

A Note on Historical Mortality in a Northern Bison Population

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ABSTRACT. Mortality of bison in the area of what is now Wood Buffalo National Park was recorded in records of Fort Chipewyan for the years 1821, 1823 and 1831. There is oral tradition in the Fort Smith area that many bison died in the Slave River lowlands during one summer later in the 19th century. The records of sudden death among bison during the summer resemble features of anthrax mortality that occurred among bison in the same general area between 1962 and 1978. This suggests that anthrax may have a much longer history in the region than recognized previously.

Key words: northern bison, disease, ethnohistory, anthrax

RÉSUMÉ. La mortalité du bison dans la région qui est maintenant devenue le parc national Wood Buffalo est inscrite sur les registres de Fort Chipewyan pour les années 1821, 1823 et 1831. Il existe une tradition orale dans la région de Fort Smith disant que de nombreux bisons périrent dans les basses terres de la rivière Slave au cours d'un été de la fin du XIX^e siècle. Les registres des morts soudaines parmi les bisons durant la saison d'été rappellent les caractéristiques de la mortalité due à l'antrax qui a touché les bisons à peu près dans la même zone entre 1962 et 1978. Cela laisse à penser que l'antrax peut avoir dans cette région une histoire beaucoup plus ancienne qu'on ne l'admettait précédemment.

Mots clés: bison des bois, maladie, ethnohistoire, anthrax

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INTRODUCTION

Current diseases among the northern bison (*Bison bison bison* × *Bison bison athabasca*) of the Wood Buffalo National Park area (Fig. 1) include bovine brucellosis (*Brucella abortus* infection), bovine tuberculosis (*Mycobacterium bovis* infection) and anthrax (*Bacillus anthracis* infection). Documentation of brucellosis and tuberculosis among these herds began in the late 1930s and 1940s (Tessaro, 1987:87). Anthrax occurred in the park area in a series of outbreaks beginning in 1962 (Choquette *et al.*, 1972). The 1962 occurrence represents the first diagnosed case of anthrax in the Canadian North.

The impact of these diseases on the northern bison populations are a matter of some controversy (FEARO, 1990). Some biologists consider tuberculosis and brucellosis to have a significant impact on bison survival and productivity and to be major contributors to the steady decline in the bison population of this area since the 1970s (Broughton, 1987:36-37; Tessaro, 1987:267). Others attribute this population decline more to wolf predation on bison calves and the accidental drowning of 2000 or so bison in the delta in the 1970s (Carbyn *et al.*, 1989). Anthrax losses are depicted by the Bison Disease Task Force (1989:4-3) as dramatic in appearance but playing a minor role in the bison population decline. Broughton (1987:37), on the other hand, considers the direct effect of the anthrax losses to have been significant and furthermore suggests that little is known about the indirect effects of these losses on productivity. It is perhaps worth noting that the known mortality of 1100 animals, which is being used in these evaluations, represents a minimal figure, as noted both in the biological literature (Choquette *et al.*, 1972:131; Reynolds *et al.*, 1982:991) and by local residents (Laviolette, 1990:121).

The history of these diseases is also relevant to their role in the population dynamics of the northern bison. Biologists appear to accept that brucellosis and tuberculosis were both introduced in the 1920s as a result of the decision to transport infected plains bison into the area. Gainer and Saunders (1989) have recently argued that these bison were also incubating

anthrax bacilli in their bodies at the time of transport. Another explanation of the source of the anthrax in the outbreaks of the 1960-70s involves migratory waterfowl as transporters of anthrax spores from areas in which anthrax is endemic (Choquette *et al.*, 1972; Broughton, 1987).

Some speculation suggests that anthrax may have had a longer history in the area (Gainer and Saunders, 1989:955). Records do exist of instances of sudden mortality among wood bison (*Bison bison athabasca*) in the park area. These records may be of interest to researchers concerned with the history of anthrax or, since it is impossible to identify positively these cases with anthrax, to researchers concerned with the role of diseases in northern bison population dynamics.

The historic sources include both the Fort Chipewyan fur trade post journals of the pre-1840 period, examined by T. Ferguson, and oral tradition stemming from an incident in the mid- to late 1800s in the Fort Smith area, provided by F. Laviolette, a long-time resident of the area. This paper provides, first, the relevant quotations, second, general comments on the sources of the information and, finally, a brief discussion of anthrax as a possible cause of the mortalities indicated in these sources.

THE HISTORICAL REFERENCES

The earliest reference in the Fort Chipewyan records to disease among the bison occurs in July 1821 and simply notes that "a Sickness has seized the buffaloe & carried off numbers along Peace River" (HBCA, 1821: entry of 27 July). Two years later, James Keith, the newly arrived chief trader, notes another unusual mortality among game animals. The reference occurs in his journal in the entry of 3 September 1823, which summarizes the events of the summer as they have been related to him by the officers who maintained the post during that time:

Nothing particular out of the usual Routine in summer at this place excepting a rather strange report, corroborated by different Individuals of the Chipewyans which renders it the more

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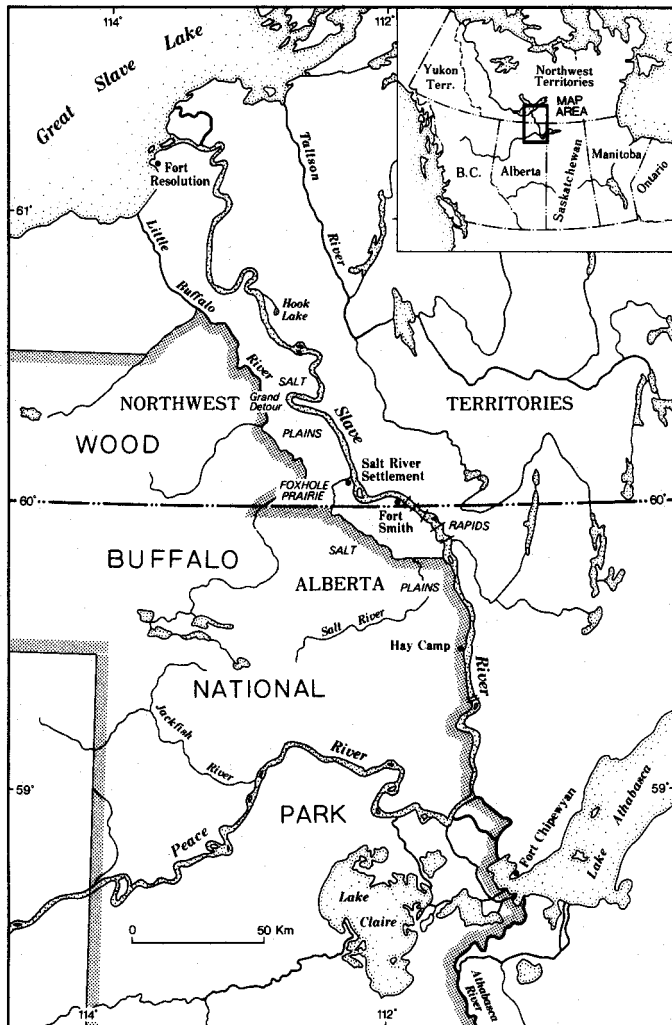


FIG. 1. Wood Buffalo National Park area.

credible, that some mortality appears to have prevailed among the large animals both moose deer as well as Buffalo in the Slave Lake direction, instances having occurred in tracing these animals during their hunting excursions of their being unexpectedly led to the Dead Carcase instead of seeing the living animal. This mortality some of them are inclined to extend to some geese — In this quarter such Phenomena have not been observed, the Indians, however consider the larger animals unusually lean [PAA, 1823].

A third reference from the 1831 post journal provides more detail on features of the mortality involved:

they all Complain they cannot kill the Animals, and there is Reports among them that they have frequently found both Moose & Buffalo dead this Summer tho quite Fat, and upon questioning them about it it appears there is some Truth in what they assert, for all those found Lifeless were frothing at the Mouth and Nose. Several of the Indians in hunting, and when they expected every Instant to get a Shot at the Animals, came upon them already killed to their Hands a few minutes before, the Distemper on their Nose chokes them, they run a Short Distance half distracted kick & toss about and fall lifeless in a few Minutes. It is needless to state the Natives will never make use of them when found, nor even Skin them. At the post of Isles a la Crosse upwards of Twenty Dogs were carried off this Summer by this same disease [HBCA, 1831-32: entry of 7 September 1831].

Subsequently this journal cites correspondence from Fort Vermilion noting the occurrence that summer of a similar mortality among the large animals of that area (HBCA, 1831-32: entry of 10 September 1831).

Oral tradition from the Fort Smith area also provides an example of sudden mortality among the bison of the area. Lavolette recalls the story passed on by the late Germaine Tourangeau and others, a story told to them when they were young men by the late Chief Pierre Squirrel, who was then an elder himself. Chief Squirrel said that when he was a young hunter, there were many wood buffalo. "Then one summer season the bison died off so quickly at Foxhole prairie that the bones were almost side by side" (Lavolette, 1989). "That big Salt Plain was just black with dead wood buffaloes" (Louis Brown, pers. comm. 1985).

These sources provide evidence of mortality but do not allow diagnosis of the cause or causes of these mortalities. All these instances comment on the suddenness of the deaths but only the 1831 quotation provides any data on the symptoms of the stricken animals. Significant also is the type of information excluded. These sources do not make reference to conditions that would have indicated drowning; nor do the pursuing hunters mention lightning strikes, which can cause isolated deaths among wildlife. The 1821, 1823 and 1831 reports indicate that the animals affected were not isolated cases. Only in the instance documented by oral tradition is it suggested that the mortality was massive, and here the element of exaggeration that often accompanies anecdotal narratives must be considered. All instances note that the mortalities occurred during the summer. The written records provide specific data on the year of occurrence but, with the exception of the 1821 case, are vague about the location. The oral tradition, on the other hand, provides a specific location but is silent on the question of the year. This content of the sources is, of course, related to the type and purpose of these narrative events.

THE HISTORICAL SOURCES

Contextual materials outline the type and purpose of these historical records as well as providing clues to some of the missing data. The trading post journals were part of the official records of the post. They were written by a clerk or the chief trader with the intent of documenting the daily activities of the post's employees as well as the arrival of persons and goods at the post. Other matters to do with the life of the post, if not specifically with its business, were also recorded. Conditions and events in the surrounding area were often not directly experienced by journal writers, who themselves did not make regular, if any, trips into the post's hinterland. Thus, such phenomena were likely to be recorded only if Native people reported them to the post and if the journal keeper anticipated that they would have an impact on the business of the post.

Sudden or extensive mortality among major species used for provisioning the post was definitely an event likely to be recorded. Chronic diseases occurring at low frequencies were much less likely to be considered worthy of note. The particular mortalities documented here occurred during the summer hunt, which provided the processed meats with which the brigades were fed. Local hunters would certainly offer some reason to the trader for their lowered rate of success in the harvest. It is notable that the journal writers for both 1823 and 1831 specifically attempted to corroborate the story, probably

to ensure that the hunters were not simply offering excuses for a reduced effort. The journal writer would also certainly record this phenomenon as justification for any subsequent failure of the post to meet the quota of processed provisions. Since the critical point was the fact of mortality as a potential danger to the success of the summer hunt, details of pathology and symptomology could be and were omitted. Unfortunately, this lack of detail makes it impossible for present-day researchers to diagnose the disease involved.

The oral tradition of relating stories about past events serves a different purpose and so operates under different constraints. In nonliterate societies oral tradition was the major mechanism for teaching others, particularly the young. Indeed, it still is important, even if this function is now obscured by today's emphasis on formal education. Frank Laviolette, the adopted son of Chief Pierre Squirrel, notes that Chief Squirrel's house at Salt River Settlement was a place where many young hunters stayed overnight on their way to or from the bush. Chief Squirrel would share his experience and knowledge with the young men. While the young hunters learned much through their own observation and experience, knowledge about events that might happen but once in a generation or two was only available through the elders. The transmission of knowledge, not calendrical dates, was significant in this tradition. It is unfortunate that more information on the symptoms displayed by the bison has not been preserved. Nonetheless, when anthrax broke out in the 1960s, Frank Laviolette and others (Laviolette, 1990:121) remembered the story passed down from Chief Squirrel and suggest that the research done then simply put a name to a disease the bison had already experienced and to which they were possibly already adapted.

Information on the specifics of location, dates, etc., may be garnered through other contextual information. The 1823 and 1831 post journal references were vague about location, unlike the 1821 reference, which indicates the banks of the Peace River as the location of some mortality. This contrast is not entirely due to happenstance. As summaries of the summer's events, the 1823 and 1831 references omit the variable details of location; but the 1821 reference is the entry of the day on which the two Fort Hunters report the mortality among the bison. This 1821 location can be further defined. It is fairly clear from the pre-1840 Fort Chipewyan journals as a whole that Jackfish River was about as far west on the Peace as any Fort Hunter would travel to hunt game for the fort, so we infer that the area indicated was somewhere along the lower Peace between its confluences with the Slave River and the Jackfish River.

In the 1823 quotation James Keith notes that most of the mortality occurred "in the Slave Lake direction," i.e., towards Fort Resolution, as opposed to "in this quarter," i.e., in the Fort Chipewyan area. This description suggests a location somewhere between Fort Chipewyan and Slave Lake but outside the actual Fort Chipewyan hunting area. Since a number of the people coming into Fort Chipewyan mention the event, it seems likely that this location is not too distant from the Fort Chipewyan hunting area. The dividing line of the contiguous Fort Resolution and Fort Chipewyan hunting areas was near the rapids on the Slave River, i.e., near the present-day location of Fort Smith. We might conclude, then, that this mortality mainly occurred north of the portages but not at too great a distance. This description accords rather well with the location of a major bison hunting ground, the Salt Plains of the Grand Detour-Salt River Settlement area.

In the 1831 quotation the moose and bison mortality occurs within the Fort Chipewyan hunting area. The summer hunt was conducted over a fairly wide area, so this mortality could have occurred north of the Peace River, up the Athabasca River or on the Birch Mountains. The reference to Fort Vermilion is equally nonspecific, although we do know that by the summer of 1831 Fort Vermilion had moved to its present location (HBCA, 1830-34: letter of Dease to chief factors and chief traders of the Northern Department, dated Dunvegan, 4 October 1831).

The event described in the oral tradition locates the mortality on the Foxhole Prairie (see Fig. 1). The date of this event, however, can only be estimated. Chief Squirrel died in 1939 (St. Joseph's Parish Records, Funeral Register, 1939). At that time his age was estimated by the priest to be 91 and by the local people to be about 102. This puts his birthdate between 1837 and 1848. According to Laviolette, at the time of the bison die-off, Chief Squirrel was apparently a young hunter in his twenties or thirties working for Beaulieu out of Salt River Settlement. Thus, the earliest this event could have taken place would have been in the late 1850s, but the 1860s and early 1870s are also a possibility. We can find no reference to such an incident in the few extant records from Fort Resolution or in the better represented but still incomplete Fort Chipewyan series.

IDENTIFYING THE DISEASE: AN HYPOTHESIS

Although the lack of detail in these quotations precludes identification of the cause or causes of mortality operating in these instances, we would like to discuss briefly one hypothesized cause: anthrax. Other possible causes, such as clostridial diseases (E. Broughton, pers. comm. 1989) and rabies (R. Ruttan, pers. comm. 1990) could be explored.

The rapidity of death in these instances and features of the 1831 case are reminiscent of anthrax. The following description of this disease relies on Choquette and Broughton (1981). Anthrax, caused by the organism *Bacillus anthracis*, is characterized by the rapidity of its onset and progress to a usually fatal conclusion from septicemia. It can potentially affect any mammalian species but is most frequently documented among herbivores. Herd animals such as bison are particularly vulnerable. More solitary herbivores, such as moose, may be affected but apparently rarely so. In the anthrax outbreaks in the park area in the 1960s and 1970s, for instance, some, but not many, moose died (Choquette and Broughton, 1981:289). The equal weight apparently given to moose and bison mortality in two of the historical quotations may be seen, in fact, as evidence *against* the identification of the disease as anthrax. Dogs and geese were also linked to these mortalities. Dogs are generally considered to be quite resistant to anthrax, although cases of anthrax outbreak have occurred where kennelled dogs have been fed on the meat of animals that have died of the disease (Jobb and Kennedy, 1963:299). Geese are apparently not vulnerable to anthrax at all.

Anthrax infection may occur in acute, subacute and peracute forms. In the peracute sequence, an apparently healthy animal dies with or without final seizures. The animal may experience choking or dyspnoea shortly before death and after death a bloody froth may issue from the nostrils and other bodily orifices. The 1831 quotation documents a similar course of choking, a final seizure and then death of animals seemingly in good condition. A froth at the nose and mouth was observed.

The 1823 quotation does not provide such detail but it emphasizes the suddenness of the deaths. Like the 1831 case, it implies that the hunters did not see any indication of weakness or illness in the sign of the animals they were tracing. The 1823 quotation also makes a connection between the mortality in the Slave Lake direction and poor condition among the animals in the Fort Chipewyan area, possibly indicating some more generalized environmental stress.

Anthrax involves two stages: a vegetative or active stage in which the bacillus is in the blood and tissues of an animal; and a spore stage brought about by exposure to air. The vegetative form is fragile but the spore is quite resistant. It can live in certain types of soil for as much as 60 years. Environmental conditions are considered extremely important in the persistence and outbreak of anthrax in any particular area (Choquette and Broughton, 1981; Van Ness, 1971). The ecology of anthrax in the Slave River Lowlands downstream from Fort Smith merits special attention. This Salt River Settlement - Grand Detour - Hook Lake area was a focus of the 20th-century anthrax outbreaks; it is identified as the location of a massive mortality in the mid-1800s by oral tradition; and it is indicated as a location of mortality in the 1823 case from the Hudson's Bay Company records. The latter two are assuredly only hypothesized to have involved anthrax, but a history of sudden mortality in one area is certainly thought provoking.

The possibility that anthrax may have a longer history in the park area than generally recognized suggests that additional research on the ecology and epidemiology of anthrax in the Slave River Lowlands is yet required, particularly in light of current programs for bison management. If the mortalities documented in the historical records are attributable to some other cause, these quotations may yet be of interest with respect to the population dynamics of the northern bison.

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