

The Political Economy of Bison Management in Wood Buffalo National Park

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ABSTRACT. Nearly a century ago government initiatives saved Canada's wild bison from extinction, and in the 1920s Wood Buffalo National Park (WBNP) was established as a preserve for wood and plains bison. Today new government initiatives threaten these northern bison with extermination as a "game management" strategy. This paper outlines the history of bison management in WBNP and addresses critical issues for the 1990s. It is argued that until the mid-1960s, when the park came under the jurisdiction of Parks Canada, management strategies were presented as biologically based but were conditioned by external political and economic considerations. Similarly, an analysis of current proposals to "replace" the bison of WBNP concludes that contemporary issues of political economy are obscured by attempts to justify the plan on biological grounds.

Key words: bison, game management, Wood Buffalo National Park, political economy, EARP, tuberculosis, brucellosis

RÉSUMÉ. Il y a presque un siècle, des mesures instaurées par le gouvernement ont empêché la disparition du bison sauvage canadien et, durant les années 20, le parc national Wood Buffalo a été créé en tant que réserve intégrale pour le bison des bois et le bison des plaines. Aujourd'hui, de nouvelles mesures prises par le gouvernement dans le cadre d'une stratégie d'aménagement cynégétique menacent ces bisons du Nord de disparition complète. Cet article retrace l'historique de la conservation du bison dans le parc national Wood Buffalo et traite des enjeux critiques des années 90. Il soutient que, jusqu'au milieu des années 60, lorsque le parc a commencé à faire partie de Parcs Canada, les stratégies de conservation étaient mises de l'avant sur des bases biologiques mais qu'elles étaient en fait conditionnées par des considérations politiques et économiques. De la même façon, une analyse des propositions actuelles visant à remplacer le bison du parc national Wood Buffalo nous amène à conclure que les enjeux actuels d'économie politique sont brouillés par la tentative de justifier ces propositions sur des bases biologiques.

Mots clés: bison, aménagement cynégétique, parc national Wood Buffalo, économie politique, PEEE, tuberculose, brucellose

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INTRODUCTION

To celebrate the 100th anniversary of Canada's national park system, the National Film Board produced *The Great Buffalo Saga* (NFB, 1985), a badly flawed film about how Canada's bison were saved from extinction (McCormack, 1986a). It claimed that "the story of the revival of the bison in Canada begins in the hills of the Montana Territory" with "the last great bison herd in the world," the Pablo-Allard herd of plains bison (NFB, 1985). In fact, the last major herds of free-ranging bison left in North America were in northern Canada, the wood bison living west of the Slave River in what is now northern Alberta and the southern Northwest Territories (N.W.T.). But, they were in jeopardy. By the late 1800s, these bison were a remnant population, facing extinction from a combination of natural disasters and unwitting overhunting.

The northern bison were rescued by federal government legislation and enforcement, accomplished through the expansion of a complex and increasingly comprehensive regulatory regime. Bison hunting was prohibited, and Wood Buffalo Park was established, now Wood Buffalo National Park (WBNP). There have been nearly 100 years of bison management strategies. This history is reviewed in the first half of the paper, to demonstrate how management strategies were based on economic and political considerations of northern development until the mid-1960s, when the park was administered for the first time by the Canadian Parks Service.

In the 1990s, a coalition of government departments threatens the park bison with the most serious threat of all, extermination, recommended as a scientifically justified, government-sanctioned "game management" initiative. Most recently, an Environmental Assessment Review Panel (EAP, 1990) recommended that the bison of WBNP be "removed" and replaced by disease-free bison with wood bison phenotypes. The goal of the second half of this paper is to contextualize this recom-

mendation by examining related political and economic issues that have been obscured by an emphasis on the "biological facts."

19TH-CENTURY THREATS TO THE WOOD BISON

American bison are stereotyped as animals of the Great Plains. It often surprises people to learn that they successfully inhabited the boreal forest. In fact, "wood bison" are not strictly forest animals. They occupy a mosaic pattern of woodlands and open areas or "prairies" located within the forest. Samuel Hearne was the first European to report on the bison of the boreal forest, which he saw in 1772 in the Slave River lowlands east of Slave River (Fig. 1). He observed that "the buffalos chiefly delight in wide open plains . . . but when pursued they always take to the woods" (Hearne, 1958:163). The northern bison he described are today usually classified as wood bison, or *Bison bison athabascae*, while plains bison are grouped into a second subspecies, *B. b. bison*. There has always been disagreement about these designations, an issue addressed later in the paper.

In Hearne's time, the wood bison occupied prairies and woodlands at least from the Slave River lowlands to the Liard River and from Great Slave Lake south to the northern fringes of the Great Plains. In historic times, and probably in the aboriginal past, their habitats were to a large extent created and maintained by controlled burning practiced by Native peoples (cf. Lewis, 1977, 1982). The extent of these grasslands and the role of Native burning may have been underestimated by many contemporary commentators, such as van Zyll de Jong (1986), in their evaluations of northern bison ecology and genetics. The implications for gene flow between northern and southern bison populations, along with other questions about taxonomy and speciation, are considered below.

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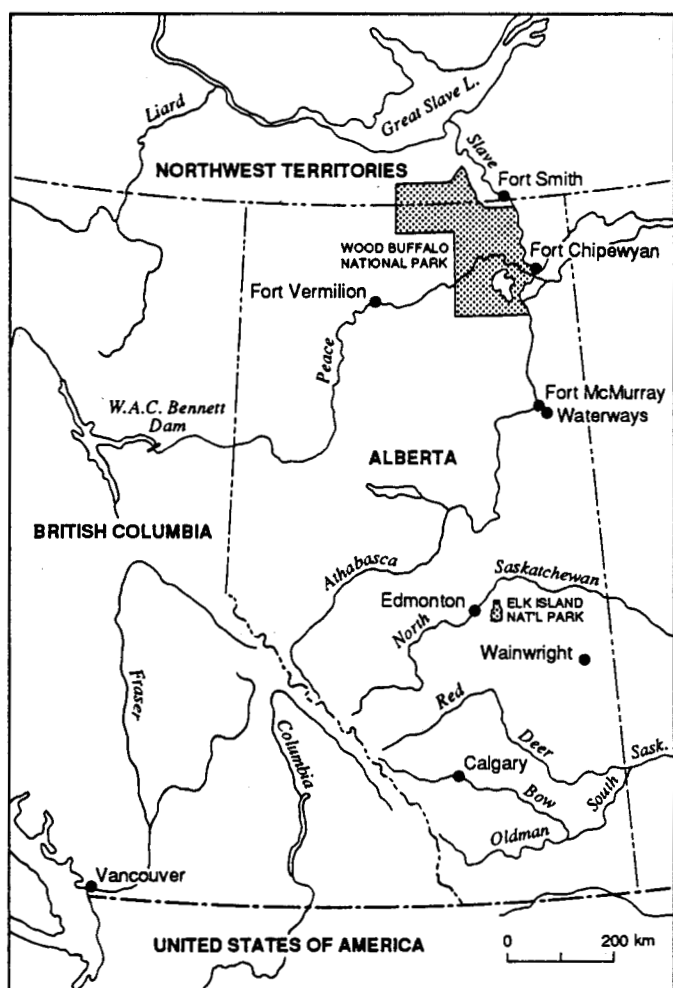


FIG. 1. Northwestern Canada.

A few years after Hearne's pioneering visit, the fur trade was carried into the wood bison range by fur traders, especially the North West Company and the Hudson's Bay Company. They required large quantities of meat to supply their immediate operations and the brigades of men who took the winter's furs each spring to eastern transshipment points. As on the plains, much of the meat was bison, though it may have been secondary to moose. Wood bison were hunted extensively in the 1800s to supply Fort Chipewyan and the Peace River posts, resulting in a marked decline in bison numbers before 1840 (Ferguson, 1990). Bison were hunted for fur trade provisions and subsistence purposes throughout the 1800s (cf. MacFarlane, 1908). By the 1880s, the northern bison herds were reduced to fragments in numbers and range, occupying a restricted region west of the Slave River, with a few stragglers reported elsewhere (cf. Mair, 1908).

Natural disasters, including winters of unusually heavy snow (Mair, 1908), contributed to the decline. Inspector Jarvis (1898) was told that around 1867, while crossing Lake Claire to the Birch Mountain, 200 bison broke through the ice and drowned. Around 1878, a heavy winter rain encrusted the snow with ice, resulting in the starvation of many bison (Ogilvie, 1893).

In aboriginal times low hunting pressures would have ensured the recovery of bison numbers. In the late 1800s, the

economies of the trading posts and the altered economies of the Native bands meant that hunting pressure on bison continued to be high. Indian hunters took advantage of harsh winter conditions to kill bison for subsistence and for exchange (MacFarlane, 1908; Jarvis, 1898; Mair, 1908). By the end of the century, no one knew how many bison remained; estimates ranged from about 300 to 600 (Jarvis, 1898; Mair, 1908). Continued heavy hunting pressure locally and increasing interest by outside "sportsmen" threatened Canada's last wild bison with extinction, which had already happened to the plains bison a decade earlier.

HISTORIC BISON MANAGEMENT IN WOOD BUFFALO NATIONAL PARK

Bison were legally protected from subsistence and sport hunting in 1894; this protection has continued in WBNP. However, for about 40 years they were killed in the park for other purposes. I have identified four bison management periods in WBNP: 1894-1922, no exploitation; 1922-50, minimal exploitation; 1950-64, intense manipulation and exploitation; and 1964-90, no exploitation, no interference.

The earliest period predates WBNP. It is included because events of the time set the stage for the creation of the park and subsequent bison management strategies. The remaining three periods focus on the history of a national park that was administered by two federal government departments, one reflecting national agendas of economic development and political expansion in northern Canada, and the other reflecting national agendas relating to wildlife conservation. Carbyn *et al.* (1989:3, 44) have called the years 1925-68 a single "management era" and the years 1969-81 a "decline era." However, I have subdivided the history of the park differently, into periods characterized by the underlying philosophy of resource management held by the government department administratively responsible. It was employees of these departments who historically administered the park and developed its policies and regulations, establishing frameworks for animal protection and exploitation and for human activities.

1894-1922: No Exploitation

The first period of bison management, that of strict protection of the northern bison, may have been the result of a report by geologist William Ogilvie (1893), who visited the Peace River country in 1891. While he thought that it would be "absurd" to try to restrict Indian hunting of bison, he recommended that the federal government introduce protective measures for both wood bison and muskox, as well as closed seasons for hunting fur bearers, to prevent sports hunting. In 1894 the government passed the Unorganized Territories Game Preservation Act, prohibiting all bison hunting except for limited scientific purposes (UK Revised Statutes, 1894). Contrary to Ogilvie's advice, Indians were included in the restriction.

The legislation was not enforced until 1897, when Inspector A.M. Jarvis of the North-west Mounted Police (NWMP) made a winter patrol to the Athabasca region (1898). Jarvis was instructed to inquire into bison numbers and location and to determine if the legislation was being obeyed (Herchmer, 1898). In fact, it was unlikely that many northern residents had heard about the hunting prohibition, and bison were still being

hunted by Natives and "sportsmen" (Jarvis, 1898). Jarvis (1898) was pessimistic about either Natives or sportsmen obeying the law in the absence of active enforcement, and he recommended that the NWMP establish a local post.

When Inspector W.H. Routledge (1899) made the next NWMP patrol in 1898, he fined a Chipewyan man named François Bystze ten dollars or ten days imprisonment for killing two bison. Routledge (1899:95-96) explained that he imposed the fine to make an example of Bystze, since he believed that Bystze was motivated by "the spirit of mischief" rather than by starvation. He expected that the bison would be protected by a local constable and the fact that "... Indians in the north have a wholesome dread of the police."

In 1899, the federal government negotiated Treaty 8 with Indians of the region and paid scrip to half-breeds (Mair, 1908; Government of Canada, 1966; Zaslow, 1971). It thereby obtained clear title to the land and provided the groundwork for the expansion of the Canadian state and its institutions into the region, enabling the creation of WBNP and the elaboration of various regulatory systems. Treaty 8 states that the Indians surrender their rights to the land and confirms their rights to continue hunting, trapping, and fishing, subject to government regulations (Mair, 1908). The Indians were reassured that restrictions would not be imposed on their hunting, though promises made by the treaty commissioners to the Indians were not written into the treaty itself (Mair, 1908; Daniel, 1979; Gibot, 1979; Breynat, 1948; Fumoleau, 1975).

From 1897 through 1911, the Game Act, with its prohibition on hunting bison, was enforced by the Mounted Police, with growing suspicion about Indian violations. When Inspector Jarvis travelled through the edge of the bison range in 1907 with Ernest Thompson Seton and Edward A. Preble, they saw few bison and found it difficult to secure guides, which they interpreted as evidence that the Indians were killing bison and blaming the decline of bison numbers on wolf predation (Seton, 1981; Jarvis, 1908). Jarvis's opinion became part of the park's literary tradition and was often cited uncritically by later commentators (Ferguson, 1990). Jarvis (1908) believed that imprisonment should be made the *sole* punishment for killing bison, because fines were too easy for Indians to raise. His recommendation was not accepted, but in later years bison poachers did occasionally serve jail terms instead of paying costly fines.

In 1911, the federal government decided to protect the bison by creating a small force of resident "Buffalo Rangers," under the jurisdiction of the Forestry Branch (Mitchell, 1976; Potyondi, 1979). The following year, Maxwell Graham recommended that a park or game preserve be established in the bison area. No hunting or trapping should be allowed, except for "noxious" animals (memo from Graham to Mr. Harkin, 7 December 1912 [PAC, RG 85, v. 665, file 3911 pt. 1]).

By this time, a group of fire rangers had been organized by the new Province of Alberta to enforce its fire suppression regulations. They patrolled northern Alberta, including the Fort Chipewyan and Fort Fitzgerald regions (various entries, PAC, RG 39, v. 112, file 40308; Ferguson, n.d.). It is likely that Buffalo Rangers also tried to stop fires in the bison range. Since the suppression of fires included those fires set deliberately by Natives to manage the land, bison habitats may have started to deteriorate in the 1910s, creating problems to which government officials would react in later years, though without understanding their causes.

1922-50: Minimal Exploitation

The Creation of Wood Buffalo Park, 1922: The early 1900s and especially the years that followed World War I saw the northward expansion of homesteaders and other southerners, bringing with them new agrarian and industrial interests. They were driven by the depressed prairie agricultural economy, high fur prices, and improved northern transportation of the 1920s (McCormack, 1984). The bison range was invaded by men who wanted to trap. With the exception of Metis trappers from Lac La Biche and Plamondon and a few non-Natives who stayed in the area, the newcomers were transient non-Native men who trapped as a commercial enterprise for cash income, and not as part of a way of life. They hunted and trapped intensively, depleting local fur-bearing and game animal populations (McCormack, 1984). While Metis trappers had moved north with their families and were characterized by a subsistence-oriented way of life, in this new setting they too contributed to animal resource depletion. Local Indians found their livelihoods threatened. They asked that hunting preserves be established to protect their resource base (Russell, 1981; Fumoleau, 1975).

The federal government was sympathetic to the Indians. Yet it resisted the idea of a large preserve for two reasons. First, Treaty 8 provided for creating an Indian reserve amounting only to 70 square miles. Second, although the federal government still had legal control of Alberta lands, it was unwilling to pressure the provincial government to agree to a game preserve. The Department of Indian Affairs did approach the provincial government about how non-Indian hunting and trapping might best be regulated to protect Indian interests. The province's response was that if Indians were granted exclusive hunting and trapping districts, they would have to forfeit their rights under Treaty 8 to hunt and trap elsewhere in the province (Russell, 1981). In fact, the provincial government viewed the white trappers as "desirable" (Fumoleau, 1975). Conversely, Indians were neither voters nor a provincial responsibility.

The federal government, on the other hand, was alarmed at the influx of outside trappers, believing they posed a new and serious threat to the wood bison (Graham, 1923). Others were also concerned about Indian bison hunting (F.H. Kitto, report [PAC, RG 10, v. 4085, file 496, 658 1A]). The federal government dealt with this situation by creating the bison park that had been proposed before the war. It was to protect the bison and, secondarily, to protect the Indian inhabitants of the bison range from competition with outside trappers. Wood Buffalo Park came into existence by Order-in-Council P.C. 2498 on 18 December 1922.

Although the Order-in-Council was issued under the authority of the Dominion Forest Reserves and Park Act, it specified that this new northern park would not be administered by the Dominion Parks Branch, but by the Northwest Territories and Yukon Branch of the Department of the Interior. This was because Wood Buffalo Park was designed to protect bison, not to accommodate visitors. The district agent for the Mackenzie District of the Northwest Territories Branch was also the park superintendent (Mitchell, 1976; Lothian, 1976; Potyondi, 1979). The mandate of the branch was to develop a climate in which entrepreneurs would exploit or "develop" northern resources, thereby generating wealth and providing monetary contributions to national, regional, and local economies. However, until

World War II, government efforts were episodic and unsustainable, providing little assistance to private entrepreneurial activities.

The new park included that part of the present park lying north of the Peace River (Fig. 2) located within Alberta and the Northwest Territories. Only Treaty 8 Indians were allowed in the new park to hunt and trap. White trappers and all traders were excluded from the new park immediately. Metis were excluded after the first year (McCormack, 1984).

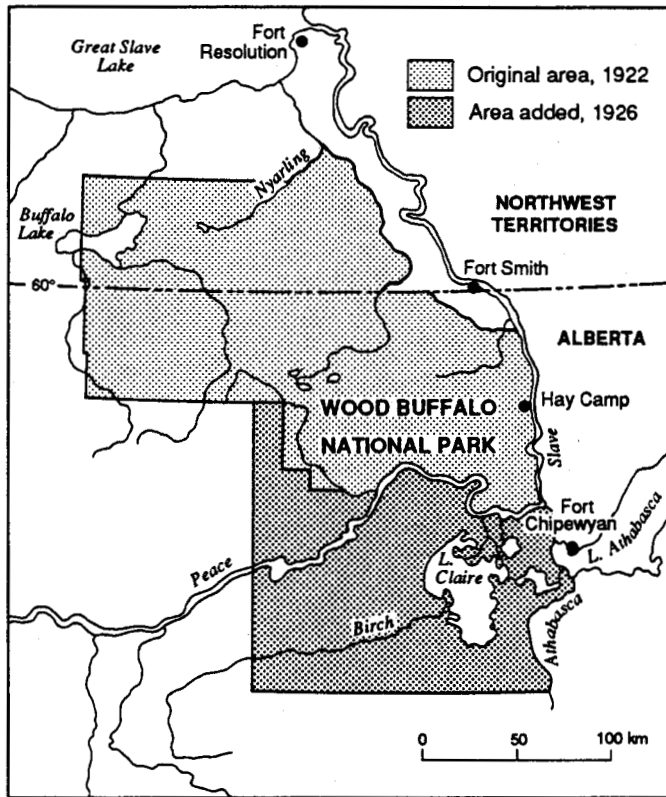


FIG. 2. Wood Buffalo National Park. (Adapted from a map prepared by Northwest Territories and Yukon Branch, WBNP files.)

The Enlargement of Wood Buffalo Park, 1926: Wood Buffalo Park was enlarged in 1926 as the result of events in another bison preserve, the Wainwright Buffalo Park. This preserve had been established to protect the Pablo-Allard plains bison herd, bison from the northwestern plains that had been preserved in the United States (cf. Rowan, 1929; Ogilvie, 1979; Lothian, 1976; NFB, 1985). Wainwright bison were fenced and protected from predators. By the 1920s they had outgrown the capacity of their range (Graham, 1924; Mitchell, 1976; Ogilvie, 1979), and the Wainwright administration was forced to reduce their numbers. Public opposition to bison slaughters led officials to consider a plan to send surplus bison to Wood Buffalo Park (Ogilvie, 1979; Mitchell, 1976). Apparently, this option was suggested by a member of the Alberta legislature who was also the owner of the Northern Transportation Company, the company that would ship the bison north and profit from it (Rourke, n.d.; McCormack, 1977-78; W.A. Fuller in NFB, 1985).

The federal government decided to ship several thousand young bison to Wood Buffalo Park. The idea was opposed by

biologists and departmental officials who were worried about interbreeding between the wood and plains bison and about the possible spread of tuberculosis from the plains to the wood bison. The Wainwright herd had contracted this disease from domestic cattle, but the wood bison were not known to be infected with it (Mitchell, 1976; Ogilvie, 1979; cf. Lothian, 1976). The bison were to have been tested for tuberculosis before leaving Wainwright, but this was not done (Mitchell, 1976).

Between 1925 and 1928, 6673 bison were shipped by rail to Waterways and by barge downriver to the park, where they were released on the west side of the Slave River in the vicinity of what is now known as Hay Camp (Raup, 1933; Rowan, 1929; Leising, 1959; Carbyn *et al.*, 1989; Ogilvie, 1979). Local people who witnessed these events, including Chief Warden Mike Dempsey, claim that many bison died during transport and that fewer bison were actually released, possibly fewer than 6000 animals (Bill Fuller, pers. comm. 1991; David Adie, pers. comm. 1990; Carbyn *et al.*, 1989).

As Graham (1924) expected, these plains bison did interbreed with the estimated 1500 wood bison. However, the gene flow was a complex process. According to Graham (1924), the sex ratio among plains bison was to be one male to five females. Carbyn *et al.* (1989) have speculated that the mature wood bison bulls would have bred more plains bison cows than the young plains bison bulls, increasing the wood bison genetic contribution to the combined population out of proportion to their numbers. The young plains bison may also have been subjected to greater wolf predation. These factors probably increased the percentage of wood bison genes in the new gene pool. With interbreeding and association came the probable transmission of tuberculosis and brucellosis to the wood bison. Unfortunately, the actual historical process of hybridization and disease transmission in this population is not understood.

In the winter of 1925-26, the plains bison left the park, crossing the Peace River to feed in the meadows of the Lake Claire area (Raup, 1933; Mitchell, 1976). Faced with the problem of protecting the plains bison, which now lived outside park boundaries, the park administration decided to enlarge the park to encompass this additional bison range (letter from Maxwell Graham to J.E. Spero, Canadian National Parks Branch, Department of the Interior, 22 January 1926 [PAC, RG 85, v. 1213, file 400-2-3, pt. 1]). The park was expanded on 30 April 1926 by Order-in-Council P.C. 634 (Fig. 2). At that time, the northwest corner of the park containing Buffalo Lake was removed from the park. It was brought back into the park on 24 September 1926 by Order-in-Council P.C. 1444 (Lothian, 1976; Church, 1976).

Residents of the Fort Chipewyan region had opposed park expansion unless there were firm guarantees that their use of the area would not be impaired (letter from McDougal to Finnie, 25 March 1926 [PAC, RG 85, v. 1213, file 400-2-3, pt. 1]). In response to their lobby, the government decided to allow access to the park south of the Peace River to "any persons" who were hunting and trapping in the annexed region in 1926 (Order-in-Council P.C. 1444, 24 September 1926). Traders were also allowed to continue their operations (memo from Richards to Finnie, 2 February 1929 [PAC, RG 85, v. 1213, file 400-2-3, pt. 1A]).

Bison Management in the Park: Bison were managed during the first three decades of the park's existence primarily by being protected from subsistence hunting by Natives and others

resident in or using the park. But in 1929 the park administration began a program of small-scale, seasonal bison hunts, in response to a request for bison meat for food at the residential school (memo to W.W. Cory, 25 October 1928 [PAC, RG 85, v. 1213, file 400-2-3, pt. 1A; cf. Mitchell, 1976]). Control of hunting and meat distribution was in the hands of park officials. They channeled the meat through the missionaries and the Indian Agents to the residential schools and to needy people in the neighboring settlements (Mitchell, 1976). The eventual recipients — local Indians and Metis — did not participate in the distribution process. The acceptability of this early slaughter program was a precedent for the greatly expanded post-war commercial slaughter operation and led to proposals for money-making operations.

The number of bison taken in these hunts was usually small, no more than 21 animals in any one year (Mitchell, 1976). However, the government was willing to increase the number to accommodate requests for more meat (McCormack, 1984). Although the park had been established to protect the bison, and Indian subsistence hunting for bison was not allowed, it was acceptable for government officials to hunt bison to give to Indians as relief when it would save the government money during the depressed economy of the 1930s. However, it was not yet acceptable to consider sport hunting or commercial slaughter. Bison were again an exploitable resource, though to conserve rather than to generate wealth.

Within the bison management strategy during these early decades were intermittent studies of the park bison and efforts to increase the number of bison by killing wolves, or "wolf control." Scientific study began in the 1920s (Rowan, 1929); studies were later conducted in the 1930s by Hugh M. Raup (1933) and J. Dewey Soper (1941), among others. The first bison aerial survey was made in 1932, although the first relatively systematic survey was not conducted until 1946-47 (Carbyn *et al.*, 1989), when more extensive research began.

The data generated by these pioneering studies provided relatively little reliable information about the ecosystem of the park and the role of bison within it. Some arguments about wildlife management were presented as scientific analyses but appear to be grounded in prevailing sentiments of the day, particularly in terms of predator-prey relationships. For example, Soper (1945) presented several reasons to explain the discrepancy between the number of bison the park range should support (85 000) and the estimated population (20 000), including timber wolf predation, high natural mortality due to the natural hazards of the park, and possibly a lower rate of fertility than southern bison. He did not consider habitat deterioration (cf. McCormack, 1984) as a possible factor, and at the time the presence of disease was unknown. Soper settled on wolf predation as the major cause, claiming that wolves in the park had increased considerably since the 1930s. His conclusion was in line with anti-wolf sentiments deeply embedded in Euro-Canadian agrarian-based wildlife traditions (McCandless, 1985).

His conclusions had drastic implications for park "management" of bison predators. He recognized that the park was a wildlife sanctuary, where bison would be subjected to the full range of natural hazards and predators, except human ones. Yet he objected to wolf predation on bison, in that ". . . the meat consumed by wolves is a very regrettable feature, since it seems such a useless waste of food" (Soper, 1945:30). He recommended that timber wolves be reduced in number through a combination of poison (strychnine) and bounties. Wolves were

poisoned and trapped in the park by the warden staff throughout the 1940s and at other times as well, with major impacts on their numbers (L. Carbyn, pers. comm. 1991; Mitchell, 1976; Oldham, 1946, 1947).

Ironically, Geist (1990) has suggested that the consequent decrease in wolf predation allowed tuberculosis and brucellosis to become more widespread among park bison, in that vulnerable and diseased animals were not culled by wolves. If so, it is possible that the high rates of infection and disease found by biologists in the late 1940s and during the 1950s were anomalous, not typical of rates in the years when wolf predation was important. Those figures are still cited today as rates of infection and disease among the park bison, even though the data are now 30-40 years old (Geist, 1990). Contemporary estimates of disease rates are based on a survey conducted between 1983 and 1985 on a small number of animals (Tessaro *et al.*, 1990). Natives who hunt the local bison believe that disease rates are actually much lower than those given (Ferguson, 1989), though they are probably not detecting early stages of infection.

In short, while park staff undertook some wildlife management during these early decades, their efforts were primitive, based on limited data and minimal understanding of ecosystem relationships. Efforts at management were little more than *ad hoc* tinkering, which occasionally undermined the relationships in nature that the park had been established to protect. Moreover, some park management policies, especially those related to the suppression of traditional Native burning and reducing wolf populations, may have contributed to the very problems that park staff were trying to remedy.

1950-64: Intense Manipulation and Exploitation

By the 1940s, conditions of drought and related changes in sizes of animal populations, combined with heavy trapping and the elimination of controlled burning, depleted the numbers of fur and game animals in the park. For the first time, park residents were restricted in the number of moose they could kill. They requested permission to kill bison instead. All requests were denied, although the annual bison kill by warden staff was increased (McCormack, 1984; telegram from E.G. Oldham to R.A. Gibson, 9 January 1948; memo from Fred Fraser, district agent, to R.A. Gibson, 20 July 1948 [PAC, RG 85, v. 1097, file 472-3, pt. 2]). Only a few years later, the park administration reversed its position and decided that it was time to "manage" the bison for meat production and commercial profit and to eliminate disease in the herds. This second period of bison management began in 1950.

Two factors were responsible for this new policy. The first and most important was the vigorous post-war development activities of the federal government's northern administration, which administered Wood Buffalo Park. The government itself became an entrepreneur, investing heavily in infrastructure and intensifying its "development" activities (Rea, 1968; McCormack, 1984; Zaslow, 1988). Staff of the Northern Administration Branch considered conservation policy "an albatross to be accommodated only to the extent absolutely necessary" (Potyondi, 1979:103). Park bison were viewed as a potential source of cheap meat for northerners, especially at a time when other populations of local wild game were in decline (Stevens, 1954). Increased availability of meat would support the growth of northern business. Also, a southern market for bison meat was believed to exist.

The second factor was concern about tuberculosis, which had been recently discovered in the herds. Bison studies during the 1940s had shown that many bison had been exposed to or were sick with tuberculosis. Based on positive reactions to tuberculin testing (which may only indicate exposure, not necessarily infection) and on discernible lesions, more than 40% of the older animals showed signs of the disease (Fuller, 1951b). The combined effects of a high incidence of tuberculosis and diminished range availability were hypothesized as the limiting factors for the growth of park bison herds since the early 1930s (Fuller, 1951a,c). Therefore, controlling tuberculosis should lead to increased bison numbers. Not all agreed; another commentator claimed that the animals had adapted to the disease (Stevens, 1954). In fact, the impact of tuberculosis on bison has never been fully understood and has been studied only in a limited way. From the government's point of view, if bison meat were to be marketed, it was important for both health and marketing reasons to control and, if possible, eliminate tuberculosis.

A 1954 report outlined the government's new bison management strategy based on the goals of producing bison meat and eradicating tuberculosis (Stevens, 1954). It proposed investing government funds in productive infrastructure (corrals, abattoir, etc.), tuberculin testing of bison, slaughtering animals that tested positively, salvaging their meat, marketing bison meat, and slaughtering additional animals (especially cows and young) to supply the orders for bison meat. This new program began with the slaughters of 1950 and 1951 (Fuller, 1955:1),

intensified when corrals were built in the mid-1950s, and continued until 1967, when the last commercial slaughter occurred to supply meat for the Montreal world fair (Ogilvie, 1979). Thereafter, there were a few slaughters for local food needs; even these ended in 1972 (David Adie and Ken East, pers. comm. 1990). Figure 3 shows the number of bison killed and the amount of meat produced from 1951 through 1968. It had been recommended that bison herds should be manipulated so that age and sex ratios were more suited to commercial needs, but this did not occur (Stevens, 1954).

Ironically, northerners were too poor to afford the meat at the high prices based on the high cost of production (Rankin, 1954; Stevens, 1954). Bison meat could not compete with imported beef. Therefore, the government subsidized the sale of cheaper cuts in the North by selling the best meat to "outside" or southern markets (Stevens, 1954).

From 1956 to 1962, the park bison were tested for another disease, brucellosis, first confirmed in 1956 (W.A. Fuller, pers. comm. 1991). In 1957 and 1958, animals with positive brucellosis tests were slaughtered (Choquette and Stewart, 1959). Biologists now raised the possibility that the diseased bison may have spread tuberculosis and brucellosis to other animals sharing their range (Mitchell, 1976; Choquette and Stewart, 1959).

Anthrax was a third disease that posed a new threat to the bison from 1962, when the first outbreak occurred (Mitchell, 1976). Park managers developed an immediate plan for containment and a long-term management plan, by which they

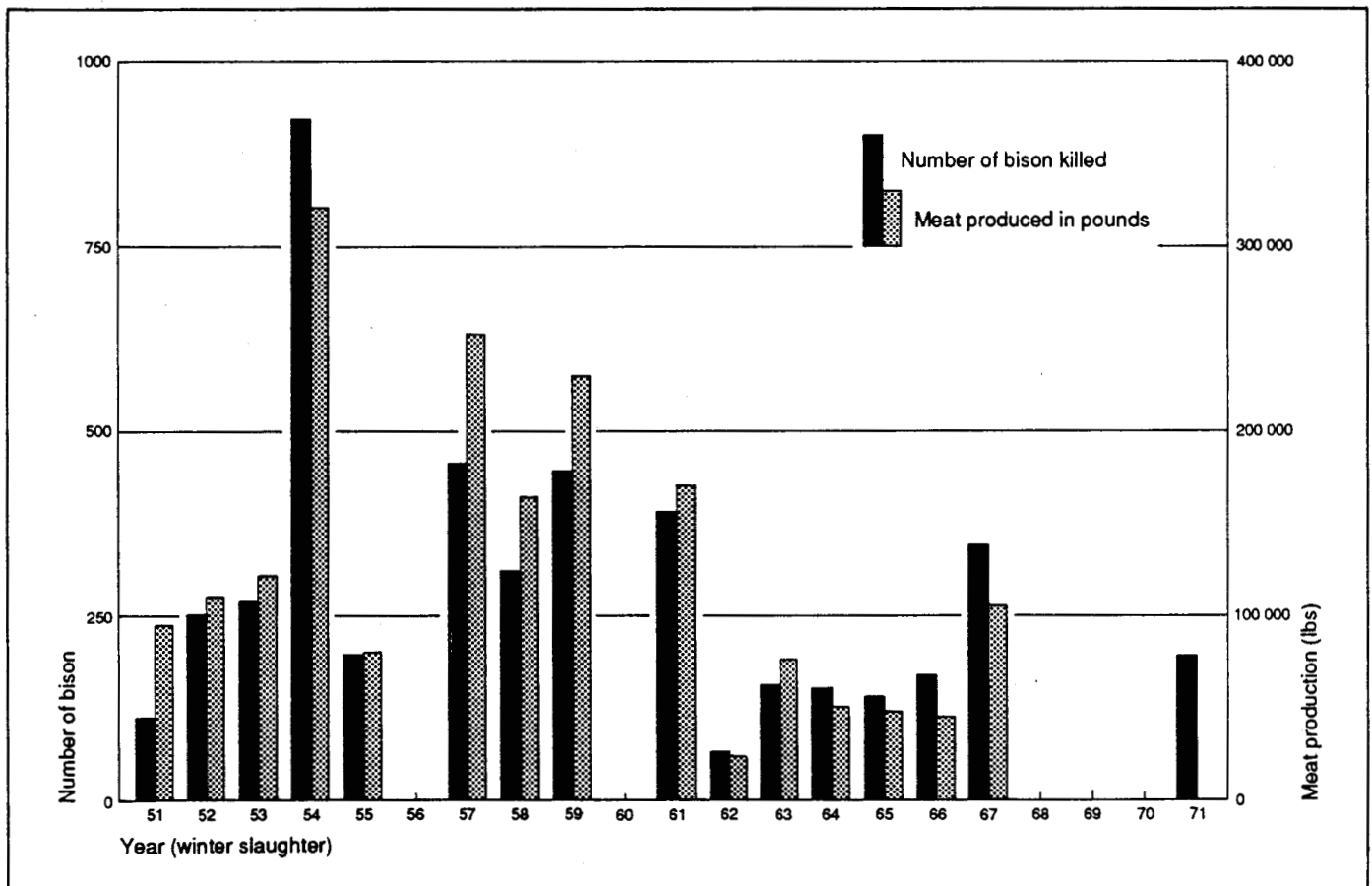


FIG. 3. Bison slaughters, 1951-71. (Data compiled from WBNP files; original figures were in pounds.)

hoped to eliminate the disease. Short-term measures entailed proper disposal of carcasses by burning and burial, vaccination, removal of bison from areas where vaccination was not feasible, thinning of herds to remove old and unfit bison, and continued surveillance of contaminated herds (McCormack, 1977-78; Choquette and Broughton, 1967; Mitchell, 1976).

These measures were not entirely satisfactory because of the inherent difficulties in trying to manage a large, wild, free-ranging animal population. The park responded by considering an extensive program of bison management and anthrax control (Novakowski and Choquette, 1967). This plan proposed that the bison in the park and adjacent areas be enclosed for five years and that any bison that could not be contained be "eliminated." The bison would be kept corralled, tested for diseases, and vaccinated for an additional ten years. Periodic slaughters within the compound would reduce bison numbers. At the end of this period, it was hoped that tuberculosis and brucellosis would have been eliminated and anthrax controlled. The bison would then be freed. The plan was not implemented for economic and political reasons (David Adie, pers. comm. 1990; Mitchell, 1976). More modest programs continued instead.

The park's bison management policies during this period were contradictory. The slaughter program *cum* disease control program meant killing the bison in order to save them. While local Natives were not allowed to hunt bison for personal food needs, the park held large slaughters and sold the meat. The process of bison round-ups and testing had a high mortality rate of about 10%. The park had been established to protect the free-ranging, wild bison, yet proposals were being considered that would have led to their full-time enclosure in one or more large compounds, or even their total elimination (cf. Stevens, 1954). These contradictions resulted from a park bison management policy that had developed on an *ad hoc* basis. It grew in response to the needs of northern development as seen by southern administrators, scientists, and politicians, rather than the needs of the local people who believed that the bison had been protected for so many years in order eventually to meet their (local) needs.

1964–Present: No Exploitation, No Interference

The latest period of bison management began in 1964, when Wood Buffalo Park came under the administrative regime of the National Parks Branch, now Parks Canada. By 1969 the transfer of jurisdiction was complete (Parks Canada, 1984). The wildlife management philosophy of Parks Canada is essentially one of non-interference, allowing natural processes to proceed unhindered (Department of the Environment, 1983). Wildlife in national parks is normally not to be killed for either food or profit (although WBNP and some other northern parks allow traditional land-based activities, including commercial trapping). Commercial operations involving wildlife, such as tourism, are not supposed to interfere directly with the animals. In line with these policies, all commercial enterprises in the park were terminated where it was possible to do so. The last commercial bison slaughter occurred in 1967. Limited slaughters for community use continued until 1972. Wolf killing ended, except by trappers, since wolves were considered by the park service to be a normal and essential component of the park ecosystem. Generally, the 1970s were marked by wildlife management decisions in WBNP that reflected Parks Canada directives.

In 1980, park staff began a process designed to rationalize its operations and avoid the reactive decision making that had characterized it in former years (Parks Canada, 1984). In line with a new Parks Canada policy approved in 1979, they initiated a comprehensive process of planning and consultation that in 1984 produced the Wood Buffalo National Park Management Plan, a management charter for the park (Canadian Parks Service, 1989b; Parks Canada, 1984).

The plan mandates bison management by non-interference by park staff (Parks Canada, 1984) — that is, bison are to be subjected to the full range of natural processes, with no human intervention unless the long-term survival of the bison were threatened. However, bison were to be "monitored" for a number of factors, and bison diseases were targeted for research. The establishment of a buffer zone between the park and areas with domestic livestock operations was also to be investigated, although the buffer zone was identified as a project of only "moderate priority."

This recent stage in the park's history is the most positive, in that park administrators attempted to base their operations on modern principles of game management and local community involvement. Ironically, it is in this period that park bison have become endangered by new and serious difficulties, with causes originating beyond park boundaries and hence beyond the control of park managers. In 1968, the park began to face an unprecedented series of environmental problems, especially those caused by the recently completed Bennett Dam, which started impounding the waters of the Peace and eliminated spring flooding of the Peace-Athabasca delta. The annual hydrological cycle of the Peace-Athabasca delta was permanently altered. A process began in which meadows grazed by bison, and maintained by spring floods, are being replaced by less productive, mature vegetation (McCormack, 1984; Carbyn *et al.*, 1989). A recent report concludes that in the delta, shrubland has encroached on meadows and wetland habitats to such an extent that productive habitats have been reduced over the past 13 years by 20%. It predicts that given current conditions, these productive habitats will largely disappear within 50-55 years (Jaques, 1990).

The effect on bison has been multiple and subtle. About 75% of the bison in the park rely on the delta at some time of the year. Inadequate forage reduces the bison's ability to withstand predators and disease, to survive severe winters, and to produce calves that themselves can survive. In short, the deterioration and reduction of the bison ranges are factors that have played important roles in the decline of bison numbers from 1969 to the present (Carbyn *et al.*, 1989).

Park staff have responded by monitoring water levels in the park and by taking mitigative measures, building a succession of dams and weirs from 1971 to 1976. Carbyn *et al.* (1989), Jaques (1990), and Fuller (pers. comm. 1991) contend that these structures have not been effective in restoring the former hydrological regime. Moreover, in the winter of 1973-74 the weir at Quatre Fourches contributed to such high water levels that 3000 bison may have drowned, and more may have starved because of icy crusts covering winter forage (cf. Tempny, 1974; Carbyn *et al.*, 1989).

Other factors also contributed to the decline in bison during this period. Wolf predation increased, because wolves were no longer being killed by park staff (Carbyn *et al.*, 1989). Tuberculosis and brucellosis undoubtedly contributed to heightened vulnerability to all causes of mortality. The various sources of

bison mortality may have been more important, since bison numbers at the beginning of this period were already reduced from the earlier round-ups and slaughters. Unfortunately, the ways in which these diverse factors interact have been studied by biologists only slightly. Today, bison in the park number about 3500 animals (Janet Mercer, pers. comm. 1990).

CONTEMPORARY THREATS TO PARK BISON

In February 1989, the federal government appointed a five-member Environmental Assessment Panel (EAP) "to publically review and assess the environmental, resource conservation, socio-economic and health implications associated with the bison disease problem, and with alternative courses of action to deal with this problem" (EAP, 1990:44). The panel released its report in August 1990. It recommended that all wild bison in WBNP and neighboring areas "be removed and replaced by disease-free wood bison" (EAP, 1990:2).

This section of the paper explores the agendas of the proponents of "replacement" to address the question of why such a measure is being proposed. It considers the implications of conventional bison taxonomy for legislation and program growth and the conflicts created by expanding agrarian economies. It then assesses the Environmental Assessment Review Process (EARP), the mechanism chosen to examine related issues and make recommendations about the bison, but which resulted in the obscuring of important political and economic dimensions.

The Politics of Taxonomy: The Wood Bison Recovery Program

Two questions of bison taxonomy have plagued considerations of bison futures in WBNP. The EAP report (1990) supported the conventional wisdom that there existed in the park two bison subspecies, *B. b. bison*, plains bison imported from Wainwright, and *B. b. athabascae*, the wood bison indigenous to the WBNP region. It accepted the assertion that the animals recovered from the Nyarling River region can be regarded as wood bison. Both positions have been challenged. A once-academic question now bears directly on bison management issues.

Two Subspecies? The argument for taxonomic differentiation into subspecies rests on three related arguments: that the wood and plains bison followed different evolutionary paths, that measurable physical differences between them exist as a consequence, and that the reason for this evolutionary situation was a barrier that geographically isolated the two groups of bison from each other and encouraged subspeciation, the beginning of species divergence.

The evolution of modern bison began with the retreat of the Laurentian ice sheet about 10 000 years ago, resulting in the colonization of ice-free regions in Alberta and the N.W.T. by bison and other species. Biologists disagree about the evolutionary process. Van Zyll de Jong (1986) hypothesizes that while hybridization occurred between *B. b. occidentalis* and *B. b. antiquus*, wood bison descended directly from the former. Geist (1990, 1991) suggests that all North American bison may derive from one ancestral source and that environmental factors may play a greater role in effecting phenotypic differences than has been acknowledged.

Now that genetic research can be conducted, reliance on physical appearance or phenotype is an increasingly weak tool for determining taxonomic status. Genetic differences are cru-

cial, although they are admittedly more difficult to identify. Van Zyll de Jong's (1986) conclusions were based strictly on phenotypic differences and are not supported by blood chemistry or genotype research. Genetic differences that have been found are considered indicative of geographically isolated populations, not subspecies, suggesting that the differences may represent only the first step — geographic isolation — along the path toward speciation (Strobeck, 1991; Bork *et al.*, 1988; Berg, 1989; cf. Reynolds *et al.*, 1982). A "genetic fingerprinting" study among park bison has been initiated by WBNP to address questions of genetic diversity (Ken East, pers. comm. 1991).

The absence of significant genetic difference is supported by information about changing Holocene environments, which may have enabled contact and gene flow among bison inhabiting the northern plains and the adjacent forests. Van Zyll de Jong proposed the existence in Alberta of a heavily forested area that isolated the southern and northern bison populations from one another, imposing reproductive isolation. Yet accounts in the historic literature and research on Native burning in Alberta indicate that contemporary notions about the boreal forest and its density are misleading (Lewis, 1977, 1982; McCormack, 1984; Ferguson, 1979). Extensive grasslands could be found at least as far north as Great Slave Lake into the early 20th century (Webb *et al.*, 1967). Many of these were created and maintained by controlled, systematic forest and meadow burning conducted by Native inhabitants. Northern grasslands diminished in this century, replaced by forests resulting from fire suppression programs and new European-based land use patterns. In fact, the forests that now create the barrier to which van Zyll de Jong refers may be of recent origin. Northern and southern bison probably became reproductively isolated by the early to mid-1800s, before such a barrier developed, due to reduction in their numbers and ranges from extensive hunting for fur trade provisioning. Before that time, there may have been ample numbers and opportunity for bison from north and south to meet, resulting in gene flow and preventing speciation.

The Canadian Wildlife Service (CWS) position, as stated by Reynolds (1987, 1988), is that the wood bison are a separate subspecies, although in an earlier paper (Reynolds *et al.*, 1982) the uncertainty in bison phylogeny and taxonomy was acknowledged. Geist (1990, 1991) and Aniskowicz (1990a,b) have challenged the CWS position and its implications. They contend that the WBNP bison represent the largest and most diverse gene pool not only of wood bison genes, but of all North American bison genes, in that they derive from a founding population of 300-600 northern bison and a small number of southern bison — that is, the bison that escaped extermination in the 19th century. In contrast, the so-called wood bison now at Elk Island National Park (EINP) and other locations represent a more impoverished bison gene pool based on 37 animals. Therefore, the proposal to eliminate WBNP bison would effectively narrow the gene pool considerably, which Geist (1990) sees as a tragic biological mistake.

Modern Wood Bison? The second taxonomic issue is whether or not a small group of bison recovered from WBNP in the 1960s should be designated *B. b. athabascae*. Such a label hinges on accepting subspecies distinctions among the bison. A 1957 aerial survey "discovered" a small herd alleged to be "pure" wood bison in the Nyarling River area, in the northern part of the park (cf. Reynolds *et al.*, 1982). They were known

to exist from earlier studies by W.A. Fuller (Fuller, pers. comm. 1991; Carbyn *et al.*, 1989). Fuller hypothesized that these bison had remained isolated from the Wainwright bison and escaped hybridization. In 1963, 16 of these bison were moved to an area north of Fort Providence that later became the Mackenzie Bison Sanctuary. In 1965, 21 bison from the same Nyarling River herd were shipped to EBNP, in central Alberta. In total, 37 animals were relocated successfully from WBNP (Carbyn *et al.*, 1989; Bison Disease Task Force, 1988).

In fact, these animals were never isolated from other bison in the park, as indicated by the fact that they had contracted the diseases carried to the park by the Wainwright bison and by their morphological similarities to the plains bison. Van Zyll de Jong (1986) estimated a 5% introgression of plains bison genes into the Nyarling River bison. These bison are considered by biologists of the CWS and the Government of the Northwest Territories (GNWT) to be the closest living descendants of the historic wood bison. They are consistently referred to as wood bison, or *B. b. athabascae*.

Implications of Subspecies Designations: One difficulty in addressing these taxonomic questions is that there is no standard procedure for establishing subspecies. If we applied the same criteria that have been applied to the bison to *Homo sapiens* or *Canis familiaris*, we would have a host of subspecies. Historical bison subspecies designations have persisted into the present in part because of inertia. They have been bolstered recently by inclusion of contemporary "wood bison" in international wildlife agreements and by an elaborate structure of protective legislation and government programs for wood bison. In short, problems of bison taxonomy are not merely a scientific debate, but have political and economic implications.

The Nyarling River "wood bison" have been legally defined as an "endangered species" in wildlife legislation of both the N.W.T. and Alberta (EAP, 1990:7-8). They cannot be hunted. This status contrasts with that of plains bison, or *B. b. bison*, which are excluded from the definition of wildlife, treated as domestic animals, and hunted (Bison Disease Task Force, 1988). Similarly, the other bison of WBNP, considered hybrids, are not protected outside the park. The Nyarling River bison were listed as "endangered" in the Convention on International Trade in Endangered Species and the Committee on the Status of Endangered Wildlife in Canada (EAP, 1990). The inclusion of these bison in wildlife legislation and agreements lends credence to the view that substantial differences exist between them and the other WBNP bison.

They also led to government-run programs to restore wood bison in number and range. In 1975, the Wood Bison Rehabilitation Program was started by CWS and Parks Canada (both of the federal Department of the Environment) and provincial and territorial wildlife departments. Responsibility for coordinating the project rested with CWS, also the main proponent. The program involved using the wood bison at EBNP as the breeding stock from which free-ranging wood bison populations would be re-established in areas of their former range, although criteria identifying their range were interpreted loosely (for example, bison became extinct in the Yukon thousands of years ago, and the Waterhen herd in Manitoba is outside the supposed wood bison range). The goal of the program was to remove the wood bison from the endangered list by ensuring their survival through a minimum of three discrete, free-ranging populations with a minimum of

200 individuals each. Wood bison were sent to several localities. There are now free-ranging herds at Nahanni Butte and the Mackenzie Bison Sanctuary, N.W.T. There are three fenced herds awaiting release, one at Nisling River in the Yukon, one at Hay-Zama lakes in northwestern Alberta (Dene Tha Band), and one on the Waterhen Reserve in Manitoba. Wood bison were also sent to zoos and wildlife animal parks. The program has been so successful that the status of the wood bison was recently "downlisted" to "threatened" (Reynolds, 1987, 1988; Reynolds *et al.*, 1982; FEARO, 1989a).

A Wood Bison Advisory Group, created in 1985, developed the Wood Bison Recovery Program, with a new goal, to "correct" the mistake made of shipping Wainwright bison north in the 1920s by "removing" the hybrid bison of WBNP and "replacing" them with bison derived from the Nyarling River stock (cf. Carbyn *et al.*, 1989; submissions to the Northern Diseased Bison Environmental Assessment Panel). To achieve this goal, all bison now occupying WBNP and the vicinity would have to be slaughtered. While some CWS biologists support this goal, it is contrary to the WBNP management plan. Despite the apparently cooperative nature of this program, former WBNP Superintendent Ken East (1990:5,6) claims that "the Wood Bison Recovery Program has evolved without the benefit of park input" and that there has been no integrated regional management.

The Expansion of Competing Ranching Economies

An equally complex set of issues affecting positions about the WBNP bison relates to the expansion of agrarian activities into regions surrounding the park. Agriculture was well established by the early 20th century in the Fort Vermilion area, west of the park (Fig. 1). Today, ranching is encroaching upon the park, with ranches existing within 70 km of park borders, including game ranches for bison and elk. The Fort Vermilion grazing reserve opened in 1982 with only 293 cattle. By 1988, cattle numbers had increased to 2400, due to a brief subsidy offered by the Department of Forestry, Lands, and Wildlife to encourage transport of cattle from central Alberta for summer grazing (Bison Disease Task Force, 1988; EAP, 1990; Bill Irvine, pers. comm. 1990).

Agriculture Canada supports the development of ranching in the Slave River lowlands (SRL), east of the park. In the 1950s, it began to explore the possibilities of agricultural development in this region (Reynolds and Hawley, 1987). A recent study concluded that cattle ranches could be economically viable only "if they were large (100-200 cows), well capitalized and well managed and if cattle prices were maintained at a high level in comparison to production costs" (Reynolds and Hawley, 1987:61); therefore, the potential for cattle ranching was considered small. Bison ranching was assessed more optimistically. In 1985, the Fort Smith Hunters and Trappers Association, in consultation with the N.W.T., commissioned a feasibility study into commercial bison ranching in the SRL (Bison Disease Task Force, 1988).

The necessary funding and approvals were obtained in the spring of 1990 (Hal Reynolds, pers. comm. 1990), when a shipment of wood bison from EBNP was delivered to provide the nucleus of a herd for the new Hanging Ice Ranch, a commercial venture operated by the Fort Smith Hunters and Trappers Association. Prior to the shipment, no effort was made to inform or involve staff from WBNP, located west of the ranch; no EARP was conducted; and the local Indian bands were

involved only in some aspects and at some stages (Ken East, pers. comm. 1990; Hal Reynolds, pers. comm. 1990; Wes Olsen, pers. comm. 1990). The presence of these bison could heighten pressure to support the plan to exterminate the WBNP bison, in that there will now be bison on the spot to replace them (cf. Johnson, 1990).

Agriculture Canada is worried that park bison could transmit tuberculosis and brucellosis to animals (cattle, elk, bison) on neighboring ranches, jeopardizing their economic prospects (statements made to the Northern Diseased Bison Environmental Assessment Panel). In fact, preventing transmission of these diseases to domestic herds should not be difficult. Strategic fencing and a buffer zone would prevent wild bison and ranched animals from coming in contact with one another. This strategy was identified in the WBNP management plan and was supported in November 1989 by senior administrators in the Canadian Parks Service (Canadian Parks Service, 1989a). Although a buffer zone was never tried, it was rejected for two reasons. First, it was not considered feasible due to the large amount of land involved. More to the point, a report by the Bison Disease Task Force claimed (1988:5-42), "Establishment of a buffer zone would likely result in significant negative reaction from local groups, livestock producers and the general public because of the exclusion of livestock and bison from the zone."

This reasoning reveals the conflict between the traditional wildlife-based economy of the northern forested region and the agrarian economies seeking to expand into this region. Focusing on livestock disease obscures this fundamental opposition. Such land use competition is not new, but it has not been considered in the proposals for the WBNP bison. Hugh Brody (1981) described this conflict for the Native peoples of northeastern British Columbia as the "agricultural frontier" expanded from the south into their homeland. It created difficulties for the Natives' mixed economy, which was based on foraging and trapping. Reynolds and Hawley (1987) predict similar land use conflicts for the Slave River lowlands, with inevitable environmental and social changes that might prove detrimental to local life styles. They conclude (1987:64,65) that "free-ranging bison and conventional livestock production are not compatible" and "wolf control would probably be necessary in any scheme for intensive ungulate production in the SRL. . . ." In short, the success of ranching would be at the expense of the traditional economy and natural wildlife relationships. It could also threaten wildlife management in neighboring WBNP.

Brody (1981) contends that most non-Natives do not realize that such a conflict exists, nor do they realize that traditional land-based Native economies are viable ones. Historically, government development policies have supported agrarian economies, while considering land-based foraging and trapping economies to be primitive and, today, obsolete (cf. Asch, 1990). However, research into the economy of the people of Fort Chipewyan (McCormack, 1984, 1986b) and the dietary research conducted at Fort Smith and Fort Chipewyan (Wein and Sabry, 1990) support the view that such economies are neither primitive nor obsolete, though they continue to be poorly understood. An alternative to the expansion of ranching is active support for the land-based economy (Asch, 1990).

The expansion of ranching could itself jeopardize the recovery of the wood bison, in that bison tend to travel great distances in new ranges (Reynolds *et al.*, 1982). It was the

incompatibility between wood bison and ranching that led to the failure of an early effort to establish a wood bison herd in Jasper National Park. When bison left the park and moved into agricultural areas, they had to be "removed" (Reynolds, 1987: 325). These problems have not been considered in relation to bison replacement proposals for WBNP.

It is support for northern ranching activities that underlies Agriculture Canada's concerns about disease transmission. Agriculture Canada is not concerned about bison genetics. It is worried that the reservoir of bovine diseases found in WBNP bison could jeopardize the expansion of ranching into the area around the park, in part by threatening Canada's brucellosis-free status. Therefore, it supports the plan to exterminate the bison of the park and replace them with disease-free bison (statements made to the Northern Diseased Bison Environmental Assessment Panel).

Whether the cattle industry should be allowed to take precedence over other interests is a political question that should be at the heart of the debate over the fate of the WBNP bison. That it is not may reflect an acceptance by most Canadians, who are engaged in agrarian and industrial activities, of the desirability and harmlessness of expanding ranching in northern regions. Because this conflict is not an obvious problem or one that is generally understood, it is also less newsworthy than the issue of disease. Yet, in the long run, it is this conflict that will need to be resolved, or at least mediated, to preserve the wild bison in the park, the lifeways of local Native residents, and possibly even the park itself.

Deciding the Future of the Park Bison: The Process

In 1986, an interjurisdictional steering committee was formed to consider issues raised by the northern diseased bison. This committee created the Wood Bison Task Force. It is noteworthy that all the members of the steering committee and of the task force were from government departments. No individuals from local communities or from conservation groups sat on the task force. The task force report acknowledged that "due to the sensitive nature of the subject, it was premature for discussions outside government agencies" (Bison Disease Task Force, 1988:A-1).

The task force has been eclipsed by the hearings and public report of the high-profile EARP. However, it was an important step that produced the agenda for formal hearings on the diseased bison. Task force members reviewed existing information and developed and evaluated a series of management recommendations. Although limited representation restricted the scope of those recommendations, the report is remarkable for the honesty with which relevant political and economic considerations were presented. In the end, it supported only one option: "removal" of the hybrid, diseased bison of WBNP and its vicinity and their "replacement" by wood bison from EBNP (Bison Disease Task Force, 1988; FEARO, 1989a).

The task force's recommendation became the basis of an Environmental Assessment and Review Process (EARP), mandated by the federal government for proposals that may have an environmental impact on federal land (FEARO, 1987; 1989a). In February 1989, the Northern Diseased Bison Environmental Assessment Panel was appointed, consisting of five members (FEARO, 1989b). As with the steering committee and task force, of the appointed panel none represented the constituency that might be called the "ordinary residents" of the

region. Other than the chair, who was from the FEARO office, all panel members were people with biological credentials, involved in wildlife study or management as their professions.

The panel held two sets of public hearings: the first, in the spring of 1989, entailed "issues scoping," in which the panel determined the main concerns and identified some required studies (FEARO, 1989c). In the second set of hearings in early 1990, the panel invited Agriculture Canada to act as a proponent in order to "focus" discussion at the hearings (EAP, 1990). However, Agriculture Canada was not required to prepare an Environmental Impact Statement (EIS), normally required by a proponent (cf. FEARO, 1989d,e). Nevertheless, the panel concluded that the range of information available to it was consistent with what an EIS should contain (EAP, 1990). This conclusion was questionable, given the unknowns identified by submissions to the panel. For example, Environment Canada's (1990) submission listed numerous concerns that the proponent should have addressed. Agriculture Canada's special role did more than focus the hearings, in that submissions reacted to the "remove and replace" proposal of the task force, whose plan to restore wood bison to their former range was now fully developed and displayed through the hearings process. During the hearings, it became clear that "removal" was a euphemism for what would be a bison slaughter of massive proportions. In effect, what was proposed was the extinction of the bison of WBNP and their genes.

It was not surprising that Natives in the region opposed the extermination of the bison in their submissions. They were not concerned with arguments about genetic purity of bison, and they challenged the arguments about danger of tuberculosis and brucellosis (Ferguson, 1989). They also feared hidden agendas, including the possibility of industrial expansion into the park (Sarkadi, 1990:A4).

What was surprising was the extent of disagreement among the different branches of Environment Canada. Staff at WBNP supported the principles embodied in their management plan (Janet Mercer, pers. comm. 1990), which provides protection for all park bison. Staff at EINP supported the remove and replace option on the grounds that the Canadian Parks Service has a commitment only to maintaining wood and plains bison genotypes, not that of the "artificially created hybrid" found in WBNP (Pick *et al.*, 1990). Neither park was allowed to make a formal submission to the panel. Instead, Environment Canada submitted one statement (Environment Canada, 1990) that supported the goal of disease elimination but also supported local heritage resource values and the minimizing of negative local impacts. It supported the restoration of wood bison, but "of the broadest practical genetic base" throughout their former range, including WBNP (1990:7). These goals and others contained within the submission are contradictory. Environment Canada's submission just muddied the waters, satisfying no one.

Despite the complexity of the issues, the recommendations issued by the panel (EAP, 1990) were based on its acceptance of two unverified premises. The panel contended that the presence of tuberculosis and brucellosis among the bison posed an unacceptable level of risk to cattle, other bison, and humans. Secondly, it asserted that the earlier interbreeding of northern and southern bison in WBNP had created a "problem" and proposed that the aboriginal bison condition should be recreated as far as possible. In fact, the panel called this situation a window of opportunity.

The panel's report acknowledged but minimized important political and economic issues, unlike the Task Force report. To examine such issues, leaders of local Native communities and individuals from disciplines other than biology and wildlife management should have been represented on the panel. These might have included viewpoints from philosophy of science, political science, public policy, rural economy, or anthropology. The future of the park bison cannot be decided solely upon careful study of biological facts, which in any event are few. But the composition of the panel makes it appear as if biological considerations are the sole consideration. The reality is that the decision about the survival of park bison will be a political decision, no matter how hard individuals and panels try to present it as a decision resulting from "objective" scientific analysis.

It is enlightening to ask who would benefit and who would suffer from the implementation of the panel's recommendation. The beneficiaries would be cattle and bison ranchers, the bison of the Mackenzie Bison Sanctuary, government employees who work with wood bison programs, and people who would find employment with implementation activities. The losers would be the WBNP bison, which would all be killed, wolves that normally prey on the bison, scavengers that utilize bison kills, human hunters and trappers, park ecosystems that include a bison component, and park visitors and residents. Scientists would also be losers, in that an opportunity to understand complex ecosystem relationships would disappear forever. Beyond the park boundaries, people with a livelihood based on a mixed economy might suffer, as their land base is eroded by competing land uses, which expand at the expense of traditional land-based economies.

The federal park system itself may be a loser, in that such a wholesale slaughter of animals in WBNP to benefit non-park interest groups would create appallingly bad publicity and a precedent for similar destruction in other parks. For example, in Alberta the recent outbreak of tuberculosis in ranch elk resulted in quarantines and slaughters and conceivably could lead to proposals to kill free-ranging herds, including herds protected in national parks. Efforts to reduce forest diseases and insect infestations outside park boundaries might open other doors to similar intervention in parks.

CONCLUSION

This paper has analyzed a century of bison management in the region of WBNP, framed by the threats to the existence of the bison that existed one century ago and that exist today. The difference between these threats is the fact that northern bison extermination in the 1800s would have been the unwitting consequence of overhunting and natural disasters, while bison extermination today will result from deliberate management decisions. In this paper, historic bison management policies and activities have been interpreted as reflecting the political and economic agendas of the departments governing the park. Today, they may also be affected by the agendas of other departments that see their interests threatened by park bison.

All scientists today decry the hasty "solution" to the problems at the Wainwright Bison Preserve in the 1920s. It created problems with which WBNP staff and others are wrestling today. If today's "solution" of bison extermination in WBNP is undertaken, it will be just as irrevocable. The bison, their genes, their predators, and the ecosystem of which they are a

part will be gone forever. Such a decision must be made only after a truly dispassionate examination of *all* the issues.

The panel's report provoked strong resistance by residents of the WBNP region, WBNP staff, and the general public. The federal government chose not to implement the panel's recommendations. Instead, in 1991 it created the Northern Buffalo Recovery Board (NBRP, 1991). The members of this "multi-stakeholder board" are representatives from nine communities in the vicinity of WBNP and seven government departments. There are two co-chairs, one appointed by the aboriginal communities and one by the federal government. The purpose of the program is "to develop a buffalo management strategy which will ensure the continuing presence of healthy free roaming herds in northern Canada" (NBRP, 1991:1). The terms of reference for the board provide for additional studies that will provide the information required to make informed management decisions, rather than decisions that are simply politically expedient.

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