

MOBILITY AND TERRITORIALITY ON THE NORTHWESTERN PLAINS OF ALBERTA, CANADA

A phenomenological approach

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Abstract. Recent archaeological excavations at a deeply stratified site in the Cypress Hills of southeastern Alberta have exposed a series of superimposed hearths with comparable lithic and faunal assemblages. The lithic assemblages consist primarily of retouch and resharpening flakes made of local raw materials while the faunal assemblages are dominated by comminuted bison bones. Perhaps the most interesting aspect of the cultural assemblages is the frequent superpositioning of hearths even though the occupation floors are separated by several centimetres to several decimetres of sterile sediment. Although spatial constraints can account for such superpositioning in caves and rock shelters, the Stampede site is an open air encampment with few physical restrictions on the placement of hearths. Similarly, the ecological diversity of the Cypress Hills can explain the selection of this upland locale for repeated occupation but these ecological variables cannot account for the repeated use of the same place for seasonal encampments. The results of our excavations thus challenge the ecological and economic models used to explain the seasonal movement of human groups, especially those based on the spatial and temporal clustering of subsistence resources. Instead, the repeated use of place by nomadic groups is more consistent with a phenomenological approach to the study of mobility and site selection. In this paper, I describe the patterned movement of Blackfoot groups across the northern Plains of Alberta as one based on a non-economic perception and use of the landscape. This Blackfoot landscape consists of a series of named places linked by paths, movements and narratives. Although some places are tied to subsistence resources, most are focal points of spiritual energy and repositories for the history and oral traditions of the group.

Résumé. Les fouilles archéologiques récentes d'un site, à la stratigraphie développée, dans les Cypress Hills du Sud-Est d'Alberta ont livré une série de foyers superposés avec des ensembles lithiques et fauniques comparables. Les assemblages lithiques se composent essentiellement d'éclats retouchés et réaffûtés réalisés à partir de matières premières locales, tandis que les assemblages fauniques sont dominés par des ossements de bison. L'aspect le plus intéressant des ensembles culturels est sans doute la superposition fréquente des foyers alors que les sols d'occupation sont séparés par plusieurs centimètres à plusieurs décimètres de sédiment stérile. Alors que les contraintes spatiales peuvent expliquer une telle superposition dans les grottes et les abris-sous-roche, le site de Stampede est un campement de plein air comportant peu de restrictions physiques pour l'emplacement de foyers. De même, la diversité écologique des Cypress Hills peut expliquer la sélection de ces plateaux pour des occupations répétées mais ces facteurs écologiques ne peuvent pas justifier de l'utilisation répétée du même lieu pour les campements saisonniers. Les résultats de nos fouilles contestent ainsi les modèles écologiques et économiques utilisés pour expliquer le déplacement saisonnier des groupes humains, en particulier ceux basés sur le regroupement spatial et temporel des ressources de subsistance. L'utilisation répétée de lieu par des groupes nomades correspond plutôt à une approche phénoménologique de l'étude de la mobilité et de la sélection de sites. Dans ce papier, je décris le déplacement des groupes de Blackfoot à travers les plaines septentrionales d'Alberta comme basé sur une perception et une utilisation du paysage non économiques. Ce paysage de Blackfoot est constitué d'une série de lieux nommés reliés par des chemins, des déplacements et des récits. Bien que quelques lieux soient liés à des ressources de subsistance, la plupart sont des points de convergence d'énergie spirituelle et les dépôts de l'histoire et les traditions orales du groupe.

Introduction

In North America, initial attempts to understand territoriality and mobility strategies can be traced back to the 1950s (*e.g.*, Beardsley *et al.* 1956) but major advances in the study of settlement patterns and settlement systems must be attributed to the efforts of processual archaeologists (*e.g.*, Bettinger 1980, 1987). The new archaeologists initially advocated the materialism and scientific approach of White (1959) but relied heavily on the cultural ecology of Steward (1938, 1955) in the practice of regional settlement pattern studies. In the study of hunter-gatherer populations therefore, the theoretical

constructs for regional settlement pattern studies were initially drawn from scientific disciplines such as ecology and systems theory (Hardesty 1980). By 1980, economic theory was incorporated into the models of settlement systems and hunter-gatherers were increasingly viewed as optimizing foragers (Winterhalder & Smith 1981).

In each of these approaches, patterned movement across the landscape is based on a knowledge of the spatial (*i.e.*, patch distribution) and temporal (*i.e.*, seasonality) clustering of resources. Further, short term harvesting strategies are designed to maximize or optimize the caloric return (*e.g.*,

Winterhalder and Smith 1981), while long-term collection strategies are devised to sustain the population without exceeding the carrying capacity of the environment (*e.g.*, Casteel 1979). In a cogently formulated argument, Binford (1980) even manages to relate the subsistence and settlement strategies of hunter-gatherers to primary biomass which he then links to external climate variables, namely temperature and precipitation. In more recent approaches, environmental variables and economic principles persist as important determinants of site location but now powerful new tools in spatial analysis (GIS) are used to refine predictive models of settlement systems (Kvamme 1992).

On the northwestern Plains of North America, models of settlement systems are, for the most part, based on the ecology and behaviour of bison (*e.g.*, Arthur 1975; Bamforth 1988; Epp 1988; Hanson 1984; Morgan 1980; Peck 2004). The annual subsistence round is often described in terms of the seasonal migration patterns of bison herds. Although there is some debate over the nature and size of the migrating herds (*e.g.*, Epp 1988), the bison are generally assumed to have moved from their winter pastures in the shelter of the foothills, parkland or river valleys, to their summer pastures on the open grasslands. Bison behaviour also serves to explain seasonal patterns of human aggregation and dispersal (*e.g.*, Morgan 1980; Vickers 1991). Thus, human groups aggregate during seasons when large herds are present and disband into smaller family groups as the bison herds disperse across their summer or winter ranges. In addition, the territories of these groups are defined on the basis of constraints imposed by the distribution of critical resources (*e.g.*, water and fuel) and the prevailing mode of transportation (*e.g.*, Graspointner 1981; Vickers and Peck 2004). Thus, even though bison herds range over vast areas, the territories or annual subsistence ranges of the Plains hunters are generally limited by the scarcity of water and fuel and/or the prevailing transportation technology, the dog travois.

Theoretical constructs based on the principles of ecology, systems theory and economy are, of course, not the only frameworks available when studying mobility and territoriality. Post-processual approaches such as landscape archaeology, for example, place a greater emphasis on human agency, praxis and structuration as determinants of settlement systems (*e.g.*, Barrett 2001). From this perspective, mobility is still an important consideration (Oetelaar and Meyer in press) but the patterned movement of populations across the landscape is based on the need to fulfill not only economic needs but also social and religious obligations (*e.g.*, Tilley 1994). To accomplish these goals, human groups follow a network of paths connecting important places on the landscape. These places may or may not be associated with specific subsistence resources but they all have names, stories, songs and rituals (*e.g.*, Basso 1996a, 1996b). More importantly, the places and the associated rituals and narratives constitute the collective memory or oral tradition of the group. Places thus become anchors for traditional knowledge and the landscape becomes the archive of the group. Travel across the landscape is much more than a quest for resources, it is an excursion through the history of the group.

Attempts to evaluate the relative merits of a scientific or phenomenological approach to the study of mobility and territoriality are often constrained by the differences in archaeological practice. The study of regional settlement patterns, for example, involves the location of archaeological sites within a defined region, the identification of roughly contemporaneous occupations, and the definition of a settlement system based on the functional relationships among the sites. The resultant models of settlement systems assume that the distribution of settlements on the landscape are the result of a cycle of economic activity over the four seasons of a year (Dewar & McBride 1992). However, most archaeological sites are, in fact, the result of a history of occupation, not all of which may have included the same number of people performing essentially the same types of activities at the same time of year. By contrast, the phenomenological approach of landscape archaeology focuses on the history of occupation at individual sites and explores this continuity in the use of place (*e.g.*, Oetelaar & Oetelaar in press a; Tilley 1994). Fortunately, such long-term land use has also been explained in terms of ecological variables (*e.g.*, Binford 1983; Dewar 1986; Dewar & McBride 1992; Smith & McNees 1999; Wandsnider 1992). The objective of this paper is to explore aspects of mobility and territoriality by examining the history of human occupation at a deeply stratified site in the Cypress Hills, a localized upland in the heart of the prairies in southeastern Alberta, Canada. This site, which has been the subject of detailed excavations over the past five years, is used to evaluate the different models of long-term land use by hunter-gatherers.

The site and its setting

The research discussed in this paper forms part of the SCAPE project, a 5-year multidisciplinary research effort designed to study cultural adaptations within the prairie ecozone. The primary objective of this project was to study human perceptions and uses of selected upland locales on the Northwestern Plains at five critical intervals during the Holocene. The five selected "time slices" of 9000, 6000, 3000, 1500 and 500 BP represent recorded intervals of significant environmental and cultural change within the Prairie Ecozone. The Prairie Ecozone, formerly the home of immense bison herds, represents the expansive tracts of grasslands found in southeastern Alberta, southern Saskatchewan, and southwestern Manitoba, Canada. Although generally view as a flat, featureless landscape, this portion of the Northwestern Plains actually includes a mosaic of landforms such as lake plains, dune fields, deeply entrenched river valleys, and localized uplands. Upland locales were selected for study since these represent areas of ecological diversity which were considered important to Indigenous populations. Unfortunately, many of these locales have been subjected to only limited archaeological investigation even though they are often included in our models of human adaptation, particularly during the Hypsithermal. On the Northwestern Plains, the Hypsithermal, dating between 9200 and 5900 BP, is generally characterized as an episode of decreased precipitation and increased temperatures resulting in lowered water tables, increased salinity in ponds and lakes, expanded

grasslands and increased fire frequency (Anderson *et al.* 1989; Vance *et al.* 1995). Archaeological sites dating to this interval are relatively uncommon on the Northwestern Plains and the Hypsithermal is often implicated as the reason for the abandonment of the grasslands or for a radical change in settlement patterns (*e.g.*, Buchner 1980; Forbis 1992; Husted 2002; Sheehan 1994, 1995, 1996 but see Albanese 2000; Artz 2000; Bettis 1995; Mandel 1992; Reeves 1973; Walker 1992; Waters & Kuehn 1996 for alternative explanations).

The Cypress Hills as research locale

The decision to focus on the Cypress Hills as a localized upland reflected a number of important considerations (fig. 1). First, the Cypress Hills represent an important landmark (*e.g.*, Binnema 2001) and destination (*e.g.*, Graspointner 1981; Uhlenbeck 1912) for the Nitsitapii, the local Indigenous population. Second, this landform occurs some distance from the mountains and foothills well within the grasslands and thus constitutes an "oasis in a sea of grass" (*e.g.*, Bonnichsen & Baldwin 1978; Holmes 1970). Third, the unique geology, ecology and climatology of the Cypress Hills has been the subject of much research (*e.g.*, Breitung 1954; Godfrey 1950; Halladay 1965; Holmes 1969, 1970; Krämer 1971; Newsome & Dix 1968; Russell 1951; Westgate 1968), including several recent studies focussing on the nature and extent of changes

to the ecophysical landscape throughout the Holocene (*e.g.*, Klassen 1994; Lemmen & Vance 1999; Lemmen *et al.* 1998; Sauchyn 1990, 1993; Sauchyn & Nelson 1999; Sauchyn & Sauchyn 1991; Vreeken 1986, 1994, 1996).

Archaeological research in the Cypress Hills, though somewhat limited, clearly identifies this upland as an important destination for Indigenous populations throughout the Holocene (*e.g.*, Bonnichsen & Baldwin 1978; Graspointner 1980, 1981; Gryba 1972, 1975). Further, the locality figures prominently as a wintering area in our models of seasonal migrations; as an important location for the collection of specific resources such as lodge poles and berries (*e.g.*, Graspointner 1980); and as a potential refugium during the Hypsithermal (*e.g.*, Buchner 1980). Similarly, recent mitigation work along a transect through the southeastern corner of the province suggests that the densest concentrations of tipi rings occurs in the vicinity of the Cypress Hills (Landals 1998). Clearly then, the Cypress Hills represent an important destination for Indigenous populations and an ideal laboratory to test our models of mobility and long-term land use by nomadic bison hunters.

Selection of the stampede site

The archaeological component of the project focused on human adaptations to the changing physical and ecological

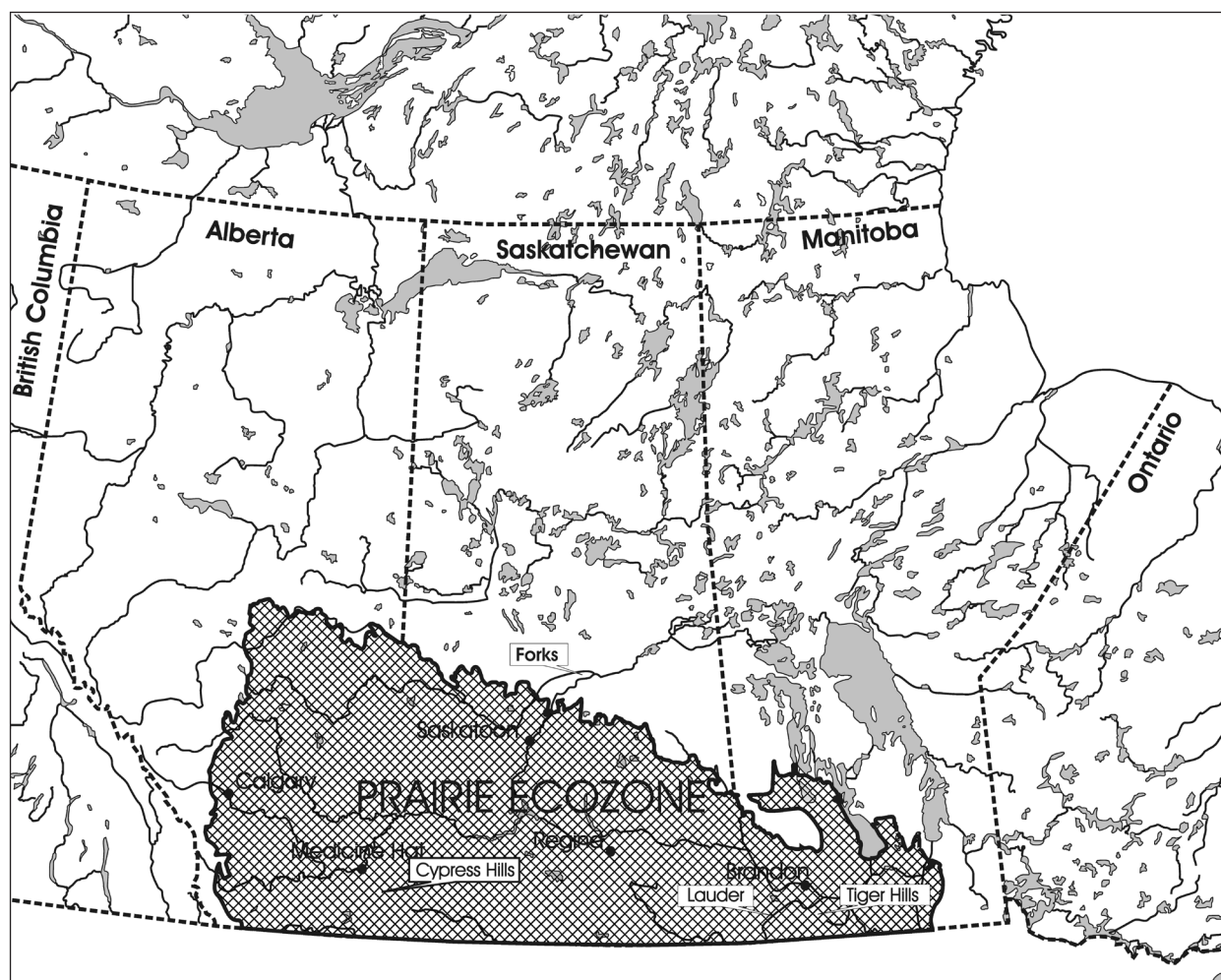


Figure 1. Map of western Canada showing the location of the research areas for the SCAPE project.

setting of the Cypress Hills throughout the Holocene. The primary objective of our research was to identify the nature and seasonality of human occupations and to determine whether or not human groups altered their settlement strategy, subsistence orientation, technology, and/or social organization to accommodate changes in the local and regional plant and animal communities. As noted previously, such research objectives can be addressed through limited excavations at a number of sites or through detailed investigations of a single site. Each of these approaches has its strengths and weaknesses. The former, for example, yields information on the age of the deposits and the season of occupation at several locations but provides only limited data on the history of occupation at specific sites. Given a sample of roughly contemporaneous sites occupied during different seasons of the year, researchers can address questions of scheduling and seasonality, central concepts in ecological models of settlement systems. The second approach (intensive investigations of a single site) provides much more detailed information on the history of occupations at one site but fails to address the variability in occupations across space. Given its emphasis on the evidence for continuity in the patterned use of the landscape, this strategy allows researchers to evaluate the relative impact of ecological, economic and ideological variables on long-term site use.

In southeastern Alberta and southwestern Saskatchewan, models of settlement systems based on extensive surveys have been proposed by Adams (1976, 1978), Brumley (1983), Brumley & Dau (1988), Landals (1998), Friesen (1998), and Johnson (2004). To date however, no one has evaluated these models using the history of occupation at a single site. The

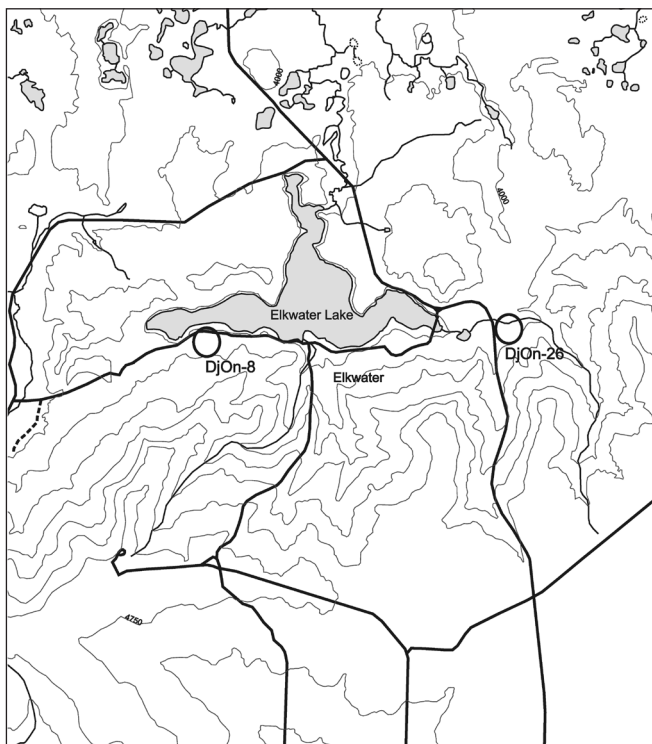


Figure 2. Topographic map of Elkwater Lake showing the location of the Stampede site (DjOn-26).

SCAPE project provided a unique opportunity to study the nature of long-term land use patterns in the Cypress Hills through a detailed investigation of the Stampede site (DjOn-26). This deeply stratified site is located in a small clearing along the forested north slope of the Cypress Hills. A spring-fed stream flows by the site and empties into Elkwater Lake, situated just beyond the northern and western limits of the site (fig. 2).

The unique combination of alluvial and colluvial processes operative along the north slope of the Cypress Hills has created an ideal environment for the preservation of archaeological deposits. At the Stampede site, for example, sporadic sediment influx has created a deposit where cultural materials are stratigraphically separated from one another by 10 or more cm of essentially sterile sediments (fig. 3). Such stratigraphic separation obviously decreases the amount of mixing between assemblages and allows researchers to examine and study entire inventories, not only diagnostic artifacts. It is thus possible to study not only the arrangement of facilities during successive occupations but also the nature and diversity in the assemblages of tools, debitage, bones, and plant remains. Such data have enabled us to examine changes in the settlement strategies, subsistence orientation, and technological organization through time and to relate these to the documented changes in the ecophysical environment.

The excavations

Over the past five field seasons, we have concentrated our excavation efforts in one pit which now measures nine meters north-south by eight meters east-west and extends six meters below surface. In the process, we have exposed a layer of volcanic ash, a slump block of cobbles and a total of thirty-one paleosols, eighteen of which include evidence of human occupation. The cultural materials uncovered within these buried soils include hearths (fireplaces), small pits (presumably used for stone boiling), tools, debitage, and bone fragments. The assemblage of tools collected from each one of these occupations includes projectile points, scrapers, drills, awls, needles, and beads. The majority of these items are normally used in the performance of domestic activities. The lithic debitage, most of which consists of retouch or resharpening flakes, derives from local raw materials, primarily cobbles from the nearby Cypress Hills Formation. Similarly, the faunal remains consist of small comminuted bone fragments, most of which are too small for identification. More importantly, the dense concentrations of small debris (<2 cm) in the immediate vicinity of the hearths suggest intervals of prolonged occupation with periodic maintenance of these intensively used work spaces. Although these work spaces may have been located inside structures, the remains of only one possible dwelling were noted during excavation.

One of the most intriguing aspects of this deeply stratified site is the remarkable continuity in the use of space. For example, the hearths exposed in successive occupations occur in essentially the same locations within the site. In some instances, the remains of successive occupations occur in distinct paleosols separated by ten centimetres of essentially sterile sediment.

DjOn -26
South Wall
Units 2, 17-20, 25, 42, 57-64

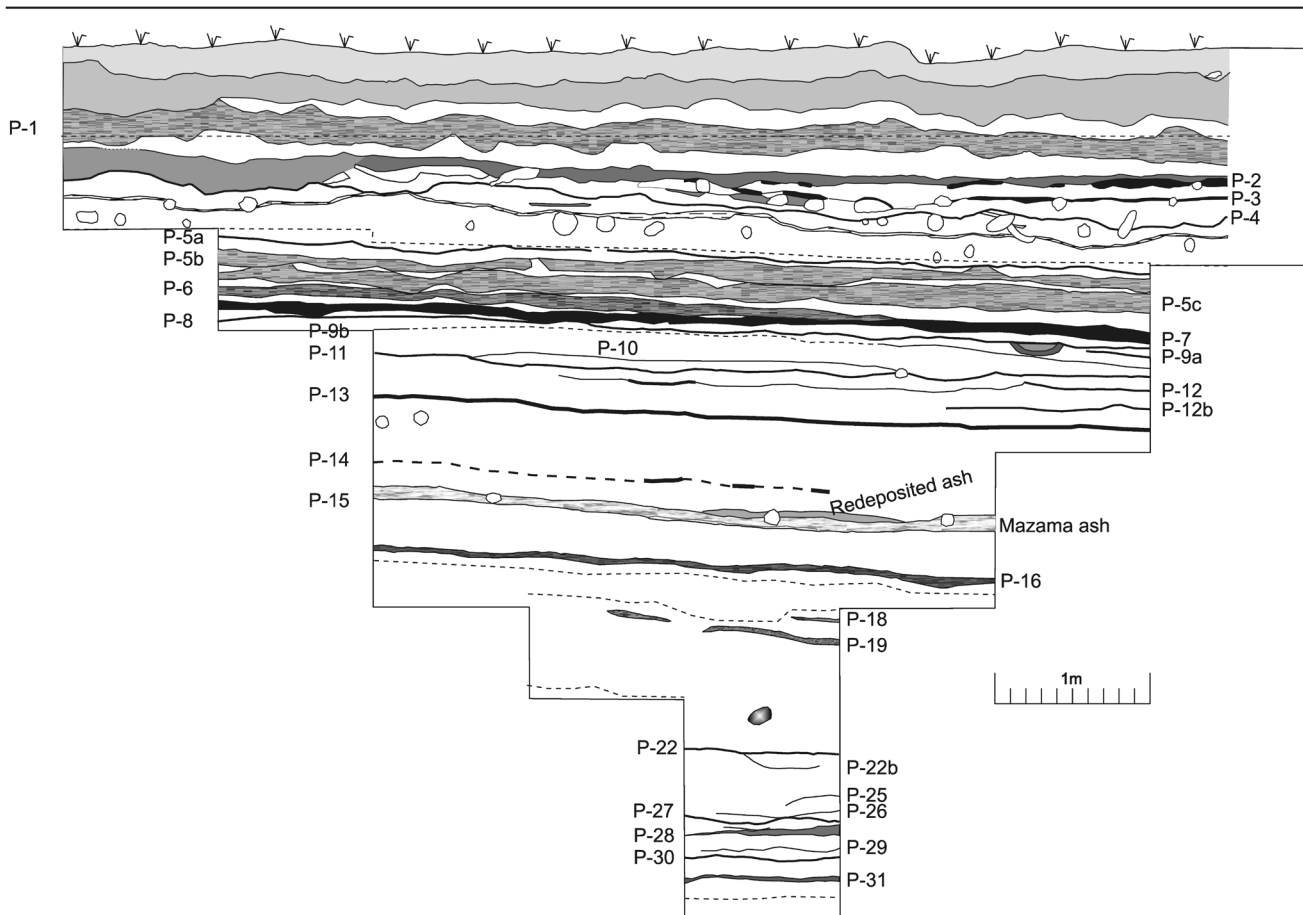


Figure 3. Profile of the south wall of the excavation at the deeply stratified Stampede site showing the buried paleosols and the layer of Mazama ash.

In other cases when sediment influx was negligible, the successive occupations have created palimpsests with evidence for the repeated use of the same facilities. More importantly, this continuity in the use of place has persisted for some 5000 years as indicated by the radiocarbon dates for the earliest (8000 BP) and more recent (ca 3000 BP) occupations at the site. In fact, the spatial congruence observed for successive occupations has been maintained despite dramatic changes in the nature and rate of sediment influx. For example, some buried soils and their associated artifacts are separated by thick sediment packages deriving from major flood events and a local landslide. Similarly, a major volcanic eruption originating in southwest Oregon deposited a layer of ash which is still 10 cm thick despite being compacted beneath three metres of silt. This catastrophic event probably forced the abandonment of the area for several decades, if not more. Yet, upon their return, the next generation of occupants not only occupied the same place but also set their hearths in roughly the same location. Even the prolonged aridity of the Hypsithermal did not seem to have an impact on the long-term land use patterns at the site.

In his discussion of long-term land use, Dewar (1986) introduces the concepts of spatial congruence and temporal continuity to describe the settlement history of a location or

site. Spatial congruence refers to the spatial displacement observed between occupation events. High spatial congruence is equivalent to reoccupation with direct superposition and is thus roughly synonymous with reuse as defined by Brooks and Yellen (1987:69) and reoccupation as defined by Camilli (1983:71). Brooks & Yellen (1987:69), in turn, define reoccupation as the repeated use of a place without spatial congruence, something Camilli (1983) refers to as multiple occupations of a place. By contrast, temporal continuity refers to the frequency and duration of successive occupations. High temporal continuity occurs when a location is occupied frequently with each occupation lasting a long time. In terms of these concepts then, the successive occupations at the Stampede site exhibit both high spatial congruence and high temporal continuity.

In their discussion of long-term land use, Dewar & McBride (1992:227) introduce and define remnant settlement patterns as "...the spatial and temporal dynamics of past people's use of places and the way those dynamics changed through time". They identify three sets of processes that affect remnant settlement patterns in the archaeological record (Dewar & McBride 1992:230). The first of these includes long-term site formation and preservation processes which consist of both on site human activity and the burial and preservation

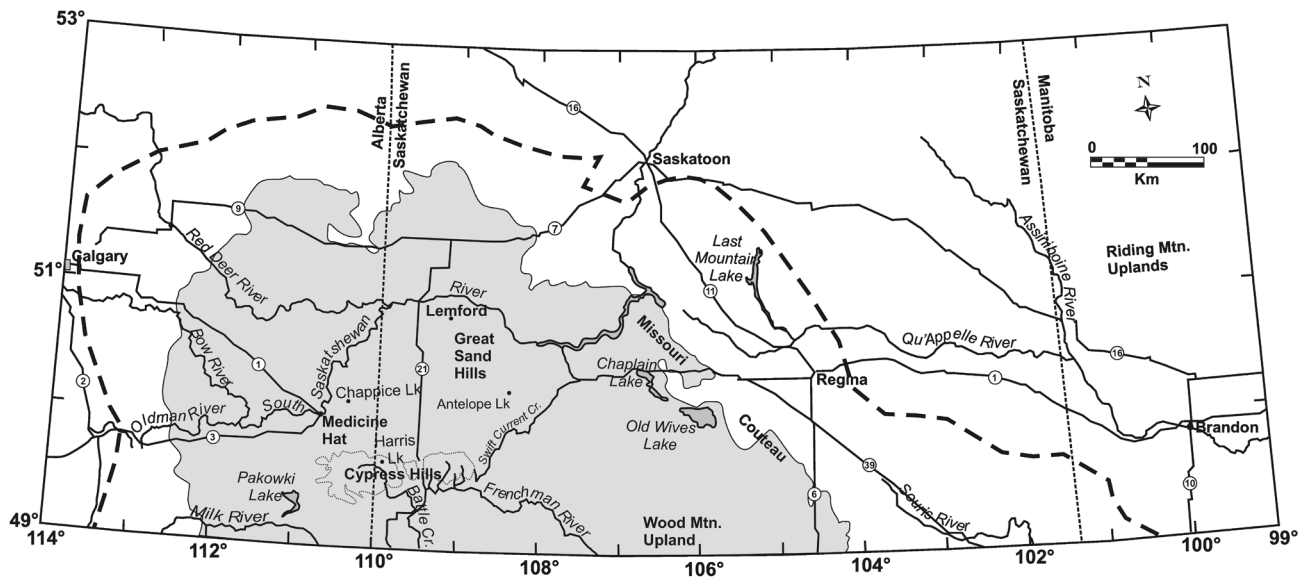


Figure 4. Map of the Prairie Ecozone (dashed line) and the Brown Chernozemic Soil Zone (shaded area) showing the extent of the Cypress Hills (adapted from Lemmen and Vance 1999).

of debris. An ideal setting such as the Stampede site is one where successive occupations are sealed by layers of essentially sterile sediment. The second set includes short-term processes that determine the locational and seasonal features of the sites used during an annual subsistence round. These processes are responsible for some kinds of intersite and interassemblage variability. Dewar & McBride (1992:230) also identify medium-term processes that are responsible for year-to-year variability in the geographical positioning and content of assemblages from residential bases, field camps, special-purpose sites, and locations. Medium-term processes include human responses to year-to-year cycles of resource availability, of both natural and human cause, and are thus responsible for settlement shifts. Such settlement shifts are reflected by changes in the density and diversity of artifacts represented in successive occupations.

Considerations in the selection of site location

Before addressing long-term land use at the Stampede site, it is necessary to evaluate the potential reasons for the selection of this location as suitable for habitation. From an ecological perspective, the most favourable locations strategically position the group relative to natural resources such as water holes or the intersection of two or more productive patches (e.g., Kelly 1995). As noted above, the diversity of resources in upland locales such as the Cypress Hills has attracted human and animal populations. In fact, the Cypress Hills contain many food and non-food resources that are not available in the surrounding grasslands. Therefore, the concentration of unique resources may have encouraged people to select this upland for human occupation. However, this unique ecological community extends for hundreds of kilometres east-west and some five kilometres north-south (fig. 4). There are thus numerous locations available for human occupation. Furthermore, each one of these places has ready access to potable water, fuel, and food. Therefore, the unique resources may have attracted human groups toward the Cypress Hills but

this variable cannot account for the selection of a particular place as a locus for habitation.

As noted by Oetelaar and Meyer (in press), movement across the landscape can influence the selection of suitable locations for establishing camps. In this context, it is interesting to note that movement toward the Cypress Hills from the north is constrained by Elkwater lake (fig. 5). To set up camp in the shelter of the forested north slope, nomadic groups would have had to travel around the east or west ends of the lake. Significantly, the Stampede site is located near the southeastern margins of the lake while another important site (DjOn-8) is situated near the southwestern corner of the lake (Brumley *et al.* 1981).

It is perhaps important to note that several cores extracted from Elkwater Lake have failed to yield dates older than 5,000 BP (Lowton *et al.* 1971; Vance & Last 1994). Thus, the lake may not have been present in the area during most of the occupation at the Stampede site. However, a recent date from a slump block suggests that the lake may have formed as early as 9,440 BP when a landslide impeded the natural westward flow of water within the glacial meltwater channel (Wiseman *et al.* 2002). If so, the lake may have been present during the early Holocene but may have dried up during the Hypsithermal creating an impermeable barrier to the coring devices used on the lake. In short then, the constraints imposed by Elkwater Lake on movement through the area may have influenced the selection of this particular location for the establishment of a campsite.

Access to the site from the south is also constrained by the steep northern slope of the Cypress Hills (see fig. 5). Although humans can negotiate steep inclines, such is not the case for dogs dragging a travois (Henderson 1994). Again, a long ravine with a relatively gentle slope extends from the top of the hill to the eastern edge of Elkwater Lake. Although the slope may have been adequate for the prevailing mode

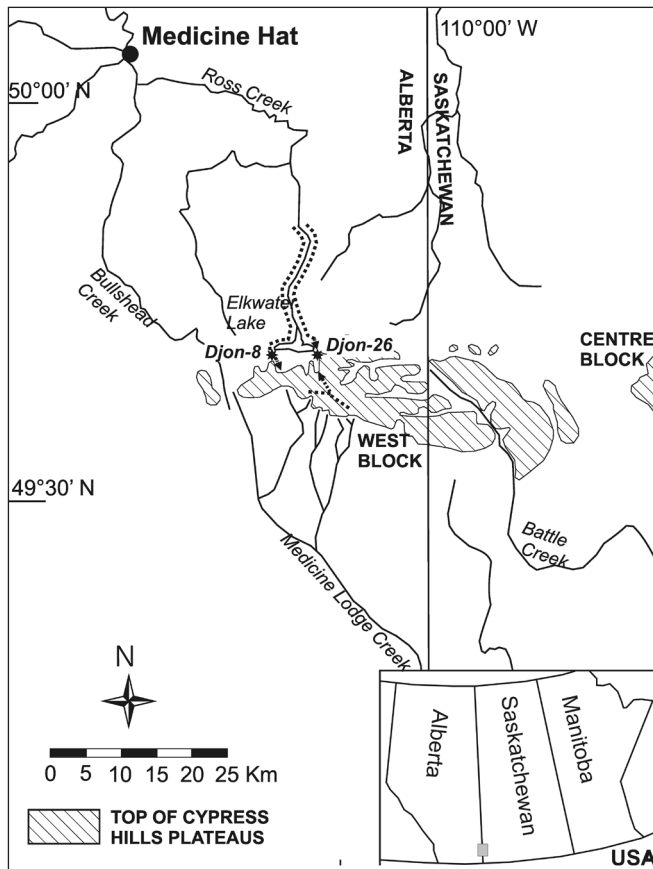


Figure 5. Map of the West Block showing possible access routes to the Stampede site from the north and south.

of transportation, the trees and shrubs growing in the ravine would have impeded the movement of a dog pulling a travois. Fortunately, this problem could have been alleviated by burning the brush, a strategy commonly used by Indigenous populations to maintain such travel corridors (Lewis & Ferguson 1999). Ironically, Highway 41, the principal road leading to the Cypress Hills, follows this ravine on its way to the US border some 140 kilometres to the south. In short then, human groups moving toward the Cypress Hills from the north or south can readily access the Stampede site and this factor may explain the selection of this particular location for the establishment of a campsite. Although access is an important consideration, other variables must account for the high spatial congruence and the high temporal continuity observed among successive occupations at the site.

Ecology and long-term land use

In his discussion of territoriality and long-term site use, Binford (1983) argues that the Nunamiut exploit resources within an annual range which he believes shifts every six to nine years within a larger extended range. The extended range essentially encompasses the territory occupied during five successive changes in the location of annual ranges. That is, every 45 years, or the average lifetime of a hunter, the group returns to occupy the first of the five annual ranges. According to Binford (1983), this shift in the annual range is required because critical resources such as fire wood, animals, and plants are depleted while, at the same time, the quantity

of domestic debris, commensal vermin and flies increases (see also Dewar & McBride 1992; Smith & McNeas 1999; Wandsnider 1992).

As the annual range shifts from one locale to the next, some of the sites continue to be occupied seasonally but their function changes. That is, a particular location on the landscape might be used as a residential base camp while the group's annual range is based in this segment of the extended range. Later, when the group's annual range shifts slightly, this same place would be used only as a temporary field camp or location. This change in site function is generally reflected in the density and diversity of the artifact assemblages from the different occupation events. At the Stampede site however, the nature of the facilities and the artifact assemblages does not change from one occupation to the next suggesting no change in site function.

According to Binford (1983), the long-term mobility options of adjacent groups would decrease as the population in an area increased through time. Under these circumstances, the long-term site use would increase but the function of the site would not necessarily change. A decrease in mobility would result in a more stable, structured, long-term land use pattern that involved the periodic use of locations and locales on the landscape over longer periods of time. In fact, Binford (1983:49) argues that this change in long-term land use would lead to an intensification of subsistence strategies, the development of new storage technologies and eventually the domestication of plants and animals. Although there exists evidence of long-term land use in portions of the Plains during the Hypsithermal interval (*e.g.*, Metcalf & Black 1997; Smith & McNeas 1999), none of the researchers attribute the occupation history at these sites to demographic pressures. If anything, most researchers envision a decrease in population within the Great Plains as a result of the changes brought on by the Hypsithermal (*e.g.*, Buchner 1980; Forbis 1992; Meltzer 1999; Husted 2002). At the Stampede site, there are certainly no indications of a change in population throughout the episode of occupation. Further, the number of sites dating to the Hypsithermal (*i.e.*, 8000 to 3000 BP) is very limited for southeastern Alberta and southern Saskatchewan (*e.g.*, Epp & Dyck 1983; Vickers 1986), even though the Cypress Hills are often assumed to have served as a refugium during this interval of aridity (*e.g.*, Buchner 1980).

Unlike Binford (1983) who relies primarily on resource structure and population density, Wandsnider (1992) bases her assessments of long-term land use on the use-life of the site and the associated facilities. She defines the reoccupation interval and the reoccupation interval variation in terms of the facility use-life, the site use-life, the site regeneration interval, and the facility decay interval. Facility use-life refers to the amount of time a facility or structure remains usable whereas site use-life is the length of time a location may be used before becoming polluted and vermin-ridden or before the immediate environment becomes depleted of critical resources. The site regeneration interval is the time required for the pollution to abate or the resources to rebound while the facility decay interval refers to the amount of time

after which no trace of the facility remains visible. According to Wandsnider (1992), the tactical decisions about site reuse are based on cost-benefit determinations, particularly those associated with reusing, maintaining and/or rebuilding/relocating the feature or campsite.

In locations where space use is not constrained by physical features such as cave walls, high spatial congruence and high temporal continuity occurs only in situations where facilities remain usable and visible, where site pollution is minimal, and where resource structure can sustain repeated exploitation. That is, human groups must be able to return to the same location without depleting the local resources and they must implement strategies to reduce the accumulation of debris. Further, the groups must construct durable facilities which will enable them to reuse the site with a consistent arrangement of people and activity areas. Although common among sedentary populations, such strategies are assumed to be rarely employed by hunter-gatherers and, as a result, their habitation sites are not expected to exhibit high spatial congruence and high temporal continuity.

As noted by the numerous authors in Minnis & Elisens (2000) and Williams & Hunn (1982), hunter-gatherer groups use a variety of management strategies to maintain or improve the productivity of the local environment. Similarly, the majority of nomadic groups also employ different strategies to maintain a living space (e.g., Brooks & Yellen 1987; Kroll & Price [dir.] 1991; O'Connell 1987). Finally, hunter-gatherer groups can and do construct facilities designed for long-term use, well in excess of the seasonal interval of occupation. At the Stampede site however, facilities are limited to shallow basin-shaped hearths with minimal modifications and thus have few if any associated costs. Similarly, the accumulated debris clearly displays evidence of periodic maintenance but this material is also frequently concealed beneath a fresh layer of alluvium or colluvium. Thus, there would be few if any surface indications of the spatial organization used by previous occupants of the site.

As noted by Wandsnider (1992), these generalizations about occupation history do not hold in situations where space is constrained socially or physically. At preferred locations in constrained space, facility maintenance and refurbishing tends to become the norm, even for hunter-gatherers. That is, in caves and rock shelters where space is physically limited, high degrees of spatial congruence and temporal continuity are expected. In the case of the Stampede site, it is important to remember that the excavated portion of the site is located in a small clearing which has persisted for well over fifty years now. A similar clearing may have been present at the time of occupation and may have imposed physical constraints on the patterned use of space. In fact, anthropogenic modifications of any living space often will leave an imprint on the landscape for several years enabling people to use subtle clues when reusing a particular place. Of course, there are costs associated with the establishment and maintenance of such clearings and the resultant space effectively becomes a place for the occupants of the site. The organization and use of space within this clearing however will probably reflect the

ideology and social organization of the group rather than the minor modifications visible after a period of abandonment.

In their study of long-term land use patterns, Smith & McNees (1999) argue that human modifications to the landscape play a significant role in this reuse of specific campsites and other occupation locations. Although the modifications most commonly discussed have a negative impact on the desirability of a location for reoccupation (e.g., resource depletion and refuse accumulation), the authors do identify a number of modifications that increase the desirability of a place for repeated use. Such alterations include the construction of facilities for shelter, storage and processing; the manufacture and on-site storage of camp furniture such as large, formalized grinding stones; and the caching of tools and raw materials (Dewar & McBride 1992:233). Deliberate ground and vegetation disturbance to promote the growth or enhanced productivity of certain resources such as seed-rich weedy plant species and root patches are also considered as desirable modifications of the landscape (Dewar & McBride 1992:233; Smith & McNees 1999:118).

Smith & McNees (1999:118) are particularly interested in the construction of relatively costly facilities for anticipated future use at locations which are occupied only briefly during any given year. Investment in such facilities implies a multi-year planning depth where the cultural features actually become a resource which encourages the repeated use of a particular location such as the Stampede site. Smith & McNees (1999) use the presence of slab-lined cylindrical basins near productive patches of biscuitroot to argue for a stable, structured, long-term land use pattern by hunter-gatherers in southwest Wyoming. Further, the occupation history involved the periodic use of locations and locales on the landscape over periods of centuries and millennia between 6500 and 3120 BP, an interval that is encompassed by the occupations at the Stampede site in Alberta. In southwest Wyoming however, the slab-lined features had vertical walls that usually extended above the ground surface, perhaps to facilitate their relocation. In fact, the visibility of the features may account for the stable, structured, long-term land use pattern observed at these sites. At the Stampede site however, only one of the forty hearths is lined with stones which could have been visible after an influx of sediment. Thus, the spatial congruence and temporal continuity at this site cannot be attributed to the construction of facilities which may have been visible after episodes of site abandonment.

In summary then, long-term land use patterns can be explained in terms of ecological variables but most of these do not seem to apply in the case of the Stampede site. From an ecological perspective, for example, the continued or repetitive use of a locale such as the Cypress Hills is constrained by the nature and productivity of the resources and the interval required for depleted resources to attain desirable levels. However, this assumption ignores the management strategies employed by most nomadic groups to maintain or increase the density of desirable resources. According to the proponents of the ecological models, the reuse of a location such as the Stampede site is also constrained by the accumulation of domestic

debris and the infestation of commensal pests. Again, this observation ignores the evidence of regular site maintenance by nomadic groups. In fact, most hunter-gatherers anticipate the duration of occupation at a particular location and implement the appropriate level of site maintenance. Finally, the spatial congruence and temporal continuity observed at the Stampede site is normally attributed to the presence of costly and highly visible facilities. Again, this assumption ignores the importance of social and ideological variables in the organization and use of space within an encampment. These cultural variables are considered below in the discussion of the phenomenological approach to mobility and territoriality.

Landscape and long-term land use

Although landscape archaeology has been defined in a number of different ways (Anschuetz *et al.* 2001), the perspective adopted here is the phenomenological approach advocated by Tilley (1994). Phenomenology involves the understanding and description of things as they are experienced by a subject. Landforms and resources are, of course, real but the description and interpretation of geographical features and the associated resources are social constructions just as are the microniches of ecologists, the drainage basins of hydrologists, and the glacial sediments of geomorphologists. These social constructs obviously vary among societies and groups; that is, not all groups classify and interpret the world around them in the same way. More importantly, few if any Indigenous groups use the classificatory schemes adopted by ecologists, geologists, or archaeologists trained in western science.

The social constructs, in turn, are based on and reflect the day to day practices of individuals and groups around the world. In those day-to-day activities, people have encounters with geographic features, with plants, with animals, and with other people. More importantly, the majority of Indigenous populations interact with many of these "real" entities through spiritual intermediaries. The encounters, interactions and activities occur at specific places in the house, in the settlement and on the landscape. To Indigenous populations then, the landscape is a social construct consisting of places, not the abstract spaces of western science. These places have names as well as associated legends, myths, songs, rituals, and stories. The places are connected by real as well as metaphorical paths which represent the countless journeys of generations of people, all of whom shared a similar relationship to the landscape (*e.g.*, Ingold 1993).

To Indigenous groups, places include an element of reality, one of perception, and one of habitual behavior (Ingold 1993). Thus, places are real things on the landscape such as mountains, hills, and rocks; rivers, lakes, river crossings, and water holes; forests, trees, and lone pines; camp sites, rock art sites, and medicine wheels. Of the numerous features present on the landscape, those serving as navigational landmarks are often the ones that have assigned names and narratives (Oetelaar and Meyer *in press*). Perceptions of the places are often based on myths and oral traditions which provide explanations for the origins of these important features on

the landscape (*e.g.*, Morphy 1995; Rapaport 1975). That is, the named places were created by spirits and ancestral beings who left behind songs, sacred objects, and practices to commemorate their creative acts. They also left behind them, in the ground, spiritual forces which could be released by ceremonial actions. During their annual cycle then, groups re-enact the wanderings of mythological heroes by following the same paths and stopping at specified places - trees, rocks, water holes, and specific camp grounds - to perform activities and ceremonies in a prescribed order. More importantly, this ritual pilgrimage is necessary to re-establish ties with the ancestors, to renew friendships with neighbouring groups, to repeat the narratives associated with these places, and to manage the resources across the homeland. The patterned movement across the landscape therefore involves more than the collection of one or more resources (*e.g.* bison); it is designed to promote the renewal of one's culture and homeland, including the associated resources.

As the groups move across this landscape, they share experiences while visiting places. In the process, every mountain, knoll, aspen grove, and river crossing becomes a familiar place and regular passages through the landscape become biographic encounters for individuals as they recall traces of past activities and previous events (Tilley 1994). Each place thus acquires its unique history over and above the associated myths and legends. Places are also marked with individual, family, and shared symbols to define the relationship between social groups and specific features and places (Taçon 1994). That is, unlike Euro-canadians who name landmarks after important personages, Indigenous people take on the name of the significant landscape features. Thus, the narratives associated with specific places on the landscape not only commemorate the act of creation but also establish the continuity between ancestral beings, social groups, and the land.

From a phenomenological perspective then, the landscape is a series of named places linked by paths, movement and narratives. The places serve as mnemonic pegs for the oral traditions of the group which, when connected by metaphorical paths, constitute the archive for the group. This archive includes not only creation myths and historical narratives but also codes of ethical conduct toward the land, the people and the resources. These are the strategies for survival in the homeland. At the same time, places, narratives and ceremonies establish continuity between the spirits, ancestors, living community, resources and land. Movement across the landscape thus becomes a ritual pilgrimage designed to renew the culture and the landscape of the group. Significantly, the entire landscape is necessary to tell the story, to complete the annual ritual cycle, and to ensure the renewal of all essential resources. That is, the territory is defined by the ideology of the group whereas the movement across this homeland is designed, first and foremost, to fulfill the social and ideological obligations of the group.

According to the phenomenological perspective then, human modification of the landscape plays a significant role in the reuse of specific campsites. However, the modifications to

the landscape are symbolic and social, not technological or economic. From this perspective, a stable, structured, long-term land use pattern should be the norm rather than the exception among hunter-gatherers. In this world, groups have a social and moral obligation to return again and again to the same places to renew their culture, their social relationships, and their connection to the land. Furthermore, this social and ideological connection to place engenders a systematic arrangement of people and work spaces at a locus of habitation and thus contributes to the spatial congruence and temporal continuity observed at the Stampede site.

How then does one account for the negative impacts of such long-term land use? As noted elsewhere (Oetelaar and Oetelaar in press b), nomadic groups can and do circumvent the depletion of local resources by implementing management strategies to increase the productivity of desirable resources. In fact, such strategies form an integral part of the oral histories and have been used for millennia in North America. As a result, the pristine ecological communities identified by ecologists actually represent the anthropogenic creations of hunter-gatherers. Similarly, nomadic groups have employed various strategies to control the accumulation of domestic debris and the quantity of commensal pests. Therefore, the impact of this constraint on the repeated use of a site can be considered negligible. Finally, only social and ideological factors can explain the spatial congruence and temporal continuity observed at the Stampede site.

Conclusion

In this paper, we have explored the long-term land use pattern observed at the Stampede site and used this information to compare and contrast ecological and phenomenological approaches to mobility and territoriality among hunter-gatherers on the Northwestern Plains of North America. Ecological approaches have identified negative and positive influences on the long-term use of particular locations for prolonged human occupation. Negative influences generally center on the depletion of local resources, the accumulation of household garbage, and the infestation of commensal pests. Unfortunately, these inferred constraints on long-term site use ignore the management strategies employed by most nomadic groups to maintain or increase the productivity of desirable resources and the implementation of regular site maintenance activities to control the deterioration of the living environment. In fact, most hunter-gatherers anticipate the duration of occupation at a particular location and implement the appropriate level of site maintenance and resource management. Positive influences include the construction of durable facilities for shelter, storage and processing; the manufacture and on-site storage of camp furniture such as large, formalized grinding stones; and

the caching of tools and raw materials. Also included in this category is the deliberate disturbance of ground and vegetation to establish a clearing for a campsite and to promote the growth or enhanced productivity of certain desirable resources. Although resources and facilities are important contributors to long-term land use patterns, neither of these factors provides a satisfactory explanation for the spatial congruence and temporal continuity observed at the Stampede site.

The phenomenological perspective, in turn, relies more heavily on social and ideological variables to explain the stable, structured, long-term land use pattern observed at the Stampede site. From this perspective, mobility is still an important consideration but the patterned movement of populations across the landscape is based on the need to fulfill not only economic needs but also social and religious obligations. To accomplish these goals, human groups follow a network of paths connecting important places on the landscape. These places may or may not be associated with specific subsistence resources but they all have names, stories, songs and rituals. More importantly, the places and the associated rituals and narratives constitute the collective memory or oral tradition of the group. Places thus become anchors for traditional knowledge and the landscape becomes the archive of the group. Travel across the landscape is thus much more than a quest for resources, it is an excursion through the history of the group and a ritual pilgrimage designed to renew the culture and the landscape of the group. The oral histories and rituals include lessons on the implementation of management strategies to maintain the balance of nature, as perceived by these nomadic groups. Therefore, the pristine plant communities identified by ecologists actually represent the anthropogenic creations of hunter-gatherers who have lived by these traditions for millennia. These groups also follow strict protocols in terms of their interpersonal relationships and it is these social and ideological variables that account for the spatial congruence and temporal continuity observed at the Stampede site.

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Bibliography

- Adams G. (1976) - *Prehistoric Survey of the Lower Red Deer River, 1975*. Edmonton, Archaeological Survey of Alberta, Occasional Paper 3.
- Adams G. (1978) - *The Alkali Creek Sites*. Edmonton, Archaeological Survey of Alberta, Occasional Paper 9.
- Albanese J. (2000) - Resumé of Geoarchaeological Research on the Northern Plains. In: R.D. Mandel (ed.), *Geoarchaeology in the Great Plains*. Norman, University of Oklahoma Press, p. 199-249.
- Anderson T.W., Mathewes R.W., Schweger C.E. (1989) - Holocene Climatic Trends in Canada with Special Reference to the Hypsithermal Interval. In: R.J. Fulton (ed.), *Quaternary geology of Canada and Greenland*. Geology of Canada 1:520-528.
- Anschuetz K.F., Wilshusen R.H., Scheick C.L. (2001) - An Archaeology of Landscapes: Perspectives and Directions. *Journal of Archaeological Research* 9(2):157-211.
- Arthur G.W. (1975) - *An Introduction to the Ecology of Early Historic Communal Bison Hunting Among Northern Plains Indians*. Ottawa, National Museum of Man Mercury Series 37.
- Artz J.A. (2000) - Archaeology and the Earth Sciences on the Northern Plains. R.D. Mandel (ed.), *Geoarchaeology in the Great Plains*. Norman, University of Oklahoma Press, p. 250-285.
- Bamforth D.B. (1988) - *Ecology and Human Organization on the Great Plains*. Plenum Press, New York.
- Barrett J.C. (2001) - Agency, the Duality of Structure, and the Problem of the Archaeological Record. In: I. Hodder (ed.), *Archaeological Theory Today*. Cambridge, Polity Press, p. 141-164.
- Basso K. (1996a) - *Wisdom Sits in Places: Landscape and Language among the Western Apache*. University of New Mexico Press, Albuquerque.
- Basso K. (1996b) - Wisdom Sits in Places: Notes on a Western Apache Landscape. In: S. Feld & K.H. Basso (eds.), *Senses of Place*. Santa Fe, School of American Research, p. 53-90.
- Beardsley R.K., Holder P., Krieger A.D., Meggers B.J., Rinaldo J.B., Kutsche P. (1955) - Functional and Evolutionary Implications of Community Planning. In: R. Wauchope (ed.), *Seminars in Archaeology: 1955*. Memoir of the Society for American Archaeology 11:129-157.
- Bettinger R.L. (1980) - Exploratory/Predictive Models of Hunter-Gatherer Adaptation. In: M.B. Schiffer (ed.), *Advances in Archaeological Method and Theory, Volume 3*. Academic Press, New York, p. 189-255.
- Bettinger R.L. (1987) - Archaeological Approaches to Hunter-Gatherers. *Annual Review of Anthropology* 16:121-142.
- Bettis III E.A. (1995) - *Archaeological Geology of the Archaic Period in North America*. Boulder, Geological Society of America, Special Paper 297.
- Binford L.R. (1980) - Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4-20.
- Binford L.R. (1983) - Long Term Land Use Patterns: Some Implications for Archaeology. In: R.C. Dunnell & D.K. Grayson (eds.), *Lulu Linear Punctated: Essays in Honor of George Irving Quimby*. Ann Arbor, Anthropological Papers, Museum of Anthropology, University of Michigan 72:27-53.
- Binnema T. (2001) - How Does a Map Mean? Old Swan's Map of 1801 and the Blackfoot World. In: T. Binnema, G.J. Ens & R.C. Macleod (eds.), *From Rupert's Land to Canada*. Edmonton, The University of Alberta Press, p. 201-224.
- Bonnichsen R. & Baldwin S.J. (1978) - *Cypress Hills Ethnohistory and Ecology*. Edmonton, Archaeological Survey of Alberta Occasional Paper 10.
- Breitung A.J. (1954) - A Botanical Survey of the Cypress Hills. *Canadian Field Naturalist* 68:55-92.
- Brooks A. & Yellen J.E. (1987) - The Preservation of Activity Areas in the Archaeological Record: Ethnoarchaeological and Archaeological Work in Northwest Ngamiland, Botswana. In: S. Kent (ed.), *Method and Theory in Activity Areas Research: An Ethnoarchaeological Approach*. New York, University of Columbia Press, p. 63-106.
- Brumley J. (1983) - An Interpretive Model for Stone Circles and Stone Circle Sites Within Southeastern Alberta. In: L.A. Davis (ed.), *From Microcosm to Macrocosm: Advances in Tipi Ring Investigation and Interpretation*. Plains Anthropologist Memoir 19:171-191.
- Brumley J.H. & Dau B.J. (1988) - *Historical Resource Investigations Within the Forty Mile Coulee Reservoir*. Edmonton, Archaeological Survey of Alberta, Manuscript Series 13.
- Brumley J.H., Dau B.J., Greene M., Heikkila L., Quigg J.M., Rushworth C., Saylor S. (1981) - *Archaeological Salvage Investigations Conducted in 1979 and 1980 Within Cypress Hills Provincial Park*. Edmonton, Manuscript on file (Permits 79-91 and 80-108c).
- Buchner A.P. (1980) - *Cultural Responses to Altitheermal Climate Along the Eastern Margins of the North American Grasslands: 5,500 to 3,000 B.C.* Ottawa, National Museum of Man Mercury Series Paper 97.
- Camilli E. (1983) - Interpreting Long-Term Land-Use Patterns from Archaeological Landscapes. In: L. Wandsnider & J. Ebert (eds.), *Issues in Archaeological Surface Survey: Meshing Method and Theory*. American Archaeology 7(1):57-66.
- Casteel R.W. (1979) - Human Population Estimates for Hunting and Gathering Groups Based Upon Net Primary Production Data: Examples from the Central Desert of Baja California. *Journal of Anthropological Research* 35(1):85-92.
- Dewar R.E. (1986) - Discovering Settlement Systems of the Past in New England. *Man in the Northeast* 31:77-88.
- Dewar R.E. & McBride K.A. (1992) - Remnant Settlement Patterns. In: J. Rossignol & L. Wandsnider (eds.), *Space, Time, and Archaeological Landscapes*. New York, Plenum Press, p. 227-255.
- Epp H.T. (1988) - Ways of the Migrant Herds: Dual Dispersion Strategy Among Bison. *Plains Anthropologist* 33(121):309-320.
- Epp H.T. & Dyck I. (1983) - *Tracking Ancient Hunters: Prehistoric Archaeology in Saskatchewan*. Regina, Saskatchewan Archaeological Society.
- Forbis R.G. (1992) - The Mesoindian (Archaic) Period in the Northern Plains. *Journal of American Archaeology* 5: 27-70.
- Friesen N.P. (1998) - *Analysis of Archaeological Settlement Patterns in Grasslands National Park, Saskatchewan*. M.A. Thesis, Department of Anthropology and Archaeology, University of Saskatchewan, Saskatoon.
- Godfrey W.E. (1950) - *Birds of the Cypress Hills and Flotten Lake Regions, Saskatchewan*. Ottawa, Biological Series 40, Bulletin 120.

- Graspointner A. (1980) - *Archaeology and Ethno-history of the Milk River in Southern Alberta*. Calgary, Western Publishing.
- Graspointner A. (1981) - Southern Alberta - The Nomadic Culture. In: T.A. Moore (ed.), *Alberta Archaeology: Prospect and Retrospect*. Lethbridge, The Archaeological Society of Alberta, p. 83-95.
- Gryba E. (1972) - *Cypress Hills Archaeological Study, 1971*. B.A. Honour's Thesis, Department of Anthropology, University of Alberta, Edmonton.
- Gryba E. (1975) - *The Cypress Hills Archaeological Site, DjOn-26*. Edmonton, Parks and Planning Division, Alberta Department of Recreation, Parks, and Wildlife.
- Halladay I.R. (1965) - Recent Biota of the Cypress Hills Plateau: A General Survey of the Natural History. In: R.L. Zell (ed.), *Cypress Hills Plateau: Alberta and Saskatchewan*. 15th Annual Field Conference Guidebook Part 1, Alberta Society of Petroleum Geologists, p.37-54.
- Hanson J.R. (1984) - Bison Ecology in the Northern Plains and a Reconstruction of Bison Patterns for the North Dakota Region. *Plains Anthropologist* 29(104):93-113.
- Hardesty D.L. (1980) - The Use of General Ecological Principles in Archaeology. In: M.B. Schiffer (ed.), *Advances in Archaeological Method and Theory, Volume 3*. New York, Academic Press, p. 157-187.
- Henderson N. (1994) - Replicating Dog Travois Travel on the Northern Plains. *Plains Anthropologist* 39:145-159.
- Holmes R.M. (1969) - A Study of the Climate of the Cypress Hills. *Weather* 24(8):324-330.
- Holmes R.M. (1970) - "Oasis Effects" Caused by the Cypress Hills. In: *Proceedings of the Third Forest Microclimate Symposium*. Calgary, Canadian Forestry Service, Department of Fisheries and Forestry, Alberta/Territories Region, p. 159-180.
- Husted W.M. (2002) - Archaeology in the Middle Rocky Mountains: Myopia, Misconceptions and Other Concerns. *Plains Anthropologist* 47(183): 379-386.
- Ingold T. (1993) - The Temporality of the Landscape. *World Archaeology* 25(2):152-174.
- Johnson K. (2004) - *An Archaeological Predictive Model for the Souris River Basin, Saskatchewan*. MGIS Document, Department of Geography, University of Calgary, Calgary.
- Kelly R.L. (1995) - *The Foraging Spectrum: Diversity in Hunter-Gatherer Lifeways*. Smithsonian Institution Press, Washington, D.C.
- Klassen R.W. (1994) - Late Wisconsinan and Holocene History of Southwestern Saskatchewan. *Canadian Journal of Earth Sciences* 31:1822-1837.
- Kramer A. (1971) - Notes on the Winter Ecology of the Mule and White-Tailed Deer in the Cypress Hills, Alberta. *The Canadian Field Naturalist* 85:141-145.
- Kroll, E.M. & Price T.D. (eds.) (1991) - *The Interpretation of Archaeological Spatial Patterning*. New York, Plenum Press.
- Kvamme K.L. (1992) - A Predictive Site Location Model on the High Plains: An Example with an Independent Test. *Plains Anthropologist* 37(138):19-40.
- Landals A. (1998) - *Tipi Ring Distribution and Variability Along the Express Pipeline, Canadian Portion*. Bismark, Paper presented at the Plains Anthropological Conference.
- Lemmen D.S. & Vance R.E. (1999) - *Holocene Climate and Environmental Change in the Palliser Triangle: A Geoscientific Context for Evaluating the Impacts of Climate Change on the Southern Canadian Prairies*. Geological Survey of Canada Bulletin 534.
- Lemmen D.S., Vance R.E., Campbell I.A., David P.P., Pennock D.J., Sauchyn D.J., Wolfe S.A. (1998) - *Geomorphic Systems of the Palliser Triangle, Southern Canadian Prairies: Description and Response to Changing Climate*. Geological Survey of Canada Bulletin 521.
- Lewis H.T. & Ferguson T.A. (1999) - Yards, Corridors, and Mosaics: How to Burn a Boreal Forest. In: R. Boyd (ed.), *Indians, Fire and the Land in the Pacific Northwest*. Corvallis, Oregon State University Press, p. 164-184.
- Lowton J.A., Robertson I.M., Blake Jr., W. (1971) - *Geological Survey of Canada Radiocarbon Dates XI*. Geological Survey of Canada, Paper 71-7.
- Mandel R.D. (1992) - Soils and Holocene Landscape Evolution in Central and Southwestern Kansas: Implications for Archaeological Research. In: V.T. Holliday (ed.), *Soils in Archaeology: Landscape Evolution and Human Occupation*. Washington, Smithsonian Institution Press, p. 41-100.
- Meltzer D.J. (1999) - Human Responses to Middle Holocene (Altithermal) Climates on the North American Great Plains. *Quaternary Research* 52:404-416.
- Metcalfe M.D., & Black K.D. (1997) - Archaic Period Logistical Organization in the Colorado Rockies. In: M.L. Larson & J.E. Francis (eds.), *Changing Perspectives of the Archaic on the Northwest Plains and Rocky Mountains*. Vermillion, The University of South Dakota Press, p. 168-209.
- Minnis P.E. & Elisens W.J. eds. (2000) - *Biodiversity and Native America*. Norman, University of Oklahoma Press.
- Morgan G.R. (1980) - Bison Movement Patterns on the Canadian Plains: An Ecological Analysis. *Plains Anthropologist* 25(88):143-160.
- Morphy H. (1995) - Landscape and the Reproduction of the Ancestral Past. In: E. Hirsch & M. O'Hanlon (eds.), *The Anthropology of Landscape: Perspectives on Place and Space*. Oxford, Clarendon Press, p.184-209.
- Newsome R. & Dix R. (1968) - The Forests of the Cypress Hills, Alberta and Saskatchewan. *American Midland Naturalist* 80:118-185.
- O'Connell J.F. (1987) - Alywara Site Structure and Its Archaeological Implications. *American Antiquity* 52:74-108.
- Oetelaar G.A. & Meyer D. (in press) - Movement and Aboriginal Landscapes: A Comparative Approach. *Plains Anthropologist Memoir Number 38: Changing Opportunities and Challenges: Human-Environmental Interaction in the Canadian Prairie Ecozone*.
- Oetelaar G.A. & Oetelaar D.J. (in press a) - People, Places and Paths: The Cypress Hills and the Nisitapii Landscape of Southern Alberta. *Plains Anthropologist Memoir Number 38: Changing Opportunities and Challenges: Human-Environmental Interaction in the Canadian Prairie Ecozone*.
- Oetelaar G.A. & Oetelaar D.J. (in press b) - The New Ecology and Landscape Archaeology: Incorporating the Anthropogenic Factor In Models of Settlement Systems in the Canadian Prairie Ecozone. In: B.A. Nicholson & D. Wiseman (eds.), *Theoretical Perspectives on Human Adaptations in the Canadian Prairie Ecozone and the Modeling of Physical and Ecological Processes and their Impact on Human Adaptations: An Interdisciplinary Approach to Data Collection and Interpretation*. Occasional Paper of the Canadian Archaeological Association.
- Peck T.R. (2004) - *Bison Ethology and Native Settlement Patterns during the Old Women's Phase on the Northwestern Plains*. Oxford, BAR International Series 1278.
- Rapoport A. (1975) - Australian Aborigines and the Definition of Place. In: P. Oliver (ed.), *Shelter, Sign and Symbol*. London, Barrie & Jenkins, p. 38-51.

- Reeves B.O.K. (1973) - The Concept of an Altithermal Cultural Hiatus in Northern Plains Prehistory. *American Anthropologist* 75(5):1221-1253.
- Russell L. (1951) - Land Snails of the Cypress Hills and Their Significance. *The Canadian Field Naturalist* 65:174.
- Sauchyn D.J. (1990) - A Reconstruction of Holocene Geomorphology and Climate, Western Cypress Hills, Alberta and Saskatchewan. *Canadian Journal of Earth Sciences* 27:1504-1510.
- Sauchyn D.J. (1993) - Quaternary and Tertiary Landscape Evolution in the Western Cypress Hills. In: D.J. Sauchyn (ed.), *Quaternary and Late Tertiary Landscapes of Southwestern Saskatchewan and Adjacent Areas*. Regina, Canadian Plains Research Center, p. 27-45.
- Sauchyn D.J. & Nelson H.L. (1999) - Origin and Erosion of the Police Point Landslide, Cypress Hills, Alberta. In: D.S. Lemmen & R.E. Vance (eds.), *Holocene Climate and Environmental Change in the Palliser Triangle: A Geoscientific Context for Evaluating the Impacts of Climate Change on the Southern Canadian Prairies*. Ottawa, Geological Survey of Canada Bulletin 534:256-265.
- Sauchyn M.A. & Sauchyn D.J. (1991) - A Continuous Record of Holocene Pollen from Harris Lake, Southwestern Saskatchewan, Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology* 88:13-23.
- Sheehan M.S. (1994) - Cultural Responses to the Altithermal: The Role of Aquifer-Related Water Resources. *Geoarchaeology* 9(2):113-137.
- Sheehan M.S. (1995) - Cultural Responses to the Altithermal or Inadequate Sampling? *Plains Anthropologist* 40(153):261-270.
- Sheehan M.S. (1996) - Cultural Responses to the Altithermal or Inadequate Sampling Reconsidered. *Plains Anthropologist* 41(158):395-397.
- Smith C.S. & McNees L.M. (1999) - Facilities and Hunter-Gatherer Long-Term Land Use Patterns: An Example from Southwest Wyoming. *American Antiquity* 64(1):117-136.
- Steward J.H. (1938) - *Basin-Plateau Aboriginal Sociopolitical Groups*. Washington, Bureau of American Ethnology Bulletin 120, 346 p.
- Steward J.H. (1955) - *Theory of Culture Change: The Methodology of Multilinear Evolution*. Urbana, University of Illinois Press.
- Taçon P.S.C. (1994) - Socialising Landscapes: The Long-Term Implications of Signs, Symbols and Marks on the Land. *Archaeology in Oceania* 29:117-129.
- Tilley C. (1994) - *A Phenomenology of Landscape: Places, Paths, and Monuments*. Oxford, Berg.
- Uhlenbeck C. C. (1912) - *A New Series of Blackfoot Texts from the Southern Peigans Blackfoot Reservation Teton County Montana, with the help of Joseph Tatsey*. Amsterdam, Johannes Muller.
- Vance R.E., Beaudoin A.B., Luckman B.H. (1995) - The Paleocological Record of 6 ka BP Climate in the Canadian Prairie Provinces. *Géographie physique et Quaternaire* 49:81-98.
- Vance R.E. & Last W.M. (1994) - Paleolimnology and Global Change on the Southern Canadian Prairies. *Current Research 1994-B*:49-58; Geological Survey of Canada.
- Vickers J.R. (1986) - *Alberta Plains Prehistory: A Review*. Edmonton, Archaeological Survey of Alberta, Occasional Paper 27.
- Vickers J.R. (1991) - Seasonal Round Problems on the Alberta Plains. *Canadian Journal of Archaeology* 15:55-72.
- Vickers J.R. & Peck T.R. (2004) - Islands in a Seas of Grass: The Significance of Wood in Winter Campsite Selection on the Northwestern Plains. In: B. Kooyman & J. Kelley (eds.), *Archaeology on the Edge: New Perspectives from the Northern Plains*. Calgary, University of Calgary Press, p. 95-124.
- Vreeken W.J. (1986) - Quaternary Events in the Elkwater Lake Area of Southeastern Alberta. *Canadian Journal of Earth Sciences* 23:2024-2038.
- Vreeken W.J. (1994) - A Holocene Soil-Geomorphologic Record from the Ham Site near Frontier, southwestern Saskatchewan. *Canadian Journal of Earth Sciences* 31:532-543.
- Vreeken W.J. (1996) - A Chronogram for Postglacial Soil-Landscape Change from the Palliser Triangle, Canada. *The Holocene* 6(4):433-438.
- Walker E.G. (1992) - *The Gowen Sites: Cultural Responses to Climatic Warming on the Northern Plains (7500-5000 B.P.)*. Ottawa, Archaeological Survey of Canada, Mercury Series Paper 145.
- Wandsnider L. (1992) - The Spatial Dimension of Time. In: J. Rossignol & L. Wandsnider (eds.), *Space, Time, and Archaeological Landscapes*. New York, Plenum Press, p. 257-282.
- Waters M.R. & Kuehn D.D. (1996) - The Geoarchaeology of Place: The Effect of Geological Processes on the Preservation and Interpretation of the Archaeological Record. *American Antiquity* 61: 483-497.
- Westgate J. (1968) - *Surficial Geology of the Foremost-Cypress Hills Area, Alberta*. Alberta Research Council Bulletin 22.
- White L.A. (1959) - *The Evolution of Culture: The Development of Civilization to the Fall of Rome*. New York, McGraw-Hill Book Company, Inc.
- Williams N.M. & Hunn E.S. (eds.) (1982) - *Resource Managers: North American and Australian Hunter-Gatherers*. Boulder, Westview Press.
- Winterhalder B. & Smith E.A. (1981) - *Hunter-Gatherer Foraging Strategies: Ethnographic and Archaeological Analyses*. Chicago, The University of Chicago Press.
- Wiseman D.J., Running IV G.L., Freeman A. (2002) - A Paleoenvironmental Reconstruction of Elkwater Lake, Alberta. *Géographie physique et Quaternaire* 56(2-3):279-290.

