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Alaska's indigenous muskoxen: a history

Peter C. Lent

Box 101, Glenwood, NM 88039, U.S.A.

Abstract: Muskoxen (*Ovibos moschatus*) were widespread in northern and interior Alaska in the late Pleistocene but were never a dominant component of large mammal faunas. After the end of the Pleistocene they were even less common. Most skeletal finds have come from the Arctic Coastal Plain and the foothills of the Brooks Range. Archaeological evidence, mainly from the Point Barrow area, suggests that humans sporadically hunted small numbers of muskoxen over about 1500 years from early Birnirk culture to nineteenth century Thule culture. Skeletal remains found near Kivalina represent the most southerly Holocene record for muskoxen in Alaska. Claims that muskoxen survived into the early nineteenth century farther south in the Selawik - Buckland River region are not substantiated. Remains of muskox found by Beechey's party in Eschscholtz Bay in 1826 were almost certainly of Pleistocene age, not recent. Neither the introduction of firearms nor overwintering whalers played a significant role in the extinction of Alaska's muskoxen. Inuit hunters apparently killed the last muskoxen in northwestern Alaska in the late 1850s. Several accounts suggest that remnant herds survived in the eastern Brooks Range into the 1890s. However, there is no physical evidence ot independent confirmation of these reports. Oral traditions tegarding muskoxen survived among the Nunamiut and the Chandalar Kutchin. With human help, muskoxen have successfully recolonized their former range from the Seward Peninsula north, across the Arctic Slope and east into the northern Yukon Territory.

Key words: archaeology, cryptozoology, Eskimo, extinction, hunting, Pleistocene.

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Introduction

My purpose is to bring together information from several unpublished sources as well as published material regarding the indigenous muskoxen of Alaska and adjacent Yukon Territory with emphasis on the nineteenth century. Before turning to muskoxen of the Holocene I will treat briefly Alaska-Yukon muskoxen of the Pleistocene. Localities mentioned in the text are shown in Fig. 1.

Pleistocene history

The first dispersal eastward out of Asia into the area of Alaska and the Yukon Territory occurred during the Illinoian glaciation, 150 000 to 250 000 years before present (BP). A portion of a skull found in a gravel outwash of Illinoian age near Nome, Alaska, provides the best evidence for this early invasion (Harington, 1970, 1977). The habitat in the area around Nome was apparently a dry steppe or steppe-tundra. Other skeletal remains from muskoxen thought to have lived during this period have been found in the Fairbanks area. During the late Pleistocene *Ovibos* lived amidst a rich array of large herbivore species across the vast belt of cold, arid grasslands which stretched during glacial periods all the way from eastern Europe to just east of the Mackenzie River in northern Canada. The wool-

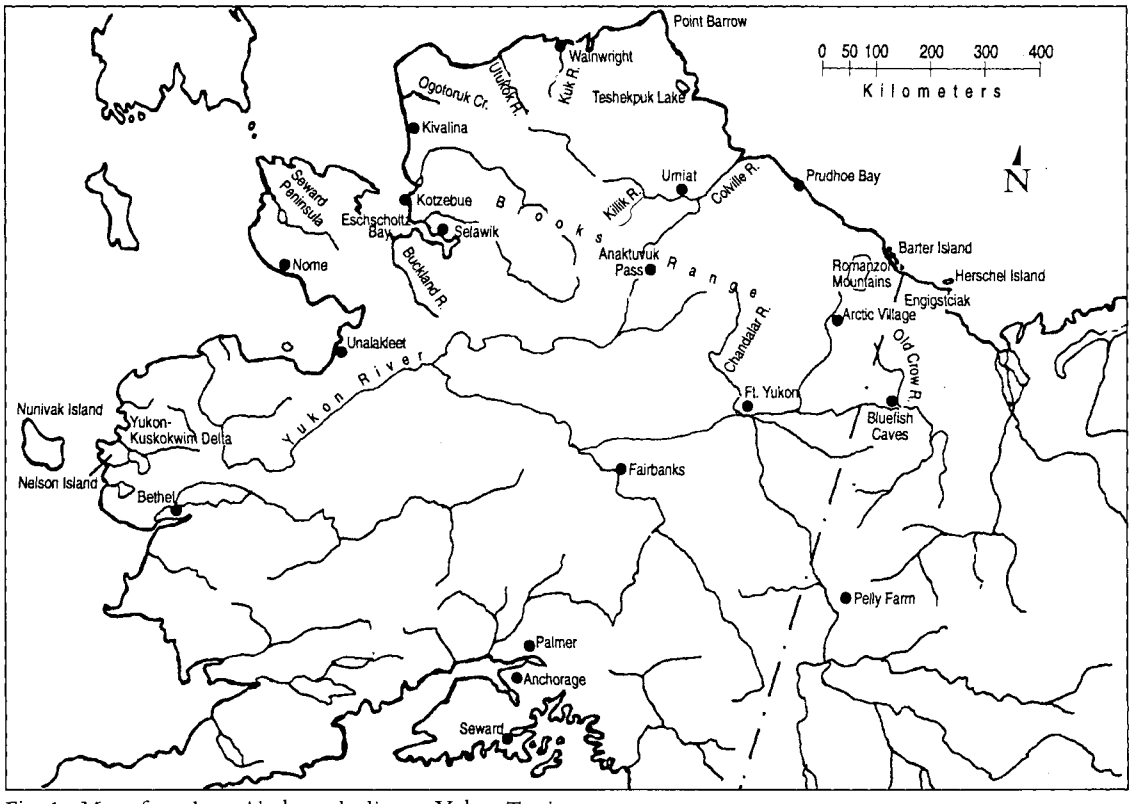

Fig. 1. Map of northern Alaska and adjacenr Yukon Territory.

ly mammoth (*Mammuthus primigenius*) was a widespread and dominant species of this steppe environment. Its relatively common fossil remains serve as indicators of the past presence of these Pleistocene steppe communities, the «mammoth steppe» as Guthrie (1982, 1990) has called it.

Although this Pleistocene steppe environment was generally an arid one with rather sparse plant cover, the primary productivity was apparently much higher than in modern tundra communities. Grazers predominated in the mammoth steppe, based on what we know from the comparatively well studied Late Pleistocene sites of Interior Alaska. Among the thousands of fossil remains from four sites near Fairbanks analyzed by Guthrie (1968), bones of the extinct steppe bison (*Bison priscus)* were most frequent. Two other grazers, the horse (*Equus* spp.) and the woolly mammoth, were next in abundance at all sites. The caribou (*Rangifer tarandus*) and muskox ranked a distant fourth and fifth in overall abundance, comprising only a small proportion of fossil elements at any site. Ovibos accounted for a little over 6% of the estimated remains at one of the sites but occurred in much lower frequency at the other three. The extinct helmeted muskox (*Bootherium bombifrons*) occurred in «trace» numbers. Moose (*Alces alces*) made up nearly 5% of individuals at one site but <1% at the other three. Guthrie estimated that overall grazers comprised 94 to 98% of the biomass of large mammals in these assemblages.

The fossils uncovered at another late Pleistocene site in east central Alaska, estimated to be approximately 30 000 years old, represented at least 11 Dall sheep (*Ovis dalli)*, three steppe bison, two caribou, one small «Yukon horse» (*Equus lambei*) and one moose (Porter, 1986). Neither *Ovibos* nor *Bootherium* occurred at this site. Porter (1988) also analyzed finds from Lost Chicken Creek where *Bootherium* was present in small numbers but the occurrence of *Ovibos* was questionable. Harington (1997) found tundra muskoxen to be relatively abundant along with Dall sheep at one site in the Sixtymile area of the Yukon, just across the border from Alaska. Animals in this assemblage lived around the peak of the last glaciation (21 000 BP).

Overall, however, low rates of occurrence of muskoxen are the rule, consistent with the evidence from Eurasia.

The mummified remains of Pleisrocene mammals provide another source of informarion about these faunas. The frozen, desiccated remains of ice age mammals have attracted immense attention and scientific interest for at least two centuries. About 50 examples of soft tissue from Pleistocene mammals have been found in Siberia alone (Dubrovo, 1990). Of these, mammoths have been most commonly reported; 12 to 15 good specimens are documented, including two calves. Over the years northerners have also found four or five woolly rhinoceros (*Dicerorhino* sp.), three steppe bison, at least two horses, two helmeted muskoxen, wolverine (*Gulo* sp.) and several smaller mammals, and limbs and other body parts of several stag elk (*Alces latifrons*) and caribou (Guthrie, 1990). One report makes mention of a whole muskox body discovered on Laikhof Island, one of the New Siberian Islands (Allen, 1913). Another apparent example of a preserved muskox (*Ovibos*) was found on Eschscholtz Bay, Alaska in 1828. I will say more about this specimen later.

Of course, many factors besides the relative abundance of living representatives contribute to the likelihood of a mammal being preserved and subsequently discovered and reported. For example, caribou seem to be poorly represented; perhaps some finds of this species are never reported because the Pleistocene forms are not noticeably different from the living species. Nevertheless, the finds of ice age mummies are consistent with my contention that *Ovibos* was not particularly common in the Pleistocene.

In the Pleistocene steppes numerically dominant migratory species exploited the expanses of grasslands and mixed seasonally with smaller numbers of more sedentary, residential species. Presumably, *Ovibos* persisted by occupying niches that these more abundant grazers were not able to exploit as successfully. *Ovibos* in Beringia apparently used a broad range of habitat types, ranging from wet lowland patches to river valleys and broken uplands. In that sense, their pattern of habitat use resembled that of the mammoths. However, muskoxen probably specialized in using relatively small patches of plant communities, such as those with mixed grasses, sedges and low shrubs in mesic locations. They would have sought out productive wet sedge communities, but these covered perhaps only 10% of the steppe landscape (Guthrie 1968, Bliss & Richards, 1982). Although these communities were among the most important to muskoxen, they were also used by caribou and mammoths and to a lesser extent by other large herbivores. Muskoxen also would have used smaller patches of windblown habitat in winter, perhaps those in hilly topography, as they do today. Although critical for survival these would have been relatively unproductive.

Despite the fact that no assemblage of paleontological or archaeological material from any Pleistocene or early Holocene site has revealed a high abundance of muskoxen there is a perception in the popular literature and even among some paleontologists (Anderson, 1984a) that the muskox must have been highly successful and considerably more abundant during the ice age. Bliss & Richards (1982) attempted to estimate the numbers of large herbivores that might have once roamed over the rangelands of Beringia, based largely on densities of large herbivore species in present day arctic and subarctic ecosystems. They concluded that a typical 1000 km^2 of this hypothetical Beringian landscape would have contained 840-1605 muskoxen (0.8-1.6 individuals km^{-2}), as well as many horses, a few hundred each of bison and moose, 1320-2700 caribou, and 43-61 mammoths. According to these estimates the biomass of muskoxen exceeded that of any other large herbivore species and only caribou were more numerous.

Such figures are untenable. They promote the false image of the muskox as ubiquitous and abundant, dominating ice age ecosystems. Even accepting the greater diversity of plant communities and the generally higher primary productivity in the mammoth steppe compared to existing tundra rangelands, the matter of competition must be given greater attention. The Holocene tundra biome and boreal forest, with their impoverished large mammal faunas, are not valid models for their intended purpose. Calculations based solely on present day ecosystems also ignore the presence of several extinct large herbivore species, including Bootherium, which occurred as far north as Point Barrow during interglacials. In addition, in communities where permafrost was absent the density and variety of small and medium sized mammalian herbivores, many of rhem burrowing forms, greatly exceeded that of tundra communities.

Overall, the competition for forage and the limited extent of suitable habitats held muskox densities in Pleistocene environments to a fraction of that

estimated by Bliss & Richards, probably less than 0.25/ km^2 overall. This density is comparable to that presently occurring on Low Arctic ranges of mainland Canada. My rough estimate is based on suppositions that muskoxen were numerically abundant on only a small portion of the mammoth-steppe landscape, probably less than 20% of the area and that their relative proportions among Pleistocene remains is in rough relationship to their relative abundance in these communities.

The above findings suggest that, contrary to popular belief, the tundra muskox was a relatively uncommon large herbivore in Pleistocene ecosystems. Obviously, in limited areas where favorable conditions existed muskox densities would have reached or perhaps slightly exceeded values seen in the most productive tundra ecosystems. Even before the arrival of humans in North America the muskox was not an abundant species in interior or northern Alaska. Finds of fossil *Ovibos* are most frequent from the middle and upper Yukon River drainage, along the northern coast of the Yukon and Alaska as far south as Norton Sound. and along rivers draining the central portion of the Alaskan Arctic Slope such as the Itkillik, Colville and Meade (Harington, 1961; Geist, 1962). Presumably there were opportunities for interchange between muskox populations in the Alaska-Yukon region and those farther east at least prior to the establishment of human hunters in the region of the lower Mackenzie River. In a brief comparative study Harington (1970) found no significant differences between fossil specimens found in the Yukon Territory and Alaska and skulls of recent muskoxen of mainland Canada.

Holocene history

We have no direct evidence for the contraction in the range of *Ovibos* and its shift to occupancy of the newly developing tundra ecosystems as the Pleistocene passed. We can only guess at these events based on our rather uncertain understanding of the changes in landscapes and vegetation at this time. Evidence for utilization of muskoxen by hunters prior to about 2000 years ago is exrremely limited and comes largely from the area of the present Yukon Territory. At the Pelly Farm site, skeletal material representing three muskoxen may be approximately 5000 years old (MacNeish, 1964). Another very old muskox hunting site occurs at Engigstciak, where hunters apparently often waited for caribou and other game on a hilltop near the mouth of the Firth River. Reintroduced muskoxen now roam this same area within Ivvavik National Park. MacNeish, (1956) claimed the site was occupied as early as 8000 years BP, but evidence of muskox hunting seems to be more recent, put at about 3250 years BP by Harington (1977).

Later, people of the Birnirk culture occupied coastal areas in northwestern Alaska from 600 to 900 AD. The Birnirk people on the Alaskan mainland had not yet developed technology for whaling to the point of the later Thule culture Inuit; nevertheless they subsisted in large part on marine mammals. In addition to focusing on marine resources, they continued to use caribou and, sporadically, muskoxen as well.

At archaeological sites near Point Barrow and Wainwright, Ford (1959) found scattered items demonstrating use of muskoxen by Birnirk Period inhabitants. Birnirk people possessed muskox robes; some were apparently buried in them. They also used ladles and spoons of muskox horn. Evidence of muskox exploitation ranged from early Birnirk, about 1500 years ago, into the era of Thule culture as recent as 200 to 300 years BP. Thus, hunting of muskoxen and use of muskox implements continued through the transition from Birnirk to Inuit (Thule) culture. However, the digs revealed only intermittent and minor use, never large scale exploitation. At the Walakpa site near Barrow Stanford (1976) also found only rare (less than 1% of bone fragments) occurrence of muskoxen. Here also, however, evidence of muskoxen exploitation occurred at all three principal levels: Birnirk, early Thule and late Thule.

About 480 km southwest of Barrow, Inuit living at a coastal site on Ogotoruk Creek also used muskox horn implements; one dates to roughly 200 years ago. The people of this remote settlement engaged in taking guillemots (*Uria* spp.) and other birds and bird eggs at the nearby sea cliffs and in hunting caribou. Apparently, they rarely encountered muskoxen, for the excavators identified only one muskox bone out of more than 2000 skeletal parts of vertebrates (Hadleigh-West, 1966). Geist (1961) also found a few muskox bones in the Ogotoruk area and Pruitt (1966) reported an unfossilized muskox horn core found along the beach near Cape Thompson. With one exception, the finds in the vicinity of Ogotoruk Creek represent the most southerly records for «recent» remains of muskoxen along the Alaskan coast. A muskox skull apparently of recent age was found at Heart Cave inland from the village

of Kivalina (approximately 80 km southeast of Ogotoruk). According to Giddings, who examined this cave in 1959, «[the] skull of a young musk ox looked fresh where it lay on the cave floor» (Giddings & Anderson, 1986). The following year his assistants dug a broad trench in the entrance to the cave. Caribou and muskox bones were plentiful in the upper centimeters, the remainder of the trench was sterile. The published notes are inadequate to determine whether the bones represented one or possible more individuals, but it is reasonably certain that only one skull was evident. Unfortunately the archaeologists visiting this site gave this unique specimen little attention. Subsequently, the skull was removed from the cave by a school teacher and lost on the tundra near Kivalina (E. Burch Jr., pers. comm). Thus the mystery regarding this skull remains.

Were Inuit farther south along the western coast of Alaska ever hunters of muskoxen? Neither archaeological studies nor oral history provide clear evidence of such utilization. However, at Elephant Point, on Eschscholtz Bay, the Beechey party found the remains of a muskox in 1826. Earlier explorers had visited this site, about 50 km southeast of the present town of Kotzebue, and reported well-preserved remains of mammoths and other species of mammals in the frozen silts of the sea cliffs. When the site was visited by the Beechey party other skeletal material and portions of carcasses lay in the waters of the quiet bay in proximity to the eroding cliffs (Beechey, 1831). These finds included a muskox and caribou as well.

Buckland (in Beechey, 1831) who examined the specimen brought back to England by Beechey, considered that the muskox was contemporaneous with the caribou and that these were remains of recently dead animals that had washed into the bay, mixing with those of fossil species coming down into the waters from the eroding cliffs. Regarding the muskox find, he concluded that, «..the condition of the skull and horns ... differs so essentially from the condition of all the bones of elephants from this place, that it is impossible it can have been buried in the same matrix with them ...» The head was said to be so lightly decayed that it «had not long since been stranded by the waves» (Buckland, Appendix to Beechey, 1831, p. 336). Incredibly, Buckland chose not to provide an engraving of the muskox head in his contribution because it was not a fossil! My efforts to locate this specimen in the U.K. have been unsuccessful. Captain Beechey (1831) interviewed (without a good interpreter) natives who came from up rhe Buckland River, which flows into Eschscholtz Bay from the base of the Seward Peninsula. He concluded that they were familiar with the species, recognizing the specimen and an illustration of a muskox.

Buckland's argument for the distinctive freshness of the muskox specimen is less than convincing in light of his comments on one other find. He refers to the horn of an «ox» (not a muskox) that was said to have been found in a state equally fresh with the head of the muskox and also recently cast up on the shore. However, it is even less likely that this horn sheath was derived from an animal then living in western Alaska. According to Lydekker (1898), the «ox» in question was a Pleistocene bison, *Bison priscus*. Reverend Buckland's comments and analysis were certainly influenced in part by a continued hesitancy on the part of the scientific community to accept that «elephants» (mammoths) and arctic species such as caribou and muskoxen could have once lived together under the same climatic conditions. Buckland, for example, also declared that the bones of Pleistocene animals found in a cave in Wales had been swept in through the entrance during the biblical flood, and he was convinced that the skeleton of a young man of Paleolithic antiquity uncovered in the same cave was that of a woman buried there by the Romans (Stern, 1969).

Quakenbush (1909) carried out a more detailed investigation of the Elephant Point site and a reconnaissance for fossils along the Buckland River. He located fossil material from muskoxen in both areas and found mammoth bones and mammoth hair in the bluffs. He concluded that the material considered by earlier visitors to have washed into Eschscholtz Bay was in fact derived from the eroding bluffs or, in the case of caribou, had been left by hunters. The brief comments by Beechey and conclusions of Buckland have been used as evidence that muskoxen inhabited the Kotzebue Sound - Seward Peninsula region in the early nineteenth century (Smirh, 1987). However, in light of later findings, such as those of Quakenbush, and in the absence of any corroborating evidence from archaeological or ethnographic sources, I consider it most likely that the Elephant Point muskox represented a particularly well preserved «mummy». It seems improbable that muskoxen were still living in this area in the nineteenth century. The people from the Buckland River could well have been familiar with

muskoxen from travels farther north or through trade.

In the northern part of Alaska the Thule whaling culture was well developed by around 900 AD. These people lived in larger communities than the earlier Birnirk culture, aided by technology that allowed increased specialization for whaling. An increasingly complex and affluent society developed (Sheehan, 1985). Even if exploitation of the low numbers of muskoxen was only occasional these larger, more stable populations could have had great impact.

Especially after 1200 AD, the numbers of Inuit living in interior portions of northwesrern Alaska increased. These were caribou hunters who lived a largely nomadic existence. As late as the late nineteenth century these people, known broadly as the Nunamiut, lived in small bands in the Brooks Range and tundra region of northwestern Alaska. Substantial contact between Inuit of northern Alaska and westerners did not occur until the 1840s and 1850s, although trade goods from Siberia had been known in northern Alaska since about the end of the 17th century. Near the end of the 19th century the Nunamiut were decimated by influenza. Dispersal and mixing of the survivors with people of coastal settlements followed (Spencer, 1959).

Some of the remaining Nunamiut eventually regrouped in Anaktuvuk Pass at a site strategically located for intercepting the annual migrations of caribou through the Brooks Range. Despite the devastating changes resulting from contact with westerners the Nunamiut Eskimos of Anaktuvuk Pass retained a rich folklore based on hunting experience and information passed down from generation to generation. When first interviewed by anthropologists and biologists at this settlement in the 1950s, only one living Nunamiut had ever seen a live muskoxen. This aged hunter had traveled as a youth beyond the Coppermine River in Canada, 1000 km to the east. Nevertheless, the surviving oral traditions included specific knowledge about muskoxen (Rausch, 1951; Gubser, 1965).

The traditional muskox hunting areas known to the Nunamiut lay in the northern foothills region along the Colville River above Umiat and near where the Colville is joined by the Killik River, as well as on the lower Anaktuvuk River. In the early decades of rhe nineteenth century Nunamiut people lived in scattered, mobile bands in these areas, particularly in the Colville Rivet drainage (Hall, 1978; Burch, 1977).

A legend regarding muskoxen and the people of the Killik River region was srill being told in the 1950s. Two versions both involve a menstruating girl. The young woman violated taboos by not remaining hidden while menstruating. In one version she looks upon a hunter driving muskoxen toward the camp, and thus both the hunter and the muskoxen are turned to stone. The Nunamiut storytellers still knew the location of these rocks in the 1950s. Such associations of stories and places helped to keep these folk tales alive, reflecting ties with the land going back many generations (Ingstad, 1954).

The Nunamiut had available a wider variety of resources and raw materials than did some of the Inuit of the Canadian High Arctic. Driftwood was abundant and Nunamiut hunters frequently penetrated the northern fringes of the boreal forest. They had access to products from a variety of marine mammals and even to trade goods from Siberia. Thus, horn and bone from muskoxen must have been of less critical importance here compared to the High Arctic. But the coastal Eskimos certainly valued Dall sheep horn (Spencer, 1959). Surely, muskoxen horn would have been equally prized and perhaps at one time easier ro obtain than sheep horn? Nunamiut informants also stated that muskox skins were valued (Gubser, 1965). Perhaps the greatest importance of muskoxen was as a food source when the migrating caribou failed to come as expected. At times of such crises hunters could seek out the more sedentary muskox herds at locations known by tradition. The muskoxen would thus be a «critical resource» in the sense of Wilkinson (1975), aiding survival during relatively short period when other resources, such as caribou, failed. At least one Nunamiut informanr actually suggested that heavy hunting had been responsible for the disappearance of muskoxen from northwestern Alaska. The muskoxen were said to have disappeared or gone eastward (Ingstad, 1954), a statement made also with regard to caribou when they were scarce.

Dall sheep have continued to play a role as a critical food resource when caribou were unexpectedly absent. They are prized in spring time because, like the muskox, individuals often still possessed substantial body fat at a time when caribou had depleted their subcutaneous reserves. After the decline in caribou and the extirpation of the muskox overharvesting led to a marked decline in Dall sheep numbers in the late nineteenth century (Campbell, 1978).

Because of the lack of corroborating archaeological evidence, Wilkinson (1975) believed that the Nunamiut informants interviewed in the 1950s had exaggerated the importance of muskoxen to their ancestors. The archaeological evidence for exploitation of muskoxen in the mountains and foothills of northern Alaska continues to be basically non-existent. Twentieth century Nunamiut stated that they have often found unfossilized horns or skulls of muskoxen in their travels in the Brooks Range and northern foothills, but only a skull collected on Tulugak Creek has been specifically documented (Rausch, 1951).

Most muskox skulls of recent origin have been found on the tundra or associated with old habitations closer to the coast, including on Herschel Island, in the Colville River Delta, near Teshekpuk Lake, along the lower Meade and Kuk rivers and in the vicinity of Wainwright (Allen, 1913; Bee & Hall, 1956; Chesemore, 1980). Early traders and explorers found ample evidence that muskoxen had been recently hunted and used by Inuit along the northern coast of Alaska. Charles Brower, the first trader at Point Barrow, reported finding both bones and pieces of skin in association with old dwelling sites. Similarly, Stefansson collected hides, skulls and bones from house sites (Allen, 1913).

Hunters from a coastal Inuit settlement killed the last known muskoxen in northwestern Alaska just prior to the upheaval that struck Inuit society starring in the 1860's. This last muskox hunt probably occurred in 1858. Both Brower and Stefansson provide similar versions of this event, told by an Inuk named Mangi (Mangilanna) who died in the winter of 1899-1900. Srefansson's version is as follows:

"About 1858 there was a scarcity of food in winter at Cape Smythe [Point Barrow]. Mangi's father and other hunters went inland looking for caribou «...and some distance up the Kuuk [Kuk] River which flows into Wainwright Inlet, they fell in with a band of 13 muskoxen and killed them all. Since then no one near Point Barrow is known to have killed muskoxen or seen them" (Allen, 1912, 1913).

The mouth of the Kuk River lies near the present village of Wainwright. A tributary of the Kuk River that enters it a few miles inland is known as Omikmak Creek, a name derived from the Inupiat word for muskox (Hornaday & Brower, 1911; Allen, 1912, 1913). These reports and the specimens found by the first explorers and traders confirm that Inuit in northern Alaska were still occasionally taking muskoxen in the first half of the nineteenth century. Taken together with the archaeological finds of Ford, Hadleigh-West, and Stanford, described earlier, they provide evidence of continued, if erratic, use of muskoxen by people living along the coast of northwestern Alaska for at least 13 centuries (500 to 1850 AD). Hunters killed this last band in northwestern Alaska before the introduction of effective firearms (Sonnenfeld, 1960).

Farther east in the Alaskan Arctic marine mammal resources were more limited and the human population correspondingly lower. One small coastal village (Kaktovik) and a few sires of seasonal or shorr-term occupancy existed at the time of first European contact. Nunamiut may have been living inland in the eastern Brooks Range during certain periods, but the evidence for this is both sketchy and controversial (Anderson, 1984b). Athapaskan (Kutchin) Indians who lived south in the northern edges of rhe raiga on the south side of the Brooks Range were principally hunters of caribou. The Chandalar Kutchin, also encountered muskoxen on the northern fringes of their hunting grounds according to information they related to McKennan (1965). Kutchin hunters sought caribou and Dall sheep in the rugged rerrain of the Brooks Range, where wind-swept hilltops rose above sparsely timbered slopes. According to the Kutchin, they also found small numbers of muskoxen in this high country. We know little about these muskoxen, other than what the Chandalar Kutchin learned from their ancestors: that a few muskoxen frequented the south side of the eastern Brooks Range in the nineteenth century. Oral traditions relating to hunting of muskoxen are sketchy, but informants believed that they were sometimes driven over cliffs. A small mountain near Smoke Creek, a tributary of the East Fork of the Chandalar River, southwest of the Kutchin settlement of Arctic Village, is called «Muskox Shirt Mountain» in the Kutchin tongue.

All told, however, the density of hunters in the eastern Brooks Range was lower than to the west (Anderson, 1984a). It is not surprising that the last few remnants of native muskoxen in Alaska apparently survived in this region. In the rugged, incised terrain with sheltered, productive valleys groups of muskoxen might have gone undetected for some time.

In the last decades of the century east-west movements of both Indians and Inuit intensified in northern Alaska. «Alaskan» Eskimos had been

involved in hunting muskoxen as far east as the Coppermine River and maintained ties with Inuit of the Mackenzie Delta area (Hone, 1934; Smith, 1984). Conversely, Athapaskan Indians from far to the east had on occasion moved into northeastern Alaska and hunted and mixed with the Kutchin people of Alaska. Alaskan Inuit often accompanied the whaling vessels. Further, the decline in caribou numbers in western Alaska, disease, starvation and social disruption caused migrations, primarily west to east.

With regard to the decline in caribou in northern Alaska there is still some question as to whether it started before the arrival of Europeans or was a result of the introduction of firearms and the demand for food by American whalers overwintering in the Arctic. In any case, the slaughter in western Alaska was immense in the 1880s and later to the east in the 1890s, as whalers progressed farther into the Arctic in search of new stocks. In the western Arctic of Canada, there is no doubt that taking of muskox occurred into the twentieth century. Whalers wintering at the Baillie Islands and Langton Bay, about 320 kilometers east of the Alaska border, received muskox meat and hides in trade, hunted some themselves and also obtained a few live muskox calves (Anderson in Allen, 1913; Bockstoce, 1986).

The demand for game meat led to increased exploitation of caribou in Alaska, but there is no unequivocal proof of procurement of muskoxen for or by whalers or traders. Only a few tantalizing bits of evidence suggest that some muskoxen might have survived into the era of commercial whaling in Alaska or in Canada west of the Mackenzie River. Turner (1886) reported that both the Inuit and Indians of northeastern Alaska were familiar with the muskox and that a few muskoxen might remain in or north of the «Rumiantzof» [Romanzof] Mountains. His remarks were apparently accurate, but unfortunately he gives no clue of what led him to mention the Romanzof Mountains specifically.

The naturalist, Andrew Stone, also referred to the Romanzof Mountains «...from which specimens of musk-ox are reported to have recently been brought, by way of Camden Bay» (Whitney, 1904:89). However, after visiting northeastern Alaska in 1898-99 and interviewing many Inuit, missionaries and traders, Stone concluded emphatically that no muskoxen lived in the region nor had any been seen or killed in recent years. Allen (1912) also concluded rhat the muskox hides to which Stone referred had actually come from east of the Mackenzie River. Campbell (1978) suggested that Chandalar Indians might have provided muskoxen hides to the Hudson's Bay Company via the early Fort Yukon trading post but provided no evidence for this. Stone, who made specific inquiries in the area, obtained no hint of any such trade.

However, some accounts exist that suggest Alaska's last native muskoxen survived in the eastern Brook Range. We are indebted to Irving McKinley Reed, a life-long resident of Alaska, for collecting these accounts. An engineer and early member of the Alaska Game Commission, he maintained an intense interest in muskoxen and their reintroduction into Alaska. Reed grew up in Nome, the most important port of call on the west coast of Alaska. As a youth in that town he talked to many men about their experiences in the Arctic.

One story related by Reed (1946) hints that muskoxen might have been taken in Northeastern Alaska by or for whalers wintering at Herschel Island, 60 miles east of the Alaska-Yukon border and only a little over 100 miles from the Romanzov Mountains. In 1906, while engaged as a blacksmith's assistant on Ophir Creek not far from Nome, he worked with a man who claimed to have hunted muskoxen from Herschel Island in the 1890s. It is quite possible that misunderstanding may have garbled this account and that the hunting may have actually taken place farther east. However, another bit of evidence also suggests that muskoxen might have been available to these whalers from some source. In a letter dated October 10, 1890, Marion (Mrs. Horace P.) Smith, wife of an arctic whaling captain, mentions to her mother that she had recently received a muskox skin robe. This letter is significant because it provides a more precise date, one that was prior to the time that whalers were penetrating past the Mackenzie River Delta and thus it seems unlikely (although not impossible) that the muskox skins had come from so far east (John Bockstoce, pers. comm).

According to other information collected by Reed, a band of Chandalar Kutchin killed a herd of muskoxen in mountainous terrain between Christian and the Sheenjek River in the eastern Brooks Range, in 1892 or 1893. An effort to locate the skulls of these last muskoxen was not successful (D. Klein, pers. comm.). If such a kill had occurred, neither meat nor hides would be likely to have gone north to Herschel Island and the whalers but rather south to the Kutchin settlements and trading posts.

Reed (1946) also related a story told to him by Henry Rapelle, a man who subsequently lived in Fairbanks for many years. In January 1895, Rapelle had been traveling by dog team along the Yukon River between the settlements of Circle and Eagle. He stayed overnight with an Indian family at the mouth of Charlie Creek. The old Indian man of this household possessed a head and hide of a young male muskox. He told Rapelle that he had shot it late the previous year up the Kandik River, having thought it was «a bear with horns». The Kandik flows southwest into Alaska from the Yukon Territory, joining the Yukon River about 80 km west of the international border. According to Reed, Rapelle was able to make an accurate identification of the muskox because he had previously spent time in the Canadian Arctic.

Reed suggested that the young male had been a lone survivor from the band killed in 1892 or 1893 and had wandered about 150 miles south down from the mountains into the edges of the taiga before meeting his end. This tale would seem implausible except that the events are remarkably similar to an occurrence documented in 1970, after the re-introduction of muskoxen into northeastern Alaska. A group released on the coast near Kaktovik on Barter Island scattered widely. One young male wandered alone about 250 km south over the Brooks Range and was shot by an Indian hunter from Arctic Village. The man had never seen a muskox before and later stated that he shot it from the rear thinking it was a bear (Lent, 1971). Certainly at a quick glance, perhaps of an animal fleeing through heavy brush, a muskox, with its long hait, coloration and loping «rocking-horse» gait might be confused with a grizzly bear. The muskox killed in the 1890s could plausibly have been a survivor from one of the last groups in the Brooks Range.

Based on conversations with informants in Nome, Reed related one final event in the history of Alaska's native muskoxen. In 1897 or 1898 two French Canadian trappers allegedly killed an entire herd, 18 head in all, east of Chandalar Lake on the North Fork of the Chandalar River, between Lake and Tobin creeks. This account, like the others cited above, has not been confirmed from other sources. Nevertheless, the details are consistent among the stories and wirh Turner's general statement. There was no apparent reason or incentive for informants to fabricate these accounts. Although not confirmed by the apparently thorough inquiries of Andrew Stone, the accounts are consistent: small numbers of muskoxen probably survived in the eastern Brooks Range until nearly the end of the nineteenth century.

All writers of the late nineteenth and early twentieth century and all archaeological and ethnographic sources are in agreement that the muskoxen of northern Alaska were extremely rare and nearly extinct prior to the arrival of Europeans and the availability of firearms. Were Alaska's muskoxen exterminated by aboriginal overhunting or were these last herds simply remnants in marginal habitat, unable to sustain themselves in the face of a warming climate?

But other technological innovations perhaps did play an important role leading to the final extinction of Alaska's muskoxen. The built-up sled pulled by dogs seems to have come relatively recently as a significant element in northern Alaskan Inuit life. Hall (1978) has compiled evidence suggesting that this technology and all its accoutrements (including pegged runner shoes, etc) did not become commonplace until about 1600. Even a relatively small team of three to five dogs allowed the hauling of heavy loads of meat and hides cross country for the first time. The expansion of the Nunamiut into the areas north of the Brooks Range in recent cenruries was facilitated by improved dog traction. The desire to maintain greater numbers of dogs probably put further pressure on the caribou population, and on inland and anadromous fisheries, and increased both access to and demand for furbearers (Hall, 1978). Muskoxen would have been particularly in demand in times of caribou scarcity or as emergency food during long sled journeys. In addition, coastal villagers had increased opportunities to hunt far inland with the aid of larger dog teams. New patterns of exploitation arose. Prior to these developments isolated groups of muskoxen were more likely to have survived far from the small centers of human habitation, and colonizing animals would have on occasion moved out from these groups. Human dispersal and the increased mobility of hunting bands might well have contributed to the final demise of Alaskan muskoxen.

Coastal Inuit also suffered periods of crisis with winter food shortages resulting from failure of whaling. Such crises occurred every 6 to 10 years, according to Spencer (1959). Minc & Smith (1989) characterized the period from 1780 to the early 1900s as cool and wet with high amplitude climatic fluctuations of longer duration - a time of great

year-to-year variability. This was a period of intensive, specialized focus on whaling, but the coastal inhabitants turned to trade and increased use of terrestrial resources when whaling failed. Such shifts to other prey might also have contributed to the extirpation of the last bands of muskox.

Some climatic change occurred in the late nineteenth and early twentieth century. For example, the Chandalar Indians report that moose were rare, almost unknown, in the Brooks Range and elsewhere in northeastern Alaska up until early in this century. Much of the area north of the Yukon River where spruce predominates today was said to be principally willow-covered shrublands in the mid-nineteenth century (McKennan, 1965). On the other hand, the Nunamiur told Rausch (1951) that their ancestors had long hunted moose in the Colville River drainage. Historical evidence suggests, however, that resident moose population have substantially increased in northern Alaska in this century.

Inuit themselves provided two opinions regarding the disappearance of muskoxen. «Mangi» told Charles Brower in 1888 that muskoxen had been abundant on the coastal plain until large numbers of caribou became evident (Brower, 1952). In contrast, a Nunamiut informant attributed the disappearance of muskoxen to hunting pressure by Inuit (Ingstad, 1954).

Conclusions

There is no clear evidence of climate change in the last centuries of sufficient magnitude to explain the extinction of Alaskan muskoxen. Climate fluctuations of greater degree had occurred prior to this reset Holocene period (Haworth, 1989). The most likely scenario is that muskoxen were restricted by competition and climatic factors to relatively limited areas in northern Alaska. Although the species had persisted for millennia in northern Alaska it was not abundant, probably surviving in small isolated populations. These were vulnerable to hunting by an increasing human population. Technological advances allowed greater stability in human numbers and greater mobility by Inuit hunters. The presence of a large Inuit population in the Mackenzie Delta area would have precluded recolonization of northern Yukon and Alaska by muskoxen from the population centers to the east of the Delta. Thus, my scenario differs from that of Wilkinson (1975) in that I believe hunting by Inuit and Indians could have led to the extirpation of Alaska's indigenous muskoxen even through the species did not serve as a staple resource for these people. One fact is certain: The success of the reintroduced muskoxen in northern Alaska demonstrates that extensive suitable habitat has continued to exist there.

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