

TITLE

HUMAN ECOLOGY AND PREHISTORY  
OF THE FOREST/GRASSLAND TRANSITION  
ZONE OF WESTERN MANITOBA

by

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B.A., Brandon University, 1978

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## ABSTRACT

Viewed from the perspective of prehistory, the forest/grassland transition zone of western Manitoba has remained an unknown and largely uninvestigated tract of land, lying between the southern boreal forest Woodlands to the east, and the Northern Plains to the west. It is an area characterized by marked topographical and ecological diversity when compared to adjacent regions and biomes. Virtually all of the important subsistence resources of the adjacent forest and plains biomes are to be found within this forest/grassland transition zone. In addition, these diverse resources can be found to occur within a moderate distance of each other due to the mosaic pattern of habitats which characterize the distribution of the parkland vegetation.

This thesis examines the interactive dynamics of the physical, biological and cultural variables operative in the study area, with the goal of developing models which account for the patterns observed in the archaeological record. These patterns result from activities associated with the local human ecology and the prehistoric adaptive strategies which developed and were utilized by the aboriginal occupants of the study area.

The early ethnohistoric accounts of the region have provided sufficient information to reconstruct the basic subsistence pattern of the Assiniboine, Cree, and Ojibwa, who utilized the area during the period of European contact. In addition, it has been possible to outline the adaptive changes in subsistence strategy which these several groups un-

dertook in response to environmental and technological variables which resulted from the European inroads.

The Prehistoric period, dating from the commencement of retreat of the continental glaciers 12,000 years ago, is much more complex. The cohesive pattern that integrates developments throughout this timespan is a pattern of flexible demographic and cultural response to new or changed environmental opportunities. While the details of adaptive strategies varied from group to group, the general patterns of subsistence can be shown to conform to a limited number of basic models which are closely tied to the environmental parameters of the biomes under consideration.

The human ecology of the forest/grassland transition zone of western Manitoba is characterized by patterns of flexibility in cultural response to changing environmental opportunities. The resulting adaptive strategies, which have been identified and modelled, indicate a varied repertoire of social and technological systems by means of which the various cultural groups effectively exploited the resources which were available. In addition, it can be demonstrated that 'risk reducing strategies' were employed to more fully exploit unique or temporary situations afforded by the interaction of physical, biological, and cultural variables affecting the total human environment.

This thesis is  
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## CHAPTER 1: INTRODUCTION

The substance of this dissertation is an examination of the basic resources available for human subsistence found within the forest/grassland transition zone of western Manitoba, together with the adaptive strategies which Protohistoric and Late Prehistoric populations developed and employed there. In chapters 2 and 3, the nature and relative abundance of the physical and biological resources found in the area are examined. Chapter 4 explores the concept and significance of ecotones and chapter 5 evaluates ecological models applicable to hunters and gatherers. In chapter 6, the ethnohistoric accounts which relate to the study area are investigated and chapter 7 outlines and models the adaptive strategies followed by protohistoric and historic Indian groups. Chapter 8 briefly summarizes what is known of the culture history of adjacent areas and articulates these developments with materials recovered in the study area. Chapter 9 models the adaptive strategies of groups inhabiting the study area during the Late Woodland period, together with a short summary of the contrasting and complementary patterns of subsistence strategy employed by the various groups which inhabited the study area since the final retreat of the Wisconsin glaciers.

Harris (1983:38) has defined human ecology as a study which, "... concentrates on the ecological relationships among human beings and their cultures and the rest of the organic and inorganic environment...". Prehistory is the vast time period filled by human

cultures, before written records documented the course of events, and the protohistoric period relates to the period of incipient contact between literate and non-literate societies. In the study area, prehistory extends from the time of the retreat of the glaciers until the close of the seventeenth century. At this point, circa A.D. 1700, the protohistoric period is initiated with the first facsimile accounts of fur traders and adventurers - often recorded as hearsay by a second party. As the ethnographic record accumulates, a fairly clear picture of segments of a lifeway in transition emerges but the antecedents of this lifeway can only be reconstructed from the archaeological record.

In writing this dissertation, an attempt is made to reconstruct the physical and biological parameters which characterized the forest/grassland transition zone of western Manitoba. An attempt is also made, using ethnographic and archaeological data, to reconstruct the subsistence strategies of the various groups which inhabited the region prior to European settlement. It is the goal of this study in human ecology to provide a basic outline of prehistoric subsistence strategy in the study area, post 1250 b.p., and develop models which will serve to stimulate problem oriented research and lead to a better approximation of human ecology prior to European contact.

The forest/grassland transition zone in western Manitoba has never been the object of a regional study in human ecology and prehistory. Ray (1974) has examined the human ecology of Indians engaged in the fur trade in a study which covers much broader regional parameters but it is

limited within a very narrow time period. Syms (1977) has published a comprehensive account of cultural dynamics during the ceramic period in the southwestern section of this area and Hanna (1982, 1984) and Snortland-Coles (1979) have written detailed theses on the social and ecological dynamics respectively, of the Duckbay Complex along the western periphery of Lake Winnipegosis, further to the north and east. Numerous individual sites have also been reported within the study area but there has been very little by way of any attempt to synthesize cultural developments or model adaptive strategies within the region through time, or to articulate these variables with events and patterns in adjacent areas.

The study area extends from Red Deer Lake, north of the Porcupine Mountain upland, eastward to the margins of Lake Winnipegosis and Lake Manitoba, southward towards the Canada/United States boundary at a point near 98 longitude. The southern and western boundaries are the Canada/U.S. and Manitoba/ Saskatchewan borders respectively (Figure 1).

The outlines of this triangular area are determined, in part, by natural boundaries and, in part, as a matter of convenience. The eastern edge is bounded by features of natural topography, the western prairie lakes of the Manitoba Lowlands and the general trend of the Manitoba Escarpment to the south. The southern and western boundaries are largely a matter of convenience, since they follow modern political boundaries rather than any natural environmental transitions. Since these latter boundaries only have significance for culture bearing

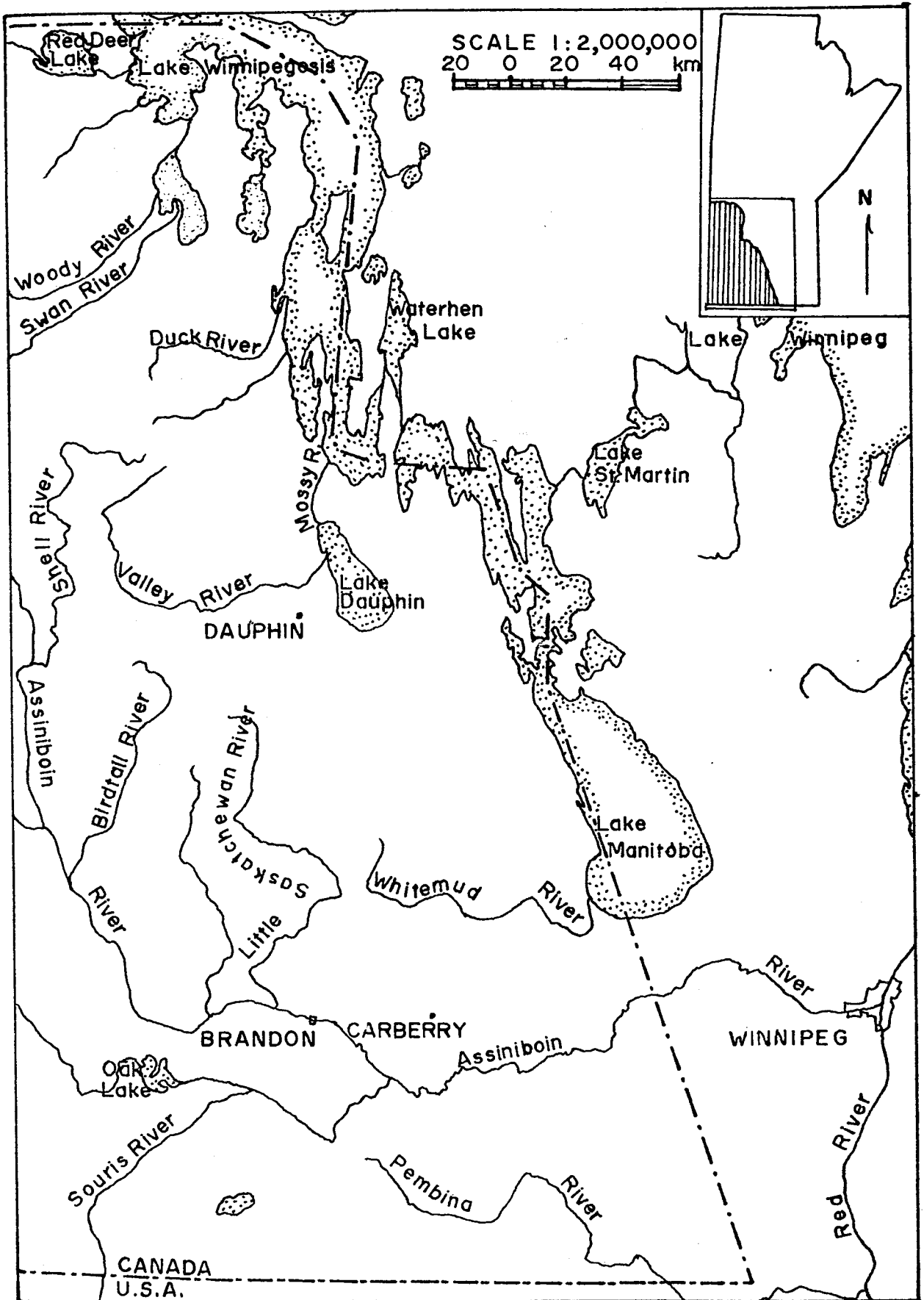


Figure 1. Rivers, lakes and urban centers in the Study Area.

species and since they postdate the time period of interest, the study area cannot be understood in isolation from adjacent regions. The interactive dynamics of the physical, biological and cultural variables present in the study area will serve as the focus of this dissertation, but the realities of prehistory necessitate the consideration of resources and social dynamics in a much wider area as well. The subsistence resources which characterize the study area have fluctuated over time in response to changes in glacial activity and climatic episodes. The human ecology of the study area has been dramatically affected by these fluctuations and by the cultural dynamics in adjacent regions.

## CHAPTER 2: THE PHYSICAL ENVIRONMENT

The most basic components of the environment are those which can be subsumed under the heading Physical Environment. These variables include geomorphology, surface and subsurface geological deposits, soils, climate, rainfall and water resources. These are the limiting factors of the plant and animal communities which will inhabit a given region. While a variety of biological and cultural factors may affect the succession or composition of a local community, the overall range of possibilities within a region will be determined by the physical variables which characterize that region.

The study area (Figure 2) is underlain primarily by Cretaceous shales. Along the eastern margin, underlying Lake Dauphin and the western margin of Lake Manitoba, and trending in a southeasterly direction, Triassic deposits form the bedrock. The Lake Winnipegosis area is underlain by Devonian beds and eastward, towards Lake Winnipeg, Silurian and Ordovician limestones form the bedrock. Further east and to the north, the Laurentide ice sheet advances have eroded and transported the Paleozoic, Mesozoic and Cenozoic beds exposing the Precambrian Shield (Weir 1983). The single Cenozoic bedrock formation in the study area is the Turtle Mountain formation on the Canada/United States boundary. The very large amount of glacially transported material has been redeposited as glacial till over the bedrock to the west and south of the exposed Shield area.



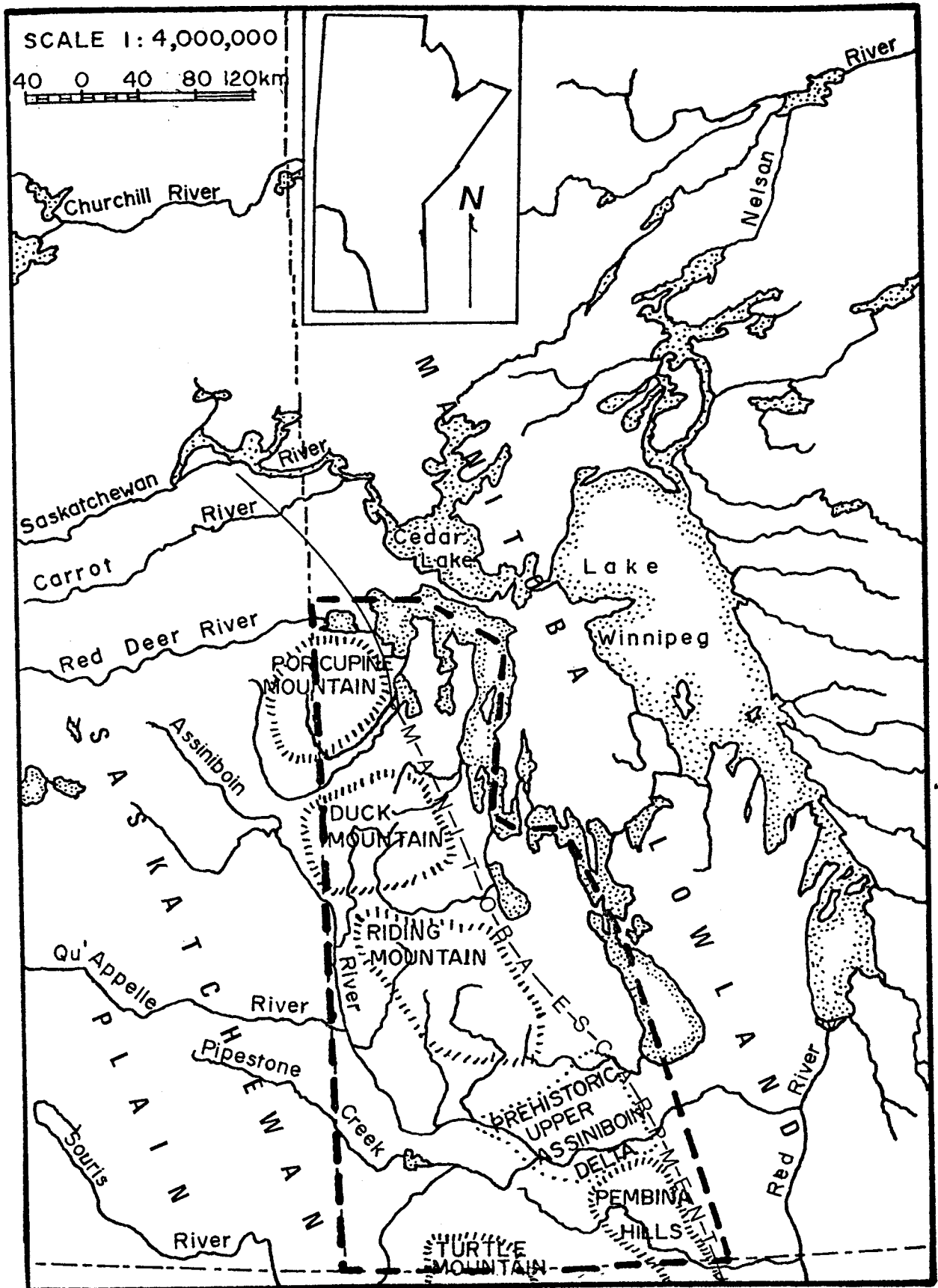


Figure 2. Modern Physical Features of Forest/Grassland Transition Area.

Glacial drift and end moraine features of Late Wisconsin age cover the entire study area. In addition, much of the study area is covered by surface deposits of fluvial and glacio-lacustrine origin resulting from delta or underflow fan deposition where glacial meltwater spillways entered proglacial lakes such as Lakes Souris and Agassiz. The area also contains deep water deposits from the lacustrine depositional regimes of the proglacial lakes themselves (Weir 1983).

Over much of the area, the postglacial landscape has been subject to extensive surface modification by the action of wind and water. Channel and sheet erosion due to runoff of precipitation and seasonal meltwater has resulted in dissection of areas of high relief and in the development of local fluvial deposits. The coarse textured glacio-lacustrine and delta deposits have been subject to extensive aeolian modification and are, for the most part, stabilized dune fields at present.

Overall relief within the study area ranges from 250 meters a.s.l. at the margins of Lake Manitoba to about 830 meters a.s.l. in the Duck and Porcupine Mountain uplands. The dominant physiographic feature within the study area is the Manitoba Escarpment. This feature extends from about 98 degrees W at the Manitoba/North Dakota boundary northwestward into southern Saskatchewan above the Porcupine Mountain landform at approximately 53 degrees N 102 degrees W. This escarpment forms the boundary between the Manitoba Lowlands, the bed of glacial Lake Agassiz, and the second level of the Saskatchewan Plain. The

escarpment is marked by a series of cuesta like uplands eroded from Upper Cretaceous shale (Figure 2). These uplands rise between 350 and 500 meters above the Campbell Beach level of Lake Agassiz. The lowest of these uplands, the Pembina Hills, rises to 500 meters a.s.l. and straddles the International Boundary. The Riding Mountains reach an elevation of 750 meters a.s.l., the Duck Mountains > 830 m.a.s.l., and the Porcupine Mountain > 820 m.a.s.l. The Pasquia Hills in northwestern Saskatchewan are a continuation of these topographic features. The Turtle Mountain upland, which straddles the Canada/United States border to the west of the Pembina Hills, is a remnant of more recent Cenozoic age and rises to an elevation of 765 m.a.s.l. (Rand McNally 1981).

The study area is mantled with a variable layer of drift and glaciolacustrine deposits, as has been noted above. Consequently, bedrock outcrops are rare and largely confined to the Cretaceous shales. There are, however, frequent deposits of gravel resulting from the reworking of till and moraine deposits by fluvial action along meltwater channels and from the development of beach ridges by wave action of the proglacial lakes. These deposits contain cobbles of resistant materials, particularly cherts and quartzite, suitable for lithic technology. Since all of these materials are redeposited, and represent a mixture of cryptocrystalline and microcrystalline materials which have been formed over several hundreds of millions of years and subsequently eroded from a multitude of unidentified formations, there is no likelihood that local materials in archaeological sites can be traced to specific quarries.

Clay deposits, suitable for the manufacture of aboriginal ceramics, are widespread in the study area. While many of these beds have a widespread distribution across the area, physical analysis of the paste from ceramics recovered in the area have been related to particular formations (Hanna 1982). With further work on cultural and physical attributes of ceramics it may be possible to differentiate between patterns of trade in ceramic wares and patterns of movement of the people who manufactured them.

Among the physical resources in the area of possible interest to prehistoric groups are the salt springs adjacent to Lake Winnipegosis which were utilized during the contact period (Atwood 1970; James 1956). These springs may have been utilized during the prehistoric period as well. At present, there is no archaeological evidence to support this view.

Lakes and rivers are an important physical component of the study area. This is so not only from the perspective of freshwater habitat for a variety of avian, mammalian, fish and molluscan species, but also as a means of facilitating travel throughout the region. The Manitoba Lowlands adjoining the study area are dominated by residual lakes in the bed of glacial Lake Agassiz (Figure 2). Of particular significance is the Lake Winnipeg drainage system, which by way of the Red, Assiniboine/Qu'Appelle and Saskatchewan, and Winnipeg rivers, links the headwaters region of the Mississippi, the entire Northern Plains, and the western Great Lakes region with Hudson's Bay through its northern

outlet, the Nelson River. The northern portion of the study area is drained by the Lake Winnipegosis/Lake Manitoba drainage which flows by way of Lake St. Martin and the Dauphin River into Lake Winnipeg.

Several small rivers and streams flow from the uplands to the west into the Lake Winnipegosis/Lake Manitoba drainage system. The major streams are the Red Deer River which flows north of Porcupine Mountain, and the Woody and Swan rivers which flow between the Porcupine and Duck Mountains and empty into Swan Lake. Further south, the Duck and Garland rivers drain the northern and eastern slopes of the Duck Mountains and empty into Lake Winnipegosis. The Valley River flows between the Duck Mountains and the Riding Mountains and empties into Dauphin Lake and the Whitemud River system drains the area south of Riding Mountain and empties into the south end of Lake Manitoba. The degree to which these small rivers and streams were utilized for canoe travel is uncertain. However, in most cases prehistoric sites are to be found where the rivers enter lakes or intersect with other topographic features such as the Campbell Beach of glacial Lake Agassiz.

The study area falls along the northern edge of the Humid Mid-Latitude climatic region (Rand McNally 1981). The heaviest precipitation occurs during summer and the region is characterized by hot summers and cold winters with mean annual temperatures falling between -1 degree and 4 degrees C (Rand McNally 1981). In summer the mean July temperature is 19 -20 degrees C with highs over 35 degrees C (Longley 1972). May to September precipitation in the study area ranges

from 254mm to 355mm, with the higher amounts falling in the upland areas (Weir 1983). Annual precipitation in the Riding Mountain, Duck Mountain and Porcupine Mountain uplands is 508mm, some 50mm higher than in adjacent areas to the west (Weir 1983). Violent thunderstorms are common during July and August.

In winter the mean daily temperature falls between -17.5 degrees and -15 degrees C with lows to -40 degrees C (Longley 1972). Snowfall is highly variable from year to year but averages 1270mm, the equivalent of 127mm of rainfall (Longley 1972). Blizzards with high winds and wind driven snow are a common occurrence from November until the end of March.

Spring commences in late March with the date of ice breakup varying from late March to mid-April (Rannie 1983). Rannie (1983) notes that freezeup of the Red River varied from late October to late November in the period 1798-1981 and, while the Red River is outside of the study area, the range of variation from year to year, if not the actual dates, will have general applicability to the study area.

Within the study area there is considerable climatic microvariation based primarily upon relief. In the southern portion of the study area the summer growing season has been evaluated at 2800 degree days with the season diminishing to 2000 degree days in the Riding, Duck and Porcupine Mountain areas (Weir 1983). While the frost free period in these uplands and the average summer temperature is somewhat lower,

there is a higher annual rainfall. These conditions have a profound effect upon dependent plant communities.

The soils in the area are primarily chernozemic, with the overwhelming majority falling in the black chernozem group. This group is associated with grassland plant communities (Weir 1983). On poorly drained sites, local gleysols are frequently identified. The smaller group of dark gray chernozems are associated with the Pembina Hills and Turtle Mountain uplands and with the areas west and south of the Riding Mountain and Duck Mountain uplands. These dark gray chernozems are associated with forest/grassland transition zones (Weir 1983).

The most elevated portions of the Riding, Duck and Porcupine Mountain uplands are classified as gray luvisols. These soils are associated with the Boreal Forest areas of the province (Weir 1983). To the north of the Porcupine Mountain, and over a major portion of the Prehistoric Upper Assiniboin Delta, cumulic and orthic regosols occur. These are underdeveloped soils resulting from recent alluviation or disturbance due to extensive erosion (Weir 1983). The Assiniboin Delta area is characterized by stabilized dune sands. Two small areas of black solonchic soils occur in the southern portion of the study area.

As has been noted above, these soils have been developed on glacial tills or reworked glacio-lacustrine or glacio-fluvial deposits derived from these same tills. The various soil orders and groups are determined by factors of local drainage, microclimate and the effect of

local plant communities. The widespread distribution of black chernozems indicates dominance of grassland in the study area prior to the European influx. The limited presence of the dark gray chernozems and the luvisols in the uplands indicates that these areas have been dominated by forest environments throughout their developmental history.

During maximum Wisconsin glaciation the entire region was covered by the Laurentide ice sheet (Teller et al. 1980). Several authors (Fenton et al. 1983; Last and Teller 1983; Teller et al. 1980; Teller and Last, 1981) suggest that the land surface in the study area was not available for biological colonization until some time after 12,000 B.P. when the Keewatin ice sheet, which advanced across the Lake Agassiz Basin from the northwest, began its final retreat. "Over much of the area west of the Manitoba Escarpment, the ice had become stagnant by this time [14,000 B.P.], although it persisted in places beneath a thick blanket of insulating debris for several thousand years" (Teller and Fenton 1980:32). However, Klassen (1983a) maintains that the Qu'Appelle/Assiniboin glacial spillway leading from the Regina Plain and emptying into Lake Agassiz was active by 14,000 B.P. and that vegetation was established on the delta surface prior to 12,000 B.P. Since Klassen (1972: 544) has shown that the modern drainage system was developed primarily by reexcavation of ancestral valleys established in Early Wisconsin times, it may be that some parts of the existing system developed beneath stagnant ice and that development of the Prehistoric Assiniboin Delta was initiated on low sections of the escarpment surrounded by masses of stagnant ice in the surrounding uplands.



There is clearly some disagreement among the various authors concerning the timing of final deglaciation of southern Saskatchewan and adjacent southwestern Manitoba. Christiansen (1979:925-926) has indicated deglaciation of the major portion of the study area was initiated as early as 14,000 B.P. with the Pembina Spillway actively draining glacial Lake Souris at 15,500 B.P. Between 11,000 and 12,000 B.P. the entire study area was ice free with the Manitoba Escarpment forming a boundary between Lake Agassiz and the dry deglaciated landscape to the west (Christiansen 1979:928-930). Christiansen (1979:933) places the building of the Pas Moraine at this time as well (Figure 3).

Fenton et al. (1983:60) indicate that glacial advances near Des Moines Iowa, dated circa 14,000 B.P., were initiated by Keewatin ice flowing through the bed of glacial Lake Agassiz and that, with the exception of the Turtle Mountain upland, the entire study area was covered with ice until about 11,600 B.P. Exposure of a major portion of the study area was achieved between 11,400 and 10,200 B.P. (Fenton et al. 1983:67). The Campbell Beach, which forms a line of demarcation along the Manitoba Escarpment, emerged as dry land circa 10,900 B.P. but became an active shoreline again circa 9900 B.P. when a readvance of ice in the Thunder Bay region dammed the eastern outlet to Lake Agassiz (Fenton et al. 1983:69).

Both Christiansen (1979) and Fenton et al. (1983) are extrapolating from external evidence to reconstruct the events which occurred in the

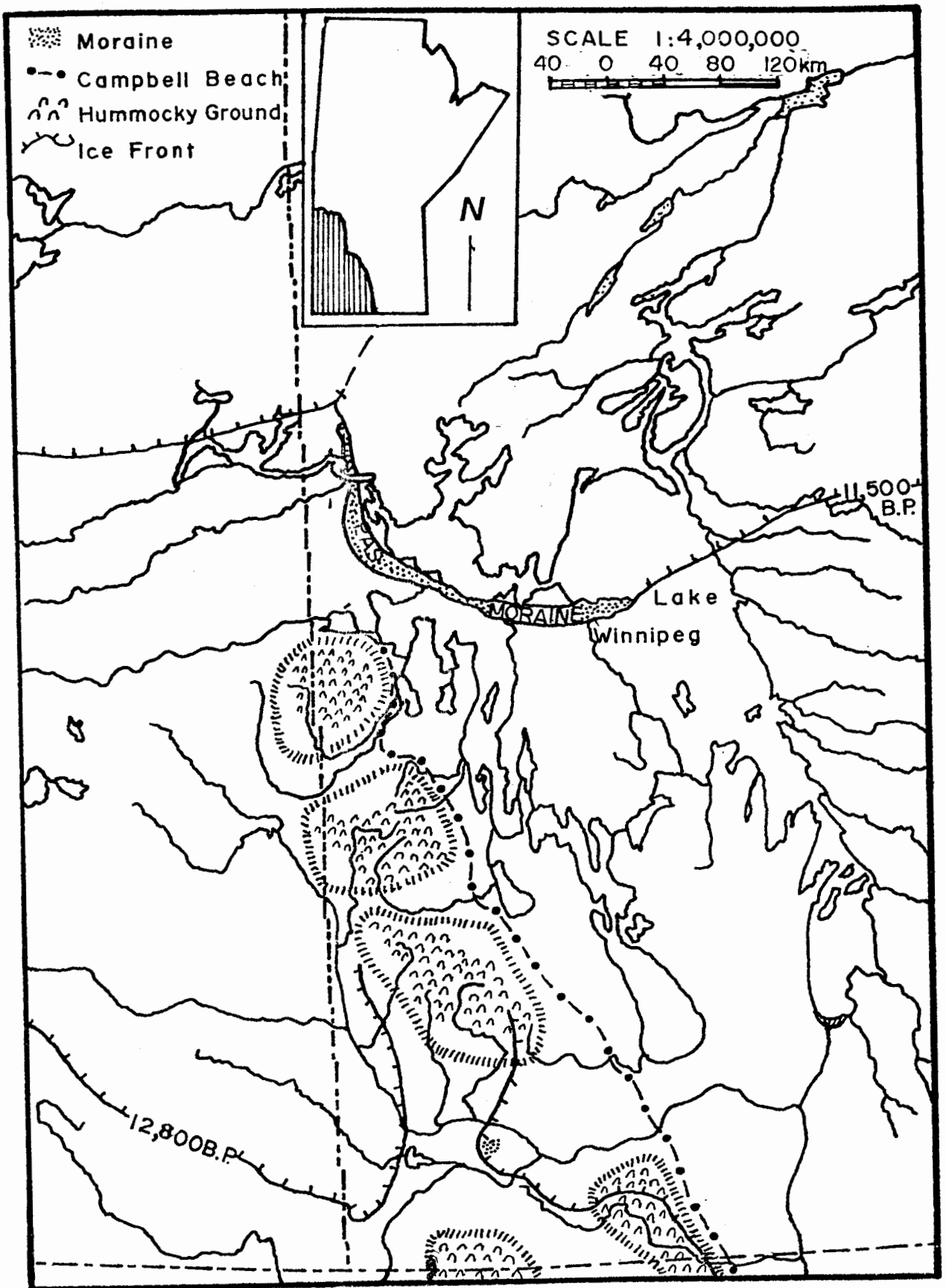


Figure 3. Glacial Geomorphology in the Study Area and in Adjacent Regions.

study area. Their conclusions are primarily drawn from evidence found to the west and north, and to the east and south, respectively. Teller et al. (1980) have suggested that many of the organic sediment dates used by Christiansen (1979) were contaminated with Mesozoic carbon and gave erroneously old dates of the order of 2000 or more years. However, Klassen's (1972) date of 12,400 B.P. on peat near Rosendale on the eastern margin of the Assiniboin Delta and Ritchie's (1976) date on organic material from Sewell Lake near Shilo, close to the head of the Assiniboin Delta, suggest the establishment of a biotic community at a time more in keeping with the Christiansen (1979) chronology. Klassen (1983 a&b) has suggested that the major glacial advances, circa 12,000 B.P., were confined to the bed of Lake Agassiz and bypassed the area west of the Manitoba Escarpment.

In itself, the establishment of localized plant communities on the Prehistoric Assiniboin Delta does not clearly demonstrate a land surface capable of supporting the kind of trophic chain necessary for colonization by Homo sapiens. Even if portions of the landscape were deglaciated, or at least free from the leveling effect of active glaciers, it is likely that the uplands and adjacent areas were still deeply buried in stagnant ice mantled by an insulating layer of frozen drift (Teller and Fenton 1980: 32). Such conditions may have persisted for centuries after active glaciers had retreated northward.

Recent work by Birks (1981) suggests that ice movement subsequent to 14,000 B.P. may have been the result of fluctuation in precipitation or

some other variable at the source area of glaciers, rather than any overall climatic changes occurring near the ice fronts. Pollen cores taken at Kylen Lake in northeastern Minnesota indicate a gradual, uninterrupted warming trend between 14,300 B.P. and 9250 B.P. (Birke 1981). During this period there were independent advances of several glacier lobes in the area circa 12,000 B.P. The pollen record at Kylen Lake does not indicate any accompanying climatic deterioration. Active glacier centers to the east and north may have initiated movement of some glacier lobes while allowing other areas to remain stagnant and subject to in situ wasting under the influence of a general warming trend.

In the study area, it is unlikely that any of the major land surfaces were fully deglaciated prior to 12,000 B.P. with the possible exception of the areas to the west of Turtle Mountain and the south-central portion of the Manitoba Escarpment where the Assiniboin Delta had been building into the margin of proglacial Lake Agassiz. Klassen (1983b) places deposition of the Prehistoric Upper Assiniboin Delta between 13,000 and 12,000 B.P.

It is probable that the greater part of the study area was available for plant colonization by 11,000 B.P., since the active ice front had retreated far to the north and, in a still stand or brief advance, deposited the Pas Moraine at this time (Figure 3). On the glacial drift covering stagnant ice in the uplands, it is likely that a pioneering Boreal Forest had developed (Teller, et al. 1980).

Work published by Teller and Last (1981) concerning the south basin of Lake Manitoba has provided valuable insights into the physical environment of the area immediately to the east of the Manitoba Escarpment. Using a correction formula based upon the percentage of Pre-Quaternary micro-fossils present in a sample (Nambudiri et al. 1980), their reconstruction covers the period 12,000 B.P. to the present.

Initial sedimentation in the Lake Manitoba basin began when the area was a part of Lake Agassiz (Table 1). Until about 9500 B.P. the basin was alternately isolated and reflooded by the fluctuating waters of Lake Agassiz. "Lake level fluctuations occurred during the next 2000 years in response to changes in the lake's southern and eastern outlets, crustal rebound, and position of the ice margin." (Last and Teller 1983: 348).

The cool moist weather conditions of this initial period were modified by a Hypsithermal warming trend which began after 11,000 B.P. (Teller and Last 1981). With the retreat northward of Lake Agassiz and a general dessication of the environment following 9500 B.P., there was a shifting balance between the drying effect of a low precipitation/evaporation ratio and differential crustal rebound which forced water from the north basin of Lake Manitoba to the southern basin.

"Between 9000 and 4500 B.P. the level of Lake Manitoba fluctuated from essentially a dry lake

Table 1. Lake Manitoba Chronology (Last and Teller 1983)

Age	Water Regime in Lake Basin
11,000 - 9600 B.P.	ENTIRE BASIN SUBJECT TO FLOODING BY LAKE AGASSIZ
10,500 B.P.	Eastern outlet opens briefly draining southern portion of Lake Agassiz
9900 - 9600 B.P.	Ice dams eastern outlets - reflooding of southern portion of Lake Agassiz Basin
9500 B.P.	Eastern outlets reopened and the southern end of the Lake Agassiz Basin drains
9000	FLUCTUATING WATER LEVELS WITHIN THE LAKE MANITOBA BASIN
5500 B.P.	Higher temperatures and reduced rainfall lead to complete dessication of southern two thirds of Lake Manitoba Basin
4500 B.P.	Increased rainfall, lower temperatures and northward diversion of Assiniboine River into Lake Manitoba refloods the southern basin
2000 B.P.	Assiniboine abandons north-flowing channels and is diverted eastward into Red River - modern climatic conditions maintain relatively constant lake levels

basin to a body of water with a maximum size and configuration very close to that of today." (Last and Teller 1983: 349).

The southern two thirds of the southern basin of Lake Manitoba became dry about 5500 B.P. and granular soils developed under the influence of grasslands which expanded due to the Hypsithermal warming trends (Last and Teller 1983). This condition prevailed for about 1000 years (Teller and Last 1981).

At about 4500 B.P. the combined effects of differential crustal rebound in the north, and increase in precipitation marking the decline of the Hypsithermal, and the rechanneling of the Assiniboin River into the south end of the Lake Manitoba basin, combined to reflood the southern basin (Last and Teller 1983; Teller and Last 1981). By the end of the Hypsithermal, levels of salinity had risen in the diminished lake, limiting organic productivity. Dilution of this brackish water gradually raised biological potential of the lake to modern levels where an annual production of over a million kg of fish can be sustained (Weir 1983: 126).

About 2000 B.P. crustal rebound and channel sedimentation had reduced the gradient of the Assiniboin River to the point where it reestablished a channel eastward to join the Red River flowing into Lake Winnipeg (Last and Teller 1983). The increased precipitation and diminished evaporation of the post Hypsithermal period have allowed Lake Manitoba to maintain essentially stable conditions of pH and water level since the cutoff of Assiniboin discharge into the basin.

## SUMMARY OF IMPLICATIONS FOR THE BIOTIC COMMUNITY

Under the influence of cool moist climatic conditions, which may have resulted in heavy winter snowfall, and overgrown with an impoverished boreal forest and tundra plant community, the early deglaciated landscape was probably a rather unattractive environment for potential human colonists. Unstable landscape associated with stagnant ice in the uplands and the unpredictable release of proglacial meltwater surges would have added to the hazards of the area until well after 11,000 B.P. It is probable that the area was used very little by human populations until some time after 9500 B.P. when the eastern outlets to Lake Agassiz remained permanently open and the lake began its steady retreat northward following the diminishing continental glacier.

The effect of the Hypsithermal upon grassland expansion would likely be accompanied by a northward movement of ungulate herds. This shift in basic subsistence resources might have initiated the first major influx of prehistoric hunters into the study area. The microclimate of the uplands likely preserved forest communities in favoured locations creating a limited, edge effect ecotone within the area. The return to more temperate, and essentially modern conditions after 4500 B.P. brought about the conditions which were observable during the European Contact period and the rich resource potential which made the forest/grassland transition zone so important during the fur trade era.



### CHAPTER 3: THE BIOTIC COMMUNITIES AND ECOLOGY OF THE REGION

Because of the wide range of physical variability in the study area there is a great diversity of plant and animal communities present. Rowe (1972) has identified four different sections of the Boreal Forest within the region as well as Medium Grass Prairie (Figure 4). Within these major divisions, a wide range of intermediate and distinctive communities can be found which are related to riverine, lake and marsh habitats, together with rapid or gradual transition zones which are based upon surface and internal drainage, direction of exposure, elevation, and soil and water chemistry.

Almost the entire study area falls within Bird's (1961) Aspen Parkland area. Only the high uplands, located above the Manitoba Escarpment, the lowlands west of Lake Winnipegosis, the Spruce Woods Provincial Park area, and a section of true prairie stretching south of Brandon, are excluded. The high uplands are covered by the Mixedwood assemblage of the Boreal Forest (Rowe 1972) and the relatively small area of true prairie forms a small, though distinctive enclave within the study area. In describing the Aspen Parkland Bird (1961:3) states that,

"The Aspen Parkland contains two major plant communities, forest and grassland, which are intermingled in a mosaic of irregular isolated patches and more or less solid stands, as well as

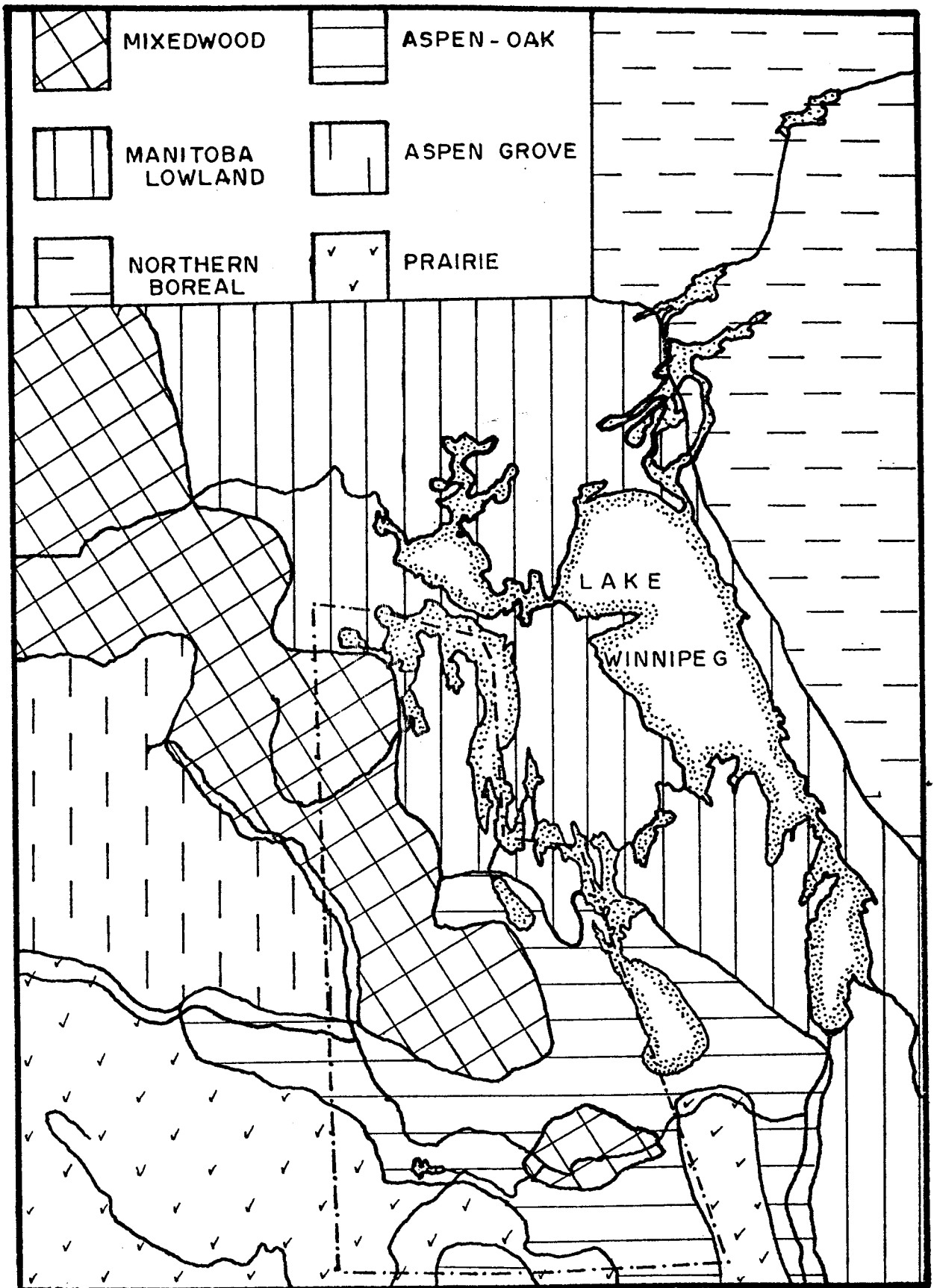


Figure 4. Modern Vegetation (after Rowe 1972).

numerous aquatic communities. According to the pressure of the dominant factors - weather, man, and fire - the grassland may advance on the forest when the trees are unable to survive during dry periods and when there are repeated fires, or it may retreat as conditions become more favourable for forest growth. These factors operated when the white man arrived. Since his appearance, man, by the introduction of agriculture and the checking of prairie fires, has taken an increasingly important part in changing the biota."

As has been pointed out by Bird (1961) the ratio of grassland to forest is constantly shifting in response to climatic changes and cultural practices. Similarly, the boundaries between forest regions and grasslands have shifted through time (Last and Teller 1983, Ritchie 1964, 1969, 1976, 1983; Teller and Last 1981). The entire study area can be viewed as a transitional zone where, since the final retreat of the glaciers and the withdrawal of Lake Agassiz, grassland and forest have always been present in variable amounts (Table 2). Within the area, this transitory pattern has maintained an ecology where the edge effect has produced a functioning ecotone, rich in primary subsistence resources valued by human populations.

Bird (1961:6-9) describes three grassland types which characterize the unforested portions of the study area. The first of these grassland

Table 2. Vegetation and Climate in the Study Area (Ritchie 1983)

<sup>14</sup> C Years	Tiger Hills Upland	Riding Mountain Upland	Grand Rapids Lowland	Paleoclimate
2000	Poplar/oak woodlands & prairie on xeric sites	Southern mixed boreal forest, oak savannas on xeric sites	Mixed boreal forest	M Wet I L D Moist
4000		Deciduous woodlands and prairie	Birch/poplar woodland with pine on xeric site	W Moist A
6000	Prairie with shrub & poplar groves on meso-hydric sites			R M Dry
8000			Spruce/prairie parkland	
10,000		Prairie, hazel/willow/ poplar on mesic sites		C Dry O Moist O L Wet
12,000			Lake Agassiz sediments	
13,000	Spruce woodlands	Spruce woodlands		

communities developed on sandy lacustrine soils in the southwest corner of the study area, west of the Turtle Mountain upland. These grasslands are dominated by drought resistant wheatgrasses (Agropyron sp.), gramma grasses (Bouteloua sp.), and speargrasses (Stipa sp.). In lower, moister areas bluegrasses (Poa sp.) dominate (Bird 1961). Among the herbs found in the area are the Indian breadroot (Psoralea sp.) and locoweed (Oxytropis sp.) (Looman and Best 1979). Wolf willow (Eleagnus commutata) and western snowberry (Symphoricarpos occidentalis) are important shrubs in this area and frequently form suitable habitat for pioneering aspen stands to become established (Bird 1961:26). These species are characteristic of the true prairie.

The second grassland community is situated about 90 miles further north and to the west of the Riding Mountain upland. The soil is a black chernozem developed on glacial till, and the stands of grassland vegetation are taller and more luxuriant than at the first site (Bird 1961:7). The dominant grasses are northern wheatgrass (Agropyron trachycalum), June grass (Koeleria cristata), rough hairgrass (Agrostis scabra), and speargrass (Stipa comata). Indian breadroot (Psoralea sp.) is common and there is an increase in the stands of wolf willow and snowberry compared to further south.

The third grassland community described by Bird (1961) developed on the sandy outwash deposits of the Prehistoric Upper Assiniboin Delta near the eastern edge of the study area. The soils are orthic regosols developed on stabilized sand dunes. In established stands, the dominant

grasses are speargrass (Stipa sp.), sand dropseed (Sporobolus cryptandrus), bluestem (Andropogon sp.), blue gramma (Bouteloua gracilis), June grass (Koeleria cristata), and sand grass (Calamovilfa longifolia). (Bird 1961:8). In active dunes, the dominant grasses are big bluestem (Andropogon gerardi), Indian rice grass (Oryzopsis hymenoides), and sand grass (Calamovilfa longifolia). Species of Indian breadroot (Psoralea sp.) and numerous pioneering shrubs, including wolf willow, snowberry and bearberry (Arctostaphylos uva-ursi), are common.

These grassland communities represent the open prairie above the Campbell Beach line. To the east, on the Agassiz Plain, elements of the tallgrass prairie dominate. These species include the cord grasses (Spartina sp.) and plains blue grasses (Poa sp.).

Rowe (1972) has described four sections of the boreal forest occurring within the study area. The more intensive, local study by Bird (1961) describes six forest communities within the same area. Four of the communities described by both authors are broadly similar in composition, although the areas are not always conterminous. Two additional communities described by Bird (1961) are of localized rather than regional distribution but, since they contribute to an understanding of the subsistence resources of the area, they will be included in this descriptive summary.

The Aspen Grove section, described by Rowe (1972), stretches from the Alberta foothills in a broad belt to the north of the open grasslands of

the Northern Plains. This section makes a small incursion into the study area west of the Riding and Duck Mountains (Figure 4). In the study area, the soil under this section is primarily a dark gray chernozem (Weir 1983). Trembling Aspen (Populus tremuloides) is the only common species of tree although Balsam Poplar (Populus balsamifera) is frequently present on moist lowlands. This forest section is characterized by a mosaic of grassland and forest patches with relatively little shrubbery in the understory of the aspen patches. There is frequently a dense fringe of snowberry along the margin of the aspen groves, however (Table 3).

The Aspen-Oak section described by Rowe (1972) was subsumed by Bird (1961) into the general description of the Aspen Parkland. Bird (1961) chose to consider the presence of bur oak (Quercus macrocarpa) in the southern portion of the study area as a localized occurrence, confined primarily to south facing slopes or widely scattered on the regosols of the Assiniboin Delta. Rowe (1972), however, sees oak as an integral, although scattered, component of the eastern margin of the grassland/boreal forest interface. The unique floodplain community described by Bird (1961:13-14) containing oak, ash, basswood and Manitoba maple is enclosed within the Aspen-Oak section of Rowe (1972) and further serves to differentiate this section from the Aspen Grove section to the north and west. The Aspen-Oak section follows the eastern boundary of the study area northward along the western margin of the southern basin of Lake Manitoba and swings westward to include

Table 3. Comparison of Plant Communities According to Bird (1961) and Rowe (1972)

BIRD (1961)		ROWE (1972)					
Plant Community	Areal Extent in Study Area	Dominant Species	Secondary Species	Forest Section	Areal Extent in Study Area	Dominant Species	Secondary Species
Aspen Poplar Community	Swan Valley, west of porcupine and Duck mountains, Dauphin Plain, area south of Riding Mountain, except grasslands, willow sloughs, floodplain	Populus tremuloides, Populus trichocarpa, Corylus sp., Cornus stolonifera, Rosa sp.	Prunus virginianus, Amelanchier alnifolia, Symphoricarpos occidentalis	Aspen Grove	West of Riding and Duck Mountains	Populus tremulooides	Black poplar, Green Ash, Manitoba Maple
Bur Oak Community	Southern exposures on, and to the west of Manitoba Escarpment	Same as for Aspen Poplar Community plus Quercus macrocarpa	Same as for Aspen Poplar Community	Aspen Oak	Dauphin Plain, south and east of Riding Mountain, upper and lower Assiniboine Delta except Spruce Woods area	Populus tremulooides	Black poplar, Bur oak, white elm, green ash, Manitoba maple
White Spruce Sandhill Community	Weakly stabilized dune area on Upper Assiniboine Delta - mainly in Shilo military reserve and Spruce Woods Park	Populus tremuloides, white spruce	Bur oak, bearberry, creeping juniper	Mixedwood	Spruce Woods/Shilo area; Duck Riding & Porcupine mountains and the area west of the Duck Mountains	Populus tremulooides, black poplar, white birch, white spruce	Jack pine, black spruce, white elm, green ash, Manitoba Maple
Tamarack - Black Spruce Swamp Community	Bordering on north and eastern margin of parkland, the headwaters of Epinette Creek in the Spruce Woods, and as relict patches in Duck and Riding mtns.	Black spruce, tamarack	Trembling aspen, Labrador tea, white birch	Manitoba Lowlands	From Mixedwood boundary on upland to lake borders on the east	Black spruce, tamarack	White spruce, trembling aspen, black poplar, white birch
Willow Community	Localized occurrences on stream sandbars and along banks, between high and low water level along sloughs	Salix sp.	Little or no undergrowth of non-salix species				NOT DIFFERENTIATED BY THIS AUTHOR
Maple, Elm and Ash Floodplain Community	Assiniboine and Souris River floodplains	Manitoba maple, ash, white elm	Cottonwood, basswood, salix sp.				NOT DIFFERENTIATED BY THIS AUTHOR



Dauphin Lake and the Dauphin plain. The entire area south of Riding Mountain, and north of the Souris and Pembina Rivers, falls within this section with the exception of the Spruce Woods area on the Upper Assiniboin Delta (Figure 4). The soils in the Aspen-Oak section are primarily black and dark grey chernozems with local humic gleysols in poorly drained areas (Rowe 1972; Weir 1983).

The Mixedwood section described by Rowe (1972) treats the White Spruce Sandhill Community (Bird 1961) of the Spruce Woods area on the Upper Assiniboin Delta as an outlier of a broad band of transitional forest and occasional grassland lying to the north of the Aspen Grove section. In the Spruce Woods area the soils are primarily orthic regosols, and in the uplands to the north, the soils are gray luvisols and dark gray chernozems which are characteristic of boreal forest soil development regimes (Weir 1983).

"The characteristic forest association of the well-drained uplands is, as the name implies, a mixture of varying proportions of trembling aspen and balsam poplar, white and Alaska birches, white spruce and balsam fir.....jack pine enters into the forest composition on the drier soils, and mixes with black spruce on the plateau-like tops of the higher hills'. ...There is a minor occurrence of white elm, green ash, Manitoba maple and bur oak along the edges of the section, noticeably in the southeast" (Rowe 1972:36).

There is a gradual diminution in numbers and varieties of broadleaf deciduous tree species along a north trending transitional gradient within the study area. Needle leaf, trembling aspen and white birch become increasingly dominant towards the north in the Duck and Porcupine uplands.

The final section falling within the study area, described by Rowe (1972), is the Manitoba Lowlands section. This section roughly corresponds to the Tamarack-Black Spruce Swamp Community described by Bird (1961). This section occupies the northern fringe of the study area between the Mixedwoods and the western margins of Lake Winnipegosis and the northern basin of Lake Manitoba. There are a few local occurrences of this community throughout the area such as the headwaters of Epinette Creek in the Spruce Woods and in the Riding and Duck Mountains (Bird 1961:15). The soils in this region are eutric brunisols and dark gray chernozems. These soils are characteristically developed under forest cover.

"The prevailing vegetation on the flat, poorly drained land consists of forest patches of black spruce and tamarack with intervening swamps and meadows. Good stands of white spruce, trembling aspen and balsam poplar, sometimes in mixture with balsam fir and white birch, occur on the better drained alluvial strips bordering rivers and creeks" (Rowe 1972:31).

From the above account of grasslands, forest sections and riverine and willow communities it can be seen that the study area contains a great deal of ecological diversity. In addition to the above habitats, the area contains extensive marshlands below the escarpment as well as in the hummocky moraine topography of the uplands (Weir 1983). The numerous lakes provide habitat for aquatic and riparian species.

Because of this range of ecological diversity, the study area contains an extremely diverse, although frequently sparse or scattered, inventory of subsistence resources. In addition, as Snortland-Coles (1979:108-109) and others have pointed out, changes in moisture regime, disease and parasite frequency, as well as major climatic shifts, can influence levels of resource availability from year to year. Human populations, at the top of the trophic chain would have been required to adopt flexible and mobile systems of resource exploitation to effectively utilize the subsistence resources which the area offered.

The literature contains an abundance of references to plant species which are known from ethnographic and ethnohistoric sources to have been utilized by various groups during or subsequent to the initial White contact period (Black 1980; Denmore 1974; Hellson and Gadd 1974; Shay 1980a; Snortland-Coles 1979). A wide range of plants, collected from a diverse assemblage of ecological zones, were utilized by aboriginal populations. The range of uses is almost as great as the number of plants involved. Some species, such as kinnickinik (Arctostaphylos uva-ursi and Cornus stolonifera), were used for ceremonial purposes,

others such as wild sarsaparilla (Aralia nudicaulis) were primarily medicinal, cat-tail down (Typha latifolia) was used as diaper liner and a great many were valued as supplementary food sources (Shay 1980a). The importance of duck potato (Sagittaria latifolia) and cat-tail (Typha latifolia), two marsh plants, has been outlined by Snortland-Coles (1979:93-94). The importance of Indian breadroot (Psoralea esculenta), a fleshy tuber from the dry areas of the plains, has been discussed by several authors (Kaye and Moodie 1978,1981; Reid 1977,1979). (For a listing of plant species useful to human populations which are found within the study area, see Snortland-Coles 1979 and Shay 1980a). In addition to the plant species which were directly utilized by aboriginal populations, the various plant communities supported numerous animal species which were of primary importance to human populations (Ray 1972; Smith 1975; Syms 1977).

Characterizations of plains fauna have been dominated by descriptions of endless herds of bison, and this view has been supported by field investigations of bison pounds and drives in the plains area (Adams 1975; Forbis 1962; Frison 1967,1970,1974,1978; Kehoe 1973; Reeves 1978). An alternate view of the bison as a species which utilized the open grasslands as part of a subsistence round which included the parklands forest/grassland transition zone has been argued by several authors (Arthur 1975; Morgan 1979, 1980). A somewhat similar pattern may have been followed by elk (Cervus canadensis) in the prehistoric period, although the known distribution of archaeological remains in the study

area indicate that elk were taken in the forest edge areas then (Nicholson 1978, 1981), as would be the case now (Rounds 1975). The major grassland adapted species, which were available throughout the year on the open plains, were antelope (Antilocapra americana), jackrabbit (Lepus townsendii), and small canids such as the coyote (Canis latrans) and swift fox (Vulpes velox) which subsisted primarily upon voles and other non-hibernating rodents during winter. Prairie chicken (Tympanuchus cupido) and sharp-tailed grouse (Pedioecetes phasianellus) were also available on the open grasslands.

The Manitoba Lowlands section (Rowe 1972), typical of the more northerly boreal forest sections, is characterized by black spruce, tamarack, and birch, with local wet meadows and marshes, and intersected by lakes and streams. Moose (Alces alces) and woodland caribou (Rangifer tarandus caribou) inhabit this area, together with varying hare (Lepus americanus) and the carnivores which prey upon these species, including timber wolf (Canis lupus), wolverine (Gulo luscus), coyote (Canis latrans), red fox (Vulpes vulpes) and several smaller mustelids. The rivers and lakes in the Lowlands abound with beaver (Castor canadensis) and muskrat (Ondatra zibethicus) and fish are a major resource. Snortland-Coles (1979:106) lists 13 species of fish present in Lake Winnipegosis and recovered five of these species from the Ashkibokahn Site on that lake.

The major portion of the study area falls between the southern and western grasslands, and the needleleaf boreal forest to the north and

east. This area is a parkland mosaic composed of grasslands, aspen-oak groves and the Mixedwood sections. Within this zone, all the species mentioned above, with the possible exception of antelope, can be found. This area is the usual habitat of mule deer (Odocoileus hemionus) and has served as habitat for the recent expansion of white-tailed deer (Odocoileus virginianus).

Several species of large ungulate frequent the forest/grassland interface. Prior to European expansion, bison, a grazing species, were a major resource in this area in fall and winter. Elk, which combine summer grazing and limited browsing in winter, were probably available at all seasons as were mule deer. Moose, which are primarily a browsing species, were restricted to the more heavily treed areas, especially the uplands. Important non-ungulate species, including snowshoe hare (Lepus americanus), porcupine (Erethizon dorsatum), black bear (Ursus americanus), and red squirrel (Tamiasciurus hudsonicus), were to be found throughout the study area, wherever small groves of trees could be found. Wherever the snowshoe hare found suitable habitat, the various mustelids and canids which depended upon it for food were also found. These included mink, several species of weasel, foxes and the coyote.

The muskrat and beaver were to be found wherever streams and marshes, associated with willow (Salix sp.) and aspen (Populus sp.), could be found. The aquatically adapted mustelids (mink, otter, fisher) were frequently present as well. It can be seen that the forest/grassland transition zone brought together, within a relatively small geographic

area, species inhabiting a variety of adjoining communities to produce a biome containing an unusual diversity of constituent plants and animals.

The most important meat animals were the large ungulates. Archaeological evidence indicates the presence of bison (Balcom 1976; Hamilton et al. 1981; Rushowick 1975; Tisdale 1978), elk (Balcom 1976; Nicholson 1978, 1981), moose (Balcom 1976; Nicholson 1978; Snortland-Coles 1979), mule deer (Nicholson 1978) and caribou (Snortland-Coles 1979) in the study area. Antelope have been inferred for the southwestern portion of the area (Syms 1977) but the identification of archaeological specimens is an extremely infrequent occurrence in the published literature.

Archaeological evidence (Hamilton et al. 1981; Nicholson 1978; Snortland-Coles 1979) indicates that large and medium carnivores including bears (Ursus sp.), dogs and wolves (Canis sp.), and lynx and bobcat (Lynx sp.), were also butchered and eaten. Of even greater importance, were the medium size aquatic rodents, beaver and muskrat, and the lagomorphs, jackrabbit and varying hare or snowshoe rabbit. The large and medium size carnivores were thinly scattered and available largely on the basis of fortuitous encounters or taken by means of deadfalls (Honigmann 1956). The rodents and lagomorphs were subject to cycles, and represented localized populations which could readily be trapped and rapidly hunted into scarcity even when locally abundant.

The published archaeological data indicate that migratory waterfowl contributed a significant amount of meat in sites associated with major waterways (Nicholson 1978; Snortland-Coles 1979). Sites where bison were the major faunal resource contain negligible amounts of unidentifiable bird bone which may be of natural origin (Balcom 1976; Hamilton et al. 1981). None of the published reports from the study area identify grouse (Tetraonidae) as a faunal component. Besides migratory waterfowl, only raptors - mainly eagles - seem to be a significant avian faunal component (Hamilton et al. 1981; Nicholson 1978; Snortland-Coles 1979). As was the case with migratory waterfowl, fish were an important seasonal resource during the Late Prehistoric Period (Snortland-Coles 1979). The ethnographic record indicates harvesting techniques which were tied to open water. Weirs seem to have been used (Atwood 1970; Snortland-Coles 1979) and the recovery of bone harpoons in sites, together with fish remains, indicates the use of fish spears (Snortland-Coles 1979; Tisdale 1978).

The diversity of plant and animal resources within the study area provides a broad base of subsistence resources available to hunting and gathering populations. Many of these resources, such as migratory waterfowl, fish, berries, and tubers, are available on a seasonal, rather than a continuous basis. Others, such as bison and elk, by reason of their social or migratory behavior, varied in abundance or ease of hunting according to the season. The ubiquitous small and medium sized mammals, such as rabbits and their predators, fluctuated in



numbers according to population cycles governed by disease vectors and predator/prey ratios. In addition, changes in habitat due to cultural factors such as fire ecology, and shifts in forest/grassland/marshland boundaries, and the areal extent of these communities, in response to short-term and long-term climatic fluctuation, influenced local and regional abundance of plant and animal species.

The pattern of resource availability which emerges is one where the subsistence base varied dramatically according to season, with abundance shifting from one ecological zone to another. Morgan (1980:145) believes that, prior to the introduction of the horse and firearms, the movement of bison from summer pastures on the xeric prairie to winter pasture in the fescue and mixed grass prairie of the parklands was a regular and largely predictable phenomenon. The pattern of the Red River herd, described by Hind (1860), based upon reports of longtime residents of the area, supports this contention. As the bison shifted out of the Aspen Parkland (Bird 1961) onto the open plains, the return of migratory waterfowl and the runs of spawning fish created abundance in the lakes, marshes and rivers towards the east in the study area. With the arrival of spring and the thawing of the soil, tubers and bulbs of many species (Psoralea, Typha, Sagittaria, Allium) could be harvested. In summer, a variety of greens could be collected (Aralia, Aclepias, Chenopodium, Scirpus, Galium). Later, in summer and fall, ripening berries and nuts were locally abundant (Prunus, Rubus, Amelanchier, Quercus, Corylus), together with tubers and bulbs - fattened for next years seed production.

Throughout the area, numerous less palatable or difficult to harvest resources served as a meager, but usually reliable last line of subsistence during times when the main resources failed. These included the inner bark (cambium) of woody species (Acer, Celastrus, Oleaceae, Larix, Picea, Populus, Tilia) and several species of lichens (James 1956; Shay 1980a).

#### CLIMATIC CHANGE AND BIOLOGICAL SUCCESSION IN THE STUDY AREA

Chapter 2 indicates that following the retreat of the glaciers, circa 12,000 B.P., the emergent landscape was colonized by impoverished tundra and boreal forest communities. Ritchie and Lichti-Fedorovich (1968:878) and others have indicated that these communities were likely unique and that no known living analogues exist today. The fauna associated with these pioneer communities might have included muskoxen (Ovibos sp.) and barren ground caribou (Rangifer tarandus groenlandicus). There is little evidence for this period of the elephants and giant bison, common further south, which were exploited by the "fluted point cultures". Given the probable sparseness of subsistence resources in the area, and the generally accepted small numbers of Llano and Folsom hunters inhabiting the continent (Guthrie 1980:72), there is little reason to expect any major drive to exploit and occupy the study area at this time.

Ritchie (1964, 1969, 1976, 1983) and Ritchie and Lichti-Fedorovich (1968) have established three successive vegetation sequences for

west-central Manitoba, based upon pollen studies and secure radiocarbon dates. Their reconstruction commences prior to 10,000 B.P. and extends to the present time (Table 3). As has been noted above, the first of these zones developed under cool, moist conditions and is represented in the pollen cores as being dominated by spruce (Picea sp.), aspen (Populus sp.), and wormwood (Artemisia sp.), with grasses (Graminae sp.) becoming more abundant towards the end of this period, reflecting a drier climate circa 10,000 B.P. (Ritchie 1983:160). The plant assemblage at this time period could probably best be described as a spruce parkland containing elements of tundra (Ritchie and Hadden 1975).

During deposition of Zone 2, circa 10,000 B.P. to 4,000 B.P. there seems to have been a strong warming trend accompanied by reduced precipitation (Ritchie 1983:161). In the Great Lakes region, several hundred miles to the east, this time period has been characterized as a warm humid phase (Warner et al. 1984). In the study area, the pollen assemblage is dominated by wormwood and grasses, with small amounts of poplar, willow (Salix sp.), hazelnut (Corylus sp.), and a small increase in oak (Quercus sp.) towards the end of the period (Ritchie 1983:160). The inferred plant community is a vastly expanded grassland, compared to historic times, with small groves of woodland on meso-hydric sites in depressions and on north-facing slopes. This interpretation of the expansion of the grasslands is supported by pollen cores collected at Grand Rapids (Ritchie and Haddon 1975) where Mayer-Oakes (1970) found bison remains associated with Middle Archaic materials. There appears

to have been a prairie maximum circa 7,000 B.P. when the Grand Rapids area, located towards the north end of Lake Winnipeg, was dominated by a Spruce-Prairie parkland (Ritchie 1983: 161).

The environmental changes initiated at this time appear to have greatly diminished tree cover in the study area (Ritchie 1983) and caused lakes to shrink or disappear (Fenton et al. 1983; Last and Teller 1983; Teller and Last 1981). Given these changed environmental parameters, it is reasonable to suppose that the fauna, and their distribution and patterns of movement, would more nearly approximate that of the open grasslands than that of the historic parkland assemblages, at least until circa 4000 B.P. when cooler, wetter conditions prevailed (Tables 1 and 2).

During the deposition of Zone 3, from circa 4,000 B.P. to the present (Ritchie 1983), there was a gradual trend to cooler temperatures and an increase in precipitation. The Aspen-Oak Grove section invaded the southern grasslands, and the Mixedwood forest expanded to cover the uplands (Ritchie 1983). Along the northeastern edge of the study area, the boreal forest spread across the Manitoba Lowlands replacing the Spruce-Prairie parkland (Ritchie 1983). By 2500 B.P., the Aspen-Oak grove and grassland mosaic, encountered by the first Europeans, had become established over most of the southern portion of the study area, as well as the areas to the west and the east of the Riding and Duck Mountain uplands. It was during this period that the southern basin of Lake Manitoba filled and an outlet opened by way of Lake St. Martin and

the Dauphin River into Lake Winnipeg (Teller and Last 1981). During the latter part of this period, the patterns of movement, and the strategies of adaptation, which were observed by the early fur traders and missionaries, came into being.

## CHAPTER 4: THE ECOTONE CONCEPT AND IMPLICATIONS FOR HUNTERS AND GATHERERS IN THE STUDY AREA

Homo sapiens, like all other living species, exists in an ecological context (Hardesty 1977:7). Individually and collectively, they interact with other species in a predator/prey relationship at the upper end of a trophic chain. The human species, like all other species, is subject to numerous environmentally imposed limitations related to energy capture and the maintenance of homiothermic equilibrium. More simply stated, humankind must obtain, from the environment, their food, adequate to body maintenance and activity, and clothing and shelter, adequate to conserve or dissipate body heat.

Specialized adaptive systems, such as those of koalas, pandas and hummingbirds, utilize the resources of an extremely narrow ecological niche. Such species have evolved their particular adaptive specialization over a great many generations and have successfully monopolized, to a large extent, the particular resource upon which they rely, to the exclusion of other potential competitors. For these species, the reliability and abundance of their particular resource are key factors.

By Holocene times, humans, over countless generations, had evolved an extremely generalized adaptive system utilizing an extensive array of plants and animals as the basis for their subsistence. For such a

generalized species, diversity of resources can largely offset deficiencies in the reliability and abundance of key resources. Such deficiencies frequently prove disastrous for species with specialized adaptive systems. Greiser (1985:7) states that, "A generally accepted economic principle is that broad-based or mixed-strategy economies are more reliable, or secure, than narrow-focused economic strategies." A pure strategy, relying upon a single abundant resource leaves its adherents vulnerable should that resource be depleted or fail to appear at the expected time or place. Jochim (1976:27) argues that,

"A pure strategy would be the specialization and concentration on one resource alone. Militating against such over-concentration are: considerations of risk reduction, which advise spreading the risk, even away from a single low-risk item; the desire for prestige, whose definition requires the contrasting presence of low-prestige items; the structuring of sex role differentiation, requiring at least a dual economic focus; and lastly the desire for variety."

The resources of the northern temperate zones are markedly seasonal in terms of availability and relative abundance. In the northern grasslands, large herd animals form the principal natural source of available protein and energy and tend to follow a pattern of seasonal movement. In the northern forests, small aggregations or single animals form the major resource, except where streams and lakes furnish large numbers of fish, particularly during spawning runs. Plant foods in the

plains and subarctic regions are available almost exclusively in the growing season, since frozen ground and snow cover effectively bar access to roots, and frost destroys most subaerial vegetation suitable for human consumption. Subsistence in the more northerly regions, where resources are typically seasonal, scattered, or mobile, carries much higher risk than in tropical areas where resources are more localized and much less subject to marked seasonal fluctuations (Butzer 1971:149).

In Chapter 3 it was noted that almost all subsistence resources in the study area, which are important to human populations, are either subject to pronounced seasonal variability, fluctuations due to population cycles, territorial mobility, or are unable to withstand prolonged local exploitation. In other words, there are no natural subsistence resources in the area or in the surrounding subarctic and plains regions which are characterized by a reliable sustained local yield throughout the year. This situation has characterized the area throughout prehistory and changed only after the introduction of agriculture and a market economy by Europeans.

Under conditions of marked seasonality and resource fluctuation it is reasonable to expect that within any broad region, encompassing diverse habitats and biomes, those areas which are characterized by a diversity of subsistence resources will be heavily utilized by populations of hunters and gatherers. The term ecotone is frequently used to describe many such areas. An ecotone is considered to be a transitional zone between two adjacent biotic communities, containing species



characteristic of both and, occasionally, species unique to the transition zone itself. The concept has been recognized for some time (Bird 1961; Cooter 1974; Odum 1959) and utilized by archaeologists as a matter of course (Baerreis and Bryson 1965; Cleland 1966; Syms 1977; Watrall 1976). More recent writers in ecology (Baxter 1977) recognize changes in species abundance along environmental gradients, which may result in increased localized abundance in numbers of individuals or in species diversity, but they rarely employ the term ecotone. A survey of recent texts and articles indicates that the term ecotone has fallen into disuse among ecologists. Rhoades (1978) has questioned the uncritical acceptance of the term, by archaeologists and others, since spatial and relative production parameters of an 'ecotone' have never been clearly defined. An ecotone can vary in size from the edge of a small pond (Rhoades 1978:610) to the several hundreds of thousands of square kilometers of the Aspen-Parkland (Bird 1961). Similarly, some ecotones may be more productive than adjoining areas and others may be less productive than areas on either side of the transition zone (Rhoades 1978:612). Rhoades (1978) has suggested that since an ecotone has no precise boundaries and represents a transition between two distinctive biomes, it is more accurate to simply treat the plant and animal assemblages as a continuum, grading from one biome into the next. This view is shared by King and Graham (1981) who see the ecotone as a function of transition along a gradient between major biomes, rather than as a distinct entity. Davy (1980) has disputed this argument, stating that, while ecotone boundaries are not precisely definable, the

ecotone concept is a useful descriptive idea for the resource abundance frequently encountered in transition zones.

The concept of 'edge effect' (Odum 1959) has been widely accepted as an explanation for much of the productivity of ecotonal boundaries. Rhoades (1978), following Whittaker (1967), has argued that if the boundaries of ecotones cannot be determined, it is pointless to discuss any hypothetical edge effects of these invisible boundaries. Whittaker (1967) states, "Such transitions are not lines along which communities meet but are themselves steeper community gradients." While the terms edge effect and ecotone suffer from a lack of precise definition, the phenomena which they are intended to describe continue to be of interest to ecologists and archaeologists. King and Graham (1981) regard the 'edge effect' as being of greatest significance in a forest/grassland situation or in any natural or artificial break in a forest canopy which will favour successional or understory plants and shrubs.

An example of a transitional zone which has functioned as an ecotone is to be found in the blending of the Carolinian and Canadian biotic provinces of the Great Lakes area (Cleland 1966). Almost all of the animal species of demonstrated economic significance to human populations, which are found in either the Carolinian or Canadian biotic provinces, are found in the transition ecotone between these biomes (Cleland 1966:224-244). Cleland (1966) points out that faunal remains from Late Archaic rockshelters such as Durst and Raddatz, located in the Carolinian - Canadian transition zone, support the idea of resource abundance in such areas.

"Both of these rockshelter sites are located on the Carolinian - Canadian forest edge. Since biotic transition zones, or ecotones, are characterized by concentrations in both kinds and numbers of plant and animal species, they are favourable hunting places for people who inhabit the larger biotic provinces which form them" (Cleland 1966:56).

Cleland (1966:96) further indicates that with the introduction of horticulture from the south, this area, with its rich natural resources, continued to supply a significant portion of its human population with their basic subsistence needs from natural sources.

The entire study area (Figure 1) can be viewed as a transition zone between boreal forest to the east and xeric mixed prairie to the west. The transition between these biomes is rendered more complex by the high uplands (Figure 2) which serve as sites for mixedwood outlier communities derived from the margins of the boreal forest. The complex of small lakes associated with the hummocky surface of these uplands, and the complex drainage networks resulting from the higher precipitation associated with these uplands, also furnish significant habitat diversity within the area. Similarly, the orthic regosols of the Prehistoric Upper Assiniboin Delta support a mixedwood and grassland mosaic and an accompanying diversified faunal assemblage. Perhaps the environmental feature which most strongly characterizes the study area is the diversity of habitat and subsistence resources available, in

comparison to the adjacent major biomes of the xeric plains and the boreal forest (Table 4).

The subsistence resources which are available to hunters and gatherers can be characterized as either localized or mobile resources. Localized resources can be found within a reasonable logistical range of an established basecamp. Localized resources include plants of all kinds, non-migratory small and medium sized mammals and birds, and fish. The availability of these resources may be limited by seasonal considerations, especially in the case of plants, hibernating animals, and fish which may have been inaccessible due to the thick ice present in late winter. Mobile resources are those birds and animals which normally travel distances greater than a person based in a fixed camp would journey in the course of regular hunting or gathering activities. Mobile resources include large ungulates following seasonal migration rounds and migratory waterfowl (Table 5).

The uplands within the study area are extremely important from ecological point of view. They exist as islands within the matrix of the Aspen-Parkland and are characterized by forest ecosystems. Bonnichen and Baldwin (1978:2) have indicated a similar role for the Cypress Hills on the border between Saskatchewan and Alberta.

Table 4. Relationship of Subsistence Resources to Major Environmental Zones

Resource	Southern Boreal Forest				Aspen Parkland				Shortgrass Plains			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
Bison					P	S	P	P	S	P	S	
Elk				*	P	P	P	P	*	*	*	
Moose	P	P	P	P	S	S	S	S				
Antelope					*	*	*	*	S	S	S	S
Deer					S	S	S	S				
Cariboo	S	S	S	S								
Bear	S	S	S	S	S	S	S	S	*	*	*	
Wolf/Coyote	*	*	*	*	*	*	*	*	*	*	*	
Lynx	*	*	*	*								
Small Carniv.	*	*	*	*	*	*	*	*	*	*	*	
Lagomorph	S	S	S	S	S	S	S	S	*	*	*	*
Beaver	P	P	P	P	S	S	S	S				
Muskrat	S	S	S	S	P	P	P	P				
Small Rodent	*	*	*		*	*	*		*	*	*	
Waterfowl	P	S	P		P	S	P		S		S	
Tetraonidae	*	*	*	*	*	*	*	*	*	*	*	*
Raptors	*	*	*	*	*	*	*	*	*	*	*	
Fish	P	S	S	?	P	S	S	?	*	*	*	Technological limits regarding ice fishing
Plants (roots)	*	*	S		*	*	S			*	S	
" (berries)			S				S				*	
" (herbiage)		*				*						
" (rice)			P									

Note: Information derived from Burt and Grossenheider 1976; Losey 1978; Syms 1977; All environmental zones include rivers and lakes.

P - Primary      S - Secondary      \* - Minor

Table 5. Descriptive Characterization of Subsistence Resources in Study Area

Zone	Species	Dispersed	Clustered	Localized	Mobile	Spring	Summer	Fall	Winter	Major all year	Minor all year	Major seasonal	Minor seasonal	Comments
PLAINS	Bison	*	*			*						*		A viable subsistence strategy for the Plains requires a major food preservation technology.
	Antelope	*	*			*	*	*	*		*			
	Bear-grizzly	*		*		*						*		
	Wolf/Coyote	*		*		*	*					*		
	Lagomorph	*	*			*	*	*	*		*			
	Waterfowl		*	*		*	*						*	
	Plants	*	*			*	*					*		
PARKLAND	Bison	*	*			*	*	*				*		Abundant and diverse resources indicate a wide range of adaptive strategies possible.
	Elk	*	*			*	*	*	*	*				
	Moose	*	*			*	*	*	*	*				
	Deer	*	*			*	*	*	*		*			
	Bear	*		*		*	*	*	*		*			
	Wolf/Coyote	*		*		*	*	*	*		*			
	Small Carniv.	*	*			*	*	*	*		*			
	Beaver/Muskrat	*	*			*	*	*	*	*				
	Waterfowl		*	*		*	*	*				*		
	Fish		*	*		*	*	*	?			*		
FOREST	Moose	*	*			*	*	*	*	*				Diverse but dispersed year around resources and seasonal lake and river resources make several broad base adaptive strategies possible.
	Cariboo	*		*		*	*	*	*		*			
	Bear-black	*		*		*	*	*	*		*			
	Wolf/Coyote	*		*		*	*	*	*		*			
	Lynx	*	*			*	*	*	*		*			
	Small Carniv.	*	*			*	*	*	*		*			
	Beaver/Muskrat	*	*			*	*	*	*	*				
	Waterfowl		*	*		*	*					*		
	Fish		*	*		*	*	*	?			*		
Plants	*	*			*	*	*				*			

"The highlands provide a trip mechanism for low-passing clouds resulting in more rain than in the surrounding prairies. Eighteen to twenty inches of rainfall per year is not uncommon in the hills as contrasted to ten to twelve inches per year at stations on the plains to the north. With this additional rainfall, the hills support groves of white spruce, lodgepole pine and quaking aspen, along with mixed grass and fescue, which are atypical of the short grass prairies in this sector of the western plains. As might be expected, grey wooded forest, dark brown and brown soils are associated with this anomalous vegetation pattern. It supports a number of mammals and birds not commonly found in the adjacent prairie region"

Various other highland outliers have been mentioned in ethnohistoric accounts as important sources of seasonal resources - especially as wintering areas. Among these are Wood Mountain (Eastman 1971), Moose Mountain and Touchwood Hills (Atwood 1970), Turtle Mountain (Eastman 1971), and Riding Mountain (James 1956).

Similarly, the Spruce Woods area of the Assiniboin Delta (Nicholson 1981) and the Great Sandhills of western Saskatchewan (Epp and Townley-Smith 1980; Gordon 1979) exhibit species abundance consistent with the ecotone concept. There is also archaeological evidence of more

intensive utilization of these areas by prehistoric human populations than in adjacent habitat areas (Epp and Townley-Smith 1980; Gordon 1979; Nicholson 1981).

While some authors have disputed the validity of the terms 'ecotone' and 'edge effect' because of the difficulty in arriving at clearcut definitions (Rhoades 1978; Whittaker 1967), the increased diversity and relative abundance of species at particular intervals in transition zones can frequently be demonstrated (Bonnichsen and Baldwin 1978; Cleland 1966; Davy 1980; Odum 1959; Pettapiece 1969). The study area, by reason of physiographic relief and other variables of the physical environment, is characterized by the interfingering of several distinct biotic communities together with the transition zones which result from their proximity. This situation results in the presence of an extremely diverse range of localized resources while at the same time encouraging the seasonal influx of mobile resources such as bison herds (Hind 1860; Morgan 1980) and flocks of migratory waterfowl (Nicholson 1978; Snortland-Coles 1979).

#### SUMMARY OF IMPLICATIONS FOR HUNTERS AND GATHERERS

Like all other living things, mankind is dependent upon the immediate environment to provide the material subsistence necessary for survival. The adaptive systems developed by human groups are relatively generalized and exploit a wide range of potential resources available in the areas where they reside.



While the terms 'ecotone' and 'edge effect' have been criticized for their lack of precision in the literature, the study area, by reason of its many distinctive biotic assemblages and species abundance, fulfills the general criteria of an ecotone. The forest/grassland transition area of western Manitoba offers an extremely wide array of localized resources useful to hunters and gatherers. These resources are diverse but in all cases suffer limitation due to seasonality, fluctuating population cycles, or low productivity. In addition to the variable localized resources, certain highly productive mobile resources are seasonally available.

While the area contains an abundance of subsistence resources, this positive aspect is tempered by the many factors of variability associated with these resources. Strategies for survival, under these conditions, would necessitate seasonal movement governed by an intimate knowledge of the available resources and their probable location. The adaptive strategies of hunters and gatherers utilizing this area would necessarily require logistical resource scheduling (Binford 1980) of a sufficiently flexible nature to meet the contingencies attending the failure of any particular resource or resource cluster to occur at the expected time or place, or in the anticipated measure of abundance.

CHAPTER 5: CONSIDERATIONS AFFECTING THE DEVELOPMENT OF MODELS  
FOR THE HUMAN ECOLOGY OF HUNTER-GATHERER POPULATIONS  
IN NORTHERN TEMPERATE ZONES

The principal active process which engages all living things is provision for their biological maintenance. In its most elemental terms this is expressed as the capture of energy (Casteel 1972; Jochim 1976; Norberg 1977). Abruzzi (1982:13) has stated that, "Both human and non-human communities constitute material systems through which energy flows and by which populations and their resources are mutually regulated." While energy is an easily measured and vital component of diet, obviously a large number of other nutritional criteria must be met to maintain a healthy reproductive population (Keene 1981a:134). It is also obvious that not all potential foods contain an adequate, balanced ratio of calories, proteins, vitamins, and minerals, for bodily function and maintenance (Keene 1981a:136-138).

The means by which a species maintains itself, in competition with other species, and obtains its nutritive requirements from the environment is considered to be its adaptation. A successful adaptation involves the development of efficient extractive and processing systems, such as the teeth and rumen of bovids, and the provision for defense or escape from predators. The adaptation also includes a reproductive strategy which will maintain or increase population numbers within the parameters of its ecological niche. For most species, the adaptive

repertoire is limited to biological or sociobiological response. Humankind has evolved a unique adaptive strategy, loosely bound up in the term culture. The cultural adaptation is essentially the transmission of the cumulative knowledge of many generations to each succeeding generation - the accumulated learning of ancestors becoming the everyday common knowledge of each succeeding generation. The importance of adaptive strategies, and human preoccupation with subsistence lore, has been clearly stated by Durham (1981:219):

"One may conclude that adaptation has been a major concern, though certainly not the only concern, of culture and cultures for more than three million years. Against this background, a culture whose attributes reflect little concern for human survival and reproduction must surely be seen as some kind of exception, not the rule. Of course, this does not mean that any society's full set of cultural attributes are uniquely explained by adaptation."

The adaptive cultural repertoire includes an ecological adaptation, coupled with an extractive technology, by means of which the material needs of the population are met and the culturally conditioned aspirations and expectations of the group are satisfied.

Human cultural systems function within the broad framework of ecosystems. Hardesty (1977:14) describes the ecosystem as,

". . . a dynamic set of relationships between living and non-living things through which energy flows and materials cycle and because of which other problems of survival are

worked out. In practice the ecological system is identified by a group of plants and animals, along with their non-living environment, that makes up a 'food web' and generally affect each other's chances of survival."

Humans have adapted to a wide range of ecosystems and, in many cases, extract nutrients from several ecosystems either sequentially or synchronically. An example of the former strategy would be illustrated by plains hunters who harvested bison in summer and fall and moved into the parklands to hunt deer and elk in winter. This general pattern has been outlined for the Dakota by Hickerson (1970). An example of the second strategy would be the practice, followed by the Ojibwa (Bishop 1978) of netting fish and snaring rabbits and other small land mammals during times of environmental stress when other major food sources such as moose, woodland caribou, and beaver, were scarce.

The concept of an ecological niche is central to all species-specific ecological models. Hardesty (1977:109) states that, "In terms of energetics, the niche is an organism's share of the limited energy and nutrients available in an ecological system." He further states,

"The human ecological niche is a feeding strategy of a human group. It defines a set of resources within an ecological system that is essential to a group's survival and is measured by subsistence variety. The niche of a human group is not static but changes with the process of adaptation" (Hardesty 1977:120).

In the case of Homo sapiens, there is no single ecological niche such as that of the koala, panda or hummingbird. Human populations, by reason of an omnivorous diet and the potential for rapid adjustment in a culture based adaptation (in contrast to a strictly biological adaptation), have adapted to a wide variety of niches, exploiting virtually all of the major ecosystems on the planet. While much of the subsistence economy of modern populations is dependent upon agricultural and industrial technology, the subsistence technologies available to Late Paleolithic hunters placed almost all of the available subsistence resources of the natural environment within reach. Homo sapiens has been at the apex of the trophic pyramid for tens of thousands of years.

The cultural adaptation of human groups is composed of a complex body of cumulative knowledge which regulates behavior and influences choices. This body of knowledge transmits patterns of subsistence behavior and the evolved technologies of the particular group. While culture does not replace biological considerations of physiology, nutrition, and reproductive drive, it strongly influences the expectations of a social group and the way in which the group will attempt to satisfy these expectations. While the extractive systems of human populations can be perceived and quantified by measures developed for other species (Abruzzi 1982:13), predictive indicators of the behavior for these species frequently prove inadequate for human groups. This anomaly arises because of the need within human populations to satisfy expectations which are not generated by simple biological considerations

and because of historical considerations unrelated to the immediate situation. The need to satisfy ceremonial, decorative, and prestige requirements, frequently leads to the expenditure of large amounts of time and energy in the procurement of species which offer little return in nutrient or utilitarian value. The prestige which Plains Indians associated with eagle feathers, and the widespread interest in dentalium and olivella shells, serve as examples. Similarly, the widespread practice of food taboos or dietary prohibitions of one kind or another can frequently be shown to be maladaptive on the grounds of foraging or dietary efficiency, although at some period in the recent, or more distant past, these practices may have been functionally adaptive (Harris 1974, 1979).

It has been stated above that the satisfaction of primary subsistence needs is a major concern of all human groups and that activities necessary to meet these needs are carried out within the framework of ecological systems. It has been further stated that the perception of these needs, and the manner in which they are satisfied, is strongly influenced by the particular cultural matrix which has evolved about a group throughout their historic development. Any attempt to reconstruct or model the subsistence behavior or the human ecology of a social group should take these factors into account. In the case of an extinct culture, all possible lines of evidence must be considered and evaluated in order to develop a useful approximation of the lifeways followed by the group being studied.

## DATA SOURCES AND THEIR LIMITATIONS FOR MODELING

There are three basic approaches which have been used in attempts to reconstruct the lifeways of past human populations. The first approach attempts to devise ecological models. Ecological models depend upon accurate reconstruction of the paleoenvironment and an assessment, based upon modern analogues, of the available resources and carrying capacity of the environment. This resource potential is juxtaposed with an estimate of the energy and other nutrient or utilitarian requirements of a dependent human population, given a particular level of technology.

Ecological models relate to the biophysical environment and attempt to explain interrelationships between organisms and their environment. They are based upon data which describes the physical environment and the organisms which were present at a given time and place. These data may be recovered from either archaeological or non archaeological contexts. An example of the application of an ecological model to prehistoric human ecology is the use of Optimal Foraging Theory to develop a linear programming model of subsistence in the Saginaw Valley of Michigan in Late Archaic times (Keene 1981a).

The second approach is through ethnographic analogy. This is a comparative model where the lifeway of the study group is postulated to be similar to that of a historic or modern group, possessed of an equivalent technology and living in a similar environment. Ethnographies and historic documents serve as primary data sources for the comparative model.

Ethnographic models are based upon written accounts of the behaviors and patterns of historic societies - usually these are emic accounts by outside observers. These models usually take the form of analogies. The Parkland Exploitation Cycles model proposed by Ray (1974: 47) is an example of an ethnographic model since it is based primarily upon documentation of aboriginal lifeways rather than an intricate and detailed reconstruction of ecological possibilities or the evidence from archaeological remains.

The third approach attempts to reconstruct prehistoric lifeways primarily from archaeological data. These models are closely tied to patterns of distribution of archaeological remains within sites or to patterns of distribution of the sites themselves across the countryside.

Initial attempts to formulate models based upon archaeological recoveries grew out of the Culture Area concept (Kroeber 1931) and led to Culture History which tended to be tied to typological schemes, stacked chronologies, and regional parameters. In an attempt to break out of these constrictions, Binford (1964, 1965, 1972) advocated Processual Archaeology - the study of change within archaeological assemblages untrammelled by interpretive frameworks imposed by ethnographic analogy. He stressed the uniqueness of each particular site as the result of the interaction of depositional context, depositional history, culture history, and site function (Binford 1964:431-432). Binford went on to emphasize that only an explicit sampling design which incorporated an adequate sized regional sample



could provide the necessary information to understand prehistoric cultural systems (Binford 1972:33). In developing explanatory schemes, Binford (1972:33) believed that analogies developed from ethnographic sources should not be used directly to interpret archaeological data but rather to generate explicit hypotheses concerning cultural behavior which could be tested in archaeological contexts. He (Binford 1972:61) further stated,

" . . . our understanding of the past is not simply a matter of interpreting the archaeological record by analogy to living societies, as has been commonly asserted (cf. Thompson 1956:329). Our knowledge is sound to the degree that we can verify our postulates scientifically, regardless of the source of our inspiration. Scientific verification for archaeologists is the same as for other scientists; it involves testing hypotheses systematically."

Wiesener (1982:176) has recently elaborated on this position by asserting that it is necessary ". . . . . to specify a spectrum of organizational strategies which hunter-gatherers use to adapt to various environments, and to relate these strategies to regular and predictable patterns of human remains." She (Wiesener 1982:176) goes on to state,

". . . it will be necessary to consider variation in hunter-gatherer organization in the light of strategies used in the entire productive process - those strategies used for organization around resources, as well as those used in organization around other persons in social relations of

production."

The approach advocated by Wiessner (1982) relies upon the evidence from material remains interpreted in the light of theoretical constructs based upon risk reducing strategies and organizational strategies directed towards resource utilization.

Each of the approaches listed have certain advantages and disadvantages which are inherent in the nature of the data itself or in the underlying theoretical assumptions. Ecological models focus on the habitat, that is, the structural setting of subsistence activities, and upon the niche, which is the resource assemblage and procurement strategy utilized by a particular species (Jochim 1981:45). In general, such models presuppose that the most efficient means of achieving energy capture, or other subsistence goals, will be the most adaptive and of greatest benefit to a given population. A recent application of this principle to hunter-gatherer populations has entered the literature under the heading of Optimal Foraging Theory (Smith and Winterhalder 1981). Durham (1981:230) states that,

". . . optimization models deal with the same cost-benefit tradeoffs and simultaneous solutions to multiple demands that adaptation itself engenders, at least according to current theory. Moreover, whatever else human societies may do in an environment, they must always establish behavior patterns appropriate to the acquisition and control of sufficient free energy. In some cases these patterns are only a small part of human behavior, to be

sure, but even then energy relations are a sort of

'bottom line' on human adaptation."

This rather general statement of the nature and goals of Optimal Foraging Theory is almost always narrowed in any attempted application, since the variables governing human behavior are extremely complex and diverse.

Optimal Foraging Theory and the applied technique of linear programming (Keene 1981b; Reidhead 1979) attempt to demonstrate stable systems governed by a limited number of biophysical variables or even a single material restraint. Application of these models to purely biological systems frequently shows a good approximation to reality (Belovsky 1978; Krebs 1978; Norberg 1977), however, the correspondence to the reality of culture bearers is frequently tenuous or contradictory. The basic postulate put forward by Keene (1981a:131) that selection favours groups which best satisfy food and nonfood, or nutritional and non-nutritional, material needs is simplistic. History has repeatedly demonstrated that marginal nomad groups may overrun and annihilate or assimilate groups which regularly produce food and other material surpluses. The conquest of Imperial China by Mongol nomads in the 11th century (Lamb 1952) serves as an example. Likewise, the dramatic eighteenth century egress of the Cree from their boreal forest base into the parklands and the plains had relatively little to do with optimal foraging efficiency. It was based primarily upon a drive to expand and control their middleman position in the fur trade and was facilitated by their access to European weaponry (Ray 1974).

Selby and Hendrix (1976) used linear programming and synchronic data to provide a framework relating stated goals to empirically measured achievement of those goals in a contemporary Mexican village. They clearly indicate that their successful results could only be achieved when knowledge of material and cultural goals were available. An approach which ignores cultural values cannot produce insights into the emic world of a contemporary group and will only serve to obscure what little evidence remains of the emic worldview of prehistoric populations that might be preserved in their archaeological sites. The analytical categories of optimum foraging models are based upon etic statements deduced from quantification of the physical and biological aspects of the total environment. Of necessity, most archaeological investigation and reporting will consist of etic goals and statements. The fragmentary nature of the archaeological assemblage and the perishable nature of most cultural remains often leaves little choice. However, the goal of understanding emic perceptions and worldview of prehistoric cultures should not be summarily dismissed because it is difficult to achieve or, in a great many cases, impossible. While these perceptions are obscure and difficult to evaluate they did influence the accumulation and the deposition of material culture in prehistory and their influence should be discernable although difficult to interpret in most cases.

Recently a number of researchers have attempted to relate the material culture of modern groups to observed patterns of subsistence. These efforts, while producing some useable data have, in some cases,

suffered from a lack of methodological rigor or testable propositions. Yellen's (1977) ethnoarchaeological work among the !Kung demonstrated activity areas within campsites but failed to separate out materials from previous occupations by the same or similar groups. The work of Binford (1978, 1980, 1982) among the Nunamiut clearly recorded the multiple use and reoccupation of a variety of sites but fell short of demonstrating how the artifacts related to the various occupations, or activities carried out, could be separated. In addition, Binford (1980) notes that in an area which has been occupied for many centuries, where there are neither diagnostic artifacts or materials suitable for dating, sites cannot be satisfactorily assigned to any particular cultural complex or adaptive system. Winterhalder (1981b:80-81) has observed that within the lifetime of a hunter in the boreal forest, the same constellation of subsistence resources will not recur in sufficient detail to ensure identical decisions. Because of this, continuity of subsistence behavior is dependent not so much on the experience of the individual as on received tradition. The enculturation of successive generations serves to ensure a continuity of expectations and provides knowledge of the means for their satisfaction. This transgenerational continuity effectively serves as a risk reducing mechanism for human populations by creating a cultural environment where behavior and response are predictable in the face of biophysical environmental fluctuations.

The degree to which investigators will sacrifice achieving of the goal of modeling the realities of cultural behavior, in order to escape its complexity and unpredictability, is well illustrated in the statement by Moore (1981:194):

"Culture systems function through flows of matter, energy and information. . . As an all knowing and computationally perfect decision maker, the 'economic man' serves the useful modeling function of holding the informational capabilities and capacities constant while the dynamic created by variations in the flows of matter and energy is investigated.

This assumption is justified not by its reasonableness, but by the powerful and elegant models of human behavior which have been based on the simplification."(emphasis mine)

In the minds of some authors, powerfulness and elegance in modeling are more valuable than a more complete but untidy reconstruction of human lifeways which attempts to address the problems of socio-cultural patterning.

These criticisms are not meant to suggest that Optimal Foraging Theory and linear programming models are of no value in understanding the subsistence strategies of prehistoric hunters and gatherers. It is only intended to show that the scope of the models to deal with complex cultural variables and data is limited by the underlying assumptions and structure of the models themselves. When an attempt is made to utilize these models in predicting the subsistence strategies of prehistoric

populations, it is necessary to first of all achieve a precise paleoenvironmental reconstruction. This is usually impossible to accomplish with the necessary precision to relate ecological events to a given site at the time it was occupied. For example, a late frost may destroy nut and berry crops in a given year, or a series of severe winters may temporarily drastically reduce deer populations in a given area, or disease vectors may decimate local populations of particular plants or animals. Any, or all of these short term fluctuations may have precipitated real crises in the lives of dependent human populations. Attempts to deal with these traumatic events may have influenced patterns of archaeological deposition but left no identifiable traces in the paleoenvironmental record. Of course, Optimal Foraging and linear programming models of subsistence, like any other models for prehistory, become increasingly reliable as the data base is expanded. When large numbers of sites, representing the activities of all seasons over a period of several years, have been tabulated, an increasingly reliable series of explanatory models can be constructed. When this situation has been achieved, then anomalies or unusual assemblages can be evaluated against a composite or average background of a reconstructed environment or pattern of behavioral expectations.

The value of Optimal Foraging Theory (Winterhalder and Smith 1981) and other biological models (Casteel 1979) to the archaeologist lies primarily in their usefulness in assisting in the development of a solid ecological background against which these cultural and environmental

anomalies may be more clearly perceived. They provide the investigator with a methodological tool capable of constructing a model of expected subsistence patterns, and enabling social configurations, based upon quantified data and explicit assumptions. O'Connell and Hawkes (1981:116) state that,

"The value of such theory lies in its role as a reference dimension, as a source of testable hypotheses about the organization of subsistence related behavior in a wide range of environmental, technological, and social circumstances. By testing such hypotheses, we should be able to distinguish those aspects of behavior motivated by the principles of optimal foraging from those which are shaped by other variables, and, having isolated the latter, seek explanation for them in other terms."

Biological models predict the behavior of mankind in the expectation of etic decisions by a rational animal. The behaviors which originate in the historical experience of a group or in the non-empirical world of magic, philosophy, or religious belief, must be accounted for in some other way. Greiser (1985:6) suggests that adaptive behavior is directed towards satisfying needs rather than achieving optimizing efficiencies. In support of this position she quotes Simon (1957:261) who concludes that,

". . . however adaptive the behavior of organisms in learning and choice situations, this adaptiveness falls short of the ideal 'maximizing' postulated in economic theory. Evidently organisms adapt well enough to



'satisfice' [sic]; they do not, in general, 'optimize'."

Hunters and gatherers develop adaptive systems which allow them to extract from their particular environmental situation the materials they may require to 'satisfice' their perceived needs arising from biological initiatives and culturally conditioned expectations.

The second approach to modeling, ethnographic analogy, is structured from isochronic data and usually is based upon data from a relatively short time period. Such models tend to imply a strong measure of stability and conservatism in simple societies. For example, the structural-functional emphasis of British Social Anthropology emphasized the preservation and maintenance of existing structures and was unable to account for or to predict social change (Harris 1968). The predictive value of models based upon synchronic ethnographic data is weak since there are no diachronic trends to indicate directions of change or to aid in the identification of the agents of change. From the perspective of the archaeologist, the major problems associated with models derived from ethnographic data is the lack of predictive power associated with a short time scale and the wealth of socio-cultural background information which cannot be verified in the limited archaeological record.

Several authors have recognized the danger of imposing ethnographic patterns on archaeological remains (Binford 1965; Braun and Plog 1982; Wobst 1978). Wobst (1978) points out that the application of untested theory, based upon ethnographic sources, to the archaeological record will only serve to perpetuate shortcomings which may be inherent in that

theory. He notes that salvage ethnographers have tended to concentrate on recording distinctive features of hunter-gatherers within artificially circumscribed parameters and have used these data to construct a caricature of the ethnographic present as a model for modern hunter-gatherer reality (Wobst 1978:304-305). Wobst (1978:305) notes that the ethnographic pattern of hunter-gatherer insularity, which characterizes the ethnographic present in both the Old and the New World is refuted by the archaeological record which clearly indicates widespread prehistoric trade and interaction networks encompassing diverse economies, including hunters and gatherers. This latter pattern is confirmed in the study area by work done by Syms (1977,1980) and Nicholson (1986).

In favour of ethnographic and ethnoarchaeological studies it must be stated that they provide clear and unequivocal evidence of many of the socio-cultural variables affecting decision making processes which are not available from any other source. A number of authors (Binford 1980; Braun and Plog 1982; Honigmann 1956; Lomax and Arensberg 1977; Speth and Spielman 1983; Tanner 1979) have reported upon many subtleties of subsistence strategy which would be almost impossible to deduce from the archaeological record.

Binford (1978,1980,1982) has clearly shown that within a relatively short period of time, a single site may be reoccupied many times with totally different activities being carried out in response to the changing subsistence opportunities of the seasons. Colson (1979:21) has

listed a number of cultural and behavioral responses utilized by groups to lessen vulnerability to seasonal or other environmental shifts. The work of Tanner (1979) has shown how religious belief and practice parallels and supports decisions regarding subsistence behavior and the ceremonial treatment and deposition of faunal remains. In the absence of ethnographic data, it is highly unlikely that many of the aspects of human behavior delineated by these authors would have been deduced from the archaeological record, although once they have been identified in ethnographic contexts, frequently the prehistoric analogues have been demonstrated (Nicholson 1978:12). While Optimal Foraging Theory proposes a narrow range of best possible subsistence strategies, the ethnographic record has shown that the pursuit of satisfaction of culturally conditioned goals has initiated the development of a wide range of responses to the opportunities which the environment affords.

In the third approach to cultural reconstruction, which is based upon archaeological data, the models have, in the past, tended to be tied to typological schemes wherein the artifact assemblages themselves frequently assumed the attributes of 'culture bearers' in their own right. The "Beaker Folk" of V. Gordon Childe (1925) who were identified by their beaker shaped ceramics, the "Chavin Culture" (Kano 1979) based upon their distinctive motifs in sculpture and ceramics, and the "Oxbow Complex" (Epp and Dyck 1983) characterized by a projectile point with a distinctive 'eared' morphology, are all examples of postulated social entities based upon a perceived ethnicity in the artifacts. The final

aggregation of such archaeological assemblages may well be a function of taphonomic variables, trade, diffusion of artifact styles, a widespread technological adaptation, or a proselytizing religion. None of these variables are sufficient to define an ethnic group composed of the individuals with whom the artifacts may have been associated. Such social entities, reconstructed from archaeological data, may bear little resemblance to the empirical realities under which the artifacts were deposited. More recently, it has become the practice to develop hypotheses and testable theoretical constructs based upon empirical realities which have been identified in ecology and ethnology. This approach involves the construction of models which proceed from the testing of explicit hypotheses against data recovered from an archaeological context. They are essentially explanatory models. These archaeological models are concerned primarily with identification and explication of patterns which emerge in a context of archaeological excavation and subsequent analysis.

The raw data of the archaeologist consists of the durable fragments of past cultural activity, plus their spatial relationships, together with the remnants of natural thanatic events, and the matrix in which they are enclosed. Behavior which leads to the deposition of durable cultural material in an environmental context is most easily investigated by the archaeologist. This fact does not preclude the investigation of the less tangible areas of human behavior in prehistory - it simply makes it more difficult. Kohl (1981:90) states that,

"Archaeology's association with materialism is basic; by the

very nature of their data, archaeologists must at least believe that the material remains of a past society allow for its reconstruction, that the society's tangible, discarded products provide sufficient information to reconstruct its activities and history plausibly. In other words, archaeologists consciously or unconsciously adopt the materialist premise that there is a significant correlation between what a society produced and how it functioned. Correlations aren't equivalent to causes, and the acceptance of this premise need not imply adherence to a conception of history that denies or minimizes the significance of ideas and beliefs."

Attempts to 'fine tune' these materialist reconstructions, in order to interpret or discover causation, must be undertaken with some caution. Rappaport (1971:247) has stated that, "Disparities between men's images of nature and the actual structure of ecosystems is inevitable." This results in decisions being made by prehistoric site inhabitants in response to an emic environmental perception which may be quite different from the etic, objective reality of the archaeological investigator, who lives in a vastly different culture and time. Wood (1978:259) refers to the emic viewpoint as a cognized model of the environment, operative in the minds and perceptions of a given population. Since the details of the cognized model held by a given prehistoric population are unknowable and all of the referents are

necessarily constructed from the distribution of their artifacts, archaeological reconstructions of decision making processes must remain tentative. There is no way of knowing conclusively whether the variables selected by the investigator were decisive in the minds of the people being studied or if they ranked them consistently at all seasons or in all social or survival contexts.

Archaeological reconstructions are also subject to the effects of taphonomic variables. Only those artifacts, and the evidence of their associated behaviors, which are preserved or leave some identifiable trace of their passing in the site matrix, can be utilized to build archaeological models. For example, what archaeological evidence of berry picking or root digging will remain that will not be obscured by a single fortuitous kill of a large ungulate, even though the site may have been chosen for its proximity to the plant resources?

While archaeological data and its resulting models have their limitations, archaeological remains provide the only reliable data on prehistoric demographic patterns, subsistence strategy, and technological achievement. Such data provides the strongest models for predicting and explaining change and development through time and in response to environmental shifts.

It should be obvious from the above discussion that each of the three approaches to modeling prehistory are characterized by particular strengths and weaknesses which are inherent in the data themselves. The

biological models establish physical parameters within which adaptations can operate, and indicate the optimal strategies for achieving material goals. They cannot, however, anticipate the cognized models or culturally conditioned expectations of a culture bearing species.

The ethnographic models describe the known strategies of contemporary groups within the framework of their cultural milieu and the observed ecological context. But since the data are synchronic, and represent only short term observations of the ethnographic present, these models can present only a few of the possible adaptive strategies available to human groups in their particular ecological context. Further, since many of these studies depend upon, and assume, a working knowledge of the cognized worldview of the participants, and often lack a detailed description of material items accompanying the behaviors which are described, it is often difficult or impossible to test them against the archaeological record. Finally, ethnographic models are usually static and dynamically circumscribed - attuned to intervals of time which are too short to be identified with confidence in an archaeological context. The insularity of the ethnographic study group and the physical parameters of the archaeological site tend to reinforce each other and perpetuate models of cultural isolation which are seldom substantiated in regional studies (Burley et al. 1981).

Archaeological models suffer from the fragmentary nature of the data base. This deficiency severely limits the potential of the resulting models to reconstruct socio-cultural configurations or cognized models

held by prehistoric groups under study. The archaeological culture tends to be seen as a material culture scattered over the landscape rather than as a dynamic part of the living environment.

On some level, most investigators are aware of at least some of the limitations of the particular classes of data and acknowledge some of the constraints (Abruzzi 1982; Binford 1982; Keene 1981a Moore 1981; Wood 1978). Having made this concession, the normal procedure seems to be to ignore the limitations. This course of action is usually justified by appealing to the complexity of the data and the requirement for elegant, testable models (Moore 1981).

Several authors (Cleland 1966; Jochim 1976; Losey 1978; Steward 1955; Syms 1977,1980) have combined information from biological and ethnographic sources to form descriptive models which are consistent with observed archaeological patterns. These models are useful heuristic devices for articulating the scattered fragments of information recovered from the archaeological record. Because of the complexity of these models, it is usually impossible to test them fully in an archaeological context. However, they do serve a useful function in that testable hypotheses, relating to particular aspects of archaeological data, can be generated from these explanatory models. Thomas' (1973) largely successful attempt to test Steward's (1938) ethno-ecological model for Great Basin subsistence against archaeological data, drawn by means of a random sample survey of the Reese River Valley, serves as an example. Thomas (1973:155) found that over 75 percent of 130 deductive



predictions, generated by means of a computer simulation model based on Steward's theoretical model (1938,1955), were statistically verified, and that, "The rejected propositions probably reflect failure of the computer model rather than shortcomings in Steward's model"(Thomas 1973: 155).

#### THE ROLE AND DEVELOPMENT OF A HUMAN ECOLOGY MODEL FOR THE STUDY AREA

A model is a simplified representation of some reality. Krumbein and Graybill (1965:13) state that, "In its most general sense, a model provides a framework for organizing or structuring a . . . study." Harvey (1969:141) states,

"In general, models serve as heuristic devices for manipulating observations and hypotheses; they may also act as visualizing devices, comparative devices, organizational devices, explanatory devices or devices for the construction and development of theory."

Clarke (1972:1) states that, "Models are pieces of machinery that relate observations to theoretical ideas" and,

"If explanation in general, and explanation in archaeology in particular, is viewed merely as a form of redescription which allows predictions to be made, then models as predictive forms of redescription are essential parts of archaeological explanations" (Clarke 1972:2).

Models organize information collected as raw data, simplify complex problems by eliminating all but the most relevant information, illustrate theoretical abstractions and relate observations to theoretical constructs, serve as explanatory devices, and facilitate the development of hypotheses. A model eliminates detail which is thought to be irrelevant to the central theories being outlined. It isolates the essential factors and interrelationships which appear to account for the variable observations which are the concern of the investigator.

In general, models can be divided into two broad categories based upon function. Conceptual models serve to illustrate theoretical statements about variables and their relationships but, in their given form, they may not be testable. Conceptual models serve primarily as explanatory devices. Krumbein and Graybill (1965:19-20) state that,

"A conceptual model is a mental image of some natural phenomenon. Conceptual models may be diagrammatic or expressed in qualitative or quantitative form; they are based on a foundation of observation and serve to express some segment of the real world in idealized form."

The criteria necessary for a conceptual model are that the model be explanatory or illustrative. It may be predictive and it may be testable. A conceptual model is essentially a theoretical model.

Operational models contain explicit statements which may be tested independently. Their role is to advance testable hypotheses. Clarke (1972:10) describes operational models as useful for,

". . . the experimental analogues or the hypotheses produced from them, which the archaeologist pushes against a sample of archaeological reality to test the goodness of fit between the two."

Operational models are composed of testable statements or representations of some explicit reality. They are meant to be more strongly predictive than explanatory and are designed to be testable.

Keene (1981a:6) has observed that,

"Models have limited explanatory powers and limited analytical capabilities. However, if the limitations are understood and if the expectations are realistic, these models can provide a useful aid to the study of prehistoric societies. It is simply not possible to account for all the interrelationships that exist among the components of systems operating in the real world. Models permit us to simplify the problem by examining only some of these relationships in detail. Models are only approximations of reality. Most contain deliberate distortions usually in the form of simplifying assumptions, which are necessary to make the problem more manageable."

The greatest single contribution of a model to the study of archaeology is when it isolates important biological or cultural themes from a mind stunning mass of information, and weaves them into a recognizable and comprehensible pattern which explains or illustrates or predicts the patterns of behavior or distributions which are preserved in the

archaeological record. The model, while not a comprehensive picture of reality, becomes a comprehensible one.

There are almost as many model types as there are researchers and a detailed discussion is well outside the scope of this chapter. The interested reader is referred to an extensive body of published literature (Binford 1964,1965; Clarke 1968,1972,1977; Gummerman 1971; Hayden 1981; Keene 1981a; Krumbein and Graybill 1965; Leone 1972; Reidhead 1979; Renfrew 1979; Zubrow 1973). Any models developed for examining human ecology in the study area must take into account the environmental potential of the landscape and the social and technological capabilities of its human inhabitants. The available environmental and paleoenvironmental information is of a general nature and a useful quantification of the potential yields of subsistence resources is impractical at the present time. The accumulated body of published archaeological information is even more sketchy.

If a model is to fulfill the role of explaining the adaptive strategies and social dynamics which have been operative through time in the study area, certain minimal criteria must be satisfied. The most basic of human needs is subsistence. Provision for adequate energy capture and nutritional standards, to meet the requirements for body activity and maintenance, forms the basis for any successful adaptive strategy. Second only to food requirements, is the necessity for adequate clothing and shelter in a temperate climate with pronounced seasonal variation. These basic needs, food, clothing, and shelter,

must be met within the parameters of the available environmental resources. These parameters are influenced by territorial range, technology, social organization of the various groups utilizing the area, and the ecological potential of the area itself. These determinants are never fixed. They are in an uneven but dynamic state of flux, influenced by technological innovation and diffusion, and socio-cultural variables such as warfare and trade.

The development of cultural systems of adaptation, whether prehistoric or historic, is subject to numerous controlling variables which operate within a cultural milieu. These variables may be interactive with the natural environment but frequently, especially in socially complex and technologically advanced societies, operate with relatively little direct environmental reference. Ideology and belief systems influence environmental perception and associated behaviors. Similarly, a variety of risk reducing strategies, particularly alliance and kinship patterns, together with trade networks, influence population movement and distribution. Cultural continuity and related historical or traditional patterns of thought and behavior also play an important role in the development and maintenance of all cultural systems of adaptation.

Among these controlling variables are a set of agents of change which include independent invention, the diffusion of ideas, and the migration of individuals and groups (Cohen and Eames 1982; Harris 1983). These factors frequently operate in a random fashion to influence

technological development and the spread and communication of ideas throughout individual populations. Such variables are rarely predictable and operate within evolving cultural systems to produce changed configurations, in much the same way that mutations operate within evolving biological systems to create new genetic material. These cultural variables, interacting with the variables of the natural environment, produce the complex patterns of cultural adaptation which are found in the archaeological and ethnohistoric records.

The three types of models outlined at the start of this chapter can never completely represent the complexities of the systems from which they were drawn. Archaeological and paleoenvironmental data represent only the resistant material remains of cultural activity and such vestiges of context which have survived the destructive effects of taphonomic vectors (Behrensmeyer and Hill 1980; Briuer 1977; Shipman 1981) including decomposition, bioturbation, and natural erosion. Similarly, ethnographic data represent only such information as came to the attention or caught the interest of the reporter. Ecological data, in like manner, represent only those aspects of the natural environment which were of interest to the reporting individuals. These fragmented observations, whether delimited by taphonomic vectors or by reporting biases, serve as the basis for all subsequent modeling. For the prehistorian, the goal of explanatory modeling is to develop the best possible approximation of the extinct cultural systems under study. The nature of the available data and the particular interest of the

investigator will influence the emphasis of the model which is developed.

Within the Ethnohistoric Period, social dynamics within and between groups have frequently been recorded by European observers. Similarly, other cultural determinants, which are based upon Native ideology and tradition, can be gleaned from the literature. This kind of information is rarely recoverable from the archaeological record. Notwithstanding the lack of congruence in information classes between the respective data bases, it is useful to develop the most complete models possible for general comparative purposes. Evidence for basic subsistence strategy and diet breadth is frequently available from both ethnographic and archaeological sources. In such cases, models developed from one source can be tested against data from the other. Where direct evidence for a variable is present only from one data base, sometimes an analogous pattern can be inferred from comparable related data recovered from the complementary data base (Nicholson 1978:12).

The early chapters of this dissertation have outlined an environment characterized by considerable resource diversity but strongly limited by a marked seasonality. Following Hayden (1981:347-348), the study area would fall into a moderate animal biomass area. While there is considerable plant diversity, this resource is available almost exclusively during the growing season, unless some form of preservation and storage were practiced.

Adaptive strategies for survival, under these conditions, would indicate seasonal movement governed by an intimate knowledge of the available resources. Similarly, the lack of resource stability in the area would encourage the development of various risk reducing strategies such as storage, trade, information exchange, and alliances (Barnard 1983; Binford 1980; Colson 1979; Hayden 1981; Moore 1981; Nicholson 1986; Speth and Spielman 1983; Testart 1982). The term nomadic is popularly characterized as an aimless wandering in search of indeterminate subsistence resources. A more accurate view is expressed by Hayden (1981:375) who states that, "In sum, nomadism can be viewed as a balancing mechanism for maintaining and conserving the resource base while exploiting it at an optimum level." Survival in the study area would require a carefully calculated pattern of movement based upon a sure and certain knowledge of the timing and probable location of given subsistence resources. The scheduling of movement to maximize returns from spawning runs and the arrival of migratory waterfowl, coupled with the day-to-day maintenance of band members, should these events be delayed, would have been matters of critical concern for group leaders. Similarly, the interception of the migrating bison herds was critical not only for immediate survival, but in many cases to ensure a supply of preserved meat (jerky, pemmican) during lean periods throughout the winter. Plant resources and stored foods were probably of great importance during these logistical moves (Morgan 1979; Nicholson 1985b).



While the published data for the study area may preclude detailed reconstruction of the adaptive strategies employed by aboriginal groups, any model should reflect the ecological generalities implied by the environment and the limitations imposed by the available technologies of the ethnographic and archaeological culture groups. The known risk reducing strategies must also be taken into account in the development of any model of adaptive strategy or human ecology in the study area.

## CHAPTER 6: THE PROTOHISTORIC AND ETHNOGRAPHIC RECORD OF SUBSISTENCE IN THE STUDY AREA

The most extensive body of information, relevant to aboriginal lifeways in the study area, is to be found in the ethnohistoric literature of the fur trade era, circa 1700-1870. The writings of fur traders, adventurers, government agents, and others who lived among, or interacted with various native groups in, or adjacent to the study area, constitute a rich, though far from complete, account of native lifeways prior to European settlement and the establishment of the reserve system. It is in this protohistoric period that the most complete reconstruction of aboriginal lifeways can be established.

Colson (1979:19) regarded ". . . the mixed economies of hunter-gatherers, pastoralists, and subsistence agriculturists, as a mixture of coping strategies which reduced their long-term vulnerability to weather and other natural forces that affect food supplies." It is the goal in this chapter to identify the 'coping strategies', the patterns of movement, and the technologies associated with particular groups within the study area during the protohistoric and early historic period.

Models are most easily constructed where a measure of equilibrium can be assumed or where change is cyclical, returning to a former configuration governed by variables which can be measured and integrated

into an ongoing system. Modeling is much more difficult when an unprecedented variable, of sufficient power to alter all other variables within a system, is introduced. This is particularly true if there is little or no data available to model the system accurately prior to the advent of the disruptive variable. Human populations in the study area were affected by three such variables: the fur trade, the horse, and European settlement. All of these variables affected the study area populations to some degree prior to their physical appearance in the area.

#### FACTORS AFFECTING DEMOGRAPHIC SHIFTS AND SUBSISTENCE IN THE STUDY AREA AFTER A.D. 1700

Competition for the riches of the fur trade contributed to a series of events which culminated in the destruction of Huronia by the Iroquois Confederacy in 1650. The Hurons, who had played a dominant middleman role in the fur trade of New France, were dispersed to the west, possibly as far as the Mississippi, where they were visited by Radisson in 1658 (Morton 1929: XXI). In order to reestablish their trade links, the French were forced to explore and travel beyond Michilimakinac into the regions surrounding Lake Superior. It was in the latter half of the seventeenth century that the French fur traders, notably Radisson and Groseilliers, came into direct contact with the Cree (Kristineaux) who were primary producers of beaver and other boreal forest furs. By 1685, the French Governor, Jacques Rene de Brisaye, Marquis de Denonville, recognized the importance of a new tribe, the Assiniboine, as primary

suppliers of furs to other Indian middlemen, and urged that steps be taken to encourage them to trade with the French on Lake Nipigon rather than journey to Hudson Bay to trade with the English (Ray 1974:11). At this time, the Cree were living west of Lake Superior in the vicinity of Rainy Lake and northward into the James Bay region (Burpee 1927; Ray 1974). The Assiniboines were found living about Lake-of-the-Woods (called Lac des Assiniboels [Burpee 1927:297]), eastward to Pigeon river along the present Ontario/Minnesota border, and northward through the fringe of the boreal forest to the parklands of the Carrot River region of Saskatchewan (Ray 1974; Doughty and Martin 1929). The Ojibwa (Chippewa, Ottawa, Saulteaux) were found to the south and east of the Cree and Assiniboine territories. The distribution of Native groups living in and adjacent to the study area, circa A.D. 1690, is shown in Figure 5.

Seventy five years later, following the westward expansion of French fur traders, and the construction of trading posts in the interior, there was a noticeable shift to the west and south by the principal Native groups directly involved in the fur trade (Figure 5). This resulted in part from a depletion of fur bearing animals in the eastern regions, as groups adjacent to the trading posts intensified trapping activities to satisfy their desire for European trade goods, and in part from a desire on the part of the Indian middlemen to maintain their controlling position in the flow of furs from the receding hinterlands to European markets. In 1754, the Hudson's Bay Company explorer Anthony Hendry (Burpee 1973) discovered firsthand the role of Cree middlemen in

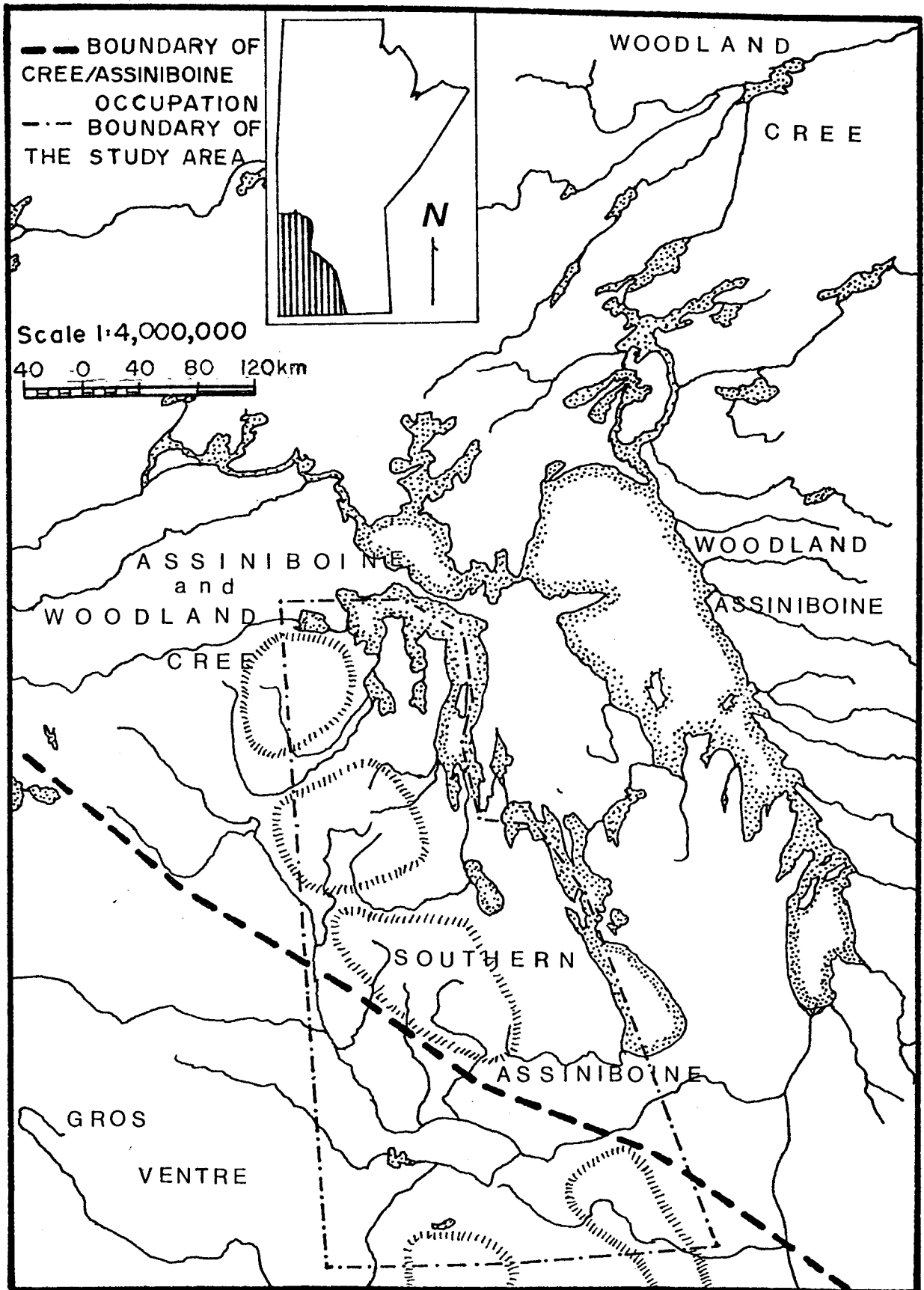


Figure 5. Distribution of Native Groups Circa A.D. 1690 (after Ray 1974).

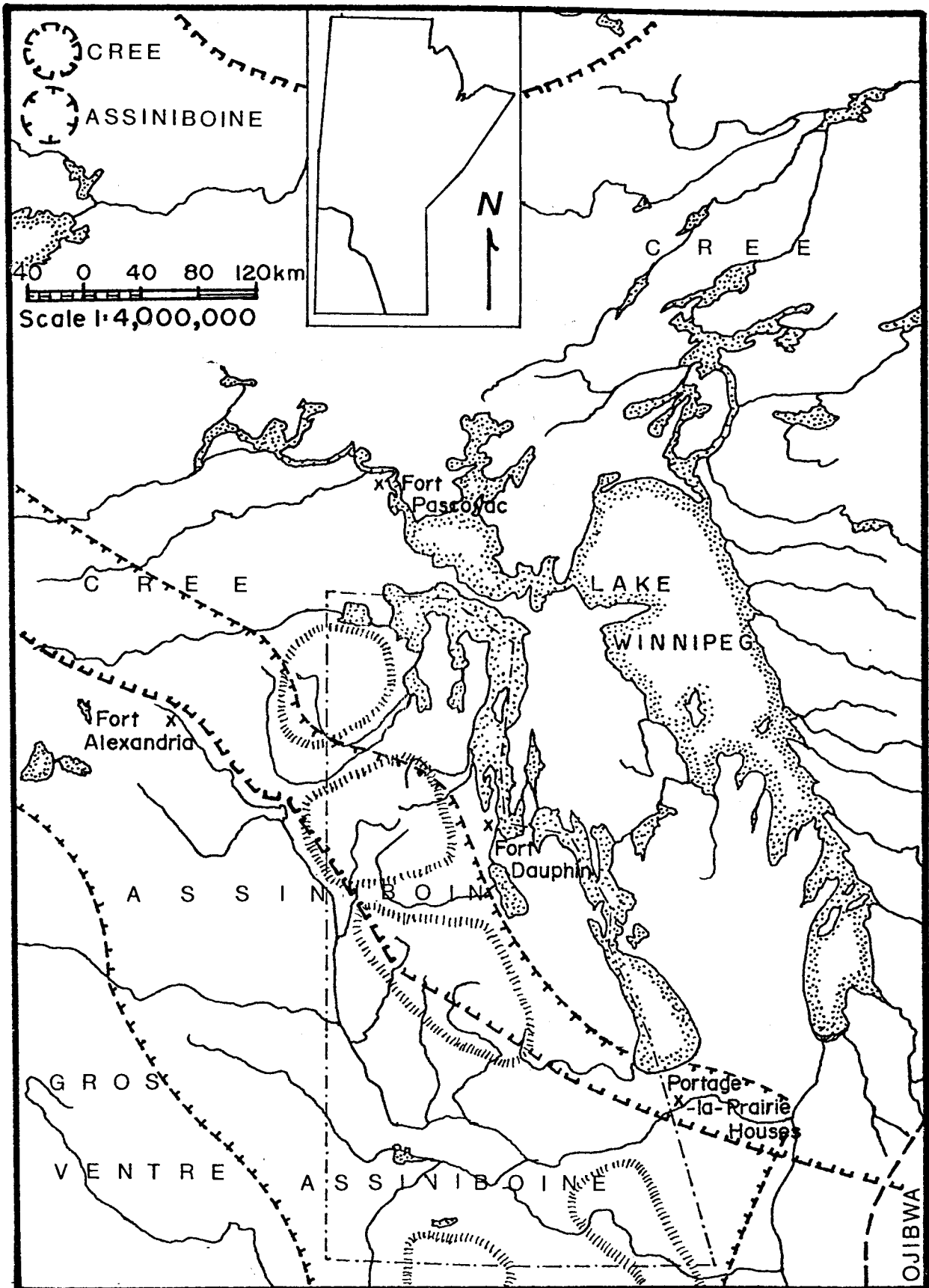


Figure 6. Distribution of Native Groups Circa A.D. 1765 (after Ray 1974).

acquiring furs from the Blackfoot. Anxious that the party of Cree he was accompanying should return to York Factory with a good supply of furs to trade, Hendry addressed his Cree companions on the matter.

"I asked the natives why they did not hap [sic] wolves; they made answer that the Archithinue [Blackfoot] natives would kill them, if they trapped in their country: I then asked them where and when they were to get the wolves etc, to carry down in the spring. They made no answer; but laughed one to another.... An Indian told me that my tent-mates were angry with me last night for speaking so much concerning happing, and advised me to say no more about it, for they would get more wolves, beaver etc, from the Archithinue natives in the spring, than they could carry" (Burpee 1973:38).

Hendry saw this statement confirmed as he and his Cree companions began their return to York Factory in the spring. He states,

"One hundred and twenty seven tents of Archithinue natives came to us: I bought 30 wolves skins from them, and the Indians purchased great numbers of wolves, beavers and foxes etc, which proves what the woman formerly told me, concerning the natives getting part of their furs from the Archithinue Indians. They told me that I should soon see their leader. I did my endeavour to get some of them down

to the fort; but all in vain; and altho' the Indians promised the Chief Factor at York Fort to talk to them strongly on that subject, they never opened their mouths; and I have great reason to believe that they are a stoppage; for if they could be brought down to trade, the others would be obliged to trap their own furs: which at present two thirds of them do not "(Burpee 1973:45).

In the following 100 years, these trends intensified, resulting in a further displacement of Native groups westward and towards the south (Figure 7). As the Assiniboine shifted out of the forest into the plains areas, they adapted to a plains oriented subsistence strategy (Ray 1974). By the early 1800's John MacDonell, at Fort Esperance on the Qu'Appelle, was trading primarily with the Assiniboine for bison products and the skins of wolves which followed the bison herds (Provo 1984). During the same period, the Cree were moving into the area vacated by the Assiniboine and onto the edge of the plains in company of the Assiniboine (Lamb 1957; Morton 1929). By the 1850's some divisions of the Cree had moved into the plains/ parkland niche, formerly occupied by the Assiniboine, and the Assiniboine, severely reduced by smallpox, had shifted southwest into territory formerly controlled by the Gros Ventre and Blackfoot who had been similarly decimated (Hind 1860; Ray 1974). By this time virtually all of the study area, with the exception of the Turtle Mountain region, was occupied primarily by Ojibwa groups



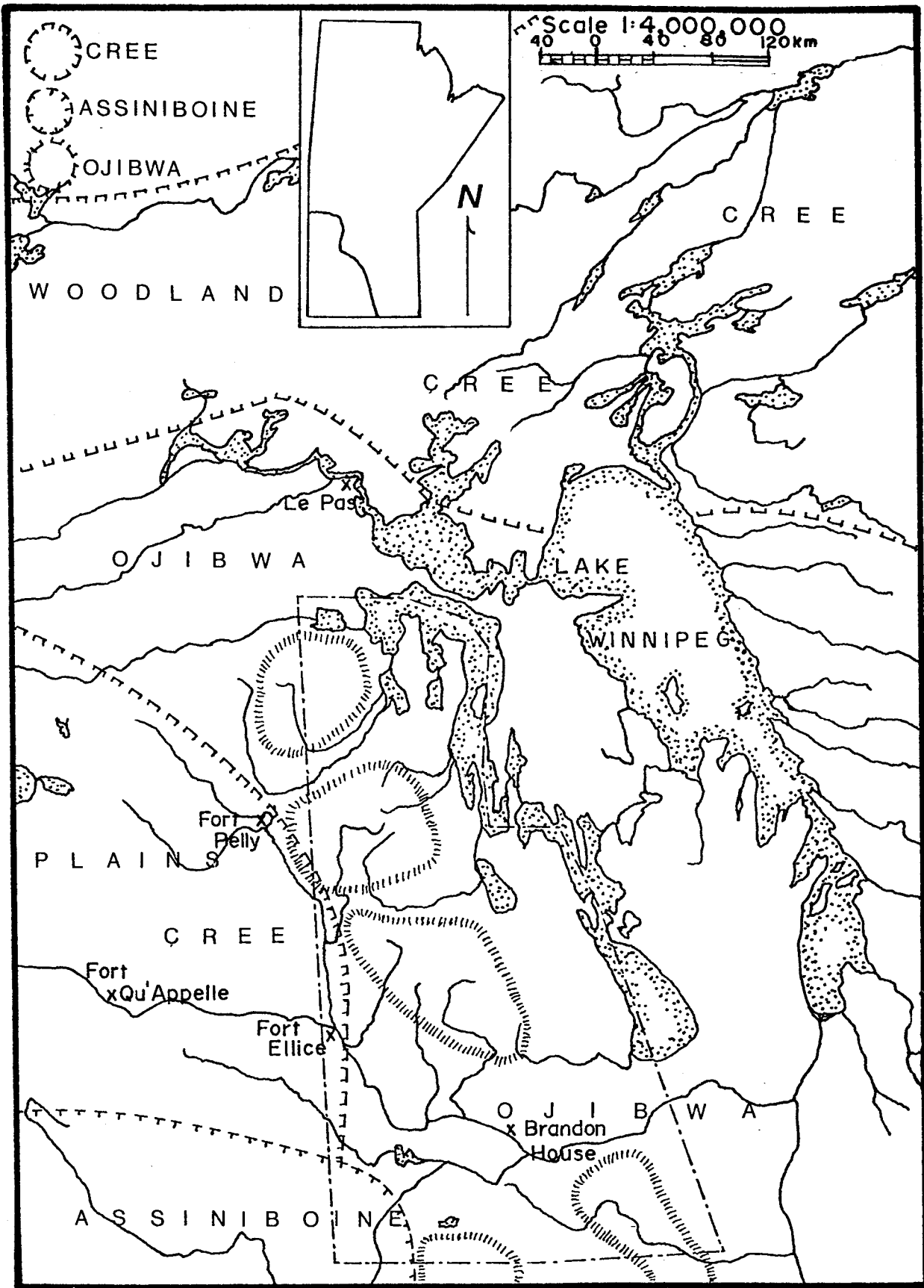


Figure 7. Distribution of Native Groups Circa A.D. 1865 (after Ray 1974).

whose more intensive trapping and hunting methods enabled them to survive on lands abandoned as exhausted by the Cree (Ray 1974:104).

The expansion of one group into the hunting territory which had been abandoned - possibly temporarily - by another group was not always achieved amicably. The bitter resentment of individual Ojibwa towards Ottawa or other more distantly related Ojibwa hunters is clearly shown in the anecdotal account of John Tanner (James 1956). On several occasions Tanner's life was threatened by Cree hunters who resented his living off their lands and by Ojibwas of his own group who resented his White ancestry.

The introduction of the horse into the plains from the southwest served to intensify several trends already in place. The increased mobility and speed of pursuit which the horse provided dramatically altered patterns of exploitation of the bison - the major plains subsistence resource. Where careful stalking of individual animals, surrounds of small herd segments, or the elaborate manoeuvring of small herds into pounds or natural traps had been the practice (Frison 1974; Kehoe 1973; Nicholson 1982), it was now possible to easily approach and kill several animals from the relative safety of horseback or to repeatedly drive segments of herds over longer distances into pounds. The ease of procurement which the horse provided, coupled with the demand for bison products initiated by the inland fur trade, led to an unprecedented slaughter of animals for which there existed neither the means nor the motive in earlier times (Kehoe 1973).

The introduction of the horse onto the plains served to provide an added incentive for the intensification of raiding and warfare. The practice of raiding among the various Indian groups had, from time immemorial, been perpetuated as an ongoing means of redress for transgressions between individuals and tribal entities and for the assertion of tribal hunting rights within an area. It also served as a means whereby male youths passed into manhood and by means of which warriors added to their prestige. The trophies which were traditionally collected were of symbolic value and, aside from captives which might be adopted into the band and kinship network of the successful raiders, these spoils were of no economic importance to the parties involved in inter-tribal warfare. The horse, because of its usefulness, the property of self propagation, ease of maintenance in a grassland region, and its property of being self transporting, became a primary target for raiding parties. Horses could be traded to Whitemen for European luxury goods and, when bestowed as gifts, enhanced the donor's prestige. In addition, since fine horses were highly valued and might be tethered by their owners within the camp, their theft under such dangerous circumstances bestowed high prestige upon a successful raider. Theft of all, or a major portion, of the horses belonging to an enemy camp provided a swift escape for the raiders and hindered rapid pursuit by the outraged victims (Grinnel 1920; Lowie 1909; Mandelbaum 1940).

The horse was of little economic value to groups based within the boreal forest or in the more heavily forested eastern extremities of the

parkland. Within the study area the horse was probably relatively scarce until well after the close of the eighteenth century. When La Verendrye travelled to the lands of the Missouri village tribes in 1738 neither the Assiniboine, with whom he travelled, nor the Mandans, whom he visited, had acquired horses although these people were familiar with the horse owning Gens des Chevaux, who may have been the Cheyenne (Burpee 1927:407). When Hendry visited the southern Blackfoot (Archithinue) along the headwaters of the South Saskatchewan River in 1754, he found them to be well supplied with horses and noted the presence of "four Asses" (Burpee 1973:33). The Assiniboine used horses as baggage animals but did not use them for riding at this time (Burpee 1973:45). Within the next few decades, the Assiniboine acquired increased numbers of horses and became superb horsemen to the extent that Harmon (Lamb 1957:41) wrote in January of 1801 that, ". . . the Assiniboine are the best horsemen, for they never go any distance afoot, and with these animals they often run down and kill the buffalo with their bows and arrows, which they find full as convenient for that purpose as fire arms . . ."

The Cree, even after the western members of the tribe had adopted a plains lifestyle based upon bison procurement, did not manage to acquire large numbers of horses. Mandelbaum (1940) quotes Fine Day of the River People, who lived between the North and South Saskatchewan Rivers, as stating,

"My father came west as the Blackfoot were driven back, because there were more buffalo here. In his time [he died about 1860] they had only very few horses and used dogs more than we did" (Mandelbaum 1940:195).

The increased mobility which the horse furnished enabled Indian and White hunters to maintain pressure on the dwindling bison herds to the verge of extinction of that resource. In addition, commercial hunting of bison by American hunters - encouraged by the American Government of the day - rapidly depleted herds south of the Canadian/U.S. boundary. By the summer of 1870 the bison herds were no longer a reliable resource in the north central plains region. Ray (1974:225) states,

"During the ensuing winter, starvation was widespread and Indians and traders alike suffered. Men in the Qu'Appelle District had to resort to eating gophers obtained by pouring water down their holes and setting snares at the openings. The summer of 1871 proved to be equally lean in southern Saskatchewan."

Ray (1974:228) further notes that, ". . . between the summers of 1871 and 1876 all Indian claims were extinguished in the grassland, parkland and bordering woodland areas of the Prairie Provinces by Treaties 1 through 7." Fullfilment of the demands created by the fur trade, which were facilitated by the introduction of the horse, led to the

extinguishing of the major resource of the plains, the bison. This destruction followed upon the severe depletion of the food animals and fur bearing species throughout the eastern and central boreal forest regions.

European settlement is usually considered to have been a significant factor in Western Canada after the Confederation of 1867 and the Manitoba Act of 1870. However, the ripple effect of settlement to the east affected central North America long before this time. In contrast to the colony of New France, which attempted to transfer the tightly organized feudal system of Europe to the New World, the New England settlements grew in a more random and expansionist manner with settlements expanding according to immediate circumstances, rather than as part of a scheme governed by central planning and administrative authorities. The displacement of Native People along the Eastern Seaboard, coupled with warfare accompanying English/French rivalry for control of the fur trade, led to westward shift of many Native groups and an increase in territorial control by several groups. The destruction of the Huron and their allies by the Iroquois Federation has already been mentioned as an example of the resulting disequilibrium. Similarly, the rapid expansion of the Ojibwa (Chippewa, Saulteaux) and the allied Ottawas into the Western Great Lakes region (Kinietz 1965), and subsequently the parklands (Hickerson 1970), serves as an example of a strategically well located group exploiting the disequilibrium and trade opportunities which European expansion and commerce in furs

created. In 1670, Dablon reports the Saulteurs, inhabiting the St. Mary's River region at the Sault, as numbering some one hundred and fifty souls but united with three other tribes which numbered more than 550 persons (Kinietz 1965:318). Kinietz (1965) infers that the original small group was subsequently inundated by southern migrations of cognate groups calling themselves Outchibous (Ojibwa) who formed the Chippewa of historic times. Beginning in 1736, the south and westward drive of these groups, which were allied with the Cree and occasionally the Assiniboine, eventually forced the Santee Dakota out of the parklands of Minnesota and onto the open plains west of the Red River. This expansion was achieved by 1775, although the Dakota continued to hunt and launch retaliatory raids against the Ojibwa on the eastern side of the river for many decades after (Hickerson 1970:69-71; Warren 1957). It was into this unstable milieu that the fur traders, led by Kelsey, La Verendrye, Hendry, and Cocking, ventured and the ethnohistoric record of the study area was initiated.

#### SUBSISTENCE OPPORTUNITIES AFFORDED BY THE STUDY AREA

Several authors (Losey 1978; Ray 1974) have proposed models which articulate various historic groups with the environmental resources available to them. All of these models tend to be based upon an assigned territory and a subsistence strategy appropriate to that territory. They are, in effect, models frozen in time, based upon a relatively short 'ethnographic present' reconstruction. In the preceding section it has been shown that all of the groups in the study

area had shifted their territorial position and their subsistence base dramatically within the period of European contact. While human populations shifted, and the resource base fluctuated in response to natural cycles and human predation, the basic subsistence resources, which were dependent upon their particular habitats, remained in place. A more detailed examination of these resources and the shifts which took place follows.

Each of the major environmental zones, in and adjacent to the study area, contained characteristic subsistence resources upon which human populations could develop subsistence strategies (Table 4). Some of these resources were fixed while others were highly mobile. Virtually all were influenced, in regard to their availability and relative abundance, by seasonal factors. In addition, some resources were dispersed while others were highly aggregated. All were circumscribed by the range of suitable habitat. Relatively few of these resources were available in any given environmental zone as a major year around resource (Table 5). Most such permanently available species were forest or parkland species with a limited range and, as numerous records have demonstrated (Burpee 1973; James 1956; Lamb 1957; Morton 1929; Provo 1984), were subject to local extinction due to hunting pressure. In some regions, the arrival of certain migratory species, or changes in environmental circumstances which had interfered with procurement, alleviated food shortages which had become critical (James 1956).



An alternative to the strategy of subsisting within a single environmental zone is to capitalize on seasonal resource peaks in adjacent zones. Such a strategy has been modeled for the Cree and Assiniboine by Ray (1974:47). This strategy is substantiated by the ethnohistoric record (Burpee 1973; Gates 1965; James 1956; Lamb 1957; Mandelbaum 1940; Morton 1929; Provo 1984) and by ecological studies (Bonnichsen and Baldwin 1978; Morgan 1980). Ray's model (1974) is based upon the seasonal movement of bison, the influx of migratory waterfowl, and the spawning runs of fish, together with the localized resources of the various environmental zones.

The majority of the published subsistence models for the Subarctic areas of North America have emphasized the importance of large ungulates; almost to the exclusion of other species. This reflects the high value placed upon these animals by European observers and the Native People as well (James 1956:163). A prime moose or buffalo cow could yield 400 to 500 pounds of edible fat and protein (Nicholson 1978:9) and, at a time when commercial hunting and preparation of large quantities of dried meat and pemmican were major economic pursuits, the large ungulates, especially the bison, were unquestionably the most important food animals. In addition, virtually all of the writers were mature White males interacting with mature Native males who were engaged in hunting, a traditionally male pursuit. However, a careful reading of accounts of life in hunting camps, removed from the immediate vicinity of the trading posts, indicates that other species played a major role in subsistence, as well.

In the forest and parklands, bears and the aquatic fur bearers (beaver and muskrat) played an important role as food species. Keene (1981a:136) places the energy and protein levels of bear and beaver well above that of deer - in the case of beaver, the kilocalories per 100 gm of meat are almost three times as high as in deer. Hayden (1981) and others have pointed out that animal fat is highly prized among hunters and gatherers with carbohydrate deficient diets. The fur trade accounts (Lamb 1957; Provo 1984) clearly show that rendered fat was a valued Native commodity and that pemmican was constituted of equal parts of pounded dried meat and tallow, with the addition of a quantity of dried berries. The beaver, and fall and winter bear, were described as good eating by fur traders and Natives alike, although modern Europeans, with carbohydrate rich diets, often find these meats distasteful on account of their 'greasiness'.

Bears were abundant in the study area. The account of John Tanner (James 1956) contains numerous instances of winter starvation being eased by the discovery of dened bears (James 1956:163) as well as examples of the killing of bears as a part of day-to-day hunting, particularly in the fall of the year. Tanner (James 1956:119) notes in his account, how in the fall of the year at a place on the Assiniboin River,

"In the month that I remained here, I killed, notwithstanding the pooriness of my gun, twenty four bears and about ten moose. Having now a great deal

of bear's fat which we could not eat. I visited the sunjegwun [cache] I had made, where I killed the twenty moose with seven balls, and put the fat into it."

Similarly, trappers and their dependents frequently subsisted upon the animals which had been trapped for their furs over long periods of time. This was particularly the case with beaver when they were locally abundant. Tanner (James 1956:40) notes that he had killed as many as 100 beaver in the course of a single month and that when a disease had caused large numbers of beaver to die that, "Those animals which died of this sickness we were afraid to eat, but their skins were good" (James 1956:89). Muskrats are also available throughout the boreal forest and parklands, and are considered to be good eating. According to Nelson (1973:270), "They are skinny and poor eating from June until around November, but by January they have become very fat and remain so until late May. Muskrats are boiled or roasted; the meat is very tender and tastes delicious."

Hares were eaten by all groups but were little valued and usually taken by women or children. The energy value of hares is low but they are not difficult to capture when present in numbers. Bishop (1978) indicates that actual starvation was scarcely inducement enough to press northern Ojibwa hunters to redirect their procurement activities from other more desirable species to hares and fish since these species were considered to fall within the domain of women's procurement.

Some carnivorous fur bearers were also eaten, but frequency of consumption varied from group to group according to species and the availability of alternate food sources. Mustelids were seldom eaten among the Cree (Mason 1967). According to Rodnick (1938:25) mustelids, wolves, foxes, and dogs, were eaten by the Assiniboine, although the last were eaten only on ceremonial occasions or in the extremity of starvation. Harmon (Lamb 1957:207) indicates that the Indians kept two kinds of dogs, the smaller of which was excellent eating, much like pork, but the flesh of the larger dogs always had a rank taste. In 1754, Hendry (Burpee 1973:37) records the killing of six cats which he describes as fine eating, like lamb.

Migratory waterfowl were an important resource throughout the study area in spring and fall, and wherever suitable nesting habitat was available, during the summer as well. Harmon (Lamb 1957), MacDonell (Provo 1984) and Tanner (James 1956) frequently refer to the shooting of migratory waterfowl in spring and fall, and Tanner mentions the killing and preserving of immature waterfowl during the summer of 1795. He states,

"In the middle of the Lake-of-the-Woods is a small, but high rocky island, almost without any trees or bushes. This was now covered with young gulls and cormorants, of which I killed great numbers, knocking them down with a stick. We selected 120 of the fattest, and dried them in the smoke, packed

them in sacks, and carried them along with us"

(James 1956:62).

Other species of birds, particularly wintering species, frequently served in a minor role to supplement or provide variety in the regular diet. Nelson (1973:82) notes that the Kuchin used fence snares to harvest snow buntings which served as a tasty source of fresh meat in early spring. Grouse were frequently taken in snares and traps by young boys in the bush around the hunting camps (Eastman 1971; James 1956).

Fish were an abundant and extremely important seasonal resource in, and adjacent to, the study area (Hind 1860; James 1956; Lamb 1957; Mandelbaum 1979; Provo 1984). The sturgeon was especially valued because of its large size and the richness (fat content) of its flesh. Fleming (Hind 1860 I:487) notes the purchase of fish pemmican, ". . . dried fish pounded and mixed with sturgeon oil" Hind (1860II:28), travelling up the Dauphin River towards Lake St. Martin in late September 1858, encountered a group of Cree Indians and noted that,

"These Indians had been making their autumnal fishing hunt, and possessed large birch bark vessels filled with pounded white-fish, previously dried and smoked, a miserable substitute for pemmican. They had also sturgeon bladders filled with white-fish oil. The pounded fish and the oil form part of their winter stores!..."

The principal means of taking fish were by means of nets and lines in lakes (Lamb 1957:102) and by means of weirs and spearing in rivers (Hind 18601:491; Mandelbaum 1979:73-74).

Vegetable foods are frequently overlooked in the subsistence models which are proposed for Subarctic hunters and gatherers; Snortland-Coles (1979) being a notable exception. A few examples drawn from the ethnohistoric record serve to indicate that this practice is in error. Hendry (Burpee 1973:25), while travelling westward along the North Saskatchewan River in September of 1754, notes that, "We are yet above 400 in number, two-thirds of whom live chiefly on fruit." In reference to Psoralea esculenta, Hind (18601:319) states that,

"The Crees consume this important vegetable in various ways; they eat it uncooked, or they boil it, or roast it in the embers, or dry it, and crush it into a powder and make soup of it. Large quantities are stored in buffalo skin bags for winter use. A sort of pudding made of the flour of this root and the meskatomina berry is very palatable, and a favourite dish among the Plain Crees."

Rodnick (1938:27) states that,

"Besides meat, no Assiniboin meal was complete without berries and wild vegetables. The list of vegetables, berries and roots eaten was extensive. Prairie or wild turnips were dried and stored after

pounding. Wild rhubarbs were gathered in the late spring. The leaves were cut off and the plant dried. It was also eaten fresh. Berries eaten included the service-berry, the bull berry, june berry, chokecherry, gooseberry, strawberry and red willow berry, the latter eaten only in times of famines. Berries were only eaten when ripe, or pounded with dried meat to form pemmican. The rarer fruits, such as the wild plum and wild grape, were eaten fresh whenever found."

From the time that frost withdrew from the ground, until it froze in the fall, plants formed an important part of the aboriginal diet. It must also be born in mind that preserved vegetable foods formed a part of the winter diet. Towards this end, some Native groups exploited the gathering proclivities of other species to their own advantage. Eastman (1971:25) recalls that,

"My grandmother worked like a beaver in these days [autumn] (or rather like a muskrat, as the Indians say; for this industrious little animal sometimes collects as many as six or eight bushels of edible roots for the winter, only to be robbed of his store by some of our people)."

Wild rice was an important staple in the diet of southern boreal forest groups and formed a valuable reserve against winter starvation.

Eastman (1971:200-203) discusses the harvesting and preparation of wild rice and concludes by stating that,

"Caches were dug by each family in a concealed spot, and carefully lined with dry grass and bark. Here they left their surplus stores for a time of need. Our people were very ingenious in covering up all traces of the hidden food. A common trick was to build a fire on top of the mound. As much of the rice as could be carried conveniently was packed in par-fleches, or cases made of rawhide, and brought back with us to our village" (Eastman 1971:203).

Hind (1860:118) noted the inevitability of famine for the Indians east of Lake Winnipeg in the fall of 1857 due to failure of the wild rice crop, coupled with a scarcity of fish and the cyclical die off of snowshoe rabbits. Harmon (Lamb 1957:92) indicated the importance of wild rice to the subsistence of the local trading posts, circa 1800 by stating,

"This grain is gathered in such quantities, in this region, that in ordinary seasons, the Northwest Company purchase, annually, from twelve to fifteen hundred bushels of it, from the Natives; and it constitutes a principal article of food, at the posts in this vicinity."

Whether wild rice was present along the eastern margin of the study area in prehistoric times is uncertain, and the ethnohistoric data is



equivocal (Ray 1974:30). It is certain that it was available within several days canoe travel to the southeast in the Wanipagow and Lac du Bonnet area (Burpee 1927; Hind 1860; Lamb 1957). Dore (1969) identifies the species as native to the Manitoba Lowlands although Snortland-Coles (1979:93) states that it is not known to occur in Lake Winnipegosis along the eastern edge of the study area.

Corn, which was purchased from the Mandan on the Missouri, formed a part of the winter subsistence of the Assiniboine during the contact period (Burpee 1927:258). During his visit to the Mandan villages in 1738, La Verendrye repeatedly mentions the abundance of stored corn and other crops which were available for feasts and trade (Burpee 1927). It is probable that this trade extended well back into the prehistoric period.

It is clear that within the study area, a wide range of subsistence resources were available to any group possessed of the knowledge and technology necessary to develop and implement procurement strategies appropriate to their harvesting and processing. It is also apparent that a number of risk reducing strategies, including mobility, storage, and trade were in place to take advantage of resources in adjacent areas and, that during the protohistoric and early historic period, all major subsistence resources and numerous risk reducing strategies were utilized.

CHAPTER 7: MODELING ADAPTIVE STRATEGIES AND CHANGE AMONG THE  
ASSINIBOINE, CREE, AND OJIBWA, A.D. 1700 - A.D. 1870

The principal groups occupying the study area during the Protohistoric and Ethnographic periods were the Assiniboine, Cree and Ojibwa. In addition, other groups such as the Sioux, Mandan, and Gros Ventre, made occasional incursions for raiding or to trade (James 1956; Lamb 1957; Provo 1984) and the fur companies brought in Iroquois as voyageurs and hunters (James 1956, Lamb 1957). However, none of these latter groups lived or hunted within the study area to any significant degree during the period of interest here. The following section will explore in some detail the subsistence strategies employed by the Assiniboine, Cree and Ojibwa while living in the forest/grassland transition zone of western Manitoba. The chapter will conclude with the development and presentation of models of adaptive strategies employed by these groups during the Ethnohistoric Period.

ASSINIBOINE

The Assiniboine speak a Siouan dialect and, according to tradition, separated from the Yanktonai in Northern Minnesota early in the seventeenth century (Lowie 1909; Ray 1974; Rodnick 1938). Although linguistic evidence points to a recent separation of the Assiniboine from a parent eastern Siouan group, the Western Assiniboine (Stoney) show greater differentiation in language and may represent a much earlier break (Lowie 1909).

In a recent article, Syms (1985) has pointed out that the Assiniboine were composed of at least two major linguistic divisions circa A.D.1700. Based upon recent linguistic research, ". . . the Stoney and the Assiniboine represent 11 different groups within two different divisions, with each division having two distinct dialects" (Syms 1985: 75). Clearly, this kind of linguistic divergence indicates an initial separation of the Stoney, and probably major portions of the groups collectively referred to as the Assiniboine, prior to 350 B.P. However, since these divisions cannot be identified at the present time through archaeological remains, or their territorial ranges determined from the ethnohistoric accounts, the Assiniboine utilizing the study area will be treated as a single interacting tribal entity. In support of this method it is noted that the early ethnohistoric record indicates a good deal of movement by various groups of the Assiniboine. In 1755, on his return to York Factory, Hendry encountered a group of Eagle Eyed Indians in the northern parkland of Saskatchewan (Burpee 1973). These were Woodland Assiniboine whose home territory was well to the east of Lake Winnipeg.

Prior to A.D. 1700, the Assiniboine are described by early French observers as a Woodland group possessing a southern boreal forest adaptation (Ray 1974:11). In contrast, in 1691 Kelsey (Doughty and Martin 1929:13) describes a surround kill of bison in the parklands, in the vicinity of the Touchwood Hills. Similarly, Smith and Waggoner, two Hudson's Bay Company employees sent from York Factory to explore inland in 1757, travelled by way of Lakes Winnipegosis and Manitoba to the

Assiniboine River and, "Here'in the baren ground'[sic], they met the Sinipoete [Assiniboine] and saw a new method of killing the buffalo. 'Ther was a pound as maed to kill the boffler in and that day wandey [Wednesday] there was 67 cam in at onese.'" (Rich 1958 1:643). From these diverse accounts it would appear that the various bands, which together formed the Assiniboine linguistic grouping, were engaged in a wide range of adaptive strategies suited to the ecology of the particular areas in which they resided.

By the early 1730's La Verendrye found that the Assiniboine had moved westward, out of the Rainy River and Lake-of-the-Woods area into the parklands west of Red River (Ray 1974:16). In September of 1738, while La Verendrye was enroute to visit the Mandan, he encountered ten tents of Cree at the forks of the Red and Assiniboine rivers. The Cree attempted to dissuade him from proceeding westward because he would be ". . . going among people [Assiniboine] who did not know how to kill beaver and whose only clothing was buffalo skin. . . ." (Burpee 1927: 301).

When John MacDonell arrived at Fort Esperance on the Qu'Appelle River in 1793, he found that his major trade was with the plains/parkland adapted Assiniboine whose principal items of trade were bison products including pemmican, tallow, and hides, together with the skins of wolves which followed the bison herds (Provo 1984). Forty years later, the Assiniboine were to be found primarily south and west of the Qu'Appelle Valley. When Hind (1850) followed the Qu'Appelle to its source and then

turned northward along the South Saskatchewan in 1857, he encountered only Cree and Ojibwa Indians. By this time, nearly all the remaining Assiniboine had shifted south and west into Montana and the extreme southern edge of Saskatchewan (Ray 1974:183).

The pattern of Assiniboine migration, expansion, and change in adaptive strategy, which emerges from the ethnohistoric record follows a transitional arc, leading from forest to parklands to plains (Figure 8). The Woodland Assiniboine first enter the ethnohistoric record in the mid-seventeenth century as suppliers of furs to Cree and Ojibwa middlemen in the Upper Great Lakes region, and shortly afterwards as part of mixed Cree/Assiniboine canoe brigades at York Factory on Hudson's Bay (Ray 1974). Seventy five years later, most of these Woodland Assiniboine had joined their relations in the Parklands.

During this period, subsistence was primarily based upon moose, beaver, fish, migratory waterfowl, and wild rice. With expansion into the parkland, there was an increased reliance upon the bison and there is evidence for the use of surround kills and bison pounds (Doughty and Martin 1929; Rich 1958 1:643). It is probable that these techniques were learned from adjacent groups in the western parklands. Frison (1978) credits Besant hunters, moving out of the Eastern Woodlands onto the plains, circa A.D. 100, with the final elaboration of the bison pounding complex. The necessity for learning techniques of procurement associated with unfamiliar species is clearly indicated in Tanner's account. Tanner (James 1956:224-225) relates,

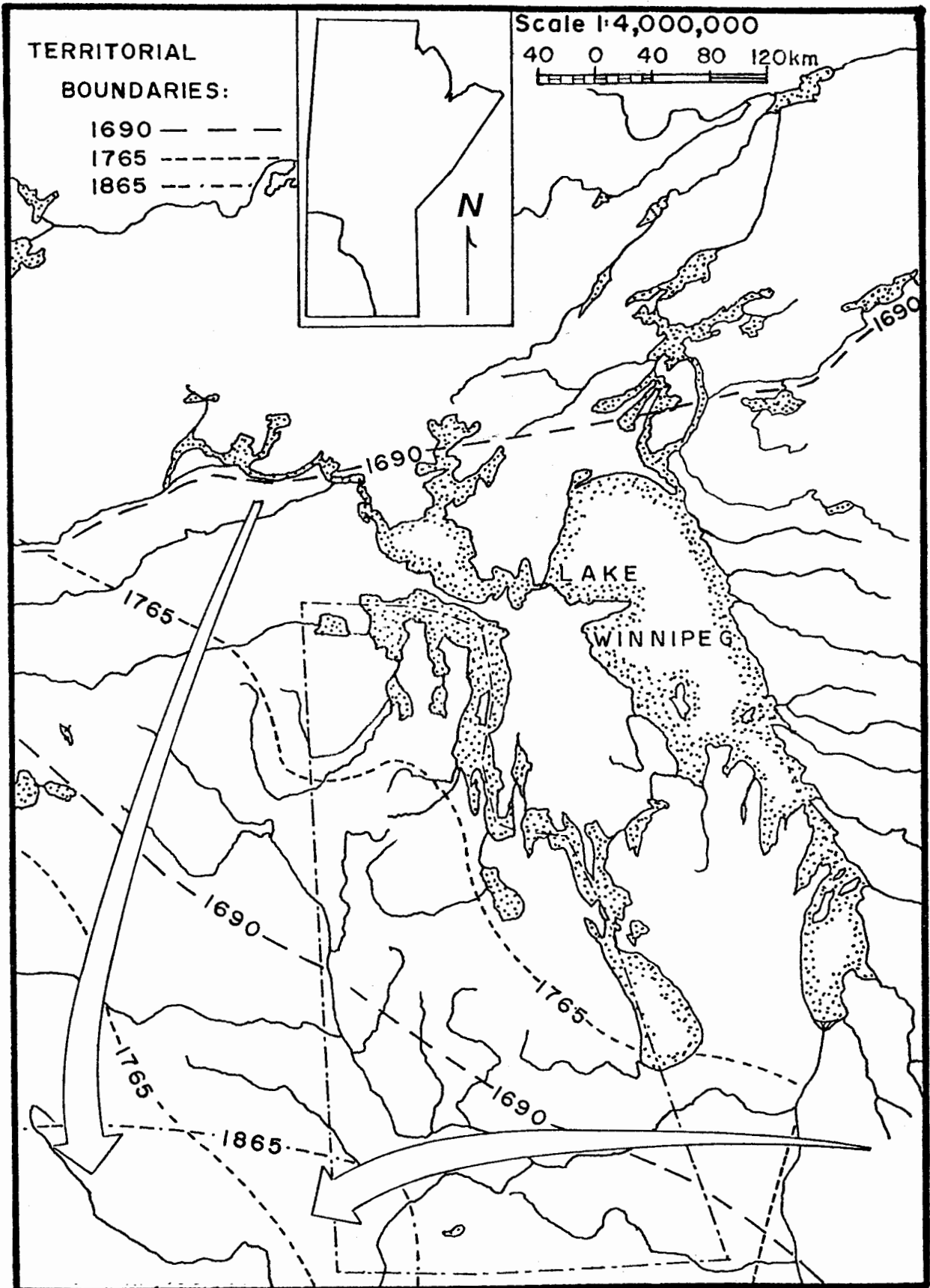


Figure 8. Movement of the Assiniboine: Protohistoric to Late Historic Period (After Ray 1974).

". . . we went immediately in the direction in which we believed the herd would be found, and having walked about three hours, ascended a little hill, and saw before us the ground black with buffaloes. We crawled up, and I killed immediately two fat cows. As I was cutting these up, I began to hear the guns of the men of our party, they having followed me on, and being now arrived among the buffaloes. It was somewhat late when I was ready to go to our camp, most of the men were in before me. I had expected to have heard the sounds of feasting and rejoicing, but when I entered the camp, not a voice was to be heard. No women and children were running about, all was silent and sad. Can it be, thought I, that this relief has come too late, and that our women and children are all dead. I looked into one lodge after another. In all, the people were alive, but none had anything to eat. The men having most of them come from a forested country, and having never hunted buffalo before, all failed to kill except myself. The supply of meat I had brought, I having loaded the two young men that were with me, somewhat allayed the hunger that was prevailing . . . Next morning, long before dawn, the women started for the remains of the two buffalo I had killed, and several of the men, most of them having obtained from me some instruction about the part to be aimed at, went again in pursuit of the herds, and this time several of them killed."

The Woodland Assiniboine continued to shift westward away from primary forest resources and to rely more and more upon bison. In time, the bison became the basic supplier of almost all physical needs of the Assiniboine. Alexander Henry the Younger (Coues 1897:517-518) noted that the principal occupation of the Assiniboine in 1808 was the manufacture of pemmican and grease from the bison, and that,

" . . . in summer they chase the buffalo on horseback, and kill them with bows and arrows; in winter they take them in pounds. It is supposed that these people are the most expert and dextrous nation of the plains in constructing pounds and in driving buffalo into them."

In 1801, Harmon (Lamb 1957:41) noted that the Assiniboine ". . . live out in the spacious Plains and hunt wolves (of different species) Foxes, Bears & Buffalo etc." The final southwesterly movement of the Assiniboine took them south of the Milk River and today they occupy the Fort Belknap Reservation between the Milk River and the Little Rocky Mountains upland (Rodnick 1938).

At contact, circa A.D. 1700, the Assiniboine appear to have been engaged in a forest/parkland adaptive strategy similar to that modelled by Ray (1974:47) for the Cree, where forest resources, such as fish, moose, and beaver, were relied upon during spring through summer; followed by the wild rice harvest in late summer and early fall. In late fall, there was a move to the parklands where bison could be readily hunted as they drifted into the parklands to their winter pastures. No



doubt dried wild rice, which had been cached in the fall (Eastman 1971), was used as a supplement when the less than certain movements of the bison in the eastern parkland brought the threat of winter famine. During this early period, around the end of the seventeenth century, the Assiniboine seem to have been the dominant group in the study area.

Circa 1760. The Assiniboine had become well established in the parkland and had begun to move into the margins of the xeric grasslands on a seasonal basis. Regular trading expeditions in the late fall to the Mandan villages for corn were an established tradition - possibly to provide a substitute for the wild rice which had been harvested in earlier times. Bison was now the major subsistence resource, together with moose, elk, beaver, and bear. Horses were scarce among the Assiniboine at this time and were used chiefly for the transporting of goods, rather than for riding. During this period, the Assiniboine were the dominant group in the southern portion of the study area.

By the end of the 18th century, the Assiniboine were well established as plains/parkland bison hunters, following the seasonal movement of the bison herds into the plains in spring and summer, and returning with the herds in late fall and winter to the parklands. The seasonal harvest of roots, such as Psoralea esculenta, and a variety of berries supplemented the diet, together with corn traded from the Mandan.

The demise of the great bison herds after 1870 ended this strategy and led to the settlement of the Assiniboine on reservations. During

this period, the Assiniboine gradually drifted westward and abandoned the study area, except for occasional use of the Souris River Basin to the west of Turtle Mountain.

## CREE

In the mid-seventeenth century, Algonquian speaking Cree were found throughout the boreal forest along the southern and eastern margins of Hudson's Bay, the drainages of the Nelson, Hayes, and lower Saskatchewan rivers, along the river systems draining into James Bay, and south to Lake Nipigon and Rainy Lake where they came into friendly contact with the Assiniboine (Ray 1974; Mandelbaum 1940). At this time, their adaptive strategies were, of necessity, geared to northern boreal forest resources.

At contact, circa A.D. 1660, the Cree subsistence strategy was based upon fish as a primary resource during the season of open water (spring through fall). In spring and fall, migratory waterfowl provided a windfall of fresh meat. Moose and caribou were important food animals at all seasons but were especially important when heavy ice closed fishing. Beaver and muskrat were also important food animals. During periods of cyclical abundance, rabbits were easily caught and served for winter clothing as well as for food. With the addition of European staples, purchased at stores, this subsistence pattern is followed by the Northern Cree in modern times.

As the Assiniboines shifted from the forests to the parklands they were followed by the Cree. The Cree, anxious to maintain a middleman role in the fur trade, expanded westward from Hudson's Bay, driving the Athapaskan groups before them and extending their territory along the entire length of the North Saskatchewan River. By 1760, the Cree had established themselves throughout the Manitoba Lowlands as far south as the forks of the Red and Assiniboin rivers, and along the northern margins of the parkland on the north side of the North Saskatchewan River well into modern Alberta (Mandelbaum 1940; Ray 1974). During this period, the Cree were the principal occupants of the northern portion of the study area - the Assiniboine being in the minority north of the Assiniboin River. At this time, the Cree incursions into the parkland were primarily related to their middleman role in the fur trade and the subsistence strategies which they used in the parkland were an extension of seasonal patterns of procurement practiced in the adjacent forest regions. Mandelbaum (1940:180) characterizes the Cree as being ambivalent between the forest and parkland environments as late as 1790, with some groups choosing to remain within the hilly, forested uplands even though the open plains with their abundance of bison were nearby (Figure 9).

Throughout the first half of the nineteenth century, the Cree extended their occupation increasingly into the western parkland and withdrew from the study area until only the section of the Assiniboin River above the junction with the Qu'Appelle was regularly occupied (Ray

1974:184). It is during this period that the Plains Cree differentiated themselves from the Woodland Cree and adopted a plains/parkland subsistence strategy consistent with, and learned from, the Assiniboine who had preceded them (Mandelbaum 1940:165). When Hind travelled up the Qu'Appelle to its source and continued northward along the South Saskatchewan in 1858, the groups which he encountered were almost exclusively Plains Cree, subsisting almost completely upon bison (Hind 1860). Recognizing that the bison herds were diminishing, these Plains Cree were vociferous in their expressed desire to exclude Metis and Whites from hunting on their lands although they remained eager to trade bison products (pemmican, grease, hides) for European goods (Hind 1860 1:334).

As the Cree moved south and westward into the Manitoba Lowlands, they gained access to the wild rice areas of southeastern Manitoba and southwestern Ontario (Ray 1974:30) and entered the eastern margin of the parklands. The subsistence pattern, circa A.D. 1760 differed little from earlier times, except for the local addition of rice and elk which increased the range of fall and winter subsistence resources. The Cree occupying the northeastern portion of the study area at this time were following a pattern which differed little from that followed by their grandparents a century earlier to the northeast, adjacent to Hudson's Bay (Figure 9).

During the next century, Woodland Cree expanded into the parkland and adopted the seasonal round which has been modelled by Ray (1974). In

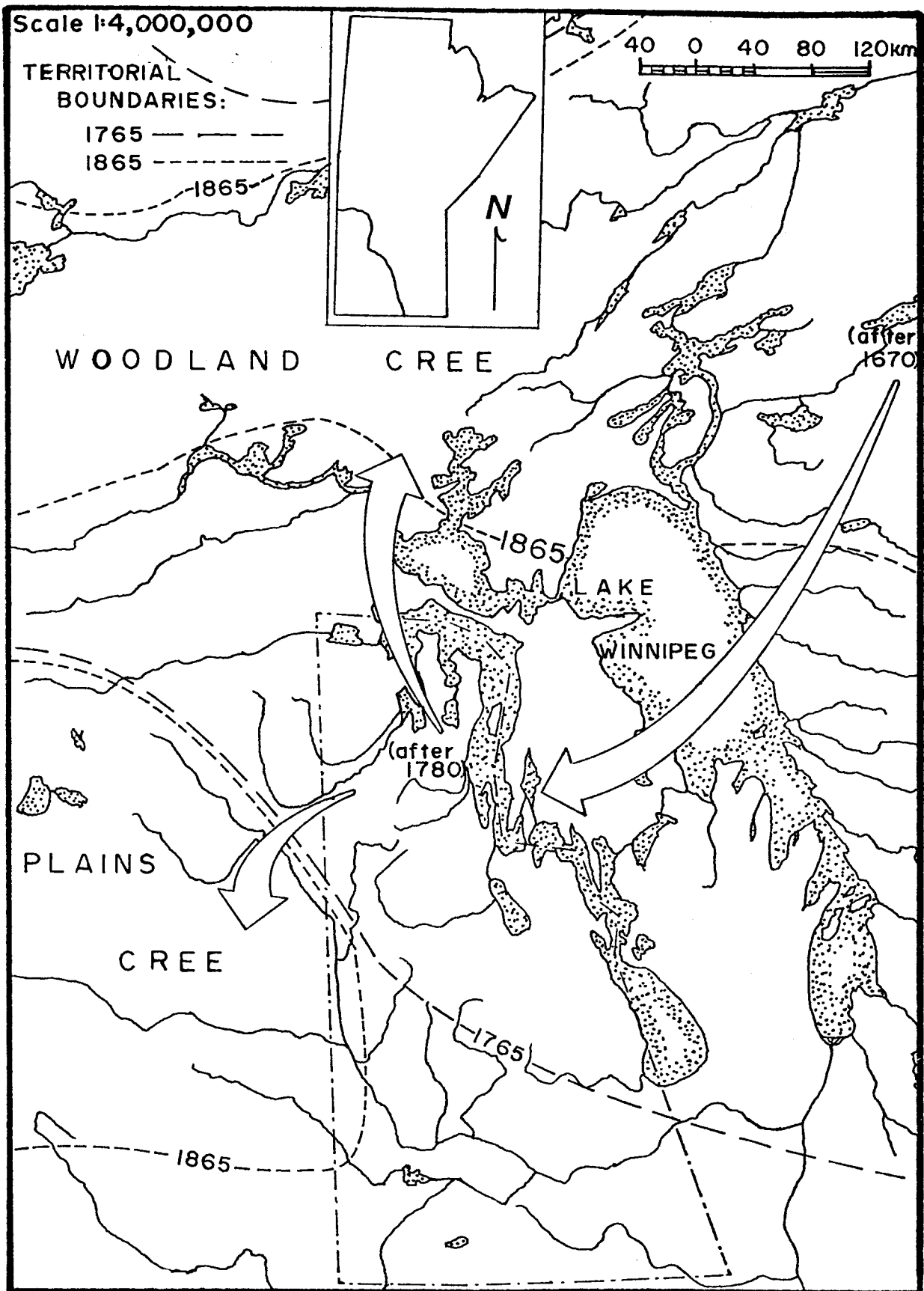


Figure 9. Movement of the Cree: Protohistoric to Late Historic(after Ray 1974).

spring, families camped at fishing stations and at strategic sites along the flyways of migratory waterfowl bordering the eastern margins of the parklands and in the boreal forest itself. As summer progressed, they continued to make their living along the waterways of the forest by fishing, hunting, and gathering roots and other vegetable foods. In fall trapping was intensified and the southbound waterfowl provided a surplus of food prior to the critical time at freeze-up. With the onset of winter, to an increasing degree through time, many of the Cree travelled westward into the parklands to find the bison returning from summer grazing on the xeric grasslands. Towards the close of this period in the first half of the nineteenth century, the Plains Cree began to differentiate from the Woodland Cree and gradually adopted the equestrian plains/parkland subsistence strategies of their allies the Assiniboine. This pattern was firmly in place by 1858 when Hind passed through the Qu'Appelle River area. In the study area, the Cree had largely been superceded by the Ojibwa who were moving in from the east. The Woodland Cree, whose subsistence strategies had changed little since contact, were for the most part, confined to the northern boreal forest. Except for western Saskatchewan, they were separated territorially from the Plains Cree by the Ojibwa entry into the territory which the Plains Cree had abandoned in pursuit of the Plains bison economy (Ray 1974:184)

#### OJIBWA

The Ojibwa (locally also called Chippewa and Saulteaux) are an Algonquian group who speak a language similar to that of the Cree. The

groups which were ancestral to the Ojibwa first appear in the historic record along the St. Mary's River in 1640 (Kinietz 1965:317). According to Kinietz (1965:317-320), the Saulteaux were a series of cognate bands living north and south of the St. Mary's River who visited or gathered at the rapids for fishing and social interaction. They were collectively called 'Saulteurs' (people of the falls) by the French. Kinietz (1965:321) states that those living north of Lake Superior lived solely by hunting, fishing, and gathering wild foods, while those living to the south practiced a limited horticulture, based on corn and squash, to supplement their diet of wild foods. Moose and beaver were the most important food animals and Kinietz (1965:322) quotes Perrot as reporting that a band of Chippewa snared more than 2400 moose in the winter of 1670-1671 on Manitoulin Island. The abundance of fish was the factor which accounted for the continued presence of the Saulteaux along the St. Mary's River. All early accounts of this region comment upon the abundance and excellent quality of the whitefish caught in handnets here and Kinietz (1965:324) notes that the Chippewa sold surplus fish to other Indians and the French at Macinac as well as drying large quantities for storage.

From their relatively restricted homeland, circa A.D. 1620, the Ojibwa rapidly expanded their sphere of influence westward and northward to include almost the entire study area, with the exception of the area to the west of Turtle Mountain (Hickerson 1970:ii; Ray 1974:184). During the greater part of this expansion, much of the area was shared with

Cree and Assiniboine people with whom they were allied against the Sioux (James 1956).

By 1760, the Ojibwa had expanded westward into the northcentral Minnesota and Lake-of-the-Woods areas where wild rice became available as a fall and winter staple (Ray 1974:22). In the next fifty years, most of the study area east of the Manitoba Escarpment was occupied by the Ojibwa (Figure 10). Ray (1974:104) states that,

"In summarizing the population relocations which had taken place between 1763 and 1821, one of the more striking changes was the nearly complete abandonment of the Red River Valley, the lower Assiniboine River, and the Manitoba Interlake regions by the Assiniboine and Western Cree . . . As they withdrew, the Ojibwa moved in behind them. The Ojibwa also moved into the Swan River and Cumberland districts and penetrated up the Assiniboine River as far as its confluence with the Souris River."

John MacDonell (Wood 1984:138) refers to Saulteaux at the north end of the Portage-la-Prairie in 1795 and Harmon (Lamb 1957:31) notes Saulteaux at Meadow Portage on Lake Winnipegosis in August 1800. The account of John Tanner indicates Ojibwa travel throughout the study area between 1795 and 1820 (James 1956). By the close of the bison hunting era, circa A.D. 1870, the Ojibwa occupied the maximum extent of their range, including the parkland of southern Manitoba and the northern edge of the parkland in Saskatchewan including the forks of the North and South Saskatchewan rivers (Ray 1974:184).



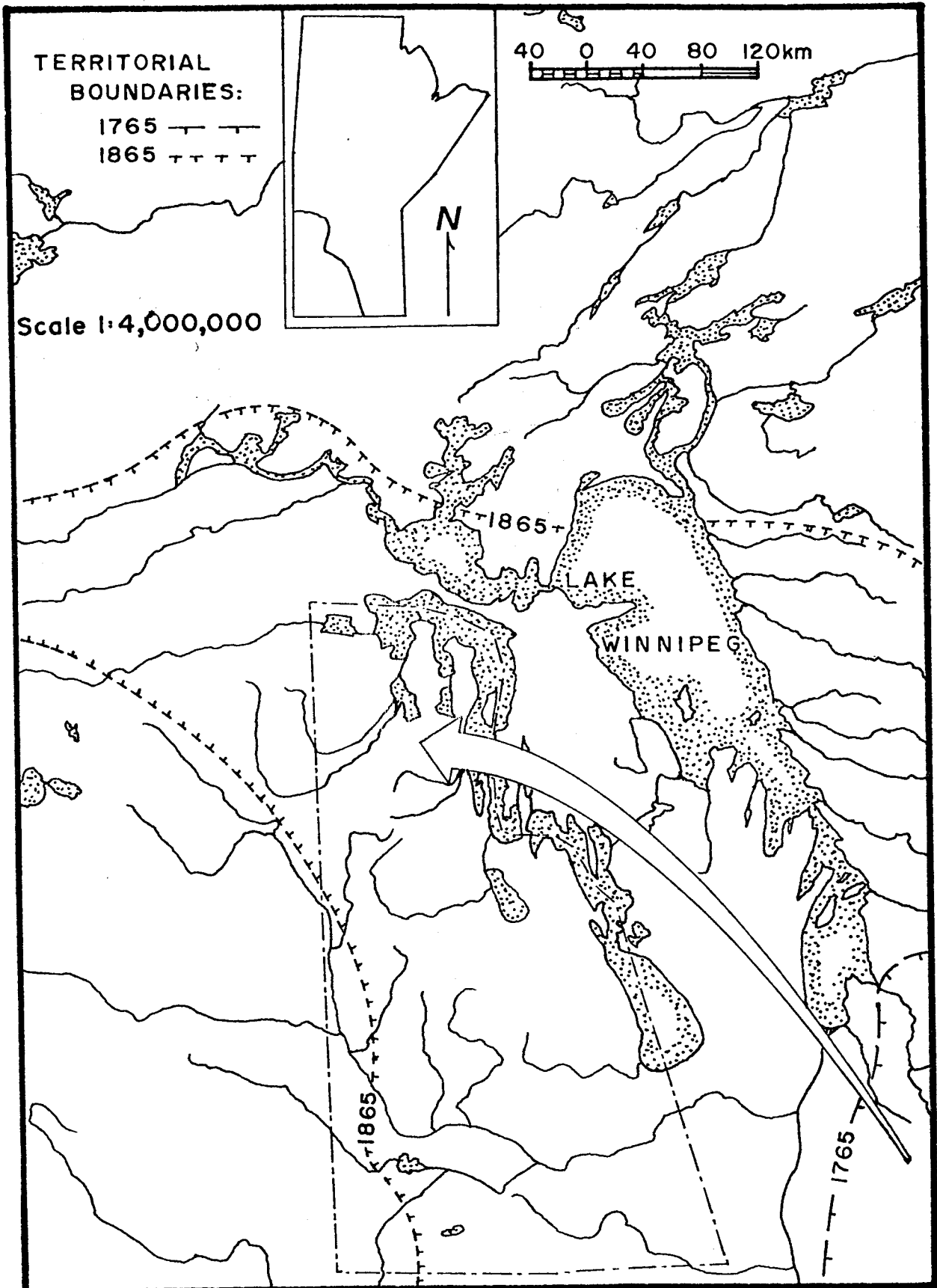


Figure 10. Movement of the Ojibwa: Early Historic to Late Historic (after Hickerson 1970; Ray 1974).

This expansion was facilitated by the fur trade practice of hiring Native hunters to provision inland forts. The Northwest Company, in particular, brought in hunters and encouraged the more proficient Ojibwa to move into areas abandoned by the Cree as impoverished (Ray 1974:104). The frequency with which Tanner (James 1956) and other observers refer to starvation in the parklands at the turn of the eighteenth century indicates that even the most proficient of hunters endured hunger in the wake of the fur trade. Tanner (James 1956:223) recounts having on one occasion been rescued from a state of exhaustion and starvation by a passing group of Indians and goes on to state,

"I had stopped at night, and being unable to make a camp or kindle a fire, I was endeavouring to reconcile myself to the immediate approach of death which I thought inevitable, when these people unexpectedly found me, and helped me return to camp. This is but a fair specimen of the life which many of the Ojibbeways of the north lead during the winter. Their barren and inhospitable country affords them so scantily the means of subsistence, that it is only with the utmost exertion and activity that life can be sustained, and it not infrequently happens that the strongest men, and the best hunters, perish of absolute hunger."

Throughout the Protohistoric and Ethnohistoric periods, the Ojibwa were tied to forest subsistence strategies. From the time of the entry

of the Ojibwa into the study area as hunters and trappers associated with the Northwest Company, circa 1785, until the close of the fur trade era, the Ojibwa retained an essentially Woodland subsistence pattern. The primary subsistence items recorded by Tanner were moose, elk, bear, beaver, fish and migratory waterfowl, with bison being taken only when encountered in the parklands during fall and winter (James 1956). Tanner also mentioned the sowing of corn at Dead River (Netley Creek) where he spent the summer, harvesting the corn in the fall (James 1956:168). The following spring, Tanner notes that he killed 400 muskrats at the same place (James 1956:176). Tanner describes a summer's subsistence activities in 1816 at Red River as follows:

"For my own part, I spent the summer in the usual quiet manner, being occupied with hunting, and the employments about our cornfields, in gathering wild rice and fishing" (James 1956:211).

He continues,

"I had a fine crop of corn, and plenty of wild rice, and as I wished to move to Rainy Lake where I could spend the winter, Mr. Bruce [H.B.C. employee], who was going the same way agreed to take twenty sacks of my corn, and at length I followed with my family"(James 1956:213).

Tanner and his Ojibwa companions alternated between wintering in the forests, subsisting chiefly on moose, bear, and beaver, and wintering in the parklands where, in addition to the above species, elk and bison

were available. It was a common practice to prepare large quantities of pemmican and to store them in caches (sunjegwun) for later use (James 1956:119). On one occasion, following a winter of frequent privation and hunger, Tanner (James 1956:226) relates,

"We had suffered so much from hunger that I wished to secure my family against a return of it. . . I made twenty large sacks of pemmican. Ten kegs of ten gallons each, which I procured from the Indians, I filled with tallow, and preserved besides, a considerable number of tongues, etc."

The pattern of subsistence which emerges for the Ojibwa who occupied the study area, following the withdrawal of the Assiniboine and Cree to the west, was based upon southern boreal forest strategies, including the cultivation of small amounts of corn. In spring, the families moved to rivers and lake marshes where spawning fish and migratory waterfowl could readily be taken. In late spring, small fields of corn were planted and large ungulates were hunted - moose and elk, if the group was in a forested section of the parklands; moose and woodland caribou, if in the forest, and occasional bison stragglers in the more open areas of the parkland. In fall, following the wild rice and corn harvests, the groups moved to forested areas where bear and moose together with fur bearers, particularly beaver and muskrat, made up the diet which was supplemented by the stored grain. During this period, families moved frequently as local resources became depleted. This pattern differs from that followed by the Woodland Assiniboine and the Woodland Cree who

occupied the study area earlier only through intensification of resource exploitation and a limited sedentarism accompanying horticultural practice. The intensification of resource exploitation was necessitated by the depletion of game stocks in the wake of the fur trade and often resulted in local starvation. The limited horticulture practiced by the Ojibwa in the Parklands limited their mobility to some degree since it was necessary to tend their fields at certain times of the year. This lessened mobility further depleted local resources resulting in greater dependence upon their crops in an area where corn growing was marginal.

SUMMARY OF SUBSISTENCE STRATEGIES Each of the groups discussed, Assiniboine, Cree, and Ojibwa, followed a transitional subsistence strategy which led from the forest to the plains (Figure 11). The extinction of the great bison herds, and severe depletion of most other animal resources in the parklands, effectively brought the plains/parkland adaptive strategy to an end and simultaneously halted the outward migration from the forest to the plains.

At contact, the Cree and a major section of the Assiniboine were engaged in subsistence strategies geared towards the resources of the southern and northern boreal forests respectively. Some of the Assiniboine had entered the forested portions of the parklands and the Mixedwood sections where they made seasonal use of the bison. The various bands of the Ojibwa were far to the east, utilizing the forest resources of the Upper Great Lakes region. Under pressure from European settlement east of the Upper Great Lakes, and motivated by the

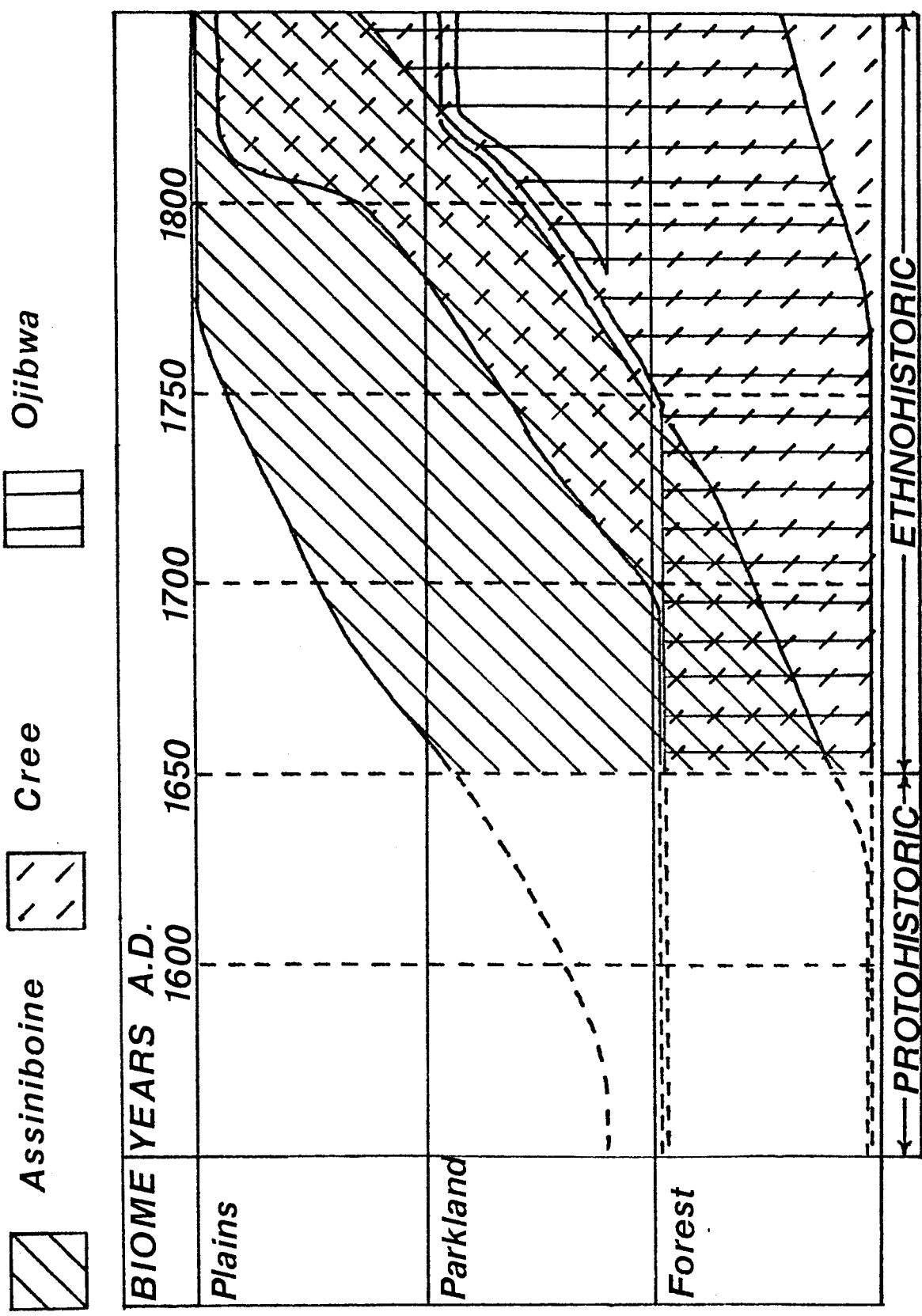


Figure 11. Transitional Adaptive Model for the Forest/Grassland Transition Zone of Western Manitoba: A.D. 1550 - A.D. 1850.

opportunities offered by the expanding fur trade, the Native groups continued to move westward. Ultimately, the Assiniboine adapted to a bison subsistence economy and were soon followed by a portion of the Cree who were their allies. The most westerly of the Ojibwa, following the withdrawal of the Assiniboine and the Cree from the parklands, were in the process of adapting to a parkland/plains economy when the bison became extinct as a major resource. The bison completely disappeared from the open plains, surviving only in small enclaves in isolated areas where the governments of Canada and the United States established game preserves.

The models of subsistence which emerge are more closely tied to resource and habitat than they are to the various ethnic Native groupings which moved through the different biomes represented in the study area. This suggests that subsistence strategies are cultural responses which are strongly conditioned by environmental parameters. It is clear that some differences existed between the subsistence strategies followed by the groups under discussion. This is demonstrated by the fact that the territorial shifts westward were voluntary and were motivated by a clearly perceived opportunity for improved circumstances. That is, succeeding groups moved into areas which were voluntarily abandoned by their predecessors as impoverished in subsistence resources. Each advancing group found the area into which they moved less impoverished than that left behind. In addition, during the ethnohistoric period at least, the succeeding groups interacted with

their precursors in the various regions and adopted their practices and major strategies of subsistence.

The ethnohistoric record indicates that there were several adaptive strategies which were viable systems for the exploitation of the resources found in the study area on a seasonal or year around basis. All of these strategies involve some degree of movement to effectively exploit resources which were seasonal, migratory, or thinly distributed.

#### MODELING THE ADAPTIVE STRATEGIES

SUMMARY OF MAJOR BIOMES Three major biomes (environmental zones) are of significance to the subsistence strategies available for the study area. The Plains region, which formed the summer pasturage for the northern bison herds (Morgan 1980), lies outside the study area proper but because of the seasonal movements of the bison herds, and of Native groups which relied on those herds, it must be considered here. The Parklands form a major portion of the southern and western portions of the study area and extend beyond the area for a considerable distance to the north and west. The Boreal Forest flanks the northern and eastern edges of the study area and the Mixedwood Section (Rowe 1972) is a major component of the eastern margins and the uplands within the study area.

In addition to the major biomes, several ecotone complexes were of potential significance in prehistoric human adaptive systems found in the study area. The riverine complexes held important seasonal resources



in the southern portion of the study area, and the riparian resources of parts of the southern boreal forest were similarly potentially significant for these areas. The Mixedwood sections within the Aspen Parkland provided a variety of important seasonal resources. Many of the resources which characterized the three major biomes occurred in greatest abundance in these ecotones or were aggregated there on a seasonal basis (Tables 4 and 5).

The availability of subsistence resources associated with the xeric shortgrass plains is confined primarily to the growing season. Morgan (1980:155) states that,

". . . the geographic area where the majority of the herds can be found during the summer and early fall is primarily the Xeric Mixed Prairie. This area is defined as the summer range. The winter range includes those geographic areas where the majority of the herds can be found during the spring, late fall and winter. The major vegetative communities associated with this area are the Mesic Mixed Prairie, the Fescue Prairie of the Aspen Grove Region, the transitional grasslands of the Aspen Grove Region and the Qu'Appelle - South Saskatchewan River Valley Complexes. The exposed grassland areas experience major utilization during the spring and fall or until adverse weather forces the herds to

concentrate in the sheltered areas of the Aspen  
Grove Region and Valley complex systems."

As has been noted earlier, bison, without question, were the major subsistence resource for human groups inhabiting the Northern Plains in the Late Prehistoric and Early Historic periods. However, as Morgan (1979,1980) and others (Hind 1860; Lamb 1957; Ray 1972,1974; Syms 1977) have indicated, the movement of bison herds was related to the changing of the seasons and while some bison probably remained in local sheltered areas, particularly on the Eastern Peripheries (Hanson 1984), the available evidence suggests that the herds abandoned the open plains in winter and migrated into more sheltered areas with more luxuriant winter grazing potential. Morgan (1980) proposes a two field rotational grazing system, with bison moving onto the xeric prairie in late spring and retiring to the parklands and valley complexes in late fall. The ethnographic record suggests that Indian hunters followed the herds' patterns of movement (Lamb 1957; Provo 1984). This abandonment of the open plains is supported by the observations of Mr. Christie, Chief Factor of the Hudson's Bay Company, who, while on a 1400 mile journey from Athabaska to Red River in December of 1859, did not meet with a single Indian (Hind 1860II:87). Modern Indian Reservations, established by treaty in this region, are confined to Mixedwood uplands such as Moose Mountain, Wood Mountain, and the Cypress Hills, or to the valley complexes where forest and parkland resources were available for winter

subsistence. The resources of the open, Northern Plains (Tables 4 and 5) did not permit the development of self sustaining year around subsistence strategies for human populations prior to the advent of farming and a market economy.

The Parkland biome contains a wide range of subsistence resources (Tables 4 and 5) which were available to resident hunter-gatherers. The development of subsistence strategies could be based upon several species of large ungulate (moose, elk, bison, mule deer), together with bear and aquatic rodents, and supplemented by seasonally abundant waterfowl, fish, and vegetable foods. A subsistence model based entirely upon the resources of the parklands, and involving the frequent shifting of base camps as local resources became depleted, is eminently feasible.

The resources of the Boreal Forest biome tend to be thinly spread and accessible primarily along rivers and lake shores. Nevertheless, many of the forest subsistence resources are available throughout most seasons of the year, although procurement may be more difficult at certain seasons. Migratory waterfowl and vegetable foods are markedly seasonal and the year around procurement of fish, given the heavy ice cover of late winter, is dependent upon advanced technology or naturally occurring open water such as may be found at rapids. Moose, woodland caribou and beaver form the mainstay of southern boreal forest subsistence. These basic resources could be supplemented by smaller species of animals, particularly muskrat and rabbit, together with

migratory waterfowl and fish. A variety of vegetable foods, especially wild rice wherever it was available, and including numerous roots, berries and tubers, were potentially important seasonal supplements for immediate use or they could be stored for winter use (Snortland-Coles 1979).

The ecotone zones within the major biomes also furnished sufficient resource potential for small, band size groups to develop subsistence strategies which involved limited mobility within sections of Valley Complex, Mixedwood or riparian habitat. Any such adaptive strategy, however, is predicated upon exclusive access to the area and some form of management which maintains a favourable balance of resource potential to human subsistence requirement. The level of resource extraction must not exceed the capability of the resource base for replenishment. If resource extraction should exceed the rate of resource replenishment, then the resource base must be expanded, either territorially or through a broadening of the exploitation strategy to include new resources or by concentrating on resources previously exploited at a suboptimal level.

INTRODUCTION TO THE MODELS The adaptive systems of hunter-gatherers are developed to satisfy the clearly understood objectives related to the meeting of two levels of need. The first or primary level of need relates to provision for the basic requirements for physical survival. The second level is the concern for quality of life - goals related to personal satisfaction and the emotional well being of members of the society. Jochim (1976:19) has identified Primary Goals as:

- 1) The achievement and maintenance of a reliable supply of food and manufacturing staples
- 2) The maintenance of energy expenditure within a predefined range

Similarly, Jochim (1976:22) lists Secondary Goals as:

- 1) Desire for good tasting foods
- 2) Desire for variety
- 3) Desire for prestige
- 4) Desire to maintain differentiation of sex roles

All of these goals must be met within the parameters of the resource potential of the environment. The level of technology which is available to a given society, together with its capability for organization of human resources, will play a significant role in the development of adaptive strategies and selection of risk reducing strategies.

In Chapters 4 and 6 (Table 5) a number of significant variables are identified which influence resource ranking by resident populations and the organization of subsistence activity around certain critical resources found within the biomes which were available for exploitation by groups residing within the study area. These variables are:

- 1) Seasonality
- 2) Distribution
- 3) Mobility
- 4) Abundance
- 5) Energy Value
- 6) Non Food Yield

Viable adaptive strategies will evolve as a response to these variables. Minimally, these strategies must provide for the satisfaction of energy and nutritional requirements, and the supply of critical non food needs such as skins for clothing and shelter and materials for tool manufacture. Circumstances permitting, a workable adaptation will attempt to satisfy whims of taste and the desire for variety, together with purely cultural wants such as enhanced prestige and the maintenance of distinctive sex roles.

The importance of 'risk reducing strategies' has been outlined in Chapter 5 where three important culturally regulated behavioral complexes were identified. These were:

- 1) Enculturation - learned skills, technology, and historic socio-economic practices
- 2) Alliance and Trade - distribution of surpluses and access to additional resources
- 3) Preservation and Storage - the processing and conservation of surplus food and non food materials

The process of enculturation perpetuated the accumulated body of community knowledge associated with extractive technology together with methods for organization of human resources to effectively satisfy the goals and perceived needs of the society. The accumulated skills of countless generations, together with recent innovations, were passed on to succeeding generations within a particular tradition and in this way maintained expectations and provided the regular means for their

satisfaction. Continuity of lifeway and cultural expectation, based upon tradition and precedent, coupled with knowledge of the means of satisfaction, diminished levels of risk associated with unfamiliar territory and resources, and the social stresses associated with shifting socio-political structures. Enculturation is a conservative, stabilizing influence which serves to perpetuate established patterns.

Alliances and trade networks provided means for the exchange of material surpluses between groups with the goal of achieving mutual satisfaction and greater diversity of food and other material resources. They functioned to minimize conflict potential over access to territory and resources and to more evenly distribute surpluses throughout a larger and more diversified population. They also provided frameworks for increased personal and collective mobility of individuals and groups over a larger territorial range and access to resources within that expanded range. These socio-economic practices tend to be innovative and flexible, allowing response to unusual or unstable circumstances.

Preservation and storage technology provided for the accumulation of the surplus potentials which the environment afforded. These stored accumulations could be reserved against times of shortage or utilized as a means of exchange for exotic or otherwise scarce materials which were obtainable from other groups connected by alliance or trade network.

In summary, it may be stated that the satisfaction of biological and cultural needs had to be met within the environmental parameters of the

region. These needs were satisfied through the adaptive strategies developed by the groups residing in the region. Their strategies were geared towards securing regular and sustained supplies of food and non food material resources necessary to collective survival and well being. The technological capability and socio-economic practices of particular groups effectively shaped and regulated these adaptive strategies. Finally, an important aspect of any overall adaptive system was the implementation of risk reducing strategies which broadened the subsistence base and tended to mediate fluctuations or other shortfalls in the resource base.

THE MODELS No single model can properly account for the diversity of adaptive strategies which could be developed within the study area. In part, this is attributable to the ecological diversity which is present and, in part, it is the result of historical factors; that is, the retained traditions or skills of groups migrating into the study area from adjacent biomes.

Utilizing the biogeographic categories of biome and ecotone, and taking into account the technology and socio-economic capabilities of prehistoric hunter-gatherers, four basic adaptive strategies can be proposed to exploit the subsistence potential of the study area. These strategies have been logically derived from an evaluation of the subsistence resources which characterize the biogeographic regions of the study area (Tables 4 and 5). The four strategies are:

- A) Seasonal round utilizing resources of a single biome
- B) Seasonal round utilizing resources of two or more biomes



- C) Seasonal round utilizing resources of a single biome together with seasonal exploitation of one or more ecotones
- D) Intensive exploitation of one or more ecotones

Type A strategies involve the practice of a subsistence strategy which exploits the resources of a single biome. Within the biome the resources may be dispersed and/or clustered and present throughout the year and/or seasonal. The essential characteristic of the adaptation is that it is firmly based upon the resources which characterize the biome.

Type B strategies are based upon subsistence strategies which effectively draw upon the resources of two or more biomes. Usually such adaptive systems are based upon the seasonal movement of human groups across biome frontiers to exploit particular species at an optimum of quality or productivity.

Type C strategies closely resemble Type A subsistence strategies except that particular resources which are seasonally associated with one or more ecotones within the biome are critical to the success of the adaptation. Should these resources fail to appear at the expected time and place, the adaptive strategy would fail - it would have to undergo drastic alteration or be abandoned altogether.

In a Type D strategy, the subsistence procurement activities are geared towards exploiting resources in one or more ecotones within a biome. Resources may be harvested from the adjacent areas but the subsistence strategy is firmly tied to the exploitation of resources

within the localized parameters of the ecotones. Settlements will tend to be of longer duration and population movements will be more localized than is the case with strategies A, B, and C, where mobility is a major feature of the adaptation. It will be necessary for groups following a Type D strategy to control access to the resources upon which they are dependent, since unforeseen resource depletion would vitiate their subsistence adaptation.

All of these strategies involve some degree of mobility for the populations as a whole since none of the resources of the study area are sufficiently productive or sustained in yield to allow a fully sedentary adaptation to develop. A further underlying assumption postulates that all groups utilizing the study area employed appropriate 'risk reducing strategies' to turn seasonal surpluses to their advantage and to ameliorate seasonal or other environmentally induced shortfalls of food and necessary non food resources.

Of the four strategies outlined above, a Type D strategy would seem to be the most desirable since abundant, diverse, localized resources offer the potential for a least cost subsistence strategy. When abundant subsistence resources are continuously available within a relatively circumscribed area, then it is to be expected that a low cost adaptive strategy would emerge. Such a strategy would be characterized by the production of surplus goods and limited subsistence related mobility. The Indians of the Northwest Coast of North America furnish an excellent example of such a strategy, utilizing the huge, resource rich

freshwater /sea/landshore ecotone of the region. However, the small ecotones in the study area are vulnerable to resource depletion through overexploitation or to small scale environmental deterioration. Only when population levels could be maintained at an optimum level, below the capacity of the resource base for self-replenishment, could a Type D adaptive strategy be perpetuated. Whenever depletion took place, it would become necessary for dependent populations to increase the resource base and adopt one of the remaining strategy Types.

When resources within a biome are not too severely curtailed by variables such as seasonality, a high degree of mobility, or thin dispersion, the least cost adaptive strategy would probably be Type A. In this system, a limited degree of mobility within the familiar biome would place adequate subsistence resources within the reach of resident hunters and gatherers. Only when the needs of the human population outstrip the capacity of the biome resources to satisfy its requirements, or when resources of superior utility become available in adjacent environmental sections, will a Type B adaptive strategy become more attractive.

Where major resources are subject to marked seasonality or other cyclical fluctuations, and where complementary resources are to be found in adjacent biomes, a Type B strategy is likely to emerge. In the Northern Plains region of North America, the bison furnishes an excellent example of a seasonally mobile resource whose availability fluctuated markedly according to region and season. Similarly, the

seasonal nature of the spawning runs of fish, of waterfowl migration and the availability of most plant resources, have led many groups to embark upon Type B strategy seasonal rounds crossing biome boundaries to exploit subsistence resources at maximum levels of abundance or quality and, in effect, to optimize returns from a utility/cost evaluation equation.

When extensive ecotonal areas exist within a biome in which complementary seasonal resources are aggregated, a Type C strategy may emerge. The Valley Complexes found in the open Plains and Eastern Peripheries serve as examples of biophysical areas where such seasonal aggregations occurred in a manner appropriate to complement the dispersal of the major subsistence resource (bison) from the open xeric Plains.

In all of these adaptive systems risk reducing strategies played an important role - even amid the abundance of the Northwest Coast, the potlatch complex served to initiate the accumulation of surpluses and the more even distribution of abundance throughout the larger society (Piddock 1965). As will be outlined in Chapter 8, the presence of sites in the study area which contain the diagnostic artifacts of several contemporary cultural groups - drawn from a wide geographic area - probably represent the material assemblages resulting from the longterm implementation of trade and alliance networks. APPLICATION OF THE MODELS In the balance of this chapter the ethnographic groups which inhabited the study area will be used to test the applicability and explanatory value of these subsistence strategy models in terms of

consistency with the published evidence, feasibility, and the likelihood of satisfying primary and secondary goals. The various historic groups described in the early writings of European traders, missionaries, and explorers, will be examined to determine whether their lifeways can be accounted for within the four subsistence strategy Types which have been outlined above. In Chapter 9, several major prehistoric groups, as defined by distinctive artifact assemblages, will be similarly evaluated.

ASSINIBOINE At first contact, circa 1690, the Assiniboine seem to have been following a Type B strategy utilizing resources of the Southern Boreal Forest and the Parkland. It is uncertain from the accounts whether two distinct divisions of the Assiniboine were exploiting these two biomes or whether a seasonal round was already in place covering both biomes - in any case, it can be assumed that materials from one area were available in the adjacent area through traditional kinship channels. In 1739 La Verendrye encountered no serious difficulties in his journeying from the Lakehead to the Mandan villages on the Middle Missouri. This journey was made in company with Assiniboines who frequently visited the Mandan villagers to trade for horticultural produce and ceremonial garb. The account of La Verendrye indicates that commerce and communication among the Assiniboine bands was open and frequent. It was not difficult for the forest adapted groups to extend their range into the more heavily treed sections of the Parklands. Many of the species found in the Parkland were also native to the Boreal Forest. In the study area wintering in the Parklands became an

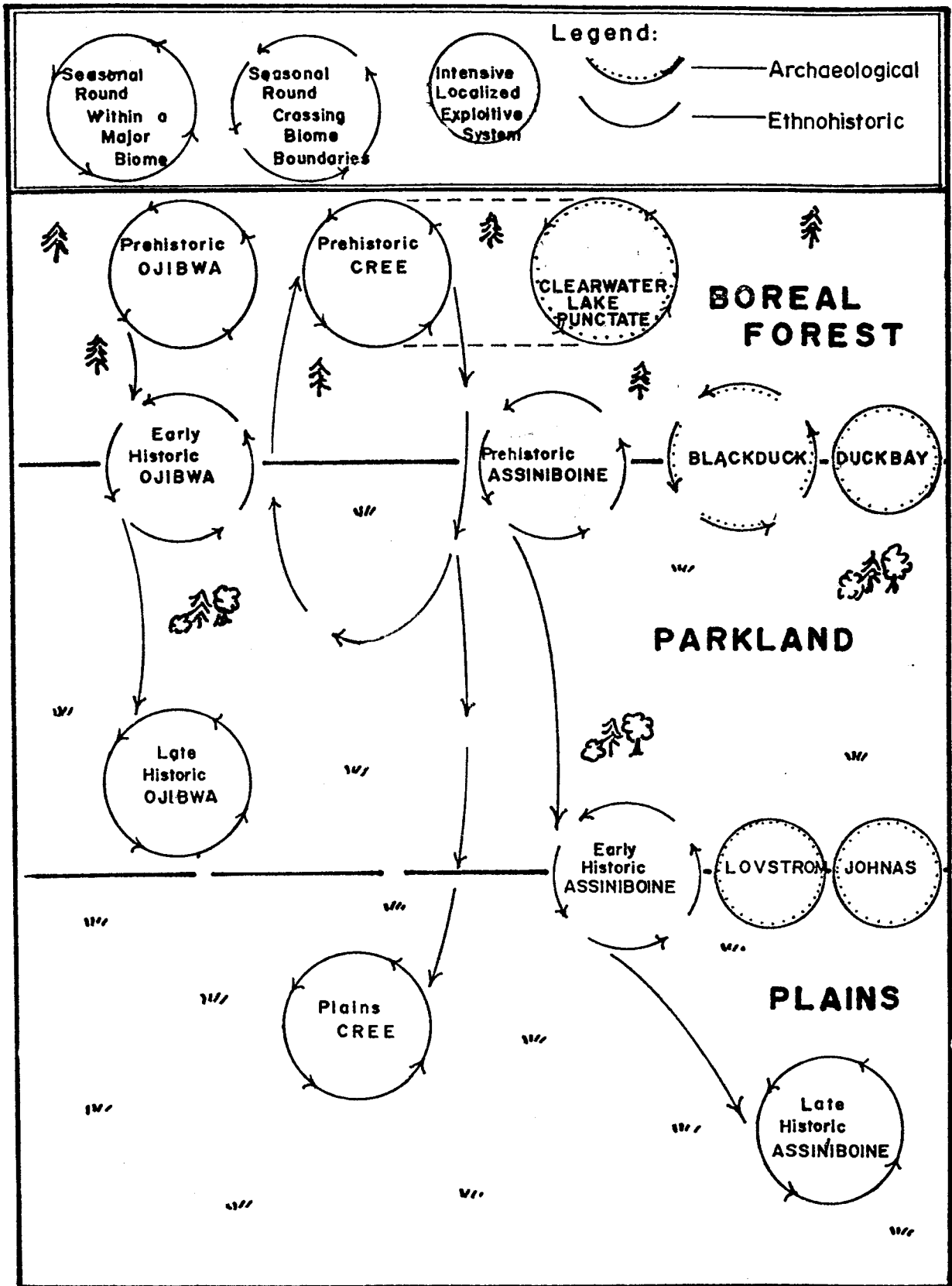


FIGURE 12. Environmental adaptations found within the forest/grassland transition zone of western Manitoba A.D.700 to A.D.1700

increasingly common practice for the Cree with the advent of the fur trade (Ray 1974:47) and successively for the Ojibwa (James 1956). Similarly, the available evidence suggests that the Assiniboine had followed this pattern prior to achieving a Plains/Parkland adaptation, centered upon the bison (Figure 12).

As the Assiniboine began to acquire horses and the fur trade expanded westward, spearheaded by the Cree with whom the Assiniboine were allies, the Assiniboine moved progressively out of the parkland and onto the Plains. In this final stage, prior to confinement to the reserves, the Assiniboine adopted a Type C strategy identical to that outlined for the Plains Cree (Figure 12). From the early Protohistoric accounts until the decimation of the Middle Missouri horticultural village tribes, by European diseases, the Assiniboine were actively engaged in trade for horticultural produce with the village tribes. The Assiniboine were also actively engaged in the production of pemmican and grease to supply the inland fur trading posts. The eventual confinement of the Assiniboine to reserves led to their enforced adoption of a Type D strategy, relying upon the resources of the ecotonal areas which they had chosen for reserves. These circumscribed resources were supplemented by government funds which fulfilled the role of risk reducing strategies.

CREE The Protohistoric and Early Historic Cree followed a Type A strategy based upon the resources of the Boreal Forest. Moose, fish and aquatic rodents were dietary staples which were supplemented by bear, rabbits and small carnivores (Figure 12). Plant resources and migratory

waterfowl were seasonally important subsistence staples (Tables 4&5). The skins of the food species furnished material for clothing and bark, especially birch, was important for constructing canoes and dwellings. Ceramic vessels were manufactured from local clays and the lithic industries, based upon local materials such as quartz, quartzite, felsites, and limited amounts of chert, were functional but undistinguished. This model shows marked continuity with archaeological remains in the region (Chapter 8) which demonstrate little change until the advent of the fur trade (Figure 12).

With the advent of the fur trade, and the opportunity to play the role of middleman between Native inland groups and the Hudson's Bay Company, the Cree began to shift on a seasonal basis into the Parklands. Initially, the Cree began to move into the Parkland in late fall and began trapping furs and trading worn trade goods to Natives further inland in exchange for furs during the winter months. In late spring, they travelled downriver through the Boreal Forest to the H.B.C. posts on Hudson's Bay. In this way, the Cree moved into a Type B strategy utilizing the resources of both the Boreal Forest and the Parkland. The ethnographic record indicates that this was a transitional model. With the passage of time, the Cree increasingly abandoned trapping Parkland furbearers and engaged only in subsistence hunting - particularly bison - and relied upon their trading skill to acquire furs to trade with the H.B.C. Finally, as market trapping depleted the supply of furs in the Parkland, the Cree chose between two options, ignoring a third. Rather



than occupy the Parkland by means of an intensification of extractive technology, the Cree retreated to the Boreal Forest and renewed their ancestral Type A strategy or else remained upon the Plains following a Type C strategy relying upon Bison on the open plains in summer and camping in the ecotone Valley Complexes or uplands of the Parkland in winter when the bison retreated into these areas. Once the technology for bison pounding had been mastered, the subsistence strategy (and therefore any model thereof) shifted to a pattern of primary dependence upon the bison and the seasonal exploitation of the xeric plains as well as the parklands. Fine Day, the Plains Cree informant quoted by Mandelbaum (1940:68), succinctly summed up the reasons for this shift by stating, "We depended mostly on the buffalo. This was because anyone could kill a buffalo but it took a good hunter to get a moose or elk." Morgan (1979,1980) has modelled a similar type of subsistence strategy for the Avonlea hunters who occupied the Garrett site.

OJIBWA In the mid-seventeenth century, the Ojibwa were a Boreal Forest adapted group utilizing a Type A subsistence strategy. Their involvement in the inland fur trade led to their expansion to the southwest by waging war against the Dakota and to the northwest as an auxiliary network of the Northwest Fur Company. As the inland trade developed in the latter part of the eighteenth century, the Assiniboine and Plains Cree shifted from fur trapping in the Parkland into the role of provisioners exploiting the bison - a primarily Plains resource. The Cree who still wished to engage in trapping retreated to the forest and carried on an expansion towards the northwest.

The Boreal Forest adapted Ojibwa moved into the abandoned Parkland biome and by means of intensified systems of procurement established themselves in a Type B strategy utilizing the widest range of available resources. Their strategy relied heavily on fish in summer and on moose and the flesh of fur bearers, especially aquatic rodents, in winter. The Ojibwa also served as provisioners to the trading posts in the nineteenth century but this role was largely taken over by the Metis attached to the posts. The Ojibwa expansion ended with the almost simultaneous demise of the bison and the fur trade economy in western Canada in the late nineteenth century. As the subsistence base rapidly diminished under the pressure of intensified procurement strategies associated with the fur trade, which served the market economies of Europe, the Ojibwa populations became concentrated in ecotone areas within the Parklands such as Valley Complexes, the Mixedwood Uplands and riparian sites. In these locations - surrounded by a flood of European settlers flocking onto the best agricultural land - the Ojibwa were forced into a Type D strategy. The provision of some additional resources through government funding, provided in accordance with treaty agreements, functioned to some degree as a valuable risk reducing strategy.

In the foregoing summary of Assiniboine, Cree and Ojibwa seasonal rounds, several viable subsistence strategies utilizing the resources of the study area and adjacent regions, have been demonstrated from the ethnohistoric record. These are all consistent with the known available

resources within and adjacent to the study area (Tables 4 and 5). The rapid shifts in subsistence strategy which took place for groups moving through the study area are, for the most part, the result of European intervention. The opportunities which the fur trade offered and the excesses which it encouraged led to drastic changes in the ecology and population dynamics of species throughout North America. Ultimately, the depletion of subsistence resources, the introduction of technically advanced artifacts and beverage alcohol, led to major social dislocation and upheaval within Native society. It is unlikely that any such rapid, widespread disruptive series of related events occurred in prehistory. Indeed, the archaeological record appears to record a much more gradual change and a pattern of cultural stability and continuity seems to have been more the case in the prehistoric period.

It may be that evidence for these ethnohistoric subsistence strategies is to be found in the archaeological record as well. Where diagnostic artifacts or artifact assemblages can be excavated in association with butchered faunal remains, it should be possible to establish the time of year at which the site was occupied, in addition to the identification of species of animals which were important to the subsistence strategy. When sufficient numbers of sites have been excavated to indicate the whereabouts of cultural complexes at all seasons of the year - together with a suitable range of food species - it should be possible to demonstrate adaptive strategies associated with particular cultural groups. It may also be possible to gain some insight

into the patterns of interaction between various prehistoric groups which have occupied the study area. These statements will be reviewed and elaborated upon in Chapter 9 following a review of the archaeological evidence.

CHAPTER 8: CULTURE HISTORY AND PATTERNS OF SUBSISTENCE IN  
THE FOREST/GRASSLAND TRANSITION ZONE OF WESTERN MANITOBA

Since the entire study area was at one time deeply buried beneath the Late Wisconsin continental ice sheet, it is abundantly clear that the initial human residents were immigrants from outside areas. Further, since the area to the east of the Manitoba Escarpment was inundated beneath the waters of proglacial Lake Agassiz until some time after 9000 B.P. (Last and Teller 1983), colonization before this time necessarily flowed from the south and west. With the onset of the Hypsithermal warming trend, the boreal forest retreated and the grasslands expanded dramatically (Ritchie 1983). During the Hypsithermal maximum, circa 5500 B.P., the region to the east of the study area was, in all probability, a xeric grassland containing a few brackish lake remnants but generally deficient in freshwater and other subsistence resources which were important to hunters and gatherers (Teller and Last 1981). Until the close of the Hypsithermal climatic episode, some 1000 years later, entry to the study area may have been limited to a southward trickle of hunters and gatherers from the fringes of the parklands to the north and from the west along a few of the river systems such as the Qu'Appelle/ Assiniboine and the Saskatchewan/Carrot River/Swan River valley drainage networks. A small local population of resident nomadic hunter and gatherers may have developed during this period utilizing the resources

of the remnant Mixedwoods in the uplands and the river valley complexes. The wetter post-Hypsithermal conditions favoured an expansion of the parklands and southward movement of the boreal forest. The discharge volume of waterways increased and the Manitoba Lowlands now provided an abundance of seasonal resources, together with an increase in the forest habitat for populations of moose, beaver, bear and other localized year around resources. This expansion in forest and parkland area opened up a large amount of territory suitable for an expansion of the forest adapted peoples to the east.

In general, the distribution in the study area of archaeological material is consistent with expectations based upon these environmental tenets. The Paleo-Indian and Meso-Indian materials found in the study area bear strong relationships to materials found to the south and west and, prior to circa 3000 B.P., rarely is there evidence of eastern influence upon the cultures of the study area. After this time, there is evidence for a succession of Neo-Indian cultural influences flowing into the area from the east, gradually displacing the earlier western cultural traditions.

The archaeological complex or "culture" which appears as a named entity in published works and, in particular, in chronologies of prehistory, requires some further discussion. Usually, an archaeological culture is recognized on the basis of the recurrence of particular constellations of traits such as hearth design, patterns of site distribution, or most specifically, the unique products of technology -

diagnostic artifacts. When the artifact assemblages of past groups, living in a region at a particular time, are found to contain similar constellations of traits, these assemblages are described and collectively assigned to an archaeological culture. Various authors (Rouse 1960; Spaulding 1953) have developed methods which rigorously define traits and have proposed hierarchical schemes which differentiate the degrees of relatedness between clusters of assemblages through time and space. In these schemes, the emphasis is placed upon the trait and most particularly upon the diagnostic artifacts. Some artifacts, such as the fluted Clovis and Folsom bifaces, or certain ceramic wares such as Mimbres or Laurel, have proven to be reliable markers of particular time periods and to be closely associated with the lifeway of the people who manufactured them. Other artifacts, such as unifacial lithic scrapers and bone awls, have proven to be much less useful for defining small cultural groupings.

The descriptive inventories of all of the archaeological cultures which have been based upon the clustering of traits which have been defined from the surviving remains of the material culture of past groups serve, at best, as analytical categories which reflect past behavior. They can say little or nothing about the ethnicity or emic perceptions of relatedness which the people who created the material deposits shared. It is usually impossible to know, with any degree of certainty, whether the distribution of a particular trait represents the dispersal of people utilizing the trait or simply the spread of ideas

among populations already resident. In the balance of this chapter, the use of terms such as Clovis and Folsom refers to the presence of the distinctive fluted points or other traits comprising the material assemblage recognized as being associated with these archaeological cultures elsewhere.

The presence of the archaeological cultures, indicated by the recovery of characteristic or diagnostic material remains, is explicitly recognized. The implicit meanings of these occurrences are much less precise. In a few rare cases (Hanna 1980b, 1982, 1984), a close correspondence between an archaeological culture and a circumscribed social unit or units has been demonstrated. In most cases, the social units associated with an archaeological complex remain obscure. The occurrence and distribution of archaeological complexes which are explicitly outlined in the balance of this chapter represent the material evidence for the distribution and spread of patterns of material culture and related adaptive strategies. The relationships to social units are largely implicit since there is very little evidence for conterminous distribution of ethnic social units and material assemblages.

For the sake of convenience, five time periods have been proposed to deal with past cultural groupings in the study area. The four major groupings, Paleo-Indian, Meso-Indian, Neo-Indian, and Historic, were first proposed as changes in nomenclature by Smith (1957:169). In order to facilitate the development of a Caribbean chronology, Rouse



(1964:393) established time ranges of 15,000 B.C. to 5000 B.C. for Paleo-Indian, 5000 B.C. to 1000 B.C. for Meso-Indian, 1000 B.C to A.D. 1500 for Neo-Indian, and A.D. 1500 to the present for Indo-Hispanic. Dyck (1983) has modified the scheme proposed by Mulloy (1958) for the Northern Plains into four segments composed of: Pleistocene Hunters Period - 17,000 B.P. to 10,500 B.P., Early Plains Indian Period - 10,500 B.P. to 8000 B.P., Middle Plains Indian Period - 7700 B.P. to 1850 B.P., Late Plains Indian Period - 2000 B.P. to 170 B.P. All of these systems are somewhat arbitrary divisions of time which are loosely based upon environmental and technological considerations, and which exist for the convenience of the researcher. Dyck (1983:64), in presenting his chronology for Saskatchewan, notes that,

"The chronology that I am about to present is yet another reworking of Mulloy's scheme, with inclusion of most parts of the Long Creek sequence and with a definite Saskatchewan flavour."

The chronological scheme utilized in this dissertation uses the nomenclature proposed by Smith (1957), with the addition of a Protohistoric period, and establishes time parameters which are for the most part consistent with those of other contemporary authors (Dyck 1983; Frison 1978) working in the Plains area. This scheme has been developed to accommodate statements concerning generalities arising from the data which are relevant to developments in the Forest/Grassland Transition Zone of Western Manitoba.

In the following sections, archaeological complexes which have been identified in the study area, and which are characterized by diagnostic artifacts, will be discussed. Insofar as published research permits, the places of origin for these complexes will be indicated and the timing and direction of the movement of people and technological innovations into the study area will be indicated, together with inferred subsistence strategies.

### PALEO-INDIAN

The earliest cultural materials found within the study area are fluted points. Four Clovis points have been recorded as surface finds in Manitoba (Pettipas 1976a, 1976b). These finds are undated and were collected within the study area above the Manitoba Escarpment. These points have all been recovered from the uplands on either side of the Prehistoric Upper Assiniboine Delta and in the Turtle Mountain area of southwestern Manitoba a few surface finds of Folsom and Midland points have been reported by Carmichael (1981:35).

A few well crafted Agate Basin and Hell Gap projectile points have been surface collected throughout the study area. None have been collected in datable context but the fine quality workmanship indicates a High Plains derivation. In addition, numerous lanceolate points with lateral edge grinding have been collected whose cultural affiliations are unknown. These finds may be related to later northern Agate Basin assemblages (Wright 1972, 1976). Similarly, Cody materials have been

collected as surface recoveries throughout the study area but no excavated or excavatable sites have been reported.

TRANSITIONAL PALEO-INDIAN/MESO-INDIAN The close of the Paleo-Indian period and the advent of the Meso-Indian period (also called Archaic) in the vast region between the Rocky Mountains and the Mississippi and Red River drainages seems to have been characterized by a proliferation of projectile point styles and a wide range of adaptive strategies which intensively exploited the diminished and changing resources of an increasingly desiccated landscape. Almost everywhere in this region, the paleoenvironmental evidence indicates an expansion of grasslands, a retreat of the forests, and an overall diminution of rainfall and water resources (Buchner 1981; Fenton et al. 1983; Frison 1978; Ritchie 1976, 1983). Frison (1978) suggests that conditions during this period varied widely within the larger area and that any understanding of the adaptive strategies utilized during the Altithermal must be underpinned by carefully constructed local chronologies.

One of these Late Paleo-Indian transitional complexes has been recorded in Manitoba, however. Saylor (1978) indicates that Pryor Stemmed projectile points have been recovered in surface collections from the Maskwa River site in the southern boreal forest and from the Carberry/MacGregor area along the eastern boundary of the study area. Frison and Grey (1980:27) indicate that Pryor Stemmed was among the last Paleo-Indian complexes in the Bighorn Basin and appears to have been separated from other contemporaneous High Plains groups. The Manitoba

points identified by Pettipas (1981) have also been assigned to the Pryor Stemmed Complex by Gryba (1981).

The assignment of these Manitoba projectile points to the Pryor Stemmed Complex remains speculative in the extreme. This is particularly true since none of the Manitoba points have been identified in a datable context.

#### MESO-INDIAN

The beginning of the Meso-Indian period is generally placed around 6000 B.C. (8000 B.P.) in the Eastern and High Plains. The Paleo-Indian/Meso-Indian transition period has been associated with large side-notched projectile points, an increasing use of seed grinding equipment, and greater reliance upon small to medium game animals and plant foods (Jennings 1974). Frison (1978:191) notes that most of the information on the subsistence and lifeways of the Altithermal cultures is found on the peripheries and uplands associated with the plains, rather than on the plains themselves.

For a variety of reasons, none of the major type sites of the Mummy Cave Series of artifact assemblages, including Mummy Cave (Wedel et al. 1968), Logan Creek (Kivett 1962), and Simonsen (Agogino and Frankforter 1960), have been adequately published. The Hawken site (Frison et al. 1976; Frison 1978), on the other hand, located on the western edge of the Black Hills, furnishes an excellent example of subsistence activities during this time period. At this location, some 6500 years

ago, people using large side-notched projectile points drove small groups of Bison antiquus into a natural trap on at least three separate occasions (Frison 1978: 41). The season of the kills was estimated to be early to mid-winter (Frison 1978:193). Nearby, a spring kill by a group using the same type of side-notched projectile points was dated to a period 300 to 400 years later (Frison 1978:198). These sites demonstrate an effective communal bison procurement strategy which generated a seasonal surplus of meat.

For the purpose of taxonomic classification of these early side-notched points, the classification Mummy Cave Series, employed by Dyck (1983:69) following Reeves (1969), will be followed. The degree of excellence in craftsmanship demonstrated in these large early side-notched points varies widely within and between sites. The identification of these points is highly problematic outside of contexts which can be dated either by radiometric or stratigraphic sequencing. As Dyck (1983:92) has noted, "One of the problems with Mummy Cave Series materials is that, in a disturbed or surface context, they are often mistaken for much later complexes such as Hanna or very late side-notch types."

Dyck (1983:69) places the temporal range of this early side-notch complex between 7700 B.P. and 4700 B.P. for Saskatchewan - roughly the duration of the Altithermal period. He notes that,

"To date there is certainly one and possibly three excavated Saskatchewan sites bearing Mummy Cave Series components. The Gowen Site (Schroedl and Walker 1978; Walker 1980) is

somewhere in the middle of the series, while the Oxbow Dam site (Nero and McCorquodale 1958), Long Creek site level 9 (Wettlaufer and Mayer-Oakes 1960) are at the threshold of the Oxbow complex. The dates on these components range from 6150 to 5000 B.P."(Dyck 1983:92).

The Gowen site projectile points (Schroedl and Walker 1978) show a much cruder style of workmanship than found at Hawken and other contemporary sites found to the south and west. Many of the points appear to fall between side-notched and corner-removed in terms of basal morphology. Determination of the range of variation within and between assemblages of points during the Altithermal period, and the regional parameters which such variation may define, await the excavation of additional regional samples. Most of the excavated sites from this period fall outside of the study area (Figure 13).

While the presence of the Mummy Cave Series side-notched point complex has not been demonstrated for the study area, no easy explanation for its absence is apparent. The area would have been readily accessible from the south where the Simonsen and Logan Creek complexes were well established, or from the west where the Gowen site occupants camped. Some of the surface collected large side-notched points which have been recovered in the area may indicate the seasonal or intermittent use of the study area by Mummy Cave Series projectile point users. The resolution of these problems must await the discovery and analysis of stratified or dated assemblages, coupled with local application of mathematical classification indices such as those

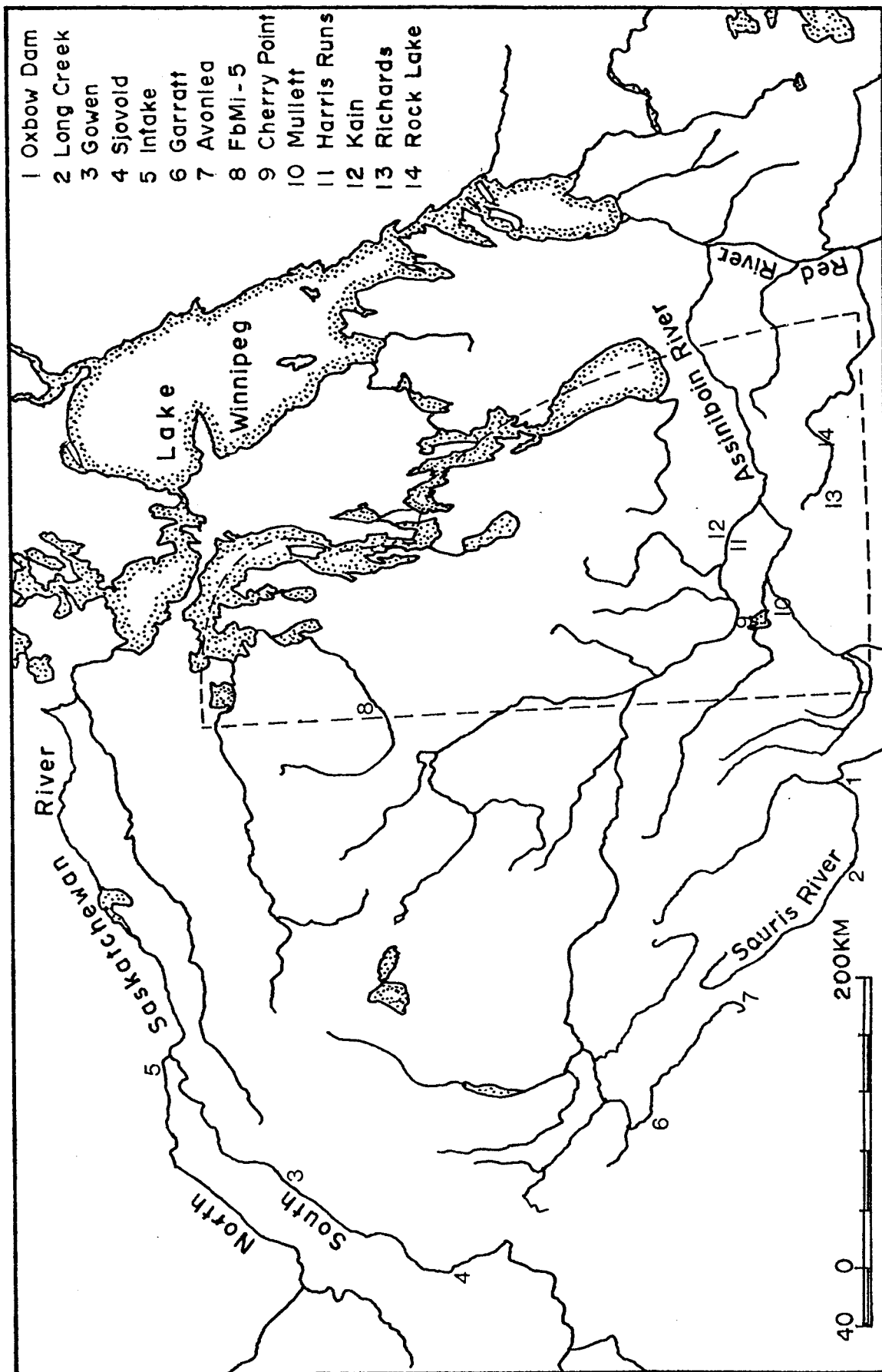


Figure 13. Meso-Indian and early Neo-Indian sites

described by Knight and Keyser (1983) to assign surface or other undated assemblages properly. Since neither the Plano recoveries nor any of the Early Meso-Indian assemblages have been dated, or found in unequivocal stratigraphic sequence in the study area, no initial or terminal dates of occupation by the various groups can be established.

Oxbow and/or Sandy Creek projectile points are promiscuously scattered over the surface of the entire study area. Collectors, from the Swan River Valley to the Turtle Mountain area, display these eared points as a prominent and ubiquitous component of their collections. The widespread but thinly scattered distribution of Oxbow materials, presumably deposited at a time when the Altithermal conditions were ameliorating, could indicate seasonal incursions which might have led to a pattern of intensive exploitation of diverse seasonal resources available in the various habitats which characterized the study area at that time. A Sandy Creek assignment of these materials would indicate post-Altithermal occupation (Dyck 1983).

The late Sandy Creek occupation at Cherry Point (Figure 13) suggests that the Oxbow subsistence strategy, which depended heavily upon bison, as well as the projectile point style, persisted into the Christian Era (Gibson 1981; Haug 1976; Syme 1983). The faunal analysis of the site (Balcom 1976) indicates that bison were the primary species utilized, although small amounts of elk, moose and grey wolf were present, together with duck, turtle and fish remains. The site appears to be a campsite which was occasionally reoccupied over a period of some 1800



years by people using Oxbow/Sandy Creek and McKean Complex points to hunt bison and other large ungulates.

McKean Complex materials, like Oxbow, are thinly scattered over the study area and have been found in datable context only at Cherry Point. The mixing of McKean Complex and Oxbow materials in the lower levels at the Late Middle/Early Late Prehistoric site of Cherry Point (Gibson 1981; Haug 1976), in the south central portion of the study area, indicates that some form of co-occupation persisted along the eastern periphery of the Northern Plains at least. The stratigraphic consistency of the dates indicates that they are valid (Table 6).

Within the study area, a few surface finds indicate a limited dispersal of Old Copper artifacts (Steinbring 1970, 1980) but the evidence is not sufficient to indicate anything more than long distance trade of artifacts or, at most occasional seasonal incursions along waterways leading from the southern and eastern boreal forest into the Manitoba Lowlands.

Throughout the study area, Pelican Lake points are ubiquitous surface finds (Brow 1976; Gryba 1981; Tole 1978; Warren 1980). The only excavated Pelican Lake points found within the study area were recovered from the multicomponent unstratified Avery site at Rock Lake (Joyes 1970). The faunal assemblage from this site suggests a generalized parkland/riverine exploitation strategy consistent with that utilized by later protohistoric groups like the Ojibwa.

Table 6. Manitoba Radiocarbon Dates

Site	Cultural Affiliation	Lab Number	C14 Date	Source
Simnock	Caribou Lake Complex	OxA-116	8030 <sup>±</sup> -160 B.P.	Buchner (1984)
Whitemouth Falls	Oxbow	Gak-4248	4860 <sup>±</sup> -150 B.P.	" (1979)
"	"	GX-4416	4625 <sup>±</sup> -150 B.P.	" (1979)
LM-8	Old Copper	GX-5802	3870 <sup>±</sup> -190 B.P.	" (1979)
"	"	DIC-1215	3660 <sup>±</sup> -75 B.P.	" (1979)
Steeprock Lake	Archaic	S-616	3795 <sup>±</sup> -130 B.P.	Simpson (1974)
"	"	S-479	3130 <sup>±</sup> -110 B.P.	" (1974)
"	"	S-615	2480 <sup>±</sup> -120 B.P.	" (1974)
Whitemouth Falls	McKean	GX-4415	3405 <sup>±</sup> -175 B.P.	Buchner (1979)
Pas Reserve	Duncan/Hanna	A-1369	3190 <sup>±</sup> -60 B.P.	Long & Tamplin (1977)
Kame Hills	Shield Archaic	S-967	3340 <sup>±</sup> -65 B.P.	Dickson (1976)
Kame Hills	Shield Archaic	S-780	3170 <sup>±</sup> -70 B.P.	" (1976)
Ericksdale Burial	Pelican Lake	S-651	3360 <sup>±</sup> -95 B.P.	Syms (1983)
Bjorklund	Larter	GX-4145	3125 <sup>±</sup> -175 B.P.	Buchner (1979)
"	"	GX-4147	3105 <sup>±</sup> -150 B.P.	" (1979)
"	"	GX-4148	2950 <sup>±</sup> -130 B.P.	" (1979)

Table 6. continued

Site	Cultural Affiliation	Lab Number	C14 Date	Source
Bjorklund	Larter	GX-4130	2945 <sup>±</sup> -160 B.P.	Buchner (1979)
"	"	GX-4149	2840 <sup>±</sup> -130 B.P.	" (1979)
"	"	Gak-4713	2750 <sup>±</sup> -95 B.P.	" (1979)
"	"	GX-4144	2705 <sup>±</sup> -120 B.P.	" (1979)
Stott Site	Archaic	GX-5143	2876 <sup>±</sup> -111 B.P.	Tisdale (1978)
Cherry Point	I	S-1029	2860 <sup>±</sup> -205 B.P.	Syms (1983)
"	I	S-1030	2830 <sup>±</sup> -260 B.P.	" (1983)
"	II	S-1031	1850 <sup>±</sup> -100 B.P.	" (1983)
"	II	S-1032	2060 <sup>±</sup> -130 B.P.	" (1983)
"	III	S-1033	1015 <sup>±</sup> -105 B.P.	" (1983)
"	III	S-1034	1040 <sup>±</sup> -185 B.P.	" (1983)
Wapisu Lake	Archaic/Laurel	S-956	1920 <sup>±</sup> -85 B.P.	Dickson (1976)
"	Laurel	S-959	1645 <sup>±</sup> -195 B.P.	" (1976)
Pas Reserve	Laurel	A-1424	1820 <sup>±</sup> -150 B.P.	Long & Tamplin (1977)
"	"	A-1368	1590 <sup>±</sup> -50 B.P.	" " (1977)
Kame Hills	"	Gak-6063	1290 <sup>±</sup> -150 B.P.	Dickson (1976)

Table 6. continued

Site	Cultural Affiliation	Lab Number	C14 Date	Source
Notigi Lake	Laurel	S-746	1200 <sup>±</sup> 130 B.P.	Dickson (1976)
LM-8	"	DIC-1217 a&b	1100 <sup>±</sup> 110 B.P.	Buchner (1979)
"	"	DIC-1216	860 <sup>±</sup> 50 B.P.	" (1979)
Oscar Point	"	S-1079	1135 <sup>±</sup> 65 B.P.	Dickson (1976)
Kain Site	Sonota	SFU-72	1700 <sup>±</sup> 100 B.P.	Nicholson (1985a)
Richards Site	Sonota	S-1338	1425 <sup>±</sup> 150 B.P.	Syms (1983)
"	Sonota/Besant	GX-1193	1240 <sup>±</sup> 130 B.P.	Reeves (1970)
"	" / "	GX-2059	1375 <sup>±</sup> 120 B.P.	" (1970)
Calf Mountain	" / "	GX-1192	1105 <sup>±</sup> 85 B.P.	" (1970)
Snyder Dam	Late Middle Woodland	S-739	925 <sup>±</sup> 70 B.P.	Syms (1983)
"	"	S-741	1010 <sup>±</sup> 60 B.P.	" (1983)
Pas Reserve	Avonlea	A-1349	975 <sup>±</sup> 150 B.P.	Long & Tamplin (1977)
Stott Site	Blackduck	GX-5142 A&G*	1370 <sup>±</sup> 103 B.P.	Tisdale (1978)
"	"	S-1303	1355 <sup>±</sup> 60 B.P.	" (1978)
"	"	GX-5177	1320 <sup>±</sup> 135 B.P.	" (1978)
"	"	GX-5139	1220 <sup>±</sup> 135 B.P.	" (1978)

Table 6. continued

Site	Cultural Affiliation	Lab Number	C14 Date	Source
Stott Site	Blackduck	GX-5141 A&G*	877 <sup>±</sup> -100 B.P.	Tisdale (1978)
"	"	GX-5176	820 <sup>±</sup> -130 B.P.	" (1978)
"	"	GX-5175	780 <sup>±</sup> -105 B.P.	" (1978)
"	"	GX-5174	740 <sup>±</sup> -105 B.P.	" (1978)
"	Late Woodland	GX-5140	355 <sup>±</sup> -115 B.P.	" (1978)
"	Blackduck	S-1272	1110 <sup>±</sup> -60 B.P.	Syms (1983)
"	"	S-1273	1040 <sup>±</sup> -45 B.P.	" (1983)
Gompf Site	"	S-1366	1015 <sup>±</sup> -60 B.P.	" (1983)
"	"	S-1367	1135 <sup>±</sup> -65 B.P.	" (1983)
"	"	S-1368	985 <sup>±</sup> -65 B.P.	" (1983)
Lord Site	"	S-652	1170 <sup>±</sup> -90 B.P.	" (1983)
Wanipigow	"	GX-4690	1120 <sup>±</sup> -170 B.P.	Buchner (1979)
"	"	GX-4689	1095 <sup>±</sup> -150 B.P.	" (1979)
Wapisu Lake	"	Gak-6495	1090 <sup>±</sup> -120 B.P.	Tisdale & Jamieson (1982)
Bjorklund Site	"	GX-4142	923 <sup>±</sup> -125 B.P.	Buchner (1979)
"	"	GX-4143	900 <sup>±</sup> -105 B.P.	" (1979)

Table 6. continued

Site	Cultural Affiliation	Lab Number	C14 Date	Source
Ejorklund Site	Blackduck	GX-4146	735 <sup>±</sup> -120 B.P.	Buchner (1979)
"	"	GX-4712	620 <sup>±</sup> -75 B.P.	" (1979)
Richards Site	"	S-913	920 <sup>±</sup> -60 B.P.	Syms (1983)
Wuskwatim Lake	"	S-1080	490 <sup>±</sup> -85 B.P.	Dickson (1976)
"	"	S-1076	465 <sup>±</sup> -65 B.P.	" (1976)
Aschikibokahn	Duckbay	DIC-845	1270 <sup>±</sup> -275 B.P.	Hanna (1982) rejected
"	"	DIC-846	1260 <sup>±</sup> -285 B.P.	" (1982)
"	"	GX-5517	770 <sup>±</sup> -110 B.P.	" (1982)
"	"	GX-5516	695 <sup>±</sup> -175 B.P.	" (1982)
Lovstrom Site	Blackduck, Duckbay	S-2699	1215 <sup>±</sup> -320 B.P.	Nicholson (1986)
"	& Middle Missouri	S-2700	1280 <sup>±</sup> -190 B.P.	" (1986)
Stendall Site	Late Woodland	S-786	965 <sup>±</sup> -70 B.P.	Syms (1977)
"	"	S-690	850 <sup>±</sup> -75 B.P.	" (1983)
Reston Burial	Devil's Lake-Sourisford	S-743	665 <sup>±</sup> -175 B.P.	" (1983)
Feland Site	"	S-686	500 <sup>±</sup> -130 B.P.	" (1983)

Table 6. continued

Site	Cultural Affiliation	Lab Number	C14 Date	Source
DILLW-12	Meat Cache	SFU-73	480 <sup>±</sup> 100 B.P.	Nicholson (1985b)
Brockinton I	Late Woodland	S-687	1110 <sup>±</sup> 80 B.P.	Syms (1983)
Brockinton I	"	rerun	1320 <sup>±</sup> 95 B.P.	" (1983) rejected
Brockinton II	"	S-688	1425 <sup>±</sup> 75 B.P.	" (1983)
Brockinton II	"	S-689	350 <sup>±</sup> 125 B.P.	" (1983)
Wapisi Lake	Late Woodland	S-957	795 <sup>±</sup> 180 B.P.	Tisdale & Jamieson (1982)
Snyder Dam II	Late Woodland	S-740	665 <sup>±</sup> 70 B.P.	Syms (1983)
Kain Site	"	SFU-75	310 <sup>±</sup> 100 B.P.	Nicholson (1985a)
Kame Hills	Selkirk	S-966	1010 <sup>±</sup> 95 B.P.	Dickson (1976)
"	"	Gak-6065	650 <sup>±</sup> 100 B.P.	" (1976)
Carrot River	"	A-1196	490 <sup>±</sup> 110 B.P.	Long & Tamplin (1977)
Pas Reserve	Clearwater Lake	A-1293	490 <sup>±</sup> 60 B.P.	" " (1977)
McBride/Barrington	"	S-781	460 <sup>±</sup> 100 B.P.	Dickson (1976)
Kame Hills	Selkirk	Gak-6062	380 <sup>±</sup> 70 B.P.	" (1976)
Sandhill Bay	Clearwater Lake	S-965	300 <sup>±</sup> 170 B.P.	" (1976)

\* A&amp;G apatite and gelatin combined date

## NEO-INDIAN

BESANT/SONOTA The Besant Phase emerges in the Northern Plains circa 2050 B.P. and terminates circa 1200 B.P. (Reeves 1983:8). Reeves (1983:92) states that,

"The Besant Phase is named after the characteristic altat1 point type -- Besant Side-Notched -- first described and named as such for the Mortlach site by Wettlaufer (1955). Samantha Side-Notched (Kehoe and Kehoe 1968) is the type designation for the corresponding arrow point."

In addition to the distinctive projectile points, the association of verticalled [sic] cord roughened ceramics has been satisfactorily established at several plains sites (Reeves 1983:9). This new evidence has effectively refuted Byrne's (1973:449) assertion that ceramics did not occur in Besant sites north of the Missouri Coteau.

The controversy (Reeves 1983; Syms 1977) concerning the relationship between the Sonota Complex, defined by Neuman (1975) and characterized by large burial mounds, and the Besant Phase (Reeves 1970a,1983) which lacks the burial mound trait, remains largely unresolved at the present time, although some degree of relationship is evident. Virtually all authorities are in agreement that the Besant and Sonota people had a strongly plains oriented subsistence strategy in which bison played a primary role. In addition, there seems to be general agreement that the Besant/Sonota configuration has its origin on the eastern peripheries of the Northern Plains (Reeves 1983:13-14; Syms 1977:95). Byrne



(1973:459-460) implies that Early Variant Saskatchewan Basin ceramics may have been influenced by Middle Woodland Laurel ceramics from southern Manitoba and Reeves (1983:9) notes that,

"Middle Woodland ceramics have now been found in the Saskatchewan Basin in direct association with Besant points at the Intake site on the North Saskatchewan, 9 km downstream from Prince Albert. A collagen date of A.D. 745+/-80 (S-2185) has been obtained."

Reeves (1983:14) has suggested that Besant is technologically related to the Sandy Creek Complex which co-existed temporally with Pelican Lake, a postulated lineal descendent of the McKean Complex variant Hanna. The Sandy Creek Complex (Wettlaufer 1955) occurs widely across the Northern Plains and may be derived from the earlier Oxbow Complex (Dyck 1983). The most recent dates for Sandy Creek are from the Cherry Point site in the study area and date to circa 1950 B.P. (Dyck 1983:109). Reeves (1983:14) states that,

". . . Besant is technologically related through Sandy Creek to late Oxbow [an opinion shared by Ian Dyck (1983)]. Sandy Creek persisted in the parklands during Pelican Lake times, emerging around the time of Christ as the Besant Phase, which subsequently expanded over the plains as a result of their entry into a Hopewellian trade network and consequent social-cultural changes inside the culture."

From the foregoing discussion, it is clear that all problems concerning the origins of Besant/Sonota artifact styles have not been resolved. The ceramics appear to have an Eastern Woodland affiliation and the lithics, according to Reeves (1983), have definite technological affiliations with earlier Plains oriented complexes to the west. The answers to these questions may lie in careful analysis of modal changes within the various classes of artifacts which will trace change through time and space to points of origin. It may well be that the Besant/Sonota complexes have their origin in a blending of cultures similar to that outlined for the Young Dog band of the Cree-Assiniboine (Sharrock 1974) where intermarriage produced a hybrid ethnicity which was repudiated by both the Cree and the Assiniboine.

Besant/Sonota hunters relied chiefly upon bison for their subsistence although other species such as elk were also taken (Syms 1977:90). Frierson (1978:223) has summarized the importance and sophistication of Besant bison procurement by stating,

"In summary, the Besant cultural incursion into the Northwestern Plains brought with it, or else developed there, the most sophisticated bison procurement methods the area had seen. Hunters were able to incorporate sophisticated artificial structures into certain features of the natural topography and produce highly efficient buffalo corrals or pounds. As a result, these hunters were less dependent upon the arroyo trap and the jump and consequently could set up operations in a wider variety of

favourable bison habitat areas. Of particular interest is the effort expended on the construction of the two corrals and the Ruby site religious structure. The latter indicates that the Shaman's role in communal bison procurement was of considerable importance by at least 1800 years ago. The corrals, the weaponry, and the drive lane complexes reflect a high level of competence in handling bison and careful attention to the various details that helped ensure success. The religious structure at the Ruby site indicates that all possible supernatural help was also called upon to ensure the success of events that had a high probability of failure. Besant was actually a culture climax - at least in terms of bison procurement - that was never reached again on the Northwestern Plains."

The major Besant/Sonota sites all substantiate the importance of bison in the subsistence strategy. The Sonota burial mound complex includes the interment of partial and entire carcasses of bison as well as the remains of the hunters (Syms 1977:88-89). In addition to the elaborate pound structures described by Frison (1978), Besant hunters continued to take bison using jumps and natural traps (Reeves 1978). Reeves' (1983:97) statement that, "The [Besant] economy is based almost entirely on the communal hunting of bison by the use of traps, pounds, or jumps", is supported by the available archaeological evidence. It is, however, reasonable to assume that other animal and plant species were

utilized as seasonal supplements, as was the case for plains/parkland adapted groups during the ethnohistoric period which also relied upon bison as their primary subsistence resource.

If Reeves (1983) is correct in his derivation of Besant from Sandy Creek/Oxbow antecedents, then there are some unsolved questions regarding the florescence of bison pounding during the early Besant Phase described by Frison (1978). Dyck (1983) indicates that mass kills associated with a communal bison procurement system are not a feature of the Oxbow complex. Similarly, the Sandy Creek Complex shows little evidence of a communal procurement system. Whatever the derivation of the Besant/Sonota atlatl points, it is apparent that the Besant/Sonota subsistence strategy, based upon a complex pattern of communal bison procurement, evolved independently from either of the proposed antecedents on the Plains or in the Eastern Woodlands. It may be that interaction (as yet undemonstrated in the archaeological record) with the contemporaneous Pelican Lake and Avonlea complexes (Tunaxa Tradition of Reeves, 1983) initiated the patterns which culminated in the highly sophisticated procurement strategies described by Frison (1978).

Within the study area, the earliest Besant/Sonota date is from the Kain site (Figure 13), a small stratified site east of the city of Brandon (Table 7). The excavations indicate a transitory campsite with small numbers of bison present in each of three occupation levels. The Besant level is dated at 1700+/-100 B.P. (SFU 72) and contains a single large, well made Sonota point made of Knife River Flint (Nicholson

DATES B.P.	Southern Saskatchewan	Study Area	Eastern Manitoba
100			
200	.	.	.
300	Late Variant Sask. Basin Complex	.	.
400	.	.	.
500	.	.	.
600	.	.	.
700	Late Side-Notched Point Series	Blackduck	Selkirk Blackduck
800	.	.	.
900	.	Duckbay	.
1000	Early Variant Sask. Basin Complex	Snyder Dam	.
1100	.	.	.
1200	.	.	.
1300	.	.	.
1400	Avonlea	.	.
1500	Besant	.	Laurel
1600	.	.	.
1700	.	Besant	.
1800	.	?	.
1900	.	.	.
2000	.	Sandy Creek	.
2100	.	.	.
2200	Sandy Creek	.	.
2300	.	Un-named Complex	.
2400	Un-named Complex	.	.

Table 7. Neo-Indian sequence in southern Manitoba and Saskatchewan.

1985a). The Richards Village site near Killarney in southern Manitoba (Hlady 1967; Paulson 1980; Syms 1977) contains an extensive Sonota component dated 1425+/-150 B.P. (S-1338). While no faunal report has been published, the dominant species in all components at the Richards site appears to be modern bison. Besant projectile points are ubiquitous in surface collections throughout the study area, with the Sonota variant being more common in the southern portion (Syms 1977).

Large Besant mass kills such as the Ruby site (Frison 1978), the Muhlbach site (Gruhn 1969) and Head-Smashed-In (Reeves 1978) have not been identified in the study area and this may be a reflection of the population dynamics and seasonal movement of bison in the eastern parklands during the Besant period. It may also reflect a sampling problem since relatively little research has been conducted by professional archaeologists in the study area. A large accumulation of bison bone at the Richards site could be the result of small scale surrounds and individual kills rather than mass kills. There is a possibility, by no means demonstrated, that Besant hunters were among those who utilized the Harris bison runs east of Brandon, where small numbers of bison were driven over the escarpment of the Assiniboin River Valley (Hamilton 1976). Gravel quarrying operations have destroyed the bone deposits at the Harris site so that correlation of bison remains and diagnostic tools is no longer possible.

AVONLEA Avonlea is a widespread plains oriented complex characterized by finely made shallow, side-notched projectile points. The complex

appears circa 1800-1700 B.P. and terminates on the Northern Plains circa 1200 B.P. but persists for another 300 years in southern Alberta and the foothills (Reeves 1983:16). Avonlea coexisted with Besant which Reeves assigned to the Napikwan Tradition originating on the eastern peripheries of the plains (Reeves 1970:47).

The sudden appearance of Avonlea on the Northern Plains is something of an enigma. Reeves (1970) originally postulated that the Avonlea Phase emerged from the earlier Pelican Lake Phase as a part of a continuum which he termed the Tunaxa Tradition. However, as Reeves (1983 :18) now notes,

"Intensive research over the past 14 years at Waterton, Crownest and the Kootenay Valley has yet to uncover any phase transitional campsite or kill components: either they don't exist; they exist elsewhere; the hypothesis is incorrect (which it may well be); or we just have not found them."

Syms (1977:92) has suggested that the Avonlea ceramics at the Garratt site in south central Saskatchewan bear some resemblance to Sonota materials. Byrne (1973:451) suggests these same ceramics can be readily subsumed under his Early Variant Saskatchewan Basin Complex. Morgan (1979) indicates that the ceramics from the Avonlea component at the Garratt site bear a generalized resemblance to Eastern Woodland ceramics in Manitoba and Minnesota of about the same age. She also notes (Morgan 1979:207) the presence of Avonlea-like points at the Petaga Point site

(Breed 1969; Caine 1974) in east central Minnesota, indicating some form of interaction between the Northern Plains and the Eastern Woodlands. The postulate that, ". . . Avonlea represents a displacement and movement of populations from the Upper Mississippi Valley into the northwestern plains sometime during A.D. 150-200" (Morgan 1979:220) is a plausible but undemonstrated possibility. As in the case of the Besant/Sonota materials, it seems that an Eastern Woodlands influence can be identified in the ceramics although the technological antecedents of the lithic technologies remain elusive.

The Un-named Complex, identified by Dyck (1983:107-108) from layer 14 at the Sjevold site, and dated to 2500 B.P. contains some well made side-notched projectile points which bear some resemblance to later Avonlea points. Dyck (1983) sees similarities between these points and those found in Eastern Woodland complexes of the same period. Dyck (1983:108) also notes that such points were recovered from Head-Smashed-In, midway through the Pelican Lake sequence, dating to circa 2450 B.P. If these assemblages have any bearing on the development of Avonlea, and can be demonstrated to have Eastern Woodland antecedents, they may represent the first tentative seasonal venturing of a Woodland group onto the Northern Plains - the first wave of immigrants leading to the Assiniboine, Cree and Ojibwa migrations in the Protohistoric and Historic periods. The subsequent introduction of ceramics, bearing Woodland traits, may indicate a blending of technologies and ideas to create a more complete plains/parkland adaptation as the newcomers



interacted with the already established Pelican Lake and contemporaneous Besant people, replacing or blending with the former, and coexisting with the latter. Refutation or substantiation of these speculative statements awaits discovery and analysis of additional assemblages in the Northern plains. The rather well made side-notched projectile points described by Gryba (1980:49) from FbMi-5 in the Swan River Valley, which have been dated to 2330 B.P., may also belong to the Un-named complex (Figure 14).

The subsistence pattern followed by Avonlea people was a basic plains/parkland adaptation with a heavy reliance upon bison procurement (Kehoe 1973; Morgan 1979; Reeves 1983; Syms 1977). Morgan (1979:175-183) indicates a seasonal round based upon winter occupation of the Valley complexes of the plains and summer occupation of the more xeric areas. In the xeric plains, small lakes and streams supplied water, and buffalo chips were readily available for fuel in summer. The selection of these seasonal sites was conditioned by a cultural response to the movement of the bison herds. Morgan (1979:178-179) suggests that bison procurement was largely abandoned during the rut in July and August, with preserved meat and alternate food resources being utilized as the hunters returned to the Valley complexes. Here the hunters and their families awaited the return of the wintering herds when bison pounding techniques could once again be effectively utilized to replenish the depleted stores of pemmican (Morgan 1979:180-181).

This pattern of subsistence probably has its roots in the late Altithermal patterns evolved by McKean Complex and Pelican Lake hunters moving from the foothills, uplands, and parkland fringes, into the xeric plains on a seasonal basis, following the bison herds on their seasonal shifts. The elaboration of the bison pounding technology by the Besant hunters provided the means to acquire predictable seasonal surpluses of dried meat to accommodate predictable seasonal shortfalls (spring and fall) in food resources. The Avonlea people employed the strategy of utilizing uplands and Valley complexes for wintering grounds as a part of a regular seasonal round based primarily upon plains resources.

The archaeological evidence (Dyck 1983; Reeves 1983; Syms 1977) indicates that Avonlea was a strongly plains oriented complex with only a limited extension into the parklands. The principal occurrence of Avonlea is in southern Saskatchewan, adjacent southeastern Alberta, and extending into northern Montana (Dyck 1983:123). In these areas, numerous bison kill sites employing jumps and pounds have been excavated (Adams 1975; Forbis 1962; Kehoe 1973; Reeves 1978), together with a wide range of campsites (Byrne 1973; Dyck 1979; Morgan 1979).

The Avonlea projectile point is found in small numbers along the western edge of the study area. No large kill or camp sites have been identified in the study area and finds of Avonlea points are confined to isolated surface recoveries or small numbers of points in mixed assemblages (Joyes 1970; Nicholson 1976). The overall impression is that Avonlea material is intrusive from the west rather than an indigenous

culture. This is so because Avonlea materials are only found as a minor component in mixed assemblages or as isolated surface finds. No pure Avonlea component has been identified within the study area and no major site identified where Avonlea predominates. Indicative of the Avonlea presence within the study area are the Rock Lake sites (Joyes 1970) which are consistent with the winter utilization of a Valley complex but there is no evidence that the Avonlea groups became established in this area or elsewhere in Manitoba. It may be that bison movements were not sufficiently predictable or that bison were not regularly present in sufficient numbers in the Pembina Valley area during Avonlea times. Failure of the bison to arrive in a predictable fashion by early winter, in large numbers, would preclude the establishment of a seasonal round based upon the winter occupancy of the Pembina Valley and summer occupancy of the xeric plains to the west, as Morgan (1979, 1980) has suggested for southern Saskatchewan. The sparse scattering of small Avonlea sites in western Manitoba may indicate experimental forays into an area where bison movements were less reliable than further west. If the Manitoba bison populations at this time tended to be non-migratory, or only irregularly so, as Hanson (1984) has indicated for North Dakota, then the Avonlea strategy might have been less effective since a localized population can be quickly hunted out or driven off - unlike a large migratory influx.

PRAIRIE SIDE-NOTCHED AND PLAINS SIDE-NOTCHED The small Side-Notched Point System of the Northern Plains, a classificatory system developed

by Kehoe (1966,1973), has been widely used to subsume and describe the range of variation in the ubiquitous small side-notched projectile points of the Middle and Late Neo-Indian period, found throughout the Northern Plains and adjacent parklands. With the disappearance of Avonlea from the archaeological record, circa 1200B.P., there is a proliferation of small side-notched projectile points displaying generally mediocre flint knapping skills in relation to the earlier finely crafted Avonlea points. Kehoe (1966:830) defines and describes these points as,

"Comparatively irregular in outline, with poorly defined angles, the Prairie Side-Notched points bear very mediocre bifacial flaking that often leaves portions of the original surface of the blank unretouched. Flake scars are broad and conchoidal, with numerous lumps, rough areas, and hinge fractures. The poor quality flaking and lack of symmetry are distinguishing characteristics of the Prairie Side-Notched Type . . . Large, wide, shallow V- to U-shaped side-notches are sometimes so low on the blade that they would ordinarily be classified as corner-notches . . . [The base is] predominantly narrower than the proximal end of the blade, although it may be equal to or wider than the blade in some specimens."

The temporal span generally attributed to these projectile points is approximately 1250 B.P. to 700 B.P. (Kehoe 1966,1973) in the Northern

Plains with a persistence of the general type for an additional 350 years in parts of Montana. Points of this general type also persist in Manitoba until protohistoric times. Kehoe (1973:76) sees relationships between the Prairie Side-Notched Type and Woodland points in Nebraska, and Dyck (1983:129) observes that, ". . . the general style bears a strong resemblance to Middle and Late Woodland points to the east." Reeves (1983:18-20) believes that Avonlea gave rise to the Tobacco Plains Phase (prehistoric Kootenay) which, in turn, influenced the late Old Women's Phase (North Peigan) lithic industries. However, it is difficult to understand how the "mediocre bifacial flaking" with which Kehoe (1966) characterizes Prairie Side-Notched points, could be derived from the Avonlea Phase which is characterized by such well controlled pressure flaking. Since the more crudely made Prairie Side-Notched points coexist with Avonlea for some 300 years, it is more likely that they represent an incursion into the plains from the east, partially displacing Avonlea in Saskatchewan and southeastern Alberta.

The late Old Women's Phase variants, Washita and Pekisko (Forbis 1962:95; Kehoe 1966:50), which display much finer workmanship than earlier forms, may represent a blending of the technologies of the two coexisting groups. This blending may have given rise to the Plains Side-Notched Type (Kehoe 1966, 1973) which dates from circa 700 B.P. to early historic times. Kehoe (1973:61-62) describes the Plains Side-Notched Type as,

". . . characterized by a well defined outline with sharp angles at bases and notches. Symmetry, though common, was

not always as fully achieved as in most Avonlea points . . .  
The notches are small, deep and narrow. Their shape is  
rectangular and they are placed fairly high on the blade  
. . . The bases of Plains points are at least as wide as  
the proximal end of the blade; in later periods, bases are  
often wider than the blade."

Various authors (Forbis 1962; Kehoe 1966,1973; MacNeish 1954,1958;  
Nicholson 1976) have attempted to describe varieties within the broad  
Type categories, along the continuum of variation which characterizes  
these small Late Prehistoric side-notched points through time and space.  
Usually, the criteria are based primarily upon morphological and  
technological considerations with stratigraphic positioning playing a  
supporting role in assignment. The potential social or ethnic correlates  
of these variety designations has rarely been commented upon. Since many  
of the criteria are subjective, or occur on more than one of the  
postulated varieties, it has proven difficult for investigators to agree  
upon varietal assignment of points within assemblages - let alone among  
assemblages, which may be influenced by available (or selected) raw  
materials and the variable skills of individual flintknappers. A  
reliable descriptive model of the distribution of these varieties  
through time and across space will require a monumental study of  
stratified, dated sites across the entire Northern Plains and adjacent  
parklands. Until this has been done, the social and ethnic correlates of  
the several varieties (which will probably require a rigorous and

thorough redefinition) will remain a matter for continued but unfruitful speculation. There has been no serious attempt, to date, to correlate projectile point varieties to ceramic variability, although some correlations at the broader hierarchical level of type have been attempted (Byrne 1973; Frison 1978). Since these small side-notched projectile points and Late Plains and Late Woodland ceramics are regularly found in association, some social and ethnic relationships must have existed between the makers of these artifact classes. It is reasonable to expect that these relationships will be discerned from the archaeological remains, once etic classifications have been developed which reflect the emic realities of the makers.

The spatial distribution of Prairie and Plains Side-Notched points has not been satisfactorily established. Small side-notched points are found throughout the foothills, and their distribution extends into transmountain passes such as Crownest Pass (Driver 1985). They are ubiquitous throughout the entire plains area with local variations tending to intergrade with each other as the bow and arrow replaced the atlatl dart. Dyck (1983:132) states, ". . . the distribution of Prairie and Plains complexes appears to be ubiquitous throughout the plains and parkland areas of Saskatchewan." To the north, these Late Prehistoric Prairie and Plains Side-Notched points seem to blend imperceptibly into the Late Woodland assemblages of the southern boreal forest (Dickson 1980:Plate 3; Kelly and Connel 1978:Plate 5; Tamplin 1977:136; Tisdale and Jamieson 1982:Plate 3). Within the study area, they are found almost everywhere, frequently associated with Late Woodland ceramics.

Within the Northern Plains area, the subsistence strategies of the users of Prairie and Plains Side-Notched points follows that established by earlier Besant and Avonlea groups. Bison were of primary importance, and numerous examples of continuity in the use of pounds and jumps by successive groups have been published (Forbis 1962; Frison 1978; Kehoe 1973; Reeves 1978). However, on the peripheries of the plains, in the parklands, and in the southern boreal forest, there is widespread evidence that a variety of subsistence strategies were employed by the users of late side-notched projectile points, in which bison were of little or no importance (Buchner 1979, 1982; Hanna 1982; Snortland-Coles 1979). In these areas the people, as might be expected on the basis of the ethnohistoric record and the predictions of Optimal Foraging Theory (Winterhalder 1981a and b), exploited the available resources of the forest and waterways. Faunal remains at Aeschikobahn (Snortland-Coles 1979:126) indicate a primary reliance upon fish, with secondary reliance on moose, bear, aquatic rodents, lagomorphs, and migratory waterfowl. At the Bjorklund site, Buchner (1982:111) indicates a primary dependence upon forest resources by groups using Prairie and Plains Side-Notched points. The evidence for the Late Neo-Indian period strongly suggests that ethnicity, subsistence strategies, and the distribution of projectile point styles, were not conterminous with each other.

During the Neo-Indian period there is clear evidence for the diffusion of people and ideas from the Eastern Woodlands into the Central and Northern plains. This diffusion, following the Altithermal,



may well have been in response to changing environmental opportunities as the parklands expanded (Dyck 1983; Last and Teller 1983; Ritchie 1976) and bison numbers increased and altered their patterns of movement (Arthur et al. 1975; Guthrie 1980). In addition, there is evidence for a demographic increase of the human populations in the Eastern Woodlands, accompanying Hopewell developments, which initiated westward expansion around 1900 B.P. (Syms 1977:84-87).

As the Woodlands cultures encountered the plains oriented cultures a diffusion of technological traits occurred. Ceramics began to appear in the sites occupied by the successors of aceramic assemblages and new lithic styles began to co-occur with established ceramic complexes in the eastern peripheries of the plains. Small unnotched triangular projectile points also began to appear along the northeastern periphery as a part of the Late Woodland assemblages (Nicholson 1976; Whelan 1976). During the Neo-Indian period a heterogeneous but interrelated configuration began to develop which enveloped the plains, parklands, and southern boreal forest regions. This configuration began to be characterized by small side-notched points, unnotched triangular points and fabric impressed ceramics. In addition, during the Late Protohistoric period, there is evidence of diffusion of traits and people from the Middle Missouri area into the Northern Plains (Byrne 1973; Nicholson 1986; Syms 1977).

The adaptive schemes which emerged during the Late Neo-Indian period were extremely diverse. During this period, the first clear evidence of

bison pounding in the study area emerges in sites such as Brockington (Syms 1977), Stendall (Rushowick 1975), and the Stott site (Tisdale 1978). All of these sites are located in the southwestern section of the study area. In the northeastern section, the importance of bison in archaeological assemblages diminishes, and forest and freshwater species dominate in the faunal assemblages (Nicholson 1978; Snortland-Coles 1979). These adaptations are consistent with the known resources of the respective areas and are not considered to be an artifact of cultural choice.

In most cases, the diagnostic lithics of the Late Neo-Indian period span the entire range of the plains, parklands, uplands, valley complexes, and the southern boreal forest. Because of this widespread and largely undifferentiated distribution, the Late Neo-Indian period will be explored, as it relates to the study area, primarily by means of several identified ceramic complexes of the Late Middle Woodland and Late Woodland periods. The spatial and temporal parameters of these ceramic complexes are more clearly defined than the lithics of the same period and thus allow a more detailed examination of the movement and subsistence strategies of the groups which deposited them in their sites.

The term Woodland which is frequently subdivided into early, middle, and late periods, is used extensively in late chronologies in eastern North America. According to Jennings (1974:214), the Early Woodland stage marks the end of the Archaic period in the Southeast, circa 4500

B.P., with the introduction of pottery. Middle Woodland is equated with the Adena and Hopewell (Burial Mound I and II) cultures by Jennings (1974:220) who suggests a time span of 2800 B.P. to 1150 B.P. The Late Woodland complexes, including Mississippian (Temple Mound), emerged from Middle Woodland antecedents and persisted until the Protohistoric/Historic interface.

While this general temporal framework is implied by the term Woodland, given the distances involved, the diversity of habitat, and socio-cultural variability existing between the Eastern Woodlands and the Northern Plains, there will be local differences in absolute dates for the assignment of complexes within the general Woodland framework. The commonly identified ceramic wares found within the study area show consistent evidence of Eastern Woodland origins - Byrne (1973) has stated this to be so for the Saskatchewan Basin Complex as well. The Cluny Complex (Forbis 1977) and a few individual vessels of Middle Missouri origins seem to be the only exceptions and there is no evidence to suggest independent invention of pottery anywhere on the Northern plains.

LAUREL Syms (1977:80-81) has defined the Laurel Composite assemblage as sharing a common core of traits including,

". . . toggle head harpoons, overlapping projectile point typologies, and conical ceramic vessels with varying frequencies of pseudoscallop shell stamping, linear stamping and stab and drag stamping decorative technique applied to the upper third of the vessel. . . . Other traits which

are not ubiquitous but are identified as part of the Laurel Composite are small burial mounds, often containing burial bundles, a variety of stemmed and notched projectile points, the cold hammering of native copper into simple tools such as awls, barbs, chisels and beads, and hafted beaver incisor tools."

Middle Woodland Laurel ceramics originated in the Upper Great Lakes region within the Lake Forest Biome (Fitting 1970). The temporal span ranges from sometime before 2050 B.P. until 850 B.P. (Syms 1977:81). Buchner (1979:104) suggests a time transgressive northward movement of the Laurel culture into the boreal forests of Ontario and Manitoba from the southeast.

Laurel ceramics are sparsely distributed in the study area, being found almost exclusively along the waterways and in the northeastern periphery of the area. Remains of at least two vessels were recovered as surface finds along an extinct channel of the Assiniboin River south of Carberry and Syms (1977:81-82) reports occasional sherds from Southwestern Manitoba. These occasional finds of Laurel sherds do not appear to represent substantial occupation of any part of the study area and may be accounted for by trade, exploratory trips, or sporadic use of riverine and lakeshore environments by a forest adapted people. Byrne (1973:384) has suggested that the Early Variant Saskatchewan Basin Complex may have been influenced by Laurel technology (Table 7).

OTHER MIDDLE WOODLAND WARES IN THE STUDY AREA Syms (1977:93) has identified four Middle Woodland complexes utilizing Southwestern Manitoba. These are Sonota, Valley, Snyder Dam I, and Besant. The Sonota and Besant distribution and subsistence strategies have been discussed earlier and identification of these complexes within the study area rests primarily upon lithics, rather than upon the Woodland derived ceramics.

The Valley Complex has been identified on the basis of a reconstructed vessel from Southwestern Manitoba (Syms 1977:88). While no Valley Complex components have been excavated within the study area, the subsistence strategy of these people is known from sites further south in the Central Plains. "The emphasis is on diffuse, riverine resources with bison being unimportant"(Syms 1977:88). It is unlikely that the Valley Complex people utilized any portion of the study area regularly and Syms (1977:88) notes,

". . . the Valley complex represents the remains of a group whose core area was the Central Plains and South Dakota, with a probable extension up the Missouri River and into the Souris Basin. Southwestern Manitoba was peripheral to more southerly haunts."

The Snyder Dam site at the junction of Gainsborough Creek and the Souris River, west of Turtle Mountain, has produced a Middle Woodland component which bears some resemblance to Fox Lake ceramics from Southern Minnesota. Syms (1979:54) estimated a weighted mean date of

1013+/-39 B.P. for this component. The associated fauna include shell fragments and the thoroughly fragmented remains of a juvenile and an adult bison. The site is located in the parkland/plains transition zone. The derivation of the Snyder Dam ceramics is uncertain and no similar Middle Woodland sites have been identified in the area. The site probably represents a transitory incursion into the area from the southeast, consistent with tertiary resource exploitation, as outlined in Syms (1980) Co-Influence Sphere Model.

BLACKDUCK According to Syms (1977:104),

"The Blackduck horizon has been identified primarily on the basis of distinctive decorative traits on thin-walled, globular vessels with flared rims; however, other traits are small triangular notched and unnotched projectile points, end and side scrapers, awls, tubular pipes, occasional unilateral harpoon and socketed bone projectile points, bone spatulates, fleshers, copper beads and awls, beaver incisor gouges, and burial mounds generally containing seated burials."

Generally speaking, it is the ceramics which are considered to be diagnostic, since all of the other artifact types are known to occur in other Woodland and Plains assemblages of the same time period.

The decorative traits which appear in various permutations on the globular Blackduck vessels include cord wrapped object impressions, punctates (usually round but occasionally irregular or oblique), twisted

cord impressions, and linear impressions from various smooth objects. Combing or brushing are occasionally present below the lip. Trailed lines are rare. Incising and check stamping do not occur as normal elements in Blackduck decorative schemes and decoration is confined to lip, rim, and neck areas. Most decoration is confined to the exterior of the vessel although cord wrapped object impressions sometimes appear on the interior of the lip and occasionally there are interior punctates with corresponding exterior bosses. The bodies of the vessels usually display fabric impressions which are frequently smoothed or otherwise obliterated. A few vessels display a completely smooth exterior on the body.

The vessels appear to be manufactured, in many cases, inside fabric or basketry molds or else by the paddle and anvil technique. There is no evidence for coiling. Paste is variable in texture from vessel to vessel and usually contains abundant grit temper. Vessels are relatively thin walled (2.5 - 8mm) although frequently the lip area is much thicker due to a wedge shaped profile. Rims usually display outward flaring but may also be straight.

Syms (1977:101) sets the emergence of Blackduck ceramics at circa A.D. 600 to 700 in the Upper Great Lakes region with terminal dates circa A.D. 1600 to 1750 in the areas north and west of Lake Superior. Blackduck ceramics extend from the north shore of Lake Superior, across the northern one third of Minnesota, through the Manitoba Lowlands into Southwestern Manitoba, and northward into the Lower Saskatchewan River

drainage basin (Syme 1977:98). The known distribution of Blackduck sites does not extend west beyond the Manitoba border except in the lower Saskatchewan drainage and along the Churchill River (Meyer 1983).

Syme (1977:97) recognized regional variation within the Blackduck ceramics and used the broad stylistic term 'horizon' to subsume this variability. Numerous attempts have been made to develop descriptive categories or modes for the combinations of design elements which characterize the Blackduck assemblages (Carmichael 1977; Evans 1961a and b; Hamilton et al. 1981; Tisdale 1978) but invariably, the typologies tend to be site specific and fail to encompass the range of variability encountered at other Blackduck sites. In Minnesota, changes in the decorative motifs and rim/neck profiles have been shown to change through time (Anfinson 1979) but these particular sequential developments have not been demonstrated in other areas where Blackduck ceramics are found.

Early Blackduck ceramics show some similarities to Laurel vessels in terms of decorative elements, although techniques of manufacture (coiling versus paddling and fabric molds) are dissimilar (Anfinson 1979; Lugenbeal 1976). (For a more complete discussion see Tisdale 1978: 101-104.) Buchner (1976,1979) has argued for cultural continuity throughout the Woodland period in southeastern Manitoba and the adjacent regions in Ontario, based upon a basic similarity of artifact inventories and faunal remains in the sites from this period. It must be noted, however, that the ethnohistoric evidence indicates that



continuity in subsistence strategy and associated technological items cannot be equated with ethnic continuity. That is, while we know that in many areas the Assiniboine were succeeded by the Cree, who were in turn succeeded by the Ojibwa, no diagnostic artifacts have been identified which will allow for a reliable ethnic assignment of sites known to be from this period. The ethnohistoric evidence indicates continuity of subsistence strategy for these three groups, and this subsistence continuity is indistinguishable from cultural continuity in the archaeological record of the Protohistoric Period.

In many sites, Blackduck ceramics are found associated with other ceramic wares and in some sites there appears to be a blending with, or possible transition to, the later Selkirk ceramics which have been associated with the historic Cree (Buchner 1976; Saylor 1977; Syme 1977). The individual design elements and globular vessel form which characterize Blackduck pottery have an extremely broad distribution and frequently occur in ceramic wares which are demonstrably distinct from Blackduck. At the Hagen site, in Montana, Mulloy (1942) identified many design elements characteristic of Blackduck ceramics, including wrapped rod impressions, cord impressions, and punctates. The assemblage, as a whole, is quite different from Blackduck and Mulloy (1942:11) states that, "Preliminary consideration of the ceramics indicated that it is a single rather well integrated cultural complex." Byrne (1973:437) sees strong relationships between the Late Variant Saskatchewan Basin Complex and the Blackduck and Selkirk wares in Manitoba and believes a

continuous ceramic tradition exists from east to west across the Northern Plains at this time. At the Stott site, a variety of uncharacteristic traits have been noted in the Blackduck assemblage. Among these are Blackduck motifs which have been executed by means of incising and occasional dentate stamping (Hamilton et al. 1981; Syms et al. 1979:132). Tisdale (1978: 100-101) notes that, "While regional and temporal subdivisions within Blackduck ceramics may emerge, the ceramic complex as a whole shows considerable integrity." This observation seems accurate since the published literature has established the basic themes which characterize variability within Blackduck ceramics (Carmichael 1977; Dawson 1974; Evans 1961 a&b; Hamilton 1981,1982;Hamilton et al. 1981; Lugenbeal 1976; Syms 1977; Tisdale 1978; Wilford 1955; Wright 1967). There is also a growing concensus regarding evolutionary and developmental processes which suggests continuity in technology and subsistence strategies from Middle to Late Woodland times within the Boreal Forest biome with an expansion into the Parkland during the Late Middle and Late Woodland stage (Buchner 1976,1979; Carmichael 1977; Lugenbeal 1977; Saylor 1977). Several authors (Hamilton 1982; Nicholson 1986) have noted variations on basic Blackduck themes which have counterparts in adjacent areas and are associated with distinctively different archaeological assemblages. These latter variations appear to be localized developments rather than indications of widespread change within the Blackduck Horizon. These modifications of individual design elements and the design anomalies suggest various kinds of interethnic dynamics and the exchange of ideas among the fluid hunter and gatherer

societies of the plains/parkland/ boreal forest regions - a pattern which may anticipate the later Assiniboine/Cree/Ojibwa dynamics of the early Historic period when groups frequently interacted and occasionally intermarried but essentially maintained their corporate identities.

The subsistence strategies employed by the users of Blackduck ceramics appear to be as diverse as their ceramics or, more accurately, as diverse as the resource potentials of the areas which they inhabited (Table 8). In the boreal forest sites, faunal remains indicate a broad based strategy utilizing fish, beaver, moose, woodland caribou, bear, and migratory waterfowl (Dawson 1974), as well as wild rice whenever it was available (Buchner 1979). As the Blackduck occupations enter the parklands in southern Manitoba, there is clear evidence of associated mass kills of bison which have been excavated at sites such as Stott (Hamilton et al. 1981; Tisdale 1978), Gompf (Syms 1978), Brockinton (Syms 1977), and Stendall (Rushowick 1975; Syms 1977). At sites such as Brockinton, butchering of animals was moderately intensive with only humeri and femorae being smashed to facilitate marrow extraction (Syms: personal communication). Further north, at the Stott site, radii, tibiae, and metapodials were regularly processed to extract marrow as well (Hamilton et al. 1981), indicating a more thorough utilization of the animals. There is no evidence at the present time to indicate whether these large communal kills, characteristic of contemporary as well as earlier groups to the west, are a function of an increase in bison numbers in the southern portion of the study area,

SPECIES UTILIZED	FhNa-35 Pehonan? MNI	DlMa-1 Blkduck. NISP	FbMb-1* Dkbay. (NISP)	FbMb-1^ Dkbay. (NISP)	Bjorkland Blkduck. NISP	Lovstrom Lt.Wldd. NISP
small mammal		15				14
medium ungulate		4				2
large "		2				217
bison	2	2016			1	5
elk	3			(22)	2	1
moose	1		(12)	1	(103)	5
caribou			(2)	1		
deer	2	15			(3)	2
canid	4	30	(4)	1	(18)	4
bear	1	1	(2)	1	(4)	1
lynx	4	1			(13)	2
wolverine						1
otter					(3)	2
badger		1				
raccoon		3				
fisher						3
skunk		5	(2)	1		1
marten						1
mink		2	(2)	1		1
weasel	1	5				
porcupine	1					
beaver	15	38	(33)	3	(206)	13
muskrat		2	(24)		(17)	6
small rodent		69		1		
rabbit	21	21		2	(4)	2
bird	1	8				2
pelican			(5)	1	(3)	1
swan	1		(4)	2	(4)	2
gt. blue heron	1			1		
sandhill crane					(3)	1
Canada Goose			(5)	1	(2)	1
eagle/hawk	1	1	(3)	1	(6)	2
duck	2		(6)	2	(10)	6
loon			(4)	2	(2)	1
turtle						1
fish		139				
sturgeon						28
pike	1		(65)	24		
walleye	2		(181)	74		
sucker	14		(90)	26		2
goldeye	2					
perch	1		(3)	1		
whitefish			(10)	3		
mussel	3	51	(46)	43		2

Table 8. Faunal remains from Late Woodland sites in (or adjacent to) the study area. [\* Snortland-Coles 1979; ^ Nicholson 1978]

or a function of a more effective social and technological adaptation present among Blackduck hunters than was the case among earlier groups which inhabited the area (Figure 14).

Since the Blackduck material culture seems to be derived from the southern boreal forest to the east, where individual or small scale co-operative hunting was practiced (Bishop 1978; Hickerson 1970; Kinitz 1965; Rogers 1963; Tanner 1979), it is unlikely that the social organization and the accompanying technology for communal bison hunting came from this direction but rather was learned from groups living further to the west. Frison (1978) has strongly argued that bison pounding requires not only a well disciplined social group but also an exact and detailed understanding of bison behavior. Given that communal bison procurement had been a feature of subsistence strategy on the plains to the west for several millenia, it is more likely that the necessary complex of technology, organization, and lore, came from that direction.

The author (Nicholson 1976) found it possible to classify most of of the projectile points at the Stott site using the Small Side-Notched Point System of the Northern Plains (Kehoe 1966). A small number of side-notched points and a few unnotched triangular specimens could not be fitted to the Kehoe system (1966,1973) and these specimens all bear strong resemblance to contemporary Late Woodland examples. Personal examination of the Brockinton points and a portion of the Gompf material indicates similar projectile point assemblages at all of these Blackduck

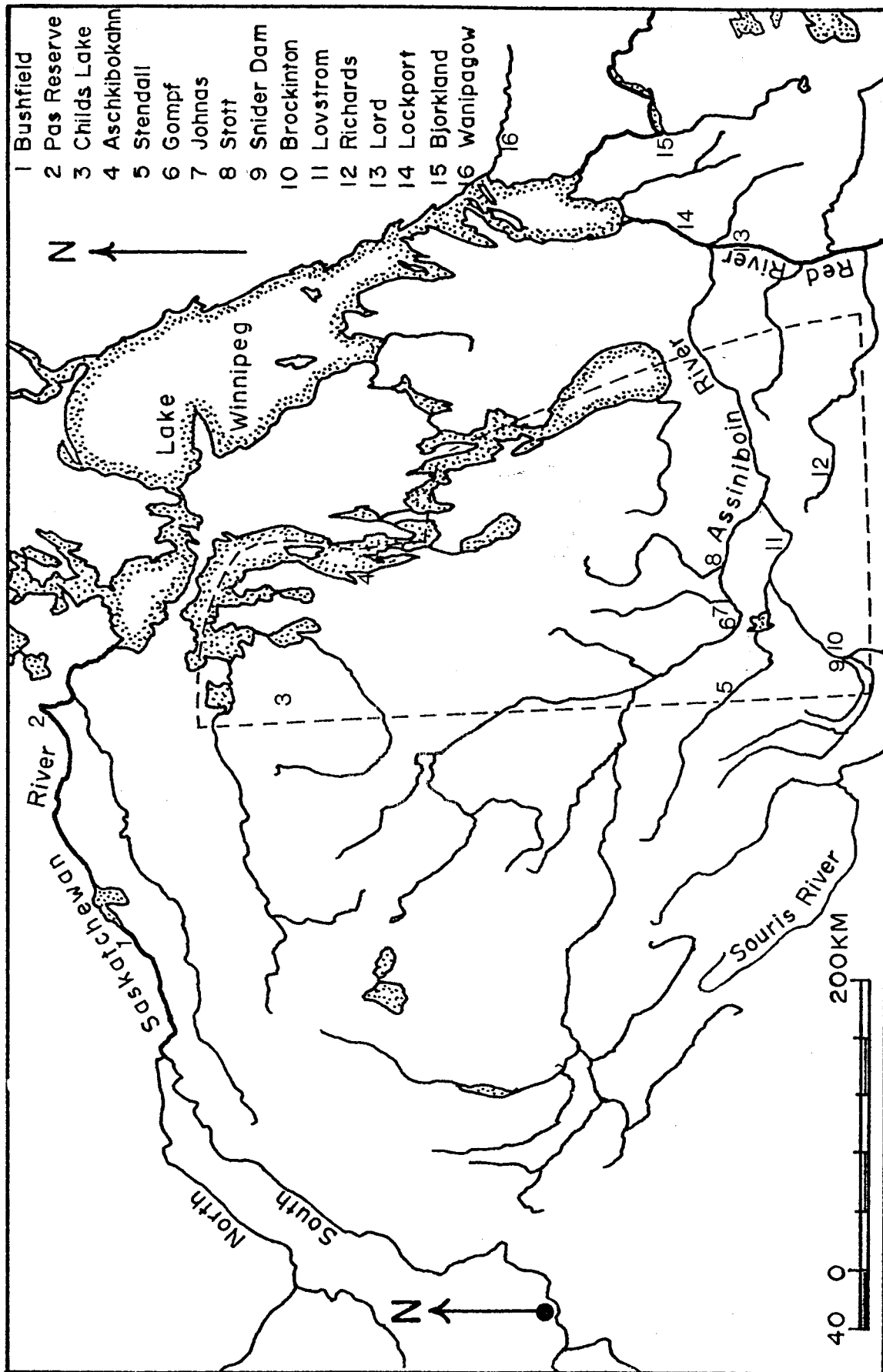


Figure 14. Late Neo-Indian sites

bison kills. The broad distribution of these projectile points across the Northern Plains, such that points recovered along the Eastern Periphery can be classified according to criteria established from contemporary assemblages much further west, indicates significant cultural contact with the west. The Woodland points and ceramics, together with other Woodland artifacts such as unilateral barbed harpoons, found in these mass kill sites indicates definite association with eastern groups. In the southern parklands of the study area, Blackduck appears to incorporate technological and organizational traits from two major cultural adaptive systems - the woodlands and the plains. The nature of this contact is obscure at the present time. Whether contact was casual, involving trade and the accompanying diffusion of ideas, or more intimate, involving intermarriage and the creation of a hybrid culture similar to that of the later Cree/Assiniboine Young Dog band (Sharrock 1974), is uncertain. Detailed study of artifact attribute patterns and their distribution (Hanna 1982) may shed light on this problem at a future date.

All of the study area has been utilized by users of Blackduck ceramics, from the more open prairie between Oak Lake and Turtle Mountain (Rushowick 1975; Syms 1977), eastward along the Manitoba Escarpment and the Assiniboin Valley (Hamilton et al. 1981; Joyes 1970; Syms 1977; Tisdale 1978), the adjacent Manitoba Lowlands (Snortland-Coles 1979), and the uplands (Badertscher 1982; Jamieson 1974; Magne and Shay 1980; Simpson 1970a, 1970b). There is no evidence, at the present

time, to indicate whether all of these areas were used contemporaneously with each other or whether the occupations represent a continuous expansion moving across the area. Dates for single occupation Blackduck sites in Manitoba (Table 6) range between 1170+/-90B.P. at the Lord site (Syms 1983) and 465+/-65 B.P. at Wuskwatim Lake (Dickson 1976). The range of Blackduck associated dates from the Stott site (Tisdale 1978: 110) brackets this time interval, indicating a remarkable degree of continuity in the reuse of this site by people associated with a particular cultural horizon. The complex valley wall stratigraphy and internal instability of the site matrix (Zoltai: personal communication 1984) precludes the delineation of most individual occupations within the site but, aside from the small indeterminate Archaic component deeply buried in Zone A (Tisdale 1978) the site occupations are clearly dominated by groups using Blackduck materials.

The inferred 700 to 800 year occupancy of the study area by people identifiable by their use of Blackduck ceramics appears to have initiated a strategy which exploited bison by means of communal kills, as well as utilizing the resources of the forest and waterways. The Blackduck subsistence strategy probably changed during the outward expansion and occupation of the parklands from a southern boreal forest base. Initially, the Blackduck people may have begun to hunt ungulates in the parklands during the summer, returning to the boreal forest to harvest wild rice in the fall, and to hunt beaver, moose and woodland caribou, in their familiar forest biome as the Ojibwa did much later



during the historic period. The presence of ceramic modes at the early Late Woodland Lovstrom site, on the Plains/Parkland interface, which replicate modes at Wanipagow, which is well within the boreal forest on a wild rice lake, supports this reconstruction (Nicholson 1986). Upon coming into contact with plains/valley complex or plains/parkland adapted people, Blackduck users may have gradually increased their reliance upon bison, utilizing late fall and winter hunts to accumulate a surplus of dried meat and pemmican to provide for the lean period in spring before the spawning runs began and the migratory waterfowl returned. It may be that these people continued to move westward contributing to the developments which led to the Late Variant Saskatchewan Basin ceramics described by Byrne (1973). In the southern margins of the Northern Boreal Forest, the forest adaptation seems to have persisted for some time alongside the emerging Selkirk Complex which lasted into the Historic period (Dickson 1976).

The co-occurrence of the materials of other cultural complexes with Blackduck materials, noted earlier, may result in part from social interaction (Hamilton 1982) with other groups living nearby or through trading contacts (Nicholson 1986), and in part from post-depositional taphonomic factors in multiple component sites. It is certain that there was no single subsistence strategy which can be used to characterize the Blackduck Horizon across the range of biomes in which its participants lived. The subsistence strategies of the Blackduck Horizon are characterized by an adaptive flexibility which efficiently exploited the

available subsistence resources of all of the regions into which people utilizing Blackduck ceramics expanded.

DUCKBAY Duckbay ceramics have been found as a minor component in Late Woodland assemblages in the Manitoba Interlake region (Riddle: personal communication 1984), in southeastern Manitoba where MacNeish (1958) identified them as Sturgeon Punctate, into east-central Saskatchewan (Meyer and Smailes 1975), the uplands of west-central Manitoba (Badertscher 1982), in southwestern Manitoba (Nicholson 1986), and in northern Minnesota (Lugenbeal 1976). Duckbay sherds usually constitute less than 5% of the total ceramic assemblage (Hanna 1982:3). In Manitoba, Duckbay ware is contemporary with Blackduck and early Selkirk materials, which form the usual ceramic associations. The Aeschikokahn site, FbMb-1 (Figure 14), dating to circa 750 B.P. is the only known site where Duckbay ware is predominant (Hanna 1982:3), although Blackduck vessels constitute about 28% of the recovered assemblage (Snortland-Coles 1979:23). Other tools regularly found in association with Duckbay ceramics are, for the most part, indistinguishable from those which characterize Blackduck assemblages.

Duckbay ware has been divided into three Types - Duckbay Punctate, Duckbay Notched Lip, and Duckbay Undecorated (Hanna 1982:4). According to Snortland-Coles (1979:27-28),

"These vessels display rims that are straight to slightly S-shaped descending to a sharply angled neck. Shoulders of these vessels tend to be also sharply angled, unlike those of Blackduck vessels. Surfaces are fabric impressed

and have been smoothed prior to decoration partially obliterating surface treatment. Decoration is found on lips, rims, and, occasionally on shoulders.

The vessels appear to be manufactured in a manner similar to that employed with Blackduck vessels and contain similar grit and sand temper.

The Duckbay Punctate Type has,

". . . minimally three rows of punctates on the rim exterior. When additional rows are present these continue onto the shoulder and in some instances onto the body of the vessel. Punctates are generally rectangular in shape, but can be circular, crescentic, or irregular. Occasionally, they occur on the interior of the rim. Punctates or similar decorative elements occur with high frequency on the lip, and may or may not be the same as the punctates on the rim exterior (Hanna 1978:3)."

"Duckbay Notched Lip . . . is characterized by shallow closely spaced punctates on the rim exterior extending onto the lip. They are most frequently formed with the end of an object, pseudo-cord-wrapped object, pie-shell crimping, fluting, and incising" (Hanna 1982:5).

"Duckbay Undecorated maintains the overall vessel shape characteristic of the ware but lacks decoration" (Hanna 1982:5).

Hanna (1982:198) has proposed that the unusual distribution of Duckbay ware results from the settlement pattern of a non-sedentary endogamous local band. It is postulated that this band utilized the Aeschkibokahn site as a base for fishing and for hunting migratory waterfowl in spring and fall. They probably hunted and gathered from this site in the summer as well. During the winter, the group may have dispersed inland from the exposed lake site. Hanna (1982:93 and 103) indicates that this postulated band would number between 140 and 150 individuals, which is consistent with the reconstructed carrying capacity of the region adjacent to the Aeschkibokahn site.

Snortland-Coles (1979) has emphasized the role of the nearby wetlands as a source of subsistence resources for the local human population - particularly the plant species. Hanna (1982:74) has pointed out that a variety of adjacent environmental zones, including marsh, forest, meadow, stream and lake, would have placed the Aeschkibokahn region in a resource independent territory, ". . . since the proximity of interspersed biomes means that access to any and all biomes and their resources can be easily achieved from any one site" (Hanna 1982:113). Hanna also suggests that the area may have been even more productive of useful subsistence resources at the close of the Neo-Atlantic climatic episode (Bryson and Wendland 1966) which approximates the period of Duckbay occupancy.

Hanna (1982) and Snortland-Coles (1979) have both noted the paucity of research which has been conducted in the areas adjacent to

Aschkibokahn. Recent work in the uplands to the west (Badertscher 1982) and in the Interlake area to the east (Riddle: personal communication 1984) indicates an increased frequency of Duckbay ware in the areas adjacent to Aschkibokahn, in contrast to what was believed to be the case earlier. However, these finds do not indicate any major Duckbay sites comparable to Aschkibokahn but rather, small temporary or ancilliary occupations consistent with the model proposed by Hanna (1982:129). Hanna (1982:197) indicates that a semi-sedentary model, in which Aschkibokahn served as a year around base for subsistence activities also fits the data but, as she has noted, the exposed location of the site poses problems for a winter occupation in terms of an inadequate supply of firewood and a demonstrable lack of shelter from the winds off the lake.

The archaeological evidence for Duckbay subsistence strategy (Table 8), centered on the Aschkibokahn site, strongly suggests a pattern similar to that practiced by the Chalkyitsik Kuchin, residents of the northern boreal forest. Nelson (1973:17) states that,

"They followed a pattern which is common to many Athapaskan groups, travelling far up to the headwaters in fall, staying in the upriver country until spring, then floating down the river and spending the summer fishing in the downriver regions."

The Aschkibokahn site, located on a small island in Lake Winnipegosis at the outlets of the Drake and Duck rivers, would not have been a

desirable habitation during spring breakup, when unstable ice conditions can render any offshore activity difficult or impossible. Similarly, almost all of the winter subsistence resources, which were available by means of known prehistoric Duckbay technology, were to be found inland from the site. In addition to the above limitations, year around hunting would have soon depleted the localized small game and caused much of the large game to avoid the area adjacent to the village. The inferred butchering pattern for large game at this site indicates that most large animals were processed at some distance from the site (Nicholson 1978) and were subjected to intensive marrow extraction processing. This intensive butchering, which extended to the phalanges and tarsals, indicates that animal fats were in short supply and highly prized by the site inhabitants. These animals, in all probability, represent fall kills made before the inhabitants moved to wintering areas inland (James 1956; Nicholson 1985b).

Fish and migratory waterfowl, together with a variety of vegetable foods, appear to have been extremely important subsistence resources at Aechkibokahn, based upon faunal analysis (Nicholson 1978:5; Snortland-Coles 1979:121) and environmental reconstruction (Snortland-Coles 1979:93-107). All of these resources show marked seasonality, being available spring through fall. The uplands to the west, and to a lesser extent the Interlake Lowlands to the east, would have contained an abundance of suitable winter subsistence resources such as moose, elk, aquatic rodents, and snowshoe hare. The growing evidence, noted above, for

dispersal of Duckbay ware throughout these areas, supports the idea that family groups dispersed through the hinterland of Aschkibokahn in late fall, returning to the site after spring breakup to exploit the riverine and marsh resources of spawning fish and migratory waterfowl.

The Duckbay adaptation appears to have been an unusually localized or simply a hitherto archaeologically unrecognized, boreal forest adaptation. The evidence cited by Hanna (1980b, 1982, 1984) indicates that a particular social configuration developed among the Duckbay people which enabled them to control and exploit a relatively small, but highly productive wetland niche, together with adjacent Lowland and Mixedwood sections of the boreal forest. Detailed analysis of other ceramic assemblages, and possibly other classes of artifacts as well, may reveal that similar patterns existed elsewhere in the forest/grassland transition areas.

The origin or ultimate fate of the Duckbay people is unknown at the present time. Their relationship to any historic groups is also unknown although clearly a Woodland association is indicated.

SELKIRK Selkirk wares first appear circa 950 B.P. and terminate with historic contact in the late Eighteenth or early Nineteenth century A.D. according to Syms (1977:108). There appears to be a relationship between Blackduck ceramics and Selkirk wares, since both share a number of nearly identical design elements, similar vessel forms and a largely equivalent lithic and bone tool assemblage (Buchner 1979:121). The two

ceramic assemblages are frequently found in the same site and Saylor (1977:25-26) states that,

"There is firm evidence of Blackduck and Selkirk ceramic making populations having shared the same ecological areas. Indeed, it can be hypothesized that they had nearly identical exploitive and settlement patterns in the Wanipagow Lake region . . . Selkirk ware has to some degree developed, at least in part, from Blackduck ware."

The distribution of Selkirk ware is confined almost exclusively to the boreal forest, seldom extending into the adjacent borders of the parklands, although it is occasionally reported from the Mixedwood uplands (Jamieson 1974). The evidence from the uplands, however, more strongly favours Blackduck and Duckbay occupation (Badertscher 1982; Magne and Shay 1980; Simpson 1970a). Selkirk wares have been almost universally assigned to the prehistoric Algonkian speakers collectively known as the Cree (Buchner 1979:120; MacNeish 1958:49; Syms 1977:108). The distribution of Selkirk ceramics supports this assignment since the Cree are not believed to have ventured onto the plains or to have been a significant presence in the parklands until after the introduction of fur trade goods which replaced aboriginal ceramics with copper vessels (Figure 14).

MacNeish (1958) first defined the Selkirk Focus, based upon his definition of Winnipeg Fabric-Imprinted ware, at sites in southeastern Manitoba. MacNeish (1958:162-166) described the ware as usually having



flattened lips and outflaring rims although a few lips were rounded and some of the rims were straight or slightly S-shaped with occasional incipient collars. The bodies usually have a slightly angled shoulder. Below the shoulder the body gradually emerges into a wide sub-conoidal base. The bodies are greater in maximum horizontal width than they are in height. MacNeish (1958:162-166) further notes that the vessels are made using a paddle and anvil technique or, occasionally, inside babiche woven fabric. The interior of the pots indicates horizontal brushing for purposes of smoothing. The paste was coarse textured and contained abundant grit temper.

The ware was composed of three types: Alexander Fabric-Impressed, Sturgeon Falls Fabric-Impressed, and Sturgeon Punctate. The Selkirk Horizon (Syms 1977) has since been divided into three phases (Hlady 1970a,1971; Meyer 1978a,1978b,1983). Hlady (1970a,1971) defined Grass River ware on the basis of a coarse ribbed fabric or basketry impression on the exterior of the vessels together with undecorated rims and indicated that this complex was most common in north-central Manitoba and probably was the handiwork of the historic Swampy Cree. Meyer (1978b) has questioned the validity of this ware since it is indistinguishable from Winnipeg Fabric-Impressed (Selkirk) ware as defined by MacNeish (1958). Grass River ware is now generally referred to simply as Selkirk ware.

Clearwater Lake Punctate was first defined by Hlady (1970a) and this definition has since been confirmed and refined by Meyer (1978a, 1978b). Meyer (1983:163-164) states that the Clearwater Lake complex is,

". . . characterized by globular pottery vessels with constricted necks and vertical or excurvate rims. However some vessels bear only a slight neck constriction (Smailes 1979:87) and are elongated rather than globular. The flat lips are often decorated with incisions or impressions, often made with a cord wrapped tool. A single row of punctates is present around the lower rim or the neck proper.

In northern Manitoba, in the Kame Hills area, Dickson (1980, 1983) has defined a variant of the Clearwater Lake Punctate Complex. The Kame Hills Complex is characterized by additional vessel forms such as plates and bowls plus variability in the number of rows of decorative punctates.

The Pehonan Complex defined by Meyer (1981) appears to be a transitional culture involving traditional Clearwater Lake artifacts and subsistence practices, together with traits from the plains areas to the south and west. The complex has been dated at the Bushfield East site near Nipawin to 1616+/-60 B.P. (S-1331). Meyer (1981:30) states,

"The pottery of the Pehonan complex incorporates traits which reflect contacts both to the north and south. It is apparent that the closest relationship is with Selkirk ware, particularly as the latter is expressed in the Clearwater Lake complex . . . On the other hand, the occurrence of angular shoulders in the Pehonan complex materials and the occasional presence of decorated shoulders distinguishes the

pottery of this complex from that of the Clearwater Lake complex. Angular shoulders and shoulder decoration are traits of the late prehistoric (non Middle Missouri) pottery of the Saskatchewan grasslands. It is likely that the Pehonan complex potters adopted these features from this southern source. It is possible that the Nipawin Horizontal type also is a result of southern contacts - with the makers of Middle Missouri type pottery in this case . . . The projectile points of the Pehonan complex are late triangular and side-notched forms, characteristic of the grasslands. They are unlike late projectile points from the forest to the north and northeast which tend to take more generalized side-notched forms."

The stone adzes and bone harpoon points also point to a forest origin and the Pehonan Complex appears to be a genuine edge or biome fringe phenomenon.

Since almost all Selkirk/Clearwater Lake sites are found in the boreal forest, where acid soils rapidly destroy organic remains, most subsistence data are found in sites in the forest/parkland margins such as Lockport (MacNeish 1958) and the Pas Reserve site (Tamplin 1977) or by means of environmental reconstruction (Buchner 1976; Syms 1977). The pattern which emerges is that of a forest adaptation, heavily dependent upon fish and migratory waterfowl in spring through fall, and relying on moose, caribou, aquatic rodents, and snowshoe hare, in winter. The sites are located along waterways which facilitated travel through the forest

and also furnished abundant food resources during the seasons of open water. While the evidence is largely inferential, it is likely that plant foods were important seasonal resources (Snortland-Coles 1979), including wild rice in the southeastern areas (Saylor 1977).

The Bushfield sites and other adjacent Pehonan Complex sites are located along the forest/parkland transition of northeastern Saskatchewan, adjacent to the Saskatchewan River system, northwest of the study area. During the fur trade era, this area supported sizeable populations of forest species such as moose, bear, and beaver; edge species such as deer and elk, and wintering populations of bison. It is probable that Kelsey visited this general area in A.D. 1690.

Meyer (1981:7) describes the area as,

". . . characterized by the parkland/forest interface of this section of the province. Historically, the meadows and poplar bluffs of the parkland supported herds of bison and elk. There is considerable evidence that the largest numbers of bison were present through the winter (Arthur 1975). Moose were present in the stream valleys and lake and slough edges (Dyck 1977:240-242); and mule deer were also common. In that portion of the boreal forest bordering the parkland, the same species of ungulates were present, although in differing numbers. Here, the most common game animals were the moose and elk followed by the mule deer . . . All of the rivers and streams supported numerous species of fish which, particularly in the forest zone, might be found in enormous numbers during the spawning

runs . . . It is apparent that the productivity of this parkland/forest interface was great and that, with smaller mammals, waterfowl and vegetable foods added to the big game resource, a relatively secure subsistence economy was possible."

That this diverse ecological zone was, in fact, efficiently exploited by the Pehonan people is confirmed by excavations at the Bushfield East site (Meyer 1981:10). Magne (1976) identified faunal remains from a single unit and found bison, moose, beaver, fox, Canis sp., muskrat, medium sized bird, and medium and large fish. This assemblage indicates a diversified subsistence strategy consistent with the diverse, dispersed, seasonal nature of the resources in the area. Excavations at the Lloyd site (Quigg 1983) confirm utilization of a wide selection of species during Pehonan times in the Nipawin area (Table 8).

The Pehonan Complex likely persisted until European contact in the early Eighteenth Century. Meyer (1983:168) has inferred that the distinctive hybrid Pehonan Complex may be the result of the Woodland Cree (Clearwater Lake) interacting with the parkland/plains oriented Assiniboine (Plains Side-Notched projectile points). Such a scenario would be consistent with the accounts of Kelsey in A.D. 1690 (Doughty and Martin 1929), LaVerendrye in the 1730's (Burpee 1929) and Hendry in 1754 (Burpee 1973).

There is little evidence for Selkirk/Clearwater Lake occupation within the study area, except for the Riding Mountain upland where

Jamieson (1974:214) assigned the majority of the ceramic sites located in her survey to the Selkirk Phase. A reexamination of the written descriptions (no photographs available) indicates that Blackduck (5 vessels) and Duckbay (3 vessels) wares predominate. The description of angled and decorated shoulders on some vessels, together with mention of incising on fabric impressed vessels, may indicate a significant presence of the Pehonan Complex (Jamieson 1974:130,153,171). The remaining Late Woodland vessels are too fragmentary for any definite assignment and may represent variants of Blackduck and Duckbay wares, or possibly Selkirk and Clearwater Lake vessels. The presence of Pehonan Complex material in the Riding Mountain Mixedwood forest would be consistent with the ecology of the forest/parkland edge found near Nipawin. The Riding Mountain sample needs to be increased in size and reanalysed in the light of recent developments in order to resolve these uncertainties.

MIDDLE MISSOURI CERAMICS Recent work (Johnas: personal communication; Nicholson 1986) indicates a significant presence of Middle Missouri related ceramics at sites associated with riverine ecotones in the southern portion of the study area. The radiocarbon dates from the Lovstrom site (Table 6), which overlooks the Souris River valley, indicate an initial Middle Missouri presence by at least 1250 B.P. Materials from the Johnas site, which overlooks the Assiniboin River valley, and includes materials resembling Talking Crow and Campbell Creek wares (Smith 1977:152-155), suggest a prehistoric cross date circa

250 B.P. This timespan of some 1000 years indicates longstanding patterns of interaction between village horticulturists and Plains nomads which is in agreement with Syms (1977:120-121) hypotheses concerning the trade relationships of these groups from Middle Woodland times until the Late Prehistoric period.

Macroscopic examination of these vessels indicates that not only do the decorative motifs and fabrication techniques differ from local ceramics (Blackduck, Duckbay) but that the paste frequently differs in texture and temper. The paste tends to be finer grained and frequent lumps of grog (ground up ceramic) are to be found in lieu of grit or other forms of temper. This line of evidence suggests that some vessels were manufactured elsewhere and that probably they were transported into the study area. It may be that they were containers for corn or other horticultural produce intended for trade.

The Lovstrom site ceramics are, for the most part, consistent with manufacturing techniques and decorative motifs found in boreal forest derived Late Woodland wares such as Duckbay (Hanna 1982), Blackduck (Hamilton et al. 1981; Tisdale 1978) and the Early Variant of Saskatchewan Basin Complex (Byrne 1973). The sherds display a wide range of fabric and cord impressions including some unusual impressions of a looped cord pattern on the interior of one rimsherd (Nicholson 1986:67). In addition, among the surface collected sherds identified in the Lovstrom's collection from the site, there are sherds which show unmistakable affinity with Late Prehistoric period vessels from the

Middle Missouri region to the south. Virtually identical specimens have been recorded from the Stallcop site on the Milk River in northcentral Montana (Keyser 1980). Similar vessels have also been recorded at the Hagen site on the Yellowstone River (Mulloy 1942). The presence of this unique vessel indicates some form of culture contact between groups living in the Hudson's Bay drainage system and groups in the Mississippi drainage system. At the present time, the exact nature of this contact or the direction of movement of the populations is uncertain.

The majority of the surface collected Lovstrom ceramics appear to be Blackduck and Duckbay. Two neck sherds, S-1-48 and S-2-23, (Nicholson 1986) are identical with Blackduck specimens identified by Tiedale (1978: 151 & 157) at the Stott site, and three rimsherds, S-1-42, S-1-39, and S-2-19 (Figures 15 & 16), fall into categories proposed by Carmichael (1977) for Blackduck ceramics recovered at Wanipigow (Table 9). Four rimsherds appear to fit categories developed by Snortland-Coles (1979) for Duckbay ceramics recovered at Aeschikokahn (Table 9). In addition, several other rimsherds appear to be variations within the Blackduck and Duckbay repertoire of ceramic decorative techniques. Two sherds, 9-3-113 and 9-2-56 (Nicholson 1986:67), excavated in unit 9 may be Duckbay related. Rimsherd 9-2-56 (Figures 15 & 16) exhibits a plain exterior with notched lip impressions consistent with Duckbay Type B/Mode 7 but has a series of parallel knotted cord impressions on the interior of the rim. Sherd 9-3-113 is smaller (14mm x16mm) and appears to have parallel trailed impressions. Several sherds, S-1-31, S-1-32, S-1-37, and S-1-33,



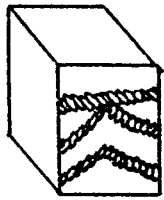
appear to be Blackduck variants which may be unique to the Lovstrom site. Some 126 body sherds represent an indeterminate number of probable Woodland vessels. These sherds are fabric impressed, obliterated fabric, or smooth surfaced. Some of these body sherds may also relate to the Saskatchewan Basin complex (Byrne 1973).

Catalogue Number	Classification	Reference	Site	Cultural Association
S-2-23	Mode 1c	Tiedale 1978:157	Stott	Blackduck
S-1-48	none	Tiedale 1978:151	Stott	Blackduck ?
S-2-19	Mode II Var 1	Carmichael 1977:26	Wanipigow	Blackduck
S-1-42	Mode IV Var 2	Carmichael 1977:34	Wanipigow	Blackduck
S-1-39	Mode V	Carmichael 1977:36	Wanipigow	Blackduck
S-1-45	Type A Mode 4	S.-Coles 1979:201	Aeschkib.	Duckbay
S-1-38	Type B Mode 7	S.-Coles 1979:203	Aeschkib.	Duckbay
S-1-34	Type B Mode 8	S.-Coles 1979:204	Aeschkib.	Duckbay
S-1-41	Type B Mode 9	S.-Coles 1979:205	Aeschkib.	Duckbay
S-2-20	Yr1	Byrne 1973:91	Morkin	Sask. Basin
S-2-22	none	Keyser 1980:15	Stallcop	M. Missouri

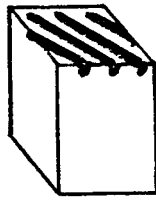
Table 9. Lovstrom ceramics related to existing typologies.

Several sherds, surface collected from the Lovstrom site, S-2-21, S-2-22, and S-2-31, (Figures 15 & 17), are from one or more Middle Missouri vessels. The vessel has a smooth finish and an "S" shaped profile (Nicholson 1986:71). Decoration is confined to a series of cord impressions running horizontally around the rim and includes a stylized rainbow motif. A vessel bearing identical decoration has been reported by Keyser (1980) at the Stallcop site on the Milk River in Montana (Table 9) and a similar vessel is reported at the Hagen site on the Yellowstone River (Mulloy 1942). Neither of the above sites has been dated by radiometric techniques.

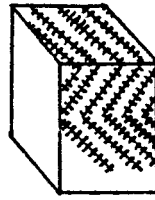
Some rimsherds do not fit comfortably with either the Blackduck, Duckbay or Middle Missouri types. One of these, S-2-20 (Nicholson 1986: 69), appears to be a variant of the Yri subclass within the Saskatchewan Basin complex (Byrne 1973:91). This rimsherd displays a smoothed surface and the lip tapers to 6mm from a maximum rim thickness of 11mm, while the base of the rim tapers to 8mm giving the rim a slight lens configuration in cross section (Nicholson 1986:53). The only decoration is a series of oblique right to left impressions on the lip made with a narrow flat instrument and spaced at about 5mm intervals. Several other smooth finished undecorated rim sherds may also belong to the Saskatchewan Basin complex. In general these rimsherds seem to belong to the transitional modes of the Early/ Late Variant of the Saskatchewan Basin Complex which, according to Byrne (1973), is post 1000 B.P.



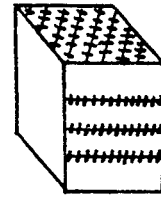
S-2-22



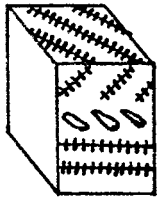
S-2-20



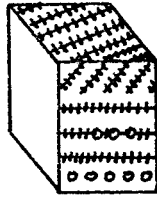
S-1-42



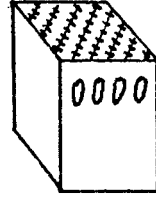
S-1-39



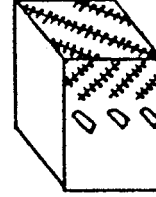
S-2-19



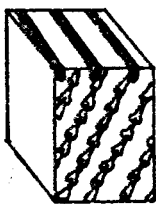
S-1-31



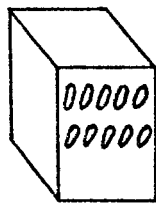
S-1-37



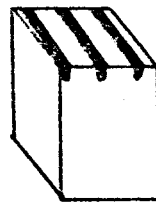
S-1-33



9-2-56



S-1-45



S-1-38

Figure 15. Rimsherd motifs from the Lovstrom site.

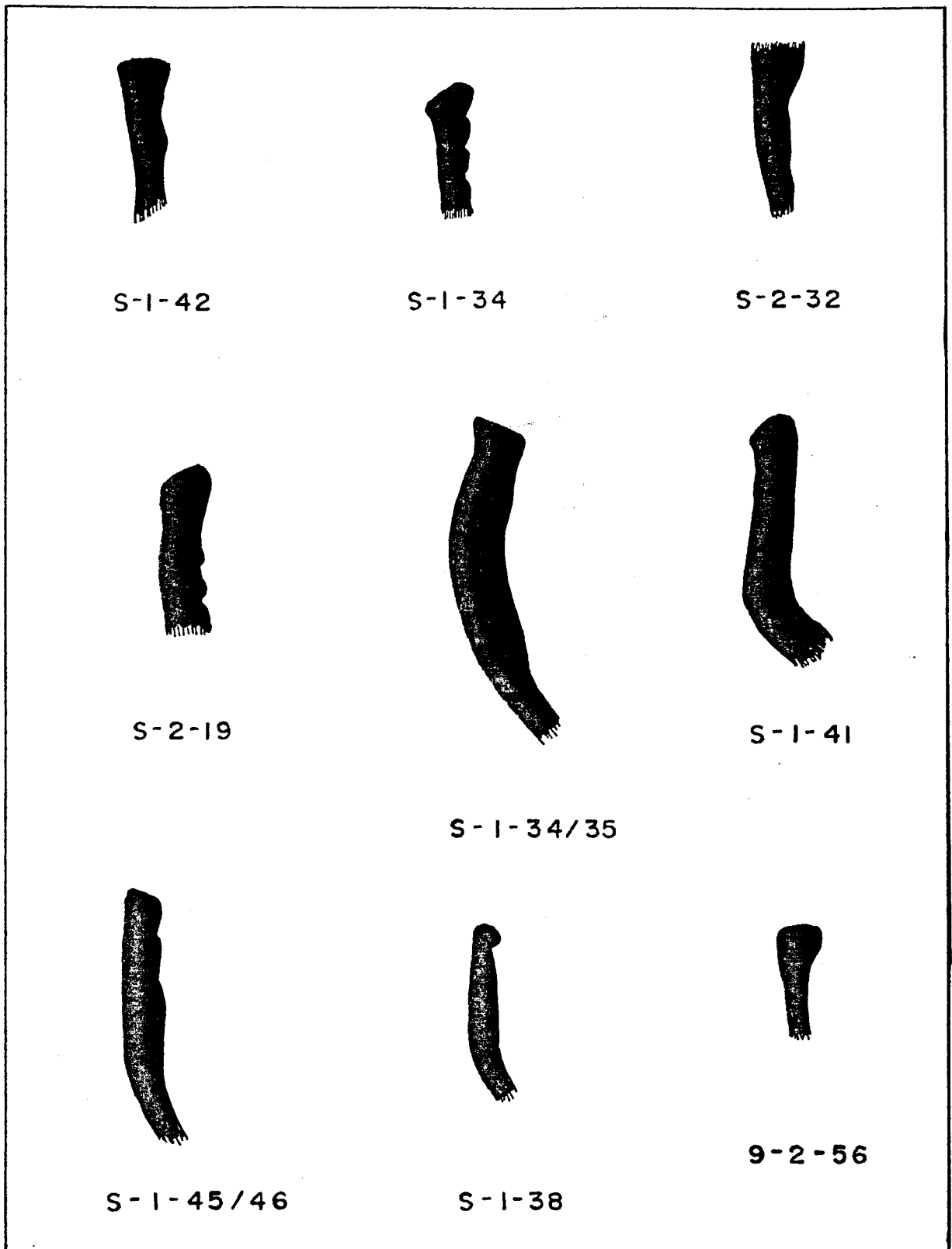


Figure 16. Rim profiles from Lovstrom site.



S-1-31/32



S-1-33



S-1-37



S-1-131



S-2-20



S-2-21/22/31

Figure 17. Rim profiles from Lovstrom site.

The mixture of local and imported ceramics could indicate either successive occupations of the sites or that the occupations were contemporaneous aggregations resulting from socio-economic practices such as trade or ceremonial/alliance activity. In postulating successive occupations, it is difficult to explain why groups from the Middle Missouri area, the Saskatchewan Basin, the Boreal Forest to the north (Duckbay) and to the east (Blackduck), would choose to successively occupy a single site on the north bank of the Souris River (Nicholson 1986) unless there was some practical reason to do so. Numerous other locations nearby would appear to be equally suitable from an ecological perspective and most prehistoric Middle Missouri (Initial Coalescent and earlier) horticultural sites were located on floodplains or terraces rather than on the high bank overlooking the floodplain (Jennings 1974). The location of the Lovstrom site would appear to be more ideally suited to trading purposes than to horticultural practice and there is little evidence at the present time to suggest that this site represents mass kills of bison or other big game. The local riverine ecotones would supply a diverse range of resources at most seasons of the year but would not withstand sustained exploitation by large resident populations. The present evidence suggests brief occupations rather than extended campsites or semi-permanent villages.

The available evidence suggests that the Middle Missouri materials found scattered over Southwestern Manitoba probably represent trading activity rather than actual settlement by village horticulturists. It

has been noted earlier (Chapter 5), and in the following chapter, that trade is a valuable risk reducing strategy in any adaptive system as well as a means for obtaining exotic materials. Because of this it is a reasonable expectation that some sites in an area will contain evidence of the direction and extent of exchange transactions. The Middle Missouri ceramics found in the study area are firm evidence of prehistoric socio-economic activity which crossed environmental and cultural boundaries.

CHAPTER 9: MODELING ADAPTIVE STRATEGIES IN THE FOREST/GRASSLAND  
TRANSITION AREA OF WESTERN MANITOBA IN THE LATE  
CERAMIC PERIOD 1250 B.P. - 250 B.P.

In Chapter 7 it has been shown that no single model can properly account for the diversity of adaptive strategies which could be developed within the study area. In part, this is attributable to the ecological diversity which is present and, in part, it is the result of historical factors - that is the retained traditions or skills of groups migrating into the study area from adjacent biomes.

Utilizing the biogeographic categories of biome and ecotone, and taking into account the technology and socio-economic capabilities of prehistoric hunter-gatherers, four basic adaptive strategies to exploit the subsistence potential of the study area have been proposed. These are:

- A) Seasonal round utilizing resources of a single biome
- B) Seasonal round utilizing resources of two or more biomes
- C) Seasonal round utilizing resources of a single biome together with seasonal exploitation of one or more ecotones
- D) Intensive exploitation of one or more ecotones

All of these strategies involve some degree of mobility for the populations as a whole since none of the resources of the study area are



sufficiently productive or sustained in yield to allow a fully sedentary adaptation to develop. A further underlying assumption postulates that all groups utilizing the study area employed appropriate 'risk reducing strategies' to turn seasonal surpluses to their advantage and to ameliorate seasonal or other environmentally induced shortfalls of food and necessary non food resources.

In the balance of this chapter the ethnographic and archaeological cultural groups which inhabited the study area will be used to test the applicability and explanatory value of these subsistence strategy models in terms of consistency with the published evidence, feasibility, and the likelihood of satisfying primary and secondary goals. The various historic and prehistoric groups will be contrasted and historic groups described in the early writings of European traders, missionaries and explorers, and the prehistoric groups as defined by distinctive artifact assemblages, which have been described in preceeding chapters, will be examined to determine whether their lifeways can be accounted for within the four subsistence strategy Types.

The adaptive strategies employed by the protohistoric and early historic occupants of the study area have been described in greater detail in Chapter 7. A brief summary will be presented here prior to a more detailed examination of the prehistoric evidence concerning systems of adaptation followed by archaeological culture groups which inhabited the study area.

The Assiniboine successively utilized strategies which 1) followed a seasonal round exploiting Parkland and Plains biomes [Type B]; 2) made a final shift towards dependence upon the resources of the Plains Biome with seasonal dependence upon ecotonal areas such as uplands and valley complexes within the Plains Biome [Type C]. These two basic strategies were supplemented by trade for horticultural produce with the Missouri Village Tribes. In the post fur trade period, the Assiniboine were confined to reserves in the ecotone areas of the plains where their lifeway was supplemented by Federal funding through treaty provisions [modified Type D].

The Cree followed the Assiniboine patterns except that the first strategy, seasonal reliance upon the resources of two biomes, was rapidly abandoned with the majority of the Cree withdrawing from the depleted parklands to return to their ancestral dependence upon the resources of the Boreal Forest Biome (Type A). A large minority adapted their subsistence strategy to the Plains Biome and relied primarily upon the exploitation of bison on the open plains in warm seasons and in the valley complexes in winter [Type C]. In the post fur trade period, the Plains Cree often shared reserves with the Assiniboine or established themselves under the provisions of treaties in plains ecotones.

The Ojibwa, at contact, relied upon a strategy of intensive exploitation of subsistence resources found within the Boreal Forest Biome together with minimal horticultural practice [Type A]. Following the extension of the fur trade networks, the Ojibwa expanded into the

parklands of the study area and shifted gradually from a boreal forest resource dependency to an intensive exploitation of the Mixedwood upland and forested margin of the parklands while retaining ties with the boreal forest and some of its resources - particularly fish and wild rice [Type B].

The Ojibwa expansion into the Plains/Parkland interface coincided with the decline and extinction of the bison herds. Following the demise of the fur trade economy, the Ojibwa were settled on reserves according to treaty provisions. Most of these reserves were located in ecotones within the parklands and included valley complexes, Mixedwood uplands, and riparian sites [Type D]. In principle, the treaties gave exclusive hunting rights to the Natives in these reserves, besides access to subsistence resources on Crown lands.

The archaeological cultures, for the most part, do not exhibit any clear ethnic association and have been identified on the basis of particular morphological and design attributes of certain classes of artifacts - specifically ceramics. These ceramic assemblages have been recovered together with other classes of artifacts throughout the study area and in adjacent biomes. There appears to be a marked tendency for these assemblages to be found associated with particular environmental parameters and ecological situations. While the data are far from complete, patterns of subsistence strategy which are consistent with the models proposed earlier in Chapter 7 have emerged (Figure 12).

SELKIRK (CLEARWATER LAKE PUNCTATE) The archaeological evidence indicates that groups using this ceramic ware followed a Boreal Forest Type A strategy. This ware has been attributed to the Protohistoric Cree and the associated remains show a continuity of subsistence strategy and of most elements of the procurement technology used by the preceding Laurel culture of the Boreal Forest. The goals of Selkirk ceramics users appear to have been met satisfactorily within the Boreal Forest biome and there is little hard evidence of extended trade or other risk reducing strategies such as food preservation and storage. At some sites on the margins of the forest biome (Meyer 1981) there are indications of some interaction with Plains groups (Chapter 8) and some short term storage, to meet brief seasonal shortfalls, was probably practiced by Selkirk users, since the Cree are known to have utilized freezing in winter and smoking and drying of fish and red meat in warm seasons to conserve seasonal surpluses.

BLACKDUCK Widespread archaeological evidence indicates that users of Blackduck ceramics employed a Type B strategy to exploit the resources of Boreal Forest and Parkland biomes (Chapter 8). It is uncertain to what degree bands migrated between Boreal Forest and Parkland sites but the presence of identical decorative modes on Blackduck vessels in Boreal Forest sites and Parkland sites (Table 9) indicates that such movement did take place. As is the case for Selkirk users, there is evidence of technological and subsistence continuity from the Boreal Forest adapted Laurel Complex to early Blackduck. Eastern Blackduck

sites, such as the McCluskey site (Dawson 1974) and the Pic River site (Wright 1967) give clear evidence of boreal forest adaptation while western sites such as Brockinton (Syms 1977), Stendall (Rushowick 1975) and Stott (Hamilton et al. 1981), provide evidence of seasonal mass kills of bison on the Plains/Parkland interface (Figure 15).

While the distribution of Blackduck ceramics does not generally extend west of the Parkland, particular decorative elements, which are characteristic of Blackduck decorative modes, commonly occur on Late Variant Saskatchewan Basin ceramics and in other western assemblages such as Hagen in Montana (Mulloy 1942). Radiocarbon dates (Table 6) indicate the presence of Blackduck assemblages in each biome throughout a period of several hundred years indicating longstanding continuity of the Type B strategy for Blackduck users. Strong evidence for employment of risk reducing strategies including storage and trade are provided by sites such as the Kain Cache site (Nicholson 1985b) and the Lovstrom site (Nicholson 1986).

DUCKBAY Based upon evidence from Aschkibokahn (the type site [Shortland-Coles 1979]), Duckbay people appear to have followed a Type D strategy. Hanna (1982,1984) has argued that an endogamous band of approximately 150 people successfully controlled access to the area surrounding their principal site located in a riparian ecotone. She further argues (Hanna 1984) that occasional outside marriage and trade - risk reducing strategies - account for the occasional appearance of Duckbay ceramics in contemporary Selkirk and Blackduck assemblages. The

major archaeologically identifiable food resource at this site was fish and Snortland-Coles (1979) argues that plant resources may have been of major seasonal importance. Moose, beaver and migratory waterfowl were also important dietary staples (Nicholson 1978).

Scattered finds of Duckbay ceramics indicate that the nearby Mixedwood Uplands may have served as a wintering area since the primary Aschkibokahn site was deficient in several critical non food resources. The site lacked shelter and an adequate fuel supply for an extended winter occupation. In addition, the site could have proved hazardous during spring breakup (Chapter 8).

The reason for the disappearance of the Duckbay adaptive strategy prior to European contact is unknown. It may be that other competing groups infringed upon the Aschkibokahn hinterland and depleted the resource base, compelling the Duckbay residents to disperse or adopt a more nomadic lifeway to expand their resource base territorially. It may also be that other undiscovered sites, resembling Aschkibokahn, are to be found in nearby riparian ecotones. Recent unpublished survey results (Riddle: personal communication) lend some support to this hypothesis.

Similarly, the reason for the prehistoric emergence of the Type D subsistence strategy identified at Ashkibokahn is unknown. The Ojibwa Type D strategy emerged as a direct result of environmental depletion and coercive enclosure on limited tracts of land. Hanna (1982) has suggested that the subsistence resources surrounding Aschkibokahn may

have been more abundant during the Duckbay occupancy than at any later time due to the mid-Atlantic climatic optimum and there is no evidence to suggest increased demographic pressures in Late Prehistoric times. The local resource abundance may simply have supplied the opportunity for a group of hunter-gatherers to escape some of the rigors of constant nomadism for a period of time.

TRADE/ALLIANCE SITES Several sites within the study area which contain mixed assemblages may be related to the implementation of 'risk reducing strategies' by bands following different types of subsistence strategies or distinctive socio-economic practices. Each of the proposed types of subsistence strategy would be expected to produce seasonal surpluses of particular commodities - foods such as dried or smoked meat and fish, rendered animal fat, wild rice and dried roots; non foods such as hides and fur, lithic materials, ceramic vessels, or other manufactured utilitarian or ceremonial goods of significance to the people involved (Figures 5&13).

In general, the exogamous pattern of mate selection followed by the majority of hunter-gatherer groups is consistent with the goals outlined in alliance theory for more complexly organized social groups (Cohen and Eames 1982:121-122). However, Hanna (1982,1984) has proposed an endogamous marriage pattern for the Duckbay inhabitants of the Aschkibokahn site to account for the unusual clustering of their ceramics within one major occupation site. By limiting contact with outsiders and eliminating the obligations commonly associated with

affines, the Duckbay people would have been better able to control the exploitation of their productive but spatially circumscribed ecotone. This postulated endogamy would favour the goals commonly outlined for Descent Theory (Cohen and Eames 1982:121-122) which, once again, is associated with more complexly organized social groupings. An endogamous pattern of mate selection would, however, facilitate the aims of a social group which was attempting to control access to the subsistence resources of a small ecotone. It should, however, be noted that Duckbay ceramics are frequently recovered as a minor element of other assemblages - notably Blackduck - which indicates that isolation from other groups was less than complete (Chapter 8).

The effective utilization of preserved surpluses and the need to maintain nutritional stability during seasonal or other environmentally induced shortfalls can best be satisfied through some means of exchange or trade. In band level societies these economic transactions are usually facilitated by social alliances such as kinship network extension or through recognized trading partnerships (Cohen and Eames 1982:100; Harris 1983 65-69). In addition, the pursuit of exotic items for the satisfaction of secondary goals which are initiated by culturally conditioned wants of taste, variety, prestige, and preservation or enhancement of sex roles, will inevitably lead to some form of exchange with outsiders.

Sites such as Lovstrom (Nicholson 1986) which contain mixed artifact assemblages derived from a wide geographical and ecological spectrum,



may be the result of intergroup exchange activities, together with other concomittant socio-economic activities. This site contains ceramic materials indicating the interaction of people utilizing widely divergent subsistence strategies within a series of contiguous but divergent environmental biomes. In addition to Blackduck, Duckbay, and Saskatchewan Basin Complex ceramics, representing Boreal Forest, Parkland, and Plains habitats, the Lovstrom site contains Middle Missouri ceramics which indicate interaction with surplus producing horticultural village tribes living to the south. This site is located on the north bank of a resource rich ecotonal Valley Complex. The highly fragmented faunal remains at the Lovstrom site, together with an abundance of calcined and burnt bone, indicate intensive processing of small numbers of animals (Nicholson 1986). Since such processing would normally be carried out by women, it can be assumed that entire family groups were present and not just males who were engaged in trading activity. It is likely that such sites resulted from trading activities together with a conscious provision for the extension of alliances and kinship networks through intermarriage.

#### SUMMARY OF ARCHAEOLOGICAL SUBSISTENCE MODELS

Subsistence strategies for the study area have probably changed very little throughout the Neo-Indian period (1750 B.P. - 250 B.P.) although the strategies utilized by particular groups may have changed markedly. In support of this idea it has been shown in Chapter 7 that during the

Protohistoric and Ethnographic periods (A.D. 1700 - A.D. 1870), that, as various Native groups moved through the area, their subsistence strategy changed according to the nature of the subsistence opportunities which were available to them in their new environments (Figure 15). The causes or incentives contributing to change in historic and protohistoric times are reasonably well understood and the rate of this change was accelerated compared to the evidence for prehistoric change. Essentially, the adaptive repertoires remained in place geographically while the different groups gradually moved through the area and successively acquired new repertoires and abandoned old ones. It is probable that similar demographic shifts took place in early prehistoric times - especially in the aftermath of the Altithermal, at a time when forest and parkland habitats were expanding and the xeric grasslands shrinking. The rate of adaptive change in prehistory would be expected to approximate the rate of environmental change in the absence of any dynamic or unusually precipitous cultural innovation or upheaval.

The diversity of potential subsistence resources available for human populations within and adjacent to the study area suggest that several broad adaptive strategies would have been viable. All of these proposed strategies, which are based upon hunter-gatherer technology, presuppose some degree of population movement. In addition, it is proposed that various risk reducing strategies would be employed to guarantee access to resources and to more evenly distribute seasonal surpluses throughout an extended portion of the year and over a wider geographical area.

The four Types of adaptive strategy, which have been proposed for the study area, have been shown to be adequate for satisfaction of the primary and secondary goals of historic and prehistoric groups of hunter-gatherers who inhabited the region. With the depletion of the resource base - particularly bison - and the encroachment of European agriculturalists onto large tracts of the Parkland and Plains, the major adaptive strategies became unworkable. Of the four strategies which have been proposed, only Type D - the intensive exploitation of ecotones, survived in a modified form within the study area until recent historic times (Figure 12).

CERAMIC DISTRIBUTION The groups which have been discussed in this chapter have been identified primarily on the basis of their ceramics. It is problematic as to whether the distribution of ceramic bearing sites reflects the full round of subsistence activities participated in by the groups under study.

Ceramics are generally assumed to be manufactured and used by females and associated with processing activities which involve the containment of fluid and the application of heat. Among groups where hides are abundant (i.e. Plains adapted bison hunters), pits dug into the ground, lined with green hides and fuelled by preheated stones serve these requirements quite satisfactorily. However, the archaeological record indicates the presence of ceramics in a wide range of different ecological and functional situations.

The Brockinton, Stendall and Stott sites are all bison kill and butchering sites which contain an abundance of Blackduck ceramics. The Aschkibokahn site, a campsite where fishing was the major subsistence enterprise, contains a large number of Blackduck vessels in addition to the dominant Duckbay ware. Sherds of Blackduck and other ceramic wares have been recovered in situations which suggest transitory travelling camp sites (Badertscher 1982; Zywna 1982) or supplementary subsistence activities such as berry picking or root harvesting. A lithic workshop (Magne and Shay 1980) has similarly been given a Blackduck cultural assignment based upon the presence of ceramics. In addition, sites such as Lovstrom indicate intergroup relationships based upon the presence of several distinct, contemporaneous ceramic wares in a single site.

There are, however, some subsistence related activities which would be unlikely to be accompanied by ceramics. These would be related primarily to 'male only' tasks. Male initiation or ceremonial sites (Carmichael 1979) might not be expected to yield evidence of ceramics. Similarly, game lookouts and lithic quarry sites are unlikely to contain ceramics. Small scale hunting kills where the meat was butchered and transported to a camp site could be expected to yield only a small lithic assemblage. Other small short-term occupancy foraging camps which were outliers from a large residential camp (Binford 1982) may contain no ceramics unless a ceramic related function was performed there.

Ceramics are awkward to transport and highly susceptible to breakage. It is probably no coincidence that large ceramic sites are usually

located on a waterway where water transport was available. While small aceramic lithic and bone assemblages from the Late Prehistoric Period have been identified in the study area, the major sites, which represent harvesting of a wide range of resources, contain ceramics. It is probable that a reasonable representation of seasonal rounds can be reconstructed from the ceramic bearing sites although many logistical campsites will elude positive assignment.

#### HUMAN ECOLOGY OF THE FOREST/GRASSLAND TRANSITION ZONE OF WESTERN MANITOBA

The ecology of humans, like that of all other living species, is subject to the conditions imposed by the environment. The limitations or opportunities which the subsistence base provides, mediated by the level of technology and the achieved socio-cultural capability for organization of human resources, determine the nature of the adaptive strategy which will evolve within any given society. The speed or precise direction taken by any individual adaptive strategy will also be influenced by a number of culturally directed controlling variables which, taken together, will be unique to any given society. The adaptive strategies which have been modelled for Prehistoric and Historic populations utilizing the Forest/Grassland Transition Zone of Western Manitoba attempt to account for settlement and subsistence patterns which emerge from the archaeological and ethnohistoric records. The models themselves are based upon the environmental opportunities which the region affords.

The subsistence strategies of the three major groups utilizing portions of the study area during the ethnohistoric period, the Assiniboine, the Cree, and the Ojibwa, are relatively well known, as are their directions of movement from the forest, through the parkland and onto the plains. It is also known that their occupation of the study area was in part contemporary but mainly sequential. The reasons for their expansion towards the west and some of the reasons for its success are also known. European settlement and diseases, European technology and the fur trade, and the introduction of the horse, all provided impetus to this expansion at the expense of other contemporary western groups.

The prehistoric analogues are, of course, much less well understood. Some archaeological manifestations have persisted for thousands of years, displaying a remarkable degree of conservatism in artifact style and lifeways; others emerge briefly and undergo rapid transition or disappear enigmatically from the record. In prehistory, there is evidence to suggest the flow of people and ideas from many directions, whereas in the protohistoric period, almost all movement is from east to west with only perishable furs moving from west to east. The socio-economic determinants of population movement in prehistory are extremely difficult to discover, although we know that trade and other forms of exchange must have played an important part in the social dynamics of most prehistoric groups (Burley et al. 1981; Millar 1981; Nicholson 1986; Syms 1977). The constraints upon the movement of human groups

which are most evident in the archaeological and paleoenvironmental record, relate to changes in climate which affect the biological subsistence of all species including Homo sapiens. Major changes in artifact assemblages, and the inception of new archaeological complexes and changes in their distributions, show a marked correspondence with broad environmental changes on the Northern Plains and adjacent regions (Table 2). Numerous authors (Buchner 1979; Dyck 1983; Frison 1978; Jennings 1974) have demonstrated the general correspondence of these cultural and environmental events and have reconstructed some of the circumstances accompanying them. It has been noted earlier (Chapter 8) that cultures, as defined by archaeological assemblages, are not necessarily equivalent to ethnicity of the populations which may have been in some way involved either as users or agents of artifact dispersal and this point should be remembered throughout this summation.

Against the background of 10,000 or more years of prehistory in the study area, the Protohistoric and Ethnohistoric periods covering less than 200 years, seems insignificantly short - less than one standard deviation on most C14 dates. This time period has incorporated numerous anomalies into the archaeological record which would be extremely difficult to discover in the absence of the ethnohistoric accounts. The confinement of Selkirk/Clearwater Lake ceramics to the boreal forest is an artifact of the introduction of metal pots into the Cree cultural assemblage at a particular point in time and does not represent the final boundaries of Cree expansion. Given the rapid but brief expansion

of the Ojibwa into the area, their occupation probably cannot be distinguished at all as separate from the general distribution of European, fur trade related, artifacts. The entire period is too brief to be sequentially ordered by means of radiometric dating. What remains that is to some degree comparable with the identifiable, and in most cases longer lived prehistoric manifestations, are the subsistence strategies.

The protohistoric and ethnohistoric strategies appear to have been consistently related to the environmental opportunities, regardless of the ethnicity of the groups living in the various areas. Each succeeding group seems to have interacted with the preceding group and acquired the technology most suited to harvesting the available food resources. This may be partly a function of the speed at which replacement and expansion took place in this short 170 year period. During these population shifts, there was a rapid depletion of game resources and the fur trade network facilitated and encouraged expansion of hunters into new, less intensively exploited areas.

The events of prehistory seem to be less strictured, perhaps more gradual, and indicate a wider variety of adaptive schemes related not only to broad environmental parameters but possibly to social configurations as well. There is virtually no information on the subsistence strategies of Paleo-Indian cultures in the study area and, from the study of later groups, it is clear that extrapolations over long distances are as likely to be incorrect as otherwise.



In an attempt to understand economic decision making processes, among hunter-gatherers, Keene (1981a:11) proposed that, "When faced with a choice between two resources of equal utility, the one with the lowest cost will be chosen." Utility is taken to mean usefulness to the evaluating individual, in terms of food and non food yield, and cost is treated as a function of time invested, energy expended, and risk incurred (Keene 1981a:12). If this assumption is accepted as reasonable, then any included model of decision making within a model of adaptive strategy will follow this line of thinking and, "Faced with an array of resources of varying costs and varying utilities, hunter-gatherers will attempt to select the combination of resources which can best satisfy their basic needs at the lowest possible cost" (Keene 1981a:13). This utility/cost equation is assumed to have shaped the adaptive strategies outlined earlier in this chapter and in Chapter 7.

COMPARISON OF HISTORIC - PREHISTORIC ADAPTIVE STRATEGIES It is difficult to contrast prehistoric and historic adaptive strategies through archaeological recoveries because of the very short duration and transitory nature of the latter. Any attempt to verify the movements of historic Native groups in the area through material remains would help only in tracing distribution networks of the European fur trade, since fur trade goods accompanied all Native movement from the protohistoric period onward. As metal projectile points and guns, steel knives, and copper or iron pots, replaced stone, bone and ceramic artifacts in the Native assemblages, the material indicators of Native ethnicity disappeared from the archaeological record.

The only information which is readily available regarding subsistence strategies of Native groups in the protohistoric and post contact eras is found in the writings of European observers. These accounts record sporadic observations of groups in transition, pursuing new opportunities, or abandoning depleted habitats. It may be that some of the isolated finds of exotic or unusual lithic or ceramic materials which have been recovered from time to time - primarily as surface finds - represent brief passages of such cultural groups in prehistory.

The Cree represent one such brief passage in the early historic period. It has been generally accepted that the Cree were the makers and users of Selkirk/Clearwater Lake Punctate ceramics (Buchner 1979; MacNeish 1954; Syms 1977). While it may not be possible to demonstrate that the Cree were the sole group associated with Selkirk ceramics over their 800 year history, the adaptive strategy which has been outlined for Selkirk and Clearwater Lake Punctate users is consistent with that of the protohistoric/historic Cree. Aside from the documented over exploitation of fur bearing species which took place with the advent of the fur trade, there appears to have been some 800 years of cultural continuity for groups associated with Selkirk wares. A marked degree of resource stability is necessary in order that a Type A strategy should sustain a large cultural group within a single biome for such a lengthy period of time.

The distribution of Blackduck sites throughout the southern boreal forest and the parklands is consistent with a Type B strategy. The

presence of identical decorative modes on vessels in both biomes supports this interpretation (Table 9). It is not clear at the present time to what degree the resources of the two biomes were exploited by means of population movements following a seasonal round, or by means of commodity exchange - that is, trade or gift giving along traditional kinship networks.

Radiocarbon dates indicate Blackduck continuity for approximately 1000 years beginning circa 1300 B.P., with the earliest and latest dates being found in the Upper Great Lakes region (Syms 1977). Relatively early dates have been obtained in the study area (Table 6) but there is little evidence of Blackduck ceramics in the parklands after 500 B.P. It is unknown whether this is a result of the retreat of Blackduck users into the boreal forest where they may have adopted a Type A strategy, or whether it is due to the abandonment of ceramics by a segment of the population who were moving into a more plains resource oriented adaptation.

The first interpretation seems unlikely unless it can be shown that Blackduck users adopted Selkirk ware, since this is the ware which appears to have replaced Blackduck in the latter part of the Late Prehistoric and Early Protohistoric periods. The second interpretation seems more probable since there is no apparent successor to Blackduck ceramics in the study area. Some of the surface collections in the southwestern part of the study area have produced a few sherds which bear resemblances to Coalescent Middle Missouri ceramics but there is

insufficient evidence to postulate a major occupation which could have replaced the Blackduck users. The Saskatchewan Basin Complex appears to have developed for the most part from an earlier Middle Woodland base and there is little to suggest a Blackduck presence to the west of the study area. The undated materials from the Hagen site on the lower Yellowstone River in Montana (Mulloy 1942), do bear some resemblances to Blackduck ceramics but given the absence of any reliable chronology, all speculations regarding the possible direction and timing of population movements are pointless.

In the case of the Blackduck assemblages, a tentative analogy can be made to the protohistoric Assiniboine. The early ethnohistoric record indicates presence of the Assiniboine in the southern boreal forest and the parklands. These people were following a Type B subsistence strategy utilizing the resources of both biomes and supplementing their subsistence with annual fall trading expeditions to the horticulturally based Mandan villages on the Middle Missouri. As the Gros Ventre were forced westward, the Assiniboine shifted onto the plains and rapidly moved into a Type C adaptive strategy based upon intensive exploitation of bison on the xeric prairie in summer and shifting into the Valley Complexes and uplands in winter. The shift to the plains was accelerated by the introduction of the horse and the demand for bison products which was created by the fur trade. This transition was achieved in a space of less than 100 years. Based upon dates from the Stott site, a similar Blackduck shift would have taken place over a period of some 500 years.

since the dates associated with Blackduck ceramics cover at least that length of time.

Within the study area, all mass kills of bison which have been identified post 1200 B.P. are associated with Late Woodland ceramics - where a more specific cultural assignment can be made - Blackduck ceramics. A variety of campsites or other brief occupations have been noted but the Blackduck people appear to be, at the present time, the last archaeologically identifiable group to conduct mass kills of bison within the study area. The reason for this is unknown and the hiatus may indicate a sampling problem. With the advent of the horse, repeated small scale kills scattered across the landscape became the norm, although as late as 1757 (Rich 1958) the Assiniboine were taking bison in pounds near the present site of Portage-la-Prairie and the Plains Cree continued to do so well into the latter half of the eighteenth century in Saskatchewan (Atwood 1970; Hind 1860).

The Type D strategy employed by Duckbay ceramic users has no ethnographic parallels in the study area and only emerges in the late Historic Period in modified form in the reserves set aside and supported by Federal treaty. This situation suggests that a Type D strategy will not emerge except under an unusual combination of environmental and/or social circumstances. Such circumstances must have occurred circa 750 B.P. at the Ashkibokahn site, located in a riparian ecotone adjacent to the modern Pine Creek Indian Reserve, where Duckbay ware is the dominant ceramic material. Elsewhere, these ceramics are occasionally found as a

minor component in Blackduck or, occasionally, Selkirk assemblages. This pattern suggests a stable social configuration wherein a relatively small community exercised control over the resources of a rich ecotone while maintaining limited commerce with larger outside groups. The principal subsistence resource for Duckbay people was fish, supplemented by moose, aquatic rodents, and migratory waterfowl. These basic subsistence items are those utilized in a Type A boreal forest adaptive strategy. The unique aspect of the Duckbay strategy is that instead of relying upon group mobility to harvest widely dispersed resources, the Duckbay people were able to maintain control of an exceedingly rich ecotone and limit access by outsiders. By virtue of this control, they established a longterm seasonal occupation which lasted from spring through fall with a winter dispersal into the adjacent Mixedwood uplands - another ecotone area.

Based upon recovered faunal remains in the study area there is little evidence for a parallel to the intensive exploitation strategy employed by the Ojibwa in the late Historic period. The ethnographic sources dealing with early historic Ojibwa in the study area (Atwood 1970; James 1956) indicate a primary reliance upon the meat of furbearer species, supplemented by European foods - flour, bacon, lard, etc. - obtained from traders together with limited horticulture. Evidence of Ojibwa wintering sites, as described above, would be expected to yield the remains of furbearers in large numbers with occasional large ungulate. No such sites have been recorded from the prehistoric period. This

absence may reflect a sampling problem since relatively few sites have been excavated in the Mixedwood uplands and the acid soils rapidly destroy bone of all kinds - especially small mammals.

The record provided by the archaeological assemblages indicates a reasoned and sensitive response to environmental opportunities which is consistent with, if not predicted by, Optimal Foraging Theory for hunters and gatherers in a temperate forest/grassland transition zone. The expression of this response is modified by the respective traditions and collective experience of the participants who shared in the various archaeological cultures which inhabited the Forest/Grassland Transition Zone of Western Manitoba.

It has been stated earlier in this chapter that decision making results from an evaluation process which weighs utility against cost. Elsewhere (Chapter 5), it is acknowledged that historical factors, together with ideology and belief systems, may also affect the decision making process. Since ideology and belief are rarely discernable in the archaeological record, and archaeological evidence for enculturation or traditional transmission is largely limited to observations of cultural continuity or discontinuity, the utility versus cost equation forms the most useful means for the reconstruction of prehistoric decision making processes.

The rapid changes in adaptive strategy which have been modelled for the Protohistoric/Historic period have been constructed utilizing

ethnohistoric materials which contain a wealth of detail on the movement of individuals and family groups belonging to various Native cultures. The archaeological record for the same time period does not provide this kind of detailed socio-cultural information and would merely indicate a simultaneous rapid disintegration and ultimate disappearance of native groups accompanied by the rapid expansion of European material culture. It may be that the implied conservatism found in the archaeological record is more apparent than real, and that while diagnostic artifact styles persisted, the ethnicity of their users may have changed. Similarly, the diffusion of archaeological cultures may represent dispersal of ideas rather than the movement of people. In Chapter 7, it has been shown that while several historically documented ethnic Native groups moved through the study area over a period of some 170 years, the basic adaptive strategies remained in place. This observation is consistent with the utility/cost equation and, holding technology constant, it is a predictable outcome. However, the historically documented subsistence resource depletion which accompanied the fur trade expansion and led to intensification of subsistence resource harvesting and ultimately the collapse of the Native adaptive strategies prepared the way for the introduction of industrial technology and radically changed adaptive strategies. The remnants of Native culture and adaptive strategies were subsumed into the lower echelons of the European market economy and became materially indistinguishable from other segments of the new dominant society, although many of these groups have persisted and maintained their cultural identity to the present time.



It has been shown in this dissertation that the ecological parameters of the biophysical environment will elicit a limited range of adaptive responses among hunters and gatherers. Given knowledge of the diversity and abundance of the basic subsistence resources found in the area, these responses are, in a broad sense, predictable under a utility versus cost equation. By means of this approach four adaptive strategies which would satisfy the subsistence needs of prehistoric groups living in the study area have been proposed. In addition, by examining the ethnohistoric and archaeological record, it has been demonstrated that many groups implemented a variety of 'risk reducing' strategies to ameliorate the negative impact of resource fluctuations and to satisfy the need for non essential exotica related to an enhanced lifeway. The argument has been made that the general framework of adaptive strategies can be reconstructed from paleoecological data or by means of ethnographic analogy. However, verification or testing of the usefulness of the models as explanatory devices within the prehistoric context can only be achieved through the careful examination of archaeological data. When the predictive statements, which have been generated from a model derived from an independent data source, are shown to be useful in explaining distributions or patterning observed in an unrelated data set, then the overall worth of the modeling exercise and its continued applicability are supported.

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