National Park in Canada. Wood bison generally travel in smaller bands than plains bison (Roe 1970). There are reports that wood bison favor forested habitats and they are more wary than plains bison. Seton (1911) on his first encounter with wood bison in Northwest Territories in 1907 described them as "more shy than moose". It is possible wood bison would avoid farmlands frequented by the present herd of plains bison. Wood bison are likely to be even more valued as game animals in interior Alaska than the plains bison.

SUMMARY

Bison from the Delta herd damage grain when they move into farming areas during August and September. Damage results from bison walking through and wallowing in grain fields and from consumption of grain. Damages can be minimized by harvesting grain crops by mid-August when possible, prior to the arrival of most bison. Crop insurance programs to compensate farmers for losses to bison could reduce friction between farmers and bison enthusiasts. Harassing bison to frighten them from grainfields may reduce grain losses. Long-term solutions to bison depredations will probably involve enhancement of summer range and development of alternate winter foraging areas, possibly on the bison preserve and sites west of the Delta River. Fences could be employed to exclude bison from grain fields or to confine bison on designated

ranges. Other management possibilities include substantial reduction or elimination of bison to stop grain depredations. The present herd of plains bison could be replaced with wood bison from Canada, possibly reducing depredation to grain while providing better game animals than the present plains bison.

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