

The Tenth North American Caribou Workshop,
Girdwood, Alaska, USA,
4-6 May, 2004.

8000 years of caribou and human seasonal migration in the Canadian Barrenlands

Bryan C. Gordon

Canadian Museum of Civilization, 100 Laurier Street, Gatineau, Quebec, J8X 4H2, Canada (bryan.gordon@civilization.ca).

Abstract: Caribou (*Rangifer tarandus*) are the common thread running through thousands of years of cultural evolution in northern mainland Canada. From the earliest Indian traditions, through the Pre-Dorset and Dene cultural evolution, up to historic times, the vast herds of migratory Barrenland caribou provided food, clothing and shelter. They determined the human cycle -- seasonal migrations, seasonal levels of fitness, and season of procreation. Caribou even permeated Dene mythology and supernatural beliefs. Within the Beverly caribou (*R. t. groenlandicus*) range in the Canadian Barrenlands, investigation of 1002 archaeological sites points to long-term stability of human band and caribou herd interaction. Caribou bone and hunting tools occur in multiple levels, the earliest to 8000 years, based on 131 radiocarbon dates. Through time, specific hunting bands aligned with specific migratory barren-ground caribou herds. This relationship helps to explain observed archaeological and ethnological differences within different caribou ranges for these hunting bands. In general, biological evidence concurs with ethnographic and archaeological evidence. But short-term variations in migration routes between northern boreal forest, taiga and tundra may have followed changes in herd size and environment, e.g., unfavorable snow and ice conditions or forest fires. However, such influences were not discernible archaeologically.

Key words: Barrenlands, Beverly range, Canada, Dene, herd-following, hunters, migratory barren-ground caribou, Pre-Dorset, *Rangifer*, seasonality.

Rangifer, Special Issue No. 16: 155-162

Introduction and background

As a graduate student in archaeology in the late 1960s, I was asked to investigate stone tools collected by a team from the Calgary Zoo (Calgary, Alberta, Canada) capturing muskox (*Ovibos moschatus*) calves in the Thelon Game Sanctuary, Northwest Territories (Nunavut, as of 1999), Canada. The sanctuary is in the central Barrenlands between Great Slave Lake to the west, Hudson Bay to the east, the two Prairie Provinces (Saskatchewan & Manitoba) to the south, and the Arctic Ocean to the north (Fig. 1). The sanctuary is located roughly in the north-central tundra part of the Beverly caribou (*Rangifer tarandus groenlandicus*) range (e.g., Miller *et al.*, 1988; Hall, 1989).

The stone tools came from sand blowouts beside the Thelon River near its junction with the Hanbury and Clarke Rivers (Gordon, 1996: Fig. 1.6). I examined 68 camps, including two large deeply stratified (300 m² × 2 m deep) water crossing camps

with almost 5000 artifacts, three smaller shallow downriver sites with several hundred artifacts, and the rest, surface sites (Gordon, 1975: 4). One of the two 2-m deep sites, KjNb-6, had six major levels (*op.cit.*: xvi). One of its lowest levels, Pre-Dorset or ASTt (Arctic Small Tool tradition; *op.cit.*: 125–133), had easily recognizable tools because they had been identified elsewhere. The distinctive, familiar tiny chert ASTt tools, dating from 3450 to 2650 years ago, were compared with similar ones from sites in the Kaminuriak, Bathurst, and Bluenose caribou herd ranges, as defined by the Canadian Wildlife Service (Fig. 2: Kelsall, 1968; Thomas, 1969; Parker, 1972).

Pre-Dorset site locations, like the herd ranges themselves, overlap, mainly from the northern boreal forest along the migration routes through the taiga onto the tundra. The overlap was most prominent where the Beverly and Kaminuriak winter ranges coalesce.

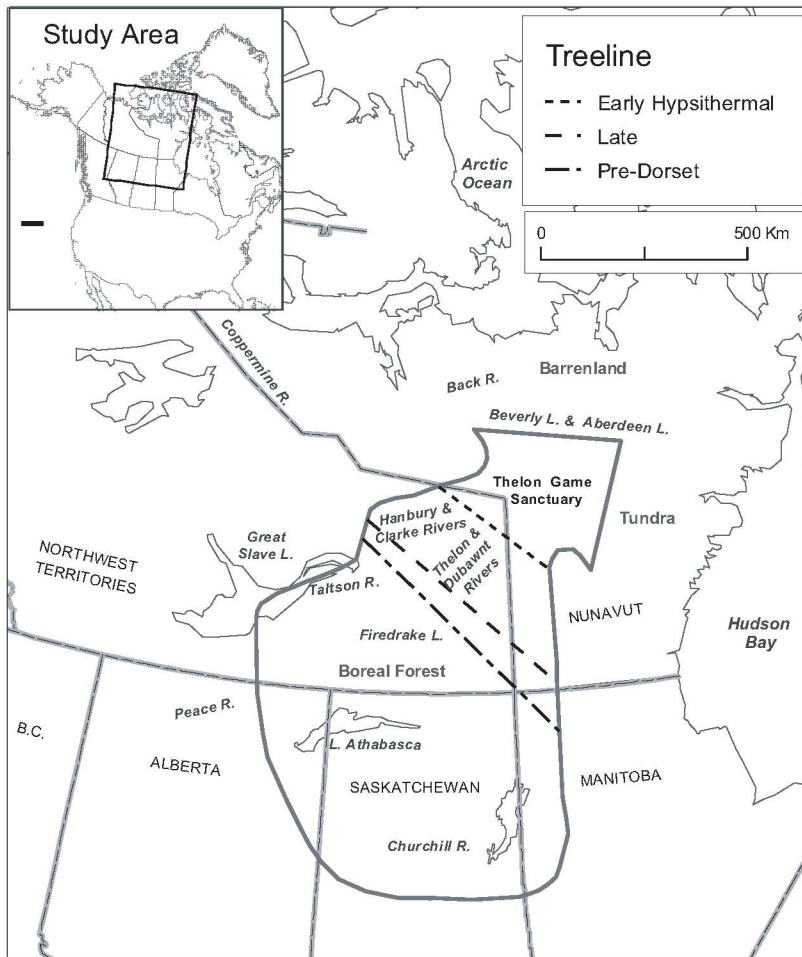


Fig. 1. Study area in northcentral mainland Canada.

And yet the distinctness of artifact traits between ranges could be differentiated. This was consistent with caribou herd data recalculated by Parker (1972) from Miller & Robertson (1967). Six percent of ear-tag returns for Kaminuriak caribou came from range normally occupied by Beverly caribou. Then, using ear-tag returns during the same time period from his study, Parker found that about 5% of Beverly tagged caribou came from range normally used by Kaminuriak caribou. This suggests about 94% herd discreteness between the Beverly and Kaminuriak herds, adding additional support to the belief that the caribou in each population are normally faithful to their respective traditional annual range and offers support for an explanation of why, despite overall similarity, I could separate Beverly and Kaminuriak traits for Pre-Dorset tools. Slight differences between each range probably resulted from limited human contact because hunters focused on the center of the ranges where migrating herds were most

predictable. Due to widely separate migration routes and simultaneous migrations, it would have been rare for any migratory Barrenland hunting bands to harvest from several herds. In this paper, band refers to hunters.

Artifact distribution and trait similarities supported my thesis of a band-herd association for the remaining Barrenland cultures. As Pre-Dorset site distribution also coincided with the four historic Dene hunting ranges outlined in 1972 by Smith (1978: Fig. 5), I suggested site distribution of all Barrenland cultures fell within the overlapping Pre-Dorset and Dene hunting ranges and the herd ranges (Fig. 2). Thus, the three disciplines of wildlife studies, ethnology and archaeology meshed, and I postulated a discrete Pre-Dorset band-discrete caribou herd association.

Human occupancy of the Dene or East and West Chipewyan, Yellowknife, and Dogrib hunting ranges

coincided with the Kaminuriak, Beverly, Bathurst and Bluenose caribou herd ranges. The names of these Dene tribes have been replaced by the names of smaller local bands; e.g., the Eastern Chipewyan with the Duck Lake, Barrenlands and Hatchet Lake bands; the Western Chipewyan with Caribou-Eater bands at Stoney Rapids and Black Lake; while the Yellowknives were assimilated by the Dogrib (Smith, 1978: 71).

Minor Dene camps may extend beyond each range boundary. By focussing on the center of the herd ranges, hunting bands maximized meat and hide availability. There were no viable alternatives available to hunters over the long term without vacating proven hunting areas for untested ones, something that is absent in the archaeological record. Just as the Beverly and Kaminuriak caribou herds remained 94% discrete in their overlapping winter range, hunting families followed a similar pattern; e.g., the Eastern Chipewyan's Hatchet Lake band range

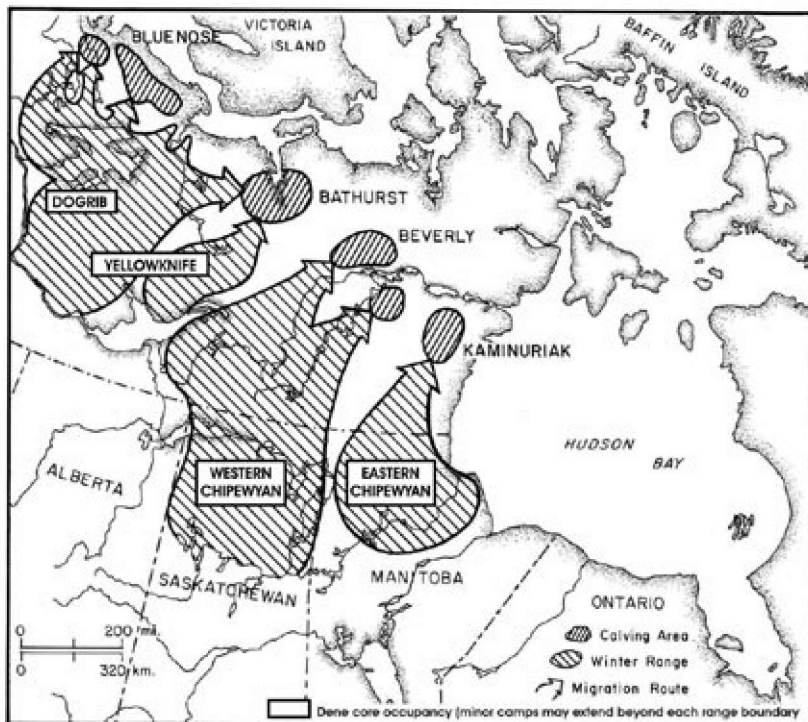


Fig. 2. The ranges of the four major migratory barren-ground caribou herds (late 1900s) and the associated historic Dene occupancy in northcentral mainland Canada.

overlapped that of the Western Chipewyan's Black Lake band. This ensured survival through kinship alliances, as it allowed shared hunting territory in those years when one herd did not appear (Smith, 1978: 83).

The following is a brief account of my investigation to gain insight into how this near total reliance on caribou could have remained functional on an annual basis over several or more millennia.

Criteria for long-term association

Two all-important conditions are linked to the successful long-term association between each archaeological phase of a hunting band and a specific caribou herd.

(1) Hunters virtually were totally dependent on caribou. This did not mean, given the opportunity, other animals and some plant matter were ignored. Other prey included muskox, moose (*Alces alces*), black bear (*Ursus americanus*), grizzly (*U. arctos*), beaver (*Castor canadensis*), hare (*Lepus americanus*), fish, birds and their eggs, and berries. Basically, people could eat everything available and edible, but this array of other potential food items would have contributed relatively little to their total annual diets. At the water crossings,

the fast pace of killing and processing meat and skins would have left little time for other activities, including fishing. Most importantly, hunters would not be tempted to forage for other food when 'tasty snacks' of fat and raw meat were readily available in caribou butchering. While butchering and later resting, they likely exchanged stories about the origin and importance of caribou in myths such as Celestial Caribou and Caribou Man (Gordon, 2003: 10–12). Only one non-caribou bone—that of a muskox—was found among thousands of excavated bones. There is no evidence that the absence of other bones was due to decomposition, as tiny caribou bone needles and awls survived. People used bone and

antler for tools, sinew for sewing, skins for winter and summer clothing, tents, bags, rope; even fish nets. Thus, such complete dependence on caribou for the necessities of life led annually to seasonal herd-following.

(2) Bands adapted their movement to intercept herds. Essentially, they followed the herds as they moved north to the calving ground and gathered at major water crossings about halfway. Although the people could not keep up with the migrating caribou, they apparently learned to anticipate the return migration in late summer and prepared for mass hunts when the animals returned. During the spring migration hunters must have been able to kill enough caribou to last until late summer migration. They did this by driving groups, sometimes over several months, into pounds where the animals could be dispatched (Hearne, 1958: 50–51). They also drove groups along brush drive-lanes to open lakes or rivers where they were lanced. In the spring, they gathered using 20–40 tents, based on the size and distribution of artifact clusters at these crossings. Over winter in the forest they gathered in even larger numbers of 80–100 tents at pounds (brush or tree enclosures). As each tent averaged two families, each with two children

Table 1. Cultures occupying the Beverly caribou range over the past 8000 years.

Culture	Years ago	Origin. adaptation
Dene Chipewyan	Present–200	From Late Talttheilei. Move to the forest due to fur trade influence for furbearers.
Late Talttheilei	200–1300	From Middle Talttheilei. Seasonal forest and tundra. General deterioration of artifact types.
Middle Talttheilei	1300–1800	From Early Talttheilei. Cultural effluorescence based on site numbers, content and tool quality.
Early Talttheilei	1800–2450	From Earliest Talttheilei. First full alignment with Beverly herd migration corridors.
Earliest Talttheilei	2450–2600	Forest origin in northwest B.C. Mainly forest.
Pre-Dorset ASTt	2650–3450	Palaeo-Inuit from Alaska. Mainly tundra.
Shield Archaic	3500–6500	Northern Plano origin? Mainly forest.
Northern Plano	7000–8000	First Beverly range pioneers. Mainly forest.

and one grandparent (Hearne, 1958), 800–1000 people could aggregate at one camp. Later, bands divided to hunt more dispersed animals in the forest. Cows and calves winter close to treeline, while bulls venture to the southern limits of their range. During April, pregnant cows begin their northern migration (Smith, 1978: 69–71). Bulls follow later but stop short of the calving grounds. Throughout the year, hunting families located themselves such that kinship ties provided a communications network for reporting on herd movement in given areas, an adaptation for human survival through meat-sharing (Smith, 1978: 75).

One-hundred and thirty-one C14 dates scattered over 1002 archaeological sites show herd-following existed for 8000 years (Gordon, 1976). With caribou the main source of sustenance, archaeological sites are, with few exceptions, caribou hunting camps. They affirm tandem movement of a caribou herd and a hunting band. The general absence of skeletal materials from other species at those crossing sites is not surprising, given that people moved to those locations solely for short intense hunting periods.

In the historical period, hunting patterns changed as Dene began providing meat to Hudson's Bay Company forts. They abandoned mass hunts at water crossings because forts were located for trade, not hunting, and local caribou were soon exterminated. After the Dene adapted to the fur trade, traditional herd-following ceased and most hunters remained in the forest year-round to trap furbearers and trade. They deserted traditional water crossings because these required long walks, waits and boats. Eventually, widespread use of rifles, many equipped with

telescopic sites, led to long distance shooting in areas easily reachable by snow machine or charter aircraft (Miller, 1987; Gordon, 1996).

Beverly range past and present

The Beverly range covers about 400 000 km², including the northern portions of the two Prairie Provinces (Saskatchewan & Manitoba), east-central mainland Northwest Territories and west-central mainland Nunavut (Fig. 2).

The size of the Beverly caribou herd has been estimated from about 100 000 to 420 000 animals at various times in the last half of the 20th century (e.g., Hall, 1989; Thomas, 1998). The herd's range once extended deep into Saskatchewan (Fig. 1), but since the 1970s, its southern migration and range occupancy has shifted north. It now extends from Lake Athabasca and Great Slave Lake northeast to its calving grounds north of Beverly and Aberdeen lakes on the lower Thelon River. Calving to the south of these lakes occurs in years when northward spring migration of parturient cows is delayed by difficult traveling conditions, such as deep or slushy snow. When caribou calve south of Beverly and Aberdeen lakes, cows and calves are close enough to denning wolves that calf mortality increases (Miller *et al.*, 1985; F. L. Miller, pers. comm., 2004).

Three treelines are known: a modern one from the present to 700 BC, which ignores minor Little Ice Age fluctuations; the Pre-Dorset one from 700 to 1500 BC; and the Early Hypsithermal treeline from 2000 to 6000 BC (Fig. 1). The herd crossed each treeline in their respective time period. Despite changes in treeline, location of the calving ground apparently has remained essentially the same for millennia, having served well for calf survival by ensuring relative freedom from predators and humans because of its remoteness and isolation (cf. Miller *et al.*, 1985, 1988).

As archaeological site distribution changed little over the past millennium, despite the Little Ice Age, the Beverly caribou range probably was also quite stable. This relative stability of Dene hunting camps contrasts with great changes in human distribution farther north during a very cold period (Nichols,

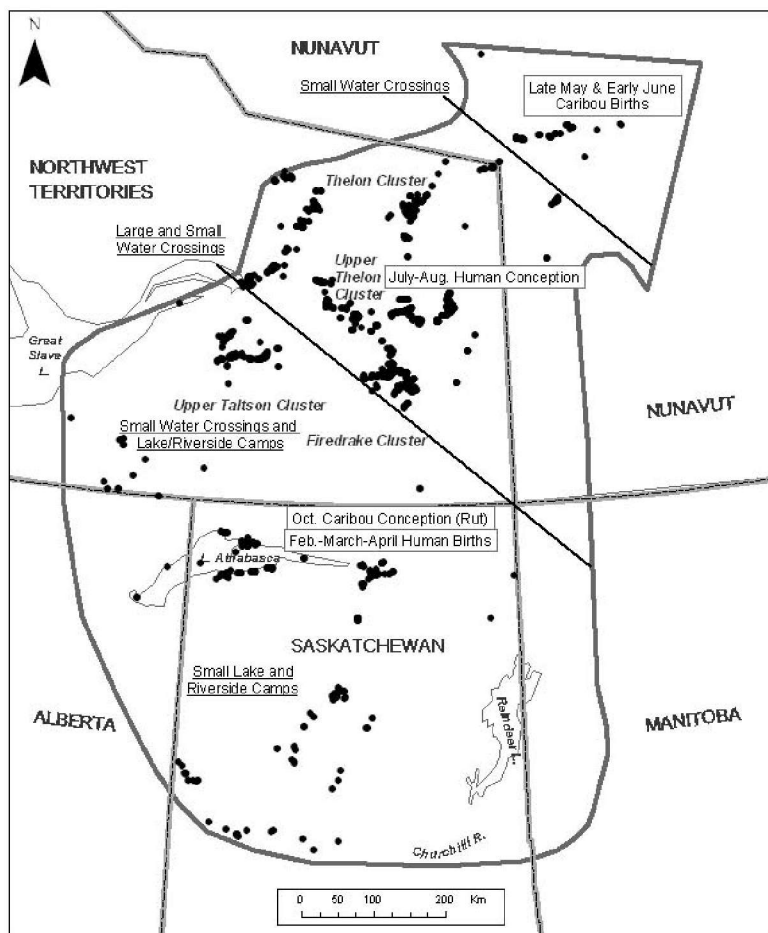


Fig. 3. One thousand and two archaeological sites showing 8000 years of caribou and human conception and birthing in northcentral mainland Canada.

1967: 176), when earlier Inuit-like Pre-Dorset hunters abandoned coastal seal hunting under thickening ice and began following caribou herds (Gordon, 1975: 52).

North-south changes in the treeline and associated climatic factors apparently did not influence the overall location of the Beverly calving grounds (cf. Gunn & Miller, 1986). However, the size of the herd over time and year-to-year variations in weather, travel conditions, availability of vegetation and changes in the absolute food supply, etc., can and do influence what sections of the overall calving grounds are used in any given year. These short-term changes in caribou movements were undoubtedly devastating for the hunting bands depending upon caribou, but are not reflected in the archaeological evidence to date.

To test for long-term herd-following in the Beverly caribou range, I examined artifacts from 1002

archaeological camps involving eight cultures (Table 1). Range use by hunters varied from incipient in the pioneering Northern Plano period to full coverage in the Middle Taltheilei period. Climate change caused northern advance of the treeline in the Post-Glacial Northern Plano period, when Plano and Shield Archaic were mostly forest-adapted cultures. When the extremely cold Pre-Dorset period followed, the treeline retreated 200 km and this culture was mainly tundra-adapted. Warming began with the return of Indian Taltheilei cultures, beginning about 2600 years ago. Since that time, climate has undergone minor cycles, save for the colder Little Ice Age in Late Taltheilei.

Historic Chipewyan (Dene) camps

My sample consists of 181 Chipewyan or Etthen-Eldeli Dene (Caribou Eater) camps that represent the most recent Dene bands, descendants of prehistoric Late Taltheilei hunters, and occupying the range from Samuel Hearne's time (1769-72) to the present

(Fig. 3). These camps represent hunters of late summer-autumn herds migrating southwest along the Thelon and Dubawnt Rivers. Forest and tundra camps along these caribou migration routes contain trade goods of steel fish hooks and cartridge-reloading tools, lead shot, copper rivets, brass kettles, glass beads and bottles, clothing, tents and thread, birchbark baskets, wooden fur stretchers, fish-drying racks and tent poles (some still standing!) and bone awls and beamers (lengthwise split caribou leg bones with both internal edges sharpened for removing fur from skin) (Gordon, 1996: Figs. 3.1, 3.4, 3.10, 3.12, 3.15). As far as discernible, the historic range of the caribou was identical to the modern range, extending northeast from Saskatchewan to the Beverly calving grounds. Despite poor traveling conditions and the great distance involved, some Chipewyan were apparently able to follow the herd to the calving grounds (Burch, 1976).

Examination of post-1846 Roman Catholic baptismal records shows the influence of caribou upon human health and procreation. Chipewyan records indicate four of five babies were born in February, March, and April, with a pronounced birth peak in April. This is nine months after the major southern caribou migration, when bands aggregated to hunt at water crossings. At the largest northern sites (Fig. 3, Thelon cluster), the herd crosses the river in early to mid-July, crossing the Upper Thelon cluster several weeks later. At this time, caribou were abundant. Hence, humans were healthy and most likely to conceive.

Late Talttheilei camps

The latest Dene prehistoric phase (Late Talttheilei), descendants of Middle Talttheilei, has 218 forest and tundra sites. These contain mostly stone tools but some bone and wood tools persist, as does some natural copper (for lanceheads) that was traded from the Coppermine River area. Culturally diagnostic tools are crude asymmetric, unground, side-notched arrowheads characteristic of the introduction of the bow (Gordon, 1996: Fig. 4.4). Evidence of trade goods in advance of European exploration include Hudson's Bay Company brass kettle fragments (Gordon, 1996: Fig. 4.14).

Middle Talttheilei camps

Middle Talttheilei was the effluorescence of Dene culture and the descendants of Early Talttheilei. Its 327 camps were larger and artifacts denser in occurrence than any other period. Based on the number and extent of hunting camps, climate must have been ideal for herd and hunter growth (Table 1; Gordon, 1996: 85). Extensive camps along the Thelon and Dubawnt Rivers depict parallel migrations. Distinct diamond-shaped lanceheads with ground bases (Gordon, 1996: Figs. 5.2–4) and many scrapers and oval knives (Figs. 5.7–9) permit easy tracing of herd-following in this period.

Early Talttheilei camps

A less dense concentration of 170 archaeological sites represents Early Talttheilei; the first Talttheilei hunters to fully align throughout both Beverly herd migration corridors. Fewer Dubawnt sites suggest smaller caribou migrations than on the Thelon. Diagnostic tools are fine symmetric shouldered points with ground tapered or square bases (Gordon, 1996: Figs. 6.3–4). An earlier subphase (Earliest - Gordon, 1996: Fig. 6.7) has few sites because it represents the first Dene pioneers who arrived from northwest British Columbia via the Peace River and Lake Athabasca. They began herd-following when the preceding

Pre-Dorset hunters returned to the Arctic Coast with climatic warming (Gordon, 1995).

Pre-Dorset Talttheilei camps

The 222 Pre-Dorset or Arctic Small Tool tradition sites represent Palaeo-Arctic newcomers arriving in an extremely cold period, when sea-hunting was interrupted due to ice thickening (Nichols, 1967: 176,177; Gordon, 1995: 325–340). Treeline was at its southernmost, so sites that were in forest for other phases were on the tundra during the Pre-Dorset period, a comfortable situation for a coastal tundra culture (Irving, 1970: 340–42). These people also adapted to the winter forest to the south around Lake Athabasca and Black Lake (Minni, 1976). There is, however, no evidence from site locations that this cold period caused any major alterations in the overall location of the Beverly calving grounds. The tiny Pre-Dorset banded chert tools, distinct even in surface finds, include harpoon points and sideblades, spurred endscrapers, burins, microblades and cores, graters and skin flexers (Gordon, 1996: Figs. 8.2, 8.6–7, 8.21–22). Pre-Dorset hunters probably returned to the coast about 700 BC when climate ameliorated (Gordon, 1975: 95).

Shield Archaic camps

Before climate cooled with the arrival of the Pre-Dorset, the Beverly range was occupied by Shield Archaic Indian bands enjoying the last of the Post-Glacial warming. Indeed, most of their 111 sites would have been in the forest because the treeline was at its northernmost position (Gordon, 1985). Nonetheless, the calving ground location seems to have remained stable. Site clusters are larger than they were with earlier Northern Plano camps, although sampling methods were the same, reflecting a growing population. Tools include diagnostic finely ground, asymmetric rocker-based lanceheads (Gordon, 1996: Fig. 9.2). Absence of sites on the Churchill River is likely due to difficulties in archaeological survey in the heavy forest. Distribution elsewhere of Shield Archaic sites resembles that of other cultures.

Northern Plano camps

The 33 scattered Northern Plano sites represent the range's first inhabitants, descendants of Great Plains Plano hunters who followed the melting Keewatin Ice Sheet northeast to become the first herd-followers. The northern extension of the treeline placed almost all sites in forest, where hunters on the Thelon and Dubawnt rivers intercepted the autumn migration, just as they did later, when these valleys became tundra. Diagnostic tools include finely made Agate Basin lanceheads with ground bases (Gordon, 1996:

Fig. 10.4), virtually identical to those on the Great Plains. Site absence on the Churchill River probably again relates to survey logistics. Of necessity, Southern Plano hunters must have crossed this area when they switched from hunting prairie bison (*Bison bison*) to barren-ground caribou, but the exact time and place remains unknown and they may have done this earlier and further south (Wright, 1976: 95).

Summary discussion and conclusions

Caribou are the common thread running through thousands of years of cultural evolution in northern mainland Canada. The people living there must have relied on the vast herds of migratory barren-ground caribou. The Beverly Herd's range has been used by caribou and hunters for 8000 years. Most sites are at water crossings on rivers or on the shores of large lakes (Gordon, 2003: Figs. 6–7), where hunters used mass hunts to profit from herd concentration. Herds were forced into brush enclosures (pounds) and canyons in the winter when frozen bodies of water were no impediment to movement and no help to hunters. South to north, heavy site clusters are on migration corridors on the Churchill River, Black Lake, Lake Athabasca, upper Taltson River, Firedrake Lake, and the upper Thelon–Dubawnt drainage divide. Camps are few at the calving grounds because few herd-followers could make the long trip there before summer, due to deep slushy snow, distance, water barriers and calf skins that were of less value to hunters before August (F. L. Miller, pers. comm., 2004).

Evidence from archaeological sites demonstrates long-term relative stability of human and caribou herd interactions on the Beverly caribou range. Archaeological and ethnographic evidence, together with biological data, confirm long-term range stability. Although short-term variation in migration patterns most likely occurred after marked changes in herd size, their influence on fidelity to Beverly core range was small or at least indiscernible. Caribou, the major source of food, clothing and shelter, permeated mythology and supernatural belief. The long-term continual bond found in this study between different Dene cultural groups and individual caribou herds helps to explain ethnological differences between these cultures in northcentral Canada.

The temporal interlocking of human and caribou conception and birthing in Chipewyan or Dene birth records indicate most babies were born in April – nine months after the major migration in early July a few hundred kilometers north, when herd and human nutrition, especially fat in human diet, was highest (Fig. 3; Gordon, 2003: 13, Fig. 11). A woman needs about 18% body fat to bring a fetus to full-

term (e.g., Frisch, 1988; Rosetta, 1992), which could be difficult to achieve during much of the year due to seasonal restrictions in herd-follower diet.

Hunters for many generations shared meat and skins among band members at water-crossing camps (Smith, 1978; Sharp, 1984). An example of the continual bounty annually available to herd-followers comes from the 6857 caribou captured and ear-tagged by Canadian Wildlife Service field parties on Thelon River water crossing sites during two-week periods in each year between 1960 and 1967. In those years, biologists were able to hand capture and ear tag an average of 1143 caribou annually at just a few sites (Parker, 1972).

The phenomenon of herd-following of large migratory herds of caribou by hunters to avail themselves of a usually dependable staff of life has persisted for millennia. In all likelihood, this time-tested strategy was employed in other parts of the world throughout prehistory, wherever food animals migrated in large aggregations – waterfowl, anadromous fish, and migratory reindeer, antelope, deer, horse, and mammoth.

Acknowledgments

I thank the NWT Cultural Places Program, Prince of Wales Northern Heritage Centre, and the Government of the Northwest Territories, Yellowknife for Figs. 1 and 3. I also thank F. Miller, Canadian Wildlife Service, Edmonton, my wife Marjory, and two anonymous reviewers for helpful editing and critiquing of the manuscript.

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- Wright, J. V. 1976. The Grant Lake site, Keewatin District, N.W.T. – *Archaeological Survey of Canada, Mercury Series* 47, Canadian Museum of Civilization. Table 1. Cultures occupying the Beverly caribou range over the past 8000 years.