

A DRY OASIS: THE CANADIAN PLAINS IN LATE PREHISTORY

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Abstract

The susceptibility of the Canadian plains to drought is widely considered the greatest threat to the economic and social stability of the region. Rather than simply a condition of the physical environment, vulnerability to drought is a cultural phenomenon with its origins in the spread of the modern world system to the northern Great Plains. This point is illustrated by the relationship of indigenous societies to the region in the late prehistoric period. For hundreds of years after the climatic downturn of the 13th century, the grasslands served as a refuge for many groups experiencing climatically driven hardship in other regions, even though the country was more prone to desiccation than at any time in the recent past. Two key subsistence strategies that were used in the region were pedestrian bison hunting and the management of water through the proscription of beaver hunting. As market forces took hold, these ancient and effective practices were lost, contributing to climatic vulnerability, violence and ultimately to the end of the bison economy.

Sommaire

La susceptibilité des Plaines canadiennes à la sécheresse est considérée par plusieurs comme étant la plus grande menace à la stabilité sociale et économique de la région. Plutôt qu'une condition de l'environnement physique, la vulnérabilité à la sécheresse est un phénomène culturel qui prend son origine dans l'extension du système du monde moderne jusqu'au nord des Grandes Plaines. Ceci est illustré par la relation qu'avaient les sociétés indigènes avec la région pendant la période préhistorique récente. Les Prairies ont servi de refuge à plusieurs groupes éprouvés par les conditions

climatiques dans d'autres régions pendant des centaines d'années après le refroidissement climatique du treizième siècle, et ce, malgré que le pays était plus enclin au dessèchement qu'à tout autre temps récemment. Deux techniques de subsistance clé utilisées à l'époque dans la région furent la chasse au bison à pied et la gestion de l'eau par l'interdiction de chasser le castor. Lorsque les forces du marché prirent racines dans la région, ces pratiques anciennes et efficaces furent délaissées, contribuant à la vulnérabilité climatique, la violence, et à l'écroulement de l'économie fondée sur le bison.

Introduction

The susceptibility of the northern Great Plains to drought is considered the greatest threat to the stability and prosperity of the region. As other papers in this volume show, vulnerability to desiccation is not simply a natural phenomenon, the consequence of a shortage of precipitation; rather, the limitation of human populations in areas of variable or low rainfall is a measure of a societal weakness to adapt to the range of conditions imposed by the environment. The primacy of market forces in our collective relationship with the land and climate of the northern Great Plains has been the Achilles heel of the region since the establishment of agrarian capitalism more than a century ago. Even before the recasting of the Canadian prairies as an agricultural region, the growing influence of the fur trade changed the relationship between the indigenous population and their environment. As communities looked to global markets for the produce of the region, they turned their backs on the need to maintain a sustainable relationship with the conditions imposed by the region. Prior to the extension of the modern world system to the northern Great Plains, indigenous societies were far better adapted to the environmental regime imposed by the climatic variability than those established with the coming of Europeans. The role of the northern Plains as a refuge for communities displaced by climate change during the late prehistoric period should be a lesson to those of us considering our own adaptations to the region in this time of environmental uncertainty resulting from climate change in our own time (please refer to the map at the end of this chapter for entities discussed in this paper).

Before market forces took hold of North America, climate was the dominant consideration in group decision making among indigenous societies. On the northern Great Plains, the shift away from climate toward trade with Europeans may have occurred as late as 1675.¹ The quality of prehistoric adaptation to climate is illustrated by the fact that, from the 13th century on, the region served as a refuge—an oasis for environmentally dislocated people from other regions. This was at a time when the northern Plains were considerably more prone to desiccation than it has been in the recent past.

Linking Archaeological Evidence to Historical Communities

Although human communities have inhabited the northern Great Plains for more than 11,000 years, the connection between prehistoric societies, identified through the analysis of archaeological remains, and historic and contemporary First Nations, is neither readily apparent nor free from dispute. Uncovering the link between prehistoric and contemporary societies in western North America is critical to understanding the impact of climate change on the development of aboriginal communities.

The connection between prehistoric and existing populations, however, remains a subject of debate. J.R. Vickers attributed the difficulty of relating prehistoric and contemporary populations to both limited data and the inconsistency of its interpretation in the field of archaeology. He added, "none of the current models [of cultural change in the prehistoric] can be demonstrated to be other than guesses."² On the Canadian Plains, there is little consensus surrounding the archaeological past of existing First Nations populations. One thing was certain; the yearly cycle of humans following bison herds from the grasslands in summer to sheltered areas in the parklands or wooded areas from the fall to the spring was essentially an unchanging and unchangeable phenomenon:

This then must serve to approximate the human-land relationships for the past two thousand years. No matter what the coming and going of archaeological phases or historic tribes, all must have constructed their adaptation to the seasonal availability of resources. Deviation from the seasonal round outlined here would seem impossible for a hunting people on the Northwestern Plains. Climatic change may have advanced or retarded the schedule of resource exploitation slightly, but the basic adaptation must have remained constant.³

Vickers' assertion reveals several truths about human adaptation to the climate and environment of the northern Great Plains. First, human communities relied primarily on bison for their subsistence. Other resources were undoubtedly used as a supplement, but the herds remained the staple food of the plains for millennia. Second, archaeological groups who participated in the seemingly endless cycle of bison predation changed over time. Although changes in material cultures did not always signal changes in the ethnic identity of their makers, it is certain different ethnic groups occupied different regions of the plains over time. Third, climatic change over thousands of years would have altered the annual movement of the herds and the human populations that hunted them, though, as Vickers stressed, "the basic

adaptation must have remained constant.”⁴ While the plains bison hunt served as a stable food supply for millennia, the reliability of the herds as a source of food acted as a cultural magnet during the five centuries of climatic instability that preceded the arrival of European influence to the northern Great Plains.

The Atlantic Climate Episode and its Effect on North America

Across the northern hemisphere, the climate from the 9th to the 13th centuries was marked by consistently warm temperatures.⁵ In the 1960s, two pioneers of climate history, Reid Bryson and Wayne Wendland, designated the period from a.d. 850–900 to 1200 the “Neo-Atlantic Climatic Episode.”⁶ During this time, global climatic patterns—the central tendencies of weather conditions or ‘mean’ temperatures—underwent a long-term period of warm temperatures and adequate precipitation.⁷ The period has also been variously described as the ‘Climatic Optimum’ and in Europe as the ‘Medieval Warm Period.’ Bryson and Wendland described the general effect of the Neo-Atlantic Climate Episode on North America:

(O)pen water appeared in the Canadian Arctic Archipelago, the tree-line re-advanced into the tundra, summer rains extended farther into the southwest and corn-farming became practical across the Great Plains. Glaciers disappeared from the U.S. Rockies. These evidences suggest weaker westerlies and more meridional [southerly] circulation. The boreal forest probably expanded both south and north, while prairies shifted west at the expense of the steppe.⁸

The centuries of benign weather associated with the Neo-Atlantic fuelled an unprecedented period of cultural and technological expansion through much of North America. In the Arctic, long periods of open water made it possible for village-dwelling whale hunters known as the Thule to expand eastward from Alaska to Greenland between a.d. 900 and 1250.⁹ At the same time, the Norse moved westward from Iceland, growing cereals and raising cattle along the coast of Greenland. At the turn of the first Millennium, they briefly maintained an outpost on the Island of Newfoundland.¹⁰

In the Northeast, the Neo-Atlantic brought nothing less than a revolution in subsistence practices. The adoption of maize agriculture set the stage for the present as “either specific cultures or the general patterns of historically documented groups” appeared with the diffusion of the horticultural triumvirate of corn, beans and squash.¹¹ The sudden appearance of the Iroquoian-speaking Owasco culture south of Lake Ontario around a.d. 900 signalled the spread of maize-centred agriculture to the area.¹² North of Lake

Ontario, the Huron Confederacy grew crops within walking distance of the Canadian Shield, an indication that the acidic and rocky soils of the coniferous forest were a greater barrier to the spread of cultivation than was climate. By a.d. 1000, maize and the technology associated with it were spread across the woodlands from the Atlantic Coast, through the American Midwest to the Great Plains.¹³ Improvements in storage techniques and the development of maize varieties¹⁴ contributed to the new mode of production, but the centuries of favourable weather that came with the climatic optimum have been accepted as the key factor in the northward spread of corn cultivation for decades.

The people responsible for what was essentially a 'Neolithic' revolution in eastern North America during this remarkable time are known archaeologically as the Late Woodland cultures.¹⁵ Their culture was centred in a region known as the American Bottoms, a low-lying region encompassing the confluence of the Mississippi and Missouri Rivers and Ohio Rivers. Maize had been grown in the area since the time of Christ, but the crop did not become a major economic factor until a.d. 750.¹⁶ The heart of the Mississippian culture, the city of Cahokia, was nothing less than a metropolis, with a population of between 10 and 20 thousand people in a.d. 1100.¹⁷ With its large population and unparalleled size of its earthen mounds, Cahokia represents the apex of social organization and social stratification in pre-Columbian North America.¹⁸ Most researchers agree Mississippian societies such as Cahokia were 'chiefdoms,' although some have argued the sophisticated relationship between Cahokia and its hinterland would best be described as a "state."¹⁹ Whatever the most appropriate designation, the city reached its demographic and cultural zenith during the halcyon days of the late Neo-Atlantic.

As should be the case with such profound societal changes over such a vast geographical area, the full nature of the diffusion of maize-centred agriculture was complex, and is still not fully understood. What is certain is that Late Woodland agriculture spread over a massive area in a remarkably brief period characterized by warm northern hemispheric temperatures. Communities that adopted cultivation may not have been simple offshoots of Cahokian culture, but the energy from corn and her sister crops fuelled an unprecedented cultural florescence across eastern North America.

In addition to effecting the Iroquoian and Algonkian speakers of Lake Ontario, the St. Lawrence Lowlands, and the eastern seaboard of the United States, corn and the crops associated with it were instrumental to qualitative cultural changes in the Great Lakes and Midwest. Along the Ohio River, the agricultural societies such as the Fort Ancient and Monongahela complexes²⁰ that emerged around the turn of the first millennium a.d. borrowed heavily

from the societies centred at Cahokia.²¹ Farming spread up the Missouri and Mississippi Rivers into Iowa and South Dakota where it was adopted by Siouan-speaking peoples;²² among them were the Great Oasis Complex and the Mill Creek cultural system.²³ The archaeological assemblages of these communities bore strong affinities to the highly urbanized Cahokia Culture, indicating close cultural ties or possibly migration to northern Iowa. In Wisconsin, Iowa and southern Minnesota, the Oneota culture emerged contemporaneously with the ascendancy of Cahokia, a sign that the diffusion of cultivation was not the simple spread of the technology from a metropolis to a hinterland.²⁴ As was the case in the diffusion of cultivation to other groups, the long warming trend associated with the Neo-Atlantic episode was a critical factor in the spread of the new subsistence economy.

As temperatures improved, communities in the deciduous forest of northern Minnesota added maize-based technology to their economy based on the combination hunting and the harvesting of wild rice. These people, known archaeologically as Blackduck, emerged from their heartland around a.d. 800 and swiftly expanded eastward along both shores of Lake Superior and into the Interlake region of Manitoba, and possibly even further north.²⁵ As they broadened their range, the makers of Blackduck ceramics co-existed with longstanding inhabitants of the shield, the Laurel people. The northward expansion of both the Blackduck and Laurel complexes has been attributed to the improved environmental conditions experienced during "this benign climatic episode."²⁶ As people shifted northward, so too did the environment they exploited. During the Neo-Atlantic, the tree line may have advanced as far as 280 km north of its present location west of Hudson Bay.²⁷

Blackduck and Laurel remained distinct until a.d. 1000 when a hybrid group known by their material culture as the Rainy River Composite emerged in the Boundary Waters region. To the north, on the Canadian Shield the Laurel and Blackduck traditions came together in another hybrid configuration known as Selkirk. Although not an exact science, linguistic analysis indicates these changes had profound implications for the future occupation of central Canada:

The result of using a selected Algonkian word list indicates a Cree-Ojibwa split between a.d. 987 and a.d. 1079. This range closely approximates the proposed emergence of the Selkirk (representing the northern "Cree" people) and the Rainy River (representing the more southern "Ojibwa" people) composites.²⁸

During the Neo-Atlantic, corn-based cultivation spread westward along floodplains of river valleys to the margins of the Great Plains where the new

technology supplemented the hunting and collecting economy focussed on bison predation. There, the climatic optimum came with an increase in precipitation, "(m)esic conditions enabled the spread of corn gardening and promoted the increase in the overall biomass which enhanced the productivity of hunter-gatherers."²⁹ The ancestors of the Hidatsa and the Mandan continued to hunt bison, but by a.d. 1000 they had established semi-sedentary horticultural communities along the Missouri River in North and South Dakota.³⁰ Among the oldest of these communities were those attributed to the Awatixa branch of the Hidatsa, located on the Knife and Heart Rivers, only 200 km south of the Manitoba, Saskatchewan and North Dakota borders. The doyen of Middle Missouri archaeology, W.R. Wood, stressed the connection between the favourable climate and the establishment of corn horticulture in the region: "It is surely no accident that the initial variant makes its appearance on the Prairie-Plains border and High Plains at the time it does . . . This was a warm period when more moisture was available than previously on the High Plains."³¹ The villages of the Middle Missouri underwent cycles of expansion and contraction, but the persistence of their life way for 800 years stands as a testament to their ability to maintain a successful coping range with regard to variability in climate.³²

The Neolithic revolution that engulfed the eastern half of North America abruptly halted its westward march at the Middle Missouri villages of North Dakota. Dale Walde argued climate did not limit the spread of maize cultivation on the plains; rather, the hunting and gathering communities beyond the margins of cultivation were "existing tribally organized semi-sedentary communal bison-hunting peoples" powerful enough to withstand the encroachment of horticulturalists.³³ Hunters on the Great Plains did not adopt cultivation because their needs were more than adequately served from their existing economy based on large-scale bison hunting. Walde stressed that the inhabitants of the plains were organized in a far more complex manner than has previously been recognized. Communal bison hunting through the use of jumps or pounds exploited large concentrations of bison and created great quantities of food, described as an "almost industrial level of resource exploitation."³⁴

To secure food in this way required the participation of large populations to drive herds over many kilometres, and then to dispatch and process prey. High concentrations of labour were rewarded with large surpluses of food, enough for future consumption, trade, and, eventually, heightened levels of social organization as stockpiled meat provided people with time to devote to pursuits beyond simple survival. Walde asserted these communities were not nomadic hunting bands, but maintained "semi-sedentary" communities occupied for six months or more at a time.³⁵ The move toward increased

social complexity among plains bison hunters may have begun as long as 2,000 years ago, when the people who occupied the entire northern plains came under the influence of the mound-building Woodland people who maintained villages before the general diffusion of maize-based cultivation.

While the bison hunters of the grasslands did not undergo a wholesale change in subsistence practices during the Neo-Atlantic, it was a time when hunting flourished:

Perhaps even more important than the expansion of gardening practices was the overall build-up of the regional biomass.

Grasslands and bison flourished. Availability of bison seems to have been the persistent limiting factor for human population growth and stability throughout the entire prehistory in the area.³⁶

On the Northern Great Plains, the Neo-Atlantic brought centuries of resource and cultural stability. Although the region remained subject to drought,³⁷ the bison served as a tried and true subsistence base. Archaeological evidence indicates that cultural change during the period was gradual and without intrusion from other regions.³⁸ At the beginning of the Neo-Atlantic, the inhabitants of the southern plains of Saskatchewan and Alberta were represented by only two distinct archaeological assemblages, the Besant and Avonlea phases.³⁹ According to Walde, both were influenced by eastern woodland communities in their early development and practiced large-scale communal bison hunting.⁴⁰

Besant first appeared on the plains about 200 b.c. associated with a group known as the Sonota, mound-building bison hunters on the forest plains ecotone of Minnesota. Avonlea first appeared in the dry country of southern Alberta and Saskatchewan about a.d. 100. The makers of Avonlea should not be thought of as a 'people' or as a specific ethnic group. The geographical and temporal spread of Avonlea styles across the plains indicates the people responsible for it were "from a variety of ethnic backgrounds."⁴¹

One major Avonlea innovation was the development of bow and arrow technology, in contrast to the atlatls (throwing sticks) used by the Besant. The spread of the new military technology may have been what Walde described as "a signal of mutual support" wherein local communities came together across the plains to prevent Besant encroachment on their hunting grounds.⁴² Over time, Avonlea technology expanded eastward to the margins of the woodlands of Minnesota and South Dakota. There, they traded with groups such as the Truman Mound Builders whose ceramics are present in Avonlea sites on the northern plains.⁴³ As large-scale communal bison hunters, both Avonlea and Besant communities had abundant dried meat

and hides that they traded for pottery and agricultural produce of the villages to the east. Evidence of the exchange between hunters and farmers has been found in the Moose Bay Burial Mound near Crooked Lake, Saskatchewan. While well beyond the region where cultivation was practiced, the discovery of a bone squash knife indicates that, while people of the Qu'Appelle Valley did not cultivate the soil, they were in contact with people who did.⁴⁴ A recent analysis of food residue of ceramics from beyond the range of known horticulture indicated that populations previously thought to be solely dependent on the herds were consuming maize, an indication of inter-regional trade.⁴⁵

The centuries of good hunting on the plains contributed to the emergence of a new culture, Old Woman's, in southern Alberta about a.d. 1000. This group replaced the Avonlea tradition in the region, but the change was so gradual that scholars agree the appearance of Old Woman's represented an evolutionary change, an in situ development rather than the replacement of one population with another.⁴⁶ Old Woman's is acknowledged to be the prehistoric manifestation of Blackfoot culture.⁴⁷ On the Canadian plains, the Neo-Atlantic brought centuries of cultural stability and, in the case of Old Woman's, regional development. Climatic reconstructions of Alberta have shown the period between a.d. 900 and a.d. 1350–1450 was marked by greater drought severity than the period that followed it.⁴⁸ This factor indicates human communities in the region were well adapted to dry conditions, living within their means in an arid environment.

The untroubled years of the Neo-Atlantic, when climatic conditions were analogous to those of the 1960s,⁴⁹ of course, did not last. Although climate varied from the end of the Neo-Atlantic to the modern period, conditions marked by drought or cold, or both, continued in the northern Great Plains until at least the mid-19th century. As conditions deteriorated, indigenous populations across the continent were confronted with hard choices merely to survive.

The Pacific Climate Episode: The Exodus from the Eastern Woodlands and the Plains as a Refuge, a.d. 1250–1550

The end of the unprecedented period of cultural florescence in eastern North America came swiftly. Global conditions changed so rapidly they have been attributed to a single cataclysmic event, a massive volcanic eruption in a.d. 1259.⁵⁰ The magnitude of the blast is hard to fathom. In ice cores, it produced three times the concentration of sulphates found in layers associated with 1816, when the explosion of Mount Tambora resulted in the global phenomenon known as "the year without summer."⁵¹ Recent scientific scholarship has stressed that volcanism is a key factor in abrupt large-scale climate change.⁵²

In Europe, written accounts documented the monumental change over the coming decades. By 1309, Christmas feasts took place on the frozen Thames River in the city of London.⁵³ Along with cold, Europe was drenched with torrential rains. In 1315, unceasing rains brought chaos to Europe, thousands died in floods and from subsequent crop failures. In Greenland, the Norse settlements began their painful slide into oblivion by the end of the 13th century.⁵⁴ In the Canadian Arctic, the colder temperatures brought longer periods of sea ice making whaling unsustainable, forcing the population to diversify their subsistence base into a pattern that evolved into that of the historic Inuit.⁵⁵

On the North American continent, the changes in climate marked the beginning of the long-term climatic regime known as the Pacific Climate Episode. Colder temperatures brought reduced moisture to much of western North America because the expansion of the circumpolar vortex reduced the amount of tropical air entering North America during the summer.⁵⁶ Bryson and Murray explained, "expansion of the westerlies [was]-in effect the expansion of the Arctic."⁵⁷ In the 13th century, the boreal forest began its 600-year retreat south as trees gave way to tundra.⁵⁸ During cold periods, such as those experienced after a.d. 1200, the increasing importance of westerlies as the prevailing winds would have blocked moist air from entering the plains, "enlarging and intensifying the dry shadow of the Rockies." In the American southwest, drought and the conflict that came in its wake were central aspects of the depopulation and subsequent abandonment of the Pueblo communities of the Four Corners region by 1300.⁵⁹

In eastern North America, the deteriorating climate shook the farming cultures that had spread across the eastern half of the continent. By the turn of the 14th century, the complex trade and cultural network controlled by Cahokia was breaking up.⁶⁰ Within 100 years, the Mississippian occupation of the American Bottoms region was over. Cahokia was abandoned. By 1450, the mid-continental u.s. centred on the confluence of the Ohio and Mississippi Rivers was so depopulated it has been described as the "Vacant Quarter."⁶¹ Violence undoubtedly accompanied the failure of Cahokia and its satellite communities, as the masses who had toiled so long in the construction of mound complexes lost faith in the elite who were perceived to have been responsible for large-scale failure of harvests.

In the Northeast, Iroquoian farmers experienced long-term decline of their harvest as people sought safety behind the defensive palisades of fewer, but larger communities in what descended into a 200-year cycle of inter-village warfare.⁶² The fighting stopped only in the early 16th century when the feuding communities came together with the formation of the League of the Iroquois.

The farming villages northwest of the crumbling city of Cahokia also suffered severe hardship with the arrival of the Pacific Climate regime. This was particularly the case of the region known as the Prairie Peninsula, a finger of dry climate and corresponding vegetation extending eastward from the Dakotas through Iowa into Illinois and Wisconsin.⁶³ The Oneota people experienced severe stress by the turn of the 14th century:

(L)arge settlements had seemingly fragmented into smaller dispersed communities and some relocation of population had occurred. This fractionalization was probably effected by several interrelated factors, including the deterioration of the climate (the Pacific climatic episode) and the decline of the Middle Mississippi influences to the south. Reliability of crops presumably changed as the length of the growing season and the moisture content of the soil both decreased.⁶⁴

Rather than clinging to an unsustainable way of life, the Oneota abandoned their villages and migrated to the encroaching grasslands of the Prairie Peninsula where they hunted the bison who were expanding their range eastward as forest gave way to prairie.⁶⁵ As displaced Oneota farmers took up their new life to the south and west, they came into conflict with the Mill Creek villages that were themselves undergoing severe hardship from diminished harvests and the breakdown of the Mississippian trade network.⁶⁶

Because the Mill Creek people occupied the Iowa ecotone,⁶⁷ the transitional area between the arid short grass prairie to the west and the wetter tall grass prairie to the east, they too were vulnerable to climate change. Because of their precarious environmental position, and the abandonment of their villages during the Pacific Climate Episode, the Mill Creek sites were the subject of a pioneering study in environmental history entitled *Climates of Hunger*. The authors explained the change that came with the Pacific Climate Episode, "(w)hile western Europe grew damp and gloomy, the farmers of the plains 800 years ago must have seen their corn wither and turn white with drought, their game die or move away."⁶⁸ Faunal studies indicated a shift from tree browsing deer to bison which were consumers of grass and more resilient to dry conditions. Most of the sites showed a decline in ceramics as the drought period progressed. As pottery was required for the storage and preparation of corn, the decline in ceramics was an indication less corn was being consumed. Pollen analysis, another indicator, showed a shift from oak, the dominant tree species during the Neo-Atlantic, to willow during the Pacific. Changes were marked in other plant communities harvested by the Mill Creek people, "(t)hey moved from a higher percentages of composites—which include sunflowers and asters—to a large percentage of grasses, which

have smaller leaf surfaces and require less moisture; they are favoured by a drier climate."⁶⁹

In the case of the Prairie Peninsula, grasslands advanced far to the east during the Pacific Episode. In essence, the plains came to the people of the region, leading them to abandon their settlements and take up communal bison hunting. Many of these prehistoric environmental refugees from the eastern woodlands moved toward the Great Plains as they adopted the bison hunt as their primary means of subsistence. Oneota communities continued to move west until as late as the mid-15th century, displacing the local small-scale farming villages of the Central Plains Tradition in southern Nebraska and western Iowa.⁷⁰ Although drawn west by the reliability of the herds, the sophisticated tribal level of social organization they had developed in the eastern woodlands "facilitated colonial expansion" of Oneota society.⁷¹ The western Oneota have been linked to the historic Siouan-speaking Oto and Kansa populations of the Central plains. The Degiha-speaking branch of Siouan speakers, including the ancestors of the Ponca, the Omaha, the Quappaw, and Osage nations may also have undertaken the exodus to the plains from their homeland on the Ohio River.⁷²

Along the Missouri River, climate change during the 13th century was responsible for major retrenchment among horticultural villagers. According to Donald Lehmer, the deterioration of the climate in South Dakota came with the shift to the Pacific Climate Episode, "seems to be directly reflected by the abandonment of most of the Missouri valley and the concentration of the remaining villages in a few small areas."⁷³

During the Pacific Episode the most significant "unfavourable" aspect of climate was drought. The severity of drought in the American plains during the 1200s was such that it was designated only one of two "megadroughts" on the American Great Plains during the last 1,000 years.⁷⁴ Analysis of core sediments indicates the Devil's Lake Basin in North Dakota dried up three times between a.d. 1300 and a.d. 1335. Sediment analyses provide "solid evidence of negative environmental effects of Pacific climatic episode droughts."⁷⁵ Although not fully understood, drought probably forced the abandonment of several Middle Missouri villages in South Dakota as populations moved northward into fewer large and well-fortified settlements.⁷⁶ Displaced groups, including members of the Caddo-speaking Plains Village Tradition driven from their homes by the Oneota, occupied the deserted villages of South Dakota during a cultural period known as the Initial Coalescent beginning around a.d. 1300.⁷⁷

The most famous Initial Coalescent village is located at Crow Creek, South Dakota. Its history illustrates the region-wide hardship experienced during the Pacific Climate Episode, even though the locality of

Crow Creek itself "is abundantly blessed by essentially every material characteristic that is likely to have attracted human settlement in the region."⁷⁸ The Initial Middle Missouri population who brought maize to the region established the community some time in the 12th century, but abandoned the community during the 13th. When Initial Coalescent people occupied the site around 1300, they built both palisades and dug a moat or ditch as protection from the violence surrounding them. The defensive measures were certainly warranted; however, at Crow Creek they proved inadequate. Although estimates of the date vary, a major violent episode occurred at Crow Creek resulting in the deaths of almost 500 individuals. The scene must have been horrific as victims were "killed and mutilated, that the town was burned down around their bodies, and that they were intentionally buried after an extended period of exposure to carnivores."⁷⁹ The attack was probably an invasion, as the site was occupied after the massacre.⁸⁰ People along the Missouri were killing each other in large numbers to occupy what few feasible horticultural sites remained in the region. In addition to the violence of their deaths, skeletal remains from the mass grave at Crow Creek were marked by malnutrition, another indication of the plight of horticultural villagers during this difficult time.⁸¹

The large-scale regional migrations of people who inhabited the prairie-woodland border of the central U.S. indicates that climate change during the Pacific Episode was severe enough to trigger the abandonment of farming over a large area and prompt the adoption of bison hunting in the western plains. The Oneota expansion was not the only case of Siouan speakers abandoning their crops in favour of the herds. On the northern Great Plains, the Mortlach people left their homeland in the eastern woodlands during the 13th century, and soon spread across the grasslands through western Manitoba, Saskatchewan, north-western North Dakota and north-eastern Montana.⁸² In Saskatchewan, Mortlach displaced the ancestors of the Blackfoot in what Walde considered another case of a sophisticated society with eastern roots encroaching onto the plains.⁸³

Walde has shown there were two distinct manifestations of Mortlach culture in western Canada. The southern group, the Lake Midden subphase, whose population hunted in valleys of the Qu'Appelle and the Missouri Rivers, were able to maintain sedentary communities for as long as eight months at a time. In summer, they followed the herds onto the open plains. A clustering of Mortlach sites around the Big Muddy area of Saskatchewan indicates it was used as a corridor to the villages of the Missouri Basin, supporting the view of the interdependence between nomadic hunters and village dwellers.⁸⁴ The connection between the Assiniboine descendants of the Mortlach and the Middle Missouri villages continued into the historic

period. It was they who guided the La Vérendrye brothers to the Mandan villages in 1741, and the explorer noted the two groups knew each other's languages.⁸⁵

The dry decades of the Pacific Climate Episode were also marked by the dispersal of villages into groups too small to rely on fortification for their protection. These fragmented communities practiced "a subsistence continuum from foraging, through horticulture to agriculture."⁸⁶ Even during optimal conditions, the horticultural villages of the Middle Missouri may have relied on hunted meat for as much as half of their food requirements.⁸⁷ By the early 15th century, the collapse of large settlements in the woodlands triggered a wave of immigration to western North Dakota and southern Manitoba. The tradition, known as the Scattered Village Complex, was comprised of Mississippian-influenced woodland people who displaced the small remaining Blackduck hunting and gathering communities in southern Manitoba.⁸⁸ This group came west with the technology for horticulture and goods that indicate strong trade ties to the south. In Manitoba, these members of the Scattered Village tradition are known as the Vickers focus.⁸⁹ They were almost certainly environmental refugees, displaced when climate-induced war in the Missouri Basin "caused a demographic ripple throughout the northeastern Plains, with some groups drifting northwards following stream valleys, including the Pembina and Souris Rivers."⁹⁰ The oldest cluster of sites, in the Tiger Hills south of Brandon, is dated to about a.d. 1400. The Vickers focus people were highly selective in their choice of planting locations, on well-watered soils on southern slopes that maximized sunlight and sheltered plants from the north winds. Gardening was undertaken on a small scale, a sign that crops were now more of a supplement than staple.⁹¹ To the east, along the Red River, a brief, but intensive, period of maize cultivation occurred in the early 1400s. Although their identity remains obscure, the planters at Lockport were also "acutely aware of the length of the frost free period so that sites that were also selected for micro-climatic variations which maximized the length of the growing season."⁹² The 15th century horticulturalists who walked to Manitoba were undoubtedly experts in their craft, perhaps heading north to exploit higher precipitation levels than their home regions to the south. Their expertise was no match for the global decline of temperatures in the 1450s as attempts at growing corn were marginally successful at best:

It may be that an initial, limited horticultural success in the region ended in a series of cold summers that prevented the harvesting and drying of corn, with the last crops being consumed as "green corn" or simply lost due to unseasonal [sic], late killing frosts.⁹³

Vickers focus people persisted in the Tiger Hills until mid-century then fled the region so fast that studies have attributed the move to a "sudden, drastic cold spike during the little ice age."⁹⁴ The event that triggered what may have been the coldest period of the past 1,000 years was the cataclysmic explosion of Mount Kuwae in the South Pacific in 1453-1454.⁹⁵ Tree rings from Europe, Asia and California indicate a severe short-term drop in temperatures.⁹⁶ In 1454, Aztec society experienced the famine of One Rabbit, "the most devastating one recorded for pre-Columbian central Mexico, [that] led to disease, massive migration, and widespread death . . ."⁹⁷ In central Mexico, three years of "utter" drought began "with an unprecedented freeze and snowfall in the winter of 1453-1454 which caught the inhabitants totally unprepared."⁹⁸

In Manitoba, the Vickers focus people headed west turning up in settlements in the Lauder Sand Hills south of the Virden-Oak Lake area almost a century after their departure from the Tiger Hills. In that time, the size of their settlements was "scaled down," there was a decrease in exotic materials such as catlinite and Knife River flint, but, most importantly, there was no evidence of cultivation at any of the western sites.⁹⁹ Although the later Vickers focus sites point to the abandonment of crops, the span of their occupation in southern Manitoba points to the use of microhabitats where subsistence options could be maximized:

The point of interest is that a successful, likely semi-sedentary village culture that followed a horticultural and foraging lifeway, abandoned their home territory and moved to another area is also marked by a high level of biodiversity.¹⁰⁰

A mixed subsistence base during a time of uncertainty is a prudent survival strategy. In the case of Vickers focus, it may have been used as a bridge until a more profitable resource could be exploited, and some may have returned to their ancestral communities in the Missouri Basin. Oral tradition among the Awaxawis Hidatsa of the Knife River in North Dakota recount the arrival of their people to the region "after having lost their corn" in the north.¹⁰¹ Improved conditions in the Middle Missouri after a.d. 1450 are indicated by the resettlement of southern portions of the region that had been abandoned earlier.¹⁰² At the Sanderson Site near Estevan, Vickers focus ceramics were found with "huge amounts of bison bone, suggesting a full adaptation to mass killing of bison" although "traditional foraging strategies were still followed to some degree."¹⁰³ With their move to the Saskatchewan plains, the conversion of the Vickers focus people from farmers to large-scale bison hunting was complete.

With the exception of the enigmatic and probably equestrian proto-historic group known as One Gun, Besant, Avonlea, Old Woman's, Mortlach and Vickers focus represent all major prehistoric populations on the Northern Great Plains of Canada.¹⁰⁴ Walde has argued all of these groups were either migrants from the large-scale tribally organized societies in the eastern woodlands, or were profoundly influenced by them either as a consequence of ancient trade relationships or, in the case of Avonlea, as a region-wide response to the threat of encroachment. Despite the horticultural roots of the Mortlach and Vickers focus people, all of the inhabitants of the Canadian plains were large-scale bison hunters by the 16th century. They were not small and mobile nomadic hunting bands who chased herds across the plains and parklands, but were large, highly organized, semi-sedentary communities that were able to manipulate their environments to manage herds and ensure large surpluses of meat for trade. The Hidatsa, who may have been the source of Vickers focus, also hunted the plains just above the 49th parallel and were important suppliers of bison meat to the horticultural communities of the Missouri River. The trade between hunters and cultivators may have existed for centuries; however, as Bamforth noted, colder winters and increased year-to-year variability in temperatures associated with the Little Ice Age probably heightened the interdependency of nomadic hunters and village horticulturalists, as both groups increasingly required supplements of stored food to ensure survival through unpredictable winters.¹⁰⁵ As interaction between grassland hunters and horticultural villages increased, so too might have the intensity of hunting practices after a.d. 1500. The excavation of Mortlach sites indicate bison were exploited to their fullest:

In particular, bison bones were intensively processed by being broken into tiny pieces and then boiled, the vats of water being heated with red hot rocks. Apparently, the bone fragments were then drained and dried, following which they were used as fuel. As a result, these sites contain massive deposits of small pieces of burned bone.¹⁰⁶

Climate change beginning in the mid-13th century triggered a large-scale abandonment of cultivation and reorientation to large-scale bison hunting in the grasslands from Texas to the Canadian border. While there was undoubtedly some level of group fragmentation as large woodland centres collapsed, they were largely able to maintain a high level of social cohesion and cultural institutions, even though they became hunter-gatherers, a subsistence pattern normally associated with less complex band-level societies. This was possible because, according to Walde, the large investment in labour required for the mass slaughter of bison in pre-equestrian hunts without

firearms was rewarded with huge payoffs in meat. Large surpluses were stored and traded, reinforcing the complex nature of social organization through ceremonial activities and regular and profitable contact and trade with other groups.

This pattern of adaptation on the woodlands-plains frontier provided large populations with stability for centuries. But how could communities, in some cases larger than 1,000 or more, maintain residency patterns so stable they are described as "semi-sedentary"? To move communities of such size with only dogs as beasts of burden would have required a huge effort. Even with a high degree of residential stability, pedestrian communities could only have moved a short distance without great hardship. As such, they developed complex strategies to maximize the existing assets of the environment within their limited range of mobility. The widespread success of these large-scale bison hunting communities was predicated on the regularity and reliability of bison movement and exploitation. Principal kill sites such as pounds and jumps were used repeatedly, a sign the movement of herds was predictable.¹⁰⁷

Grass fires were employed as a means of directing the local movement of herds and steering them toward kill sites, or as a means to draw bison to areas of new growth following winter and early spring burns, where they could be harvested. Pedestrian hunters had to use care in steering their prey towards the kill sites so their methods did not create widespread stampedes or significantly disrupt the movements of the larger herds.¹⁰⁸ In doing so, bison movements remained relatively predictable from year to year and allowed hunting groups to rely on access to their main source of sustenance and maintain a high degree of residential stability. Throughout the pedestrian period bison herds maintained their seasonal cycle, spending the winters in sheltered areas in the parklands or near valleys and the summers on the open plains.¹⁰⁹ Walde has shown that large communities remained stable over the winter and, in the case of the Midden Lake Mortlach site, for as long as eight months in a stretch.¹¹⁰ Summer campsites on the open plains could be maintained for as long as three to three and a half months.¹¹¹

There is no doubt the reliability of bison in the food quest drew woodland populations onto the plains. Once in the grasslands, communities were confronted with the only issue more pressing than the need for food. To survive, pedestrian groups on the northern Great Plains had to ensure they had an adequate supply of water. Securing water for large-scale hunting communities such as those described by Walde would have been an imperative, especially in the drought prone centuries of the late prehistoric. The inhabitants of the dry landscape of western Saskatchewan and Alberta developed a water management strategy that buffered them from the effects of even long-term drought. Ecological studies have shown Avonlea, and the Old

Woman's tradition that grew from it, protected their water supply by conserving populations of beaver that maintained water level in the valleys shared by both species.¹¹² Beaver ponds purposely maintained through non-exploitation served as dependable water sources for groups even during periods of extended drought. According to Grace Morgan, "the bison were "the staff of life" although the beaver "were at the core of a profound ideological framework which prized the role of the beaver in the stabilization of water resources."¹¹³

During protracted droughts, bison populations probably did not move to their summer range in the open grasslands because of the scarcity of water and tended to remain near water supplies in valley complexes.¹¹⁴ Bison activity during a drought cycle served to re-enforce the relative stability of communities camped along the tributaries of major waterways because herds remained in what would have been their winter range during normal conditions. Beaver whose dams held back even small amounts of water maintained water levels in the valley complexes, thereby stabilizing the limited resource. During the most lengthy drought periods, when water could not be maintained in tributaries, human, bison and beaver populations would have all sought refuge along main channels of waterways.

The success of this ancient strategy continued to guide the descendants of those who developed it until well into the 19th century. David Smyth has detailed how the Niitsitapi, or Blackfoot people, and their allies, the A'aninin (Gros Ventre) and the Athabaskan-speaking T'su Tina (Sarcee), refused to participate in the commercial harvest of beaver until as late as the 1820s when military and economic necessity forced them to enter the trade.¹¹⁵ Their refusal to harvest beaver was not a consequence of the rarity of the species in their territory. On his journey through southern Alberta in 1792-93, Peter Fidler rebuked his Piikani (Peigan) guides for trapping nothing of value as they passed numerous small lakes teeming with beaver.¹¹⁶ When the Blackfoot did begin to hunt beaver for commercial purposes in the 1820s, Edmonton House, their primary trading post, briefly became the most profitable in the entire domain of the Hudson's Bay Company.¹¹⁷

The availability of wood was also a key determinant of winter settlement patterns.¹¹⁸ In addition to fuel, wood was the key component of bison pounds, fenced enclosures where animals were driven to slaughter. Because pounds could accommodate between 200 and 300 animals, the amount of wood required for their construction would have been enormous, especially given the relative scarcity of trees. Trees cut by beavers, rather than compromising the wood supply of their human neighbours, were often reused and served as sources of firewood and building materials for bison pounds.¹¹⁹ The absence of beaver remains in archaeological excavations from the Moose Jaw

Creek area suggest the non-exploitation of what would have been easy prey especially in summer, is evidence that the avoidance of beaver hunting was a traditional ecological practice.¹²⁰

Mortlach people and their Assiniboine descendents who had been on the northern Great Plains for hundreds of years before the arrival of Europeans may also have avoided killing beaver. As early as the 1690s, Hudson's Bay Company differentiated Assiniboine groups in the parklands who trapped beaver and their compatriots on the plains who did not.¹²¹ On his journey to the Mandan villages on the Missouri River in 1738, La Vérendrye was told the plains Assiniboine did not know how to hunt beaver and should be instructed in the practice.¹²² Early traders who witnessed the abundance of beaver while they travelled in the grasslands were perplexed at the inability, or unwillingness, of the Indians to harvest them.¹²³ By the late-18th century, plains groups who refused to commercially harvest beaver began to pay a high price for the maintenance of their tradition. Recent immigrant groups from the woodlands, particularly the Cree, the eastern Assiniboine, the Saulteaux, and even the Iroquois, filled the demand for beaver pelts by expanding into the region as commercial trappers. Beaver hunting secured for them a preferred status among the traders and, in turn, they were able to procure firearms that provided them with a military advantage over those groups who maintained the taboo on beaver harvesting. As incoming groups associated with the fur trade displaced indigenous plains communities, beaver populations were soon reduced. The depletion of beaver populations in the parklands was noted in HBC journals by the mid-1750s, forcing trappers onto the margins of the plains.¹²⁴ By the end of the century, beaver were extirpated from other regions, such as the North and Lower Saskatchewan Rivers and the Qu'Appelle Valley.¹²⁵ In the 1790s, the trader at Fort George on the North Saskatchewan River near Edmonton complained over-hunting had "entirely ruined" the country.¹²⁶ As commercial beaver hunting to meet the European demand for furs replaced traditional conservation practices, the key strategy for aboriginal drought mitigation on the northern plains was lost.

Conclusion

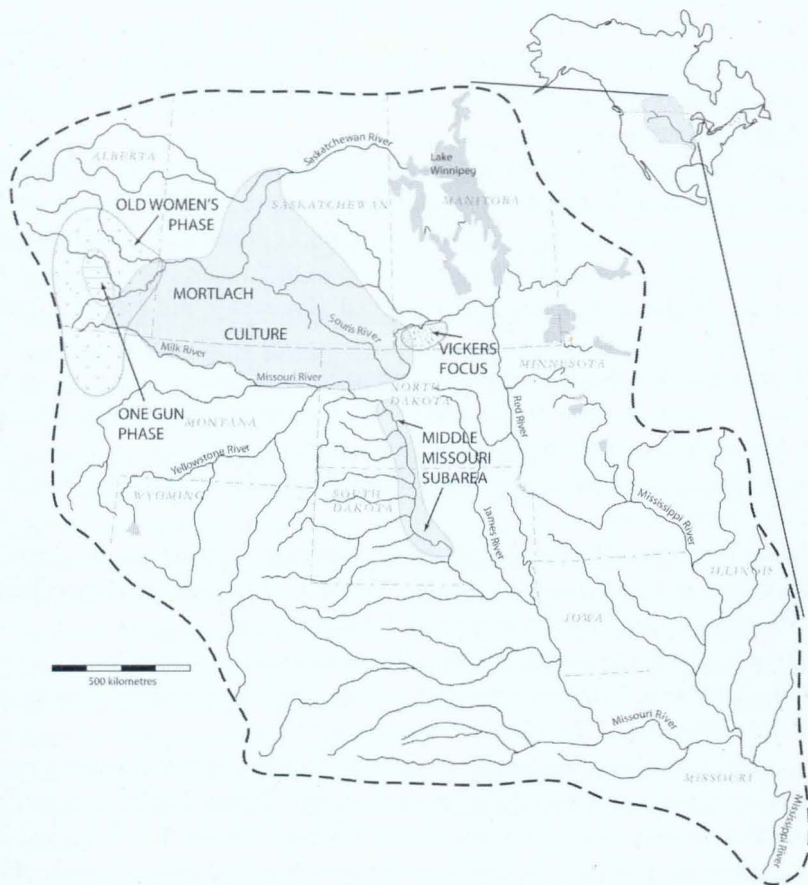
For more than 500 years after a.d. 1200, the Great Plains served as a refuge for groups experiencing climatically driven environmental stress. The dynamics of those migrations, undertaken during a period of protracted hardship, is essential to the understanding of both climatic adaptation and tribal occupation of the northern Great Plains. The people who lived on the Canadian plains in late prehistory were not small nomadic band societies constantly on the move in search of prey; rather, they were large, socially complex tribally-organized societies with institutions more akin to the villages of the eastern

woodlands than the band societies of the Canadian Shield. As climate deteriorated in the 13th century, horticultural people whose ceremonial and political lives had grown more complex during centuries of affluence during the Neo-Atlantic climate episode, chose to take their ideology and institutions west in search of the herds. In doing so, they were able to continue their traditions while taking on a new role as large-scale bison hunters. Those already on the grasslands, such as the makers of Avonlea, borrowed from woodland groups they with, creating a region-wide, and probably "multicultural," mutual assistance mechanism to meet the expansion of woodland peoples onto the plains.

Large, sophisticated, and stable groups controlled the plains during the pedestrian period, and they were successful in doing so because they were able to live within sustainable limits, even during the drought prone Pacific Climate Episode. Two basic requirements had to be met for sustained habitation: the need for food and the need for water. Bison proved to be a reliable staple; however, to ensure a constant supply of meat for so many mouths, the resource must have been managed carefully. Fire and non-disruptive hunting allowed semi-sedentary hunters to keep their prey within easy reach, walking distance in fact, for months at a time. With the arrival of horses and chase hunting, this tradition was lost. Large-scale hunting communities were able to secure enough flesh to consume, store and trade. Prehistoric people on the plains also managed water.

By abstaining from killing beaver, grassland communities secured something far more valuable than the flesh and fur of the species. The beaver, and the water their dams retained, were a powerful tool for the people of the dry lands. The species proved to be in a fragile position when the fur trade placed a higher value on the pelt of a dead beaver than the work of a live one. The longstanding inhabitants of the grasslands, the Blackfoot, the A'aninin, and perhaps the plains Assiniboine, understood the role of the species in the plains ecosystem, but they were marginalized as new groups extirpated beaver from the plains by the turn of the 19th century. As the modern world system took hold in the west; ancient practices were set aside in favour of market forces, creating vulnerability, hardship and conflict.

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Source: Dale Walde, "Sedentism and Pre-Contact Tribal Organization on the Northern Plains: Colonial Imposition or Indigenous Development?" *World Archaeology* Volume 38 (2) (2006), Figure 5, p. 297.

Endnotes

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 23. Duane Anderson, "Toward a Processual Understanding of the Initial Variant of the Middle Missouri Tradition: The Case of the Mill Creek Culture of Iowa," *American Antiquity* 52 (1987), 525-527.
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 29. Gregg, "Archaeological Complexes," 83.

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32. Lehmer, "Climate and Culture History in the Middle Missouri Valley," 59–73.
33. Walde, "Sedentism and Precontact Tribal Organization on the Northern Plains," 298.
34. *Ibid.*, 305. It should be noted that bison jumps often led to the loss of large quantities of meat because flesh spoiled before it could be processed.
35. *Ibid.*, 302–303.
36. Gregg, "Archaeological Complexes," 95.
37. Alwynne Beaudoin, "Climate and Landscape of the Last Two Thousand Years in Alberta," in *Archaeology in Alberta: A View from the New Millennium*, eds. Jack W. Brick and John F. Dormaar (Medicine Hat: The Archaeological Society of Alberta, 2003), 28.
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