Archaeological Investigations at the Dog Child Site (FbNp-24): An Evaluation of Mummy Cave Subsistence Patterns

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Abstract

The Dog Child site is a multi-component archaeological site located within Wanuskewin Heritage Park, approximately three kilometres from the City of Saskatoon, Saskatchewan. The site was excavated from 2004 to 2009 during the summer field season with help from the University of Saskatchewan Department of Archaeology and Anthropology field school and the Saskatchewan Archaeological Society field school. A Master of Arts thesis dealing with the first three years of excavation entitled *The Dog Child Site (FbNp-24): A 5500 Year Multicomponent Site on the Northern Plains* was completed by Cyr (2006).

A focus on the 2007 to 2009 field seasons has been undertaken in this thesis. Artifacts including projectile points and pottery recovered from the site as well as radiocarbon dates confirm the presence of six occupation levels. Five different projectile point series or complexes are associated with the six occupation levels including: Plains Side-Notched, Prairie Side-Notched, McKean series, Oxbow complex, and Mummy Cave series (Gowen). The Mummy Cave series at the site encompasses two of the occupation levels identified. Due to the rich Gowen cultural level at the site the opportunity to study this cultural occupation in more detail became the focus of the second research program.

The Hypsithermal is a period of increased complexity and debate on the Plains. This thesis focuses on the 7500 to 4500 years B.P. time frame during which Mummy Cave series cultural occupations are present. The archaeological remains recovered from the Gowen occupation at the Dog Child site suggest the utilization of a broader subsistence base rather than a sole focus on utilizing and consuming bison. Comparison of other sites from this time period indicates that the Dog Child site may be unique in the number of specimens and taxa represented by the excavated faunal assemblage. From this analysis a wealth of new archaeological data including insight into Hypsithermal subsistence patterns and paleoenvironmental studies can be observed.

Acknowledgements

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This thesis is dedicated to my parents David and Doreen Kobelka who encouraged me to further my education. Thank you for everything!

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Abbreviations

B.P.	Before Present (ca. 1950)
cal. B.P.	Calibrated years before present
SAS	Saskatchewan Archaeological Society
MVA	Meewasin Valley Authority
N	Number of artifacts recovered
NISP	Number of individual specimens
MNI	Minimum number of individuals
MNE	Minimum number of elements
MAU	Minimum number of animal units
%MAU	Percentage of minimum number of animal units
sp.	Species
m	metre
m^2	square metres
cm	centimetre
mm	millimetre
km/h	kilometres per hour
h	hour
°C	degrees Celsius
µ	Microns
g	grams
kg	kilograms
°	Degrees
Cat. #	Catalogue number
FCR	Fire cracked rock
SRC	Swan River chert
KRF	Knife River flint
AMS	Accelerator mass spectrometry
Cheno-Am	Chenopodaceae- Amaranth
^{14}C	Carbon 14
^{13}C	Carbon 13
δD	Stable isotope ratio of hydrogen
D/H	Deuterium/Hydrogen
$\delta^{15}N$	Stable isotope values of nitrogen
$\delta^{13}C$	Stable isotope values of carbon
HBC	Hudson’s Bay Company
NWC	North West Company

Chapter 1

Introduction

1.1 Introduction

Wanuskewin Heritage Park is of considerable archaeological interest due to the large concentration of sites in such a small area. To date 21 archaeological sites have been located within the region (Figure 1.1), 19 of which are precontact and two of which are historic (recent) (Walker 1988). This thesis will focus on the Dog Child Site (FbNp-24), the eighth site to be excavated at Wanuskewin. This is a multi-component site with six occupation levels, each of which has produced diagnostic artifacts. Excavations began at the Dog Child Site in 2004 as part of the University of Saskatchewan Department of Archaeology and Anthropology field school. Due to the wealth of Early Precontact period material found at this site excavations have continued over six summers and were completed during the summer of 2009.

In total, 71 m^2 have been excavated at the site. Due to the large amount of material recovered two theses were written on the site. The first one was completed in 2006 by Talina Cyr, *The Dog Child Site (FbNp-24): A 5500 Year-Old Multicomponent Site on the Northern Plains* which looks at the general occupation of the site with a brief dialogue into Mummy Cave occupations of the site and surrounding area. The present thesis also looks at the site in general, but focuses on the paleoenvironmental record and subsistence pattern of the Mummy Cave period occupation at the site.

1.2 Thesis Objectives

This thesis addresses a number of objectives through analysis of the artifacts recovered from the 2007 to 2009 excavations at the site:

(1) To provide an account of the paleoenvironmental record of the Hypsithermal (approximately 9000 to 4500 years B.P.) and the effect it may have had on people;

(2) To survey a sample of Mummy Cave series occupations on the Northern Plains in order to determine subsistence patterns;

(3) To examine the notion of a shift to a broader subsistence base during the Mummy Cave occupation at the Dog Child site;

(4) To reaffirming the cultural sequence identified by Cyr (2006);

(5) Analyzing and describing artifacts and features recovered from each level;

(6) Determining the number and types of faunal taxa present in each level; and

(7) Identifying activity areas and interpreting seasonality and subsistence patterns when possible.

It is believed that this thesis will be utilized as a comparative framework for future research on archaeological occupations of the Northern Plains especially with regard to subsistence patterns of the Hypsithermal period. This thesis will also supplement the larger research initiative of Wanuskewin Heritage Park in order to further our understanding of the area and of archaeological occupations on the Northern Plains.

1.3 Thesis Organization

This thesis is composed of 13 chapters including this overview. Chapter 2 provides an overview of the biophysical environment of the Dog Child site and Wanuskewin Heritage Park including the history of the area, geology, hydrology, geomorphology, and floral and faunal resources. Chapter 3 presents the cultural chronology of Saskatchewan from the Early Precontact period to the Contact period. Chapter 4 includes a summary of the methodology utilized in this study including excavation and laboratory methods followed in the analysis of artifacts and features. Chapter 5 presents the stratigraphy at the Dog Child site as well as radiocarbon dates obtained from the cultural levels.

Chapters 6 to 11 present an overview of Levels 1a, 1b, 2a, 2b, 3a, and 3b, respectively. Each chapter begins with a short summary of associated radiocarbon dates, if obtained, and stratigraphy. A short description of the lithic remains recovered from the 2004 to 2006 excavations is presented. This is followed by a detailed description of the lithic artifacts recovered from the 2007 to 2009 excavations. A similar format for discussion of the faunal assemblage has been utilized including a brief summary of the 2004 to 2006 excavations as well as a summary of the 2007 to 2009 faunal assemblage. The 2007 to 2009 summary includes a discussion on the number of identified and unidentified specimens, species identification, and a discussion of the identified species. This is followed by a short discussion on the seasonality of the level. A discussion on the distribution of artifacts and features is presented noting and explaining the presence of hearths, soils stains, and/or artifact concentrations. Each chapter ends with a discussion about the cultural level in question and includes an interpretation of the level as a whole.

Chapter 12 addresses the nature of the Hypsithermal. The past and current thoughts on the abandonment of the Plains during this period are presented. This is followed by a discussion of the climate and its impact on the people at this time with a particular focus on the Northern Plains. An intersite comparison of six sites from the Northern Plains is presented to allow for comparison of subsistence patterns between the sites. This includes a summary on site discovery and excavation followed by lithic and faunal remains recovered from the site. Lastly, the subsistence patterns of Level 3b (Mummy Cave occupation) at the Dog Child site is discussed and the idea of a broader subsistence pattern is presented. Chapter 13 summarizes the Dog Child site and includes recommendations for future work and research.

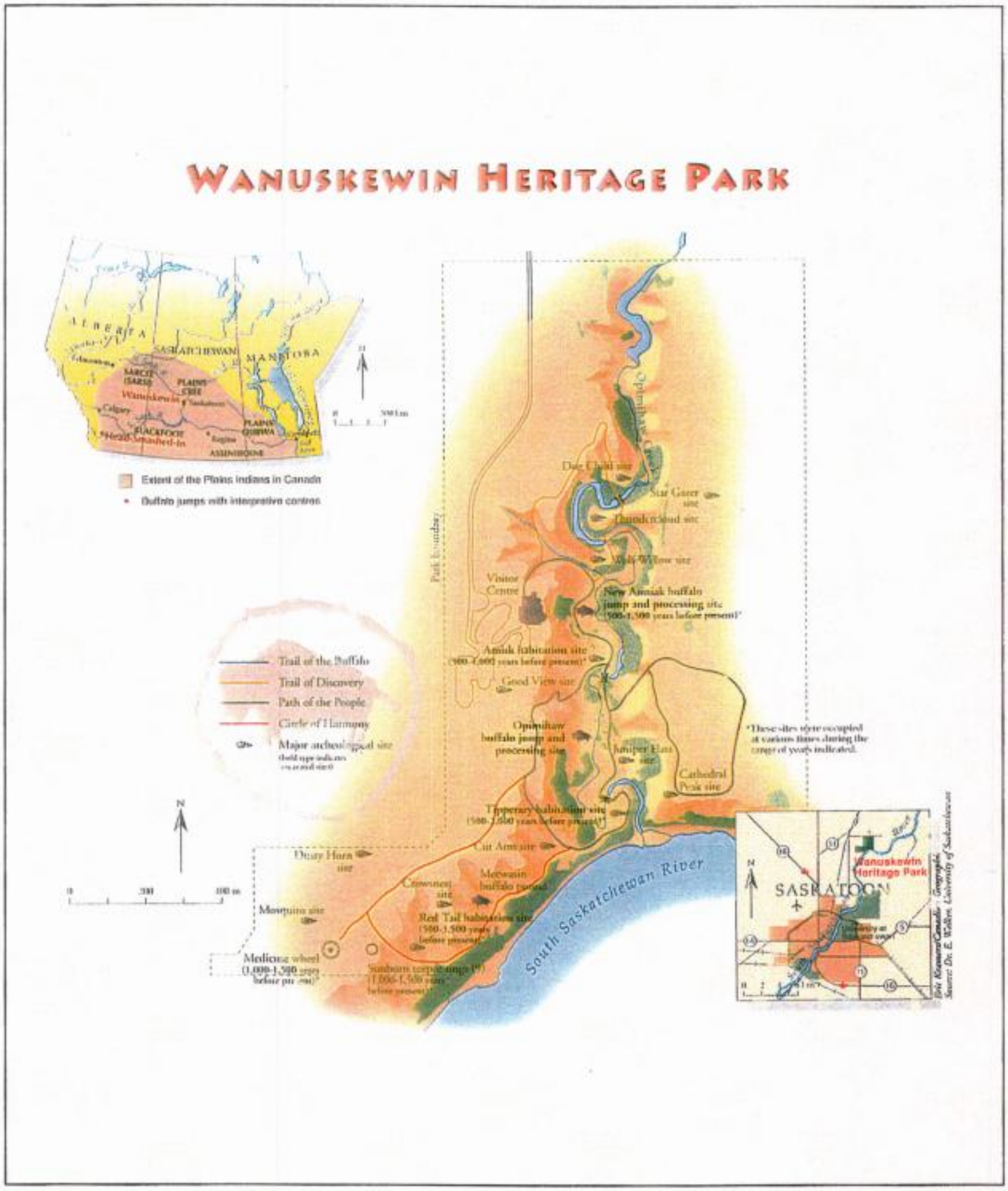

Figure 1.1: Location of archaeological sites in Wanuskewin Heritage Park (Canadian Geographic, September/October 1994:27).

Chapter 2

The Biophysical Environment of the Dog Child Site

2.1 History of the Area

Situated in a small valley on the west bank of the South Saskatchewan River, Canada's Wanuskewin Heritage Park represents approximately 6,000 years of precontact human occupation. Wanuskewin Heritage Park has been an area of archaeological interest for more than 60 years. Opimihaw Creek, formerly known as Tipperary Creek, was first visited by members of the Saskatoon Archaeological Society (SAS), particularly J.W.T. Spinks, past president of the University of Saskatchewan, in 1932. Visits to the area by SAS members continued sporadically throughout the 1940s and 1950s (Walker 1988). From the 1940s to the 1970s many amateur and professional archaeologists, including Thad C. Hecker from the North Dakota State Historical Society, also visited the area to conduct test excavations. In the 1960s a number of SAS members, along with Thomas Kehoe, then of the Saskatchewan Museum of Natural History in Regina, conducted a small excavation through the boulder alignment in the area. In 1965, under the direction of Z.S. Pohorecky, a group of University of Saskatchewan students carried out small scale test excavations at one site in the park (Walker 1983, 1988). Then in 1978 Raymond Moriyama, a Toronto architect, visited the Saskatoon area and played an important role in the initial plans for preservation of the South Saskatchewan River Valley. He was given the task of designing a conceptual 100-year Master Plan for the Meewasin Valley Authority (MVA), a newly developed agency in the Saskatoon area dedicated to the protection and preservation of the Saskatoon portion of the South Saskatchewan River Valley (Walker 1988). This plan "recognized the tremendous scientific, educational and recreational potential of the Tipperary Creek area and clearly designated it as a major focus of interest" (Walker 1983:1).

The particular parcel of land on which the Wanuskewin Heritage Park sits had been homesteaded in 1903 by the Penner family. The land was sold and from 1934 to 1980 was owned by the Vitkowski family. Then in 1981, Michael Vitkowski put the property up for sale. Mr. Vitkowski knew the importance of the area and hoped for the land to be purchased by a person or agency who would protect its rich historical resources (Walker 1983). The land was initially purchased by the City of Saskatoon for eventual resale to the MVA. Although it was known for precontact artifacts, an assessment of the area had never been completed. Therefore the MVA contacted Dr. Ernest Walker and in 1982 and 1983 a detailed archaeological assessment of the area was conducted (Walker 1983, 1988). Dr. Walker, along with a couple of volunteers, located 21 archaeological sites (19 precontact and two historic Euro-Canadian sites) through surveying and test excavations (Walker 1988). After completion of the assessment in 1983, the MVA purchased the property containing the archaeological sites and launched an initiative to establish a heritage park in the area based on the archaeological assessment (Walker 1988). The MVA's plan for the area augmented the 1978 100-year Master Plan with a new master plan, a market study, a resource management plan, a visitor services plan, and a research program (Walker 1988).

Wanuskewin Heritage Park has served as a beacon for management, promotion, and protection of North American prehistory for many years. Due to its uniqueness the Provincial Government declared the area as a Provincial Heritage Property in 1984, and in 1986 the property was designated as a National Historic Site by the Federal Government (Walker 1988). Completion of an interpretive center in 1992 promoted education, tourism, and archaeology to the general public. Wanuskewin Heritage Park portrays an extensively rich accumulation of Northern Plains Peoples' history with displays, events, and activities influenced by the Native American population (Yanko 2007). Due to the large number of visitors at the park the interpretive centre has recently undergone a massive renovation.

The research initiative launched by the MVA helped to develop an extensive research and educational relationship between Wanuskewin Heritage Park and the University of Saskatchewan's Department of Archaeology and Anthropology. The relationship has not only encompassed the Archaeology and Anthropology Department, but has become "multidisciplinary in that it includes archaeological, geological, paleoenvironmental and ethnobotanical studies" (Walker 1988:77). The relationship between Wanuskewin Heritage Park and the University has fostered educational opportunities for the public and university students, as well as provided a means to help interpret the rich cultural history of the Saskatoon area.

Archaeological excavations by the University of Saskatchewan have occurred in Wanuskewin Heritage Park since 1983. To date there have been ten archaeological excavations within the park. These include the Amisk site (FbNp-17) (Amundsen 1986), the Newo Asiniak site (FbNp-16) (Kelly 1986), the Redtail site (FbNp-10) (Ramsay 1993), FbNp-1 (formerly Tipperary Creek site) (Harty 2005), the Thundercloud site (FbNp-25) (Mack 2000, Webster 1999), the Cut Arm site (FbNp-22) (Nadia Smith, personal communication, 2010), the Meewasin Creek site (FbNp-9) (Frary 2009), one of the tipi rings from the Sunburn Tipi Ring site (FbNp-7) (Walker 1988) and the Dog Child site (FbNp-24) (Cyr 2006). The tenth excavation to be conducted within the park is the Wolf Willow site (FbNp-26) (Maria Mampe, personal communication, 2010) (Figure 1.1).

Excavation at the Dog Child site began in 2004 and was completed in 2009, with the sixth field season at the site. Talina Cyr has already completed a thesis entitled *The Dog Child Site (FbNp-24): A 5500 Year-Old Multicomponent Site on the Northern Plains* (2006), which centered on the 2004 to 2006 field seasons. The focus of Cyr's (2006) thesis was to assemble a composite archaeological sequence at the site, to determine technology, subsistence, activities, and seasonality of occupations, and to compile a sample of Mummy Cave series projectile points confirming or establishing any trends seen at the Dog Child site. Due to the wealth of material that was found at the site in excavation seasons subsequent to those encompassed by Cyr's (2006) study, there has been the opportunity for a second thesis on the Dog Child site. The current thesis will focus on the 2007 to 2009 field seasons at the Dog Child site in Wanuskewin Heritage Park, focusing on paleoenvironmental and subsistence patterns observed in the Mummy Cave series.

2.2 Geography

Wanuskewin Heritage Park is situated approximately three kilometres north of the City of Saskatoon, Saskatchewan (Figure 1.1). The park encompasses approximately 63 hectares of land in the SW ¼ Section 36 and SE ¼ Section 35, Township 37, Range 5, West of the Third Meridian at 52°13' North Latitude and 106°35' West Longitude. Wanuskewin Heritage Park is located within the Prairie ecozone (Figure 2.1). This ecozone is the predominant zone where agricultural production occurs, making it the most heavily settled ecozone and the one most modified by human action. The vegetation that is found in this ecozone is mostly grasses with some flowering plants and shrubs occurring in low, moist areas. Within the Prairie ecozone

Wanuskewin Heritage Park is located just south of the Aspen Parkland belt within the Moist Mixed Grassland ecoregion (Figure 2.1). This Aspen Parkland ecoregion is a transition between the Aspen Woodlands in the Boreal Forest and the Prairie Grasslands. Aspen groves occur on moister north-facing slopes and in low lying depressions, while fescue grasslands are located on the drier south-facing slopes and hills (Saskatchewan Conservation Data Centre 2002). The Moist Mixed Grassland, on the other hand, is drier than the Parkland. There are fewer trees and shrubby vegetation is present in this region. However, trees and shrubs do occur along streams and permanent sloughs. Wanuskewin Heritage Park is in a region that can be described as being moist with open native grassland, and, because of its proximity to the Aspen Parkland, slough depressions are frequently bordered by aspen groves (Padbury and Acton 1999:160).

Topographically, Wanuskewin Heritage Park is roughly 500 m above sea level and is located in the Warman Plain, a subdivision of the physiographic region known as the Saskatchewan Rivers Plain (Acton and Ellis 1978). The Saskatchewan Rivers Plain is characterized by glacio-fluvial and glacio-lacustrine surface sediments, which are a result of glacial recession during the last ice age and creation of Glacial Lake Saskatoon. More specifically the Warman Plain is characterized by "undulating and eroded till plains and gravelly glacio-fluvial plains" (Acton and Ellis 1978:5). The Wanuskewin area is a natural coulee setting with eroding valley walls and undulating prairie uplands which resulted from a glacial meltwater channel flowing through the area.

The South Saskatchewan River is a permanent water source for the area, but most of the sites in the park are located along or near the Opimihaw Creek tributary. Sites are distributed throughout the valley and are frequently located on point bars, terraces, and the prairie overlooking the valley. The Dog Child site (Figure 2.2) is located on a flat terrace on the west bank of Opimihaw Creek approximately 750 m from the South Saskatchewan River (Cyr 2006) and is the most northern site in the park. The Dog Child site is sheltered by the valley walls on the north and south, as well as an incline situated to the west of the site (Figure 2.3 and 2.4). The Dog Child site is bordered by Opimihaw Creek to the east and south allowing easy access to water.

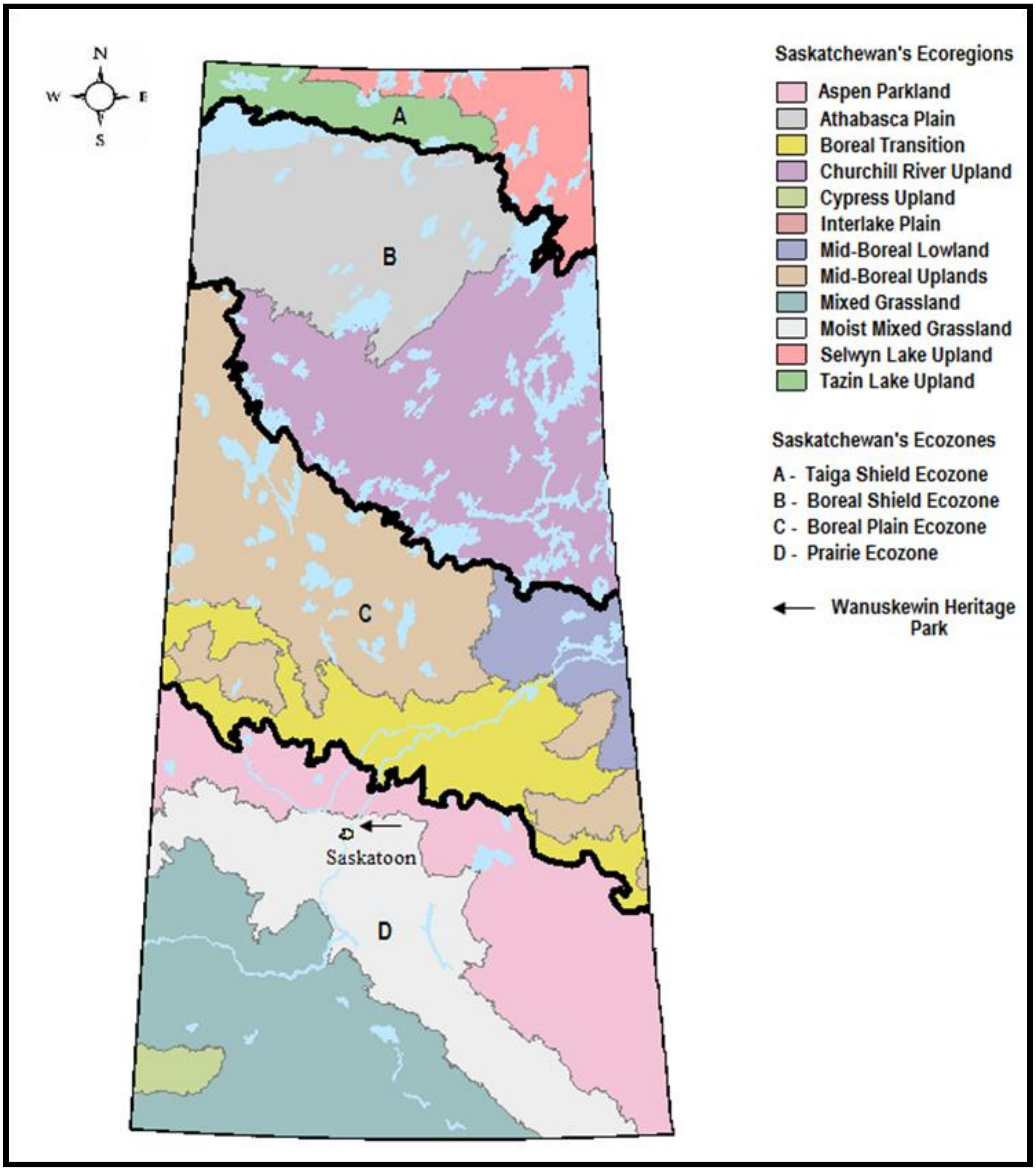

Figure 2.1: Ecoregion and ecozone map of Saskatchewan (http://gisweb1.serm.gov.sk.ca/imf/imf.jsp?config=http://gisweb1.serm.gov.sk.ca/imf/sk/sites/saskmap/saskmap.xml, accessed June 14, 2010, modified by author).

Figure 2.2: Location of the Dog Child site (FbNp-24) (Google Earth 2010).

Figure 2.3: Facing east showing the Dog Child site and Opimihaw Creek (June 2008).

Figure 2.4: Opimihaw valley facing south from the Dog Child site (June 2009).

2.3 Geomorphology

There have been numerous glacial cycles worldwide during the last 2,000,000 years. Each of these cycles has taken a somewhat different path and covered different sized areas (Snook 2008). The last glacial cycle took approximately 100,000 years to complete and encompassed a series of regular climatic variations of shorter length (Macdougall 2004; Snook 2008). Initially, it was believed that there were at least four glaciations in North America, separated by interglacial periods; the glaciations are, from oldest to youngest, Nebraskan, Kansan, Illinoisan, and Wisconsinan (Simpson 1999). However, according to Mickelson and Colgan (2004) there have been major changes in the understanding of the Wisconsinan and the terms 'Nebraskan' and 'Kansan' are no longer used. There is also evidence now of at least six pre-Illinoian glaciations. The last glaciation, the Wisconsinan, occurred approximately 80,000 to 12,000 years B.P (Dyke and Prest 1987). The Saskatoon area, including Wanuskewin Heritage Park, was subject to several advances and retreats of the continental ice sheet during the Wisconsinan glaciation. These advances and retreats are partially responsible for the erosion of underlying sediments and deposition of drift deposits that created several till and stratified layers in the area (Christiansen 1979).

The Wisconsinan is divided into three periods; the early, middle, and late Wisconsinan. The late Wisconsinan history of ice advance and retreat continues to be refined with more radiocarbon dates as well as new methods (Mickelson and Colgan 2004). During the Wisconsinan glaciation two extensive ice sheets were present in North America, the Laurentide ice sheet which covered much of Canada and the northern United States east of the Rocky Mountains and the Cordilleran ice sheet along the western coast forming from valley glaciers throughout the Canadian Rocky Mountains. The Laurentide and Cordilleran ice sheets only coalesced for a brief span between approximately 21,000 and 18,000 years B.P (Mandryk et al. 2001). The retreat of the Laurentide margin between 12,000 and 11,000 years B.P. was substantial everywhere (Dyke and Prest 1987; Mandryk et al. 2001). The Laurentide ice sheet retreat allowed for the sequential development of proglacial lakes and spillways aiding in the creation of the Opimihaw Valley, which was well within the boundary of the Laurentide ice sheet.

This retreat would have been followed by erosion and weathering in Saskatoon and surrounding area (Landplan Collaborative 1984). It would have also contributed to the creation of Glacial Lake Saskatoon, which played a role in the formation of superimposed glacio-lacustrine sediments and landforms over part of the Saskatoon area, forming land surfaces on which soils subsequently developed. Christiansen and Sauer's (1998) interpretation of glacial sediments in the Saskatoon area includes tills that belong to both the Sutherland and Saskatoon groups; these make up the soils at the site. Christiansen and Sauer (1998) proposed that Glacial Lake Saskatchewan drained into the Prince Albert area around 11,500 years B.P. Walker (1983) also notes that drainage of Glacial Lake Saskatoon would have occurred prior to 9000 years B.P. Water from the drainage of Glacial Lake Saskatoon flowed through a braided channel system in a northerly direction and began to create a valley (Figure 2.5). This was a point in time at which glacio-fluvial activity was erosional and would have also helped create the current landscapes seen in the Saskatoon area. Sometime between 12,000 and 11,000 years B.P. the South Saskatchewan River Valley became occupied by a non-glacial river (Aitken 2002).

Opimihaw Creek is classified as a misfit stream, characterized by a valley much too large to have been cut by the present-day flow regime. In fact, the creek lies in an old braided channel of the South Saskatchewan River; that was created by glacial meltwater drainage, into which Opimihaw Creek currently empties (Figure 2.5). The down-cutting of Opimihaw Creek probably occurred around 7000 years B.P., with the onset of the Atlantic climatic episode, and would have been partially created by postglacial meltwater (Walker 1983). The creek valley cuts through tills of the Saskatoon group that include the Floral and Battleford Formations (Christiansen and Sauer 1998). Walker (1983) suggested that from 9000 to 5000 years B.P. there was a reduction in flow and sediment discharge within the South Saskatchewan River system. A corresponding decrease in discharge in Opimihaw Creek may have led to the development of the misfit stream which has existed since at least 6000 years B.P. The formation of the lower terraces, which are mostly depositional in the valley area, probably occurred in conjunction with episodes of cooling including one at 6000 years B.P. and a second one at about 4700 years B.P. (Walker 1983:19).

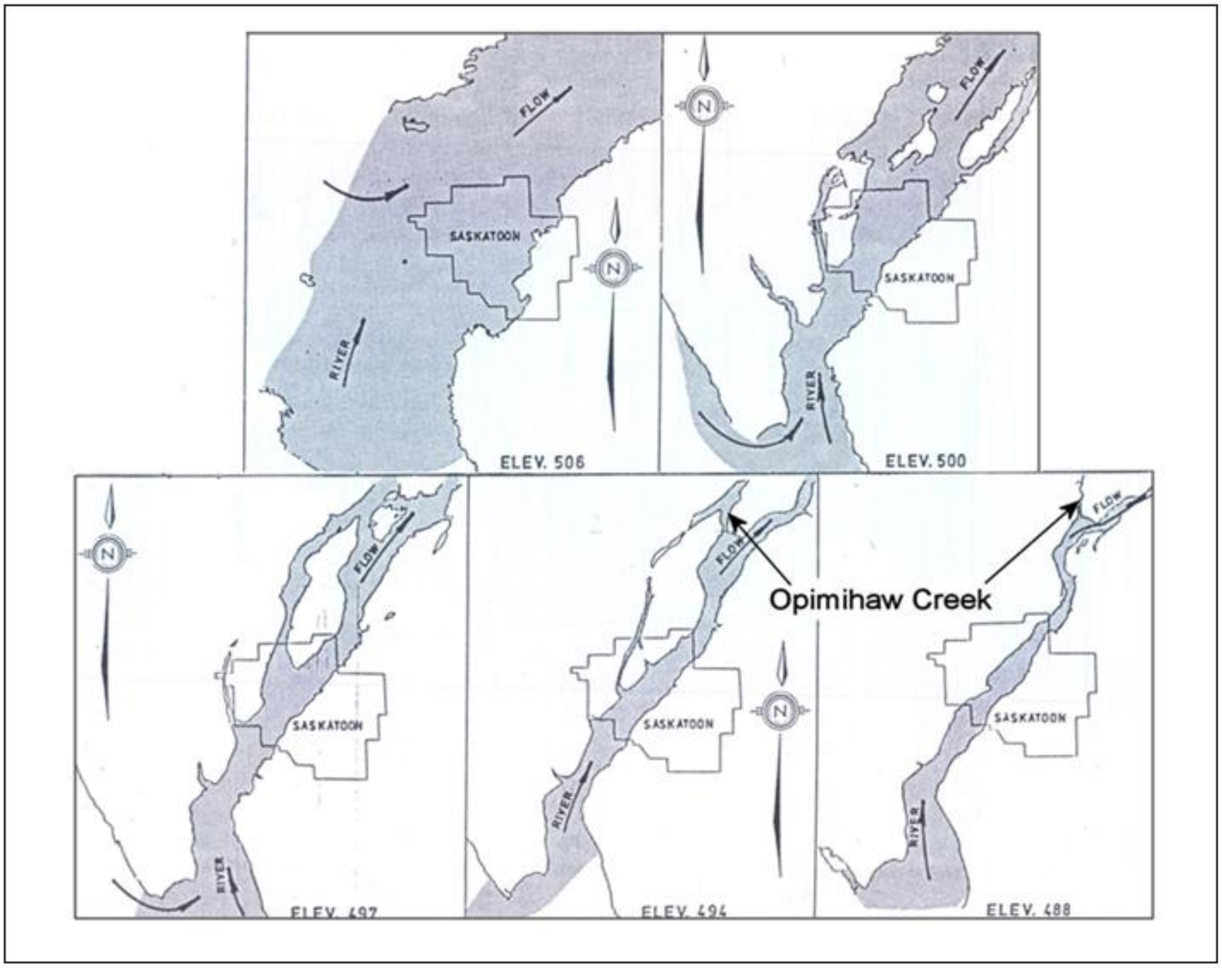

Figure 2.5: Stages in the formation of the South Saskatchewan River (After Clifton 1985: Figure 6).

The predominant glacial materials that would have been deposited across the landscape include those from ice (glacial till), those from flowing water (glacio-fluvial), and those from still water (glacio-lacustrine). Christiansen (1968b) suggests that the deposits commonly seen in the Opimihaw Creek area have glacio-fluvial and glacio-lacustrine origins which are characterized by sorting, although much of the sediments at the top of the valley are poorly sorted, suggesting glacial till. Later sediments in the area are likely a result of flooding of the South Saskatchewan River. Both of these events would result in deposition of gravels, sands, silts, and clays being the materials observed in the area. These are parent materials on which the soils found in the area formed (Landplan Collaborative 1984).

2.4 Soils and Sediments

One of the most important aspects of an archaeological site is the surrounding matrix, which is composed of soils and sediments. Soils and sediments are often used interchangeably but there is a difference between the two; "[s]ediments are the solid inorganic and organic particles accumulated or precipitated by natural or human processes" (Waters 1992:15). Sediments are created by four different processes: mechanical accumulation of solid particles, chemical precipitation of a layer from crystal constituents, decomposition and accumulation of organic matter, and material from volcanic eruptions. This results in four common sediments: clastic, chemical, carbonaceous or organic, and pyroclastic, respectively. Humans may also create sediments in the form of middens, mounds, and refuse heaps (Waters 1992). Soils, however, are profiles that are developed from the combination of physical, chemical, biological, and anthropogenic alteration of the sediments in the area (Waters 1992).

In and around Wanuskewin Heritage Park there are two basic types of soils: Dark Brown Chernozems and the Hillwash Complex. The Dark Brown Chernozemic soils dominate the upland area that surrounds the park. To the east of the valley are soils of the Weyburn Association. This type of soil develops under grassland vegetation in medium to moderately fine textured unsorted glacial till. The type of landscape that the Weyburn Association is found on is undulating and rolling landforms however, roughly undulating and gently rolling knob and kettle types are also common (Ellis and Stonehouse 1970; Acton and Ellis 1978). To the west of the valley soils are of the Bradwell Association. This group of soils is formed under grassland vegetation in medium to moderately fine textured, moderately calcareous, sandy glacio-lacustrine deposits. They occur primarily on nearly level and undulating landscapes (Ellis and Stonehouse 1970).

The two most common series of soil present in the park area are the Orthic Dark Brown and Calcareous Dark Brown series. Orthic Dark Brown soils have a low to moderate amount of organic matter. They are neutral to mildly alkaline and have low available phosphorus and high available potassium. The soils are moderately permeable with slight surface drainage and a low moisture holding capacity (Acton and Ellis 1978). The Calcareous Dark Brown soils are low to very low in organic matter. They are neutral to moderately alkaline and are low in available phosphorus and high in available potassium. These soils are moderately to highly permeable and due to their location on the top of hills they have excessive surface drainage with low to moderate moisture holding capacity (Acton and Ellis 1978).

The last group of soils found in the area belong to the Hillwash Complex and are found within the valley area. The Hillwash Complex is an amalgamation of Regosolic and weakly developed Chernozemic and Podzolic soils (Acton and Ellis 1978). These soils develop on colluvial and eroded deposits of valley slopes and escarpments. The parent material is comprised of a wide variety of glacial and recent deposits. Most landscapes associated with these soils are gently to steeply sloping and usually dissected with excessive surface drainage. Regosolic soils dominate the steep actively eroding slopes while Chernozemic soils may be encountered on more gently sloping areas (Acton and Ellis 1978). The soil formation processes will be discussed in the stratigraphy section.

2.5 Hydrology

The closest water source to the Dog Child site is Opimihaw Creek. Opimihaw Creek flows into the South Saskatchewan River, which is located approximately 750 m to the south of the Dog Child site. The creek is fed by a number of springs that are located north of the site. The "water […] moves through the intergranular openings in the soil and rock at a rate which rarely exceeds a hundred meters per year" (Landplan Collaborative 1984:21). Today "the water quality underlying the site is generally poor with sulphate and iron levels in the range which is not recommended for consumption" (Landplan Collaborative 1984:21). The maximum runoff in Opimihaw Creek is seen in the spring and precedes that of the South Saskatchewan River by approximately two months. The flooding of the South Saskatchewan River during this time has often resulted in the flooding of Opimihaw Creek due to the area being a natural settling basin into which the waters of the South Saskatchewan River flow (Landplan Collaborative 1984); however, the creation of the Gardiner Dam on the South Saskatchewan River in 1967 has regulated the amount of floodwaters which back into the creek. Often the only floods that affect parts of Opimihaw Creek are due to beavers frequently building dams within the park.

Water in Opimihaw Creek is very slow moving and often stagnant. In the past three years (2007 to 2009) there has been a significant reduction in the amount of water present in the creek. In fact, towards the end of these summers there were very few, if any, pools of accumulated water in the stream. This may be due to the drier climate that the Saskatoon area is experiencing (Environment Canada 2010).

2.6 Climate

The Köppen system defines climate regions with respect to normal vegetation types (Strahler and Strahler 1992). This means that this type of system requires only precipitation and temperature to make climatic subdivisions. According to this classification the Saskatoon area falls under the humid continental type (Dfb) corresponding with the aspen parkland and the mixed forest regions of southern Saskatchewan. Dfb refers to a humid continental climate marked by variable weather patterns and large seasonal temperature variance. Winter months are long and cold with frequent snowfall and persistent snow cover, while summer months are often warm and humid with frequent thunderstorms (Strahler and Strahler 1992). The other type of climate classification is Thornthwaite's moisture regions. This type of classification requires both precipitation and temperature but also includes evaporation (Strahler and Strahler 1992), making potential evapotranspiration a determining factor in dividing climatic zones. This classification places the Saskatoon area in a semiarid climate meaning that there is a water deficit in the area.

The Saskatoon area is one of the sunniest regions in Canada, with an average 2,381 hours of sun per year (Lundqvist 1999). July and August tend to be the sunniest months in the region, while December is often the cloudiest (Lundqvist 1999). The winter season is generally the longest of the four main seasons, with an average of five months of the year with average temperatures below freezing. Temperature change on the prairies from summer to winter is greater than any other part of Canada (Hare and Thomas 1974). The temperature throughout the entire region ranges from -40°C to near or over 38°C with an annual temperature range (1961 to 1990) of 36.1°C (Hare and Thomas 1974; Lundqvist 1999:97). The annual average temperature for the Saskatoon area is 2.0°C, July is the hottest month, averaging around 19°C, and January is the coldest month, averaging around -17°C (Lundqvist 1999:98-100). Between 1961 and 1990 the annual number of hot days (30°C or higher) was 11 and the annual number of cold days (-30°C or lower) was 18 (Lundqvist 1999).

The annual amount of precipitation is between 345 and 350 mm with the average being 347 mm (Lundqvist 1999). June has the most precipitation, while February and November have the least amount of precipitation. The average amount of snowfall in the area is between 110 and 114 cm (Lundqvist 1999:104-7). Approximately ten centimetres of snowfall is equivalent to one centimetre of rain therefore, this does not equate to a large amount of precipitation in the area. The majority of rain falls between the months of May and September. From 1961 to 1990 there have been on average 116 frost-free days (Lundqvist 1999: 102). From June to February the prevailing winds blow from the northwest and from March to May the winds tend to blow from the east or southeast (Lundqvist 1999). The average wind speeds are moderate and are roughly between 12.8 and 19.2 km/h, generally blowing from the northeast.

2.7 Flora

The current vegetation found within and around the Opimihaw Creek area may not accurately reflect the vegetation present before European contact. There are many reasons why there could have been a change in the flora of the area. Previously, there would have been grazing (with possible overgrazing) of grasses in the area by large herbivores particularly bison. Due to this possible change in fauna over time a change in flora may have ensued. Arrival of Europeans also brought (exotic) plants and weeds to the region as well as the advent of grain farming. Long- and short-term changes in climate would also have affected the vegetation, with grasslands predominating in dry years. In the Opimihaw Creek area, abundant traffic of both bison and people would have affected the plant communities present, inhibiting the growth of trees and causing more shrubs and grasses to have been present. Currently, aside from human visitors along paths, there is very little traffic in the area. This has allowed more hardy species to grow in the area (Webster 1999). There are three major vegetative zones within the Opimihaw Creek area, which include the Upland Prairie Zone, the Valley Slope Zone, and the Floodplain Zone.

The Upland Prairie Zone is composed mainly of native grasses and aspen stands. The vegetation present in the grassland areas is characteristic of the Mixed Prairie (*Stipa-Bouteloua*) Association, which extends from the Prairie Provinces into Texas (Coupland 1961). The major grassland type that occurs within the Aspen Parkland belt is the *Stipa-Agropyron* faction

(Coupland 1961). The dominant grasses in the Opimihaw Creek area are spear grass (*Stipa comata*) and northern wheat grass (*Agropyron dasystachyum*). Also common are June grass (*Koeleria cristata*) and blue gramma grass (*Bouteloun gracilis*). Together these four grasses make up 75% of the forage yield (Coupland 1961). Dozens of forbs can be found interspersed throughout the grassland, including pasture sage (*Artemisia frigida*), prairie crocus (*Anemone patens*), vetch (*Astragalus* sp.), and cinquefoil (*Potentilla* sp.). Also present are shrubs like rose (*Rosa* sp.), silverberry/wolf willow (*Elaeagnus commutate*), and wild red raspberry (*Rubus idaeus*), along with smaller plants like nettles (*Urtica dioica*), bunchberry (*Cornus canadensis*), wild sarsaparilla (*Aralia nudicaulis*), and selaginella (*Selaginella* sp.). Aspen clones (*Populus tremuloides*) and stands of submature aspen occur in low and wet areas and along with dense shrubs occupy the undulating terrain found in and around the area (Walker 1983).

The Valley Slope Zone is generally an area of active slumping with pockets of relatively stable areas. The vegetation in this zone reflects the decreasing river influence further from the creek's channel. This zone has a fairly diverse array of vegetation present. On stable slopes mixed stands of white birch (*Betula papurifera*) and balsam poplar (*Populus balsamifera*) are present. There is generally a large variety of shrubs in the area which grow best along the drainage channels. Prevalent shrubs include chokecherry (*Prunus virginiana*), Saskatoon berry (*Amelanchier alnifolia*), pincherry (*Prunus pensylvanica*), rose (*Rosa* sp.), wild raspberry, buffaloberry (*Shepherdia canadensis*), and silverberry. The unstable slope areas have vegetation that is similar to the Upland Prairie Zone (Walker 1983).

The Floodplain Zone is the most diverse of all three zones. This can be attributed to the zone's proximity to water. For instance, within the Floodplain Zone there are 12 distinct landforms, including point bars, flooded back swamps, terraces, sandbars, abandoned channels, and oxbow lakes (Walker 1992). Each of these landforms is associated with different plant communities due to their different exposure to water. The Dog Child site falls within this zone due to its location on a flat terrace next to Opimihaw Creek. The terrace itself is covered with a mixture of shrubs, grasses, and forbs. Flora commonly found here includes northern wheat grass, spear grass, blue gramma grass, silverberry, rose, and pasture sage. Towards the creek low to medium shrubs and forbs are found, including rose, willow (*Salix* sp.), and common nettle. Also in the area are some larger trees like aspen and Manitoba maple (*Acer negundo*), which occupy stable areas. Rogal (1982) compiled a complete list of all plant species observed in and around the valley. Approximately 200 species were discovered, which are listed in Appendix A; however, some specimens are rare and may not currently inhabit the area.

2.8 Fauna

The fauna of Opimihaw Creek has changed over the course of time and many species have been eradicated or affected by ecological change (Walker 1983; Webster 1999). Therefore, the modern fauna, albeit diverse, is different from what was previously present. Beck (1958) and Banfield (1974) provide information on species whose ranges coincide or formerly coincided with the valley and area. A complete list of species found in and around the Opimihaw Creek valley can be found in Appendix B.

2.8.1 Mammalian Fauna

Species that were most affected by European arrival were large mammals including bison (*Bison bison*), elk (*Cervus elaphus*), grizzly bear (*Ursus arctos*), wolf (*Canis lupis*), and cougar (*Felis concolor*), as well as some smaller species like the swift fox (*Vulpes velox*), and Nuttall's cottontail (*Sylvilagus nuttallii*). Prior to European arrival the largest and most predominant herbivore on the Plains was bison, with estimates of approximately 34,000,000 individuals present during the precontact period (Lott 2002; McDonald 1981; Roe 1970). Also common were elk, pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and occasionally moose (*Alces alces*). Currently, only white-tailed deer occupy the valley, with an occasional mule deer appearance. This is because mule deer enjoy open regions, while white-tailed deer prefer more forested areas (Banfield 1974).

Grizzly bear, cougar, wolf, swift fox, wolverine (*Gulo gulo*), and coyote (*Canis latrans*) were the most common types of carnivores present in the valley. Now, the coyote is the dominant carnivore in the valley, with cougars slowly reappearing (Banfield 1974). Other carnivores present in Opimihaw valley are skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), badger (*Taxidea taxus*), long-tailed weasel (*Mustela frenata*), mink (*Mustela vison*), and least weasel (*Mustela nivalis*). Currently, there are low numbers of the red fox, raccoon, least weasel, and mink likely due to the use of their fur (Banfield 1974).

Only two leporids are currently present in the valley: the white-tailed jack rabbit (*Lepus townsendii*) and the snowshoe hare (*Lepus americanus*). Recently the Nuttall's cottontail (*Sylvilagus nuttallii grangeri*), a previous resident of the area, has been spotted (Webster 1999). Prior to this Banfield (1941:122-123), noted that the northernmost sighting of Nuttall's cottontail was near Dundurn, Saskatchewan. However, they are still commonly found in the southern portion of Saskatchewan and Alberta (Chapman and Ceballos 1990).

A variety of rodents are found within the park. These include the least chipmunk (*Tamias minimus*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), Franklin's ground squirrel (*Spermophilus franklinii*), and Northern pocket gopher (*Thomomys talpoides*). Where there is plenty of water, beaver (*Castor canadensis*) can be found building dams, while muskrats (*Ondatra zibethicus*) can be found enjoying the ponds that are created by these dams. In wooded areas of the park porcupines (*Erethizon dorsatum*) may be present. Other small rodents present in the park include numerous mice and voles. Most common are Gapper's red backed vole (*Clethrionomys gapperii*), meadow vole (*Microtus pennsylvanicus*), deer mice (*Peronyscus maniculatus*), and pygmy shrew (*Microsorex hoyi*) (Banfield 1974).

2.8.2 Avian Fauna

A plethora of avian species are currently present within the study area (Banfield 1974). The creek and adjacent South Saskatchewan River are home to many migratory waterfowl and wading birds including great blue heron (*Ardea herodias*), white pelican (*Pelecanus erythrorhynchos*), mallard (*Anas platyrhynchos*), and Canada geese (*Branta canadensis*). Brush and small trees in the valley are home to a large variety of songbirds including warblers and sparrows (Family Emberizidae). Larger trees and open areas are occupied by birds of prey including owls (Family Strigidae) and hawks (Family Accipitridae). Other birds present within the park include red-winged blackbirds (*Agelaius phoeniceus*), western meadowlark (*Sturnella neglecta*), black-billed magpie (*Pica hudsonia*), ruffed grouse (*Bonasa umbellus*), and crow (*Corvus brachyrhynchos*). The area is heavily populated by birds during the warm summer months of the year while still retaining an ample avian population during the winter. The complete list of birds, including migratory birds, can be found in Appendix B.

2.8.3 Amphibians and Reptiles

The park is home to very few amphibians and reptiles. Amphibians which occupy the valley are the boreal chorus frog (*Pseudacris triseriata*), leopard frog (*Rana pipiens*), wood frog (*Rana sylcatica*), tiger salamander (*Ambystoma tigrinum*), and the Canadian toad (*Bufo hemiophrys*). Reptiles are represented by the western garter snake (*Thamnophis elegans*) and the red-sided garter snake (*Thamnophis sirtalis*). According to Webster (1999:15) "[d]iversity is low because species are limited to those which can hibernate to escape freezing temperatures during the winter months."

2.8.4 Fish

Larger species of fish including yellow perch (*Perca flavescens*), walleye (*Stizostedion vitreum*) and northern pike (*Esox lucius*) are frequently found in the South Saskatchewan River. Opimihaw Creek itself is generally shallow with a few deeper pools, and therefore only a few species of minnows (Family Cyprinidae) occupy these waters. However, in recent years the water level in Opimihaw Creek has been dropping. In the summer of 2009 there was only water in a couple of areas. It is therefore believed that the species of minnows that occupied the creek may be depleted or absent.

2.8.5 Molluscs

In Opimihaw Creek and the adjacent South Saskatchewan River there are many species of freshwater molluscs. In the riverbank sediments several clam (*Pelecypoda*) species can be seen. Also common are both large and small snails (*Gastropoda sp.*) found throughout the area (Webster 1999). A complete list of molluscs found in the area is listed in Appendix B.

Chapter 3

Cultural Chronology

3.1 Introduction

Native Americans have occupied the Northern Plains for nearly 12,000 years. The archaeological record illustrates the hunting, gathering, trading, and social aspects of their lives. Archaeologists have spent a considerable amount of time trying to determine the culture history of these people and are particularly concerned with temporal and spatial aspects of occupation (Frison 1991:15). The development of a culture history framework has utilized diagnostic artifacts and features as well as stratigraphy and chronometric dating to form a sequence. This sequence has the flexibility to be modified as new diagnostic material and archaeological sites are found. The first cultural sequence established for the Plains was in 1958 by William Mulloy. The framework that is currently employed is the result of many years of research. This discussion uses the chronology proposed by Walker (1992) (Table 3.1). The term 'Prehistoric' has been changed to 'Precontact', as well the term 'Historic' has been changed to 'Contact.'

Before the Northern Plains cultural sequence can be discussed, a number of terms must first be defined. An *archaeological culture* is used to define a similar assemblage of artifacts and features from a specific time frame in a particular geographical area (Renfrew and Bahn 2004:579). While Willey and Phillips (1953:617) describe an archaeological culture as "an arbitrary division of the space-time-cultural continuum defined by reference to its imperishable content and whatever of 'common social tradition' can be inferred therefrom."

Table 3.1: Cultural Chronology of the Northern Plains (Cyr 2006:17; Walker 1992:120).

<table>
<tr><th>Years(B.P.)</th><th colspan="2">Mulloy 1958</th><th colspan="2">Frison 1978</th><th>Dyck 1983</th><th colspan="2">Walker 1992</th><th colspan="2">Cyr 2006</th></tr>
<tr><td></td><td colspan="2">Historic</td><td colspan="2">Historic</td><td>Historic</td><td colspan="2">Historic</td><td colspan="2">Contact</td></tr>
<tr><td>200</td><td colspan="2" rowspan="2">Late Prehistoric</td><td colspan="2" rowspan="2">Late Prehistoric</td><td rowspan="2">Late Plains Indian</td><td colspan="2" rowspan="2">Late Prehistoric</td><td colspan="2">Protocontact</td></tr>
<tr><td>300
2,000</td><td colspan="2">Late Precontact</td></tr>
<tr><td>3,000</td><td rowspan="2">Middle Pre-historic</td><td>Late</td><td rowspan="3">Plains Archaic</td><td>Late</td><td rowspan="3">Middle Plains Indian</td><td rowspan="3">Middle Pre-historic</td><td>Late</td><td rowspan="3">Middle Pre - contact</td><td>Late</td></tr>
<tr><td>5,000</td><td>Early</td><td>Middle</td><td>Middle</td><td>Middle</td></tr>
<tr><td>7,500</td><td colspan="2">Hiatus</td><td>Early</td><td>Early</td><td>Early</td></tr>
<tr><td>10,500</td><td colspan="2" rowspan="2">Early Prehistoric</td><td colspan="2" rowspan="2">Paleo-Indian</td><td>Early Plains Indian</td><td colspan="2" rowspan="2">Paleo-Indian</td><td colspan="2" rowspan="2">Early Precontact (Paleo-Indian)</td></tr>
<tr><td>12,000</td><td>Pleistocene Hunters</td></tr>
</table>

Some of the common terms used to describe cultural sequences are *component*, *phase*, *complex*, *tradition*, and *series*. A *component* is the smallest taxonomic unit representing a single occupation within a site (McKern 1939). A site with one period of occupation will have one component while a site occupied six times will have six components. These components may have been deposited in different years and by different individuals but can be the same culturally. Willey and Phillips (1953) define a *phase* as:

> A space-time-cultural unit possessing traits sufficiently characteristic to Distinguish it from all other units similarly conceived, whether of the same or other cultural traditions, geographically limited to a *locality* or *region* and chronologically limited to a relatively brief span of time (Willey and Phillips 1953:620).

In simpler terms, a phase is an archaeological construct used to distinguish a group of artifact types with similar attributes that are related spatially across multiple sites and exist for a limited period of time. Phases can be further subdivided into subphases or varieties when looking at differing attributes. Willey and Phillips (1953) refer to *locality* and *regions* in their definition of a phase. A *locality* is the smallest unit of area which can vary in size from a single site to an area of uncertain size, and is occupied by a single community (Willey and Phillips 1953:618). A *region* on the other hand is a considerably larger unit of area usually the "result of concentrated research by and individual or group" (Willey and Phillips 1953:619). A *period* is a series of cultural formulations, like a phase, but with amplified space and time dimensions (Willey and Phillips 1953:624).

A *complex* is an all inclusive term defined as:

> a large composite archaeological unit. It consists of interconnected sites, features, and artifacts, tied together by similarities in function, style, technology, and subsistence-settlement. The parts of a complex are found within a common geographical distribution and within a common segment of time. The change in terms from culture to complex reflects the notion that an archaeological complex is not necessarily equivalent to an ethnological tribe or culture. It may be equivalent but it may also spread across ethnological groupings (Dyck 1983:69).

A *tradition* refers to the technological or cultural elements of a complex "often diagnostic, which occurs in sequential complexes, passed down as it were from one to the other" (Dyck 1983:69). Willey and Phillips (1953) explain a tradition as

> a major large-scale space-time-cultural continuity, defined with reference to persistent configurations in single technologies or total (archaeological) culture, occupying a relatively long interval of time and a quantitatively variable but environmentally significant space (Willey and Phillips 1953:628).

A *series* is defined as

> a sequence of archaeological components sharing a common space (sometimes within a single site, sometimes within a region), but belonging within separate segments of time. [It] is a crude unit of archaeological analysis used for convenience before sites, features, and artifacts are ready for reclassification into complexes and traditions (Dyck 1983:69).

Horizon is a term that can also be found within the archaeological literature. "A horizon style, as the name implies, occupies a great deal of space but very little time. It may be briefly described as a spatial continuum represented but the wide distribution of a recognizable art style" (Willey and Phillips 1953:625)

"Projectile points have been used as diagnostic markers because they are relatively common across the continent, have measurable qualitative and quantitative traits that can be documented and compared, and evolve over time and space as technologies are developed and transported" (Frary 2009:13). On the Northern Plains, pottery has also been used as a diagnostic marker. However, since pottery is a Late Precontact invention, the projectile point is the common choice for establishing cultural chronologies because it has been found associated with people for as long as they have been in North America.

Mulloy's (1958) version of a culture sequence provided a basic outline of Plains chronology (Table 3.1). This sequence contained four major periods: Early Prehistoric, Middle Prehistoric, Late Prehistoric, and Historic. Even though Mulloy's work was based on artifacts from Montana-Wyoming and the surrounding areas, it fits southern Saskatchewan and Alberta very well. This outline has been modified by many archaeologists as more information has become available (see Dyck 1983; Frison 1978; Reeves 1983; Wedel 1961; Wormington and Forbis 1968).

Dyck (1983:63-139) proposed the first system to organize archaeological materials on the Northern Plains. He divided the precontact period in southern Saskatchewan into four distinct periods: (1) the Pleistocene Hunters period (17,000 to 10,500 years B.P.); (2) the Early Plains Indian period (10,500 to 8000 years B.P.); (3) the Middle Plains Indian period (7700 to 1850 years B.P.); and (4) the Late Plains Indian period (1850 to 170 years B.P.). Dyck's (1983) chronology has been updated as more information has been acquired. Therefore the sequence used in this thesis is based on Walker (1992:120) who divided the Northern Plains into three precontact periods: (1) the Early Precontact or Paleo-Indian period (12,000 to 7500 years B.P.); (2) the Middle Precontact period (7500 to 2000 years B.P.); and (3) the Late Precontact period (2000 to 300 years B.P.). The Middle Precontact period can be divided into three segments Early (7500 to 5000 years B.P.), Middle (5000 to 3000 years B.P.) and Late (3000 to 2000 years

B.P.). Also included in the cultural sequence is the Contact period (beginning about 200 years B.P.). The three precontact periods tend to correspond with the three dominant projectile point technologies on the Plains. The Early Precontact period is associated with spear points which were utilized to hunt large game, predominantly bison. The Middle Precontact period is associated with a reduction in projectile point size and the use of atlatl darts. The beginning of the Late Precontact period is marked by the introduction of bow and arrow technology and clay pottery.

3.2 Early Precontact Period (12,000 to 7500 years B.P.)

There is still considerable debate as to whether North America was actually occupied at the beginning of this period (see Dyck 1983; Frison 1991; Mandryk et al. 2001). The only evidence for human activity at this time is surface finds of stone tools (Dyck 1983). At the beginning of this period the Wisconsinan glaciation was ending and the climate was still fairly wet and cool. Boreal forests occupied most of Saskatchewan and the megafauna still consisted of mammoths, mastodons, camels, giant bison, ground sloths, and the Pleistocene horse (Dyck 1983). Around 10,000 years B.P., as the climate became warmer and drier, the boreal forests began to retreat and the grasslands expanded.

The oldest artifacts found in Saskatchewan belong to the Clovis complex. How Clovis people arrived in North America has been a subject of great debate. Two of the more common theories on their arrival into North America are inland migration and coastal migration (Mandryk et al. 2001). It was believed that as glaciers receded, an ice free corridor opened between the Cordilleran Ice Sheet and the Laurentide Ice Sheet, allowing passage through. Current research; however, does not support this, indicating the ice sheets were very close to merging and even if there was separation travel would have been difficult if not impossible (Mandryk et al. 2001). There is growing evidence that these people came from the south and migrated northward (Elias 2002; Roosevelt et al. 2002). The most widely held theory is that immigrants arrived in the New World by way of the west coast. Radiocarbon dates from the American Great Plains indicate initial occupation between 11,200 and 10,900 years B.P. (Walker 1999:25). The Clovis complex is recognized by robust, lanceolate projectile points with flutes resulting from the removal of thin channel flakes on one or both faces of the point. The flutes do not progress beyond the basal half and do not expand to the lateral margins of the projectile points (Kooyman 2000:108). These stone tools are often found in association with megafauna, including mammoths and Pleistocene bison (Haynes 1993). There is a rarity of fluted points in extreme northern latitudes, and in Saskatchewan no *in situ* Clovis occupations have been found.

Throughout most of the Plains region Clovis is followed by Folsom and the transition has been assumed to be a cultural continuum. There is about a one hundred year overlap between Folsom and Clovis, specifically between 10,900 and 10,800 years B.P. This is complicated by the Goshen-Plainview complex (13,000 to 11,000 years B.P.), which is contemporaneous with Clovis. Goshen-Plainview points are unfluted lanceolates with parallel to slightly convex or concave sides and concave bases. They exhibit well executed parallel horizontal flaking, are basally thinned, and ground along the lower third of their edges (Kooyman 2000:111). Excavated sites in the Central Plains date between 13,000 and 11,000 years B.P. (Walker 1999:25) with sites in Montana and Wyoming dating the points to 11,300 and 11,000 years B.P. (Frison et al. 1996). These points are also restricted to surface finds in Saskatchewan.

The Folsom-Midland complex dates between 11,000 and 10,500 years B.P. It is evident that the subsistence pattern is a flourishing hunting and gathering adaptation with a strong focus on bison and a variety of other game animals (Walker 1999:25). Folsom points represent the peak in fluted technology. These points are similar to Clovis artifacts but smaller. The fluting on the points extends almost the entire length of the point body (Kooyman 2000:111). Often a nub is found in the middle of the base which is believed to be used for removal of channel flakes. Midland points are almost identical to Folsom points but lack the fluting (Walker 1999:25). Both Folsom and Midland points are restricted to surface finds in Saskatchewan.

Agate Basin (10,500 to 9500 years B.P.) overlaps with Folsom while Hell Gap (10,000 to 9500 years B.P.) overlaps with Agate Basin. Both of these complexes are similar in appearance to each other. Agate Basin points taper both to the base and to the top with no definite shoulder (Kooyman 2000:113). Hell Gap points on the other hand have a distinct shoulder separating the body from the stem. This is the first true stem in the Paleo-Indian sequence. Both of these point styles have been found in central and southern Saskatchewan as surface finds.

A variety of stemmed points appear after the Hell Gap complex collectively called the Cody complex. The first point in this complex is called Alberta (9500 to 9000 years B.P.). These points have a short stem that is parallel-sided or slightly expanded with some grinding, and very abrupt shoulders. Also part of the Cody complex are Scottsbluff and Eden projectile points, which date to around 8800 and 8400 years B.P. Scottsbluff points are generally divided into three different types (Kooyman 2000). Type I points have triangular or parallel-sided bodies, small shoulders, and broad stems with frequent basal grinding present. Type II points are similar overall but have wider bodies, are thinner in cross section, and have well-defined shoulders. Type III points have a broader blade and a gradual taper from base to tip. This results in a triangular outline with a distinct shoulder. Eden points are similar to Scottsbluff points but lack the prominent stem. Stems on these points are often very subtle and are created by basal grinding. The flaking on the bodies is collateral or transverse and creates a pronounced median ridge which produces a very distinct diamond shape cross section (Kooyman 2000:117). Also associated with these point styles is a biface referred to as a Cody knife, an asymmetrical cutting tool. These points have been found throughout southern and central Saskatchewan. Two sites have been found in Saskatchewan with *in situ* Eden and Scottsbluff points, the Niska site (DkNu-3) (Meyer 1985) near Ponteix and the Heron-Eden site (EcNx-2) (Corbeil 1995) near Prelate.

Projectile points associated with the latter part of the Early Precontact period are often grouped together and referred to as a Terminal Paleo-Indian sequence with radiocarbon dates that range from 8800 to 7500 years B.P. (Walker 1999). Points in this group are parallel-sided, obliquely flaked, lanceolate points, usually with concave bases. Groups associated with this sequence are thought have led a highly mobile lifestyle with an economic focus on bison (Dyck 1983). Projectile points included in this grouping are Lusk, Angostura, James Allen, Fredrick, Lovell Constricted, and Pryor Stemmed, some of which have been found in Saskatchewan.

Those living in the Early Precontact period lived through dynamic environmental and ecological changes (Peck 2011). They witnessed the extinction of various species and the evolution of various habitats. Bison appear to have been utilized by these people but little appears to be known about the utilization of other species both faunal and floral (Peck 2011). This was a time of high mobility for people, as resource gathering and exchange of information and technologies would have been otherwise impossible. One of the main reasons for higher mobility would have been to follow the bison, an important food source, which migrated across the Great Plains. As well people during this time likely lived in smaller group settings and, therefore, information and technology exchange would have required movement of one or more groups to a common location.

3.3 Middle Precontact Period (7500 to 2000 years B.P.)

Due to the changes in climate this period is a time when occupants of the Northern Plains began to focus on a larger subsistence pattern, as opposed to hunting only large game (Frison 1975; Reeves 1973; Schmits 1978). During this period a distinct reduction in projectile point size can be observed as well as the addition of side notches. Both of these traits suggest the possibility of the point being hafted to a smaller shaft of wood and being used with a spear thrower otherwise known as the atlatl;

> [w]ith this attachment, spears could be hurled like darts at a prey animal rather than thrust into it from close quarters. Basically an extension about 70 centimetres long that hooks onto the end of a spear shaft, the atlatl is a simple but effective device for increasing a spear's speed and power (Bryan 2005:55).

The Middle Precontact period is sometimes referred to as Archaic "to denote the adoption of a hunting and gathering subsistence pattern as opposed to a specialized hunting pattern" (Walker 1992:2-3). However, this is not the case since there were some cultural groups that were not following this pattern and others that had been following this pattern before this time frame (Frison 1991, 1992). According to Walker (1992:121) "there is no discernible Archaic adaptive stage on the Northern Plains that is any different from preceding or subsequent subsistence strategies." Therefore the term Middle Precontact period is used instead of the term Archaic.

Middle Holocene climates have proven highly complex with considerable variability in the timing and intensity of Holocene warming and drying (Meltzer 1999:404). The beginning of the Middle Precontact Period also corresponds to a change in the environment often called the Altithermal (7500 to 4700 years B.P.) (Antevs 1948), Mid-Holocene Climatic Optimum, or Hypsithermal.

3.3.1 Early Middle Precontact Period (7500 to 5000 years B.P.)

The Hypsithermal is still an area of scientific debate. One of the major controversies was whether or not there was an abandonment of the Plains area during this period. The idea of the Altithermal was based on the work of Ernest Antevs (1948, 1955) who "formulated the concept of a warm, arid Mid-Holocene interval" (Walker 1992:1). It is generally agreed that the Hypsithermal was a period with a fluctuating, gradual increase in temperature and decrease in precipitation (Vance et al. 1995). Initially it was believed that there was an abandonment of the Plains during this time (Mulloy 1958). By the 1970s it was recognized that the Plains was at least partially occupied (Walker 1992). During this period majority of the site appear to be located towards the periphery of the Plains. This could be attributed to either a movement to refuge or oasis-like areas (Hurt 1966; Yansa 2007) or a lack of research on the Plains (Reeves 1973; Sheehan 1995). Two other reasons for the lack of sites on the Plains may be attributed to point misidentification and geomorphic processes (Artz 1996; Reeves 1973). The latter may have resulted in deeply buried sites or erosion of sites.

Sites excavated during this period belong to the Mummy Cave series, named for a cave site in northern Wyoming. At least five different projectile point styles are associated with this series: (1) Mount Albion Corner-Notched, (2) Gowen Side-Notched (Salmon River Side-Notched), (3) Bitterroot Side-Notched (Northern Side-Notched), (4) Hawken Side-Notched, and (5) Blackwater Side-Notched (Walker 1992:133). Almost all the points in this series are side-notched with straight, concave, or convex bases. In Saskatchewan, two point styles commonly found: Bitterroot and Gowen Side-Notched dart tips (Walker 1999:25). Excavated sites are not very common but include the Gowen 1 site (FaNq-25), Gowen 2 site (FaNq-32) (Walker 1992), and Norby site (FbNp-56) (Zurburg 1991), all located within the City of Saskatoon. This series is also the oldest culture present in archaeological sites at Wanuskewin and these diagnostic projectile points have been found at only the Dog Child site (FbNp-24). Other sites within Wanuskewin Heritage Park, including the Amisk site (FbNp-17) (Amundson 1986) and the Redtail site (FbNp-10) (Ramsay 1993), have produced radiocarbon dates consistent with this age, but no diagnostic projectile points have been recovered.

3.3.2 Middle Middle Precontact Period (5000 to 3000 years B.P.)

During this period another climate change occurred, bringing with it cooler and wetter conditions. Much more information is known about this time period both environmentally and culturally. The increase in archaeological knowledge is due to the many campsites, kills sites, and even burials that have been found across the Plains region. Two predominant cultural groups that appear on the Plains at this time: Oxbow and McKean. The Oxbow complex (4700 to 3800 years B.P.) was widespread across southern Saskatchewan but also spread into Manitoba and Alberta (Dyck 1970; Gibson 1981). Oxbow projectile points are similar in technology to the Mummy Cave series, thereby suggesting an *in situ* evolution of Oxbow culture from Mummy Cave (Walker 1992). The Oxbow complex was first recognized during excavations at the Oxbow Dam site (DhMn-1) in 1958 (Nero & McCorquodale 1958). The classic Oxbow projectile point is perhaps one of the most recognizable points on the Northern Plains. It is a side-notched point with a deeply concave base, giving it an eared appearance. Oxbow deposits are commonly found associated with small campsites including the Harder site (FbNs-1) (Dyck 1977) and Amisk site (FbNp-17) (Amundson 1986); however, a large mass human burial known as the Gray site (EcNx-1) (Millar 1978) has also been found near Swift Current, Saskatchewan and includes Oxbow diagnostics. Information from these sites suggests that these people continued to have a nomadic lifestyle with a reliance on bison as the main food source. Material remains from excavations indicated the belief in an afterlife since some of them buried their dead and left grave goods with the burials (Millar et al. 1972; Millar 1978). These people more than likely participated in some sort of a trade network as exotic items like shell and bone from coastal areas were used in the construction of pendants and jewellery. Faunal remains indicate that they may have kept dogs and used them as work animals (Millar 1981; Morlan 1994). The Oxbow complex is overlapped by the McKean series, dated from 4100 to 3100 years B.P.

The McKean series is composed of three different projectile point styles: McKean, Duncan, and Hanna. These points were originally defined as separate point types (Dyck 1983) and even though they have been grouped together, the connection between them is still unclear (Walker 1999:25). The McKean point is a small to mid-sized lanceolate point with an indented base and no side-notches. Duncan points are lanceolate shaped and exhibit broad shoulders with an indented base, giving them a stemmed appearance. Hanna points are a smaller lanceolate form with broad side-notches which result in a tanged shoulder and flared base. Archaeologically McKean points, when found separately, are located stratigraphically below Duncan and Hanna points (Webster 2004). The McKean complex is more than likely an intrusive culture in Saskatchewan. There are two major theories on the migration of McKean points into Saskatchewan. One is that they are remains of hunting groups that moved from the foothills of the Rockies (Dyck 1983). The other is that McKean is derived from the desert culture of the Great Basin and when they migrated into Saskatchewan they brought with them their traditional subsistence patterns (Dyck 1983; Jennings 1957; Mulloy 1954). Some archaeologists also believe in the possibility that McKean may have evolved from the Oxbow complex (Wright 1995) however; an *in situ* development of McKean from Oxbow would exclude the majority of the data from the United States (Webster 2004). Nevertheless, migration from the western High Plains is currently one of the better supported theories (Walker 1999:26). Important excavated sites include the McKean type site (48CK7) in Wyoming, the Cactus Flower site (EbOp-16) in southern Alberta, and two sites in Wanuskewin, the Redtail site (FbNp-10) and the Thundercloud site (FbNp-25).

3.3.3 Late Middle Precontact Period (3000 to 2000 years B.P.)

Cooler and wetter climatic conditions continued throughout this period (Walker 1999). Culturally, the Pelican Lake complex dominates this period. Both the Oxbow complex and McKean series disappear and a new cultural unit appears: the Pelican Lake complex. Sites from this complex are dated between 3300 and 1850 years B.P. (Dyck 1983). There tends to be two styles of projectile points found in this complex. One style has a straight base and sides with corner-notches, usually leaving sharp barbs (Dyck 1983). The majority of the points in this complex are small, with some increasing in size up to 5 cm (Kooyman 2000:122). The smaller size of some Pelican Lake points implies that some form of bow and arrow technology may have been employed towards the end of this complex. The other style has straight sides, corner-notches, and a convex base instead of a straight base (Dyck 1983). These two point styles are found in association with each other from the middle to late part of the Pelican Lake complex. Pelican Lake points are frequently found associated with bison kill sites, especially bison jumps. The people associated with Pelican Lake points do not appear to have used medicine wheels as none have been recorded and graves tend to be shallow single burials often in very scenic locations (Brink 1988, Walker 1982). Pelican Lake sites in Saskatchewan include the Mortlach site (EcNl-1) (Wettlaufer 1955), the Walter Felt site (EcNm-3) (Kehoe 1965), the Sjovold site (EiNs-4) (Dyck and Morlan 1995), and the Bracken Cairn burial site (DhOb-3) (King 1961, Walker 1982) amongst others.

Contemporaneous with Pelican Lake is the Sandy Lake complex (2750 to 2150 years B.P.) which was first identified at the Mortlach site (EcNl-1) (Wettlaufer 1955). The points are small and thick with shallow side-notches and indented bases (Dyck 1983). This point style is poorly represented and often confused with Oxbow points (Frary 2009). Some sites with Sandy Lake points include the Walter Felt site (EcNm-3) (Kehoe 1965), the Sjovold site (EiNs-4) (Dyck and Morlan 1995), EgNn-9, and EgNo-23 (Neal 2006). Other projectile points also appear on the Northern Plains at this time. These are often referred to as the Un-named complex (ca. 2500 years B.P.) or the Outlook side-notched projectile point. The projectile points are a lanceolate shape with low, shallow side-notches and straight to convex bases (Dyck 1983; Dyck and Morlan 1995). These points are also poorly represented in the archaeological record but have been found at the Sjovold site (EiNs-4) (Dyck and Morlan 1995).

3.4 Late Precontact Period (2000 to 300 years B.P)

This period begins with two very important technological innovations; the distribution and use of the bow and arrow and the introduction and use of pottery. The use of the bow and arrow was obviously a huge advancement for Plains cultures. "Not only were the smaller arrow points and shafts easier to carry but the bow assured a long range, more accurate aim and more rapid fire. Proficiency with the new weapon was also easier to attain" (Bryan 2005:122). Pottery was also very important for storage, cooking, and possibly as indicators of social status. It can also provide insight into subsistence patterns and social patterns such as movement of technological styles between cultures and/or within families. The timing of these technologies is a little unclear and it is even possible that the advent of bow and arrow technology may have occurred in the previous period with the Pelican Lake culture. Pottery, on the other hand, made its first appearance with the Besant culture. It is believed that pottery was introduced to the Northern Plains region by the Woodland peoples of eastern Canada and the United States (Meyer and Walde 2009). The climate during this time period fluctuated between warm/dry and cool/moist conditions a number of times. In general it is believed that the environment resembled the modern climate regime (Walker 1999:26).

The first cultural unit recognized is the Besant complex (2500 to 1400 years B.P.) The Besant people are best known for the utilization of buffalo pounds and jumps. Due to the reliance on the use of pounds and jumps a large, organized group of people would have been required to operate them which suggests a possible increase in population (Novecosky 1999). Habitation structures associated with the Besant culture range from a pole structure with mats or brush to the use of tipis covered with hides (Walker 1999:26). Besant people used side-notched lanceolate shaped points. The notches are generally as broad as they are deep and very close to the basal edge, which is convex to slightly concave (Dyck 1983). A second point style sometimes called the Samantha point is frequently associated with the Besant complex (Walker 1999:26). During this period there appears to be a strong preference for Knife River Flint quarried in North Dakota, which suggests the possibility of long distance trade and/or transport networks (Dyck 1983; Walker 1999:26).

The Sonata complex is a variant of the Besant culture believed to be strongly influenced by the Missouri River area in North and South Dakota where it is most commonly found. This variant is associated with a unique burial mound tradition (Neuman 1975). The Sonata complex is closely related to or may even be the same thing as its Besant counterpart, in Canada, since the projectile points found in association with the mounds resemble Besant points. However, the Sonata complex has been classified as a mortuary complex, with the main difference between Besant and Sonata being the presence of burial mounds (Meyer and Rollans 1990; Walde et al. 1995).

Besant pottery is simple with vessels being concoidal in shape, made with grit and/or sand temper, and having cord marked or smooth surface finishes (Walde et al. 1995). If decorations are found on the vessel, they are commonly a single row of punctates, bosses or alternating punctates and bosses parallel to the rim (Dyck 1983; Walde and Meyer 2003:138). The Besant complex has been identified in Saskatchewan at many sites including the Walter Felt site (EcNm-3) (Kehoe 1965), the Sjovold site (EiNs-4) (Dyck and Morlan 1995), the Mortlach site (EcNl-1) (Wettlaufer 1955), the Elma Thompson site (EiOj-1) (Finnigan and Johnson 1984), and the Grandora site (FaNr-2) (Dyck 1972).

The Avonlea complex dates to between 1750 and 1150 years B.P. and overlaps with the Besant complex. This complex is a widespread horizon recognized throughout the Plains region (Meyer and Walde 2009). Even though Besant and Avonlea are contemporaneous, it has been argued that Avonlea follows Besant and that there was no contact between the two (Cloutier 2004). Projectile points associated with this complex are small side-notched arrow points. The points are triangular, very thin, and have small shallow side-notches close to the slightly concave base and demonstrate very fine and controlled pressure flaking (Dyck 1983).

Pottery associated with the Avonlea complex is commonly formed into two shapes: concoidal and globular. In Saskatchewan, the exterior finish follows three different styles: net/fabric impressed, spiral grooved, and a smoothed version. The net/fabric impressed pottery is termed Rock Lake Net/Fabric Impressed Ware (Meyer and Walde 2009). The exterior of this type of pottery is textured with either a net or fabric appearance. Decoration on the vessel may have one or more rows of punctates, bosses, or finger pinches with incisions or tool impressions on the lip (Dyck 1983; Meyer and Walde 2009). The spiral grooved pottery is termed Truman Parallel Grooved Ware with spiral grooves present throughout the entire vessel. Decorations on the lip or rim appear to be absent (Dyck 1983). The smooth surface finish is termed Avonlea Plain Ware with no decorations. The majority of the sites found in western Canada are bison kill sites including the Gull Lake bison jump (EaOd-1) (Kehoe 1973) and Head-Smashed-In buffalo jump (DkPj-1 and DkPj-2) (Reeves 1978).

The last 1,000 years of this period involved a variety of changes, including the use of small side-notched points, increases in population, movement of populations, and even horticultural practices (Walker 1999:27). The predominant point styles during this period are the Prairie Side-Notched points (1200 to 550 years B.P.) and the Plains Side-Notched points (550 to 170 years B.P.). In Alberta this time frame is known as the Old Women's/Cayley and Mortlach phase, but in Saskatchewan it is known as the Late Side-Notched period (Dyck 1983; Peck and Ives 2001).

This first point style associated with the Late Side-Notched period is the Prairie Side-Notched point. The Prairie Side-Notched point is small with a very triangular shape. The side-notches on these points are often irregular and set very close to the basal margin. Pottery vessels from this period are often referred to as Ethridge Ware (Meyer and Walde 2009). These vessels are globular in shape with a defined angular shoulder, constricted neck, and straight to expanding rims with the bases being either round or flat. The exterior finish of the vessel is either cord-roughened or smooth finish. Decoration on the vessel varies from undecorated rims to cord-wrapped tool impressions, incisions, or punctates around the rim (Walker 1999:27). There appears to be some external influence from the Blackduck complex of the eastern Woodlands as illustrated in the side-notched points, cord-roughened pottery, and burial mounds (Walde et al. 1995). Multi-component sites in Saskatchewan include the Sjovold site (EiNs-4) (Dyck and Morlan 1995), the Tschetter bison trap (FbNr-1) (Linnamae 1981; Prentice 1983), FbNp-1 (Harty 2005), and the Walter Felt site (EcNm-3), and a burial site known as the Moose Bay Mound site (EdMq-3) (Hanna 1976).

The Plains Side-Notched point is associated with the Mortlach complex in Saskatchewan. Projectile points are small triangular-shaped with notches located higher up from the base than in the Prairie Side-Notched points. The points appear to be very carefully worked and have a much finer appearance than the Prairie Side-Notched points. Mortlach vessels are globular in shape with thinner walls. The exterior finish is either fabric impressed or check stamped. Common decorations include cord-wrapped tool impressions, dentate-stamped or punctates indicative of Selkirk and Middle-Missouri influences (Walker 1999). Mortlach pottery has at least three different influences:

> [N]orthern Mortlach sites contain evidence of Selkirk contacts, southern Mortlach reflects Middle Missouri village contacts (LeBeau ware), and eastern Mortlach contains vessels with single cord impressions, a decorative technique characteristic of assemblages of northeastern North Dakota and adjacent southern Manitoba (Walde et al 1995:41).

Sometimes these sites are associated with European trade items (Mack 2000). Multi-component sites include the majority of the sites within Wanuskewin Heritage Park.

3.5 Contact Period

The very last cultural period on the Northern Plains is the Contact period which refers to the arrival of Europeans who brought with them distinct cultural materials. The Contact period is enhanced by written and oral documentation. Early historical archaeology in Canada focused predominantly on fur trade posts. At the time homesteads, ranches, small towns, and mines were too recent to be of interest to archaeologists.

"The fur trade in the first half of the sixteenth century was of minor importance and incidental to fishing" (Innis 1999:12). As the fur trade progressed the beaver became a very important aspect, as its pelt was desired by Europeans for the production of fur hats and clothing (Innis 1999). This led to exploration into unknown areas of 'Canada' and the establishment of fur trade posts. England's response to Europe's ever-growing demand for fashionable furs was the creation of a company known as the Hudson's Bay Company (HBC) (Burley 1997; Innis 1999; Markowski 2009:43). "The charter of 1670 granted the HBC exclusive rights to all trade and natural resources in the territory drained by waters flowing into Hudson Bay, a vast area the company named Rupert's Land" (Burley 1997:2). By 1690 the HBC was sending employees into the interior of Rupert's Land. Henry Kelsey was the first European to reach the Saskatchewan River, who was followed by Anthony Henday in 1690-1692 and 1754-1755, respectively (Innis 1999; Meyer and Russell 2007:163). At this time fur trade posts were not set up in the interior.

By the middle of the eighteenth century the French were establishing fur trade posts in the interior of Rupert's Land and forcing out the HBC (Burley1997; Rich 1967). The Seven Years War, 1756-1763, disrupted French trading posts and allowed the English to resume control (Friesen 2004). In 1768-1769 James Finlay was the first English trader from Canada that was trading along the Saskatchewan River (Innis 1999; Wallace 1954). "It was not, however, until 1774 with the establishment of Cumberland House, near what is now The Pas, Manitoba, that the HBC could boast an inland trading post" (Burley 1997:3). More posts would soon be established inland. Along with the establishment of more posts came new companies like the North West Company (NWC) (Innis 1999). Competition between the companies, especially HBC and NWC, became violent and often bloody with attacks frequently dispersing the settlers (Burley 1997:3). Then in 1821 a merger of the HBC and NWC occurred (Burley 1997). Throughout the early

1800s posts began to surface across much of Rupert's Land. In 1869 a declaration was signed and Rupert's Land became part of Canada. The fur trade played a large and important role in the creation and settlement of Canada. By the 1870s most of the fur trade had ended. Settlers were in Saskatchewan by the 1800s, and Wanuskewin was settled by the Penner family by 1903.

The Contact period was the initial spark that would change the face of the Plains. European commodities like horses, guns, and other trade items became desired by the Plains people. These goods begin to show up slowly in the archaeological record with a strike-a-light being found in the upper levels at the Dog Child site. The horse became an important part of the Plains way of life. It changed and improved hunting, made travel and trade easier, and even led to changes in warfare.

Chapter 4

Methodology

4.1 Site Discovery and Assessment

The Dog Child site was initially located during the park survey of 1983. According to the survey the site was determined to have a length of 67 m, a width of 21 m, an elevation of 472 m above sea level, and is located 10 m west of Opimihaw Creek (Walker 1983). During the initial survey five test pits were excavated. Dr. Walker and his field crew returned to the site and spent two weeks excavating a 1 m^2 test unit. This test square identified four buried occupations at the site. No diagnostic artifacts were found at this time. The materials found warranted further excavations, and in the summer of 2004 full-scale excavations began at the site.

4.2 Excavation Methodology

The full-scale excavations lasted a total of six field seasons and were completed by University of Saskatchewan Department of Archaeology and Anthropology field school students as a six week course. These excavations were completed under the direct supervision of Dr. Ernie Walker (2004 to 2009), Talina Cyr (2004 to 2006), Lisa Rudolf (2006), Heather Milsom (2008 to 2009), and the author (2007 to 2009). Subsequent excavations at the end of each field season were conducted by Talina Cyr and volunteers from the SAS.

Two areas of the Dog Child site were excavated and identified: Block 1 and Block 2 (Figure 4.1 and 4.2). Block 1 was first identified in 2004 and was continuously excavated during the summer months from 2004 to 2009. Block 2 was first identified in 2005, during which only one test unit was identified and excavated. During the summer excavation of 2006 an additional nine units were excavated after which no further excavations were conducted in Block 2. In total 61 m^2 were excavated in Block 1 and 10 m^2 were excavated in Block 2 for an overall total excavation size of 71 m^2. The depth of the bottom of each unit varied depending on its location within the excavation block. The majority of the northern units were excavated to a depth of 0.6 m, while units further south were excavated to a depth of 0.9 to 1 m deep. Excavations at the site exposed six buried occupation levels. A possible seventh buried level may have been uncovered at the end of the 2009 field season within two of the southernmost units of Block 1 (Units 28S 13E, 28S 14E). The majority of this thesis is concerned with the 2007 to 2009 excavation of

Block 1 (Figure 4.3). Before excavation could begin, a datum was established at the northwest corner of the site and was designated 0S 0E. The 71 excavation units were positioned to the south and east of the datum into a grid of one by one metre square units, and the southwest corner of each unit was used as secondary datum for the unit number.

These one by one metre units were divided into four quadrants to maintain control of provenience during excavations. When excavations first began in 2004, arbitrary 5 cm depth intervals were used as a means to explore the natural cultural stratigraphy of the site. Cultural levels were identified based on the presence of archaeological remains. In addition a colour and texture change was frequently noted, with cultural levels displaying a darker, organic rich soil. Once the cultural stratigraphy was recognized it was possible for excavations to continue in natural cultural levels. At times when the natural cultural levels could not be discerned, arbitrary 5 cm intervals were utilized.

Excavation was completed by level with the archaeologist excavating each quadrant separately to the same depth. The 2007 to 2009 excavations utilized two different methods. The primary method was the use of a mason's trowel to remove soil from within each quadrant. Both soft and hard bristle paintbrushes were utilized to brush dirt away from artifacts as well. Chopsticks, grapefruit knives, and dental picks were used in areas with high artifact concentration or where there were fragile artifacts, as they allowed for more precision. Dirt from these quadrants was placed into a bucket and would be sifted through a 6 mm mesh screen to look for additional artifacts. The second technique employed is called shovel shaving. This was primarily used on archaeologically sterile levels as it removed thin sections of soil which were placed into a bucket and later screened. The sod was not screened but was closely checked for any faunal or lithic remains.

Figure 4.1: Excavation of Block 1 (right) and Block 2 (left) facing east at the Dog Child site (June 2006).

All of the artifacts that were identified as a stone or bone tool, represented an identified piece of bone, or were larger than the size of a quarter were left *in situ*. The soil was removed from around the artifact using the most precise method so as not to displace the artifact. This soil was placed into a bucket based on the particular quadrant being excavated and was then sifted through a 6 mm screen to remove any artifacts or fragments that were previously missed. If a concentration of microdebitage or small artifacts were found, a 3 mm screen was used. Artifacts that were left *in situ* were recorded based on three-dimensional provenience. The artifact was measured, in centimetres, in relation to its distance east and south of the northwestern unit datum. The third measurement was the artifact's depth below the surface in centimetres using a line level. Once measured these artifacts were recorded onto a planview map documenting their exact position within the excavation unit.

Artifacts were given a catalogue number and placed into a bag with an index card recording a standard set of information including the artifact's provenience, level, site, excavator and description of the artifact. All identifiable fragments were catalogued regardless of size however the archaeological remains that were smaller than 25 mm were not mapped in and were collectively placed into one fragment bag for each level per quadrant. These fragment bags also contained index cards with the same standard information as for artifacts. In the case of features like hearths, all of the sediment was collected by quadrant and taken back to the University of Saskatchewan for water screening and fine screening. This allowed for the removal of minute flakes, bones, seeds and/or charcoal that would have otherwise not been found. Again index cards were used to record the proper information.

Record keeping was of importance in the field so the site could be accurately reconstructed back in the lab. After excavation of a level, arbitrary or natural, was completed, a standardized level record form was filled out. Information on this form included start and stop depth measurements for each quadrant, matrix description, significant finds, feature description, samples taken, photographs, level type, cultural level number, and any additional comments. Each excavator kept a standardized daily log which summarized what the excavator had completed that day. This included the depth they had excavated to at the end of the day and any important information about what they had found within the unit. Photographs of the excavation were taken by the supervisors and various field school students.

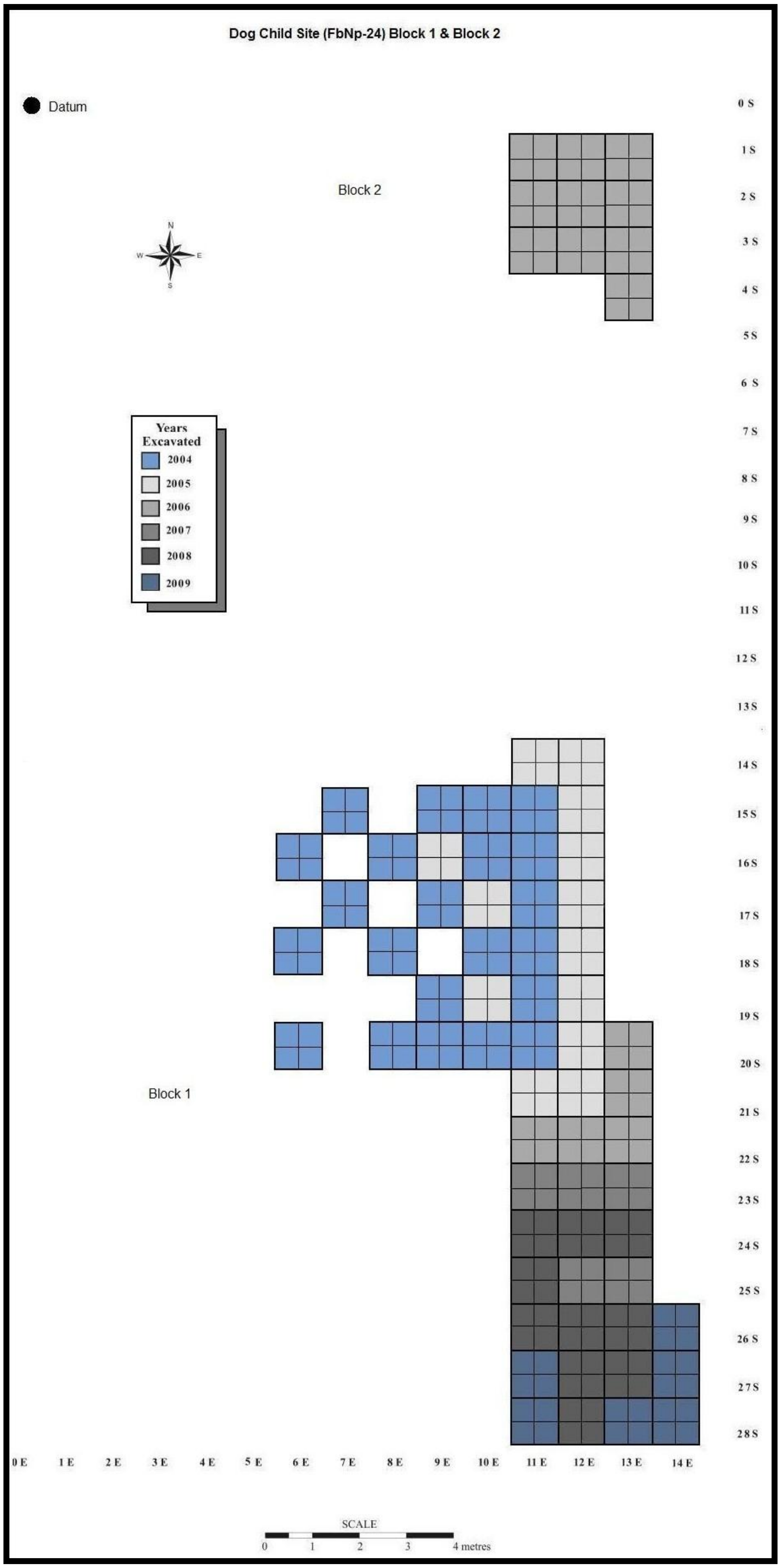

Figure 4.2: Location of excavation units at the Dog Child site.

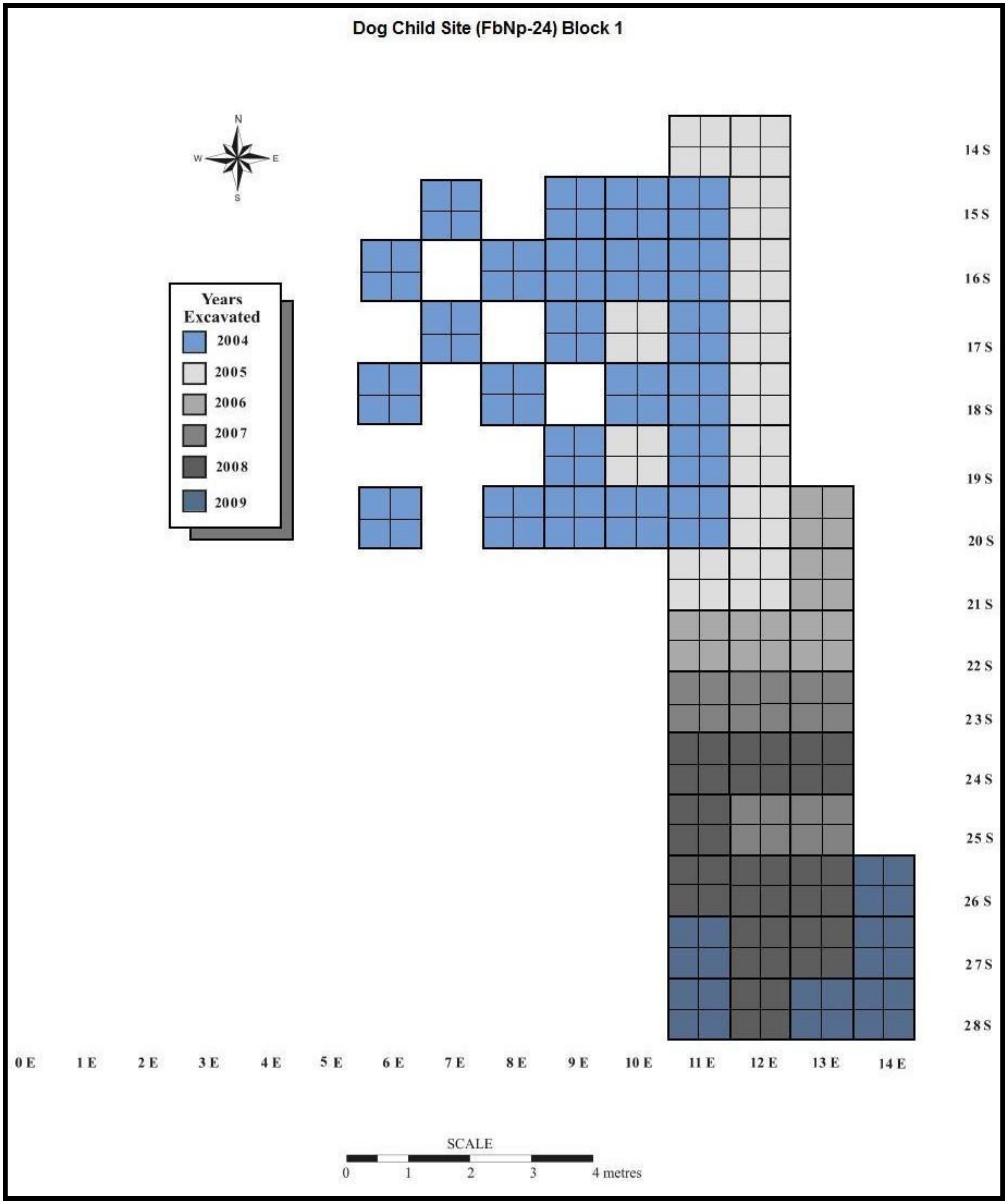

Figure 4.3: Location of excavated units in Block 1 at the Dog Child site.

The first field season in 2004 was conducted in order to determine the type of site and the cultural affiliation of the levels. There were 22 m^2 excavated in the first year and it was established that there were six buried cultural levels. The objective of the 2005 field season was to expand on the previous season. A total of 10 m^2 were excavated to a maximum depth of 56 cm. Excavations followed the same format as the 2004 field season. The SAS also started a unit (2S 12E), located in Block 2, which was completed in the subsequent field season. Due to the wealth of material remains found in the Block 2 unit the 2006 field season focussed on expanding around that particular unit (Figure 4.4). In total 10 m^2 were excavated in Block 2 to a maximum depth of 50 cm in unit 1S 13E. An additional 5 m^2 were excavated in Block 1 to a maximum depth of 57 cm in unit 20S 13E. Data from the field seasons of 2004 to 2005, and the stone tools of 2006 can be found in Talina Cyr's thesis *The Dog Child Site: A 5500 Year Old Multicomponent Site on the Northern Plains* (2006).

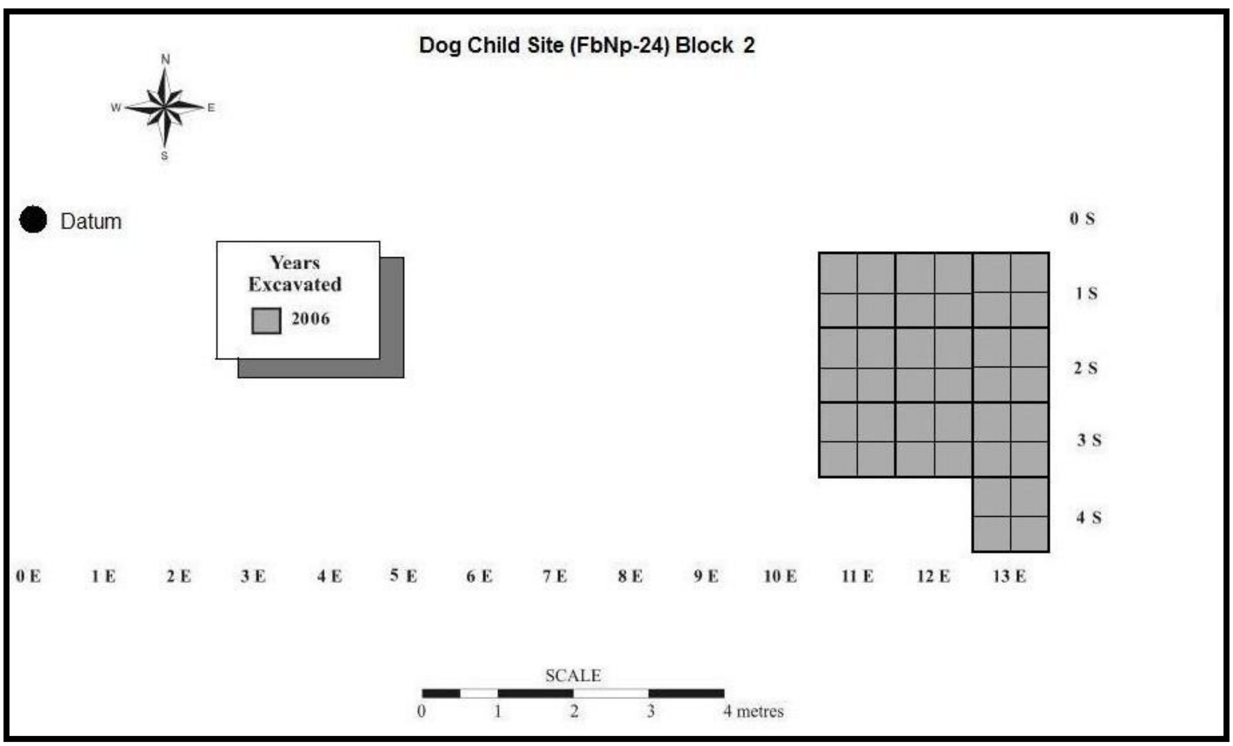

Figure 4.4: Location of excavated units in Block 2 at the Dog Child site.

Due to the presence of a Mummy Cave component (Level 3b) in Block 1 it was decided that another field season would be undertaken at the site. In 2007, a total of 5 m^2 were excavated to a depth of 73 cm in unit 25S 12E. It was found that there was a wealth of information to be gathered from the Mummy Cave level and excavations were extended for another two years. In 2008 10 m^2 were excavated to a maximum depth of 83 cm (Unit 28S 12E), while in 2009 6 m^2 were excavated to a maximum depth of 92 cm (Unit 28S 11E). During the field seasons of 2007 to 2009, the geoarchaeology students from the University of Saskatchewan Department of Archaeology and Anthropology utilized the Dog Child site as the place for their field class. Hand auger samples were taken from various areas around the site, and soil samples were taken from excavation walls but only analyzed in the field.

In the summer of 2008 the west wall of Unit 28S 12E was selected for soil column sampling. This was done to extract phytolith samples from the site with the idea of creating a paleoenvironmental record based on the findings. This particular unit was chosen because of the excellent definition of soil and sedimentary units within the site. At the time of sampling the west wall was at the southernmost end of a length of wall, allowing for the soil and sediment units to be more confidently defined in relation to the rest of the excavation block. The procedures associated with this process both in the field and laboratory, along with any results obtained, are forthcoming and not the focus of this thesis.

4.3 Laboratory Methodology

All of the data collected in the field was brought back to the Archaeology Laboratory in the Department of Archaeology and Anthropology at the University of Saskatchewan, Saskatoon. Field school students were required to wash, re-bag, identify, and catalogue the recovered material. The samples collected from features were water-screened by placing the samples into a 2 mm screen. Water was run over the sample in order to separate the fine sediment from the larger materials. These floatation samples were then placed on trays to dry. After the samples were thoroughly dried they were placed in a series of graded screens (4 mm, 2 mm, and 850 µm) and were picked through in order to find the archaeological material. This allowed for identification of microdebitage and small faunal remains. A handful of the samples recovered were sorted by the 2009 to 2010 zooarchaeology students in order for them to gain experience in recognizing microfaunal remains.

Artifacts, both faunal and stone, were cleaned using water and soft bristle toothbrushes. Artifacts like pottery, charcoal, and fragile bone were cleaned using a dry toothbrush. Once cleaned the artifacts were placed onto trays to dry. These artifacts were then identified, weighed, and re-bagged with their associated index cards. Fragment bags were sorted based on material type and form, counted, weighed, and re-bagged with index cards. All of the material remains, along with the final report for each unit, were stored in cardboard file boxes. All of the information about each artifact was recorded on a preliminary unit catalogue which was completed by the excavators. This information recorded was double checked by the author. Cyr (2006) had already created a master catalogue for the site using *Microsoft Office® Access*™ 2007 and therefore the data from 2007 to 2009 were added to the catalogue. The catalogue was also exported into *Microsoft Office® Excel*™ 2007 to create tables.

Classification for all of the archaeological materials was based on five basic categories: lithic, faunal, ceramic, metal, and organic. These basic categories were then further subdivided. Lithic remains is a large category including modified or utilized stone tools, functional stone materials, and by-products of tool production. Faunal remains include vertebrate and invertebrate remains. Ceramics include all the portions of pottery vessels like body, neck, or lip/rim sherds. The metal artifacts include European trade goods. Organic materials included wood, seeds, and charcoal.

4.3.1 Lithic Analysis

The lithics at the Dog Child site were identified by material type, based on the comparative collection housed at the University of Saskatchewan's Department of Archaeology and Anthropology, and on Eldon Johnson's (1998) overview of Saskatchewan material types. Common materials found at the Dog Child site include granite, sandstone, schist, gneiss, siltstones, basalt, and fine-grained siliceous tool stone rocks like chert, chalcedony, quartz, and quartzite. It was also noted if any of these materials had been heated. Heat treatment can alter the property of certain types of rock. This process changes the mechanical properties of the rock which often results in a change in the flaking quality of the rock making them easier to flake

(Johnson 1998). Heat treatment was commonly observed in Swan River chert as a change in appearance, most notably a change in colour and a waxy lustre.

The majority of the lithic material types recovered from the Dog Child site can be found throughout Saskatchewan. Those materials found in Saskatchewan are referred to as local materials (Figure 4.5) while those not commonly found in Saskatchewan, like Knife River flint, are considered to be exotic (Figure 4.6).

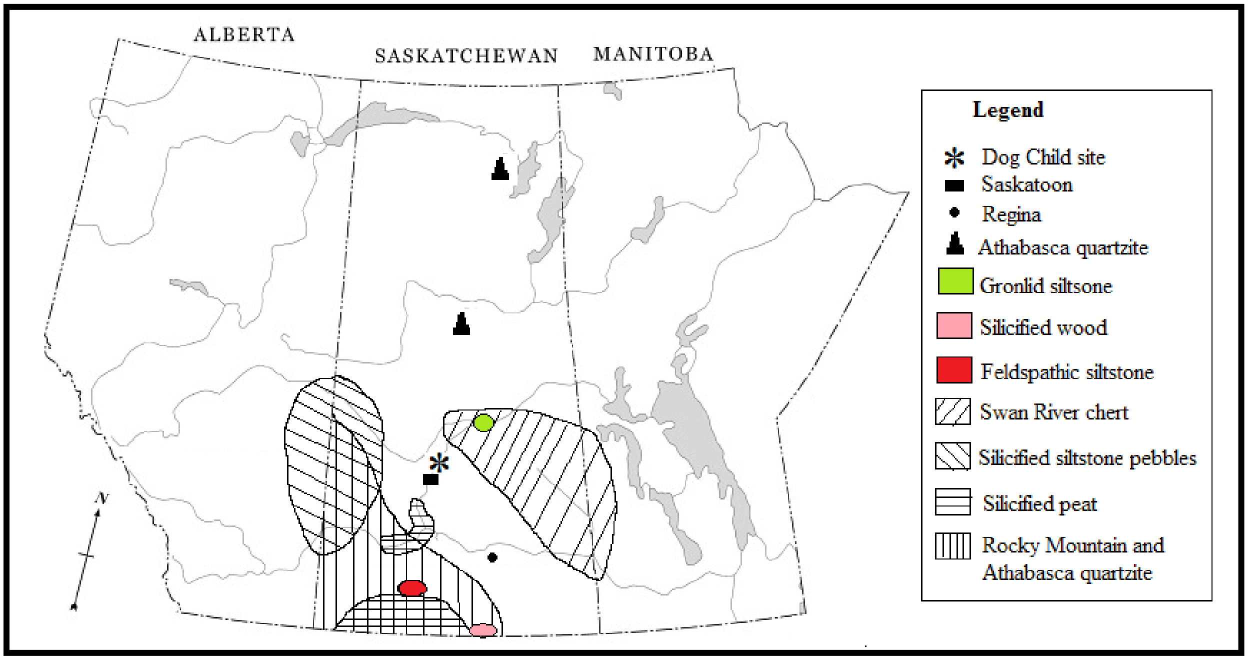

Figure 4.5: Location of local lithic materials in the Prairie Provinces.

Two types of quartzite are commonly found in Saskatchewan; Athabasca and Rocky Mountain. The primary source for Athabasca quartzite is the Precambrian Shield of northern Saskatchewan (Johnson 1998:30). Exposures were noted near Wollaston Lake, Geikie River, and east of La Ronge. In addition, glacial flow has deposited this quartzite into parts of southwestern Saskatchewan (Johnson 1998). In Saskatchewan, Rocky Mountain quartzite is found in the uplands of the Cypress Hills, the Wood Mountain area, and near Ponteix, Cadillac and east of Buffalo Gap (Johnson 1998:30).

According to Johnson (1998:32) there are no *in situ* formations of Swan River chert present in Saskatchewan. Swan River chert is most commonly found in glacial drift. It is especially abundant in archaeological deposits west of Lake Manitoba and Lake Winnipegosis, Manitoba. Swan River chert has also been found in Saskatchewan around Armit River, Little Poplar River, north of Preeceville, and in the vicinity of Coronach, but is notably absent from gravels around Canora (Johnson 1998:32). Silicified peat has been found in naturally deposited nodules and clasts in Saskatchewan; south of Rockglen, around portions of the western shore of Lake Diefenbaker, and in gravel deposits in the vicinity of Macrorie and the Wood Mountain region (Johnson 1998:34). Silicified wood has also been recovered from similar areas in Saskatchewan like the Wood Mountain Formation south of Rockglen (Johnson 1998:35-36). Silicified siltstone pebbles are sparsely present in west central Saskatchewan and throughout the southern portion of Saskatchewan however, they are fairly abundant on the shore of Grassy Island Lake, east of Compeer, Alberta and the Neutral Hills in Alberta (Johnson 1998:37). Gronlid siltstone can be found near Nipawin, west of Codette, and in the Wynyard-Lake Lenore vicinity of Saskatchewan. Small amounts have been found from Nipawin to the southwest and as far away as western Saskatchewan (Johnson 1998:38). In Saskatchewan feldspathic siltstone is frequently found in tertiary gravels which originate in the Belt Formation in northern Montana. There is a small but significant quantity in the gravels around the Ponteix area (Johnson 1998:40). On the other hand, lithic material like Knife River flint is found in North Dakota and is considered to be an exotic material (Figure 4.6).

Lithics were then subdivided into form and function categories which includes flaked tools, core/core fragments, debitage, ground and pecked tools, and fire-cracked rock (FCR) or fire-broken rock (FBR). Flaked tools include projectile points, bifaces, unifaces, and retouched flakes. Projectile points are a specialized perforating tool that would have been hafted to create a spear, dart, or arrow. These are important at archaeological sites because they are frequently used as chronological indicators. Projectile points were analyzed quantitatively and qualitatively. Quantitative (metric) measurements included length, width, thickness, body measurements, base measurements, and notch measurements (Figure 4.5, Appendix D, Table D.1 and D.2). Qualitative analysis included material type, longitudinal cross-section shape, transverse cross section shape, completeness, symmetry, basal edge shape, and modification

(Appendix D, Table D.4 and D.5). Even though they fall into a different category, from projectile points, the same quantitative and qualitative measurements were applied to preforms (Appendix D, Table D.3 and D.6).

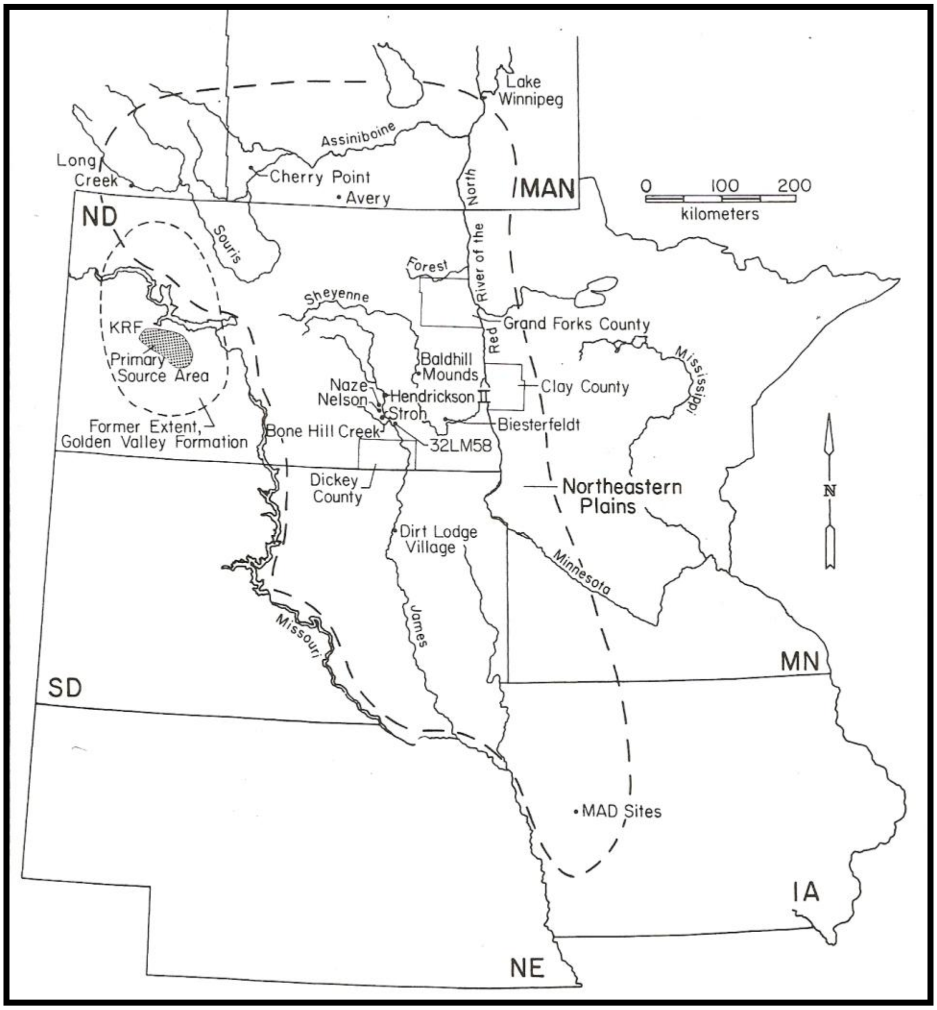

Figure 4.6: Location of Knife River flint (Gregg, 1987).

Bifaces are tools that are flaked on both sides and commonly believed to have been used as knives. Perforators are used to create holes or grooves in different types of materials and based on their function are placed into subdivisions. Scrapers are a very common unifacial tool type found at sites and are believed to be used for various scraping tasks. Sidescrapers are those tools that have the working edge located on the lateral (or longer) edge of the tool while endscrapers have the working edge on the transverse (or shorter) edge of the tool. At times a combination of both endscrapers and sidescrapers can be found. Retouched flakes are flakes that have been bifacially or unifacially retouched for intended use. Unifaces most commonly are in the form of a scraper; however, there were some stone tools with only unifacial modification that did not show the same attributes as those found on scrapers and were therefore classed as unifaces.

These flaked tools including bifaces, unifaces, and retouched flakes were also analyzed both quantitatively and qualitatively. Quantitative measurements included length of primary working edge, length of secondary working edge, maximum length, maximum width, maximum thickness, and weight (Appendix D, Table D.7, D.8, and D.9). Qualitative analysis included tool type, material, modification to working edges, overall shape, primary working edge shape and location, secondary working edge shape and location, transverse cross-section shape, and longitudinal cross-section shape (Appendix D, Table D.10, D.11, and D.12).

Ground and pecked stone tools included hammerstones and grinding slabs. These tools may have been intentionally chosen based on the original shape of the rock or the end shape may have been a result of the task for which the tool was used. Hammerstones can be various shapes and sizes depending on the task for which they are intended (Kooyman 2000:99). Types of tasks can include breaking bones for marrow extraction or for detaching flakes from cores in the process of tool production. Grinding slabs and stones have a flattened appearance and smooth feel to their surface which is the result of grinding a variety of items including seeds and plants.

Cores are lithic material from which flakes are removed in order to utilize those flakes for the basis of tool formation (Kooyman 2000). According to Kooyman (2000), there are two basic types of cores – unprepared cores, which do not possess a striking platform, and prepared cores, which exhibit a striking platform. Unprepared cores can be further subdivided into polymorphic (amorphous) cores, where flakes are removed from multiple directions, and bipolar cores, which utilize a hammerstone and anvil method for splitting the stone into two portions. In the case of prepared cores, there are three examples: unifacial cores are those that have flakes removed from a single direction, bifacial cores have flakes removed from two directions, and multidirectional cores have flakes removed from three or more directions (Kooyman 2000). The cores at the Dog

Child site were placed into these types when possible. Often only exhausted core fragments were recovered from excavation.

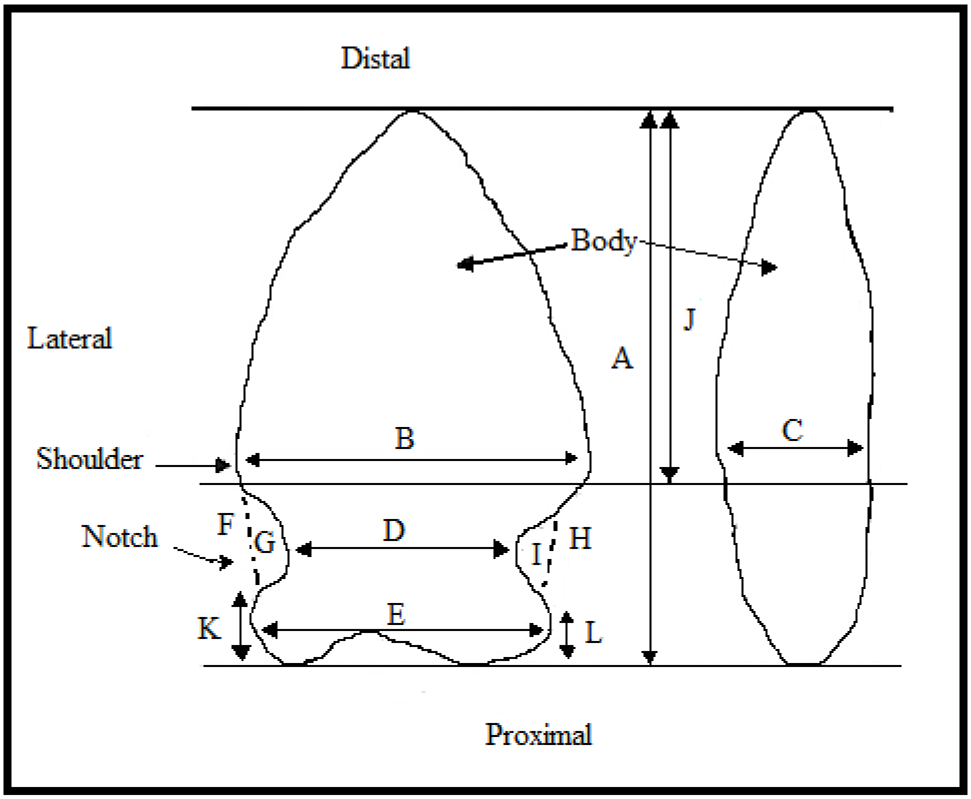

Figure 4.7: Quantitative measurements of projectile points and preforms. (A) maximum length, (B) maximum/body width, (C) maximum thickness (D) neck (inter-notch/stem width), (E) basal width, (F) left notch width, (G) left notch depth, (H) right notch width, (I) right notch depth, (J) body legth, (K) distance of left notch from base, (L) distance of right notch from base (Frary 2009, modified by author).

Debitage, including flakes and shatter, composed a large portion of the lithic assemblage at the Dog Child site. Flakes are pieces of lithic material broken from a core that exhibit some or all of the following features: striking platform, proximal and distal ends, ventral and dorsal surfaces, bulb of percussion, bulbar scar, bulbar fissures, lateral fissures, compression rings, and arrises (Kooyman 2000:12-14). Flakes were divided into three types based on Kooyman (2000). A primary flake (or decortification flake) is one of the first flakes removed from a core; therefore the entire dorsal surface of the flake is covered in cortex. A secondary flake, referred to as secondary decortification flake by Kooyman (2000), has some cortex but also exhibits a portion of dorsal surface which is not covered by cortex. Tertiary flakes, referred to as secondary flakes by Kooyman (2000), exhibit no cortex at all on the dorsal surface. Tertiary flakes can be further subdivided into various categories including shaping flakes, thinning/reduction flakes, bifacial reduction flakes, finishing flakes, and resharpening flakes. These subdivisions were not utilized in this thesis, and a flake exhibiting no cortex is simply referred to as a tertiary flake. Shatter refers to the pieces or chips of lithic material removed during lithic reduction that do not exhibit any flake characteristics; they are often angular and irregularly shaped.

Fire cracked rock (FCR), also called fire broken rock (FBR), are rocks that exhibit abrupt angles and cracks due to extreme temperature changes. These are frequently found in the construction of pits/hearths and/or boiling pits. Other natural factors like freeze/thaw cycles can also cause the cracked appearance of FCR. Therefore, only rocks that not only exhibit cracking but also reddening or blackening of the surface were classed as FCR.

4.3.2 Faunal Analysis

Faunal analysis was used to determine the type, number, and species, if possible, of the bones that were present in each occupation level. This required the use of a number of comparative, quantitative, and qualitative analyses. In order to understand how the analysis worked a number of terms must first be clarified. Faunal remains were separated into three discrete categories: elements, specimens, and fragments. An element is identified as a "single complete bone or tooth in the skeleton of an animal" (Grayson 1984:16) while a specimen is "a bone, tooth, or shell or seed, or fragment thereof" (Webster 1999:38), both of which can be identified to a taxon. Fragment refers to the bones that cannot be identified to a specific element however it may be possible to place it into a class of elements like long bones or vertebrae (Brink and Dawe 1989:80).

If the faunal remains were placed into the element or specimen category, the side of the bone was identified when possible and any distinguishing anatomical landmarks were noted. These remains were identified down to the lowest taxonomic level recognizable using the University of Saskatchewan Department of Archaeology and Anthropology's faunal comparative collection. The term taxon is used throughout and refers to a subspecies, species, genus, family, or higher taxonomic category. A number of size classes were used when the taxonomic classification of the element or specimen could not be identified. These were based on approximate weight or size groupings. In the case of birds, body size was used as opposed to weight (Table 4.1). A broad age category was also assigned to remains when woven bone, billowed surfaces and/or immature teeth were identified. This age assignment also utilized the faunal comparative collection at the Department of Archaeology and Anthropology.

Visible taphonomic processes were observed and noted in each of the artifacts. Efremov (1940) originally defined taphonomy as

> the study of the transition (in all its details) of animal remains from the biosphere into the lithosphere, *i.e.*, the study of a process in the upshot of which the organisms pass out of the different parts of the biosphere and, being fossilized, become part of the lithosphere (Efremov 1940:85).

Taphonomic processes, both cultural and natural, were observed and noted when present. Cultural processes includes burning, which implies consumption of the animal, and cut marks, which represent butchering and implied use of the animal. The degree of burning of bone was noted as raw, burned, or calcined. Partially to fully blackened bones were labelled as burned while calcined bones exhibited partial to full blue-grey to white colouring. Colour changes within the bone can be approximately correlated with a temperature to which the bone was heated (O'Connor 2000). According to O'Connor (2000), butchery marks are divided into two categories: cut marks and chop marks indicating the use of different instruments for different tasks. No chop marks were present on any of the bones and therefore only cut marks were recorded when found. Natural processes were the most abundant and included weathering, carnivore punctures, rodent gnawing, soil staining, calcium carbonate build-up, and root etching. Weathering was described using Behrensmeyer (1978) and O'Connor (2000) (Table 4.2).

Table 4.1: Size classification of mammals (Dyck and Morlan 1995:140; Cyr 2006:37).

Size Class	Mass (kg)	Associated Term	Example
SC6a	200 to 700	Very large mammal	Elk, bison
SC5a	25 to 200	Large mammal	Wolf, pronghorn
SC4a	5 to 25	Medium mammal	Coyote, badger
SC3a	0.7 to 5	Small to medium mammal	Fox, hare, skunk
SC2a	0.1 to 0.7	Small mammal	Ground squirrel
SC1a	<0.1	Micro-mammal	Mouse, vole
SC5b	N/A	Large bird	Crane, eagle
SC4b	N/A	Medium bird	Raven
SC3b	N/A	Small to medium bird	Duck
SC2b	N/A	Small bird	Robin
SC1b	N/A	Micro-bird	Warbler

Table 4.2: A summary of the weathering stage of bone (O'Connor 2000:44).

Stage	Diagnostic Criteria
0	The bone surface shows no cracking or flaking.
1	The bone surface shows cracking, usually parallel to the orientation of collagen fibres. Articular surfaces may show craking in a mosaic pattern.
2	Bone surfaces show flaking, usually along the edges of cracks. Crack edges are angular, with no rounding.
3	Bone surfaces show roughened patches resulting from the flaking of surface bone, but only to a depth of 1.0 to 1.5 mm. Crack edges are typically round.
4	Bone surfaces are rough, with loose splinters. Cracks are wide, with rounded or actively splintering edges.
5	The bone is disintegrating into splinters, and the original shape may no longer be apparent.

Once the qualitative analysis was completed, quantitative measurements were performed. Statistical abbreviations used in this thesis include N (Number of bones recovered), NISP (Number of Individual Specimens), MNI (Minimum Number of Individuals), MNE (Minimum Number of Elements), MAU (Minimum number of Animal Units) and %MAU. NISP is a basic observational, quantitative unit which refers to those remains identified to a specific element or class of elements of a particular taxon, therefore giving the abundance of units within the level (Lyman 1994). This method treats each recorded specimen as an individual and does not take into account anatomical sides, and it is possible for a single animal to be counted more than once in an assemblage. It is also biased in that if one species has more identifiable bones than another, the count for that species will be higher (Lyman 1994; O'Connor 2000). Other methods try to remove the discrepancy of the NISP method.

MNI values are obtained by sorting the identified remains of the same element into left- and right-side specimens (if appropriate). The highest value of these left- and right-side counts is the number that is used. This refers to the "smallest number of individual animals needed to account for that most abundant element" (Grayson 1984:88). To use this method it is important to know the number of each element in an animal's body. The presence of both juvenile and adult individuals must also be taken into account, as this would imply multiple individuals (O'Connor 2000). Due to the small sample size, the sex of the individuals was not taken into account.

MNE values are another method used to improve on the previous two methods. This method is able to take into account fragments of elements by recording the presence of anatomical landmarks. "MNE is the minimum number of skeletal elements or portions necessary to account for the specimens representing that portion" (Lyman 1994:52) and is considered an analytical unit, not observational. All bony landmarks were recorded and anatomical side was specified, if applicable. The highest frequency landmark is used to represent the MNE (Lyman 1994; O'Connor 2000).

To calculate the MAU values, the observed MNE count for each anatomical unit is divided by the number of times that particular landmark appears in the animal's skeleton. This number will vary depending on the unit being counted (Binford 1978; Lyman 1994). The %MAU is calculated by dividing each MAU value by the largest MAU calculated for that particular assemblage. This value shows the frequency of each anatomical landmark in the assemblage.

4.3.3 Organic Remains

Organic remains include floral remains like seeds and plant fibres as well as charcoal. Few floral remains were recovered from the site. Those that were found were either in charcoal features or hearths, indicating the possibility of use for subsistence or fuel. Previous analysis on seeds recovered from the Dog Child site was done by Cyr (2006). These seed samples were sent to Seed and Science Technology Section in Saskatoon, Saskatchewan. No further analysis was done on the seeds recovered from 2007 to 2009. Also recovered from the site were significant amounts of charcoal, suggesting the use of campfires.

4.3.4 Red Ochre

"Red ochre can be used as a pigment, as a preservative for wood, bone, and skin, and as an abrasive for polishing ivory and bone" (Tankersley et al. 1995:185). This substance is "an impure variety of the mineral hematite (i.e., Fe_2O_3, ferric oxide). The word hematite is derived from the Greek 'haimatites' which means blood-like, an allusion to the vivid blood-red color produced when the mineral is powdered" (Tankersley et al. 1995:187). This mineral is not ubiquitous across the landscape and often occurs in iron-rich strata like sedimentary deposits concentrated or enriched by meteoric water or hydrothermal solutions, in igneous rocks, in high temperature hydrothermal veins, and in contact metamorphic deposits (Tankersley et al. 1995:187). It has a wide range of colours from black, steel blue, blood red, brick red to a dull earthy pink. Red ochre is found in a variety of contexts including burials, art and non-mortuary ritual contexts, and domestic contexts throughout prehistory and the world (Roper 1991:289). Small nodules of red ochre were found at the Dog Child site. Red ochre was found smeared on some of the bones in the lower levels of the Dog Child site.

4.3.5 Radiocarbon Dating

Bone from the lower three levels at the Dog Child site was submitted for standard radiocarbon analysis in order to obtain another radiocarbon date for those levels. Radiocarbon samples were taken from Level 2b, Level 3a and Level 3b in the form of individual pieces of bone. The samples were sent to Brock University in St. Catharines, Ontario, Canada for analysis. These samples, as well as the previous samples acquired by Cyr (2006), will be discussed in Chapter 5.

Chapter 5

Dog Child Site Stratigraphy and Radiocarbon Chronology

5.1 Introduction

A cultural sequence of occupation levels at the Dog Child site had been constructed using projectile points as a cultural marker in association with radiocarbon dates (Cyr 2006). When the test unit was excavated in 1983 it was noted that there were at least four cultural levels (Walker 1983). Excavations at this site were chosen in part due to these multiple intact cultural levels. Excavations conducted from 2004 to 2009 have revealed that there are six buried cultural horizons with the possibility of a seventh. In almost all units the soil profile at this site is highly compressed. According to Cyr (2006) another level can be found at the surface but is limited to pig (*Sus scrofa*) remains. This is believed to be from the pig farm that was originally located on the property (Walker 1983). Separation of the buried occupations is not consistent and on occasion only three buried levels may be found. Therefore, as was proposed in Cyr (2006), Level 1 can be separated into Level 1a and Level 1b, Level 2 into Level 2a and Level 2b, and Level 3 into Level 3a and Level 3b.

Across the site the majority of the units have some separation between Level 1a and Level 1b however, towards the northeastern portion of the site separation between the two levels is more variable. This may be in part because this section of the site is located closer to the brush, and the roots from the trees may obscure any separation due to the darker soils and root casts. Separation between Level 2a and Level 2b is more variable than between Level 1a and Level 1b. There is also better separation between Level 2a and Level 2b towards the southeastern portion of the site. Separation between Level 3a and Level 3b does not frequently occur in the northern portion of the site in either Block 1 or Block 2 however; towards the southern portion of Block 1, separation is present in all of the units with two of the southern units (28S 13E, 28S 14E) having a seventh level referred to as Level 3c.

5.2 Soil Formation

To understand the stratigraphy of the Dog Child site it is necessary to understand soil formation. Soil formation is a process during which the surface portion of a stable (undergoing no deposition or erosion) sedimentary deposit or rock is altered by chemical, physical, biological, and anthropogenic processes (Waters 1992). Soil formation is initiated on geological deposits, and then the differentiation of layers (horizons) occurs within this deposit. The rate at which soils form and how the different horizons are created is controlled by multiple variables, including the type of parent material, the topography, organisms in the area, the climate, and time (Waters 1992). Four processes are responsible for the formation of soils (Figure 5.1): "(1) the addition of material to the soil from the ground surface and the atmosphere, (2) the transformation of substances in the soil, (3) the vertical transfer of material in the soil, and (4) the removal of constituents from the soil" (Waters 1992:41).

The addition of organic matter can result from the decay of surface vegetation and animals, as well as from the introduction of dissolved and solid particles from rainfall (Waters 1992). The second process works in conjunction with the first. The substances that were added to the soil in the first process are transformed by their decomposition. The alteration of organic materials results in the formation of humus and other organic materials, while transformation of minerals results in the formation of clays, ions, and oxides (Waters 1992). The third process refers to the downward movement (translocation) of both solid and soluble particles. These particles are carried by water down through the sediments. The material is accumulated or precipitated when the water is removed from the soil via plant roots or changes in soil chemistry (Water 1992).

> This movement of dissolved and solid substances downward through the soil is called eluviation. The leached horizon created by the removal of materials is called the eluvial horizon. The accumulation of translocated soil material is referred to as illuviation, and the horizon formed is termed an illuvial horizon (Waters 1992:42).

The last process is the leaching of chemical constituents from the soil. If the leaching is intense ions and oxides do not accumulate and instead they are flushed through the soil and become part of the groundwater.

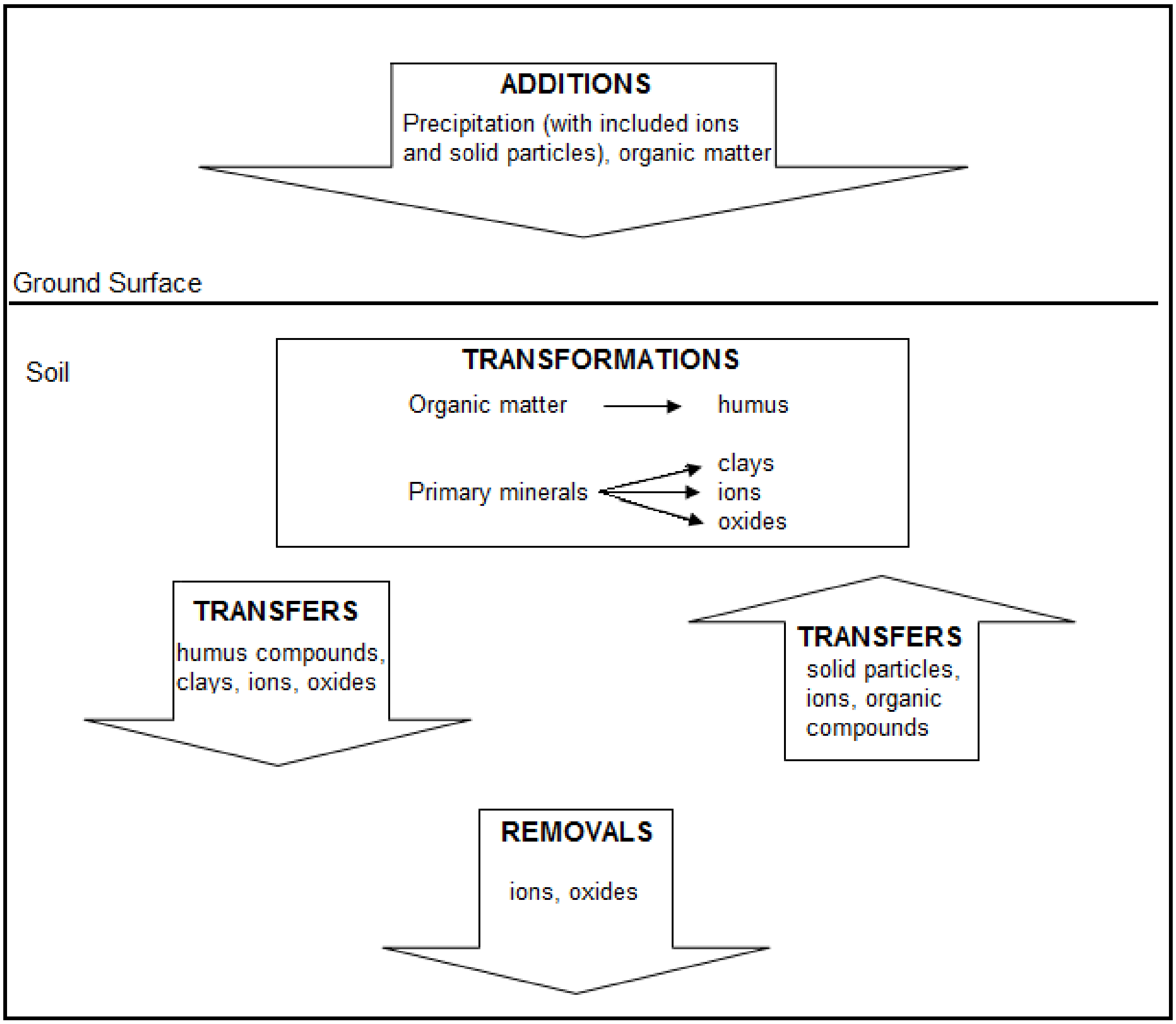

Figure 5.1: The four major processes of soil formation and their direction of occurrence (Waters 1992:42).

These four processes that are responsible for the creation and development of soil hoizons. “A well-developed soil profile is commonly characterized by three main horizons, designated A, B, and C, from top to bottom” (Waters 1992:45). The A horizon is a zone where decomposed organic mater or humus accumulates. The solid and soluble constituents from this level are often removed to the B horizon. The B horizon is an accumulation of clay, iron compounds, organic matter, aluminum, gypsum, calcium carbonate, silica, and soluble salts or a combination of the above (Waters 1992). The C horizon is a zone of fresh, unconsolidated parent material that is essentially unaltered. Other master horizons include R, O, and E however, since they were not identified in the stratigraphy of the Dog Child site, they will not be discussed further. All of the master horizons can be further subdivided based on soil properties or the type of material that has accumulated in that particular level.

5.3 Stratigraphy

Stratigraphy is the study of the spatial and temporal relationships between both sediments and soils (Waters 1992). The creation of stratigraphy at an archaeological site is the result of a combination of one of three conditions: aggradation, stability, and/or degradation. Waters (1992:61) notes that “stratigraphy provides the relative temporal and spatial framework on which to organize all archaeological data by separating temporally distinct assemblages of artifacts, ecofacts, and features that record the history of human activity at the site.” There are four objectives when studying stratigraphy. The first is to subdivide and group the sediments and soils at the site into packages or physical stratigraphic units based on observable characteristics and to record the contacts between them. The second is to order these units in relative sequence from oldest to youngest. The third is to determine the absolute age, using chronometric dating, of the units and the amount of time that is represented by stability and degradation. The last objective is to correlate the stratigraphy at the site with the stratigraphy adjacent to the site (Waters 1992:61). The stratigraphy at the Dog Child site was observed from the point of cultural occupations (Figure 5.2 and 5.3) however, one unit was profiled to show the geological stratigraphic units and soil horizons present (Figure 5.4).

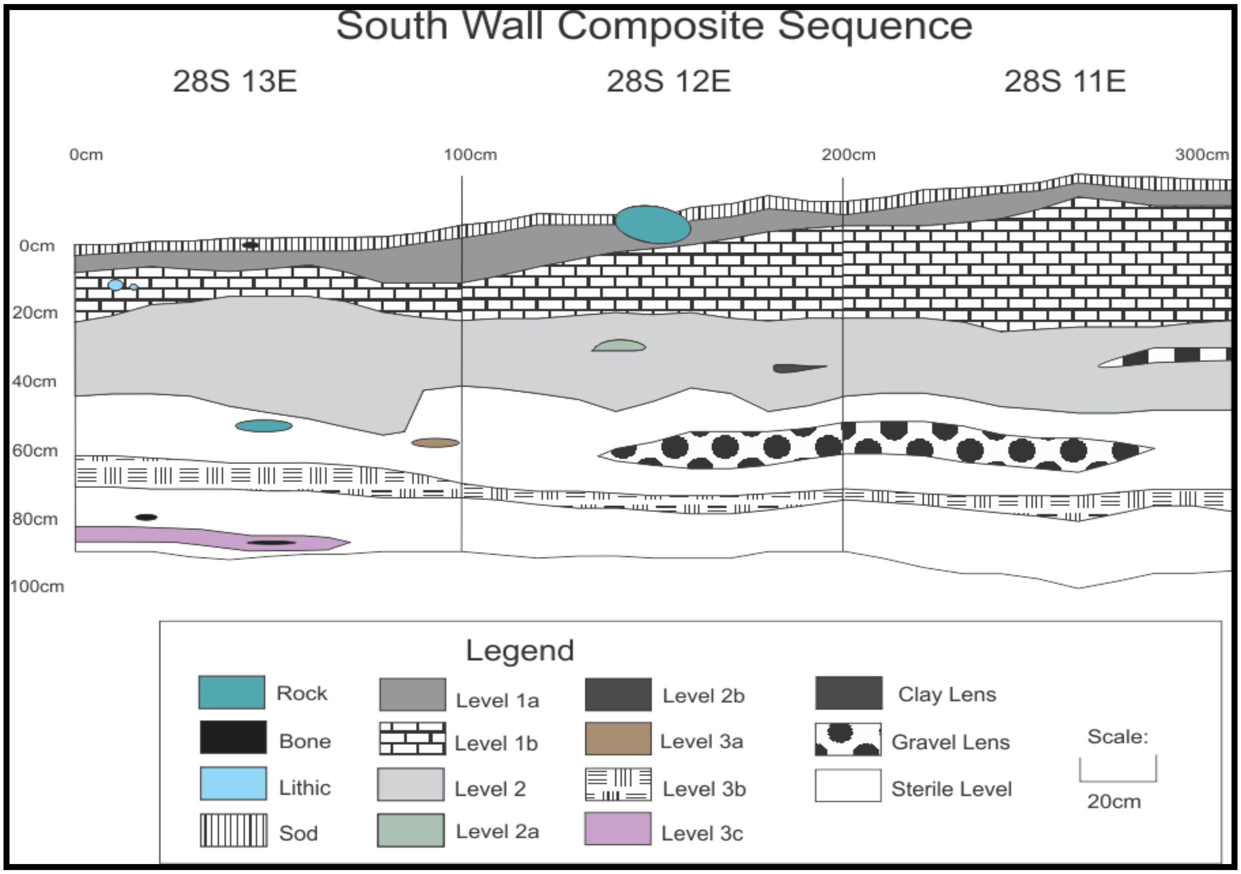

Figure 5.2: Profile of south wall of excavation; Units 28S 13E, 28S 12E, and 28S 11E.

5.4 Stratigraphy of the Dog Child Site

The topography of the Dog Child site is a relatively flat terrace with shallow buried levels. The surface of the site slopes gently downward to the southeast. Opimihaw Creek runs very close to the site and episodes of aggradation, likely due to flooding, have separated the cultural levels from one another. Stratigraphically no sedimentary structures are evident in almost all of the profile (Figure 5.4), except for S15A, where a C horizon which shows some sand to silt lensing. The A horizons all appear to have some form of mottling and the majority of them appear to be weakly developed, while the C horizons show evidence of bioturbation. Roots from the trees and grass are densest at the surface with some intermittent fine grassroots throughout the profile with most ending at the coarse gravel layer (S12). Visually two of the levels show light carbonate deposits within the soils (S8 and S9). One of the levels (S18), a weak buried A horizon, shows deformation from cryoturbation. The cultural levels are associated with all three of the different horizons present at the site with the majority being found in either an A horizon or a C horizon. Six cultural levels have been identified at the site with a possible seventh being uncovered during the final field season. This seventh level was noted in only two units: Unit 28S 14E in the southeast and southwest quadrants and Unit 28S 13E in the southeast and southwest quadrants. Separation of the cultural levels, as noted before, is variable across the northern portion of the site. The southeastern portion of the site appears to have better separation between the levels, especially in the lower cultural levels.

Figure 5.3: South wall of excavation; Units 28S 12E and 28S 11E (tags indicate cultural levels).

Level 1 is found directly beneath the sod across the entirety of the site. During the 2007 to 2009 field seasons all of the units excavated showed separation between Level 1a and Level 1b. Level 1a (Figure 5.2 and 5.3) begins at various depths but frequently appeared at a depth of 0 to 6 cm below the surface. Thickness of this level varied slightly but it is approximately 5 cm thick. The soil associated with this level is a dark brown to olive black, loamy, A/B horizon across majority of the site (Figure 5.4; S2). This level shows some weak soil structures. Plains Side-Notched materials are associated with Level 1a based on diagnostic artifacts and its position within the stratigraphic profile. No radiocarbon date has been obtained for this level.

Occasionally a 1 to 5 cm thick level provided separation between Levels 1a and 1b. This layer can be recognized by the light-coloured yellow grey, sand to sandy loam matrix. Level 1b (Figure 5.2 and 5.3) begins anywhere from 10 to 15 cm below the surface, is approximately 5 cm thick and is associated with a B/C horizon (Figure 5.4; S3A). This level towards the southeastern portion of the site exhibits a matrix that is a very dark brown, almost black, colour. This is in part due to the fact that on the surface of this area was a large amount of brush and small trees, and have worked their way further into the soil accounting for the root casts found and the greater quantity of organic matter has generated the darker soil colour. Soils from the remainder of the site are lighter than those in Level 1a and appear to be a light olive brown colour. The matrix texture is a sandy loam which extends across the entirety of the site. A chronometric age of 300 ± 50 years cal. B.P. (BGS 2659) (Cyr 2006) was obtained for this level from a charcoal sample (Table 5.1). This fits with the Late Precontact Prairie Side-Notched diagnostics that were found in this level.

As with Level 1, Level 2 also showed separation between Level 2a and Level 2b. Level 2a (Figure 5.2 and 5.3) began anywhere from 19 to 25 cm below the surface, depending on the location of the unit, with the most common depth being 20 cm. Units in the southwest of Block 1 had a lower depth than those in the northern part of Block 1 indicating a slight slope. Separation between Level 1b and Level 2a ranged from 1 to 6 cm, averaging about 3 cm thick. This separation was recognized as B/C horizon with light-coloured yellow/brown sand and small pebbles/gravel mixed throughout (Figure 5.4; S3B). Stratigraphically this cultural level can be found towards the bottom of a buried A horizon (Figure 5.4; S4) consisting of a loamy matrix. The cultural level is approximately 6 cm thick and is associated with projectile points from the McKean series. A radiocarbon date of 3700 ± 45 years cal. B.P. (BGS 2660) (Cyr 2006) was obtained from a sample of bone (Table 5.1).

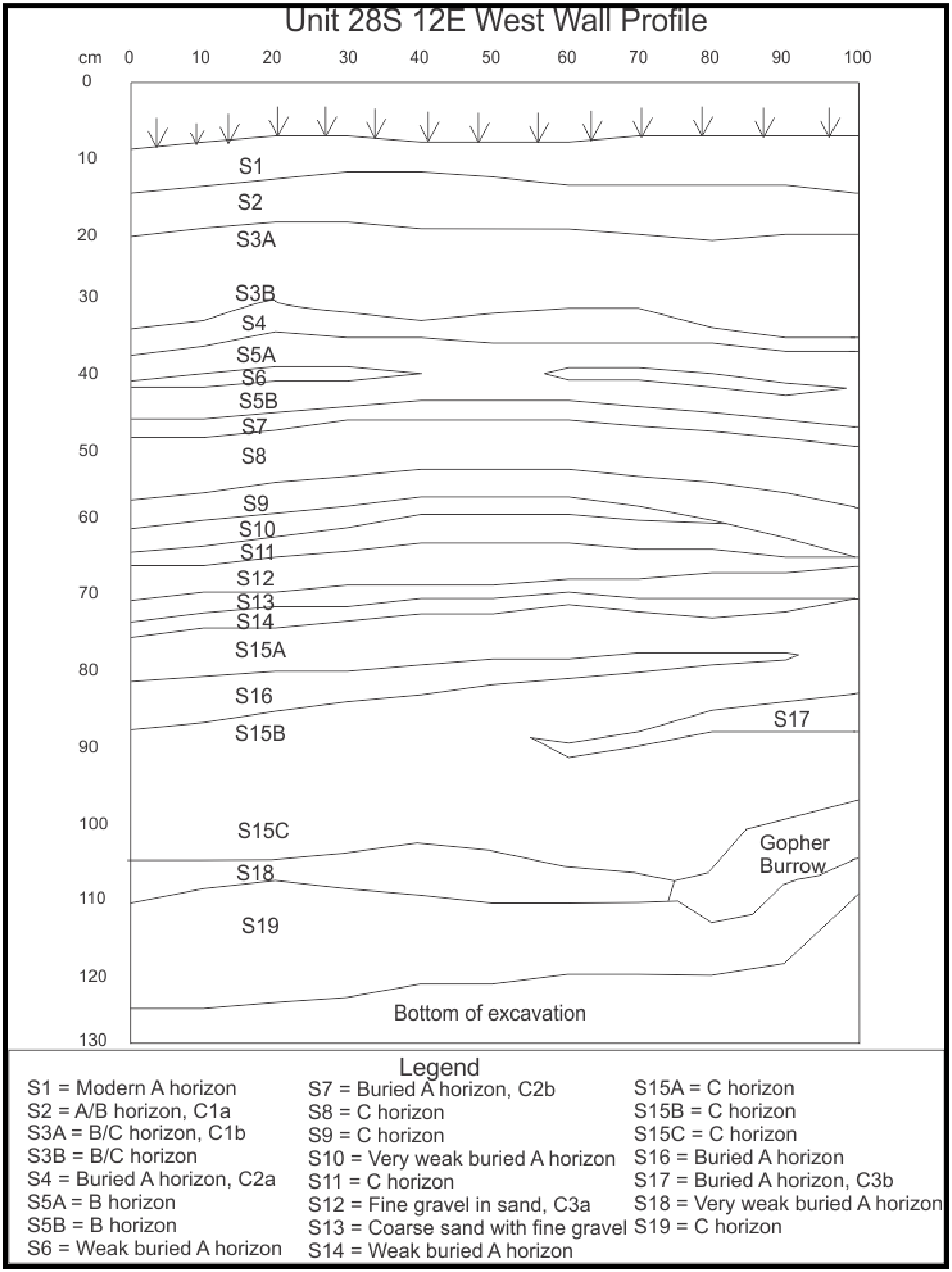

Figure 5.4: Profile of the west wall of unit 28S 12E showing the soil horizons and cultural levels.

Table 5.1: Calibrated radiocarbon age assessment.

Sample Number	Level Number	Sample Type	Uncalibrated Age (Years B.P)	Calibrated Age (Years B.P.)	Calibrated Error (±)	Two Sigma Minimum (Years B.P.)	Two Sigma Maximum (Years B.P.)
BGS 2659	1b	Charcoal	241	300	50	257	342
BGS 2660	2a	Bone	3460	3700	45	3630	3834
BGS 2661	2b	Bone	3867	4270	50	4148	4417
BGS 2890	2b	Bone	4020	4480	40	4410	4573
BGS 2662	3a	Bone	4597	5310	50	5344	5466
BGS 2891	3a	Bone	4237	4830	40	4626	4764
BGS 2663	3b	Bone	4780	5530	50	5499	5604
BGS 2892	3b	Bone	5095	5890	45	5738	5925

Separation between Level 2a and Level 2b was quite variable with a range of 1 to 7 cm thick. This level averaged 6 cm thick and was a layer of light brown clayey loam. This level is associated with a B horizon (S5A and S5B) and a very thin, weakly developed A horizon (S6) presenting in some of the units. Cultural Level 2b (Figure 5.2 and 5.3) is located towards the bottom of a buried A horizon (Figure 5.4, S7). The depth of the top of the level ranged from 23 cm below the surface to 42 cm below the surface and the level is approximately 6 cm thick. It is apparent that the beginning of the level is deeper in units that are further to the south and one level, 28S 14E, does not have a Level 2b associated with it. The matrix of Level 2b is a dark brown black sandy loam. Diagnostic artifacts found in Level 2b are associated with the Oxbow complex and an initial radiocarbon date of 4270 ± 50 years cal. B.P (BGS 2661) (Cyr 2006) was obtained from a sample of bone (Table 5.1). A second radiocarbon sample, consisting of three pieces of an *os coxae* from unit 27S 12E at a depth of 39.5 cm, was sent for chronometric dating. The calibrated age obtained was 4480 ± 40 years B.P. (BGS 2890) (Table 5.1). Using a two sigma probability distribution, the age ranged between 4573 to 4410 years cal. B.P. (Stuiver and Reimer 1998).

Level 3 is separated from Level 2b by a layer of olive/tan coloured sandy clay. It is variable in thickness, ranging from 1 to 10 cm thick. Stratigraphically this level is associate with multiple C horizons (Figure 5.4; S8, S9, and S11) and a weakly buried A horizon (S10). The most distinguishing feature present to signify the bottom of this level is the presence of a gravel lens. Excavations prior to 2007 found that Level 3 was almost exclusively a single occupation except in the southeast section of Block 1. The 2007 to 2009 field seasons continued to show separation between Level 3a and Level 3b. The top of Level 3a varies in depth but commonly occurs around 40 to 42 cm below the surface. Level 3a (Figure 5.2 and 5.3) is approximately 6 cm and is composed of an olive brown coarse sandy clay mixture. Level 3a is frequently associated with a very weak A horizon above it and in a thin C horizon immediately superior or in a gravel lens of coarse pebbles and cobbles (Figure 5.4; S12). A radiocarbon date of 5310 ± 50 years cal. B.P. (BGS 2662) (Cyr 2006) has been obtained for this level (Table 5.1). A second sample was submitted for radiocarbon dating, consisting of a left proximal radius from unit 26S 13E at a depth of 45.5 cm. The radiocarbon age obtained from this sample was 4830 ± 40 years cal. B.P. (BGS 2891) (Table 5.1). Using the two sigma probability distribution, the age range obtained is 4866 to 4804 years cal. B.P. and 4762 to 4626 years cal. B.P. (Table C.2) (Stuiver and Reimer 1998).

Level 3b is often only separated from Level 3a by 2 to 3 cm of clay but this can be up to 10 cm thick. Stratigraphically, it is associated with a number of horizons (Figure 5.4; S12 to S16). S13, like S12, also encompasses the coarse sand and gravel lens and contains very few cultural materials. Directly below this gravel lens is a very weak A horizon with a minimal amount of cultural materials (S14). In this particular unit, 28S 12E, a large C horizon is present between the gravel lens and cultural Level 3b (S15A, S15B, and S15C) with two buried A horizons (S16 and S17) pinching out in the middle of the C horizon (Figure 5.4). One of the A horizons (S17) is associated with Level 3b (Figure 5.4).

Level 3b is a buried A horizon beginning at a depth of 42 to 77 cm below the surface. The depth of Level 3b (Figure 5.2 and 5.3) varies according to the location of the unit within the site. Units at the extreme south of the site had a Level 3b that was much deeper when compared to other parts of the site, especially the northern units. At 24 m south of the datum the average depth that Level 3b began at was 51 cm, while at 27 m south of the datum the average depth is 61 cm, a 10 cm difference between the two areas that indicates a distinct slope towards the southern extent of the site. This level is a tan clayey sand that is on average 10 to 15 cm thick and is associated with Gowen materials from the Mummy Cave series. This level has been radiocarbon dated to 5530 ± 50 years cal. B.P. (BGS 2663) (Cyr 2006) (Table 5.1). A second sample consisting of a left distal metacarpal taken from unit 24S 12E at a depth of 57 cm was submitted. This age obtained from this sample was 5890 ± 45 years cal. B.P. (BGS 2892) (Table 5.1). From the two sigma probability distribution an age range of 5925 to 5738 years cal. B.P. was obtained (Stuiver and Reimer 1998).

Another level referred to as Level 3c was identified in two units at the site (Unit 28S 13E and 28S 14E). This level was very small, approximately 3 cm thick, consisting of an olive sand/clay. The top of the level had a pronounced slope to it which began at approximately 70 cm below the surface and sloped to 77 cm below the surface within 20 cm. No diagnostic artifacts were found and no radiocarbon date has been obtained. Excavation was stopped once large cobbles were found in the unit. The large cobbles were indicative of an old stream bed from Opimihaw Creek which once ran through the site before moving to its current location. Therefore it was deemed to be culturally sterile and the excavation did not proceed past the cobble level.

Chapter 6

Cultural Level 1a

6.1 Introduction

Cultural Level 1a was found immediately below the sod layer during excavations. This level is fairly thin, approximately 5 cm, with a moderate amount of artifacts. Diagnostic artifacts indicate that Level 1a should be assigned to a Plains Side-Notched assemblage however it is possible that this level may be associated with an early Contact occupation due to a European trade item found within the level. Included within the identified artifacts are flaked stone projectile points and a strike-a-light. These artifacts imply some contact between Europeans and the native peoples, thereby signifying the possibility of a more recent occupation. No chronometric dates have been obtained for this level due to belief that it is an early Contact occupation.

6.2 Cultural Level 1a Lithic Assemblage

Excavations from 2004 to 2006 uncovered 3074 pieces of shatter and flakes, 17 core and core fragments, 23 flaked stone tools, and 130 pieces of FCR. The debitage was predominantly composed of Swan River chert (55.2 %) with quartzite being the second most common lithic material at 13.2% of the assemblage. Shatter was the most dominant form of debitage at 56.3% followed by tertiary flakes at 24.8% (Cyr 2006:44). Of the 17 cores and core fragments one is a bipolar core, eight are irregular platform cores which are partially flaked, and seven are highly flaked platform cores (Cyr 2006:47). The flaked stone tools consist of two unifaces, six bifaces, and 15 projectile points. The two unifaces recovered from the previous excavations are a spokeshave and an endscraper (Cyr 2006:50). One of the bifaces was classified as a perforator and another was classified as an asymmetrical backed knife. The four remaining bifaces are broken, and their function could not be identified (Cyr 2006:52-53). Fifteen projectile points were recovered from the 2004 to 2006 excavations. Nine of these points are classified as Plains Side-Notched, one is a Plains triangular, one is a preform, three are indeterminate and the last one is a Duncan (Cyr 2006:55). Cyr (2006:56) has explained the presence of the Duncan point as "resulting from the collapse of stratigraphy caused by erosion and bioturbation."

A total of ten stone artifacts were recovered from Level 1a during the 2007 to 2009 excavations. This number excludes cores and core fragments due to the fact that their primary function is the production of flakes for stone tools. A complete list of the qualitative and quantitative measurements for the lithic tools can be found in Appendix D. The most dominant material type in all of Level 1a was Swan River chert at 60.5% of the total assemblage of which 60.1% of this was heat treated. Quartzite is the second most common material type at 7.74%, with chalcedony as the third most common material at 3.61% of the total assemblage. Of all the lithic artifacts found in Level 1a, shatter was the most commonly recovered at 56.90%. Tertiary flakes were the second most commonly recovered at 33.80% followed by fire cracked rock at 5.94% of the assemblage.

6.2.1 Projectile Points (n=8, Figure 6.1)

The eight projectile points found in this level (Appendix D; Table D.1 and D.4), from the 2007 to 2009 excavations, are associated with the Plains Side-Notched point style (Figure 6.1). Two of the eight projectile points consist of tip/midsection portions. One of the projectile points, found in Unit 26S 11E at a depth of 5 cm, consists of only a distal or "tip" chalcedony fragment exhibiting a clean break (Cat. #17759). This point has unifacial retouch that can be identified, giving the right side of the projectile an almost serrated appearance. The other projectile point from Unit 25S 11E at a depth of 8.5 cm, is a larger midsection portion of a heat treated chert point with clean breaks from the missing portions (Cat. #16504). This fragment is well-flaked, exhibiting bifacial retouch on one of the lateral margins. There has been a longitudinal flake removed from the ventral portion of the midsection, making the transverse cross section appear asymmetrical. Some microchipping is visible on the dorsal surface of the midsection.

Of the remaining projectile points, one is nearly complete with only small portion broken off, a second is broken at the notches, and the other four consist of only the basal portion of the projectile point. All are associated with the Plains Side-Notched point style. Projectile point A (Figure 6.1), found in unit 26S 12E at a depth of 6 cm, is broken obliquely from the base up to the bottom of the left notch removing the left basal edge (Cat. #17861). Ventrally, a huge flake has been removed, leaving a large indentation. What remains of the base appears to have some chipping to thin the margin. This projectile point exhibits a slight amount of bifacial retouch which is mostly unifacial on the dorsal side, and use wear is evident. The projectile point found in Unit 23S 13E at a depth of 10.5 cm is broken horizontally at the neck, leaving a slight hinge behind (Cat. #15435). This projectile point is flaked very well on the dorsal surface but not as cleanly ventrally, with large surface flakes removed, leaving it rough in appearance. Retouch is evident closer to the shoulders and exhibits bifacial retouch only a quarter of the way up the body.

The projectile point from Unit 27S 13E was found at a depth of 4.5 cm (Cat. #18916) while the point from Unit 24S 13E was found at a depth of 7 cm (Cat. #16187). Both of these points are broken horizontally about midway through the body. Projectile point F (Cat. #18916) (Figure 6.1) has a shallow angled break, almost as if a flake was removed. This is also a fairly recent chip removed from the basal margin of the point likely during the process of excavation. The basal margin exhibits chipping, and there is an indentation ventrally on the point which appears to be natural. The other projectile point is poorly constructed, but there is a clean horizontal break above the shoulders of the point (Cat. #16187). The second break is angled from the bottom of the right notch to the middle of the base removing the right basal corner. The edges of this point appear rough and unfinished. Projectile point H (Figure 6.1; Cat. #16971), found in Unit 25S 13E at a depth of 11 cm, is broken just above the shoulders missing the majority of the body and leaving behind a slight hinge. There is also an angled break from the left shoulder and the entire left basal portion is missing. This point exhibits no use wear or retouch on any of the margins. Projectile point E (Figure 6.1; Cat. #15956) is missing the distal tip and a small portion of the left basal corner. This projectile point was recovered from a depth of 5.3 cm in Unit 24S 12E. There is use wear visible on the point, but no retouch is apparent. Aside from three of the points, the majority of the points observed appear to be of good quality construction. Material type varies with three being a heat treated Swan River chert, two a generic chert, one of which is heat treated, two silicified peat and one chalcedony.

6.2.2 Retouched Flakes (n=1; Figure 6.2)

In Level 1a only one retouched flake (Figure 6.2; Cat. #16188) was found in Unit 24S 13E at a depth of 7.5 cm. It was created from a secondary flake of heat treated Swan River chert and displays both primary and secondary working edges (Appendix D, Table D.7 and D.10).

Use wear appears to consist of slight amount of abrasion, though this cannot be seen on all of the working edges. Unifacial retouch can be observed on one of the lateral margins of the flake.

Figure 6.1: Projectile points from Level 1a (A = Cat. #17861; B = Cat. #15197; C = Cat. #16504; D = Cat. #16187; E = Cat. #15956; F = Cat. #18916; G = Cat. #17759; H = Cat. #16971).

Figure 6.2: Retouched flake from Level 1a (Cat. #16188).

6.2.3 Ground and Pecked Stone Tools (n=1; Figure 6.3)

Excavations uncovered a small portion of what appears to be a grinding slab composed of red quartzite (Figure 6.3; Cat. # 15194) in Unit 23S 12E at a depth of 11 cm. The entire exterior surface of the grinding slab is very smooth in both feel and appearance. The grinding slab is broken distally, proximally and laterally, leaving only a small square portion with dorsal, ventral, and lateral intact surface present. The dorsal side of the grinding slab is completely flat while both the lateral and ventral sides have a slight curve to them. The ventral portion of the grinding slab is also blackened in colour, possibly from heating or burning of the item.

Figure 6.3: Grinding slab fragment from Level 1a (Cat. #15194).

6.2.4 Cores and Core Fragments (n=7; Figure 6.4)

Excavations from 2007 to 2009 of Level 1a revealed a total of six fragments of cores and one complete core, all of which are Swan River chert (Table 6.2). The complete core of Swan River chert has been heat treated (Cat. #16421). It does not appear to have any sort of platform modification, and all of the flakes have been removed from the core in one direction. All of the core fragments appear to be in the final stages of utilization or have been broken and discarded. Some of the fragments still contain a small amount of cortex. Three of the core fragments (Figure 6.4) are constructed from the exact same type of Swan River chert which is a mottled pink/red and grey colour with some cortex present on them. These three core fragments have also been heat treated, giving them a waxy appearance. These cores do not appear to be associated with each other and are in fact spread throughout the level.

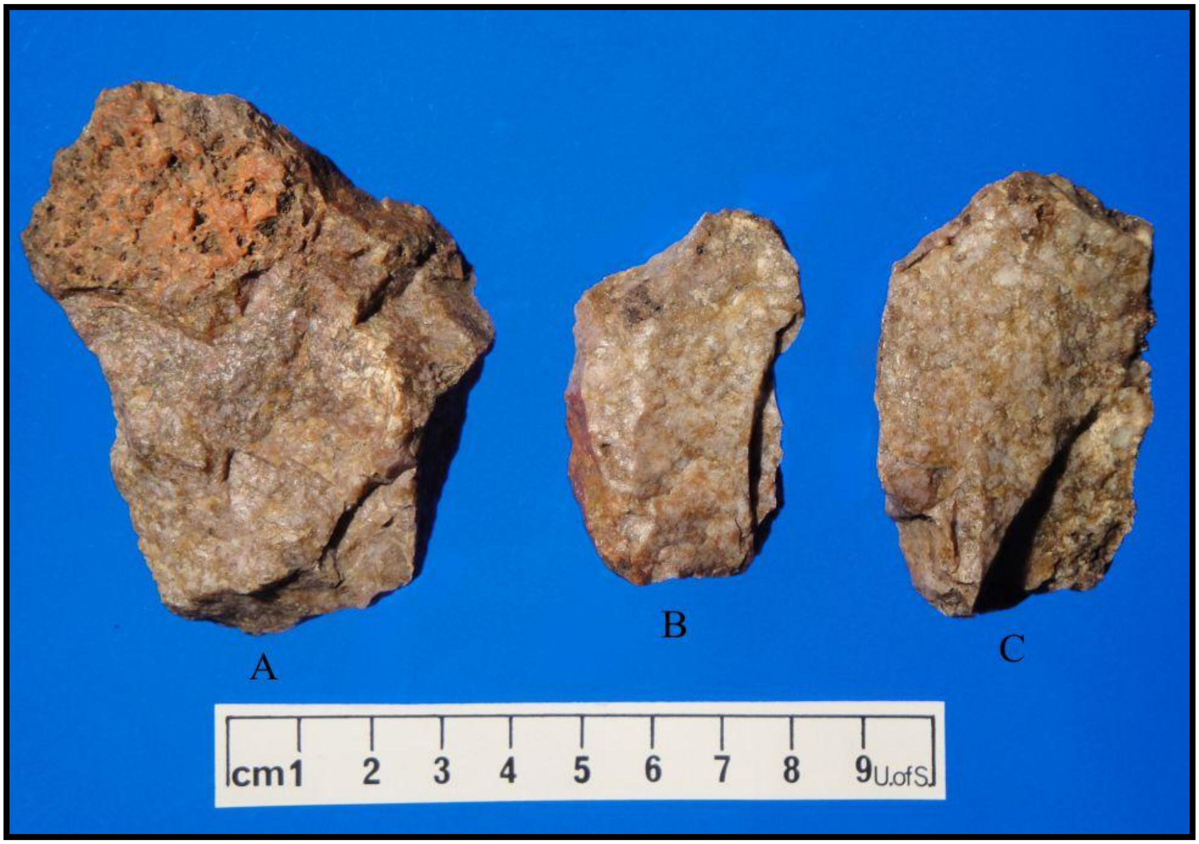

Figure 6.4: Core fragments from Level 1a showing identical material type (A = Cat. #19218; B = Cat. #18243; C = Cat. #18638).

Table 6.1: Level 1a cores and core fragments.

Catalogue Number	Material	Mass (g)	Type
18243	Heat Treated Swan River Chert	41.6	N/A
19597	Swan River Chert	294.6	N/A
16421	Heat Treated Swan River Chert	48.5	Unprepared, Unifacial
18638	Heat Treated Swan River Chert	55.2	N/A
15961	Partially Heat Treated Swan River Chert	50.1	N/A
19218	Heat Treated Swan River Chert	100.6	N/A

6.2.5 Debitage (n=711)

A total of 441 pieces of shatter and 270 flakes were recovered. The most common type of material recovered is Swan River chert, which accounts for 64.97% of the assemblage (Table 6.2). Evidence for heat treatment is present on 39.27% of the Swan River chert debitage. The second most common material type is quartzite which accounts for 8.05% of the sample (Table 6.2). Fifteen other material types represent the remaining 26.98% of the lithic assemblage (Table 6.2). Shatter is the most common type of debitage present at 62.15% of the assemblage followed by tertiary flakes at 36.72% (Table 6.2). Both primary and secondary flakes are rare, accounting for 0.28% and 0.71% of the assemblage, respectively. This implies the possibility that features present on the flake types are likely less recognizable due to breakage or reworking. Of interest is the presence of a single blade flake in the assemblage. No other material relating to the blade flake has been found and therefore a plausible theory of the presence of this type of flake cannot be made.

It is evident that there is a reliance on Swan River chert and other local material. The majority of the material types in Table 6.3 can be found throughout Saskatchewan, with the exception of Knife River flint and agate, which are found in North Dakota and Montana, respectively. Swan River chert, the most dominant material type, is commonly found in southern Saskatchewan, as well as southeastern Alberta and west-central Manitoba (Johnson 1998). Quartzite, the second most dominant material type, is also commonly found throughout Saskatchewan.

6.2.6 Fire Cracked Rock (n=46)

A total of 46 pieces of FCR was recovered in the 2007 to 2009 excavations. The most common material type by mass is granite, at 990.9 g (90.46%) (Table 6.3). The remaining material types include feldspathic siltstone, quartzite, and siltstone. There is no apparent pattern in the distribution of FCR throughout the site as a few of the pieces appear in the northwest corner of the excavation and the rest are from the southern portion of the site.

Table 6.2: Level 1a lithic debitage types (HT = Heat treated, PHT = Partially heat treated).

Material	Primary Flake	Secondary Flake	Tertiary Flake	Blade Flake	Shatter	Total	Percent (%)
Agate	0	0	2	0	1	**3**	**0.42**
Basalt	0	0	5	0	21	**26**	**3.66**
Cathead Chert	0	2	0	0	3	**5**	**0.70**
Chalcedony	0	0	11	0	16	**27**	**3.80**
Chert	0	1	19	0	24	**44**	**6.19**
Fused Shale	0	0	2	0	0	**2**	**0.28**
Gronlid Siltstone	0	0	3	0	1	**4**	**0.56**
Jasper	0	0	0	0	2	**2**	**0.28**
Knife River Flint	0	0	13	0	4	**17**	**2.39**
Quartz	0	0	0	0	27	**27**	**3.80**
Quartzite	0	1	9	0	47	**57**	**8.02**
Sandstone	0	0	0	0	3	**3**	**0.42**
Silicified Peat	0	0	7	0	19	**26**	**3.66**
Silicified Siltstone Pebble	0	0	0	0	2	**2**	**0.28**
Silicified Wood	0	0	2	0	1	**3**	**0.42**
Siltstone	0	0	0	0	1	**1**	**0.14**
Swan River Chert	2 (HT: n=2)	1 (HT: n=1)	189 (HT: n=127)	1 (HT: n=1)	269 (HT: n=142; PHT: n=6)	**462**	**64.98**
Total	**2**	**5**	**262**	**1**	**441**	**711**	**100.00**
Percent (%)	**0.28**	**0.70**	**36.85**	**0.14**	**62.03**	**100.00**	

Table 6.3: Level 1a fire cracked rock.

Material	Count	Percent (%)	Mass (g)	Percent by Mass (%)
Granite	40	86.96	990.90	90.46
Feldspathic Siltstone	1	2.17	7.70	0.70
Quartzite	3	6.52	1.00	0.09
Siltstone	2	4.35	95.80	8.75
Total	**46**	**100**	**1095.4**	**100**

6.3 Cultural Level 1a Metal Assemblage (n=1; Figure 6.5)

In Level 1a a strike-a-light, or fire-steel, was found in Unit 24S 11E in the southeast quadrant at a depth of 9.5 cm (Cat. #15717). This artifact has a C-shape with ornate spirals at its ends. The long straight portion of the fire-steel appears to be thicker on the inside surface. No maker's mark is visible on the surface and therefore no definitive age can be assigned to this artifact; however, it most likely dates to the arrival of Europeans in the eighteenth century but was used in the nineteenth century (Walker 1999). The artifact measures 7.86 cm long by 3.57 cm wide and is 0.4 cm at its thickest.

Figure 6.5: Strike-a-light found in Level 1a (Cat. #15717).

6.4 Cultural Level 1a Faunal Assemblage

Initial excavations from 2004 to 2006 revealed 2,971 faunal specimens in Level 1a. A minimum of two bison were identified in this level, as well as a large-sized canid (SC5a). The 2007 to 2009 excavations revealed a total of 2,870 faunal specimens weighing a total of 1,874.4 g (Table 6.4). Ninety-eight percent of the assemblage is unidentifiable faunal fragments weighing 1,487.9 g, of which 1284.4 grams (86.32%) are unburned bone fragments. In this level, only 1.8% of the faunal remains found were identifiable, including both burned and unburned specimens. By weight, the majority of the burned and unburned specimens were unidentified. Separated by the degree of burning 91.3% of the assemblage is unburned, 6.3% is burned, and 2.36% is calcined. In Level 1a at least seven taxa are represented by the remains found (Table 6.5). Due to a lack of identifying characteristics 18 specimens were assigned to the category of a size class. Some of these remains likely belong to one of the taxa already identified, but due to the fact that they do not exhibit any particular distinguishing characteristics they cannot be placed into one of these taxa.

Table 6.4: Level 1a faunal counts.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	7	38.5	29	250.9	1983	1284.4
Burned Bone	1	0.3	0	0	404	117.7
Calcined Bone	0	0	0	0	339	44.3
Unburned Tooth Enamel	7	52.8	11	48.6	90	41.5
Shell	0	0	1	0.8	0	0
Total	**15**	**91.6**	**41**	**300.3**	**2816**	**1487.9**

Table 6.5: Summary of Level 1a faunal remains by taxa.

Common Name	Taxon	NISP	MNI
Mammals			
Bison	*Bison bison*	23	2
Deer (SC5a)	*Odocoileus sp.*	1	1
Medium-Large Canid (SC5a)	*Canis sp.*	3	1
Small-Medium Canid (SC4a)	*Canis sp.*	6	1
Jackrabbit	*Lepus townsendii*	2	1
Birds			
Micro-bird (SC1b)	Passeriformes	1	1
Invertebrates			
Snails (Shell Fragments)	Gastropoda	1	1
Miscellaneous			
Very Large Mammal (SC6a)		13	-
Medium Mammal (SC4a)		1	-
Small Mammal (SC2a)		5	-

6.4.1 Order Artiodactyla

Bison bison

Specimens identified: NISP = 23; see Table 6.6 for a summary. MNE, MAU, and %MAU values were calculated by landmark. A summary of these calculations can be found in Appendix E (Table E.1).

Description: Known as one of the largest mammals in North America during the Precontact period the bison was the most abundant mammal on the continent, after the Ice Age megafauna extinction. At one point it was estimated that there were at least 70 million bison present in large herds sometimes up to thousands of animals (Lott 2002). However, due to the demand of meat and fur by the end of the nineteenth century their population was reduced to less 1,000 animals (Jones et al. 1983; Kays and Wilson 2009). There are now two separate populations of bison in North America. "The Endangered Wood Bison (*B. b. athabascae*) from western Canada is slightly taller, darker, and woollier, with a larger hump than the Plains Bison (*B. b. bison*)" (Kays and Wilson 2009:202). These animals are now located within various national parks in Canada and the United States but once ranged across the entire Great Plains from northern Mexico to the Great Slave Lake region of the North West Territories (Lott 2002). Bison can be found in a wide range of habitats including arid plains, aspen parklands, meadows, river valleys and forests (Banfield 1974:405-407). Rutting season occurs from July to September and peaks in mid-August but they are known to breed out of season (Banfield 1974:405-407; Kays and Wilson 2009:202). Gestation length of the bison is 285 days, with parturition between April and June with a peak in early May (Banfield 1974:405-407).

Discussion: Forty-one percent of the identified specimens recovered from Level 1a have been classified as bison. At least two individuals are represented by the specimens identified. The adult postcranial bones and teeth indicate that there is at least one adult individual present. The molar shows no wear on the occlusal surface, indicating that this individual is likely a juvenile. None of the specimens show any form of cultural modification, and all of them are unburned. Weathering is generally light to absent with only one specimen showing stage three weathering consisting of roughened patches and significant cracks. Most of these specimens exhibit natural taphonomic processes including soil staining and root etching. Four of these specimens also show evidence of trowel damage from excavation. It is believed that many of the fragmented and unidentified specimens represent bison bone fragments due to the high proportion of bison in the faunal assemblage.

Table 6.6: Summary of *Bison bison* elements from Level 1a.

	NISP	MNI (Side)	Total MNE	MAU	%MAU
Axial Skeleton					
Cranium	1	1	1	0.17	19.32
Mandible	15	2	7	0.88	100
Forelimb					
Radial Carpal	1	1	1	0.5	56.82
Fifth Metacarpal	1	1	1	0.5	56.82
Hindlimb					
Tibia	2	1	2	0.5	56.82
Other Elements					
Second Phalanx	1	1	1	0.13	14.77
Third Phalanx	1	1	1	0.13	14.77
Proximal Sesamoid	1	1	1	0.06	6.82

Odocoileus sp.

Specimens identified: NISP = 1; accessory carpal (Cat. #17858).

Discussion: There are two species of *Odocoileus* that are residents of Saskatchewan; *O. virginianus* (White-tailed deer) and *O. hemionus* (Mule deer). Both of these species are found in similar habitats; mule deer prefer both open and brushy areas in a more rugged, drier habitat, while white-tailed deer prefer forest edges and open woodlands near brush in moister habitats (Kays and Wilson 2009:208). The single specimen found in Level 1a was a right accessory carpal. Unfortunately, the distinguishing features between these two animals are in the ears, facial colouration, tail, and antlers (Kays and Wilson 2009:208), making it impossible to tell to which genus this specimen belongs. The colour of this specimen is consistent with other faunal artifacts recovered from this level. A minimal amount of weathering is present on this specimen. This specimen does not appear to be culturally modified in any way.

6.4.2 Order Carnivora

***Canis sp.* (SC5a)**

Specimens identified: NISP = 3; two second phalanges (Cat. #18242 and #22136), second carpal (Cat. #17860).

Discussion: Two of the three specimens found in Level 1a are second phalanges (Figure 6.6, A). Based on size both phalanges are larger than the specimens of a coyote (*Canis latrans*) and domestic dog (*Canis familiaris*) present in the University of Saskatchewan comparative collection. The third specimen is a left second carpal that is consistent in size with the two phalanges that were identified. These specimens are likely from a wolf, but it is possible that it could be from a large domestic dog. Distinguishing between all three specimens is very difficult to do without cranial specimens present. The colour of these specimens is consistent with other faunal remains recovered from this level. There is also soil staining and a minimal amount of weathering on these specimens. There are no apparent cultural modifications present on these specimens.

***Canis sp.* (SC4a)**

Specimens identified: NISP = 6; metapodial (Cat. #18258), three phalanges (Cat. #16972), second phalanx (Cat. #16973), proximal radius (Cat. #19816), indeterminate molar (Cat. #19394), tooth root (Cat. #19267).

Discussion: The recovery of these specimens indicates the presence of at least one individual. Several of these specimens exhibit slight weathering with only surface cracking and there were no cultural modifications present on any of the specimens. All of these specimens appear to be from an individual that is approximately the size of a large coyote or domestic dog however it is difficult to identify the proper species as these two species share almost identical characteristics post-cranially. Figure 6.6 shows three of the six specimens: two phalanges (B and

C) and a proximal radius (D) from Level 1a. There are no cultural modifications present on these specimens.

Figure 6.6: *Canis sp*. specimens from Level 1a (A = Cat. #18242; B = Cat. #16972; C = Cat. #16972; D = Cat. #19816).

6.4.3 Order Lagomorpha

Lepus townsendii

Specimens identified: NISP = 2; distal humerus (Cat. #16086), astragulus (Cat. #18543).

Description: The white-tailed jackrabbit has a large geographical range found throughout the Great Plains of west-central Canada and the United States (Wilson and Ruff 1999; Kays and Wilson 2009). The jackrabbit prefers open grasslands, sagebrush, and meadows but can also be found in forested areas (Kays and Wilson 2009:456). The white-tailed jackrabbit has enormous ears used in dissipating heat and predator detection. The coat of the jackrabbit varies with the season and habitat. Dorsally the colour tends to be yellowish to greyish brown while ventrally it is white. Jackrabbits that are located in the northern extent of their range turn a pure white colour where there is significant snowfall (Kays and Wilson 2009:46). They are a nocturnal animal foraging on grasses, forbs, and shrubs. During the day they rest in shallow forms dug into the earth and in winter create connecting tunnels under the snow.

Discussion: The two specimens found in Level 1a are identical when compared to the *L. townsendii* specimen in the University of Saskatchewan comparative collection. The colour of the bone is consistent with all other faunal remains found in the assemblage, suggesting that it belongs with this archaeological assemblage. The only type of modification that is present on the specimens is that the astragulus is burned. It is likely that this was not a natural grassfire that caused the burning of the talus due to the fact that the rest of the faunal remains recovered from this level are not burned. Based on the fact that the talus is the only specimen that is burned, it is believed to have been the result of a campfire or cooking fire.

6.4.4 Order Passeriformes
Aves Indeterminate (SC1b)

Specimens identified: NISP = 1; proximal ulna (Cat. #16647).

Discussion: This specimen is comparable to a small songbird. A species could not be determined because there was a lack of identifying characteristics; also, its size corresponded with several species. There were no cultural modifications present on the bone, and it is similar in colour to other bones in this level.

6.4.5 Class Gastropoda

Specimens identified: NISP = 1; shell (Cat. #19901).

Discussion: This was the only specimen of Gastropoda that was found in Level 1a. It was small in size with a very thin shell. There are no cultural modifications present and it is very likely that this specimen was deposited as a result of an overbank flood or was living in the muddy banks of the Opimihaw Creek. However, due to the small size and fragmentary nature the exact species could not be determined.

6.4.6 Miscellaneous Specimens

Specimens identified: NISP = 18; see Table 6.7.

Discussion: Most of the specimens are represented by very large mammal (SC6a) long bone fragments, petrous temporal, *os coxae*, and mandibular fragments. These large mammal specimens are most likely bison however there are no identifying characteristics except for their size. An immature rib tubercle represents a SC4a animal. There are also various long bone fragments that represent a SC2a mammal, likely a rodent. Weathering was absent from most specimens and when present was minimal. There do not appear to be any cultural modifications present on any of the specimens.

Table 6.7: Summary of Level 1a miscellaneous specimens by size category.

Size Class	NISP	Elements Represented
SC6a - Very Lage Mammal	13	*Os coxae* fragment, mandible fragments
		petrous temporal fragments, rib shaft
		fragments, long bone shaft fragments
SC4a - Medium Mammal	1	Rib tubercle
SC2a - Small Mammal	4	Long bone shaft fragments, rib shaft
		fragment

6.5 Seasonality

The sources for determining the seasonality for Level 1a are very limited. Typically dental eruption patterns are examined to determine the time of year the animal was likely killed. This level contained no complete mandibular or maxillary tooth rows. Only one juvenile *B. bison* specimen was recovered, from this level in the form of an unworn tooth. Only a portion of the tooth was recovered and an age could not be determined. No fetal remains were uncovered, and only one other immature specimen was identified. Only one small avian bone was identified in the assemblage, and it is likely a songbird however some songbirds are present throughout the year and without species identification the seasonality cannot be determined. According to Cyr (2006:71) "[i]t is likely that these were warm weather occupations" but the seasonality cannot be determined at this time for this level.

6.6 Artifact Distribution and Features

Three features were noted in Level 1a with one being a hearth feature and the other two dark stains in the soil. Feature 1a-1 is a dark hearth-like stain in the southwest corner of Unit 25S 11E (Figure 6.7 and 6.8), extending into the northwest corner of Unit 26S 11E. It likely extends into Unit 25S 10E and Unit 26S 10E, but these units were not excavated and therefore this cannot be confirmed. The excavated portion of this hearth-like feature is a half circle that measures approximately 45 cm north to south by 43 cm east to west. The deepest extent of this feature is approximately 11 cm below the surface. In this feature only small fragments of bone and lithics were identified. Artifacts including three projectile points, a strike-a-light, a core fragment, and some small pieces of bone and charcoal were found in close proximity.

Feature 1a-2 is a very irregular shaped charcoal stain that extends almost the entire length of Unit 27S 11E and does not extend into any of the adjacent units (Figure 6.8). This feature is, at its greatest extent, 80 cm north to south and 72 cm east to west, and is 12 cm below the surface at its deepest part. The stain almost appears as if the charcoal and ash were thrown away from a particular location. Small bits of charcoal were found within the stain, and very few artifacts were located in close proximity.

Feature 1a-3 is an irregular area of darker soil in Unit 25S 14E, 26S 14E, 27S 14E, and 28S 14E (Figure 6.8). This feature is at least 4 m long in its north to south extent and 75 cm wide east to west in Unit 27S 14E. There does not appear to be any pattern to this feature, and it likely has resulted from tree roots. Before excavation there were multiple shrubs that were growing in the area, and the tree roots along with organic material may have created the darker stain. There was no charcoal or any concentrations of debitage located in or around the feature, but there are some pieces of bone scattered through and around the feature.

Figure 6.7: Feature 1a-1 from Unit 24S 11E.

Extrapolation shows at least three separate concentrations of faunal remains in Level 1a. The first occurs in the northern portion of Level 1a in Units 23S 12E, 23S 13E, and 24S 12E. The second concentration of faunal artifacts occurs in Unit 25S 14E. The third concentration of faunal remains occurs in the southeast portion of Level 1a in Units 28S 13E and 28S 14E. It is apparent that these concentrations of faunal remains are not linked to any of the three features that have been found in Level 1a.

6.7 Interpretation of Cultural Level 1a

The archaeological assemblage from Level 1a contains artifacts that are representative of an early Contact period. The occupants of this habitation site expressed a reliance on bison procurement and local lithic materials. Artifacts from the 2004 to 2006 excavations indicated a Late Precontact period occupation. Additionally in the 2004 to 2006 excavations pottery was also recovered from this level. A total of 249 sherds of pottery was recovered consisting of predominantly body sherds. The temper of this potter was a fine grit, and 14.2% exhibited a check stamped decoration. These stylistic characteristics are consistent with the Lozinsky sub-phase of the Mortlach complex (Malainey 1998; Walde 2003). Artifact concentrations were observed in the 2004 to 2006 excavations, and the only feature observed was a small charcoal cluster.

Figure 6.8 illustrates the distribution of the artifacts and features that were uncovered in the 2007 to 2009 excavations of Level 1a. The majority of activities appear to have been carried out in the centre portion of the excavation and were identified by a higher density of discarded tools, debitage, and faunal debris. A small cluster of stone tools was found in the vicinity of the hearth (Feature 1a-1) including three of the eight projectile points. The projectile points found in this level are associated with Plains Side-Notched morphology. The majority of the stone tools were located in a cluster of seven units around the centre of the Level 1a excavation. The grinding stone fragment was likely utilized for the processing of plant and/or pieces of meat. A small amount of core fragments was found and shatter and tertiary flakes dominate the assemblage. The majority of the lithic material found in Level 1a is dominated by locally procured Swan River chert.

At least two bison are represented in the faunal assemblage, one of them being a juvenile. Unfortunately, the juvenile remains do not give any clue as to the age of the individual. The tooth found is a mandibular bison molar but the exact molar could not be identified therefore, it is difficult to determine if the tooth had erupted or not. Without this information the age of the individual could not be determined. Bison remains were not the only remains found in Level 1a. A single accessory carpal indicated the presence of a deer, though the exact species could not be determined. Also present were two canid specimens which were identified based on their size. One of the specimens was the size of a large domestic dog or wolf and based on the size of the remains it is likely a wolf. The second specimen is the size of a large coyote or small domestic dog. No canid cranial remains were found, and therefore it is impossible to tell which species are present. In addition to the above mentioned species a white-tailed jackrabbit was identified in the assemblage based on the presence of a humerus and an astragulus. A small song bird was also found in the assemblage, though no identifying characteristics were present for a species determination. Gastropod remains were also found in this level likely as a result of overbank flooding. Without identifiable birds and immature species present determining the seasonality of this level is impossible.

No radiocarbon date was obtained for this level, as it was believed to have been a fairly recent occupation which was proven by the discovery of a European metal artifact. Therefore based on only the artifacts found this level, an early Contact occupation is represented. The artifacts found in this assemblage indicate activities related to a habitation area, likely a short term campsite in which bison processing and tool manufacturing had occurred.

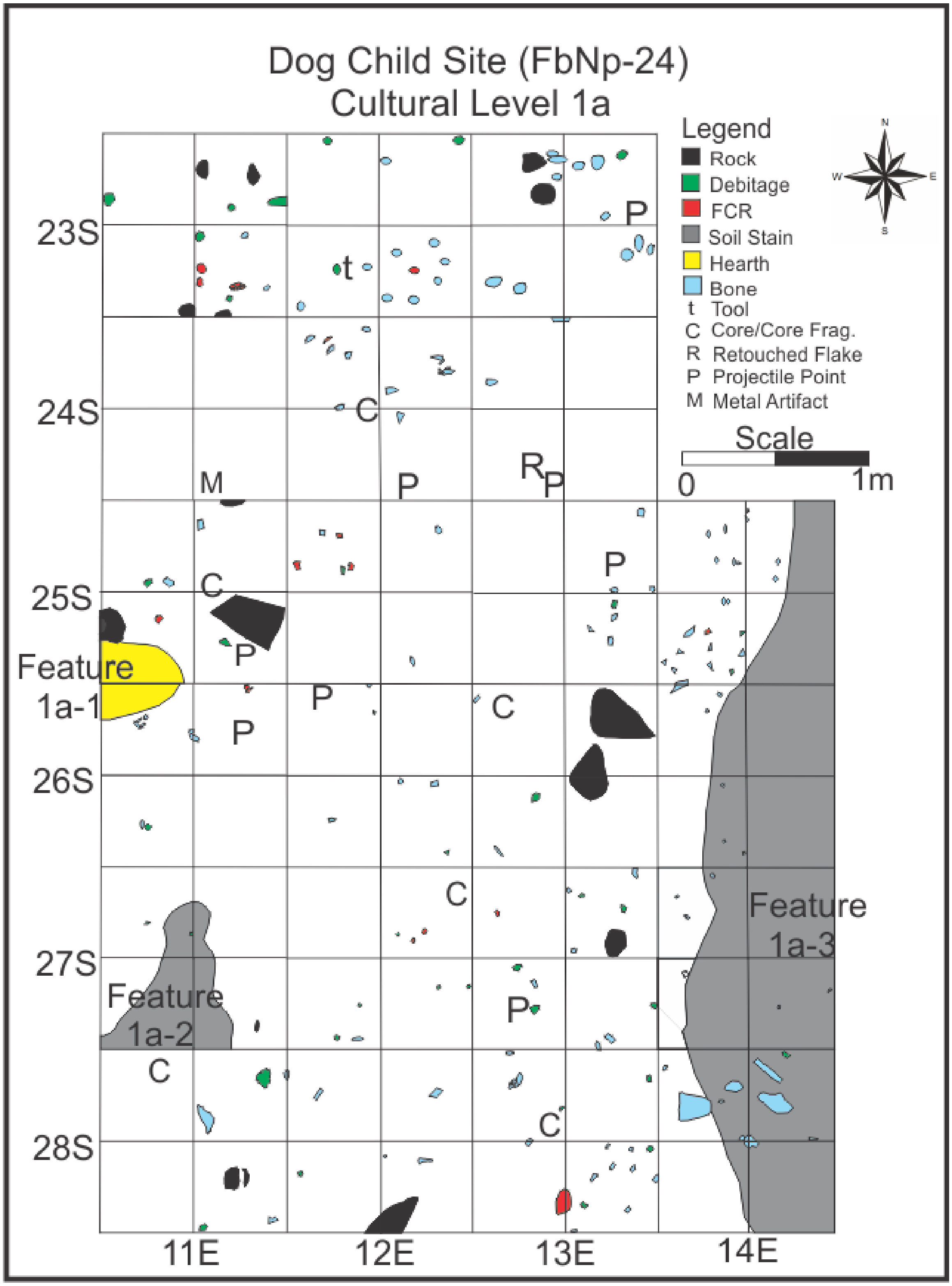

Figure 6.8: Distribution of artifacts and features in Level 1a.

Chapter 7

Cultural Level 1b

7.1 Introduction

Cultural Level 1b is associated with a Late Precontact period occupation. Previously excavated diagnostic materials revealed a Prairie Side-Notched cultural association however, no diagnostic materials were found in the 2007 to 2009 excavations. Level 1b has been previously radiocarbon dated to 300 ± 50 years cal. B.P. (BGS 2659) (Cyr 2006). This level begins around 12 cm depth and is approximately 5 cm thick across the entire site. In places, the presence of a sandy to sandy loam sterile layer separating Level 1a and Level 1b was evident.

7.2 Layer between Level 1a and Level 1b

Few cultural remains were found in this sandy transitional layer. Only one unit, 27S 11E, had materials belonging to this level. These materials consisted of both fragmented faunal and lithic remains. Faunal remains included 36 unburned unidentified bone fragments weighing a total of 13.5 g and nine burned unidentified fragments weighing a total of 4.1 g. Also found in the excavation unit were two pieces of shatter: one quartz and one Swan River chert.

7.3 Cultural Level 1b Lithic Assemblage

Excavations from 2004 to 2006 produced 6,514 pieces of debitage, 26 core and core fragments, 21 flaked tools, three ground and pecked stone tools, and 148 pieces of FCR. Debitage consisted primarily of shatter (65.9%), followed by secondary and tertiary flakes at 16.9%. The dominant material type recovered was Swan River chert at 65.9% of the assemblage (Cyr 2006:45). Of the core and core fragments four are bipolar cores and the remainder are platform cores. One of the platform cores has been expended, 19 are highly flaked, and three have minimal flakes removed (Cyr 2006:48). Of the 21 flaked stone tools ten are unifacial, five are bifacial, and six are projectile points. All ten of the unifaces are scrapers, with seven being endscrapers, the remainder have been worked on three edges. The five bifacial tools consist of a rectangular knife, two choppers, a symmetric knife, and a broken knife (Cyr 2006:53). Two of the projectile points are unidentifiable tips, one is a Plains Side-Notched, one is a Prairie Side-Notched, one is a possible Pelican Lake, and the last is consistent with a Besant point. Cyr (2006:58) explains the presence of the Pelican Lake point and Besant point as supporting “the hypothesis that geoarchaeological processes have removed sediment and soil layers which existed prior to Level 1b but succeeded Level 2a." The three miscellaneous tools present include an anvil stone, a hammerstone, and a grinding slab (Cyr 2006:58-60).

The lithic assemblage from 2007 to 2009 included a total of five stone tools. A complete list of quantitative and qualitative measurements for the lithic tools can be found in Appendix D. The most dominant material type in all of Level 1b was Swan River chert at 39.66% of the total assemblage, of which 49.22% was heat treated. Quartzite was the second most common material type at 15.77%, with various types of granite composing 13.48% of the assemblage. Of all of the lithic artifacts found in Level 1b shatter was the most common at 62.02% of the assemblage. FCR was the second most common form of lithic material at 19.45%, followed by tertiary flakes at 16.69% of the total assemblage.

7.3.1 Bifaces (n=2; Figure 7.1)

Two bifacially flaked tools were recovered from Level 1b (Appendix D; Table D.7 and D.10). One is an ovoid-shaped quartzite biface exhibiting both a primary and secondary working edge (Figure 7.1, B; Cat. #17333). This grey quartzite biface was recovered from Unit 25S 14E at a depth of 14 cm. Both the primary and secondary working edges exhibit use wear on their surfaces but no retouch. The other is a bifacial knife constructed out of heat treated Swan River chert (Figure 7.1, A; Cat. #14928). This particular biface was recovered from Unit 23S 11E at a depth of 20 cm. The biface is asymmetrical in shape and exhibits both a primary and secondary working edge with a small amount of unifacial retouch evident.

7.3.2 Unifacial Scrapers (n=2; Figure 7.2)

The excavation of Level 1b produced one small endscraper and a combination end/sidescraper (Appendix D; Table D.7 and D.10). The endscraper, recovered from Unit 28S 13E, 11 cm below the surface, (Figure 7.2, B; Cat. #19605) is constructed from a white/translucent chalcedony. It is thumbnail in size and triangular in outline. The convex, distal working edge is quite steep at approximately 80° and exhibits small chips along the margin evident of use wear. The end/sidescraper (Figure 7.2, A; Cat. # 17632) is also composed of a brown chalcedony. This tool has a convex distal working edge with an angle of around 75°. The secondary working edge is on the left lateral edge and contracts towards the proximal end of the scraper. It is quite shallow exhibiting an angle of approximately 50°.

7.3.3 Unifaces (n=1; Figure 7.3)

One uniface was found in Level 1b in Unit 23S 11E at a depth of 14 cm (Cat. #14918). The material is believed to be a silicified wood that is red in colour. This uniface exhibits two working surfaces, both of which are convex and on opposing lateral edges. These working edges also display a slight amount of retouch. It is possible that this uniface may have been hafted in some fashion as the proximal end is narrow and looks like it has been purposely thinned. The proximal end has also been broken off of the main body of the uniface. The type of material may be the reason that the proximal end was broken off and may also be why the workmanship appears to be of very poor quality (Appendix D; Table D.7 and D.10).

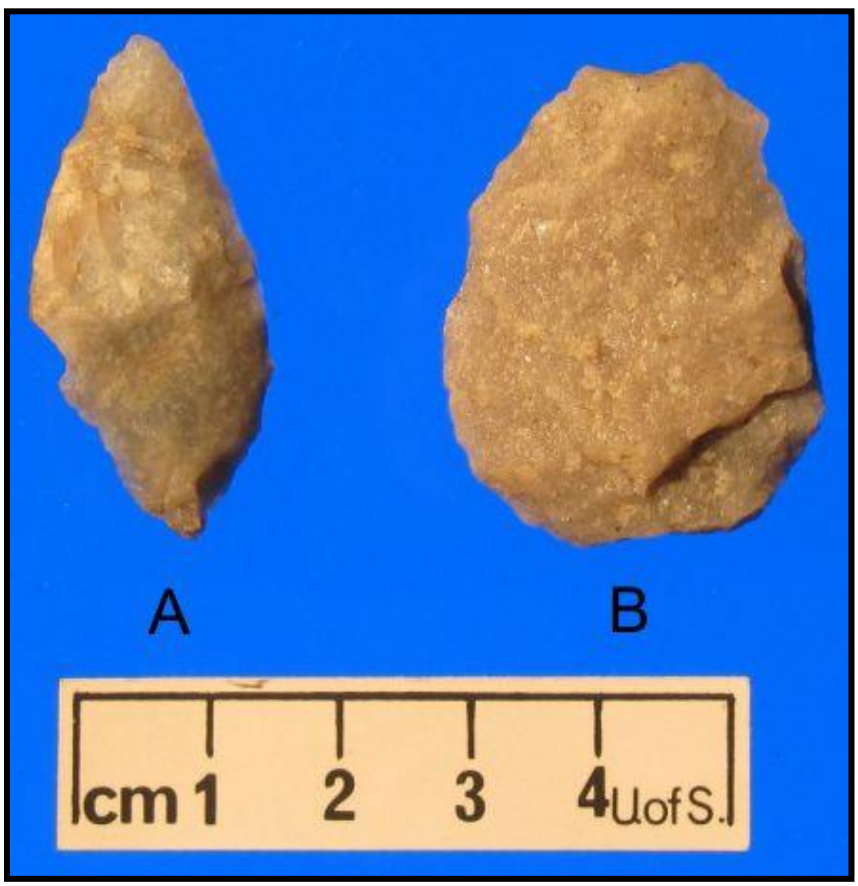

Figure 7.1: Bifaces from Level 1b (A = Cat. #14928; B = Cat. #17333).

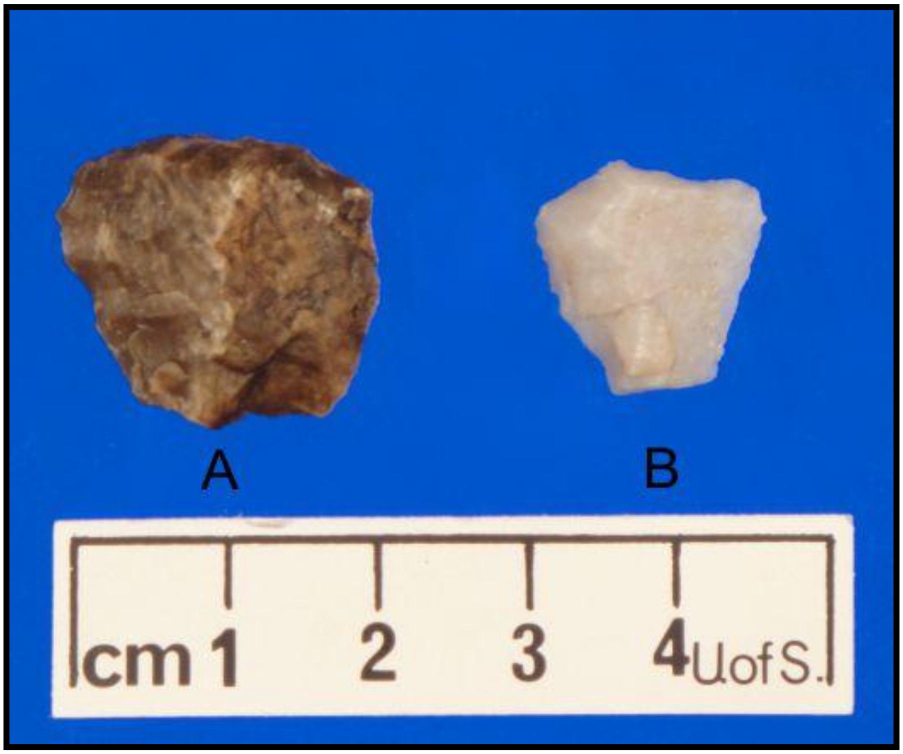

Figure 7.2: Unifacial scrapers from Level 1b (A = Cat. #17632; B = Cat. #19605).

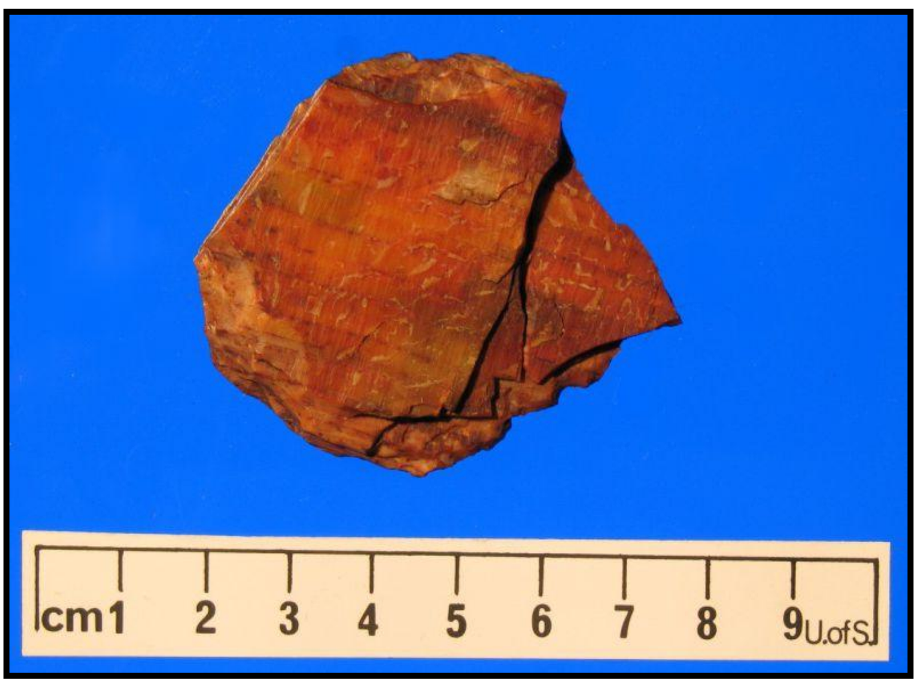

Figure 7.3: Uniface from Level 1b (Cat. #14918).

7.3.4 Cores and Core Fragments (n=1)

Level 1b revealed only one exhausted core fragment (Cat. #19606) composed of translucent quartz.

Table 7.1: Level 1b cores and core fragments.

Catalogue Number	Material	Mass (g)	Type
19606	Quartz	99.6	N/A

7.3.5 Debitage (n=520)

A total of 405 pieces of shatter and 115 flakes (excluding retouched flakes) were recovered from Level 1b (Table 7.1). The most common type of material present is Swan River chert at 49.62% of the total assemblage, while quartzite is the second most common at 19.42% (Table 7.1). Evidence for heat treatment is present on 49.22% of the Swan River chert in the assemblage. Thirteen other material types represent the remaining 50.38% of the assemblage, with quartz comprising a third of this at 11.35% (Table 7.1). Shatter is the most common type of lithic debitage comprising 77.88% of the assemblage. Tertiary flakes account for 20.96% of the assemblage, while primary and secondary flakes are rare, accounting for 0.58% of the assemblage each (Table 7.1). There is also a reliance on local lithic materials, particularly Swan River chert and quartzite.

7.3.6 Fire Cracked Rock (n=127)

A total of 127 pieces of fire-altered rock was found in Level 1b. The majority were found associated with a stone boiling pit discussed in Section 7.5. The most common material by mass is granite at 19.26 kg (51.96%). The second most common by mass is sandstone, at 8.6 kg (23.13%). The remaining 24.91% by mass is composed of a variety of different lithic materials (Table 7.2).

Table 7.2: Level 1b lithic debitage types.

Material	Primary Flake	Secondary Flake	Tertiary Flake	Shatter	Total	Percent (%)
Basalt	0	0	2	4	**6**	**1.15**
Cathead Chert	0	0	4	4	**8**	**1.54**
Chalcedony	0	0	8	18	**26**	**5.00**
Chert	0	2	1	19	**22**	**4.23**
				(H/T: n=1)		
Fused Shale	0	0	1	0	**1**	**0.19**
Granite	0	0	0	4	**4**	**0.77**
Gronlid Siltstone	1	0	2	6	**9**	**1.73**
Jasper	1	0	0	1	**2**	**0.38**
Knife River Flint	0	0	4	1	**5**	**0.96**
Mudstone	0	0	0	2	**2**	**0.38**
Quartz	0	0	2	57	**59**	**11.35**
Quartzite	0	0	10	91	**101**	**19.42**
Silicified Peat	0	1	2	9	**12**	**2.31**
Siltstone	0	0	3	2	**5**	**0.96**
Swan River Chert	1	0	70	187	**258**	**49.62**
	(H/T: n=1)		(H/T: n=43)	(H/T: n=70)		
			(P/H/T: n=1)	(P/H/T: n=12)		
Total	**3**	**3**	**109**	**405**	**520**	**100.00**
Percent (%)	**0.58**	**0.58**	**20.96**	**77.88**	**100.00**	

Table 7.3: Level 1b fire cracked rock.

Material	Count	Percent (%)	Mass (g)	Percent by Mass (%)
Fused Shale	12	9.45	7.2	0.02
Gabbro	1	0.79	4.3	0.01
Gniess	9	7.08	2348.5	6.34
Granite	79	62.20	19258.3	51.96
Granitic conglomerate	6	4.72	149.9	0.40
Granitic gneiss	1	0.79	98.3	0.27
Granitic schist	2	1.57	1335	3.60
Limestone Chert	7	5.51	5065.3	13.67
Quartzite	1	0.79	4.5	0.01
Sandstone	8	6.30	8574.8	23.13
Schist	1	0.79	218.7	0.59
Total	**127**	**100.00**	**37064.8**	**100.00**

7.4 Cultural Level 1b Faunal Assemblage

The 2004 to 2006 excavations yielded a substantial amount of faunal remains. A total of 8,478 elements, specimens, and unidentifiable fragments was recovered. These faunal specimens represent four bison (one juvenile), one snowshoe hare (*Lepus americanus*), one ground squirrel (*Spermophilus* sp.), and one large rodent (SC3a), likely a beaver or porcupine (Cyr 2006:66-69). In the 2007 to 2009 excavations there was a total of 2,422 faunal specimens found in Level 1b, weighing a total of 2,444.6 g (Table 7.4). Ninety-seven percent of the assemblage is unidentifiable fragments of bone weighing 1,393.7 g, of which 1,283.4 g (92.09%) are unburned bone fragments. In this level only 2.56% of the faunal remains found were identifiable. The majority (87.7%) of faunal remains found in Level 1b consisted of unburned remains. Almost ten percent (9.7%) of the assemblage is burned bone, and 2.6% of the assemblage is composed of calcined bone.

In Level 1b there are only two taxa represented in the faunal assemblage (Table 7.5). Eleven specimens were assigned to a category of size class because they lacked identifying characteristics. The majority of the specimens likely belong to the two that have been identified but without any distinguishing features they cannot be placed into a specific taxon. However, there are at least two specimens in the miscellaneous size category that do not fit with the identified taxa and likely belong to a taxon that has not been identified.

Table 7.4: Level 1b faunal counts.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	9	200.8	53	674.7	2024	1283.4
Burned Bone	0	0	0	0	235	86
Calcined Bone	0	0	0	0	63	15.6
Unburned Tooth Enamel	0	0	8	175.4	30	8.7
Total	**9**	**200.8**	**61**	**850.1**	**2352**	**1393.7**

Table 7.5: Summary of Level 1b faunal remains by taxa.

Common Name	Taxon	NISP	MNI
Mammals			
Bison	*Bison bison*	20	3
Medium-Large Canid (SC5a)	*Canis sp.*	1	1
Miscellaneous			
Very Large Mammal (SC6a)		6	-
Large Mammal (SC5a)		2	-
Medium Mammal (SC4a)		2	-
Small Mammal (SC2a)		1	-

7.4.1 Order Artiodactyla

Bison bison

Specimens identified: NISP = 20; see Table 7.6 for a summary. MNE, MAU, and %MAU values were calculated by landmark. A summary of these calculations can be found in Appendix E (Table E.2).

Description: See page 81.

Discussion: Sixty-three percent of the identified specimens recovered from Level 1b have been classified as bison. At least three individuals that are represented by the specimens identified in the assemblage; one of which is an adult specimen and the other two are juveniles. One juvenile specimen, based on a left distal metacarpal; was compared to the University of Saskatchewan comparative collection, and was estimated to be around six to seven months old. The second juvenile specimen is also a left metacarpal with no epiphyseal fusion, but when compared to other specimens the approximate age of this specimen could not be determined. Also present in this assemblage was a mandibular molar which exhibited no wear on the occlusal surface, indicating that it is likely a juvenile and may belonging to either of the metacarpal specimens. One of the humerii found in the Level 1b assemblage has also been identified as a juvenile based on the porosity of the bone and likely belongs to one of the above juvenile specimens. None of *B. bison* specimens show any form of cultural modification and they are all unburned. Weathering is generally light to absent with two specimens showing stage three weathering consisting of roughened patches and significant cracks. Most of these specimens exhibit natural taphonomic processes including soil staining and root etching. A number of the specimens present also show evidence of trowel damage resulting from excavation.

Table 7.6: Summary of *Bison bison* elements from Level 1b.

	NISP	MNI (Side)	Total MNE	MAU	%MAU
Axial Skeleton					
Cranium	8	1	5	0.83	100
Mandible	1	1	1	0.13	15.66
Rib	1	1	1	0.04	4.82
Forelimb					
Humerus	2	1	1	0.5	60.24
Metacarpal	3	3	1	0.5	60.24
Ulnar Carpal	1	1	1	0.5	60.24
Internal Carpal	1	1	1	0.5	60.24
Fused 2nd/3rd Carpal	1	1	1	0.5	60.24
Lateral Malleolus	1	1	1	0.5	60.24
Other Elements					
First Phalanx	2	1	2	0.5	60.24
Second Phalanx	1	1	1	0.13	15.66
Proximal Sesamoid	1	1	1	0.06	7.23

7.4.2 Order Carnivora
***Canis sp.* (SC5a)**

Specimens identified: NISP = 1; second phalanx (Cat. #15730).

Discussion: Only one element was recovered from Level 1b. Based on size it is likely that this element is from a large domestic dog or a small wolf. When compared to specimens in the comparative collection it was impossible to determine to what species this element belongs. As mentioned previously (see Chapter 6), it is difficult to determine which species canid specimens belong to without cranial bones present as aside from size, they all share similar characteristics. No cultural modifications were present on this element, and it was not burned.

7.4.3 Miscellaneous Specimens

Specimens identified: NISP = 11; see Table 7.7.

Discussion: Most of specimens identified in Level 1b are represented by very large mammal bone fragments. These specimens are likely from a bison, but there are no identifying characteristics except for their size. The humerus in the SC5a category is a large size juvenile specimen identified based on the porosity of the bone. It is very likely that this immature bone belongs to a bison, as there were at least two juvenile bison identified in this assemblage. Two rib shaft segments represent a SC4a mammal. The last category (SC2a) is a small rodent with most of the skeleton present; however, no cranial remains are present and thus this specimen cannot be identified to a genus or species. There do not appear to be any cultural modifications present on any of these specimens and weathering is minimal to absent.

Table 7.7: Summary of Level 1b miscellaneous specimens by size category.

Size Class	NISP	Elements Represented
SC6a - Very Large Mammal	6	Astragulus fragments, Coronoid process, rib shaft fragments
SC5a - Large Mammal	2	Humerus, ilium
SC4a - Medium Mammal	2	Rib shaft fragments
Sc2a - Small Mammal	1	Postcranial elements

7.5 Seasonality

The bison assemblage in Level 1b was quite small. Few complete teeth were found and no teeth were found in a maxillary or mandibular socket. Since teeth measurements could not be made, the seasonality is based on the presence of fetal and/or immature specimens. Bison generally rut in mid-summer from July to August with most breeding occurring in a two week period. The cows give birth in the spring after a gestation of about 285 days (Kays and Wilson

2009:202), generally between the middle of April and the middle of June. Therefore, it is possible to determine an approximate time frame for occupation of the site.

One of the immature elements found was a distal metacarpal which was broken into two pieces. When compared to specimens in the University of Saskatchewan's comparative collection, an approximate age of six to seven months was estimated. The other metacarpal specimen is a juvenile bison. An approximate age could not be determined for this specimen however it is slightly larger than the six to seven month old specimen. Unfortunately, the age of the tooth found in this level could not be estimated as it was not found in a socket and it is unknown which molar is present. A humerus fragment was also present but the specimen was not complete enough for a measurement or comparison, and therefore no age estimate was given for this individual.

Only one specimen was given an approximate age, and therefore the sources for determining the seasonality of this level are very limited. Based on the birthing schedule for bison, a six to seven month old bison would only be present between October and December, indicating that this is a fall to early winter occupation however this sample is extremely small and therefore the seasonality of fall to winter may not be accurate.

7.6 Artifact Distribution and Features

Two cultural features present in this level as well as the bottom part of the hearth from Level 1a, which has been discussed in Chapter 6. One of the cultural features is a stone boiling pit (Feature 1b-1) while the other is a dark soil stain (Feature 1b-2) (Thomas 2009). Feature 1b-1 is a circular feature located in Units 24S 11E and 25S 11E and is about 45 cm in diameter (Figure 7.4). At around 10 cm depth the soil began to show a change in colour to a darker brownish red and the tops of rocks from the feature were visible (Figure 7.4). The bottom portion of this basin was at approximately 23 cm below the surface. The entirety of feature 1b-1 was filled with large sized cobbles, charcoal, and some fragments of bone (Figure 7.5). These cook stones were likely used in conjunction with the pit in which they were found. There is a possibility that these stones were fired *in situ* or at a nearby hearth. The presence of a significant amount of charcoal within the pit lends support to the idea that they may have been fired *in situ*.

Small fragments of bone were present inside the pit with very little bone surrounding the pit. Therefore, the feature was most likely used as an apparatus for extracting marrow from bones.

Figure 7.4: Feature 1b-1 (stone boiling pit) from Units 24S 11E and 25S 11E.

Feature 1b-2 is a dark stain located in the northwest corner of Unit 28S 11E and does not appear in any of the surrounding units. The feature is approximately 20 cm in length from north to south and 42 cm from east to west at its maximum extent. A large amount of charcoal was found in this feature and the soil was stained by the charcoal. Very few bone and lithic fragments were found within the feature, and there are no artifacts surrounding the feature. It is possible that feature is just a dump of ashes or a small temporary fire.

Figure 7.5: Feature 1b-1 (stone boiling pit) from Units 24S 11E and 25S 11E.

Level 1b is quite sparse for cultural material except for three visible concentrations of faunal and lithic remains (Figure 7.6). The first concentration of artifacts occurs in Unit 23S 11E in the northwest and southwest quadrants. This concentration is predominantly faunal remains with a couple of pieces of FCR and two tools. The second concentration of artifacts occurs in Units 27S 14E and 28S 14E in the northeast and southeast quadrants. Again the concentration consists of faunal remains with a few pieces of FCR. The third concentration of artifacts occurs in Units 28S 11E and 28S 12E. This concentration is predominantly faunal remains with some lithic debitage. Only the third concentration of artifacts shows any association with a feature in this level, and that is Feature 1b-2, which is located in Unit 28S 11E.

7.7 Interpretation of Cultural Level 1b

Cultural Level 1b contains artifacts that represent a Late Precontact period occupation. Unfortunately, no projectile points were recovered from this level in the 2007 to 2009 excavation seasons. The previous 2004 to 2006 excavations recovered projectile points that are associated with Prairie Side-Notched specimens (Cyr 2006). The radiocarbon date obtained for this level is 300 ± 50 years cal. B.P. (BGS 2659), placing it within Prairie Side-Notched time frame (Cyr 2006). Also recovered from these excavations were a possible Pelican Lake projectile point and a possible Besant projectile point, indicating that erosion may have removed the cultural levels between Level 1b and Level 2a. The previous excavations also yielded pottery that, based on stylistic characteristics, is consistent with the Lozinsky sub-phase of the Mortlach complex. This complex is dated between 650 years B.P. and the Contact period, and therefore falls well into the radiocarbon age obtained for this level. In Level 1b a hearth feature which had a large amount of debitage surrounding it was uncovered in Unit 19S 12E. Also found within this feature was a significant quantity of seeds which displayed evidence of charring. Five separate genera were identified including 34 specimens of long-spined hawthorn (Family Rosaceae: *Crataegus succulent*), 11 specimens of *Rosa* genus (Family Rosaceae: likely Wood's rose), a chokecherry pit (Family Rosaceae: *Prunus virginiana*), a sample of wild candytuff (Family Brassicaceae: *Iberis amara*), and antelope bitterbrush (Family Rosaceae: *Purshia tridentate*). The antelope bitterbrush is an extralimital species, and its presence could not be explained. Also present in this level were artifact clusters of bone and lithic material. Features including the hearth, rodent burrows, a basin of oxidized soil (Unit 21S 11E), and a cluster of burned bone and charcoal (Unit 14S 11E) was also found in this level.

Figure 7.6 illustrates where the artifacts were recovered from during the 2007 to 2009 excavations of Level 1b. There are three concentrations of artifacts, and only one of them appears to be associated with a feature, which is the small charcoal stain in Unit 28S 11E. The most noteworthy feature in Level 1b is the stone boiling pit which is close to the northern portion of the excavation but not associated with any apparent artifact concentration.

There again appears to be a reliance on local lithic materials, with Swan River chert being the most dominant type however a few materials originate a great distance from the site. It is possible that Level 1b represents a brief occupation as there are significantly fewer artifacts and tools when compared to Level 1a. The majority of the lithic debitage that is present in Level 1b is shatter comprising just over 60% of the assemblage. Since the stone boiling pit is such a dominant feature in this level it is not surprising that FCR is the second most common form of debitage. A small percentage of tertiary flakes were recovered from the assemblage, while primary flakes, secondary flakes, and cores were rare. There was likely little tool production occurring at this site and a higher likelihood of resharpening of old tools. The presence of few tools also suggests that this occupation was short term.

Few identifiable faunal remains were also found in this level with only four individuals being assigned to a particular taxon. Bison were again the most dominant among the faunal remains found at the site with at least three individuals being uncovered. Of the three individuals, two are juvenile and one is an adult. Based on only these remains a fall to early winter occupation was suggested. The other taxon observed in this level was a canid which was represented by a second phalanx. Unfortunately, with only a single postcranial element recovered the exact species of the individual could not be identified. The remainder of the faunal remains were placed into a miscellaneous category because they lacked identifying characteristics that could place them into a particular taxon. It is likely that majority of these remains belong to *B. bison*.

The final stage of processing faunal remains is indicated by the stone boiling pit which would have likely been used to extract marrow from large bison bones. Fragments of both bone and bits of charcoal were present in the pit feature. The only other feature in this level is a dark stain of charcoal which appears to be an ash dump possibly from the boiling pit. The fact that very few artifacts were found in the level, coupled with the small quantity of faunal remains, implies that this occupation was a short term habitation site or campsite.

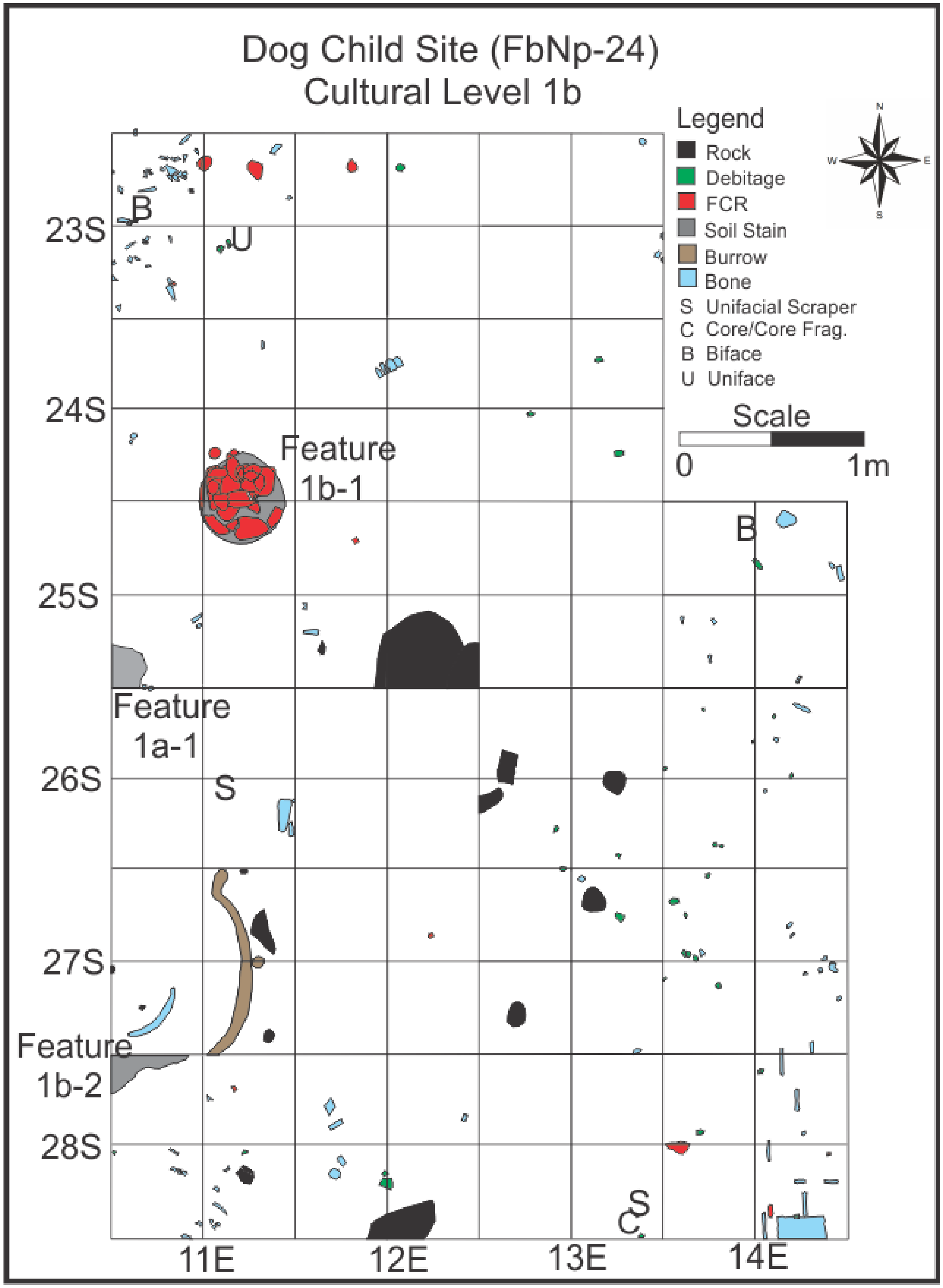

Figure7.6: Distribution of artifacts and features in Level 1b.

Chapter 8

Cultural Level 2a

8.1 Introduction

Cultural Level 2a is associated with the McKean series, a Middle Middle Precontact period culture, based on projectile points recovered during all of the field seasons at the Dog Child site. This level is 6 cm thick and begins at approximately 19 to 25 cm below the surface. Level 2a has been previously radiocarbon dated to 3700 ± 45 years cal. B.P. (BGS 2660) (Cyr 2006). Separation between Level 1b and Level 2a was approximately 3 cm in thickness. This transitional level contained very few artifacts.

8.2 Layer between Level 1b and Level 2a

Artifacts present in this level are likely due to a physical or biological postdepositional disturbance. Artifacts and fragments were recovered from six of the excavated units, 23S 12E, 25S 13E, 23S 13E, 24S 12E, 25S 11E, and 27S 12E. In this level there was one retouched flake uncovered in Unit 23S 12E (Figure 8.1; Cat. #15205). It has a primary working edge that is located distally and is straight in outline. There is also a secondary working edge located laterally and is convex in shape. It is constructed out of partially heat treated Swan River chert and has some unifacial retouch present (Figure 8.1).

The majority of the lithic materials found in this level were small amounts of debitage (Table 8.1). Shatter was the most common type of debitage at 59.57%, followed by tertiary flakes at 36.17% and primary and secondary flakes both at 2.13% of the assemblage. The most common material type seen was Swan River chert at 53.19%, of which 60% was heat treated. Quartz and quartzite were also in this level at 23.4% and 10.64%, respectively. Four other material types make up the remaining 12.78% of the assemblage (Table 8.1). Only a minimal amount of charcoal was found, totalling 0.7 g.

Figure 8.1: Retouched flake from between Level 1b and Level 2a (Cat. #15205).

Table 8.1: Lithic debitage types from between Level 1b and Level 2a.

Material	Primary Flake	Secondary Flake	Tertiary Flake	Shatter	Total	Percent (%)
Basalt	0	0	0	2	**2**	**4.26**
Chalcedony	0	0	2	0	**2**	**4.26**
Chert	0	0	0	1	**1**	**2.13**
Quartz	0	0	1	10	**11**	**23.40**
Quartzite	0	0	2	3	**5**	**10.64**
Silicified Peat	0	0	0	1	**1**	**2.13**
Swan River Chert	1	1	12	11	**25**	**53.19**
			(H/T: n=10)	(H/T: n=5)		
Total	**1**	**1**	**17**	**28**	**47**	**100.00**
Percent (%)	**2.13**	**2.13**	**36.17**	**59.57**	**100.00**	

A total of 110 faunal specimens and unidentifiable fragments was recovered from this layer. The total mass of this assemblage is 227.5 g. Only three pieces from this layer are identifiable, with all three being unburned. The remaining 107 pieces are unidentifiable, 103 of which are unburned and four which are calcined (Table 8.2). A minimum of one adult bison, represented by a left tibia fragment (Cat. #16426) was recovered from this layer. Also present is at least one juvenile bison, approximately 11 months old, represented by a left distal metatarsal (Cat. #16425). The last of the three specimens is a portion of a femur from a large mammal (SC6a) however; no species or side can be attributed to this specimen. Also present in this layer was a small amount of gastropod shells, totalling 0.4 g.

Table 8.2: Faunal counts from between Level 1b and Level 2a.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	0	0	3	146.7	103	80
Burned Bone	0	0	0	0	0	0
Calcined Bone	0	0	0	0	4	0.8
Total	**0**	**0**	**3**	**146.7**	**107**	**80.8**

8.3 Cultural Level 2a Lithic Assemblage

The 2004 to 2006 excavations yielded 2,051 pieces of debitage, 13 cores and core fragments, 15 flaked tools, and 37 pieces of FCR. Shatter dominates the debitage at 70.8% of the assemblage, followed by secondary flakes at 19.2%. The most common material type is Swan River chert at 56.9% of the debitage, followed by quartz at 18.6% of the assemblage (Cyr 2006:84). The cores recovered consist of three bipolar cores, two exhausted cores, six that are highly flaked, and one that has been broken into two pieces (Cyr 2006:86). The flaked tools consist of five unifaces including three endscrapers, one end/sidescraper, and one scraper/graver (Cyr 2006:88). Only two bifaces were recovered; one has been classified as a hafted biface and the other is believed to be a broken knife (Cyr 2006:92). A total of seven projectile points was recovered from the excavations. Three of the projectile points have been classified as Hanna style projectile points, and the remaining four have been classified as Duncan style points (Cyr 2006:93).

A total of eight stone tools was found in the 2007 to 2009 excavations of Level 2a. Of these six were flaked stone tools, and the remaining two were considered ground and pecked stone tools. A complete list of quantitative and qualitative measurements for the lithic tools can be found in Appendix D. Forty-six percent of the total lithic assemblage consists of Swan River chert with 53.44% being heat treated. The second most common material was quartz at 30.94% of the total assemblage. Ninety-two percent of the assemblage is composed of debitage. The second most common type of lithic material at the site is FCR, making up 4.91% of the total assemblage.

8.3.1 Projectile Points (n=3; Figure 8.2)

Only three projectile points were found in this level, all of which resemble the McKean point in the McKean series (Appendix D; Table D.1 and D.4). All three of these points are nearly complete. One point was recovered from a depth of 22.5 cm in Unit 28S 13E. This point is constructed from a grey fine-grained quartzite and is broken obliquely resulting in the loss of the right portion of the base (Figure 8.2, B; Cat. #19681). This point exhibits some chipping and use wear along its margins. The second projectile point, recovered from a depth of 28.5 cm in Unit 27S 13E, is constructed from partially heat treated Swan River chert, has a clean angular break through the distal portion of the body, and is missing the tip (Figure 8.2, A; Cat. #18831). This point is asymmetrical in shape and has some bifacial retouch along its lateral margins, while the basal margin shows signs of microchipping. It is difficult to determine the amount of retouch as the projectile point has a large amount of calcium carbonate deposited on the ventral surface. The third projectile point is constructed from heat treated Swan River chert and is missing the entire left portion of the base (Figure 8.2, C; Cat. #16432). The point was found in Unit 25S 11E at a depth of 26 cm. The point exhibits calcium carbonate build-up on the dorsal surface of the point. There is a small amount of retouch visible on the right lateral margin, and the flaking appears to be very well done.

Figure 8.2: Projectile points from Level 2a (A = Cat. #18831; B = Cat. #19681; C = Cat. #16432).

8.3.2 Unifacial Scrapers (n=2; Figure 8.3)

Two endscrapers were found during the excavation of Level 2a (Appendix D; Table D.7 and D.10). Both endscrapers are constructed from heat treated Swan River chert. One of the endscrapers is triangular in outline with a convex distal working end (Figure 8.3, A; Cat. #15270). This endscraper was found in Unit 23S 12E at a depth of 24 cm. The working edge angle of this endscraper is approximately 70°, and there is a small amount of retouch present along the margin. The other endscraper was found in Unit 24S 11E at a depth of 22.5 cm. It is slightly smaller and square in shape in comparison to the first endscraper (Figure 8.3, B; Cat. #15731). The distal working edge of this particular endscraper is straight in shape with a steep working edge of approximately 75°. The endscraper itself is well flaked, and the working edge shows signs of both use wear and retouch.

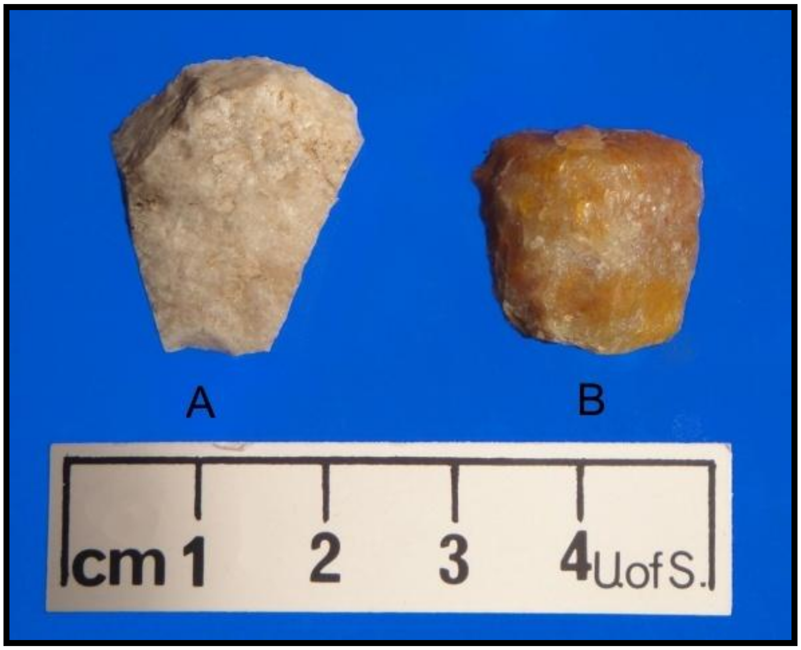

Figure 8.3: Unifacial scrapers from Level 2a (A = Cat. #15270; B = Cat. #15731).

8.3.3 Unifaces (n=1; Figure 8.4)

Only one uniface was found in Level 2a in Unit 24S 13E at a depth of 23 cm (Cat. #16194). This uniface is constructed out of a yellow medium-grained quartzite. It is circular in shape with a convex distal working surface. On the working edge there is evidence of both use wear and retouch. Proximally, there are notches on either lateral side of the uniface signifying a possible haft element (Appendix D; Table D.7 and D.10).

8.3.4 Hammerstones (n=2; Figure 8.5)

Two hammerstones were recovered from Level 2a. Both of these expedient tools were constructed out of granite (Cat. #19051 and #19862). One of the hammerstones was found in Unit 28S 14E at a depth of 30 cm (Figure 8.5, B; Cat. #19862). This hammerstone is an ovoid cobble. Peck marks are apparent on the distal end and on the ventral side in the centre. The proximal and dorsal surfaces have some pitting, but it appears to be natural. The second hammerstone was recovered from Unit 27S 14E at a depth of 23.5 cm (Figure 8.5, A; Cat. #19051). This hammerstone is ovoid to square in shape and exhibits peck marks on both the distal and proximal ends. There is also some natural pitting of the rock that is observable on the ventral side.

Figure 8.4: Uniface from Level 2a (Cat. #16194).

Figure 8.5: Hammerstones from Level 2a (A = Cat. #19051; B = Cat. #19862).

8.3.5 Cores and Core Fragments (n=5)

A total of five fragments of cores were found in Level 2a (Table 8.3). These cores appear to have been utilized to their fullest extent. The presence of platforms and platform preparation as well as the type of core has been obscured due to their reduction. Three of these core fragments are composed of Swan River chert, and only one has been heat treated (Cat. #17640). One is composed of fused shale, and the last one is composed of a grey chalcedony (Table 8.3).

Table 8.3: Level 2a cores and core fragments.

Catalogue Number	Material	Mass (g)	Type
19851	Chalcedony	15.2	N/A
17867	Fused Shale	34.1	N/A
17865	Swan River Chert	75.4	N/A
19048	Swan River Chert	119.2	N/A
17640	Heat Treated Swan River Chert	22.9	N/A

8.3.6 Debitage (n=491)

A total of 491 pieces of debitage was recovered from Level 2a; 373 of these were shatter and the remaining 118 were flakes (Table 8.4). The most common material type in this level was Swan River chert at 48.88%. Fifty-three percent of the Swan River chert was heat treated to some degree. Quartz is the second highest material type at 33.40% (Table 8.4). The remaining 17.72% of the debitage is composed of 11 different material types, none of which is higher than seven percent. Shatter is the most common type of debitage at 75.97% of the assemblage, followed by tertiary flakes at 20.16%. Primary and secondary flakes account for the remaining 3.87% of the assemblage. There is a reliance on local material like Swan River chert and quartz with few to no exotic materials present (Table 8.4).

8.3.7 Fire Cracked Rock (n=26)

There appears to be little FCR present, with 26 pieces represented weighing a total of 1,814.6 g (Table 8.5). Of this, granite is the most common by mass, weighing 1,174.9 g and accounting for 64.75% of the total assemblage. The remaining 35.25% by mass is comprised of four different material types, including Gronlid siltstone, quartzite, sandstone, and schist.

Table 8.4: Level 2a lithic debitage types.

Material	Primary Flake	Secondary Flake	Tertiary Flake	Shatter	Total	Percent (%)
Basalt	0	0	1	0	**1**	**0.20**
Cathead Chert	0	0	2	6	**8**	**1.63**
Chalcedony	0	1	2	4	**7**	**1.43**
Chert	2	0	5	5	**12**	**2.44**
	(H/T: n=1)					
Fused Shale	0	0	0	1	**1**	**0.20**
Gronlid Siltstone	0	0	0	2	**2**	**0.41**
Jasper	0	0	1	2	**3**	**0.61**
Knife River Flint	0	0	1	0	**1**	**0.20**
Mudstone	0	2	0	0	**2**	**0.41**
Quartz	0	2	13	149	**164**	**33.40**
Quartzite	1	0	5	26	**32**	**6.52**
				(H/T: n=1)		
Silicified Peat	0	0	10	5	**15**	**3.05**
Silicified Wood	0	0	2	1	**3**	**0.61**
Swan River Chert	2	9	57	172	**240**	**48.88**
	(H/T: n=1)	(H/T: n=3; P/H/T: n=2)	(H/T: n=42; P/H/T: n=1)	(H/T: n=73; P/H/T: n=6)		
Total	**5**	**14**	**99**	**373**	**491**	**100.00**
Percent (%)	**1.02**	**2.85**	**20.16**	**75.97**	**100.00**	

Table 8.5: Level 2a fire cracked rock.

Material	Count	Percent (%)	Mass (g)	Percent by Mass (%)
Granite	5	19.23	1174.9	64.75
Gronlid Siltstone	16	61.54	103.2	5.69
Quartzite	2	7.69	76.1	4.19
Sandstone	1	3.85	163.4	9.00
Schist	2	7.69	297	16.37
Total	**26**	**100**	**1814.6**	**100**

8.4 Cultural Level 2a Faunal Assemblage

The previous excavations completed in 2004 to 2006 yielded a total of 4,170 elements, specimens, and unidentified fragments. At least three bison were identified in the assemblage as well as two large mammals canids (SC5a), including one immature individual. There were 1,534 pieces of bone weighing a total of 2,574.2 g (Table 8.6) recovered from the 2007 to 2009 excavations. The majority of the faunal remains in Level 2a are unburned 1,473 (96.02%) and weigh a total of 2,549.2 g. Ninety-six percent of the total assemblage is unidentifiable fragments of bone weighing a total of 1,097.4 g. Out of the unidentifiable fragments 96.28% are unburned, 2.57% are burned, and the remaining 1.15% is calcined bone.

Five taxa are represented by the faunal remains that were recovered from Level 2a (Table 8.7). Sixteen of the specimens found in this level have been placed into a size category as they have no identifying characteristics that would enable placement into a specific taxon. It is possible that the specimens placed into the size categories belong to those that have already been identified.

Table 8.6: Level 2a faunal counts.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	16	746.8	30	716.9	1408	1080.2
Burned Bone	0	0	1	9.4	38	9.8
Calcined Bone	0	0	0	0	17	5.1
Unburned Tooth Enamel	4	3	0	0	15	2.3
Shell	0	0	5	0.7	0	0
Total	**20**	**749.8**	**36**	**727**	**1478**	**1097.4**

Table 8.7: Summary of Level 2a faunal remains by taxa.

Common Name	Taxon	NISP	MNI
Mammals			
Bison	*Bison bison*	29	3
Medium-Large Canid (SC5a)	*Canis sp.*	2	1
Richardson's Ground Squirrel	*Spermophilis richardsonii*	1	1
Voles	*Microtus sp.*	1	1
Invertebrates			
Snails (Shell fragments)	Gastropoda	3	3
Miscellaneous			
Very Large Mammal (SC6a)		9	-
Medium Mammal (SC4a)		4	-
Small Mammal (SC2a)		3	-

8.4.1 Order Artiodactyla
Bison bison

Specimens identified: NISP = 29; see Table 8.8 for a summary. MNE, MAU, and %MAU values were calculated by anatomical landmarks. A summary of these calculations can be found in Appendix E (Table E.3).

Description: See page 81.

Discussion: Just over half (55.77%) of the identified faunal assemblage consists of bison remains. These specimens represent at least three individuals; two adults and a juvenile. The adult specimens were identified by the presence of three astragali, two of which are rights. The juvenile specimen, a first phalanx, was identified based on the lack of an epiphysis and its size, which is very close to the ten month old individual in the comparative collection. The majority of all the elements and specimens are unburned with little to no weathering present. Some soil staining, cracking, rootlet etching, and calcium carbonate were recorded on some of the specimens in this level. Most of the unidentified fragments from this level are believed to represent bison elements based on their size. None of these specimens show any form of cultural modification.

Table 8.8: Summary of *Bison bison* elements from Level 2a.

	NISP	MNI (Side)	Total MNE	MAU	%MAU
Axial Skeleton					
Mandible	6	1	4	0.5	33.33
Hyoid	1	1	1	1	66.67
Axis	1	1	1	1	66.67
Lumbar Vertebra	1	1	1	0.1	6.67
Miscellaneous Vertebra	2	1	2	0.04	2.67
Forelimb					
Humerus	2	1	2	1	66.67
Ulna	1	1	1	0.5	33.33
Radial Carpal	1	1	1	0.5	33.33
Internal Carpal	1	1	1	0.5	33.33
Ulnar Carpal	1	1	1	0.5	33.33
Metacarpal	1	1	1	0.5	33.33
Hindlimb					
Femur	2	1	1	0.5	33.33
Patella	1	1	1	0.5	33.33
Astragulus	3	2	3	1.5	100
Other Elements					
First Phalanx	1	1	1	0.13	8.67
Second Phalanx	2	1	2	0.25	16.67
Third Phalanx	2	1	2	0.25	16.67
Proximal Sesamoid	1	1	1	0.06	4

8.4.2 Order Carnivora

Canis sp. **(SC5a)**

Specimens identified: NISP = 2; incisor (Cat. #22151); right maxilla M^1 and M^2 (Cat. #22221).

Discussion: Two specimens were identified in this level, and it is likely that they represent one individual. The maxilla was broken into two pieces, each containing one tooth, and was reconstructed for identification (Figure 8.6). This specimen is slightly smaller than that of the wolf in the comparative collection at the University of Saskatchewan. Thus it is possible that this is either a female wolf or large-sized domestic dog. Neither of the specimens show any sign of cultural modification, and the maxilla with teeth is soil stained.

Figure 8.6: *Canis sp.* maxilla with first and second molars (Cat. #22221).

8.4.3 Order Rodentia
Spermophilus richardsonii

Specimens identified: NISP = 1; right *os coxae* (Cat. #15872).

Description: Richardson's ground squirrels are found from southern Canada into the northern to central United States. These ground squirrels have a drab grey and cinnamon coat with a tail edged in white (Kays and Wilson 2009:64). The majority of their activity is during the day and they prefer to eat seeds and leaves. This species prefers a gravelly or sandy soil that does not hold much water. They are fossorial and excavate deep burrows with multiple entrances. Hibernation of this species occurs from September to March (Banfield 1974:114-117; Kays and Wilson 2009:64).

Discussion: This was the only specimen that could be definitively identified to this particular species when compared to the specimen in the University of Saskatchewan comparative collection. It is unclear if the specimen was intrusive or not, as the colour is very similar to the other faunal specimens in this level. This specimen shows no signs of cultural modification.

Microtus sp.

Specimens identified: NISP = 1; right mandible with teeth (Cat. #15097).

Discussion: This specimen represents one individual. The teeth that are present show similarities to those of the *Microtus* genus but are too fragmented to allow determination of the exact species. They were not found near any identifiable feature and are similar in colour to the rest of the specimens in this level. No cultural modifications are present on this specimen.

8.4.3 Class Gastropoda

Specimens identified: NISP = 3; shell (Cat. #15105, 19515, 19524).

Discussion: Three specimens were found in this level. All three were nearly complete and had become fragmented during storage after excavation due to their thin shells. No cultural modifications were present, and it is very likely that these specimens were deposited from the nearby creek.

8.4.4 Miscellaneous Specimens

Specimens identified: NISP = 16; see Table 8.9.

Discussion: Most of the specimens identified in this level are represented by large mammal bone fragments. It is possible that the large size mammal fragments are from a bison, but there are no identifying characteristics. Due to their fragmentary nature the most that could be determined is that they were very large mammal fragments. There is a small size sesamoid, a rib head, and two rib shafts that represent a SC4a mammal. The last category is a small rodent (SC2a) with two radii fragments and a fibula fragment. These long bone fragments belong to one of the small rodents identified previously however, they are too fragmentary to determine their taxon.

Table 8.9: Summary of Level 2a miscellaneous specimens by size category.

Size Class	NISP	Elements Represented
SC6a - Very Large Mammal	9	Sesamoid, zygomatic fragment, long bone shaft fragments, vertebral fragments
SC4a - Medium Mammal	4	Sesamoid, rib head, rib shaft fragments
SC2a - Small Mammal	3	Radius fragments, fibula fragment

8.5 Seasonality

The faunal assemblage in this level was quite small compared to Level 1a and Level 1b. No bison teeth were found, and only one juvenile element was recovered. This first phalanx was quite small in size and was lacking the epiphysis. When compared against a specimen in the University of Saskatchewan comparative collection it was close in size to an individual that was aged at ten months old. Based on this element, a February to March, or winter, seasonality is expected. An element from a Richardson's ground squirrel was also found in this assemblage. Based on the fact that the Richardson's ground squirrel remains are similar in colour to the rest of the faunal assemblage it is possible that they are the same age as the rest of the assemblage. This rodent is known to hibernate throughout the winter and if they were caught would only be in an excavated burrow (Webster 1999). Hibernation for this rodent ends around the middle of March, implying that if this rodent was caught by the occupants of this level, it was sometime during the late winter. However, with only these two elements being found in the assemblage the reconstruction of seasonal occupation for Level 2a is highly speculative and cannot be definitively assigned a winter occupation period.

8.6 Artifact Distribution and Features

No features were noted in the 2007 to 2009 excavation of Level 2a however, the 2004 to 2006 excavations did reveal the presence of a black stained area of soil in Unit 15S 11E. The bottom of the boiling pit feature (Feature 1b-1), discussed in Chapter 7, could still be identified in Level 2a. Similarly, there are no concentrations of debitage observed in this level (Figure 8.7). The few pieces of debitage identified are represented throughout the level. The majority of the tools identified in the level were recovered from the southern half of the excavation. The two hammerstones were identified in adjacent Units 27S 14E and 28S 14E. Two of the three projectile points were also recovered from adjacent units in the southern portion of the excavation (Unit 27S 13E and 28S 13E). All of the cores recovered from this excavation were also found in the southern half of the excavation, leaving only two endscrapers, one uniface, and one projectile point recovered from the northern portion of the excavation.

The faunal remains in Level 2a are well represented throughout the excavated units. There do appear to be two larger concentrations of faunal remains: one occurs in the southeast corner of the excavation, while the other is in the southwest of the excavation (Figure 8.7). The concentration of faunal remains in the southwest of the excavation tended to have larger identifiable remains, while those in the southeast corner of the excavation tended to be smaller fragments of faunal remains. The concentration in the southeast of the excavation was also found in association with a core, a projectile point, and a hammerstone.

8.7 Interpretation of Cultural Level 2a

Cultural Level 2a contains artifacts that represent a Middle Precontact period occupation. The three projectile points found in this portion of the excavation are representative of the McKean projectile points from the McKean series. Projectile points found in previous excavations also support a McKean series occupation but tend to resemble those points associated with the Duncan and Hanna forms (Cyr 2006). The radiocarbon date for this level does support the McKean series occupation with a calibrated radiocarbon age of 3700 ± 45 years B.P. (BGS 2660) (Cyr 2006:29-30). Figure 8.7 indicates the location of artifacts recovered from this level. No features were noted in the 2007 to 2009 excavated units, and only two concentrations of artifacts were found. The two concentrations were predominantly faunal remains. The concentration in the southwest corner of the excavation tended to be representative of larger, more complete, faunal remains while the concentration in the southeast corner of the excavation tended to represent more fragmentary faunal remains. Consistently, local lithic material was used with very few materials being transported to the site. Swan River chert and quartz are the two most dominant material types, comprising 82.28% of the total lithic assemblage. Shatter comprises just over 75% of the total assemblage. Twenty percent of the assemblage is comprised of tertiary flakes indicating there is some re-sharpening of tools occurring at the site with a very minimal amount of initial production of tools occurring.

Bison comprised the majority of faunal remains recovered from the site. A total of three individuals were identified at the site: two of them adults and the third a juvenile. This juvenile specimen was similar in size to the ten month old example in the comparative collection at the University of Saskatchewan. Other faunal remains present in this level included a large canid and two rodents. Based on the juvenile element and the rodents it is possible that this campsite is a winter occupation however, the seasonality for this level is highly speculative since it is based on a very limited amount of faunal remains. It is also very likely that the rodent remains recovered from this level are intrusive, leaving only the juvenile element as the sole indicator of seasonality. The high proportion of tertiary flakes indicates that they may have been unable to acquire new materials and therefore reworking the material they already had was their only option. This lends support to a winter occupation but is still tenuous decision, therefore it has been concluded that there was insufficient data to determine the exact seasonality.

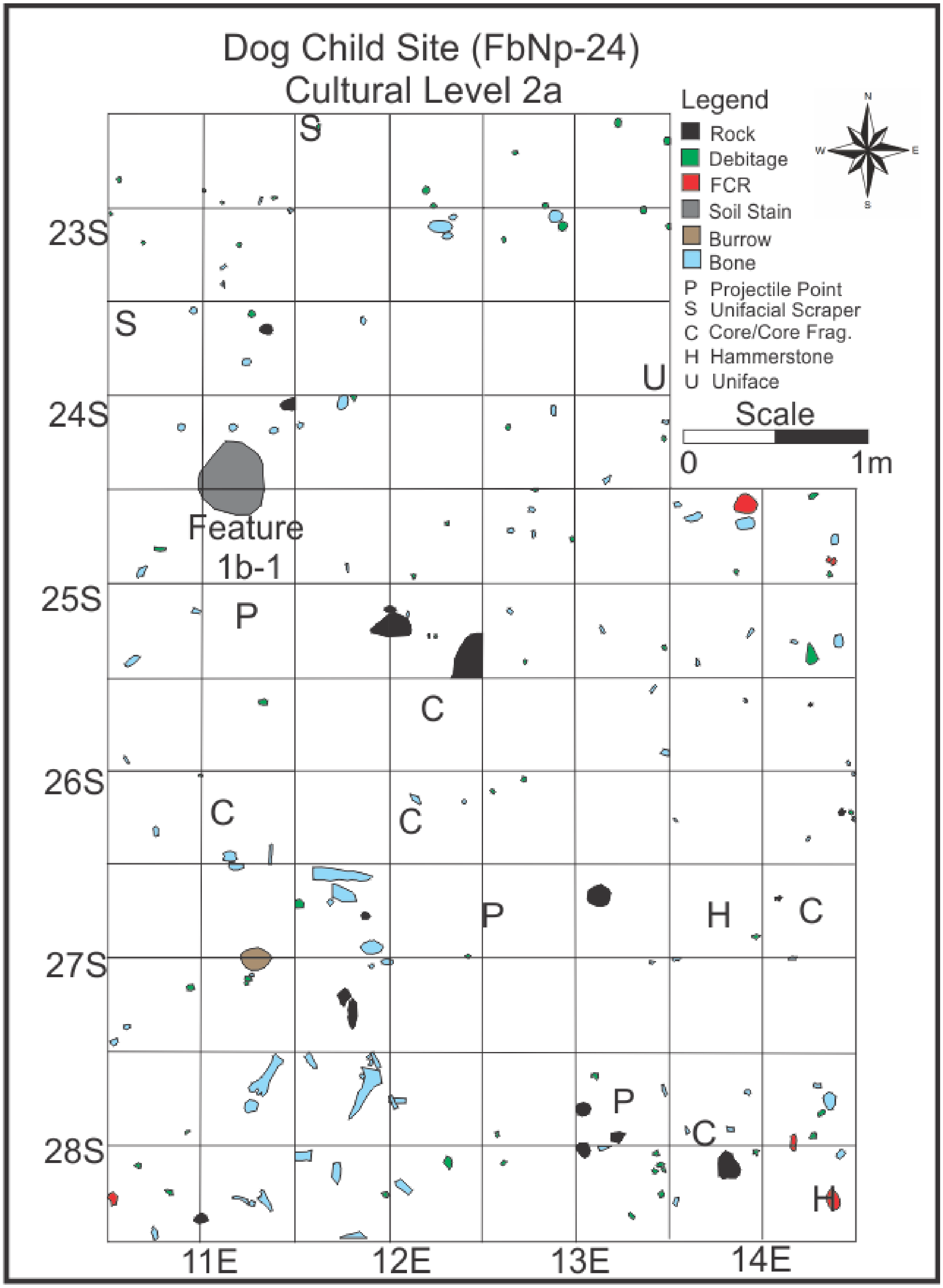

Figure 8.7: Distribution of artifacts and features in Level 2a.

Chapter 9

Cultural Level 2b

9.1 Introduction

The top of Cultural Level 2b ranged from 23 to 42 cm below the surface. This level is approximately 6 cm thick, and diagnostic artifacts found are associated with the Oxbow complex, of the Middle Middle Precontact period. Two radiocarbon dates have been obtained for this level. The first date obtained by Cyr (2006) was from a combined bone sample which yielded a date of 4270 ± 50 years cal. B.P. (BGS 2661) (Cyr 2006). The second radiocarbon date was obtained from three pieces of a left *os coxae* (Cat. #18655). The radiocarbon date was calibrated to 4480 ± 40 years B.P. (BGS 2890) (Table C.1). The difference in dates may be due to the fact that for the first radiocarbon date a composite sample of two different bones was used whereas for the second date this was not the case. However, both dates fall into the age range that is associated with the Oxbow complex. Separation between Level 2a and Level 2b was variable with a range of 1 to 7 centimetres. There were no artifacts found in this intermediate level and therefore, it is classified as a culturally sterile level however some small fragments of bone were recovered from the screened material. Thirty-one fragments of unidentified bone were found weighing a total of 12.6 g, as well as one fragment of tooth enamel weighing 0.2 g, all of which were uncovered in Unit 24S 13E.

9.2 Cultural Level 2b Lithic Assemblage

The excavations from 2004 to 2006 yielded 3,295 pieces of shatter and flakes, 18 cores and core fragments, nine flaked tools, and 98 pieces of FCR. Swan River chert is the dominant material type observed in the lithic debitage at 75.5%, with quartzite being the second most common at 6.6%. Again the most common form of debitage is shatter at 69.9% of the assemblage, followed by tertiary flakes at 19.6% (Cyr 2006:85). Of the 18 cores and core fragments five are bipolar cores, and the remaining 15 are platform cores. Three of the cores are in the final stages or reduction, two exhibit a few flake scars, and the remaining 13 exhibit numerous flake scars (Cyr 2006:87). Flaked stone tools include five unifaces, all of which are endscrapers, one bifacial knife, and seven projectile points (Cyr 2006:92). Two of the projectile points have been identified as Oxbow type points, three are preforms, and the remaining two have been classified as Early Side-Notched points (Cyr 2006:95-98).

A total of six stone tools were found during the 2007 to 2009 excavations. Five are considered to be flaked stone tools and the remaining stone tool is classified as a ground and pecked stone tool. A complete list of quantitative and qualitative measurements for the lithic tools can be found in Appendix D. In Level 2b, 42.76% of the assemblage was Swan River chert and of this just over half was heat treated (52.3%). Quartz is the second most common material type at 34.54% of the total assemblage. Tertiary flakes are the most common type of lithic remains found in Level 2b at 46.71% of the total assemblage. Shatter follows in second place at 45.72% of the total assemblage.

9.2.1 Projectile Points (n=4; Figure 9.1)

Based on the excavations of 2007 to 2009 the cultural affiliation of the four projectile points found in this level would be difficult to determine (Appendix D; Table D.1 and D.4). Three out of the four projectile points found consist of only the body with the entire base being absent. The other projectile point consists of only the base with no point body and resembles an early Side-Notched point. Three of these projectile points are made from Swan River chert, which had been heat treated in two cases the other point was found in Unit 25S 14E at a depth of 32 cm and is constructed from a feldspathic siltstone (Figure 9.1, C; Cat. #17358). This point consists of only a point body with the very tip broken off horizontally. Proximally, the point is broken at an angle and is missing the entire base. This point body is asymmetrical, and construction quality appears to be rather poor with no apparent pattern to flake removal. Additionally, dorsal and ventral flakes are removed from the lateral edges. A small amount of retouch can be identified on the lateral margins of this point as well. A second projectile point constructed from Swan River chert was found in Unit 27S 11E at a depth of 35 cm (Figure 9.1, A; Cat. #18450). This point is broken just above where the notches would be located. It appears that an attempt to remove a flake resulted instead in the removal of the entire base. In general this point has a small amount of use wear present but no retouch and is overall poorly flaked. The third point was found in Unit 28S 11E at a depth of 31 cm (Figure 9.1, B; Cat. #19253). This point is made from heat treated Swan River chert and is missing the tip which has been broken off horizontally. It appears that each of the “ears” of the Oxbow point were also broken obliquely leaving a point at the proximal end and no base. This point exhibits very nice parallel flaking with a small amount of use wear and retouch visible on the lateral margins. The last projectile point was found in Unit 25S 12E at a depth of 29.9 cm (Figure 9.1, D; Cat. #16679). This point is also constructed from heat treated Swan River chert and has been broken obliquely below the shoulder on the right side to above the shoulder on the left side, leaving behind majority of the base. No retouching or use wear is evident on this particular point however there does appear to be some basal grinding. It appears that the right basal corner and notch may also be broken. This particular point resembles the early Side-Notched projectile points recovered from the 2004 to 2006 excavations (Cyr 2006).

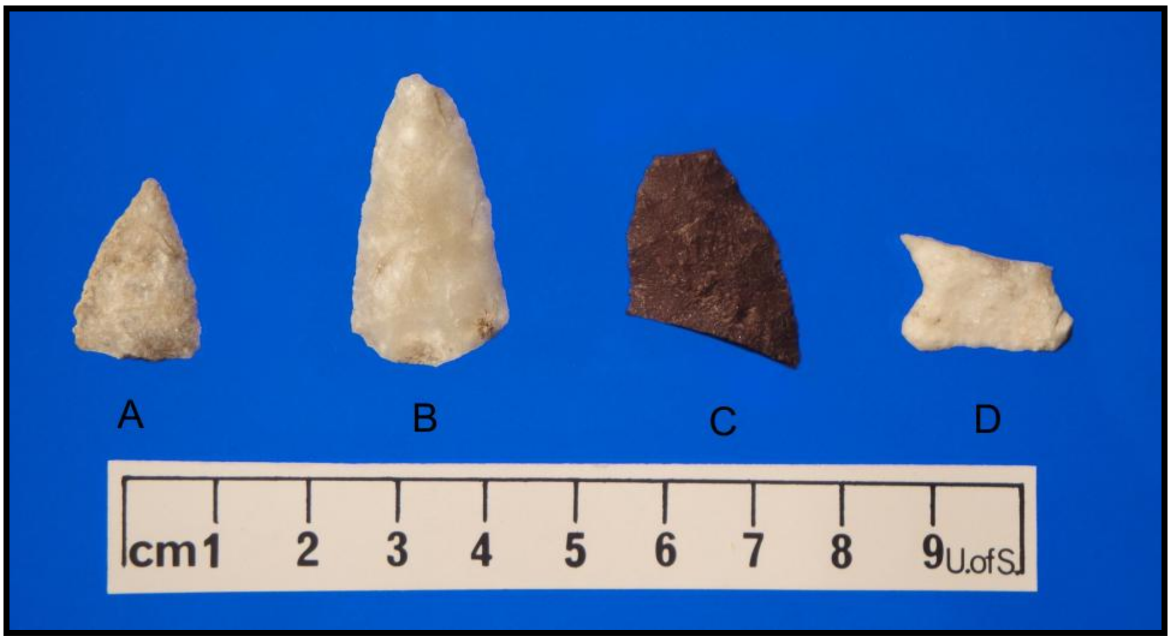

Figure 9.1: Projectile Points from Level 2b (A = Cat. #18450; B = Cat. #19253; C = Cat. #17358; D = Cat. #16679).

9.2.2 Unifacial Scrapers (n=1; Figure 9.2)

Only one endscraper was found in this level (Cat. #19968). This specimen was found in Unit 28S 14E at a depth of 42.5 cm and is constructed from a split chert pebble. Ventrally, a large flake appears to have been removed while dorsally some cortex is still present. The primary working edge is located distally and is convex in shape with an angle of approximately 70°. There is a possible secondary working edge located on the left lateral edge which is convex in shape and exhibits a 70° angle. Some chipping is evident but otherwise neither the primary nor the secondary working edge exhibit any form of use wear or retouch (Appendix D; Table D.7 and D.10).

9.2.3 Hammerstones (n=1; Figure 9.3)

A single hammerstone was found in Level 2b in Unit 28S 11E at a depth of 35 cm (Cat. #19301). This hammerstone is composed of granite and weighs 1,090.3 g. Ventrally there is a fairly thick layer of calcium carbonate that has been deposited on the surface. Only one end, classified as the distal end, shows signs of peck marks however there is some natural pitting on the surface as well. This makes it difficult to determine if additional peck marks are present.

9.2.4 Cores and Core Fragments (n=2)

Level 2b yielded two core fragments, both of which are Swan River chert. These fragments do not appear to have been used to their fullest extent as there is still usable material present on each of the cores. These cores are not grouped together nor were they near any features in Level 2b.

Table 9.1: Level 2b cores and core fragments.

Catalogue Number	Material	Mass (g)	Type
15219	Swan River Chert	146.5	N/A
17872	Swan River Chert	149.2	N/A

9.2.5 Debitage (n=286)

A total of 139 pieces of shatter were recovered from this level, and the remaining 147 pieces are a combination of primary, secondary, and tertiary flakes (Table 9.3). Swan River chert was again the dominant material type, comprising 43.71% of assemblage, and half of the Swan River chert assemblage had received some degree of heat treatment. Quartz followed closely, making up 36.71% of the assemblage. The rest of the debitage consisted of 11 different material types. Tertiary flakes dominate the assemblage at 49.65%, followed closely by shatter at 48.6%. This indicates the possibility of reworking and sharpening of flaked tools however due to the similarity in numbers this cannot be definitively determined. Primary flakes and secondary flakes are rare in this level, constituting 0.35% and 1.05%, respectively.

Figure 9.2: Endscraper from Level 2b (Cat. #19968).

Figure 9.3: Hammerstone from Level 2b (Cat. #19301).

Table 9.2: Level 2b lithic debitage types.

Material	Primary Flake	Secondary Flake	Tertiary Flake	Shatter	Total	Percent (%)
Basalt	0	0	1	1	**2**	**0.70**
Cathead Chert	0	0	0	1	**1**	**0.35**
Chalcedony	0	0	5	5	**10**	**3.50**
Chert	0	0	3	12	**15**	**5.24**
				(H/T: n=1)		
Fused Shale	0	0	0	2	**2**	**0.70**
Gronlid Siltstone	0	0	1	1	**2**	**0.70**
Jasper	0	0	0	1	**1**	**0.35**
Knife River Flint	0	0	1	0	**1**	**0.35**
Quartz	0	0	63	42	**105**	**36.71**
Quartzite	0	0	7	8	**15**	**5.24**
Silicified Peat	0	0	1	5	**6**	**2.10**
Silicified Siltstone Pebble	0	0	0	1	**1**	**0.35**
Swan River Chert	1	3	60	61	**125**	**43.71**
		(H/T: n=1)	(H/T: n=45)	(H/T: n=12; P/H/T: n=8)		
Total	**1**	**3**	**142**	**139**	**286**	**100.00**
Percent (%)	**0.35**	**1.05**	**49.65**	**48.60**	**100.00**	

9.2.6 Fire Cracked Rock (n=9)

Only nine pieces of FCR consisting of three different material types were found in this level (Table 9.4). Granite is the most abundant material by both count and mass, at 66.67% and 59.76%, respectively. The other two materials present include quartzite at 29.72% by mass, and sandstone at 10.53% by mass.

Table 9.3: Level 2b fire cracked rock.

Material	Count	Percent (%)	Mass (g)	Percent by Mass (%)
Granite	6	66.67	496.7	59.76
Quartzite	2	22.22	247	29.72
Sandstone	1	11.11	87.5	10.53
Total	**9**	**100.00**	**831.2**	**100.00**

9.3 Cultural Level 2b Faunal Assemblage

Faunal remains were quite prolific in the 2004 to 2006 excavations. A total of 10,294 elements, specimens, and unidentifiable fragments were recovered. A minimum of three bison, one large canid (SC5a), and a bird identified as a gull (*Larus* sp.) were present in this level (Cyr 2006:102). During the 2007 to 2009 excavations a total of 1,657 pieces of bone were recovered from Level 2b weighing 3,301.9 g (Table 9.4). Ninety-two percent of the faunal assemblage in this level is unburned and comprises 98.7% of the assemblage by weight. The majority of these unburned remains are unidentifiable fragments (95.8%). Burned bone makes up 5.7% of the assemblage while calcined bone comprises only 2% of the assemblage. There is also a small quantity of gastropod shells found within the assemblage (0.66%).

Even though there are few faunal remains compared to other levels at the site, there are at least ten identifiable taxa represented by the remains recovered from this level (Table 9.5). Twenty-three of the specimens recovered from this level lack any type of identifying characteristics except for their size, and were therefore only assigned to a size class. It is likely that these remains belong to a taxon that has already been identified. This level had a wide variety of specimens identified including mammals, birds, fish, and invertebrates, making it the second most diverse level at the Dog Child site.

Table 9.4: Level 2b faunal counts.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	18	304.5	42	1738.2	1437	1170.3
Burned Bone	1	0.4	0	0	94	35.2
Calcined Bone	11	0.6	0	0	22	5.3
Unburned Tooth Enamel	2	12.8	1	23.1	18	10.8
Shell	0	0	11	0.7	0	0
Total	**32**	**318.3**	**54**	**1762**	**1571**	**1221.6**

Table 9.5: Summary of Level 2b faunal remains by taxa.

Common Name	Taxon	NISP	MNI
Mammals			
Bison	*Bison bison*	30	2
Mule Deer	*Odocoileus hemionus*	1	1
Medium-Large Canid (SC5a)	*Canis sp.*	1	1
Striped Skunk	*Mephitis mephitis*	4	1
Richardson's Ground Squirrel	*Spermophilis richardsonii*	2	1
Meadow Vole	*Microtus pennsylvanicus*	1	1
Birds			
Purple Finch	*Carpodacus purpureus*	1	1
Micro-bird (SC1b)	Passeriformes	1	1
Fish			
Catfish	Siluriformes	1	1
Invertebrates			
Snails (Shell fragments)	Gastropoda	11	4
Miscellaneous			
Very Large Mammal (SC6a)		10	-
Medium Mammal (SC4a)		2	-
Small Mammal (SC2a)		11	-

9.3.1 Order Artiodactyla
Bison bison

Specimens identified: NISP = 30; see Table 9.6 for a summary. MNE, MAU, and %MAU values were calculated by anatomical landmarks. A summary of these calculations can be found in Appendix E (Table E.4).

Description: See page 81.

Discussion: Bison faunal remains only constitute 39.47% of the identified faunal assemblage from Level 2b. The bison specimens identified in this level indicate that there are at least two individuals represented based on the presence of two humeral heads, both from the right side. No juvenile bison remains were found in this level. One specimen in this level showed stage four weathering and was quite deteriorated (Cat. #15986). Three other specimens in this level showed stage three weathering with rough patches and large cracks appearing. All of the other specimens showed little to no weathering on their surfaces. Eight of the specimens showed some degree of trowel damage that had resulted from excavation. Soil staining and calcium carbonate deposits were also recorded on some of the specimens. All of these specimens were unburned and showed no cultural modifications.

Table 9.6: Summary of *Bison bison* elements from Level 2b.

	NISP	MNI (Side)	Total MNE	MAU	%MAU
Axial Skeleton					
Cranium	5	1	2	1	100
Mandible	5	1	2	1	100
Rib	2	1	2	0.07	7
Forelimb					
Scapula	2	2	1	0.5	50
Humerus	3	2	2	1	100
Radius	1	1	1	0.5	50
Radial Carpal	1	1	1	0.5	50
Metacarpal	1	1	1	0.5	50
Hindlimb					
Innominate	2	1	1	0.5	50
Tibia	1	1	1	0.5	50
Lateral Malleolous	1	1	1	0.5	50
Metatarsal	1	1	1	0.5	50
First Tarsal	1	1	1	0.5	50
Astragulus	1	1	1	0.5	50
Calcaneous	1	1	1	0.5	50
Other Elements					
Second Phalanx	2	1	2	0.25	25
Third Phalanx	1	1	1	0.13	13

Odocoileus hemionus

Specimens identified: NISP = 1; scapula (Cat. #19056).

Description: Mule deer are commonly found in northwestern habitats of Canada in small groups of animals. They prefer a mixed habitat of "coniferous forests, sub-climax brush, aspen parklands steep broken terrain, and river valleys" (Banfield 1974:390). Mule deer make seasonal migrations to higher elevations in the summer and lower elevations in the winter. The key distinguishing features of the mule deer are in the ears, face, tail, and antlers of the animal (Kays and Wilson 2009:208). When Europeans first arrived in Canada white-tailed deer were found in the most southern portions of Canada with very few having penetrated into the south-central and western portions of Canada (Banfield 1974:390-394). The mule deer, on the other hand, has always inhabited the western regions of Canada however the white-tailed deer is now slowly migrating further westward and expanding its range (Kays and Wilson 2009:208).

Discussion: Since the presence of white-tailed deer on the Northern Plains is relatively recent, it is very likely that this specimen is not that of a white-tailed deer but a mule deer. Since there is virtually no difference in the post-cranial remains this inference is based solely on the idea that the mule deer was the only species of deer inhabiting this region during the occupation of the site at this time period. Given that only one specimen was found, it is likely that only one individual is represented. Most of the blade of the scapula was missing (Figure 9.4), and the remainder displayed root etching and soil staining on its surface. There were no cultural modifications present on this faunal specimen.

9.3.2 Order Carnivora

***Canis sp.* (SC5a)**

Specimens identified: NISP = 1; third phalanx (Cat. #15885).

Discussion: Only one specimen was identified in the level and it is considered to represent one individual. The size of this specimen is comparable to that of a large-sized canid either a domestic dog or a wolf, when compared to faunal specimens from the University of

Saskatchewan comparative collection. This specimen does not show any form of cultural modification.

Figure 9.4: *Odocoileus hemionus* scapula from Level 2b (Cat. #19056).

Mephitis mephitis

Specimens identified: NISP = 4; right talus (Cat. #15344); right ulna (Cat. #15220); left mandible (Cat. #17507); right mandible (Cat. #17508).

Description: The striped skunk is common throughout most of North America. They tend to favour woodlands, fields, agricultural areas, and human neighbourhoods, but avoid more arid environments (Banfield 1974:339; Kays and Wilson 2009:188). They are often found in river valleys and coulees. Striped skunks are nocturnal animals that eat insects, rabbits, birds, eggs, carrion, fruit, and small vertebrates (Kays and Wilson 2009:188). The striped skunk begins to hibernate in early December in extensive burrows often originally excavated by other animals (Kays and Wilson 2009:188). The most distinctive features of the striped skunk is its noxious odour and unique colour pattern of black with white stripes.

Discussion: The four specimens found in this level represent at least one individual (Figure 9.5). The left and right mandibular fragments are similar in size and likely match each other. The corpus of the mandible from both the left and right portions is present along with three teeth in total. Also present is a right talus and right ulna. One specimen, the talus, shows signs of cultural modification in the form of burning. The other specimens show some root etching and soil staining.

Figure 9.5: *Mephitis mephitis* remains from Level 2b (A = Cat. #17508; B = Cat. #17507; C = Cat. #15344; D = 15220).

9.3.3 Order Rodentia

Spermophilus richardsonii

Specimens identified: NISP = 2; acetabulum (Cat. #16892); left mandible (Cat. #15889).

Description: See page 121.

Discussion: This specimen appears to be a similar colour to the rest of the faunal assemblage in this level. There is no evidence of weathering or cultural modification. Remnants of a burrow were identified in this level, and it is likely that these remains are associated with the specimens. It is believed that these specimens are therefore intrusive.

Microtus pennsylvanicus

Specimens identified: NISP = 1; left mandible (Cat. #19057).

Description: The meadow vole is common across Canada and the United States. The meadow vole prefers moist grasslands and meadows but will occupy any region that has a protective cover of grasses, sedges, and mosses (Banfield 1974:210; Kays and Wilson 2009:140). They usually live in colonies but tend to be hostile towards each other. They are most active during the hours before dawn and sunset. The meadow vole is active all year round with no indication of a hibernation period (Banfield 1974:209). They do not live in burrows but may use them for shelter.

Discussion: The specimen in this level represents one individual. A few of the teeth present within the mandible enabled accurate identification. No cultural modifications are evident on this specimen, and the colour is consistent with the rest of the faunal assemblage.

9.3.4 Order Passeriformes

Carpodacus purpureus

Specimens identified: NISP = 1; beak (Cat. #15267).

Description: The purple finch is common throughout Canada and along the Pacific Coast. They are typically found in coniferous and mixed forests nesting in the branches or forks of trees. This bird feeds on seeds and berries and will visit bird feeders. The purple finch is in direct competition with the house finch, and when together the house finch will out-compete the purple finch (Kaufman 2000:366). The purple finch lives in northern parts of Canada during the summer and will migrate to the southern United States for the winter, with birds along the coast living there year-round (Kaufman 2000:366).

Discussion: The beak represents a single specimen. The beak had no cultural modification and there was some root etching present on the surface. Weathering was absent.

Aves indeterminate (SC1b)

Specimens identified: NISP = 1; right femur (Cat. #14506).

Discussion: This specimen was similar in size to the purple finch in the comparative collection. However, due to the fact that it is similar in size to more than one specimen in the comparative collection it could not be identified past the level of Order. This specimen was found in a unit close to where the beak of the purple finch had been found, and it is possible that it is from the purple finch. No cultural modification was present on the specimen.

9.3.5 Order Siluriformes

Siluriformes indeterminate

Specimens identified: NISP = 1; fin support (Cat. #16433).

Discussion: Only one fin support was recovered during the excavation (Figure 9.6), likely because this is a larger and denser bone when compared to the rest of the fish skeleton. Unfortunately, because this is not a distinguishing bone in the body of the fish, it could not be identified beyond the level of Order. This specimen did not display any cut marks, burning, or weathering but did have a small quantity of calcium carbonate deposits on its surface.

9.3.6 Class Gastropoda

Specimens identified: NISP = 11; (Cat. #15361, 19172, 19352, 19960).

Discussion: These four shells were nearly complete and had become fragmented during storage after excavation due to their thin shells. Due to the size and fragmentary nature of the specimens the exact species could not be determined. There are no cultural modifications present, and it is very likely that these specimens were deposited as a result of an overbank flood or were living in the muddy banks of Opimihaw Creek.

Figure 9.6: Siluriformes fin support from Level 2b (Cat. #16433).

9.3.7 Miscellaneous Specimens

Specimens identified: NISP = 23; see Table 9.7.

Discussion: Very large mammals (SC6a) represent approximately half of the miscellaneous specimens identified, with the other half represented by small mammals (SC2a). Only two of the total 23 specimens are from a medium-sized animal (SC4a). The tarsal, carpals, and metapodials in the small mammal category were the only remains found that were calcined, while the remaining specimens are unburned. The very large mammal bones exhibited some root etching and little to no weathering on their surface. Four of the ten specimens also displayed evidence of trowel damage resulting from the excavation. Aside from the calcined bones no other cultural modifications were observed on the specimens.

Table 9.7: Summary of Level 2b miscellaneous specimens by size category.

Size Class	NISP	Elements Represented
SC6a - Very Large Mammal	10	Humerus shaft, innominate fragments, tibia shaft, rib shaft fragments
SC4a - Medium Mammal	2	Rib shaft fragments
SC2a - Small Mammal	11	Radius, ulna, lumbar vertebra, carpals tarsals, metapodials, maxialla

9.4 Seasonality

The Level 2b assemblage did not contain any bison teeth that could be used for metric analysis. No fetal or juvenile specimens were identified in the faunal assemblage, increasing the difficulty of determining the seasonality of this particular occupation. Several animals are present in the assemblage that would only be present in the warmer months. Fish are much easier to catch in open water, and it is possible that they were not present during the winter. *Mephitis mephitis* and *Spermophilus richardsonii* hibernate during the winter and would likely have been caught in excavated burrows. The presence of the *Cardopodacus purpureus* beak also indicates a warmer occupation since they tend to migrate to warmer areas during the winter. Previous excavations completed by Cyr (2006:102) also yielded avian bone and a projected seasonality of mid-spring through summer, therefore, based on this information it is likely that this was a spring through summer occupation.

9.5 Artifact Distribution and Features

No features were observed in Level 2b, and three small concentrations of faunal and lithic debitage were observed. The first concentration of artifacts was noted in Units 23S 11E and 23S 12E (Figure 9.7). This concentration included both lithic and faunal remains and one core fragment. The second small concentration of artifacts occurred in Unit 25S 14E (Figure 9.7). This concentration was predominantly faunal remains with one projectile point also found. The third small concentration of artifacts occurred in Units 27S 11E and 27S 12E (Figure 9.7). This concentration was also predominantly faunal material with a projectile point found in the middle of the concentration. Stone tools found in the level are quite dispersed throughout the entire site. Three of the stone tools were found in the southwest corner of the excavation near one of the concentrations of faunal remains (Figure 9.7). The identifiable faunal remains are also quite dispersed throughout the entire site.

9.6 Interpretation of Cultural Level 2b

Cultural Level 2b contains artifacts that represent a Middle Precontact period habitation occupation based on the artifacts recovered. Three of the four projectile points recovered from this level are likely representative of Oxbow projectile points, while the fourth is believed to be an early Side-Notched point. Unfortunately, three of the four are missing the basal portion of the projectile point which is one of the major identifying characteristics of the Oxbow point. The fourth point is believed to be the basal portion of an early Side-Notched point. Projectile points found in previous excavations also support an Oxbow occupation (Cyr 2006:94). Two radiocarbon dates have been obtained for this level, and both support an Oxbow occupation. An initial calibrated radiocarbon date obtained by Cyr (2006) was 4270 ± 50 years B.P. (BGS 2661). The second calibrated radiocarbon date obtained was 4480 ± 40 years B.P. (BGS 2890). It is possible that the difference between dates was due to the fact that the first radiocarbon date was composed of a composite sample of bone, while the second was from one artifact.

Figure 9.7 indicates the location of the recovered artifacts from Level 2b. No features were noted in any of the excavated units, and only three small concentrations of artifacts found throughout. Two of the three concentrations were predominantly faunal remains, while the third consisted of both faunal and lithic remains. The stone tools were recovered throughout the entire site. Local lithic material was predominantly used with Swan River chert and quartz being the most prevalent at 77.3% of the total assemblage. Tertiary flakes were the dominant type of debitage in Level 2b, followed closely by shatter, indicating that tools were being re-sharpened.

The faunal assemblage present in the level is quite diverse with ten different taxa having been identified. Unlike the other levels, the Level 2b assemblage is not dominated by any one mammal. A large amount of unidentified, unburned bone was recovered from this level. Very few burned and calcined remains were recovered from this level, and no noticeable concentrations were observed. The range of faunal remains was quite wide including bison, skunk, deer, birds, and fish. Based on the faunal remains at the site it is likely that this habitation site is a spring through summer occupation.

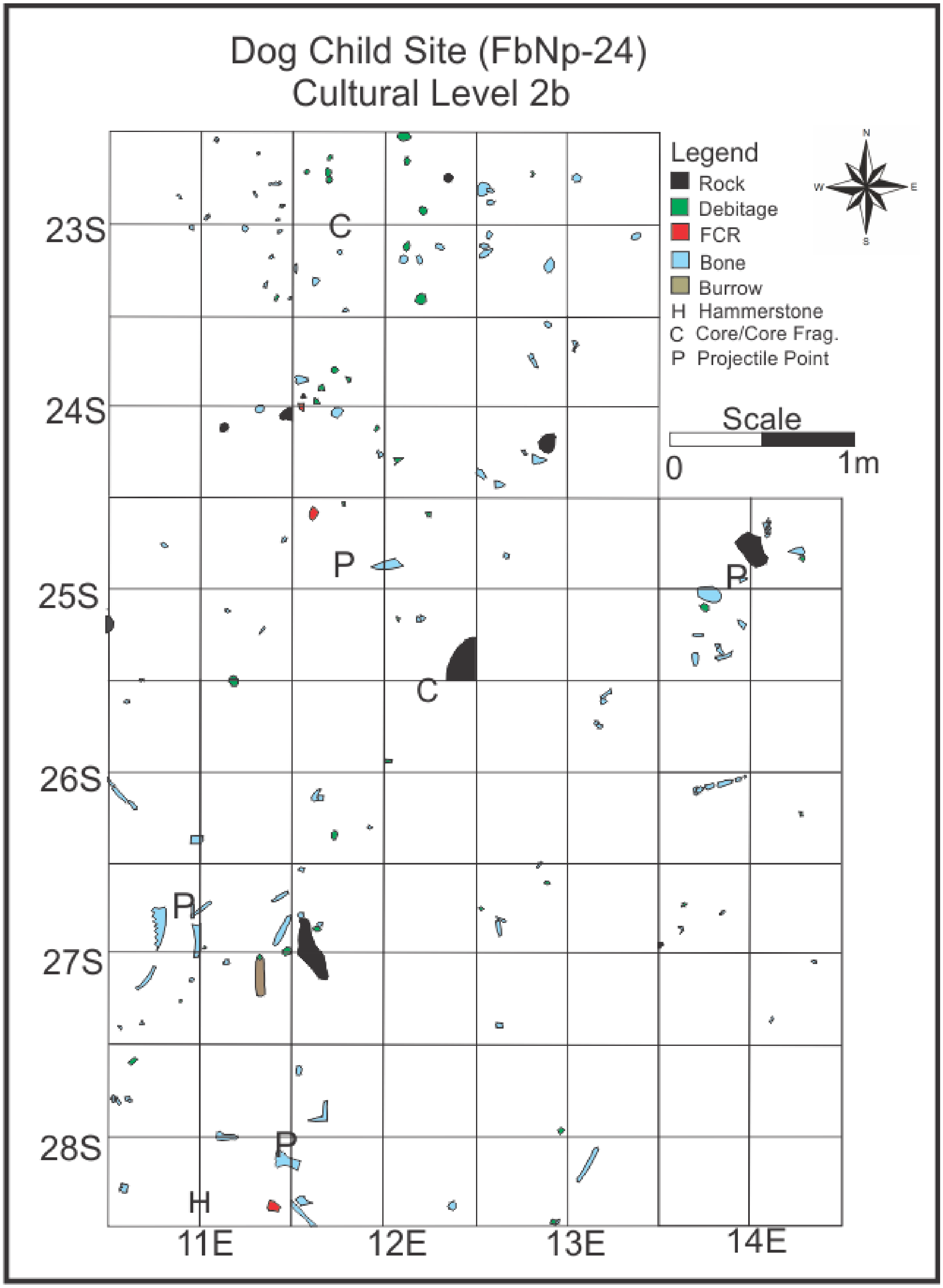

Figure 9.7: Distribution of artifacts and features in Level 2b.

Chapter 10

Cultural Level 3a

10.1 Introduction

Cultural Level 3a had the least amount of cultural material of all of the levels. This level is approximately 6 cm thick and typically begins at around 40 to 42 cm depth below the surface. The southern portion of the site begins at a lower depth, often starting at about 50 cm, and one of the units, 28S 14E, does not have a Level 3a associated with it. Additionally, a gravel lens which occurs just above the cultural materials is found in Level 3a. Two radiocarbon dates have been obtained for this level. The first radiocarbon date is calibrated to 5310 ± 50 years B.P (BGS 2662) from a sample of bone (Cyr 2006). A left proximal radius (Cat. #18187) was uncovered in Unit 26S 13E at a depth of 45.5 cm during the 2007 to 2009 excavations and was submitted for radiocarbon dating. The calibrated radiocarbon date obtained from this sample was 4830 ± 40 years B.P. (BGS 2891) (Table C.2). During the 2007 to 2009 excavations no diagnostic artifacts were uncovered therefore based on Cyr (2006:112), this level is believed to have a cultural affiliation with a Mummy Cave or transitional Oxbow/Mummy cave occupation. Separation between Level 2b and Level 3a is variable, with a rather large range from 1 to 10 cm.

10.2 Layer between Level 2b and Level 3a

There was a total of seven units in which cultural materials were recovered; Units 25S 11E, 25S 13E, 26S 12E, 27S 11E, 27S 12E, 23S 13E, and 24S 11E. There appears to be no association between the units from which the artifacts were recovered. Unit 23S 13E contained one retouched flake (Cat. # 15472) constructed out of silicified peat (Figure 10.1). The primary working edge is straight and occurs on the left lateral edge. There is a small amount of unifacial retouch along this margin. The remainder of the lithic materials found in this level are small amounts of debitage (Table 10.1). Fourteen pieces of shatter (70% of the assemblage) and six tertiary flakes (30% of the assemblage) were identified in this level. Swan River chert accounted for 55% of the assemblage with only 36% of it being heat treated. The remaining 45% of the debitage is composed of six different material types.

Figure 10.1: Retouched flake from between Level 2b and Level 3a (Cat. #15472).

Table 10.1: Lithic debitage types from between Level 2b and Level 3a.

Material	Primary Flake	Secondary Flake	Tertiary Flake	Shatter	Total	Percent (%)
Chalcedony	0	0	1	1	**2**	**10.00**
Chert	0	0	1	0	**1**	**5.00**
Fused Shale	0	0	0	1	**1**	**5.00**
Jasper	0	0	0	1	**1**	**5.00**
Quartz	0	0	0	2	**2**	**10.00**
Silicified Peat	0	0	0	2	**2**	**10.00**
Swan River Chert	0	0	4	7	**11**	**55.00**
			(H/T: n=1)	(H/T: n=1;		
				P/H/T: n=2)		
Total	**0**	**0**	**6**	**14**	**20**	**100.00**
Percent (%)	**0.00**	**0.00**	**30.00**	**70.00**	**100.00**	

A total of 284 faunal elements and unidentifiable fragments were recovered from this level totalling 206.4 g (Table 10.2). Four pieces of bone are identifiable in this level, two of which are unburned bone and the other two are teeth. The remaining 279 pieces are unidentifiable. Three of the four elements represent an adult *B. bison*: a left accessory carpal (Cat. #16994), a left incisor (Cat. #16993), and a right fused second and third tarsal (Cat. #16442). The other element, a right deciduous incisor (Cat. # 6989), represents a juvenile *B. bison*. This indicates that at least two individuals are represented in this layer however it is very likely that the faunal remains are from Level 3a as these two levels were found in close association with each other.

Table 10.2: Faunal counts from between Level 2b and Level 3a.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	3	37.2	0	0	251	159.7
Burned Bone	0	0	0	0	2	1.1
Calcined Bone	0	0	0	0	2	0.6
Tooth/Enamel	2	1.9	0	0	24	5.9
Total	**5**	**39.1**	**0**	**0**	**279**	**167.3**

10.3 Cultural Level 3a Lithic Assemblage

During the 2004 to 2006 excavations cultural separation between Level 3a and Level 3b was very rare. When separated out only 59 pieces of shatter and flakes, two cores, two projectile points, two pieces of FCR, and a large hammerstone were identified in the Level 3a assemblage. Swan River chert was the dominant material type observed in the debitage (67.8%), with quartz the second most popular at 10.2%. Shatter was the most common form of debitage at 76.3%, followed by secondary flakes at 22% of the assemblage (Cyr 2006:115). Both of the cores are platform cores, with one being in the mid-stages of reduction and the second in the early stage of reduction (Cyr 2006:117). The two points recovered from these excavations are consistent with the Gowen point style of the Mummy Cave series (Cyr 2006:122).

Very few stone tools were found within Level 3a; in 2007 to 2009 excavations in fact, only a hammerstone was recovered. The complete list of qualitative and quantitative measurements for stone tools can be found in Appendix D. Fifty-six percent of the lithic assemblage is composed of Swan River chert, with 61.86% being heat treated. Ninety-seven percent of the lithic assemblage is composed of debitage including tertiary flakes (41.63%) and shatter (55.5%).

10.3.1 Hammerstone (n=1; Figure 10.2)

A small ovoid cobble was uncovered from Unit 23S 13E at a depth of 49 cm below the surface (Cat. #15475). This cobble was constructed from quartzite and weighs 104.5 g. This hammerstone was perfectly smooth on the exterior. One of the surfaces had a thick deposit of calcium carbonate that could not be removed. This obscures any features that may be present on that portion of the hammerstone. There are peck marks located on one of the ends of the hammerstone, but no other peck marks or distinguishing marks were identified.

Figure 10.2: Hammerstone recovered from Level 3a. (Cat. #15475)

10.3.2 Cores and Core Fragments (n=2)

In this level one core (Cat. #16458) and one core fragment (Cat. #19055) were recovered. The core was clear quartz and weighed 245.3 g. Due to the material type it was not possible to determine the type of core as the flake scars were not visible. The core fragment is classed as bifacial and was composed of heat treated Swan River chert weighing 22.2 g.

Table 10.3: Level 3a cores and core fragments.

Catalogue Number	Material	Mass (g)	Type
16458	Quartz	245.3	N/A
19055	Heat Treated Swan River Chert	22.2	Unprepared, Bifacial

10.3.3 Debitage (n=206)

There was a total of 116 pieces of shatter and 90 flakes found within this level (Table 10.4). Swan River chert is the most common material type at 56.8% of the assemblage, with 61.5% of it being heat treated. Chert and quartzite follow at 9.71% and 8.74%, respectively. In total 12 different material types compose the entire assemblage of debitage. Shatter is the dominant form of debitage at 56.31%, and tertiary flakes follow at 42.23%. Both primary and secondary flakes are uncommon in this level accounting for less than one percent of the assemblage, respectively.

Table 10.4: Level 3a lithic debitage types.

Material	Primary Flake	Secondary Flake	Tertiary Flake	Shatter	Total	Percent (%)
Basalt	0	0	1	2	**3**	**1.46**
Cathead Chert	0	0	1	1	**2**	**0.97**
Chalcedony	0	1	11	4	**16**	**7.77**
Chert	0	0	10	10	**20**	**9.71**
			(H/T: n=2)			
Fused Shale	0	0	1	2	**3**	**1.46**
Quartz	0	0	1	15	**16**	**7.77**
Quartzite	2	0	6	10	**18**	**8.74**
Sandstone	0	0	0	0	**0**	**0.00**
Silicified Peat	0	0	6	3	**9**	**4.37**
Silicified Wood	0	0	1	0	**1**	**0.49**
Siltstone	0	0	1	0	**1**	**0.49**
Swan River Chert	0	0	48	69	**117**	**56.80**
			(H/T: n=36)	(H/T: n=33; P/H/T: n=3)		
Total	**2**	**1**	**87**	**116**	**206**	**100.00**
Percent (%)	**0.97**	**0.49**	**42.23**	**56.31**	**100.00**	

10.4 Cultural Level 3a Faunal Assemblage

Faunal remains associated with Level 3a from the 2004 to 2006 excavations were quite sparse, with only 424 elements, specimens, and unidentifiable fragments recovered. The faunal specimens indicate the presence of at least one bison. The artifact assemblage from 2007 to 2009 of Level 3a is dominated by faunal remains. A total of 2,846 faunal specimens was found in Level 3a weighing a total of 4,712.3 g (Table 10.5). Ninety-seven percent of the assemblage is unidentifiable fragments of bone weighing 1,674.9 g. The majority of the unidentified fragments of bone are unburned (94.69%). In Level 3a, 2.74% of the assemblage was identifiable elements and specimens. Ninety-five percent of the assemblage is unburned, 3.76% is burned, and 1.19% is calcined. Six taxa are represented by the faunal remains recovered from Level 3a (Table 10.6). Fifteen of the faunal specimens recovered from Level 3a did not display any identifiable features or characteristics needed in order to determine their taxonomic affinity therefore; these specimens were divided based on the inferred approximate size and weight of the animal they came from. These fifteen specimens were placed into three size categories: small-, medium- and large- to very large-sized mammals.

Table 10.5: Level 3a faunal counts.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	18	504.3	48	2254	2568	1585.9
Burned Bone	0	0	0	0	106	49.5
Calcined Bone	0	0	0	0	34	5.8
Unburned Tooth Enamel	3	254.2	7	24.8	59	33.5
Burned Tooth Enamel	0	0	0	0	1	0.2
Shell	0	0	2	0.1	0	0
Total	**21**	**758.5**	**57**	**2278.9**	**2768**	**1674.9**

Table 10.6: Summary of Level 3a faunal remains by taxa.

Common Name	Taxon	NISP	MNI
Mammals			
Bison	*Bison bison*	57	4
Medium-Large Canid (SC5a)	*Canis sp.*	1	1
Wolf	*Canis lupis*	1	1
Mink	*Mustela vison*	1	1
Richardson's Ground Squirrel	*Spermophilis richardsonii*	1	1
Invertebrates			
Snails (Shell fragments)	Gastropoda	8	-
Miscellaneous			
Very Large Mammal (SC5a-SC6a)		10	-
Medium Mammal (SC4a)		3	-
Small Mammal (SC2a)		2	-

10.4.1 Order Artiodactyla

Bison bison

Specimens identified: NISP = 58; see Table 10.7 for a summary. MNE, MAU, and %MAU values were calculated by landmark. A summary of these calculations can be found in Appendix E (Table E.5 and E.6).

Description: See page 81.

Discussion: Sixty-eight percent of the faunal assemblage recovered from Level 3a has been classified as bison. At least four individuals were identified in the assemblage: two adult and two juvenile bison. The adult specimens could be identified based on several elements recovered including a maxillary second premolar, maxillary first molar, proximal ulna, distal radius, proximal metacarpal, and distal tibia (Table E.5). One juvenile was based on a metacarpal that was compared to a specimen in the comparative collection with an estimated age of one year. Also present in this level is an unworn third molar, an epiphysis from a radius, and a first phalanx, all of which could not be given an age. Therefore, it is believed that there at least two juvenile bison. Five specimens in this level showed stage three weathering with roughened patches of bone and rounded cracks. All other specimens had little to no weathering visible. Only one specimen had damage resulting from excavation and was broken in half. All of the specimens were unburned and showed no cultural modifications.

Table 10.7: Summary of *Bison bison* elements from Level 3a.

	NISP	MNI (Side)	Total MNE	MAU	%MAU
Axial Skeleton					
Cranium	13	2	2	1.5	75
Mandible	5	1	2	0.38	19
Thoracic Vertebra	2	1	2	0.14	7
Rib	3	1	2	0.07	3.5
Forelimb					
Humerus	1	1	1	0.5	25
Ulna	4	2	2	1	50
Radius	4	2	2	1	50
Metacarpal	3	3	1	0.5	25
Accessory Carpal	1	1	1	0.5	25
Fused 2nd/3rd Carpal	1	1	1	0.5	25
Radial Carpal	2	2	2	1	50
Ulnar Carpal	1	1	1	0.5	25
Unciform Carpal	1	1	1	0.5	25
Hindlimb					
Innominate	1	1	1	0.5	25
Femur	2	1	2	1	50
Tibia	5	2	4	2	100
Fused Central/4th Tarsal	1	1	1	0.5	25
Lateral Malleolus	1	1	1	0.5	25
Calcaneous	1	1	1	0.5	25
Other Elements					
First Phalanx	5	2	2	0.5	25
Second Phalanx	3	1	3	0.38	19
Third Phalanx	2	1	2	0.25	12.5
Metapodial	1	1	1	0.25	12.5

10.4.2 Order Carnivora

***Canis sp.* (SC5a)**

Specimens identified: NISP = 1; right glenoid fossa (Cat. #16910).

Discussion: This specimen represents one individual. A small portion of the scapula, including the glenoid fossa, was recovered during excavation (Figure 10.3). This specimen is smaller than that of the wolf in the comparative collection at the University of Saskatchewan. It is possible that this is a small wolf or large dog. There are no signs of cultural modifications on this specimen.

Figure 10.3: *Canis sp*. scapula with glenoid fossa (Cat. #16910).

Canis lupus

Specimens identified: NISP = 1; right mandibular condyle (Cat. #19426).

Description: The wolf commonly lives and hunts in packs which consist of five to ten family members (Kays and Wilson 2009:170). The wolf is the largest wild canid and is similar in appearance to a German shepherd or a husky. Their coat colour is extremely variable from snow white to coal black and almost every colour in-between (Banfield 1974; Kays and Wilson 2009). The wolf has a holarctic distribution and is quite common in Canada, especially northern parts (Banfield 1974:294). Wolves do not have any special habitats and are found on the tundra, the plains, and in forests.

Discussion: A single specimen was found representing one individual. The wolf specimen was identical in size to that in the comparative collection. The bone was quite thick and heavy, which is a trait that has been attributed to the wolf skull (Banfield 1974). This specimen did exhibit some trowel damage from excavation and some soil staining. There was a very minimal amount of weathering present on the surface of the specimen. No cultural modification was visible on this specimen.

Mustela vison

Specimens identified: NISP = 1; left mandible (Cat. #15399).

Description: The American mink is a semi-aquatic weasel. This weasel is common but rarely seen living near stream banks, lakeshores, forest edges, large swamps, and tidal flats (Banfield 1974:330). They inhabit dens which may be located in the banks of streams, under tree roots, in hollow logs, or abandoned muskrat houses. The mink is a predator on small mammals and even rabbits. The American mink is prized for its coat, which is soft and lustrous and ranges in colour from rich brown to almost black (Banfield 1974:330). Their fur is so desired that they are often bred in fur farms (Banfield 1974). This species occurs throughout most of northern North America.

Discussion: This specimen represents one individual. The size and shape of this specimen is identical to the American mink specimen in the comparative collection. There is no evidence of weathering or cultural modification on this specimen.

10.4.3 Order Rodentia

Spermophilus richardsonii

Specimens identified: NISP = 1; left mandible (Cat. #19264).

Description: See page 121.

Discussion: Based on the teeth present in the mandible this specimen was identified as a Richardson's ground squirrel. The specimen is similar in colour to the rest of the faunal remains recovered from Level 3a. There is no evidence of weathering or cultural modification on this specimen. It is possible that this may be an intrusive specimen however there was no evidence of the remnants of a burrow in this level.

10.4.4 Class Gastropoda

Specimens identified: NISP = 8; shell fragments (Cat. #15662).

Discussion: The exact species of these fragments was not determined due to their fragmentary nature. There are no cultural modifications present, and it is likely that they are present in this level due to their proximity to the Opimihaw Creek.

10.4.5 Miscellaneous Specimens

Specimens identified: NISP = 15; see Table 10.8.

Discussion: Sixty-seven percent of the miscellaneous specimens have been classified as large to very large mammals. It is likely that these remains are bison, but there are no features that are distinctive enough to place them into the bison category. There is little to no weathering present on any of these specimens, and no cultural modifications are visible. Three of the 15 specimens are from the medium-sized mammal category (SC4a), while only two of the 15 specimens are in the small mammal category (SC2a) and are likely rodents. These specimens also display little to no weathering, and cultural modifications are absent.

Table 10.8: Summary of Level 3a miscellaneous specimens by size categories.

Size Class	NISP	Elements Represented
SC5a - SC6a Large - Very Large Mammal	10	Metacarpal, ribs, vertebral fragments, tibial tuberosity, 2nd phalanx
SC4a - Medium Mammal	3	Metatarsal, rib, scapula
SC2a - Small Mammal	2	Metapodial, phalanges

10.5 Seasonality

The Level 3a bison assemblage was fairly substantial. Few teeth were found complete, and none were found within a mandibular socket. In the absence of measurements the seasonality was determined based on the presence of immature specimens. Only two immature specimens were identified in this level. The first immature specimen is a metacarpal. Since the specimen was only a portion of the complete element, the age determination was completed based on the overall size and appearance of the specimen when compared to specimens of a known age in the comparative collection. This specimen was similar in size to the one year old specimen in the comparative collection. The second specimen was an immature third molar but was not found in a mandibular socket and this, therefore, made it impossible to determine if the tooth had erupted from the mandible. The metacarpal indicates the possibility of this level being a spring occupation. Unfortunately, basing this conclusion on the presence of a single immature element is rather tenuous. As a result, the seasonality of Level 3a cannot be determined.

10.6 Artifact Distribution and Features

Only one feature was observed in the 2004 to 2006 excavation and this was a small cluster of charcoal in Unit 18S 12E. No features were observed in the 2007 to 2009 excavations of Level 3a however approximately two concentrations of artifacts were observed in this level (Figure 10.4). The first concentration appears to run diagonally across the northern portion of the excavation (Figure 10.4). This concentration is present in Units 23S 12E, 23S 13E, 24S 12E, 25S 11E, 25S 12E, and 26S 11E. It consists primarily of faunal remains with a few lithic remains scattered throughout. Also included in this concentration is a retouched flake, a core, and a hammerstone. The second concentration is located in the northwest quadrant of Unit 27S 13E (Figure 10.4) and consists of a small concentration of faunal remains.

10.7 Interpretation of Cultural Level 3a

Cultural Level 3a is an Early Middle to Middle Middle Precontact period. Unfortunately, the 2007 to 2009 excavations did not yield any diagnostic projectile points therefore the cultural occupation of this level is based on Cyr (2006:112), who classed this level as a Mummy Cave or transitional Oxbow/Mummy Cave occupation. Two radiocarbon dates were obtained for this level. The first date obtained by Cyr (2006) was based on a bison rib excavated from a depth of 46 cm and produced a calibrated radiocarbon date of 5310 ± 50 years (BGS 2662). The second date obtained was from a proximal radius excavated from a depth of 45.5 cm and produced a date of 4830 ± 40 years B.P. (BGS 2891). There is a 500 year discrepancy between the two dates. It is possible that due to the lack of separation between Level 3a and Level 3b in early excavations the first radiocarbon date obtained may be from Level 3b. Both dates for this level still support a transitional Oxbow/Mummy Cave occupation.

Figure 10.4 illustrates the location of artifacts recovered from Level 3a. No features were found in this level. Two concentrations of artifacts were found in this level, one of which is spread diagonally over the northern portion of the site and includes the majority of stone tools found within this level. The second concentration is limited to one quadrant and is predominantly faunal remains. Very few lithic artifacts were recovered from this level. The most dominant material type found in this level is Swan River chert at 56.8%. Other materials common in this level can be found locally and include chert and quartzites. The dominant lithics in this level are flakes (41.63%) and shatter (55.5%) with only two stone tools being found. The artifact assemblage is dominated by faunal remains. Six taxa are represented by the faunal remains found. Bison is the dominant species found in the level with at least three adult individuals and one juvenile individual represented. The juvenile individual is a yearling based on comparison to specimens of the same age in the faunal collection. This insufficient collection of juvenile remains makes determining the seasonality of this level extremely difficult. It is possible that this could be an early spring occupation but because only one juvenile specimen that could be aged was recovered, the seasonality cannot be established with certainty. This level contained a sparse assemblage of artifacts with faunal remains dominating the assemblage. Since there were no features observed in this level, it is likely that this occupation represents a very temporary campsite, this is also supported by the deficiency of stone tools recovered.

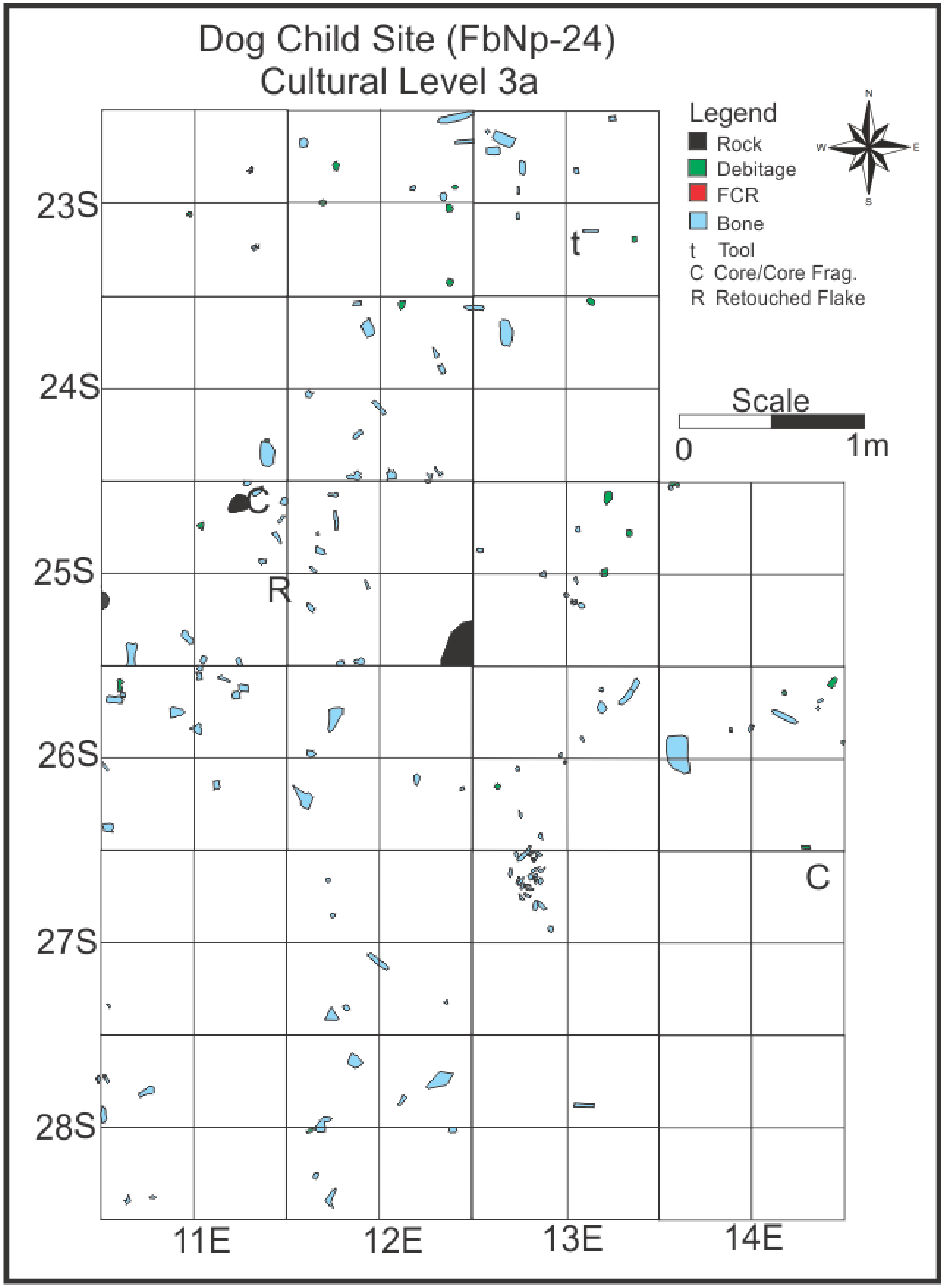

Figure 10.4: Distribution of artifacts and features in Level 3a.

Chapter 11

Cultural Level 3b

11.1 Introduction

Cultural Level 3b is the richest cultural level at the Dog Child site. This level begins anywhere from 42 to 77 cm below the surface with units at the southern part of the site having the deepest depths, which indicates of a pronounced slope towards the southeast. On average this level is about 10 cm thick. Gowen points from the Mummy Cave series are associated with this level. Two radiocarbon dates have been obtained from this level. The first date was obtained by Cyr (2006) from a composite sample of bone consisting of a left bison mandible and a left bison ulna at depths of 49.5 cm and 50 cm, respectively. After analysis, a calibrated radiocarbon date of 5530 ± 50 years B.P. (BGS 2662) was obtained. The second radiocarbon date was obtained from a left distal metacarpal (Cat. #16043) in Unit 24S 12E at a depth of 57 cm below the surface (Table C.3). The calibrated radiocarbon date obtained from this sample was 5890 ± 45 years B.P. (BGS 2892). The difference between the two dates is likely because of the composite sample utilized in the first sample. However, it is possible that the erroneous date may be due to the conflation and mixing of Level 3a and Level 3b that was seen across much of the northern portion of the excavation. Separation between Level 3a and Level 3b tends to be fairly small, averaging only 2 to 3 cm in thickness. Also of interest is the possibility of a seventh buried level, referred to as Level 3c, which will be discussed later.

11.2 Layer between Level 3a and Level 3b

Before discussing the artifacts found in Level 3b it is important to mention what was found in the level between 3a and 3b. Cultural remains were found in seven of the excavated units, which form a little cluster in the southwest portion of the excavation block. Of these units that contained material remains two of the units (27S 13E and 26S 13E) had a transitional level that was 1 cm thick. Therefore, the remains found in these units may belong to the cultural level (Level 3a) above or below it (Level 3b). In the other five units the transitional level was approximately 10 cm thick.

A small retouched grey quartzite flake was found with unifacial retouch present on the primary working edge (Cat. #18955). Two unique artifacts were found in this level. One is a piece of fossilized coral (Cat. #18472), and the other is a piece of limestone chert with a fossil impression on its surface (Cat. #18596). However, these do not appear to have any cultural significance and were more than likely brought to the area by natural processes. Two faunal artifacts were also found in the level: one is a specimen of an adult *B. bison* represented by six pieces of a left metacarpal (Cat. #17880); the other is a complete distal sesamoid (Cat. #18953) also belonging to an adult *B. bison*.

All of the other cultural remains found in this level consisted of fragmentary bone and stone debitage. A total of 432 fragments of bone and enamel was found in this sterile level (Table 11.1). Of these, 388 are fragments of raw bone weighing 216.6 g, 28 are burned bone weighing 14.3 g, and 11 are calcined bone weighing 2.2 g. The remaining five fragments are of tooth enamel and weigh 1.4 g. Also present was a small quantity of gastropod shells (n=11) totalling 1.8 g.

A small amount of lithic debitage was found in this level (46 pieces) (Table 11.2). Shatter is the dominant form of debitage at 71.74% of the assemblage with tertiary flakes making up the remaining 28.26% of the debitage. The lithic assemblage is composed of seven different material types, of which Swan River chert is the most common at 58.7%, with 25.92% of the Swan River chert being heat treated. Quartzite and chert are the next most common materials at 17.39% and 15.22%, respectively. No features were observed in this layer.

Table 11.1: Faunal counts from between Level 3a and Level 3b.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	1	3.7	6	136.2	388	216.6
Burned Bone	0	0	0	0	28	14.3
Calcined Bone	0	0	0	0	11	2.2
Unburned Enamel	0	0	0	0	5	1.4
Total	**1**	**3.7**	**6**	**136.2**	**432**	**234.5**

Table 11.2: Lithic debitage types from between Level 3a and Level 3b.

Material	Primary Flake	Secondary Flake	Tertiary Flake	Shatter	Total	Percent (%)
Basalt	0	0	0	1	**1**	**2.17**
Chalcedony	0	0	1	0	**1**	**2.17**
Chert	0	0	7	0	**7**	**15.22**
Quartz	0	0	0	1	**1**	**2.17**
Quartzite	0	0	1	7	**8**	**17.39**
Silicified Peat	0	0	0	1	**1**	**2.17**
Swan River Chert	0	0	4	23	**27**	**58.70**
			(H/T: n=3)	(H/T: n=4)		
Total	**0**	**0**	**13**	**33**	**46**	**100.00**
Percent (%)	**0.00**	**0.00**	**28.26**	**71.74**	**100.00**	

11.3 Cultural Level 3b Lithic Assemblage

The 2004 to 2006 excavations yielded 893 pieces of shatter and flakes, seven core and core fragments, five flaked tools, and six pieces of FCR. Swan River chert comprises 50.2% of the material types found associated with the lithic debitage, with quartz at 26.9% of the assemblage. Shatter is the dominant form of lithic debitage at 70.9% of the assemblage, followed by secondary flakes at 24.2% (Cyr 2006:116). Three of the seven cores are bipolar while the remaining four are platform cores. All of these cores are in their final stages of reduction and exhibit little remaining raw material (Cyr 2006:117-118). Of the flaked tools one uniface was observed and has been identified as a reverse uniface (Cyr 2006:120). The remaining four flaked tools are projectile points which have been classified as Gowen points from the Mummy Cave series (Cyr 2006:122-124). The dominant lithic found in Level 3b was shatter, followed closely by tertiary flakes at 37.54% of the total lithic assemblage. The predominant material type observed in Level 3b is Swan River chert at 49.16%. Quartzite and silicified peat are the second and third most common material types at 13.1% and 8.94%, respectively. A total of 68 stone tools were found in the 2007 to 2009 excavations of Level 3b; 66 are flaked stone tools, while the remaining two are unformed stone tools. A complete list of quantitative and qualitative measurements of both formed and unformed tools can be found in Appendix D.

11.3.1 Projectile Points (n=24; Figure 11.1 and 11.2)

Twenty-four projectile points were recovered from Level 3b excavations, 22 of which can be definitely identified as Gowen projectile points (Appendix D; Table D.2 and D.5). The remaining two are midsection/tip fragments and are likely associated with Gowen, but have been classified as early Side-Notched projectile points. Walker (1992:44) describes the Gowen projectile point morphology as being reasonably consistent, with the lateral margins of the blade usually convex. Most of the projectile points are essentially symmetrical with the maximum width being just distal to the notches. However, these projectile points are frequently reworked and this alters the symmetry of the point and commonly makes the base the widest portion of the projectile point (Walker 1992:44). The notches, positioned close to the base, are wide and shallow with the basal margin slightly convex to straight and often basally ground (Walker 1992:44).

Of the 24 projectile points found, five are complete (Figure 11.1; B, D, G, J, K), six are nearly complete missing only a small portion (Figure 11.1; A, C, E, F, I, H), two consist of a base and tip that refit with each other (Figure 11.1; L), nine consist of only the base (Figure 11.2; B-D, F-K), and the last two are midsection/tip portions of the projectile point (Figure 11.2; A, E; Appendix D, Table D.2 and D.5). A poorly constructed early Side-Notched midsection of a point was found in Unit 27S 12E at an approximate depth of 70 cm (Figure 11.2, E; Cat. #18779). Both the very tip and the base have been broken off, leaving most of the body portion. This midsection is constructed from a brown chert but is heavily patinated. The midsection shows horizontal parallel flaking dorsally but ventrally does not exhibit a regular flaking pattern. The lateral margins of the midsection do exhibit some bifacial retouch. The other early Side-Notched projectile point, also found in Unit 27S 12E at a depth of 70.5 cm, consists of the body and tip with no base (Figure 11.2, A; Cat. #18680). The base has been broken horizontally leaving a small hinge present. This point is constructed out of a heat treated Swan River chert and is quite grey in colour. This midsection is poorly flaked with an indentation on the ventral surface. There appears to be both microchipping and retouch present along the lateral margins of the point.

In Level 3b a well-made Gowen projectile point was recovered from Unit 28S 14E at a depth of 62 cm (Figure 11.1, G; Cat. #19871). This tool is made from heat treated Swan River chert. The point is nicely shaped, even though it is still asymmetric. Flakes have been removed from the body with no apparent orientation in mind, and the flake scars are barely visible. The notches of the point are well-shaped and exhibit some form of chipping. Basally, a slight amount of thinning is recognizable, while along the lateral margins retouch and chipping are both present.

A chalcedony point was found in Unit 26S 12E at a depth of 74 cm (Figure 11.1, K; Cat. #17927). This point is covered in a substantial amount of calcium carbonate, obscuring most ventral features. Not only is this point covered in calcium carbonate, but there is also patination present on most of the exposed surfaces. A small portion of the basal edge has been broken off, giving the base a slight concave shape. The point appears to be of good quality, but flaking is hard to determine due to both the calcium carbonate and the patination. The lateral margins of this point exhibit both microchipping and retouch.

Another well-made chalcedony projectile point was found in Unit 25S 14E at an approximate depth of 46 cm (Figure 11.1, J; Cat. #17607). On the dorsal surface of the point body flaking is reasonably regular, but there is no orientation of flake removal. It is apparent that a large flake has been removed just above the right shoulder. The right notch has been chipped, leaving a larger shallow asymmetrical notch. Ventrally, the surface of the projectile point is covered in a substantial amount of calcium carbonate, but a large indentation is visible towards the tip. Retouch is present on the lateral margins of the point, while the base exhibits both thinning and retouch. A slight amount of use wear in the form of chipping is present on the lateral margins.

Two of the complete projectile points are approximately 5 to 10 cm shorter when compared to the other complete points. Both are well-made projectile points that fit the typical morphology of a Gowen point, except that they are very small. One point was recovered from Unit 27S 12E at an approximate depth of 71 cm (Figure 11.1, F; Cat. #18795). This point was constructed from Gronlid siltstone and exhibits nice flaking with retouch and microchipping present on the lateral margins. The base margin of the point has been thinned by removing small flakes. The second point was found in Unit 27S 14E at a depth of 56 cm (Figure 11.1, D; Cat. #19080) and was constructed from a white fine-grained quartzite. This point also exhibits basal thinning with small flakes being removed from the dorsal surface of the point. Again, a small amount of both retouch and microchipping is evident on the lateral margins of the point.

Two projectile points were found in Level 3b with only the tip of the point broken off. One of these points was found in Unit 26S 13E at a depth of 63.5 cm (Figure 11.1, H; Cat. #18238) and is constructed from silicified peat. The right lateral edge of this point is straight, while the left lateral edge is slightly convex in shape. Flaking on the dorsal surface is of well organized with a shallow indentation towards the distal portion of the point. Ventrally, there is a build-up of calcium carbonate. Both of the lateral margins have been bifacially retouched with a slight amount of microchipping towards the distal portion of the point. The base appears to have been thinned bifacially, but this is difficult to determine because of the calcium carbonate present. The second point was found in Unit 25S 11E at a depth of 62.2 cm (Figure 11.1, A; Cat. #16472). This point was very well-made and is constructed from heat treated Swan River chert. Dorsally, horizontal parallel flaking is evident however ventrally the surface is covered with calcium carbonate, making it impossible to determine the orientation of flake removal. The base of this point exhibits bifacial thinning, and bifacial retouch is present on both of the lateral margins of the point.

The two remaining nearly complete points are each missing one of their basal corners/edges. Both of these points are very well-made, with one found in Unit 26S 12E at a depth of 71 cm (Figure 11.1, C; Cat. #17941). This point is constructed from Knife River flint and is missing its left basal edge. The basal margin of this point does not exhibit thinning, but instead a small amount of grinding is present. The lateral margins show some microchips, but no retouch or use wear is visible. Another point was found in Unit 25S 14E at a depth of 50 cm (Figure 11.1, E; Cat. #17410) and is constructed from heat treated Swan River chert. This point is well-flaked, and the flake scars are not visible, making the surface appear smooth. The lateral margins of this point are asymmetrical with the right margin being straight and the left having a convex shape to it. A small amount of retouch and microchipping is present along both of the lateral margins. It appears that the removal of a flake from the right basal corner was attempted but instead the entire basal corner was detached from the point. What is left of the basal margin has small flakes removed from it to make this margin thinner.

The projectile point found in Unit 27S 11E at a depth of 75 cm is a very poorly constructed projectile point (Figure 11.1, B; Cat. #18473). The construction material, a mottled yellow/brown chert, does not appear to have been a good quality material to work with. The left lateral margin of this point had been broken off longitudinally midway through the body, removing the shoulder and giving the point a very asymmetrical appearance. Ventrally, there is a small amount of calcium carbonate present obscuring features from this side. Dorsally, flaking does not appear to be very organized, with the presence of bumps and indentations due to flake removal however the lateral margins of the point that are present display excellent retouch. The base of this particular point exhibits both basal thinning as well as some grinding. Another point, constructed from a grey chert, was found in Unit 24S 12E at a depth of 56 cm and has been broken longitudinally (Figure 11.1, I; Cat. #16040). This break has removed a portion of the ventral surface of the point, leaving a large ridge. Dorsally, flake scars are still visible on the surface. Retouch and chipping are visible on the unbroken lateral margin of the point. Both the basal margin and the notches have thinning flakes removed from them.

The tip of an agate projectile point was found in Unit 26S 14E at a depth of 51 cm (Figure 11.1, L Top; Cat. #22065). The tip segment refits with the agate base which was found in the same unit at a depth of 48.5 cm (Figure 11.1, L Bottom; Cat. #22087). A small triangular segment is missing from the right lateral portion of the body of the projectile point, and the right basal corner is also missing from the projectile point. The point was broken diagonally above the notches and is angled toward the right notch. This projectile point displays a small amount of use wear along the lateral margins, and the right lateral margin also displays chipping. The entire projectile point is covered with a small amount of patination which is more apparent on the basal and dorsal portion of the point.

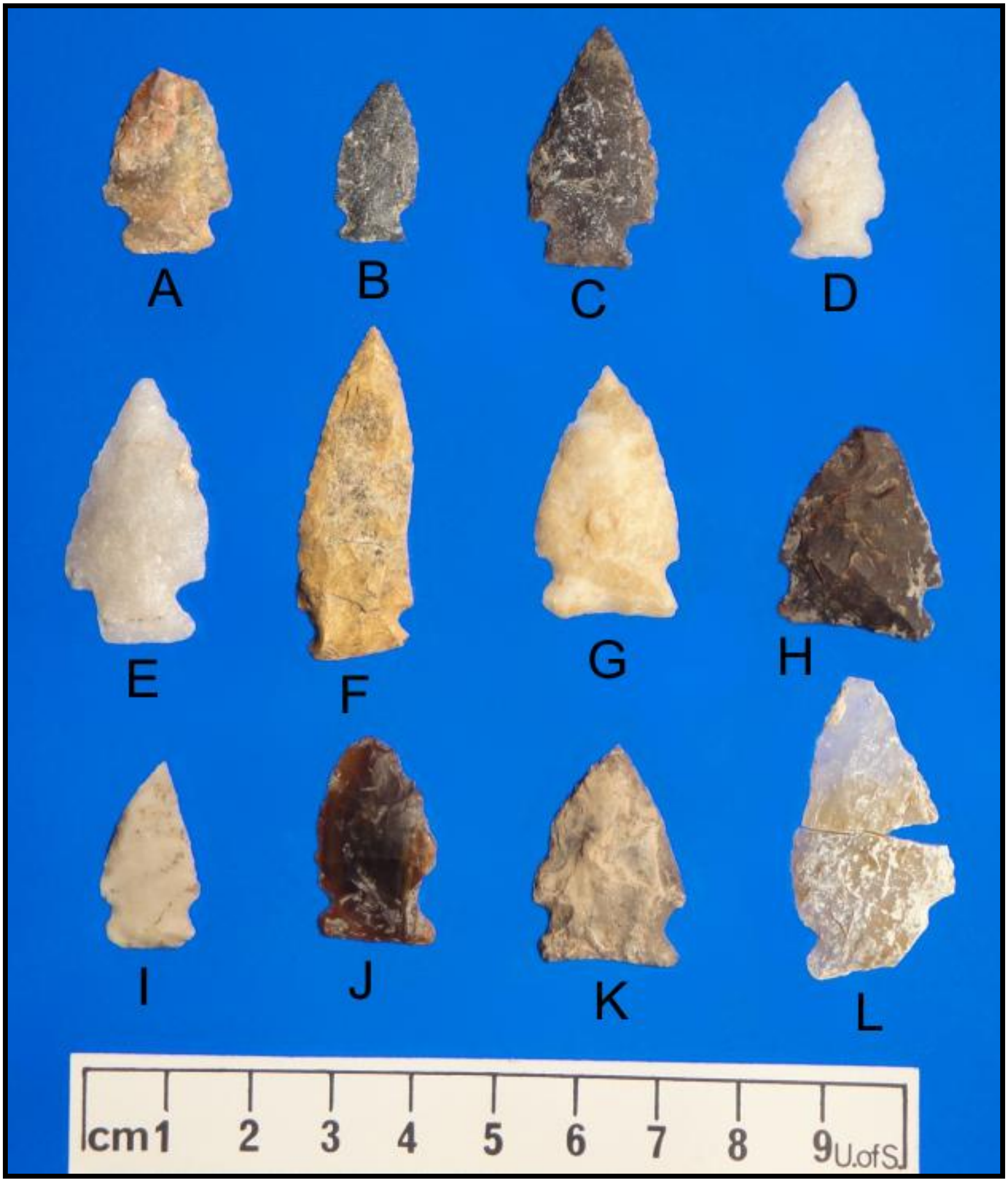

Figure 11.1: Complete to nearly complete projectile points from Level 3b (A = Cat. #16472; B = Cat. #18473; C = Cat. #17941; D = Cat. #19080; E = Cat. #17410; F = Cat. #18795; G = Cat. #19871; H = Cat. #18238; I = Cat. #16040; J = Cat. #17607; K = Cat. #17927; L Top = Cat. #22065; L Bottom = Cat. #22087).

Figure 11.2: Incomplete projectile points from Level 3b (A = Cat. #18680; B = Cat. #17100; C = Cat. #15997; D = Cat. #18976; E = Cat. #18779; F = Cat. #17409; G = Cat. #17102; H = Cat. #17975; I = Cat. #22018; J = Cat. #22180; K = Cat. #17435).

The majority of the projectile points found in Level 3b consist of the base of the projectile point. These points were often broken just above the neck or shoulders of the point. Two of the eight projectile points in this group were broken immediately superior to the notches. One was found in Unit 27S 13E at an approximate depth of 64 cm and is constructed out of heat treated Swan River chert (Figure 11.2, D; Cat. #18976). The break on this point occurred just above the shoulders at a slight angle to the left, leaving the shoulder of the right side intact. With only this small remnant remaining, it is still apparent that the construction quality of this projectile point is very good. The flaking on the dorsal surface is of very good quality. The notches are shallow with grinding present, and the basal margin of this point exhibits both thinning in the form of small flakes being removed and grinding. The left basal corner has not been modified by flaking or grinding.

The other point, found in Unit 26S 12E at a depth of 75 cm, is constructed from silicified peat (Figure 11.2, H; Cat. #17975). Again the break has occurred just superior to the notches, leaving a slight hinge. This break created a convex margin, leaving only a minute amount of shoulder on both sides of the point. No retouch is evident, but without the lateral margins this is a feature that is almost impossible to see. The basal margin on the other hand exhibits a slight amount of grinding and chipping.

Four of the projectile points appear to have been broken midway through the body of the point. All four of these points appear to be very well-made. Two are constructed from heat treated Swan River chert; one was found in Unit 24S 12E at a depth of 50 cm (Figure 11.2, C; Cat. #15997), and the other was found in Unit 26S 14E at a depth of 46 cm (Figure 11.2, I; Cat. #22018). The point found in Unit 24S 12E was broken obliquely just superior to the shoulders. Both the dorsal and ventral surfaces of this point exhibit excellent flake removal with shallow notches having been created. The basal margin of this point has been modified by grinding. The point recovered from Unit 26S 14E was broken midway through the body. Also missing from this point is the left basal corner. It appears that there is a slight amount of retouch present along the right later margin.

The other two projectile points were constructed from the same grey fine-grained quartzite and were found in adjacent units, 25S 13E and 25S 14E, at depths of 65 cm (Figure 11.2, G; Cat. #17102) and 50 cm (Figure 11.2, F; Cat. #17409), respectively. Projectile point G is well-shaped, and flake scars cannot be seen, giving the point a very smooth appearance. The projectile point was broken just above the shoulders, which created a concave edge. Both of the shoulders on this point show a slight amount of retouch. The notches are well-shaped and exhibit both chipping and grinding, which is also visible along the basal margin of the point.

Projectile point F is well-flaked on the dorsal surface, while ventrally there is also some chipping visible. The break on this point is oblique and located just above the notches, which are well-shaped. The lateral margins have a small amount of retouch and a very small amount of chipping, while the basal margin is chipped and slightly ground.

A projectile point constructed from mudstone was found in Unit 25S 13E at 62 cm below the surface (Figure 11.2, B; Cat. #17100). Even though the material is not a good quality knapping material, the point still appears to be well-made. Both the tip and basal margin of the point have been broken off, leaving behind the majority of the body, the notches, and a small portion of the point below the notches. Individual flakes on the dorsal and ventral surfaces cannot be identified due to the poor quality of the material. There is no apparent retouch on the lateral margins of the point and the notches appear to have some grinding.

The projectile point uncovered in Unit 25S 14E at 48 cm below the surface consists of only the right basal edge, the notch, and the shoulder (Figure 11.2, K; Cat. #17435) of a well-constructed silicified peat point. Ventrally, there is a build-up of calcium carbonate that could not be removed. The basal margin of this point exhibits small flakes that have been removed. The notch appears to be well-shaped with some grinding present. Even though only a small portion of this point remains, it appears that it was properly flaked and shaped.

11.3.2 Preforms (n=4; Figure 11.3)

Four partial preforms and one complete preform were uncovered in Level 3b (Figure 11.3) (Appendix D, Table D.3 and D.6). The complete preform was excavated from Unit 26S 13E at a depth of 64.5 cm and is constructed from basalt (Figure 11.3, A; Cat. #18231). This preform is poorly constructed and was broken in half, with both halves found close to each other. There are no notches present and the base is concave in shape. One of the lateral edges is straight while the other is convex giving it an asymmetrical shape. The lateral margins of this preform exhibit some flake removal indicative of finishing. Of the remaining four preforms, three are missing the very tip of the preform, while one is missing a basal edge. The preform found in Unit 26S 12E, at 68 cm below the surface, is constructed from basalt (Figure 11.3, D; Cat. #17907). The initial construction of the preform seems to be quite good, and it is apparent that this preform was in the stages of being finished. The basal margin has had some flakes removed to make it thinner, and construction of the right notch has started. There is no tip present as it has been broken horizontally, leaving a small hinge. The ventral surface of this preform is covered in a build-up of calcium carbonate. A second preform also appears to be in the final stage of finishing (Figure 11.3, B; Cat. #19090). This particular preform was found in Unit 27S 14E at a depth of 57.5 cm and was constructed from heat treated Swan River chert. Only the basal corner is missing and it appears to have been flaked away. The left side of the preform contains a very shallow notch that has not had any finishing work done on it. There is neither basal modification nor any retouch present on the preform. Ventrally, a longitudinal ridge makes the preform thicker on the left side. It appears that some initial flaking in order to shape the preform into a projectile point had been attempted.

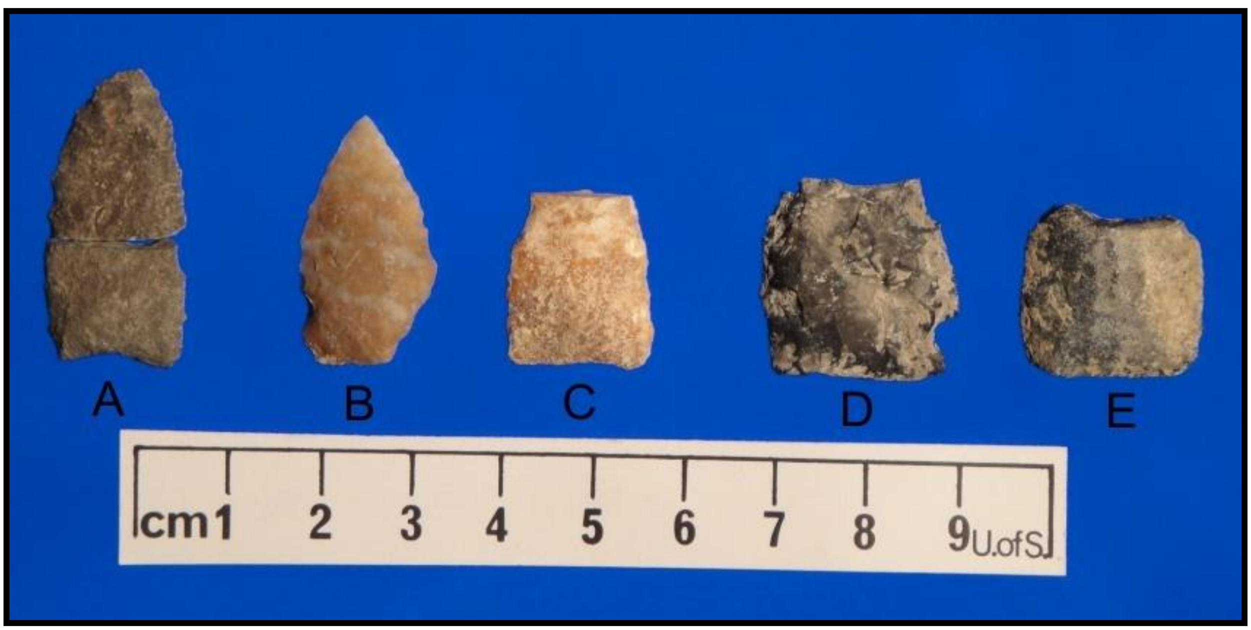

Figure 11.3: Preforms recovered from Level 3b (A = Cat. #18231; B = Cat. #19090; C = Cat. #18697; D = Cat. #17907; E = Cat. #15020).

The other two preforms are in the very early stages of construction. Only one of the two has had any type of basal modification, and in this case the base had a large flake removed from the dorsal surface, which resulted in thinning of the basal margin (Figure 11.3, C; Cat. #18697). This particular preform was found in Unit 27S 12E at a depth of 77 cm. It is constructed from a heat treated Swan River chert and displays regular flaking. The other preform found in Unit 23S 11E, at 52 cm below the surface, is constructed from Gronlid siltstone (Figure 11.3, E; Cat. #15020). The striking platform from flake removal can still be observed on the left basal corner. Ventrally, there is a build-up of calcium carbonate, and dorsally, some evidence of parallel flaking is visible. This preform has been broken distally and has received very little finishing.

11.3.3 Bifaces (n=7; Figure 11.4 and 11.5)

Level 3b contained eight bifaces and biface fragments. Three are complete bifaces, and four are broken bifaces (Appendix D; Table D.8, D.9, D.11, and D.12). Those that are broken show transverse breaks, most of which are probably a natural break that occurred at the time of use. The majority of the specimens, if they were not broken, would have an ovoid outline, but due to breakages five of the seven exhibit a triangular outline. Of the two largest complete bifaces one is ovoid in shape (Cat. #18875), and the other appears to be a diamond shape (Cat. #17432). These bifaces are constructed from silicified peat and grey chalcedony, respectively. Biface B (Figure 11.4; Cat. #18875) was found in Unit 27S 12E at a depth of 71 cm and has a lateral surface that is visibly worn and may have had some sort of backing present when in use. This biface exhibits patination on both the dorsal and ventral surfaces. It is evident that this biface was flaked both ventrally and dorsally resulting in a nice overall shape and appearance. This biface exhibits a convex lateral working edge which displays use wear in the form of chipping as well as bifacial retouch. Biface C (Figure 11.4; Cat. #17432) was uncovered at a depth of 46 cm from Unit 25S 14E. Due to the material type, the flaking observed on the biface appears to be poor in quality. A small amount of use wear is observed on the convex lateral edge as well as bifacial retouch. The third complete biface was also found in Unit 25S 14E at a depth of 52 cm (Figure 11.4, A; Cat. #17436). It is constructed from basalt and is substantially smaller compared to the other two complete bifaces. The lateral margin of this biface is covered by a substantial build-up of calcium carbonate, and only a small amount of bifacial retouch is observed.

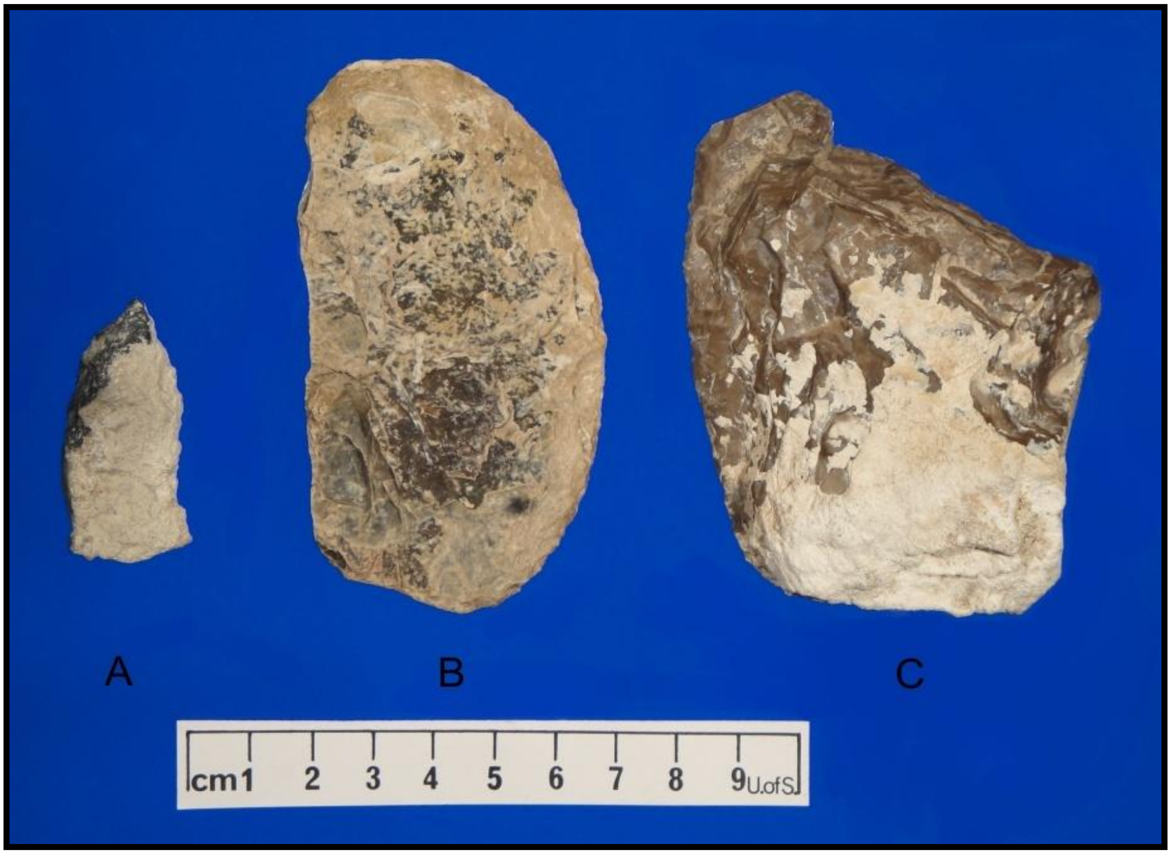

Figure 11.4: Complete bifaces recovered from Level 3b (A = Cat. #17436; B = Cat. #18875; C = Cat. #17432).

Two of the bifacial fragments are constructed from Swan River chert, while the other two are made from silicified peat. Biface C (Figure 11.5; Cat. #16229) has been broken transversely, leaving a slight hinge along the margin. This heat treated Swan River chert biface was recovered from a depth of 56 cm in Unit 24S 13E. It is a well-flaked biface that exhibits a small amount of retouch and use wear along its working edge. The second biface constructed from heat treated Swan River chert was recovered from a depth of 64 cm in Unit 26S 13E (Figure 11.5, B; Cat. #18200). This biface is very rough in appearance and exhibits only a small amount of bifacial retouch along its working edge. The working edge also displays evidence of use wear in the form of polish and dull edges. Biface D (Figure 11.5; Cat. #18852) is constructed from silicified peat and was found in Unit 27S 13E at a depth of 70 cm. This broken biface has both use wear and chipping evident along the lateral working edge. There is very little retouch present on the working edge, and most of it appears to be unifacial. The last biface constructed from silicified peat and was recovered from a depth of 70 cm in Unit 26S 12E (Figure 11.5, A; Cat. #17888). This broken biface has large flakes removed from its dorsal surface and exhibits patination on surfaces that are not covered by deposits of calcium carbonate. A small amount of bifacial retouch is present along the working edge as well as some use wear.

Figure 11.5: Broken bifaces recovered from Level 3b (A = Cat. #17888; B = Cat. #18200; C = Cat. #16229; D = Cat. #18852).

11.3.4 Unifacial Scrapers (n=22)

This category is the second most abundant numerically in Level 3b. A total of 22 unifacial scrapers were found in this level. Of these 22 scrapers, fourteen are classified as endscrapers, five are sidescrapers, and the remaining four are combination end/sidescrapers (Appendix D; Table D.8, D.9, D.11, and D.12).

11.3.4.1 Endscrapers (n=13; Figure 11.6)

In outline four of the endscrapers are ovoid in shape (Figure 11.6; F, J, K, M), six are rectangular/square in shape (Figure 11.6; A, B, E, H, I, L), and three are triangular in shape (Figure 11.6; C, D, G).

Figure 11.6: Endscrapers recovered from Level 3b (A = Cat. #16232; B = Cat. #18681; C = Cat. #17976; D = Cat. #17414; E = Cat. #19194; F = Cat. #17434; G = Cat. #18862; H = Cat. #17431; I = Cat. #17956; J = 17417; K = Cat. #19274; L = 16220; M = Cat. #19872).

In the case of the ovoid endscrapers both the distal working edge and the proximal edge are convex. The lateral margins are predominantly slightly convex, with only two of the endscrapers having at least one straight lateral margin (Cat. #17434 and #19872). An endscraper constructed from Gronlid siltstone was found in Unit 25S 14E at a depth of 51 cm (Figure 11.6, F; Cat. #17434). The working edge of this endscraper is steep at approximately 70°, and there is no visible use wear or retouch present. A second ovoid endscraper constructed from silicified peat was recovered from Unit 25S 14E at a depth of 45 cm (Figure 11.6, J; Cat. #17417). This endscraper has working edge angle of approximately 75° and exhibits use wear in the form of chipping and polish, with no retouch visible. A split chert pebble endscraper was recovered from Unit 28S 14E at a depth of 65 cm (Figure 11.6, M; Cat. #19872). This endscraper has a very shallow working edge at 45° and displays both retouch and use wear. The last ovoid endscraper is a thumbnail endscraper constructed from heat treated Swan River chert (Figure 11.6, K; Cat. #19274). The working edge of this particular endscraper is approximately 70° and has some chipping use wear but displays no retouch.

Almost all of the square/rectangular endscrapers possess lateral margins are straight however there are two endscrapers that have edges which are slightly contracting towards the proximal edge (Cat. #16232 and #17431). The proximal edges on all of these endscrapers are straight. The distal working edge of all of the square endscrapers is slightly convex. One of the endscrapers in this subgroup was constructed from Swan River chert and was recovered from Unit 25S 14E at a depth of 53 cm (Figure 11.6, H; Cat. #17431). The working edge of this endscraper is only 60°, and there is no retouch or use wear present. A heat treated Swan River chert endscraper was recovered from Unit 27S 14E at an approximate depth of 53 cm (Figure 11.6; E; Cat. #19194). This endscraper is broken on the left lateral edge and proximally. This endscraper has a working edge angle of 60°, and both retouch and polish use wear are visible. Another heat treated Swan River chert endscraper was found in Unit 27S 12E at a depth of 72 cm (Figure 11.6, B; Cat. #18681). This endscraper is poorly constructed with both the right and left lateral edges being broken. There are large flakes removed both ventrally and dorsally, giving the endscraper a very rough and uneven appearance. The working edge of this endscraper is approximately 60°, and both chipping and use wear are present. A yellow chalcedony endscraper was found in Unit 26S 12E at a depth of 75 cm (Figure 11.6, I; Cat. #17956). This is a small endscraper approximately the size of thumbnail. The working edge angle is approximately 60°, and retouch is visible. Another chalcedony endscraper was recovered from Unit 24S 13E at a depth of 61 cm (Figure 11.6, L; Cat. #16220). This endscraper appears to be poorly constructed with very little shaping. The working edge angle of this endscraper is quite steep at 80° and does display some use wear along its margin. The last endscraper in this subgroup was recovered from a depth of 55 cm in Unit 24S 13E (Figure 11.6, A; Cat. #16232).

This endscraper is constructed from a grey chalcedony. It is unique in that it exhibits lateral side notches and resembles a projectile point that was utilized for another purpose. The working edge angle of this endscraper is 70°, and a tiny amount of retouch and use wear is present along this margin.

With the three triangular endscrapers the lateral edges are straight to slightly convex and converge at the proximal edge to create a peak. One of these endscrapers is constructed from Gronlid siltstone and is very small in size (Figure 11.6, D; Cat. #17414). This endscraper was recovered from Unit 25S 14E at a depth of 47 cm. The working edge of this endscraper exhibits use wear in the form of polish and has an angle of 65°. A second endscraper was found in Unit 26S 12E at a depth of 69 cm (Figure 11.6, C; Cat. #17976). This endscraper was constructed from a chert pebble bipolar core that had been split in half a second time, making the endscraper very thin and fragile. The working edge of this endscraper exhibits very fine retouch and has a very shallow angle at only 20°. The last endscraper in this subcategory was found in Unit 27S 13E at a depth of 62 cm and is constructed from a banded black and grey chert (Figure 11.6, G; Cat. #18862). It is very nicely shaped, and the flaking is very organized. There is chipping present on both the left lateral and distal margins, and retouch is present on the distal working edge. The working edge is quite steep with an angle of approximately 80°.

The majority of the endscrapers are made from Swan River chert (n=4) with three of these being heat treated. Others have been fabricated from chalcedony (n=3), split chert pebble (n=2), Gronlid siltstone (n=2), siltstone (n=1), silicified peat (n=1), and chert (n=1).

11.3.4.2 Sidescrapers (n=5; Figure 11.7)

Of the sidescrapers four are ovoid in outline, and three of them have been broken in half, while the fifth one is rectangular in shape. Two of the three broken sidescrapers are from Unit 26S 13E at depths of 60.5 cm (Cat. #18248) and 46 cm (Cat. #18252), while the third sidescraper was recovered from Unit 26S 14E at a depth of 43 cm (Cat. #21997). The first sidescraper (Figure 11.7, A; Cat. #18248) is made from a fine-grained quartzite. The working edge angle on this sidescraper is quite shallow at only 40°. There is no apparent retouch or use wear present on the lateral margin. The other sidescraper is constructed from Cathead chert (Figure 11.7, B; Cat. #18252). This sidescraper exhibits a small amount of retouch and use wear along its primary working edge, which has an angle of 60°. The third sidescraper (Figure 11.7, D; Cat. #19075) is constructed from a grey siltstone and was recovered from Unit 27S 14E at a depth of 57.5 cm. The primary working edge on this scraper is straight to slightly convex with an angle of 70°, and retouch is present. The fourth sidescraper is rectangular in shape and is constructed from a grey siltstone (Figure 11.7, C; Cat. #16244). This particular sidescraper was found at a depth of 56 cm in Unit 24S 13E. The working edge angle is quite steep at 80°, and small retouch flakes have been removed from this margin. The last sidescraper (Figure 11.7, E; Cat. #21997) is constructed from a light grey quartzite. This sidescraper exhibits a small amount of retouch present along the right lateral margin of the scraper. This primary working edge has a shallow angle at only 55°.

11.3.4.3 End/Sidescrapers (n=4; Figure 11.8)

There are four unifacial scrapers that are considered to be a combination endscraper and sidescraper due to the fact that they have two obvious working edges. All four of these are of different sizes and shapes (Figure 11.8). With the two small scrapers, one is square (Figure 11.8, B; Cat. #17678), and the other is rectangular (Figure 11.8, A; Cat. #22089). The first end/sidescraper was found in Unit 26S 11E at a depth of 80 cm and is constructed from heat treated Swan River chert. The primary working edge is the distal edge, which is straight in outline, and the secondary working edge is located on the left lateral edge and is convex in outline. Both of these edges have working angles of 45°. These working edges exhibit some form of use wear as well as retouch. The second scraper is constructed from quartzite and was recovered from Unit 26S 14E at a depth of 49 cm. The primary working edge has a 75° angle and does not appear to display any retouch. The secondary working edge has an approximate 80° angle and displays a small amount of retouch.

Figure 11.7: Sidescrapers recovered from Level 3b (A = Cat. #18248; B = Cat. #18252; C = Cat. #16244; D = Cat. #19075; E = Cat. #21997).

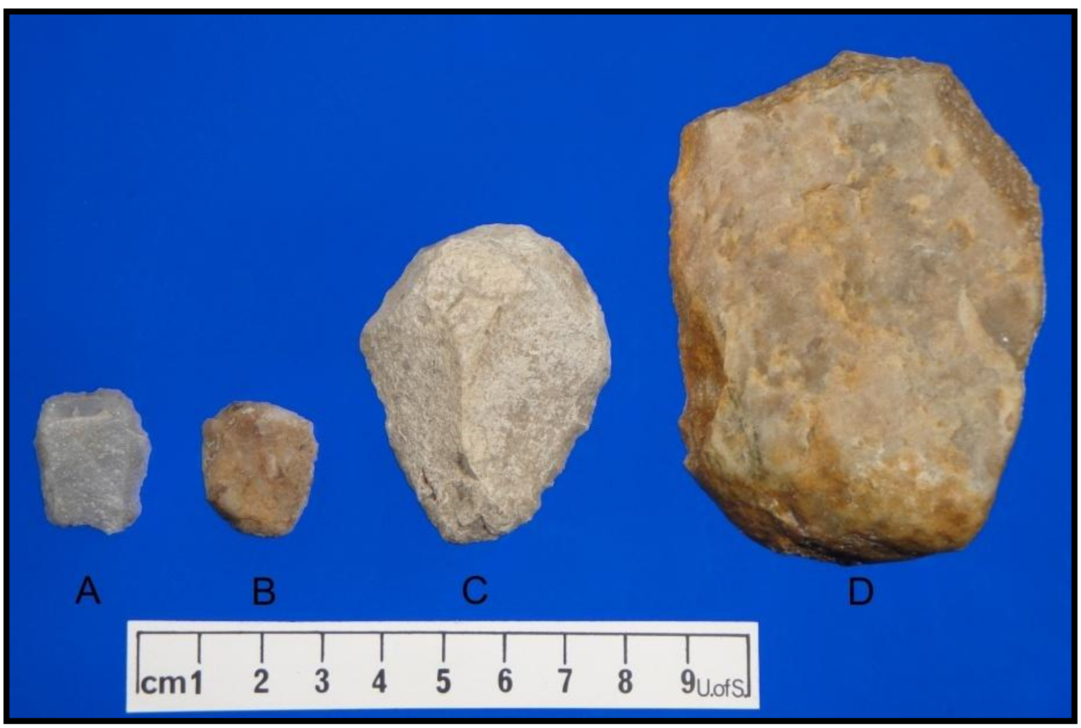

Figure 11.8: End/sidescrapers recovered from Level 3b (A = Cat. #22089; B = Cat. #17678; C = Cat. #16724; D = Cat. #15255).

The third end/sidescraper is much larger in size and is triangular in outline (Figure 11.8, C; Cat. #16724). This scraper was found in Unit 25S 12E at a depth of 61.5 cm and is constructed out of a grey sandstone. Both the distal and the lateral working edges are convex in shape. The distal (primary) working edge is only about three-quarters of the length of the entire distal edge and exhibits a steep angle at 80°, while the lateral (secondary) working edge runs the entire length of the right lateral edge and has a much shallower working angle at 50°. There may be some retouch present however this is hard to determine because the scraper is constructed out of sandstone. The working edges do display some use wear in the form of polish.

The fourth end/sidescraper is the largest scraper and is rectangular in outline (Figure 11.8, D; Cat. #15255). The primary working edge is on the left lateral side, has an angle of 70° and is quite straight in outline. The distal (secondary) working edge is convex in outline and has an angle of 65°. This scraper is constructed from a medium-grained yellow quartzite and exhibits use wear, chipping, and a small amount of retouch along its working edges.

11.3.5 Unifaces (n=4; Figure 11.9)

Four unifaces were recovered from Level 3b (Appendix D; Table D.8, D.9, D.11, and D.12). The first uniface was found in Unit 27S 11E at a depth of 74 cm (Figure 11.9, C; Cat. #18484). The uniface is ovoid in outline and is constructed from a yellow medium-grained quartzite. The lateral and distal margins all display signs of chipping and flaking. While there is some retouch present on all margins, it is most obvious on the left lateral and distal margins. Use wear is also evident along the working edges in the form of polish identified as a very smooth surface on this type of material. Two of the unifaces were found in Unit 26S 11E at a depth of 62.5 cm (Figure 11.9, A; Cat. #17661) and 74 cm below the surface (Figure 11.9, B; Cat. #17718). Of these two unifaces found, one is fabricated from quartzite (Cat. #17718) and the other is from heat treated Swan River chert (Cat. #17661). Both of these unifaces are semi-rectangular in outline, with working edges that are straight to convex in shape and have a working angle of 60° to 65°. These unifaces exhibit large rough flaking, and use wear is present. The fourth uniface is constructed from a yellow quartzite (Figure 11.9, D; Cat. #22132). Two working edges are present on this uniface. The primary working edge has an angle of 80°, while the secondary working edge has an angle of 75°. There does not appear to be any retouch present on either of the working edges, and only the secondary working edge displayed some evidence of use wear.

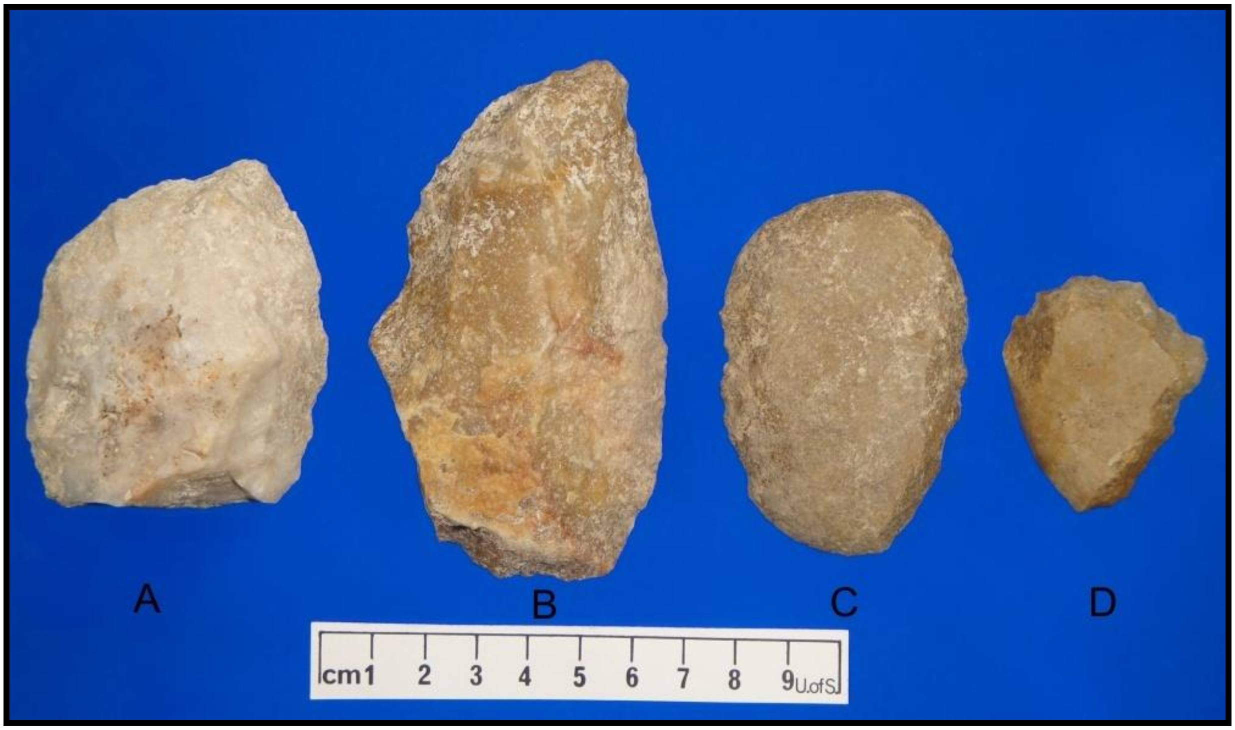

Figure 11.9: Unifaces recovered from Level 3b (A = Cat. #17661; B = Cat. #17718; C =Cat. #18484; D = Cat. #22132).

11.3.6 Perforators (n=1; Figure 11.10)

Perforators have lateral margins that are unifacially or bifacially worked and converge to form one or more points. There are many different types of perforators, though only one was found at the Dog Child site. In Unit 26S 11E a stone awl, fabricated from heat treated Swan River chert, was found at a depth of 77 cm (Figure 11.10; Cat. #17725) (Appendix D, Table D.9 and D.11). Awls are typically constructed from bone but can also be made from stone. The tip (distal) portion of the awl has been broken transversely. The outline of this tool is triangular in shape, with the straight lateral edges converging to form what would have been the distal point. A small amount of retouch is present along the lateral margins. This tool would have likely been used for puncturing a hole or incising in a very durable material.

Figure 11.10: Stone awl recovered from Level 3b (Cat. #17725).

11.3.7 Retouched Flakes (n=5; Figure 11.11)

In Level 3b a total of five retouched flakes were excavated (Appendix D; Table D.8, D.9, D.11, and D.12). Two of these flakes were found in Unit 25S 12E at depths of 63.4 cm and 54 cm below the surface (Figure 11.11, B, and E; Cat. #16768, and #16830, respectively). Both of these retouched flakes were constructed from heat treated Swan River chert, are irregular in shape, and exhibit unifacial retouch along their primary (lateral) working edge. The other two retouched flakes were excavated from adjacent units 28S 13E and 28S 14E at depths of 65 cm and 62 cm, respectively. One of these is constructed from silicified peat and has both primary and secondary working edges that have been thinned and bifacially retouched (Figure 11.11, A; Cat. #19630). The other retouched flake is irregular in shape and is made from quartz. This flake exhibits only one working edge which has been thinned and retouched (Figure 11.11, C;

Cat. #19867). The fifth retouched flake was recovered from Unit 27S 13E at an approximate depth of 57 cm below the surface (Figure 11.11, D; Cat. #18955). This flake is a grey fine-grained quartzite with a small amount of retouch present along its right lateral margin.

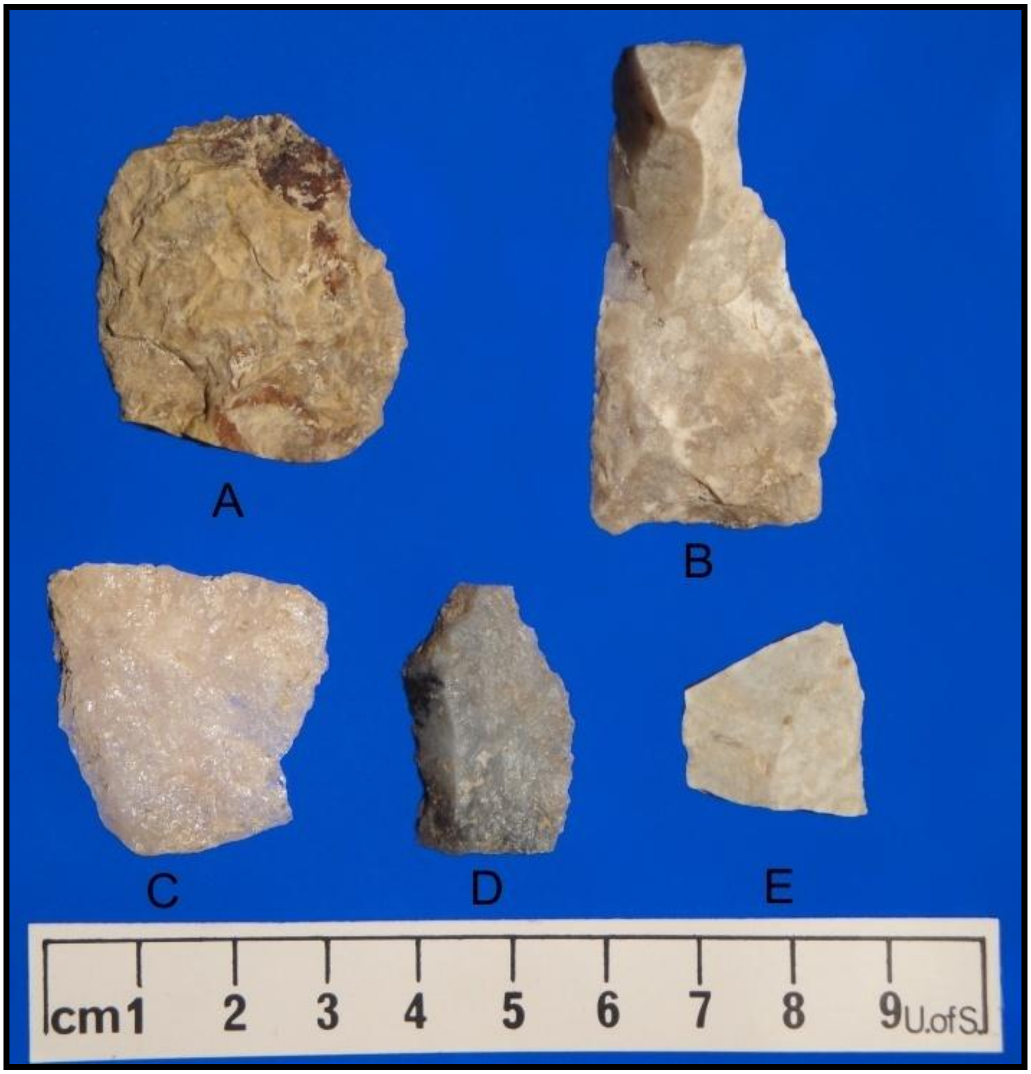

Figure 11.11: Retouched flakes recovered from Level 3b (A = Cat. #19630; B = Cat. #16768; C = Cat. #19867; D = Cat. #18955; E = Cat. #16830).

11.3.8 Hammerstones (n=1; Figure 11.12)

A single medium-grained quartzite hammerstone was excavated from Unit 25S 14E at a depth of 46 cm (Cat. #17411). It is ovoid in shape and weighs 917.4 g. Peck marks are evident on the distal portion of the hammerstone. Ventrally, any peck marks are obscured due to the presence of a substantial amount of calcium carbonate.

Figure 11.12: Hammerstone recovered from Level 3b (Cat. #17411).

11.3.9 Ground and Pecked Stone Tools (n=2; Figure 11.13 and 11.14)

Excavations uncovered a broken portion of a grinding slab in Unit 27S 14E at a depth of 52.5 cm (Figure 11.13; Cat. #19064). The grinding slab has been broken in many different places, resulting in a small portion of it being represented. This grinding slab piece has been smoothed on its dorsal, lateral, and ventral sides. Dorsally, it is very smooth and exhibits a slight dip towards the centre of the slab, while ventrally it is also smooth but no dip has been observed. It is constructed from granite and weighs 524.3 g. A second rock has been recovered from a depth of 58.5 cm in Unit 27S 13E (Figure 11.14; Cat. #18848). It cannot be definitively identified as a grinding slab but does have some indication that it may have been used for this purpose. This artifact is composed of Gronlid siltstone with a weight of approximately 2 kg and a very smooth dorsal surface.

Figure 11.13: Broken grinding slab recovered from Level 3b (Cat. #19064).

Figure 11.14: Grinding slab from recovered from Level 3b (Cat. #18848).

11.3.10 Cores and Core Fragments (n=14)

A total of 14 core fragments was excavated from Level 3b (Table 11.3). Nine of these core fragments are Swan River chert, and five of them have been heat treated. Of the remaining core fragments two are quartzite, two are quartz, and one is chalcedony. The majority of the core fragments cluster around the north central part of the 2007 to 2009 excavation block with a couple located in the extreme south.

Table 11.3: Level 3b cores and core fragments.

Catalogue Number	Material	Mass (g)	Type
16000	Chalcedony	108.3	N/A
16829	Quartz	53.6	N/A
17978	Quartz	147.1	N/A
16740	Quartzite	127.8	N/A
19631	Quartzite	275.1	N/A
15236	Swan River Chert	91.9	N/A
15250	Swan River Chert	240	N/A
16823	Swan River Chert	101.8	N/A
17036	Swan River Chert	93.4	N/A
14988	Heat Treated Swan River Chert	31.9	N/A
16237	Heat Treated Swan River Chert	102.8	N/A
16454	Heat Treated Swan River Chert	52.6	N/A
16828	Heat Treated Swan River Chert	23.2	N/A
18240	Heat Treated Swan River Chert	101.1	N/A
22013	Swan River Chert	331.2	N/A
16765	Heat Treated Swan River Chert	39.9	N/A
17978	Quartz	147.1	N/A

11.3.11 Debitage (n=4,954)

A total of 4,954 pieces of debitage were found in Level 3b, 2,975 of which are shatter and 1,979 flakes. The most common type of debitage was shatter at 60.05% of the assemblage, with tertiary flakes coming in second at 38.57%. Primary and secondary flakes were relatively rare at less than 1% for each (Table 11.4). Swan River chert was the most common material type, accounting for almost half of the assemblage at 49.88%, with 31.61% of this heat treated. The second and third most common material types were quartzite and silicified peat at 13.18% and 9.04%, respectively. The rest of the assemblage is composed of 16 different material types (Table 11.4). Thirty-three pieces of debitage (0.67%) are of an unknown material type. Identification of material type was made difficult by the heavy coating of calcium carbonate that could not be removed.

Table 11.4: Level 3b lithic debitage types.

Material	Primary Flake	Secondary Flake	Tertiary Flake	Shatter	Total	Percent (%)
Agate	0	0	2	5	7	**0.14**
Basalt	0	1	28	106	**135**	**2.73**
Cathead Chert	0	0	5	4	**9**	**0.18**
Chalcedony	0	1	109	48	**158**	**3.19**
Chert	1	4	222	124	**351**	**7.09**
	(H/T: n=1)		(H/T: n=69)	(H/T: n=28)		
Feldspathic Siltstone	0	0	0	2	**2**	**0.04**
Fused Shale	0	0	5	4	**9**	**0.18**
Gronlid Siltstone	1	0	10	12	**23**	**0.46**
Gneiss	0	0	0	6	**6**	**0.12**
Jasper	0	0	26	18	**44**	**0.89**
Knife River Flint	0	0	28	1	**29**	**0.59**
Limestone Chert	0	7	0	0	**7**	**0.14**
Mudstone	0	2	4	43	**49**	**0.99**
Natural Asphalt	0	0	0	1	**1**	**0.02**
Quartz	0	0	68	370	**438**	**8.84**
Quartzite	10	7	216	420	**653**	**13.18**
Sandstone	0	1	12	8	**21**	**0.42**
Silicified Peat	1	2	172	273	**448**	**9.04**
Silicified Siltstone Pebble	1	0	0	1	**2**	**0.04**
Silicified Wood	0	1	2	12	**15**	**0.30**
Siltstone	1	0	36	6	**43**	**0.87**
Swan River Chert	7	20	959	1485	**2471**	**49.88**
	(H/T: n=1; P/H/T: n=1)	(H/T: n=10; P/H/T: n=2)	(H/T: n=492; P/H/T: n=3)	(H/T: n=258; P/H/T: n=14)		
Unknown	0	0	7	26	**33**	**0.67**
Total	**22**	**46**	**1911**	**2975**	**4954**	**100.00**
Percent (%)	**0.44**	**0.93**	**38.57**	**60.05**	**100.00**	

11.3.12 Fire Cracked Rock (n=53)

Fifty-three pieces of FCR were found in this level weighing a total 4.5 kg (Table 11.5). The most common material type by mass was granite at 54.25% of the total assemblage. Seven other material types make up the remainder of the assemblage. The FCR in this level appears to have three areas where concentrations can be found. One of the concentrations is located in Unit 23S 13E in the southwest and southeast quadrants. The second concentration of FCR occurs in roughly the centre of the excavated units including Units 25S 13E and 26S 12E, and the third concentration is located in Unit 28S 13E. The remaining pieces of FCR are scattered throughout the level.

Table 11.5: Level 3b fire cracked rock.

Material	Count	Percent (%)	Mass (g)	Percent by Mass (%)
Breccia	1	**1.89**	76.2	**1.68**
Granite	15	**28.30**	2453.3	**54.25**
Mudstone	23	**43.40**	65.6	**1.45**
Quartzite	4	**7.55**	119.8	**2.65**
Sandstone	8	**15.09**	531.8	**11.76**
Siltstone	1	**1.89**	12.7	**0.28**
Gneiss	1	**1.89**	7.8	**0.17**
Limestone Chert	1	**1.89**	1331.4	**29.44**
Total	**53**	**100.00**	**4522.4**	**100.00**

11.4 Cultural Level 3b Faunal Assemblage

Due to the lack of separation between Level 3a and Level 3b in the 2004 to 2006 excavations faunal remains that could be definitively attributed to Level 3b were only 1,816 elements, specimens, and unidentified fragments. At least three bison and one jack rabbit were identified in the assemblage. There was a large amount of faunal material recovered from the 2007 to 2009 excavations of this level. A total of 26,684 faunal remains were recovered from the Level 3b assemblage weighing a total of 25.47 kg (Table 11.6). Ninety-eight percent of the faunal assemblage is unidentifiable fragments weighing 15.66 kg. The remaining 2.44% of the assemblage were identifiable faunal remains (Table 11.6). In terms of degree of burning 70.92% of the assemblage is unburned, 16.3% is burned, and 12.78% is calcined. At least 11 taxa are represented by the faunal remains in Level 3b, of which six are size classes and not associated with a particular genus and species.

Table 11.6: Level 3b faunal counts.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	63	613.6	355	8170.8	18098	12626.3
Burned Bone	0	0	17	212.8	4319	2031
Calcined Bone	0	0	0	0	3405	915.7
Unburned Tooth Enamel	24	669.6	25	136.6	193	78.6
Burned Tooth Enamel	0	0	2	0.4	11	4.6
Calcined Tooth Enamel	0	0	0	0	5	1.6
Shell	0	0	167	9.1	0	0
Total	**87**	**1283.2**	**566**	**8529.7**	**26031**	**15657.8**

Table 11.7: Summary of Level 3b faunal remains by taxa.

Common Name	Taxon	NISP	MNI
Mammals			
Bison	*Bison bison*	231	10
Wolf	*Canis lupus*	2	2
Medium-Large Canid (SC5a)	*Canis sp.*	15	1
Swift Fox	*Vulpes velox*	5	2
Beaver	*Castor canadensis*	2	1
Richardson's Ground Squirrel	*Spermophilis richardsonii*	19	2
Northern Pocket Gopher	*Thomomys talpoides*	13	2
Birds			
Bald Eagle	*Haliaeetus leucocephalus*	3	1
Red-tailed Hawk	*Buteo jamaicensis*	15	2
Swainson's Hawk	*Buteo swainsonii*	2	1
Medium Bird (SC4b)	Avian	1	-
Micro-Bird (SC1b)	Passeriformes	1	-
Invertebrates			
Snails (Shell fragments)	Gastropoda	167	-
Miscellaneous			
Very Large Mammal (SC6a)		85	-
Medium Mammal (SC4a)		10	-
Small-Medium Mammal (SC3a)		2	-
Small Mammal (SC2a)		8	-

11.4.1 Order Artiodactyla

Bison bison

Specimens identified: NISP = 232; see Table 11.8 and Table 11.9. MNE, MAU, and %MAU values were calculated by landmark. A summary of these calculations can be found in Appendix E (Table E.7, E.8, E.9, and E.10).

Description: See page 81.

Discussion: Approximately 40% of the identified specimens recovered from Level 3b have been classified as bison. At least ten individuals are represented by the remains recovered from this level of which seven of these individuals are adults, one is a juvenile, and two are fetal. Fifty-six of the specimens recovered are fetal bones based on size, porosity, and comparison to similar specimens in the faunal collection (Figure 11.15). At least two fetal bison, based on humerii, were recovered from the assemblage (Table 11.9). Six of the faunal specimens recovered from this level are indicative of a juvenile individual including: a right humerus (Cat. #16834), a sacrum fragment (Cat. #18685), a metapodial (Cat. #17915), a second phalanx (Cat. #22043), a cervical vertebra (Cat. #17685), and a basisphenoid (Cat. #17420). The basisphenoid, when compared to specimens in the comparative collection, was given an approximate age of one year old. This was the only specimen that could be aged of the six juvenile specimens recovered. It is possible that all of these specimens are from the same individual. The remainder of the specimens recovered from this level indicate the presence of at least seven adult individuals.

Forty-two of the specimens recovered from this level displayed evidence of trowel damage which occurred during the process of excavation. Weathering is generally light to absent with six specimens displaying stage three weathering, one displaying stage four weathering, and one displaying stage five weathering. The majority of the specimens exhibited some form of taphonomic alteration on their surfaces including root etching and soil staining. Calcium carbonate deposits were commonly found on the surface of artifacts recovered from this level; this was absent from specimens in the upper levels. A few specimens recovered from this level that display some form of cultural modification. Burning is rare, occurring on only four specimens recovered from this level. Three of them were fetal rib fragments (Cat. #18144, #17238, and #18346), and one was an adult scapula fragment (Cat. #17936). Cut marks are also rare but were found on some specimens from this level, including a spinous process (Cat. #17426) and numerous rib fragments (Cat. #17084, #17085. #17089, and #17094). A hyoid recovered from this level exhibits a tooth puncture likely from a large carnivore (Cat. #17048). Three of the faunal artifacts recovered display smears of red ochre on their surface (Cat. #17945, #17683, and #16004). Some of the small fetal bone fragments also displayed some smears of red ochre. Numerous rib fragments were recovered from this level and placed into the large mammal category. It is likely that most of these rib fragments represent bison remains.

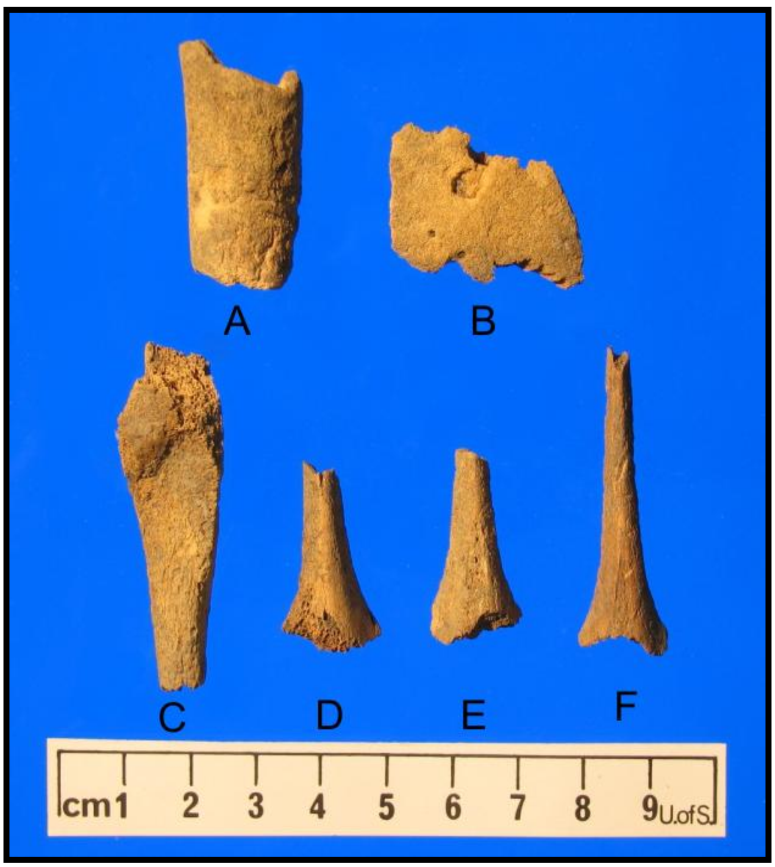

Figure 11.15: Fetal *B. bison* humerus shaft, frontal bone, ulna, and spinous process fragments (A = Cat. #17083; B = Cat. #17257; C = Cat. #17405; D = Cat. #17280; E = Cat. #18145; F = Cat. #17111).

Table 11.8: Summary of adult *Bison bison* elements from Level 3b.

	NISP	MNI (Side)	Total MNE	MAU	%MAU
Axial Skeleton					
Cranium	40	3	5	2.5	38.46
Mandible	33	3	7	3.5	53.85
Thoracic Vertebra	6	1	3	0.21	3.23
Lumbar Vertebra	5	1	3	0.6	9.23
Caudal Vertebra	1	1	1	0.06	0.92
Miscellaneous Vertebra	1	1	1	0.02	0.31
Forelimb					
Scapula	4	3	3	1.5	23.08
Humerus	9	5	7	3.5	53.85
Ulna	6	2	2	1	15.38
Radius	2	1	1	0.5	7.69
Metacarpal	6	1	5	2.5	38.46
Internal Carpal	1	1	1	0.4	7.69
Fused 2nd/3rd Carpal	2	2	2	1	15.38
Radial Carpal	2	2	2	1	15.38
Hindlimb					
Innominate	4	1	3	1.5	23.08
Femur	10	4	5	2.5	38.46
Tibia	19	8	13	6.5	100
Metatarsal	3	1	1	0.5	7.69
First Tarsal	2	1	2	1	15.38
Fused 2nd/3rd Tarsal	2	1	2	1	15.38
Fused Central/4th Tarsal	1	1	1	0.5	7.69
Lateral Malleolus	2	2	2	1	15.38
Astragulus	1	1	1	0.5	7.69
Calcaneous	1	1	1	0.5	7.69
Other Elements					
First Phalanx	3	1	3	0.75	11.54
Second Phalanx	7	1	7	0.88	13.54
Third Phalanx	4	1	4	0.5	7.69
Distal Sesamoid	2	1	2	0.13	2
Proximal Sesamoid	4	1	4	0.25	3.85

Table 11.9: Summary of fetal *Bison bison* elements from Level 3b.

	NISP	MNI (Side)	Total MNE	MAU	%MAU
Axial Skeleton					
Mandible	11	2	8	1	66.67
Thoracic Vertebra	5	1	5	0.36	24
Miscellaneous Vertebra	6	1	4	0.08	5.33
Sternebra	2	1	2	0.33	22
Rib	25	1	25	0.89	59.33
Forelimb					
Humerus	3	2	3	1.5	100
Ulna	1	1	1	0.5	33.33
Hindlimb					
Metatarsal	3	1	3	0.75	50
Other Elements					
Second Phalanx	1	1	1	0.13	8.67

11.4.2 Order Carnivora
Canis lupus

Specimens identified: NISP = 2; radius shaft (Cat. #22023); third phalanx (Cat. #16703).

Description: See page 154.

Discussion: These two specimens represent two individuals; an adult and a juvenile. The third phalanx is the same size as the wolf in the comparative collection at the University of Saskatchewan. The second specimen, a radius shaft, is similar in size to the wolf radius in the comparative collection however it is apparent that this specimen is a juvenile based on porosity throughout the bone. The surface of the juvenile bone also exhibits some weathering likely due to the friable nature of juvenile bone. Unfortunately, there is not enough of the specimen present to determine its age. No signs of cultural modification are present on either specimen.

***Canis sp.* (SC5a)**

Specimens identified: NISP = 15; right fourth metapodial (Cat. #18204); right third metapodial (Cat. #18209); right second metapodial (Cat. #18205); second phalanx (Cat. #16049); first phalanx (Cat. #16028), left second metapodial (Cat. #16039); canine (Cat. #16703); phalanx (Cat. #17239); proximal radius (Cat. #17690); rib head/tubercle (Cat. #17031); thoracic spinous process (Cat. #17689); left ulna (Cat. #17688); ulna shaft (Cat. #15758); premolar/molar (Cat. #17585); premolar and mandible (Cat. #15159).

Discussion: These specimens likely represent one individual. All of these specimens are comparable in size to a large coyote or medium-sized domestic dog (Figure 11.16 and 11.17). The right metapodial fragments were found in association with each other and are believed to be from the same animal (Figure 11.18). All of the specimens exhibit minimal to no weathering and display a minimal amount of calcium carbonate on their surfaces. Only one of the specimens recovered from this level is burned. No other cultural modifications were noted on the remainder of the specimens.

Figure 11.16: *Canis sp*. remains from Level 3b (A = Cat. #17031; B = Cat. #16451; C = Cat. #16028; D = Cat. #16703).

Figure 11.17: *Canis sp*. ulna from Level 3b (Cat. #17688).

Figure 11.18: *Canis sp.* right metapodials from Level 3b (A = Cat. #18205; B = Cat. #18209; C = Cat. #18204).

Vulpes velox

Specimens identified: NISP = 5; left mandible and P_3, P_4, M_1, M_2 (Cat. #16158); right mandible and P_3, P_4, M_1, M_2 (Cat. #17897); left mandible and P_4, M_1, M_2 (Cat. #17912), right mandible C_1, P_1, P_2, P_3, P_4, M_1 (Cat. #16782); premolar (Cat. #18127).

Description: The swift fox is the smallest North American canid (Kays and Wilson 2009: 172). It is a small fox with large ears, about the size of house cat. They are often reddish with a black tipped tail and a creamy white stomach. Female swift foxes have litters of pups born in March or April. The swift fox usually spends its hours during the day sleeping in burrows and spends the night hunting for lagomorphs, rodents, and other small prey (Banfield 1974:302; Kays and Wilson 2009:172). They prefer short and mixed grass prairies, particularly in arid areas (Banfield 1974:302). They were once found from the plains of Texas to southern Canada, but now have a very restricted range. They have been reintroduced into some places on the Canadian plains (Banfield 1974:303; Kays and Wilson 2009:172).

Discussion: The specimens recovered indicate the presence of at least two individuals recovered from Level 3b (Figure 11.19). One of the specimens is quite deteriorated with broken teeth and covered in fine layer of calcium carbonate (Figure 11.19, A). All four of the mandibles were incomplete with only the corpus and some teeth having been recovered. Soil staining was present on some of the specimens. All of the specimens exhibit a slight amount of root etching and minimal weathering. No cultural modifications were observed on any of the specimens.

Figure 11.19: Mandibles from *Vulpes velox* (A = Cat. #16158; B = Cat. #17897; C = Cat. #17912; D = Cat. #16782).

11.4.3 Order Rodentia

Castor canadensis

Specimens identified: NISP = 2; right humerus (Cat. #17961); right humerus epiphysis (Cat. #17735).

Description: The American beaver is a large aquatic rodent with a large, flat, paddle-shaped, scaly tail (Kays and Wilson 2009:50). The rich, dense beaver pelt was an important natural resource that was exploited by Euro Canadian fur trades almost to extinction. The beaver now lives throughout most of North America, occupying slow moving streams, rivers, lakes, and marshes (Banfield 1974:158-162; Kays and Wilson 2009:50). They prefer areas where aspen groves, shrub willows, alders, or water plants are nearby for food. Beavers are most active at dawn and dusk when they gather trees and saplings to eat and construct their lodges. The beaver does not hibernate during the winter months but remains in or near the den until the spring (Banfield 1974:158-162; Kays and Wilson 2009:50).

Discussion: The two specimens recovered from this level represent at least one juvenile beaver. Today beavers are very active near the site, and it is possible that they would have been active near the site in the past. This specimen is the same colour as the rest of the faunal assemblage recovered from this level. The specimens recovered exhibit little to no weathering and there is a slight amount of calcium carbonate present on the specimens. These two specimens display no signs of cultural modification.

Spermophilus richardsonii

Specimens identified: NISP = 19; right humerus (Cat. #19989); metapodial (Cat. #19997); left and right radius (Cat. #19990); tarsal (Cat. #19993); right tibia (Cat. #19987); right femur (Cat. #16622); left and right femur (Cat. #19985); left *os coxa* (Cat. #19986); left and right mandible (Cat. #19991); ribs (Cat. #19995); left and right scapula (Cat. #19984); left and right ulna (Cat. #19988); vertebrae (Cat. #19992); teeth (Cat. #19996 and #18128), right mandibles (Cat. #17437 and #17284); longbone shaft (Cat. #19994).

Description: See page 121.

Discussion: These specimens are slightly lighter in colour than the rest of the faunal assemblage, and they were found near a rodent burrow. The bones do, however, display a slight film of calcium carbonate on their surface. There do not appear to be any signs of weathering or cultural modification. For these reasons these specimens are believed to be intrusive.

Thomomys talpoides

Specimens identified: NISP = 13; axis (Cat. #16818); right humerus (Cat. #16814); left os coxa (Cat. #16816); right os coxa (Cat. #16817); left radius (Cat. #16951); left scapula (Cat. #16952); caudal vertebra (Cat. #16820); cranium (Cat. #16801); left scapula (Cat. #16819); left humerus (Cat. #16815); ribs (Cat. #16821); right mandible (Cat. #16813); left mandible (Cat. #16920).

Description: The northern pocket gopher is distributed across the central plains and western mountain regions of North America (Banfield 1974:149). They inhabit grasslands, fields, forests, and prefer a soil that is heavy and moist. The pocket gopher is active year-round in its burrows. The pocket gopher is a fairly solitary animal and seldom ventures far from its burrow (Banfield 1974:148).

Discussion: The specimens recovered from this level indicate that there were at least two individuals present. These specimens were found in Unit 25S 12E next to the burrow present in Unit 25S 13E. The specimens appear lighter in colour than the rest of the faunal assemblage, and there is no weathering or cultural modifications present on the specimens. For these reasons it is believed that the specimens are intrusive.

11.4.4 Order Falconiformes
Haliaeetus leucocephalus

Specimens identified: NISP = 3; right sternum (Cat. #17674); sternum fragments and rib fragments (Cat. #17673); furculum segment (Cat. #17657).

Description: The bald eagle is a large bird of prey that is found throughout most of North America. The bald eagle prefers areas within the vicinity of water like large rivers, lakes, and seacoasts (Godfrey 1986:127). They commonly appear in Canada during the warm summer months and migrate to the south during the winter months. Even though they are excellent hunters, they tend to be more of a scavenger and subsist mainly on fish and carrion (Godfrey 1986:128). The adult bald eagle is unmistakable in both its large size and unique colouration, with their heads and tail attaining a pure white colour (Godfrey 1986:127). Most eagles lay up to two eggs which hatch in approximately 35 days (Godfrey 1986:127). The bald eagle was seriously endangered in the 1970s but has recently been removed from the endangered species list (Kaufman 2000:118).

Discussion: These three specimens indicate that there is at least one bald eagle present in this assemblage. The specimens recovered from Level 3b are almost identical in size when compared to the eagle in the comparative collection. The sternum recovered has the same broad and flat shape that is seen in the specimen from the comparative collection. These specimens are similar in colour to the rest of the faunal assemblage in this level. They also display a slight amount of soil staining. No other cultural modifications are present on these specimens.

Buteo jamaicensis

Specimens identified: NISP = 15; left distal tarsometatarsis (Cat. #17209); forelimb third digit first phalanx (Cat. #17210); two right coracoids (Cat. #16469 and #15768); left humerus (Cat. #15763); sacrum (Cat. #15765); vertebrae (Cat. #15766); left coracoid (Cat. #15767); right femur head (Cat. #15769); right scapula (Cat. #15770); proximal sternum (Cat. #15771); proximal left scapula (Cat. #15773); hindlimb second digit first phalanx (Cat. #17058); left first phalanx (Cat. #16159); left second phalanx (Cat. #16160).

Description: The red-tailed hawk is found throughout North America and is often referred to as a "chickenhawk," even though they rarely prey on chickens. The female red-tailed hawk typically lays two to four eggs in the spring which are incubated for 28 to 32 days (Godfrey 1986:143). They tend to spend the warmer months in Canada and migrate to the south for the winter. The red-tailed hawk is commonly seen along roadsides and soaring throughout the air but likes to stay within the vicinity of trees (Godfrey 1986:142-143; Kaufman 2000:110). Typically the most distinguishing feature is the red above on their tails and the brownish band across their abdomen (Kaufman 2000:110).

Discussion: These specimens were recovered from two units: 24S 11E and 25S 13E. The largest concentration occurred in Unit 24S 11E. Based on two right coracoids found there are at least two red-tailed hawks that were recovered from this level (Figure 11.20). When compared to the specimens in the comparative collection it is clear that the specimens are a match to the Red-tailed hawk in both size and shape (Figure 11.20 and 11.21). The most distinctive feature is the coracoidal suculus and manubrial spine which are an exact match to the red-tailed hawk. These specimens are the same colour as the rest of faunal assemblage in this level. There is no weathering visible on the bones, and no other cultural modifications have been observed.

Figure 11.20: *Buteo jamaicensis* postcranial remains (A = Cat. #15767; B = Cat. #15768; C = Cat. #16469; D = Cat. #15763; E = Cat. #15770; F = Cat. #16159; G = Cat. #16160).

Figure 11.21: *Buteo jamaicensis* postcranial remains (A = Cat. #17058; B = Cat. #17209; C = Cat. #17210).

Buteo swansonii

Specimens identified: NISP = 2; right distal tibia (Cat. #17703); right femur external condyle and right proximal tibia (Cat. #17819).

Description: The Swainson's hawk is found throughout the western grasslands during the summer and migrates to the south to South America during the winter. They prefer open dry country including plains, prairies, mountain valleys, and foothills, using sparse woods or single trees for nesting (Godfrey 1986:142). The female Swainson's hawk lays two eggs in the spring which are incubated for 28 days. This hawk is fairly common across the prairies perching on fence posts or flying over the open prairie. They prefer small rodents and even grasshoppers as their form of subsistence. The Swainson's hawk has white wing linings with dark flight feathers and a white breast with a brown band across.

Discussion: These specimens indicate that there is at least one Swainson's hawk in the faunal assemblage. The tibia recovered from Level 3b was similar in size and shape to two of the hawks in the comparative collection: Swainson's hawk and rough-legged hawk. The rough-legged hawk nests in the low Arctic and Subarctic during the summer and migrates to southern Canada and the northern United States for the winter. They are only a migrant species through the Saskatoon region. Based on the distribution of these two hawks, it is believed that the specimen present is that of a Swainson's hawk and not a rough-legged hawk. These specimens are the same colour as the rest of the faunal assemblage in this level. There is no weathering present on these specimens, and no other cultural modifications have been observed.

11.4.5 Order Passeriformes
Aves Indeterminate (SC1b)

Specimens identified: NISP = 1; long bone shaft fragment (Cat. #17840).

Discussion: This is a long bone shaft fragment from a small-sized songbird. The walls of the specimen are very thin. This bone is burned and no other cultural modifications are present. This specimen is the same colour as the rest of the faunal assemblage from Level 3b.

Unfortunately, there are not enough features present to determine the exact bone or its genus and species.

11.4.6 Miscellaneous Avians
Aves Indeterminate (SC4b)

Specimens identified: NISP = 1; left humerus (Cat. #16452).

Discussion: This specimen is a humerus fragment from a medium-sized bird. It is heavily fragmented, and no species could be determined. It is the same colour as the rest of the faunal assemblage in Level 3b and does not display any weathering or cultural modification.

11.4.7 Class Gastropoda

Specimens identified: NISP = 167; shell fragments (Cat. #19002, #17310, #17589, #14806, #17841, #18372, #18412, #18618, #18774, #18786, #18805, #18967, #18988, #19022, #19179, #19186, #19203, #19207, #19382, #19389, #19553, #19556, #19566, #19767, #19792, #19972, #18124, and #15691).

Discussion: These specimens are small in size with a very thin shell. There are no cultural modifications present and it is very likely that this specimen was deposited as a result of an overbank flood or else it was living in the muddy banks of the Opimihaw creek. Due to the specimens' small size and fragmentary nature the exact species could not be determined.

11.4.8 Miscellaneous Specimens

Specimens identified: NISP = 105; see Table 11.10.

Discussion: Very large mammals (SC6a) represent approximately 80.95% of the miscellaneous specimens in Level 3b. The majority of these miscellaneous specimens are rib shaft fragments which are likely bison but could not be definitely placed into the bison category. The specimens that are classed as medium-sized mammals (SC4a) are represented by ribs and metapodial fragments. The small- to medium-sized category consists of a phalanx and talus that are approximately the size of mink however they could not be definitely assigned to this species. The remainder of the miscellaneous specimens are the size of a small rodent. These rodent bones were not found in association with any of the identified rodents and could not be assigned to a particular species. It is very likely that the majority of the specimens placed into the size categories belong to mammals that have been identified. Unfortunately, the lack of identifying characteristics, other than size, is not enough to make a species determination. The majority of the specimens displayed minimal to no weathering however three did display stage three weathering. Two of the specimens showed evidence of burning: one a large-sized mammal humerus shaft (SC5a) and the other a small-sized mandible (SC2a). Almost all of the specimens displayed root etching, soil staining and/or calcium carbonate deposits. Eleven of the specimens also showed evidence of trowel damage resulting from excavation procedures. No other cultural modifications were observed on any of the specimens.

Table 11.10: Summary of Level 3b miscellaneous specimens by size category.

Size Class	NISP	Elements Represented
SC6a - Very Large Mammal	85	Proximal sesamoid, humerus, femur, innominate, radius, ribs, tibia, ulna, and vertebrae fragments
SC4a - Medium Mammal	10	Ribs and metapodial
SC3a - Small to Medium Mammal	2	Phalanx and talus
SC2a - Small Mammal	8	Innominate, mandible, femur, and rib fragments

11.4.9 Bone Tools (n=8)

The bone tools in Level 3b were not easily identified amongst all of the other faunal remains recovered. At least eight bone tools were identified in this cultural assemblage. The majority of the bone tools recovered have been constructed from miscellaneous bone fragments. There is one bone tool that is quite unique from the assemblage, and this is an antler flaker (Figure 11.22; Cat. #18859). This bone tool was also found next to a soft percussion flake which exhibited a striking platform with a lip. The antler flaker exhibits polish and use wear, making the distal end rounded. The proximal, or thicker, end has been broken at an angle and displays an almost endscraper-like appearance that is slightly cup-shaped. This proximal end also displays parallel striations along its worn portions. Part of the shaft of the flaker has been smoothed, which is probably due to repeated handling and use. Also present on the surface is a small smear of red ochre visible in Figure 11.22.

Figure 11.22: Antler flaker recovered from Level 3b (Cat. #18859).

A second bone tool constructed from a right tibia shaft was recovered from Level 3b. This tool was smoothed to a point, and a small amount of polish can be seen on the interior of the bone. It is possible that the larger portion of this bone tool may have been utilized as a flaker (Figure 11.23, G; Cat. #15759). One of the bone tools is a small segment of a long bone shaft fragment (Cat. #19275). This tool has been shaped to a narrow point with polish observable on the tip however it is obscured by root etching (Figure 11.23; F). Three of the bone tools are spatula-shaped on one end. One exhibits a slight amount of polish and distal shaping (Figure 11.23, A; Cat. #18783). The second is likely constructed from a rib segment and has been smoothed to a spatula-shape. This bone tool shows polish along its lateral margins, and the distal portion also shows a large area that is polished and exhibits striations (Figure 11.23, B; Cat. #17104). The last tool that is spatula shaped is also believed to have been constructed from a rib segment (Figure 11.23, E; Cat. #16719). This tool is quite thick and also exhibits polish and parallel striations. The remaining two bone tools are similar in both shape and size (Figure 11.23; C and D). Both ends of these tools have been modified to some degree. One end has been shaped into a spatula shape, while the other end has been shaped into a point for possible use as an awl. There is a slight amount of thinning that is evident midway through the shaft of both of the tools, while both the distal and proximal ends of these tools display evidence of polish and striations. It is unsure what these tools may have been utilized for.

Figure 11.23: Bone tools recovered from Level 3b (A = Cat. #18783; B = Cat. #17104; C = Cat. #19085; D = Cat. #18667; E = Cat. #16719; F = Cat. #19275; G = Cat. #15759).

11.4.10 Cut Marked Bone (n=1)

Only one segment of bone appeared to display purposeful cut marks in order to create a specific item. The item in Figure 11.24 is a distal portion of a canid metapodial (Cat. #18097). This small segment of bone is believed to have been created as a bone bead. It appears to have been incised just under the articular surface of the metapodial and then broken. There has also been a small portion of the articular surface that has been removed, creating a small hole. There is no cancellous bone throughout, and it appears as if the centre portion of the bone has been smoothed.

Figure 11.24: Bone bead created from a canid metapodial (Cat. #18097).

11.5 Seasonality

The Level 3b faunal assemblage was the largest assemblage at the Dog Child site. Few complete teeth were found, and none were found within a mandibular socket. Unfortunately, the majority of the specimens recovered from this level were too fragmented or small to yield accurate measurements therefore the use of metric attributes was not possible. In the absence of measurements the seasonality was determined based on the presence of immature specimens. The specimen's age was determined based on the size and appearance of the specimens in comparison to the bison elements in the comparative collection. There were at least 56 fetal bison specimens recovered from Level 3b as well as six juvenile bison specimens. Most of the fetal specimens recovered from this level are rib segments and thoracic spinous processes. Based on the presence of three humerii shafts it is believed that there are at least two fetal bison in the faunal assemblage. Of the six juvenile specimens recovered only one element, the basisphenoid (Cat. #17420), could be aged. This specimen was given an approximate age of one year.

It is believed based on the fetal and juvenile bison specimens recovered that Level 3b is a winter occupation. Based on the birthing schedule of bison a fetal bison of this size would be available between December and March. The yearling specimen would likely have been present from January to April. None of the other specimens, aside from the birds, indicate seasonality as they could have been procured during the entire year. It is likely that the birds present here were procured sometime during the summer months and subsequently left behind. Suggesting the possibility of multiple occupations or a very long term occupation.

11.6 Artifact Distribution and Features

Cultural Level 3b is an extremely rich level in both lithic and faunal artifacts. At least three features are located in Level 3b. The first feature (3b-1) was located in Unit 25S 14E in the southeast and southwest quadrants (Figure 11.25). This concentration was picked through very carefully and consisted of predominately small debitage including tiny flakes and pieces of shatter. Also found in this area were four projectile points, five unifacial scrapers, and one biface. There is also a small area, to the south of this feature in Unit 26S 14E and 27S 14E, that is a half circle that does not have any lithic or faunal artifacts located in it. Around this half circle is a large concentration of artifacts including more stone tools (Figure 11.26).

The second feature (3b-2) is located in Unit 25S 13E and occupies all of the quadrants except for the northwest. This feature consists of stained soil with four darker stained patches within. Some charcoal was located throughout this feature, but it was minimal. The darker patches appeared to contain more fragments of charcoal as opposed to the rest of the soil stain; therefore, it is possible that this may be a place where ashes were dumped, as they would have stained the soil and not left much charcoal behind.

The third feature (3b-3) is located in Units 26S 12E and 26S 13E (Figure 11.25). This feature consists of stained soil due to the large amount of organic material that was recovered from the vicinity. The faunal remains recovered from this feature were initially believed to have been a bison cranium (Figure 11.27) however after excavation it was discovered that the remains were actually part of a bison scapula and portions of a bison *os coxa*.

The artifacts appear to be fairly dispersed throughout the level with approximately five places where they are visibly more concentrated. The first concentration of artifacts occurs with feature 3b-1 and is a mixture of both faunal and lithic artifacts as well as stone tools. The second concentration of artifacts occurs in Unit 27S 13E and 28S 13E. This concentration is predominantly faunal materials. The third concentration containing a mixture of lithics and faunal remains as well as the majority of the stone tools, is located in Units 25S 12E, 25S 13E, and 26S 12E. The remaining two concentrations of artifacts occur in a couple of the northernmost units. One concentration is in Unit 23S 11E and consists of faunal material with some lithic debitage. The last concentration of artifacts is located in two Units: 24S 12E and 24S 13E. This concentration is dominated by faunal artifacts with few lithic artifacts present. The southernmost units have a very sparse cultural assemblage, and it is very likely that this is the southern margin of the Dog Child site.

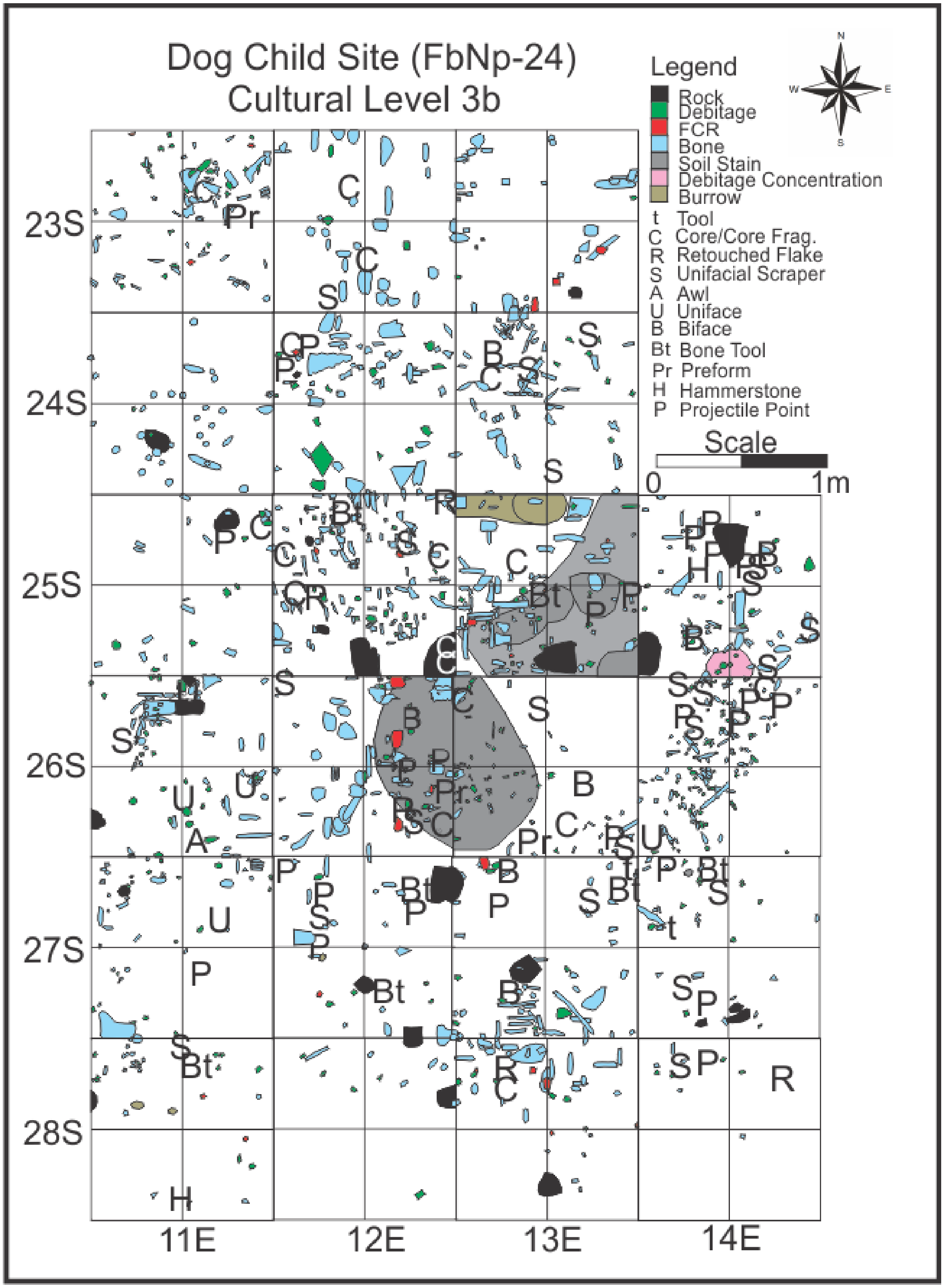

Figure 11.25: Distribution of artifacts and features in Level 3b.

Figure 11.26: Distribution of artifacts in Level 3b near feature 3b-1 in Unit 26S 14E.

Figure 11.27: Stained soil and bison scapula recovered from feature 3b-3 in Units 26S 12E and 26S 13E.

11.7 Cultural Level 3c

There may be another cultural level located below Level 3b. This level is present in two of the southernmost units excavated at the Dog Child site: Unit 28S 13E and 28S 14E. In these two units Level 3c occurred at a depth of 70 to 77 cm and was approximately 5 cm thick. The matrix in which these artifacts were found was an olive coloured sand to sandy clay. This level began at the northern portion of the southeast and southwest quadrants and sloped significantly towards the southern portion. At the extreme south of the units was the deepest portion of this level, and there was at least 5 cm of sterile soil between Level 3b and Level 3c. Very few artifacts were recovered from this level, but those recovered were clustered within a darkened soil, indicating the possibility of a cultural level.

In total six pieces of shatter were recovered from Level 3c. Three of the pieces of shatter are a generic chert, two are quartz, one is quartzite and the last is heat treated Swan River chert. One exhausted core fragment of heat treated Swan River chert that weighing 55.9 g was recovered from Level 3c. The remainder of the materials recovered from this level are faunal (Table 11.11). There are six identifiable specimens that were recovered from this level. Four of the six are remains from a bison. These include a proximal sesamoid (Cat. #19877), a left and right incisor (Cat. #19800 and #19674, respectively), and a second phalanx (Cat. #19879). Of the two remaining specimens one is a caudal vertebra (Cat. #19801) that is believed to be associated with a medium-sized mammal (SC4a), and the other is a rib segment (Cat. # 19675) associated with a large-sized mammal (SC5a). All of these specimens are unburned, and it appears that the second phalanx has been crushed. No other cultural modifications are present.

Table 11.11: Level 3c faunal counts.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	1	3	3	24.8	237	171.9
Burned Bone	0	0	0	0	87	36.3
Calcined Bone	0	0	0	0	9	3.4
Unburned Tooth Enamel	2	1.8	0	0	0	0
Total	**3**	**4.8**	**3**	**24.8**	**333**	**211.6**

11.8 Below Level 3b

The majority of these remains recovered from below 3b were faunal. These however do not appear to be associated in any way with Level 3c found at the southernmost extent of the site. Only two pieces of shatter were recovered: one quartz and one Swan River chert. It is likely that the majority of the remains recovered from this level are from Level 3b but have undergone a postdepositional process such as freeze/thaw action that has moved them to below the cultural level. A left humerus (Cat. #18811) and left ulna (Cat. #18810) were recovered from this layer and have been classified as an SC1b bird, approximately the size of a small song bird. A right humeral shaft was the only bison specimen recovered from this layer (Cat. #19442). Also recovered were two specimens that could only be placed into a size category. One is a rib segment (Cat. #19441) that is attributed to a large-sized mammal (SC5a), and the other is an incisor (Cat. #19215) attributed to a small-sized mammal (SC2a). Gastropod shells were also recovered from this level, which is likely a result of the site's proximity to Opimihaw Creek.

Table 11.12: Faunal counts below Level 3b.

Faunal Type	Element	Mass (g)	Specimen	Mass (g)	Unidentified	Mass (g)
Unburned Bone	3	0.2	12	95.9	82	72.5
Burned Bone	0	0	0	0	5	1.3
Calcined Bone	0	0	0	0	0	0
Unburned Shell	0	0	53	4.2	0	0
Unburned Tooth Enamel	1	0.1	0	0	0	0
Total	**4**	**0.3**	**65**	**100.1**	**87**	**73.8**

11.9 Interpretation of Cultural Level 3b

Cultural Level 3b is the richest cultural level at the Dog Child site. It contains artifacts that represent an Early Middle Precontact period occupation. The projectile points recovered from this level are representative of the Gowen projectile point from the Mummy Cave series. A total of 24 projectile points was recovered from this level, with 13 being complete or nearly complete and 12 being base or tip fragments. The projectile points recovered from excavations before 2007 were also representative of the Mummy Cave Gowen point (Cyr 2006:124-125).

The two radiocarbon dates obtained for this level also support a Gowen occupation. The first calibrated radiocarbon date obtained by Cyr (2006) was 5530 ± 50 years B.P. (BGS 2663). The second calibrated radiocarbon date obtained was 5890 ± 45 years B.P. (BGS 2892). The discrepancy between the two dates is attributed to the fact that the first radiocarbon date was obtained using a composite sample of bone. The artifacts included in this assemblage are those that are consistent with a habitation site.

The excavated artifacts from Level 3b are primarily faunal remains. This level contains the most diverse array of specimens present at the Dog Child site including bison, wolf, swift fox, beaver, Richardson's ground squirrel, northern pocket gopher, bald eagle, red-tailed hawk, and Swainson's hawk. Bison is the predominant faunal specimen recovered from this level in both number of artifacts and specimens. There are at least ten bison present in the assemblage: seven adults, one juvenile approximately a year old, and two fetal bison. These fetal and juvenile remains are the best indicators of seasonality for this cultural occupation, and based on these remains the occupation has been determined to be a winter occupation. However, the bird remains indicate the possibility of this being a multiple occupation or one that began in the fall or late summer.

The most noteworthy faunal remains recovered from the level are the large amount of bird remains present. In total, there is one bald eagle, two red-tailed hawks, and one Swainson's hawk. It is believed that these birds were procured at a different time of year for their feathers, as these birds are not found in this area during the winter months. There is the possibility that they were transported to the site and subsequently left the behind or that they were procured at the site during summer months. This would imply that this site may have been utilized during the summer months as well as the winter months. Also present is the remains of a small bird which is likely some sort of song bird, but could not be identified to species, as well as remains from a medium-sized bird which was too fragmented to determine species. Therefore, without knowing the exact species of these two specimens it is difficult to determine whether they are birds that are present year-round or only during specific times of the year.

Of interest in this level are those bones that display smears of red ochre. Red ochre has been found at numerous sites throughout the Plains region. The remains that displayed red ochre were the antler flaker, some bison long bone fragments, and some fetal bison bone. Based on the idea that red ochre is generally associated with religious, sacred, or ceremonial tasks it is possible that these remains were of significance to the occupants of the site. Fetal remains tend to be rarer at archaeological sites and may be considered sacred or a delicacy. It is possible that they were used in some sort of ritual after consumption, as part of a medicine bag, or used in some type of ceremony. Unfortunately, there were few to no references on the use of red ochre with fetal bison remains and therefore this is only speculative. The presence of red ochre on the long bone fragments and the antler flaker also allude to the idea that these may have been special items associated with a ceremony or ritual. The fact that red ochre was not found on all of the remains indicates that it was likely placed on particular bones by human action.

Also present in this level were bone tools which were difficult to identify amidst the rest of the faunal assemblage. One of the most unique tools recovered from the assemblage was an antler flaker believed to have been used in the production of stone tools. A second tool recovered from the assemblage has been identified as another possible flaker based on its size and shape. The remainder of the bone tools recovered appear to have one end that is shaped like a spatula. An additional two of the bone tools have a spatula shape on one and an awl on the other end. It is unclear what the function of these tools would have been. In addition to the bone tools there was one fragment of a canid metapodial that has been modified to the extent that it is believed to be a bone bead.

The lithic material in this particular level is not restricted to only local materials. There are a few materials that likely originate a great distance from the site including agate and Knife River flint. There was a wide variety of tools recovered from this site including projectile points, preforms, bifaces, an assortment of unifaces, a stone awl, retouched flakes, a hammerstone, and two possible grinding slabs. The predominant lithic material recovered from the Dog Child site is Swan River chert at 49.13% of the total assemblage. Shatter and tertiary flakes dominate the assemblage at 58.45% and 37.54%, respectively.

Figure 11.25 shows the distribution of all of the artifacts and features throughout the level. No hearths were found in this level however there is what may be a small ash dump located in one of the units (25S 13E) as the soil was darkly stained and there were some small concentrations of charcoal (Feature 3b-2). A second feature (3b-1) was found in Unit 25S 14E; it is a concentration of lithic debitage, primarily small tertiary flakes. The last feature was another soil stain found in Units 26S 12E and 26S 13E (Feature 3b-3) and was likely created by the large amount of faunal remains recovered from the area. The artifacts appear to be fairly dispersed throughout the entire level except for in the southwest and southeast quadrants of the southernmost units where there are very few artifacts. There are five areas that appear to have a heavier concentration of artifacts. The first concentration of artifacts occurs with feature 3b-1 in Unit 25S 14E and the second concentration in Unit 27S 13E and 28S 13E. The third concentration is located in Units 25S 12E, 25S 13E, and 26S 12E while the remaining two concentrations of artifacts occur in a couple of the northernmost units: Unit 23S 11E and Units 24S 12E and 24S 13E. Based on the significant amount of cultural material recovered from this level it is possible that this was a long term habitation site or a repeated habitation site.

Chapter 12

Faunal Subsistence During the Hypsithermal

12.1 Introduction to the Hypsithermal

The Dog Child site is a multicomponent site that has at least six cultural levels. Due to the plethora of cultural material uncovered in Level 3b further studies of this level were undertaken. There were three main reasons as to why Level 3b was examined further. The first was obviously because there were a large amount of cultural remains recovered. The second reason is because this site is associated with the Mummy Cave series and the third reason is because of the diversity of faunal remains recovered. This particular chapter focuses on the last two reasons.

The Mummy Cave series is interesting because of the few sites that are found across the Plains and the dynamic climatic conditions occurring at this time. Paleoenvironmental indicators suggest a change in the climate and environment, commonly referred to as the Hypsithermal. These changes were believed to have affected Mummy Cave populations to the extent that they would have modified their subsistence patterns and seasonal movements (Reeves 1973; Walker 1992). A dialogue into research on Mummy Cave sites on the Plains as well as research on the climate during this period is presented. This is followed by a small intersite comparison of the subsistence practices of six sites on the Northern Plains. These sites were chosen based on their proximity in geography and age to the Dog Child site. Research was completed in order to determine the species of faunal and plant remains that were recovered from excavation at these sites. It was discovered that the Dog Child site appears to present a unique subsistence strategy. It is possible that changes in climate were drastic enough to result in a change in subsistence during this period. The last section of this chapter discusses those faunal remains recovered from the Dog Child site and how they indicate the notion of a broader subsistence pattern. It is likely that these species were predominantly used as a source of food for the occupants of this site but also served a variety of other functions. Ethnographic examples were often utilized in order to make the reader aware of the multiple possibilities and reasons for the use of these species.

Middle Holocene climates have proven to be highly complex with considerable variability in the timing and intensity of Holocene warming and drying (Meltzer 1999:404). The

Middle Precontact period corresponds to these variable changes in the environment which are often referred to as the Altithermal (7500 to 4500 years B.P.) (Antevs 1948), Hypsithermal, or Mid-Holocene Climatic Optimum. This period is one of great contention and debate throughout the scientific community both in terms of the occupation of the Great Plains as well as the climatic environment. Archaeological sites from this time period are rare and tend to be of limited extent with sparse cultural assemblages (Walker 1992:128-129). All scientists agree on the idea that there are fewer sites present during this period however the exact reason for this is open to debate.

Initially Mulloy (1958) suggested that there was a hiatus of cultural occupation which had resulted from increased aridity on the Plains but also cautioned that this may be a result of inadequate sampling. At the time this warm and dry period was termed the Altithermal by Antevs (1948, 1955). Jennings (1957), on the other hand, proposed that a Great Basin Desert Culture had developed. This "Desert Culture" was believed to have been a function of the increase in aridity. The "Desert Culture" utilized game of all sizes and employed and procured plants for subsistence. The "Desert Culture" was recognized by a sparse population, a focus on seasonal plants and animals, few material possessions, and no permanent base camps. Jennings (1957), therefore, did not see an actual hiatus on the Plains but instead a switch to a similar strategy employed by the Great Basin Desert Culture. A few years later Hurt (1966) proposed that the first half of this period (7000 to 5600 years B.P.) was much more favourable than the last half (5600 to 4500 years B.P.). Hurt (1966) believed that evidence for archaeological occupation during this time was scarce but that the Plains were never completely abandoned. There was likely a reduction of population during this time due to the aridity of the period however only the most severe droughts made people and animals move to other areas. Hurt (1966) suggested that people and animals moved to natural refugees such as the northern periphery because of the lower temperatures, the eastern periphery because of the higher precipitation, and areas of higher elevation in the western half, such as rivers and springs in mountainous areas. Therefore, it was possible that these people may have had to focus on hunting different types of game animals and foraging plants. By the 1970s, archaeologists were in agreement that the Plains were at least partially occupied during the Hypsithermal.

Reeves (1973) proposed four different hypotheses on the absence of sites on the Plains during the Hypsithermal. The first was that the climatic conditions during this period affected the expansion of the shortgrass plains into adjacent prairies. He mentioned that this change in climate would have decreased forage yields which, in turn, would have affected the carrying capacity of the Plains. Reeves (1973:1246) suggested that the Plains likely supported a smaller bison population. Even with a smaller population he suggested that the extent of change in subsistence strategies would have depended on the shortgrass environment, and believed that the people did not shift to a forager adaptive strategy but continued to procure bison throughout. Therefore the Plains were not reduced to a hot, dry, desert that was incapable of supporting a viable bison population (Reeves 1973).

The second hypothesis was that many sites examined on the Plains were based on salvage or ‘crisis oriented’ archaeology and those not ‘crisis oriented’ were investigated due to location or age, rather than integrated research (Reeves 1973:1231). Reeves (1973) noted that research tended to concentrated around the peripheries of the Plains. The third hypothesis was that the absence of sites was due to geological processes occurring during this period. Reeves (1973) observed that these sites occurred in alluvial sediments contained within stream terraces and in aeolian sediments. For instance the Long Creek site and Oxbow sites are both associated in buried horizons within alluvial sediments (Reeves 1973). Sites tended to concentrate in stream valley floodplains or on older terraces therefore, it is possible that they were destroyed or deeply buried. The last hypothesis that Reeves (1973) proposed was that surface finds of Mummy Cave points may be more common than originally believed, due to the extent of erosion occurring during the Holocene. Sharing of stone tool technologies between groups of people was relatively common; therefore, those points attributed to a late side-notch association may in fact have been Mummy Cave in origin. This can be noted in the non-classic Oxbow point and the Mummy Cave point which share striking similarities and could be easily confused with each other (Reeves 1973).

Artz (1996) also supports the idea that geological processes played a huge role in the identification of sites on the Plains.

> Geoarchaeological studies have been geologically dynamic throughout the Holocene, with ample opportunities for sites dating to the Early and Middle Holocene to have been destroyed by erosion or buried at depths beyond those penetrated by conventional survey techniques (Artz 1996:384).

The Northern Plains has been geologically active throughout the Holocene. Great volumes of Early and Middle Holocene sediments have been deeply buried, reworked, or voided by Late Holocene fluvial activity (Artz 1996:387). Sites in valleys of tributaries to large rivers have been known to be extensively preserved, as well as those sites in alluvial fans along valley margins (Artz 1996). These dynamic geological processes have affected sites to the point that they cannot be ignored and likely played an important role in the preservation of Middle Holocene sites.

Frison (1975) suggested that the environment would have reduced the human carrying capacity on the Plains as well. Frison (1975) believed that bison hunting likely occurred in oasis-like areas and that there was a shift to more intensive hunting and gathering strategies. Reher (1977) also supported the idea of increased aridity which decreased the carrying capacity resulting in smaller bison and human populations. This suggestion implied that geological processes were not responsible for the decrease in sites present on the Plains and attributed the presence of fewer sites to the smaller human populations. Wedel (1978), on the other hand, suggested that the people were still focused on bison hunting and were not foraging with the exception of some mountainous areas in the northwestern Plains. He suggested that the proposed increase in temperature and decrease in precipitation forced the abandonment of the shortgrass area, driving people out to the periphery of the Plains. The notion of populations moving to the peripheries of the Great Plains or oasis-like areas is supported by numerous archaeologists and paleobiologists (see Hurt 1966; Frison 1975; Sheehan 1995; Walker 1992; Wedel 1978; Yansa 2007).

There does appear to be support for the notion of fewer sites on the Great Plains during this period, but the exact cause of this has yet to be determined. Walker (1992) identified 115 sites that are associated with the Mummy Cave series on the Great Plains however only a small number of these sites are considered to be well-documented with good radiocarbon dates. It is apparent that the majority of sites are located in the western montane regions with small clusters in the eastern, southern, and northern regions (Figure 12.1). This supports Hurt's (1966) suggestion that populations may have moved to certain regions of the Great Plains during this period. This can also indicate the localization of research in a particular area. Another popular idea that relates to Hurt's (1966) periphery model is the idea of refugia or oasis-like areas (Sheehan 1998; Yansa 2007). Yansa (2007) proposed that people did not abandon the Plains but instead moved to oasis-like areas. These areas would ideally be located near a permanent water source and as such were areas that were not as drastically affected by the increase in temperature of the Hypsithermal. This map also supports the hypothesis proposed by Reeves (1973) in that the concentration of these sites in the peripheries is due to individual or group sampling.

Two reoccurring themes are apparent with all excavated sites from this period. The first is that there is constant reference to sites being located near a water source such as river banks, river terraces, or floodplains on the prairies and springs, seeps, or small lakes in mountainous regions (Walker 1992). The idea that these sites are located so close to water may also be a reason why they are so difficult to find. These sites may have been destroyed by degradation or deeply buried by stream entrenchment and alluviation (Reeves 1973; Walker 1992). Lakeside and shoreline sites may have been utilized for camping at lower water levels and when the lake level rose the sites were left under water. The second reoccurring theme associated with sites from this period is that they tend to be of limited extent and are represented by sparse cultural assemblages (Walker 1992). Again, this is an idea that likely plays a significant role in the difficulty of finding sites of this age.

12.2 Climate During the Hypsithermal

There have been many independent and associated studies on the paleoclimate of the Hypsithermal on the Northern Plains including palynology (Sauchyn and Sauchyn 1991; Vance et al. 1995), diatoms and ostracods (Porter et al. 1999), and stable isotopes (Leyden 2004; Brad Schiele, personal communication 2010). All of these studies indicate dramatic climatic occurrences during this period. The first half of the Hypsithermal is considered to be warmer and drier, while the last 5,000 years have certain episodes that are comparable to today (Dyck 1983).

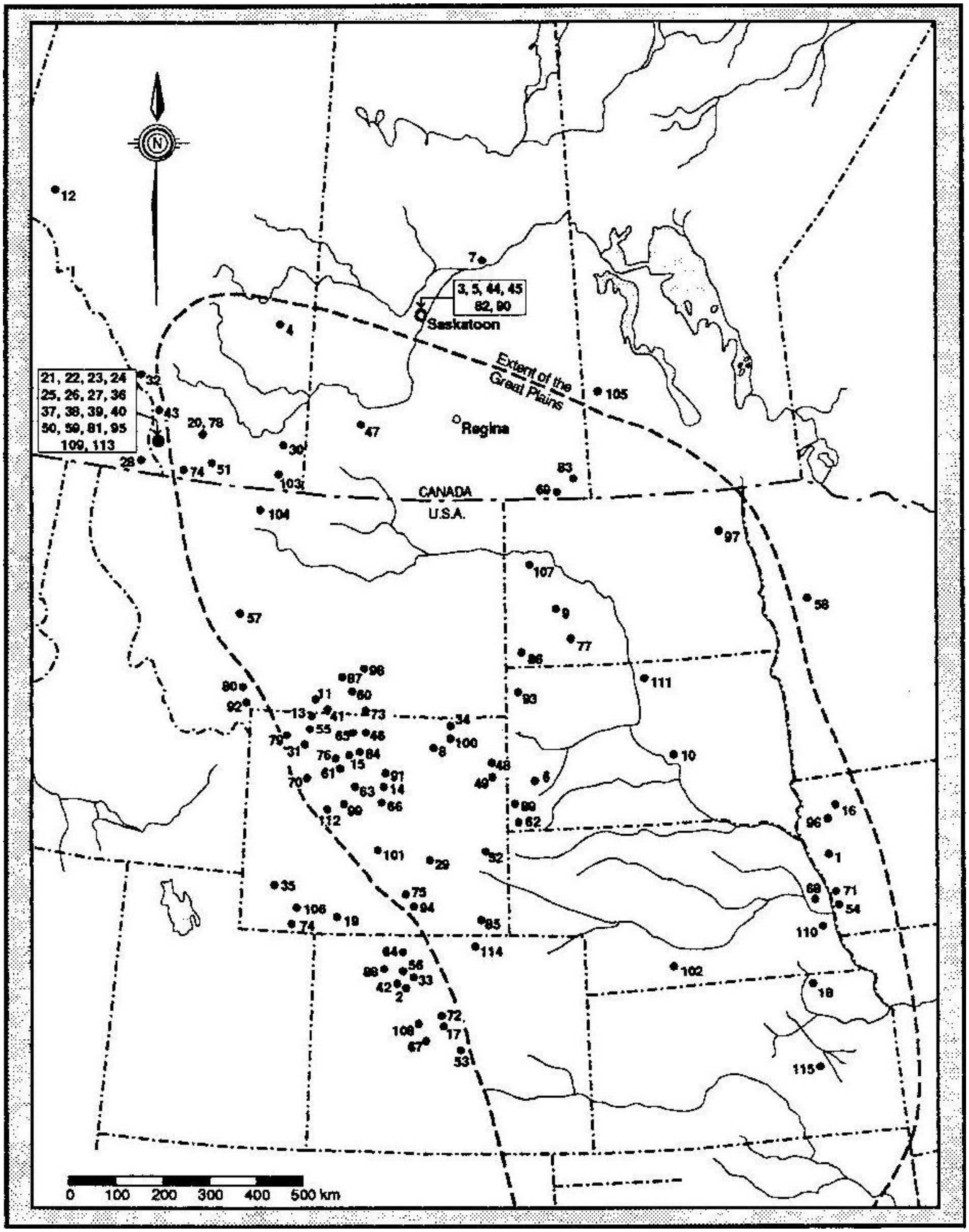

Figure 12.1: Distribution of Early Middle Prehistoric sites across the Plains (Walker 1992:126) (For a summary of sites, see Walker 1992:169-202).

From 10,500 to 7000 years B.P. the Plains appear to have undergone a period of warming. Evidence of periodic aridity is present with the transitional nature of the climate being supported by pollen and macrofossils (Lemmen and Vance 1999). There also appears to be a gradual change in vegetation occurring across the Plains. Higher temperatures and reduced aridity characterized the period from 8500 to 4600 years B.P. Studies completed in the northwestern Plains most commonly on lake cores support the idea of an increase in temperature and a decrease in precipitation.

Saline lakes are known for their rapid response to climate change and are therefore an area of interest for those studying paleoclimates (Vance et al. 1993). A study on Chappice Lake, a shallow hypersaline lake located in southeastern Alberta on the northern limit of the mixed grass prairie, provides support for a warmer climate. Lake cores were examined for types of pollen and sediment to determine the climate at a given point in time. As such two zones were identified: Zone 1 from 8.68 m to 6.00 m encompassed the period from 7300 to 4400 years B.P.; Zone 2 was from 6.00 m to 5.50 m and encompassed 4400 years B.P. to present. Zone 2 also included the entirety of a second core recovered from the lake. These two zones were identified based on the presence and amount of Chenopodiaceae-Amarathaceae (Cheno-Am), *Ambrosia* (ragweed), and *Ruppia* pollen (Vance et al. 1993).

The period from 7300 to 6000 years B.P. had low amounts of *Ruppia*, and an increase in Cheno-Am and *Ambrosia* pollen. The sediments observed from this section consisted of fine sand and silt with mud cracks visible. This suggests that the basin on occasion experienced periods of drying (Vance et al. 1993). From 6000 to 4400 years B.P., an abundance of macrofossils are present indicating a depositional environment conducive to preservation and small seasonal fluctuations. Even though the environment was depositional, water levels were low with a high amount of productivity and a large amount of carbonates in the sediment. This indicates that the climate was warm and dry but not as extreme as those climates before 6000 years B.P. (Vance et al. 1993:117). Approximately 3000 years B.P., there was an increase in water levels and a reduction in salinity, implying an increase in available water (Vance et al. 1993). This study indicates that there was repeated desiccation with interspersed stands of fresh water at Chappice Lake prior to 6000 years B.P. (Vance et al. 1993:117). From 6000 to 4400 years B.P. water levels were low, productivity was high, and a large amount of carbonates were present in the sediment, indicating a warm, dry climate. This climate was not as extreme as that before 6000 years B.P. (Vance et al. 1993).

A study completed by Sauchyn and Sauchyn (1991) looked at a 9.6 m core from Harris Lake, in the West Block of the Cypress Hills. There are two zones in this core that are of particular interest: Zone II and Zone III. Zone II extends from 8.40 to 4.85 m and dates from 7700 to 5000 years B.P. This zone shows a decrease in *Populus* and Araceae pollen, an increase in *Pinus* pollen, and a gradual decrease Cheno-Am pollen. An increase in herbaceous plants compared to tree and aquatic pollen is also present. Zone III is 4.85 to 4.10 m and dates from 5000 to 4500 years B.P. This zone shows a decrease in *Populus* and Cheno-Am pollen, an increase in *Pinus* and *Picea* pollen, and an increase in tree pollen compared to herbs (Sauchyn and Sauchyn 1991).

Zone II indicates that the environment at this time was dominated by a grassland community with a low amount of conifers and an intermediate amount of *Populus*. This suggests maximum warmth and aridity at this time. Also present during this period were extremely low lake levels with minimal fluctuation, indicating that there was little change in the warm, dry climate. Maximum aridity appears to have occurred around 7700 to 6800 years B.P. By around 5000 years B.P., there is the development of a cooling trend. Pollen recovered from the core indicates that during the time period represented by Zone III the environment was associated with a stream bank and moist woodland habitat with cooler temperatures.

A second study completed at Harris Lake looked at the ostracods found in the sediments (Porter et al. 1999). Both diatoms and ostracods indicate that maximum salinity occurred between 6500 and 5000 years B.P. From 9240 to 6400 years B.P. a variable aquatic environment is indicated (Porter et al. 1999). During the early part of this period temperatures were 1.0 to 1.5°C higher than present however by 6000 years B.P. temperatures were closer to the present. From 6400 to 4500 years B.P. there was very low diversity of specimens present, which indicates a harsh environment. This low diversity was explained by Porter et al. (1999) in two ways. The first was that it occurred from a low annual precipitation and high summer temperatures, while the second implied that there may have been high sedimentation rates occurring at this time.

Porter et al. (1999) believe that low water levels were present and seasonal fluctuations were frequent.

Studies by Vance et al. (1995) suggest warmer temperatures at around 6000 years B.P. than those at present. The boreal forest, parkland, and grassland had extended their limits further northward than today due to the increase in temperatures (Vance et al. 1995). The most significant change in the boreal forest pollen was an increase in pine pollen. This increase appears to occur in western Manitoba at around 5000 years B.P. and in central Saskatchewan at around 6000 years B.P. (Vance et al. 1995). Also apparent is the presence and westward migration of jack pine (*Pinus banksiana*), which was likely encouraged by frequent fires caused by the increase in temperatures. The parkland area displays pollen indicative of local expansion of open, grassy areas, and a low water table. This reduction of water is also present in the grasslands. According to Vance et al. (1995) peak aridity appears to have passed by 6000 years B.P., with increasingly moister conditions between 5500 to 4000 years B.P.

Multiple studies on Oro Lake, a small meromictic kettle lake located in the mixed-grass prairie region of southern Saskatchewan, have been completed (Laird et al. 2007; Last and Vance 2002). Other studies, by Vance and Last (1996) and Stuart (1999), have produced AMS radiocarbon dates from plant macrofossils recovered from cores from Oro Lake. The first study completed by Last and Vance (2002) looked at mineralogical composition, organic and moisture content, and bedding features from lake cores. This lake experienced a transition from fresh water to saline abruptly at around 9300 years B.P., likely due to a widespread decrease in moisture (Last and Vance 2002). Only one of the units in the core is applicable to the Mid-Holocene – unit 3 which has an age range of 7400 to 4000 years B.P. The sediments in this level range from finely well-laminated sediments interspersed with indistinguishable bedding. This unit is the most clay-rich unit and is dominated by the mineral aragonite. At about 7400 years B.P. the lake shifted from mainly soluble sulfate salts to sparingly soluble carbonates mixed with finer clastics and minor evaporates, indicating a slight freshening of the briny water.

Last and Vance (2002) explain the increase in clastic sediments as part of eolian transportation as opposed to transport by streams or sheetwash, these eolian processes were is likely a response to a decrease in moisture and vegetation cover and a strengthening of westerly zonal winds. Other suggestions for the change in mineral content and sediments is an increase in aridity which led to a decrease in water levels and a breakdown of the chemically stratified lake which accounted for the change in chemicals or the possibility of a decrease in groundwater which would have resulted in an increase in the proportion of carbonates. Last and Vance (2002) concluded that during this period the lake was saline but did not experience any extended period of dry or very low water conditions.

Laird et al. (2007) also studied lake cores from Oro Lake, focusing on the abundant and well-preserved diatoms. The diatoms present show a dramatic shift from a diverse fresh to subsaline assemblage to an assemblage dominated by a hypersaline taxon from 8650 to 5610 ^{14}C years B.P. This indicates a ten-fold increase in salinity in less than 100 years. This is similar to the study by Last and Vance (2002) which also indicated a shift from a freshwater lake to a saline lake. From about 5610 to 3110 ^{14}C years B.P. the diatoms indicate that the climate was more variable. Diatoms that are found in highly saline waters are punctuated by diatoms from less saline waters (Laird et al. 2007). Between 5000 and 3200 ^{14}C years B.P., wetter conditions with broadly arid conditions exist.

Leyden (2004) completed a study on stable isotopes from bison bone collagen from various sites throughout Saskatchewan ranging from the beginning of the Holocene to the end. The Norby site (approximately 5800 years B.P.) had bone that presented higher values of deuterium, indicating that the water was likely enriched (Leyden 2004). The presence of δD in bison bone collagen represents lifetime averages of regional dietary and drinking water inputs. The high D/H (deuterium/hydrogen) values in meteoric water primarily correlate with increased temperature at the site of precipitation. This indicates that a warmer climate was present at this time. The Gowen sites (approximately 6000 years B.P.) presented conditions that were cooler than what is commonly associated with this period (Leyden 2004). It is possible that shifts in climate that are significant and prolonged are not as noticeable due to the relatively short life span of a bison. The $\delta^{15}N$ (nitrogen) data analyzed from the bison tended to support the presence of an increase in aridity. "The Gowen data contrast significantly with those of the Norby site and when considered alongside the corresponding $\delta^{15}N$ results, depict a climate that is moderately temperate, but notably arid" (Leyden 2004:81). A study being completed by Schiele (personal communication 2010) will look at the stable isotopes from bison third molars. The data gathered from this study support the notion that the Hypsithermal was not as warm and dry as other proxies indicate. Schiele (personal communication 2010) has also found that there are several time periods on the Plains when the climate was harsher than that of the Hypsithermal.

"This paleohydrological record does not support the idea of a Mid-Holocene (7500 -5000 years ago) Altithermal (Antevs 1955), as frequently suggested in the archaeological literature to account for the lack of archaeological materials on the Northern Plains before 5000 years ago (Reeves 1973)" (Schweger and Hickman 1989:1831), as noted in a study on 28 lakes and bogs from central Alberta. All of this information suggests that the Hypsithermal is not the continuous hot and dry period that it was once believed to be. Evidence is growing for the notion of low water levels during this time period and increased evaporation on lakes and vegetation. It is likely that the Hypsithermal was generally warmer and was episodically and regionally variable in severity (Walker 1992). Even though it was not a prolonged drought, water levels were affected by the change in climate. Paleolacustrine data indicate that even during the severest droughts there were brief episodes of greater moisture. It is possible that even short episodes of aridity and warmer temperatures would have affected potable water sources. Some sources may have become saline or dry, while others may have become oases that provided drinking water and forage for game (Yansa 2007).

With a congregation of animals at specific oases it is likely that the faunal subsistence of the people occupying that area would have changed to accommodate the wider range of available animals. The populations of the Hypsithermal period are thought to have responded to these ecological stresses by expanding their pre-existing dietary patterns with a reliance on local plants and animals. "Almost every excavated archaeological site provides evidence of other subsistence routines, including small game hunting and in some cases, fishing: however, in every case bison are the primary resource represented" (Michlovic 2005:178). The southern and central Plains in particular present a larger variety of faunal remains as well as a large number of grinding stones, evidence of a broader subsistence base. Other areas on the Northern Plains, aside from Wyoming, suggest that bison remained a dominant form of subsistence with very small amounts of other faunal remains and little evidence of grinding implements (Haury 2005, Michlovic 2005).

12.3 Sites from the Hypsithermal on the Northern Plains

It is difficult to find sites that date to the period of the Hypsithermal. Walker (1992) reported that there were at least 115 sites recorded across the entire Great Plains however only a handful of these sites had good records including data collection and radiocarbon dates. This section presents a series of six sites from the Northern Plains dating to the time of the Hypsithermal. They have been selected in order to examine the variety, or lack thereof, of faunal specimens recovered from sites that are close in age and proximity to the Dog Child site.

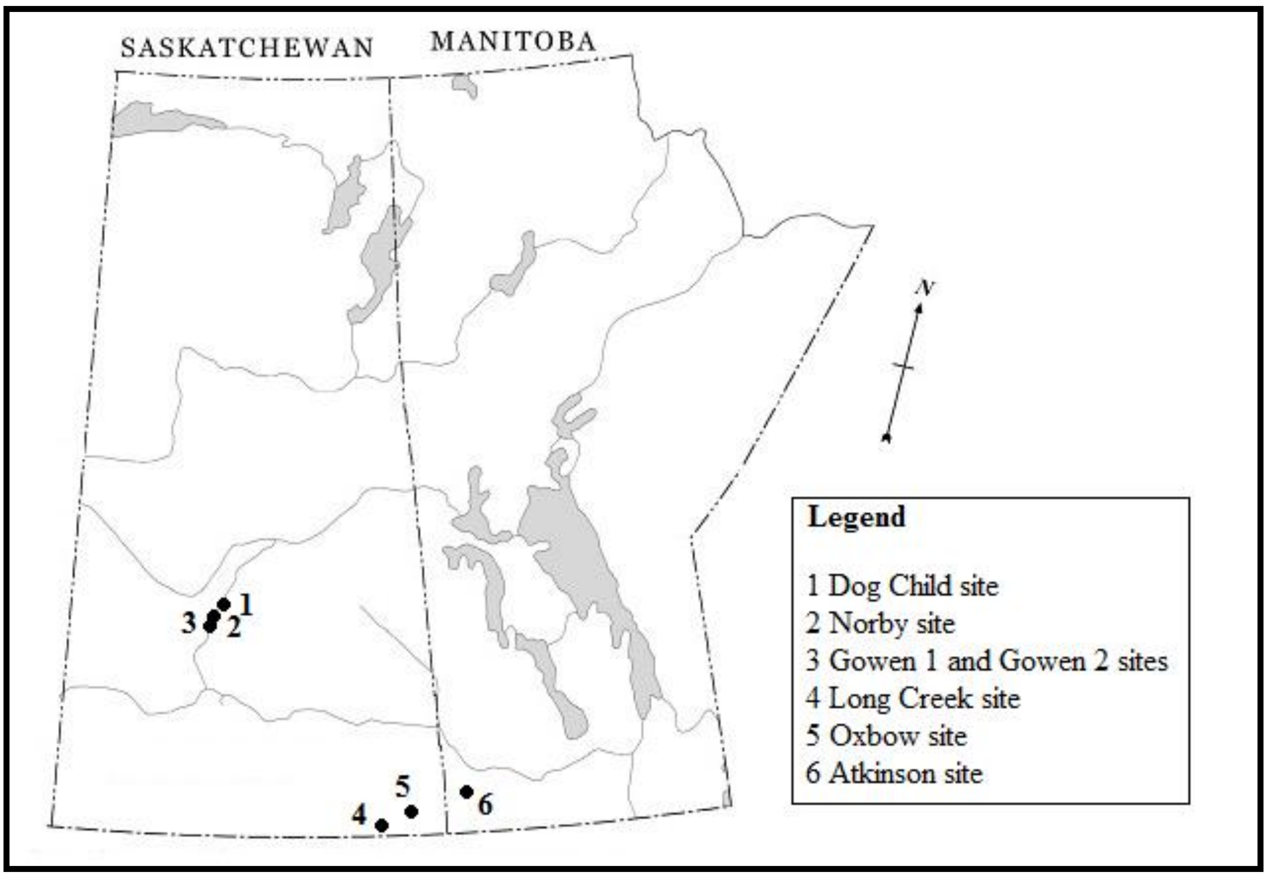

Figure 12.2: Location of comparative sites on the Northern Plains.

12.3.1 Gowen 1 (FaNq-25)

The Gowen 1 site was initially discovered in 1977 after heavy earth-moving equipment uncovered a buried archaeological deposit (Walker 1992:1). Salvage excavations were immediately undertaken to preserve and recover the remainder of the site. This site is located on the Saskatoon Terrace, a major terrace of the South Saskatchewan River, within the boundaries of the City of Saskatoon (Figure 12.2). The site is approximately 800 m west of the South Saskatchewan River (Walker 1992:4). Five radiocarbon dates were obtained for the Gowen 1 site with dates clustering around 6000 years B.P. (Table 12.1).

Table 12.1: Radiocarbon dates from the Gowen 1 site.

Sample Number	Sample Type	Radiocarbon Years B.P.
S-1526	Unburned bone	4725 ± 130
S-1527	Unburned bone	5670 ± 135
S-1448	Charcoal	5760 ± 135
S-1488	Burned bone	6065 ± 200
S-1457	Unburned bone	6150 ± 110

The cultural assemblage includes chipped stone and bone tools, lithic debitage, and FCR (Walker 1992:43). A total of 226 stone tools was recovered including 23 projectile points, one preform, four hafted bifaces, 15 bifacial knives, 35 end/sidescrapers, 11 unifaces, 23 gouges (reverse unifaces), two spokeshaves, nine perforators, 88 residual retouched items, five anvil stones, and 15 hammerstones. The majority of utilized materials were quartzites and cherts (Walker 1992:65). Ten bone tools were also recovered and include a bone tube. Others show evidence of flake removal, polish, and abrasion.

The faunal assemblage is extensive and weighs a total of 49.5 kg. Bone recovered from this site was extensively fragmented likely for marrow extraction. The majority of identifiable remains (95%) were bison. At least seven of these are adults and two are very young bison. A right first phalanx represents the only bird remain recovered from the assemblage, an American crow (*Corvus brachyrhynchos*). Also recovered from the faunal assemblage were elements from two wolves and elements from at least two medium-sized canids. Elements representing at least one pronghorn (*Antilocapra americana*) were also recovered. Often rodent bones recovered from sites are intrusive however the northern pocket gopher (*T. talpoides*) recovered from this level exhibits similar colouration and fracturing as the rest of the bones in the assemblage and was likely utilized to some extent.

Flotation analysis was conducted on 15 samples and produced six plant macrofossils which have been identified as Chenopodiaceae, possibly *Chenopodium album* (goosefoot or lambs' quarters). These are native to moist environments and available from May to June, with seeds being produced around September. This, in addition to bison material, indicates a late summer occupation. Four pits and three hearths along with a substantial amount of faunal remains indicate that the Gowen 1 site appears to be a processing area (Walker 1992).

12.3.2 Gowen 2 (FaNq-32)

The Gowen 2 site was discovered three years after Gowen 1, about 70 m west of the original site (Figure 12.2). This site was also exposed by heavy equipment, and salvage excavations were conducted. Four samples were submitted for radiocarbon dating, and the resulting dates also clustered around 6000 years B.P. (Table 12.2).

The cultural assemblage recovered from Gowen 2 is larger than that from Gowen 1. A total of 350 stone tools was recovered including 87 projectile points, five preforms, three hafted bifaces, 23 bifacial knives, 55 end/sidescrapers, 18 unifaces, 37 gouges, eight perforators, 110 residual retouched items, one anvil stone, and three hammerstones. A significant number of bone tools was recovered including five perforators, two knapping tools, two associated with specialized functions including pigment mixing and a hook, two that are spatula-shaped, two of unknown function, and seven that are cut marked and butchered. Also found were two unknown artifacts, both of which were polished, one made of bitumen and the other a broken concretion (Walker 1992).

Table 12.2: Radiocarbon dates from the Gowen 2 site.

Sample Number	Sample Type	Radiocarbon Years B.P.
S-2037	Soil	5665 ± 110
S-2036	Unburned bone	5910 ± 165
S-1970	Unburned bone	5915 ± 130
S-1971	Unburned bone	6075 ± 160

The faunal assemblage was also substantial at 148.3 kg and these specimens were also fragmented (Walker 1992). At least 14 adult bison are represented by the faunal remains. A number of rodents were identified including a Least chipmunk (*Eutamias minimus*), a northern pocket gopher (*T. talpoides*), and a muskrat (*Odontra zibithecus*). Only the pocket gopher is considered to be intrusive due to its completeness (Walker 1992:104). A number of canids were also recovered from the excavation, including a red or swift fox (*Vulpes sp.*), a coyote (*C. latrans*), at least three wolves (*C. lupus*), and at least two medium-sized canids (*Canis sp.*). No extralimital species were recovered from the excavations.

Eleven features were identified in the excavations. "These include not only pit and hearth features, but also ash lenses, bone spill piles, stained areas, a concentration of lithic debris, and a series of postholes" (Walker 1992:115). It is possible that this may have been the habitation portion of this site and is related to the first site.

12.3.3 The Norby Site (FbNp-56)

The Norby site is a bison kill located on the Saskatoon River terrace within the City of Saskatoon in the 900 block of Avenue M South (Zurburg 1991) (Figure 12.2). The site was initially discovered by Les Norby in 1988 while undertaking excavations for a new basement. An initial test pit revealed a concentration of bone approximately 1 m deep. A radiocarbon date of 5885 ± 265 years B.P. (S-3006) was obtained from unburned bone. Two additional radiocarbon dates, both from bone samples dating to 5740 ± 110 years B.P. (S-3205) and 5560 ± 120 years B.P. (S-3206), were also obtained, which fit right into the dates associated with the Mummy Cave series (Zurburg 1991).

The occupation level began around 1.10 m below the surface and ended at a depth of 1.20 to 1.25 m (Zurburg 1991). Excavation was completed in four areas and a total of 50 m^2 was excavated. The lithic assemblage from the Norby site is surprisingly small with only 176 lithic artifacts recovered. Six artifacts are classed as projectile points or fragments, and two of the six exhibit characteristics of the Gowen point style, while one of the points has been identified as a late Paleoindian point (Zurburg 1991). Other artifacts recovered include: two preforms, five bifaces, ten unifaces, and one hammerstone. The most common materials recovered from the site include Swan River chert, Knife River flint, and fine-grained quartzite (Zurburg 1991:63).

The faunal assemblage is the most significant with the majority (96.8%) being identifiable (Zurburg 1991:89). The assemblage consists of at least 26 bison which is dominated by males (Zurburg 1991:146-147). There were no immature bison specimens recovered however, age determination places the kill event around January or February (Zurburg 1991:171), suggesting that the kill site may have been a snow trap (Zurburg 1991:174). Zurburg (1991) believes that based on long bone measurements the bison present are a transition species, *Bison bison occidentalis*. Measurements appear to cluster below and around *B. b. antiquus* and above *B. b. bison* (Zurburg 1991). Only two other species were identified in the assemblage – one wolf and two rabbits. A total of three features were identified, including two processing hearths and a soil stain (Zurburg 1991:113). Bone was littered throughout with some areas showing articulating bones.

12.3.4 The Oxbow Dam Site (DhMn-1)

The Oxbow Dam site was initially excavated in 1956 by Dr. Robert Nero and Bruce McCorquodale for the Royal Saskatchewan Museum. This site is located on the east bank of the Souris River approximately 1.6 km south of the town of Oxbow (Figure 12.2). Deposits seen at this site are typical of those seen on alluvial terraces (Green 1998). In 1998 D'arcy Green completed a thesis entitled "*A Re-evaluation of the Oxbow Dam Site (DhMn-1): Middle Holocene Cultural Continuity on the Northern Plains*". This site is a multi-component site with the Oxbow level being of great importance in the naming of the Oxbow projectile point. Cultural Level 7 is of interest as its radiocarbon dates fall within those associated with the Mummy Cave series. Original dates obtained from a charcoal sample (S-44) date the site to

5947 ± 130 calibrated years B.P. A second radiocarbon date obtained by Green (1998) was from bone (S-3648) and resulted in a date of 7761 ± 90 calibrated years B.P. It is believed that the original sample may have been contaminated and is therefore erroneous (Green 1998). No diagnostic artifacts were recovered from this level. It is possible that one point from previous excavation is similar to the Bitterroot point style seen in the Mummy Cave series. Also recovered from this level was one preform and some debitage. Unfortunately, very few faunal remains were recovered from this level. Those that were recovered include a minimum of one adult bison and one Richardson's ground squirrel (*S. richardsonii*).

12.3.5 The Long Creek Site (DgMr-1)

The Long Creek site was discovered in southeastern Saskatchewan within the valley of Long Creek (Figure 12.2). This is a multi-component site that was initially discovered and excavated in 1957 by Boyd Wettlaufer and Dr. William Mayer-Oakes and at the time was the deepest stratified site to be excavated on the Northern Plains (Bryant 2002). There are three levels which have radiocarbon dates that are similar to those from Level 3b at the Dog Child site. The first date is from Level 7, which produced a calibrated date of 5317 ± 150 years B.P. (S-50) however this level is associated with the Oxbow complex and will therefore not be discussed. Two dates were obtained from Level 8; 5324 ± 80 years B.P (S-53) and 5317 ± 150 years B.P. (S-52). Level 9 produced a calibrated radiocarbon date of 5734 ± 125 years B.P (S-54) (Bryant 2002:54).

Level 8 is the level most closely associated with Level 3b at the Dog Child site if both radiocarbon dates and diagnostic artifacts are taken into consideration. A total of 60 m^2 was excavated from this level. Level 8 had a number of lithic and faunal remains recovered from it. Fourteen projectile points and projectile point fragments resembling the Mummy Cave series were recovered from this level. Also recovered were two preforms, 21 endscrapers, four sidescrapers, six bifaces, one combination drill/spokeshave/scraper, two hammerstones, two crude choppers, and 14 retouched flakes. A number of bone tools were also recovered and include three bone awls, one bone awl handle, one flaked bone scraper, a bone spokeshave, and several polished bone fragments.

A minimum of four bison were recovered from the assemblage with three of them identified as immature individuals. Two medium-sized canids were recovered and one scurid. A number of invertebrates were identified in the assemblage, including a fat mucket clam (*Lampsilis siliquoides*), white heelsplitter clam (*Lasmigona complanata*), common floater (*Anodonto grandis*) and two snail species (*Sphaerium sulcatum* and *Succinea ovaleis*). Numerous features were also identified in this level, including 11 hearths and a hearth/posthole feature.

Based on the radiocarbon date Level 9 also falls into the time frame for the Mummy Cave series however no diagnostic projectile points were recovered from this level. Cultural remains in this level were very sparse and included a large hafted biface, five retouched flakes, one bison, and one hearth.

12.3.6 The Atkinson Site (DiMe-27)

The Atkinson site is located on the north bank of the Souris River in southwestern Manitoba near the town of Lauder (Nicholson and Playford 2009) (Figure 12.2). Eleven square metres were excavated at this site in 2003, 2004, and 2006. Two radiocarbon dates were obtained for the Gowen level at this site. The first, a sample of charcoal, was dated to 6225 ± 50 calibrated years B.P. (TO-10640) and the second is a bone collagen sample that was dated to 6445 ± 120 years B.P. (TO-13365) (Nicholson and Playford 2009:29).

Seven Gowen projectile points were recovered from this level along with five bifaces. The points have been noted to be similar to those found at the Dog Child site (Nicholson and Playford 2009:33). Only a single hearth feature was identified at this site. The faunal remains at the site constitute the vast majority of artifacts recovered, weighing a total of 16.7 kg. Bison was clearly the dominant species with at least three mature individuals and one juvenile. Two fetal metapodials recovered indicate that an individual aged at six months gestation and the second aged at seven to nine months gestation were also present in the assemblage. A large amount of identified remains were classed as indeterminate ungulate but are likely bison (Nicholson and Playford 2009:37). A tooth recovered from the excavations indicates the presence of at least one cervid at the site attributed to either a moose or an elk. At least one medium- to large-sized canid was identified in the faunal assemblage as well. A mandible recovered has been classed as a

Vulpes sp. but is likely a red fox (*Vulpes vulpes*). An entire porcupine skeleton was recovered from the assemblage along with leporid fragments, suggesting the presence of a single rabbit or hare. A second leporid species (*Lepus sp.*) mandible was also recovered. The remainder of the faunal remains were placed into size categories. This site is believed to have been occupied sometime between mid-February and May (Nicholson and Playford 2009:39).

12.4 Subsistence Strategies in Level 3b at the Dog Child Site

Populations in the Great Plains from the Hypsithermal are thought to have responded to ecological change by expanding their pattern of subsistence and adopting a greater reliance on a wide range of plants and animals with a focus on local species. This is evident in the few sites found in the South and Central Plains which have a large variety of faunal remains (Haury 2005). They also have a large number of grinding implements which suggests a reliance on plant foods as well. Archaeological sites on the Northern Plains suggest that bison were a central aspect of subsistence with a very minimal amount of other fauna present. Furthermore, these sites do not show evidence of grinding implements, which may suggest that plant utilization was not as important (Haury 2005, Michlovic 2005).

The Dog Child site is considered to be a unique site in terms of faunal remains recovered. Not only were a great number of faunal remains obtained, but there was a considerable diversity of species. Looking at both the 2004 to 2006 (Cyr 2006) and 2007 to 2009 excavations there is a total of 14 taxa represented and six size categories. Bison is by far the dominant faunal taxa at the site. Including Cyr's (2006) analysis, there are at least 13 bison represented in Level 3b and an addition three represented in Level 3. Eleven of these individuals have been identified as adults, three as juveniles, and two as fetal bison. Also recovered from the site was a mule deer (*O. hemionus*), a white-tailed jackrabbit, and numerous canids including one adult wolf, one juvenile wolf, two swift foxes, one red fox, one large-sized canid, and two medium- to large-sized canids. A number of rodents were also recovered from excavations and include one immature beaver, two ground squirrels, two pocket gophers, and a second unidentified small rodent. It is unusual to find bird remains at archaeological sites but at the Dog Child site a number of different species including one bald eagle, two red-tailed hawks, one Swainson's hawk, one grouse (Family Tetraonidae), a medium-sized bird humerus too fragmented for identification, and a longbone shaft from a microbird (Order Passeriformes) were recovered.

It is quite obvious that bison is still the dominant taxa present at the site however there is a large variety of other taxa present. While some of the taxa present were used primarily as a food source, it is likely that the majority also served a secondary function. The bison remains present are not as highly processed as those seen at the Gowen sites however they are still quite fragmented, and there are very few complete elements. At the Gowen site even the smallest bones like phalanges were processed with only carpals and tarsals not being utilized (Walker 1992:92). It is likely that the heavy processing of bison bone was used for the extraction of grease which was then utilized in the production of pemmican (Reeves 1990:169). At the Dog Child site only one phalanx in the assemblage was crushed. It is possible that with the vast amount of fauna recovered from the site the idea of extensive processing was unnecessary. The Oxbow Dam site and the Long Creek site do not appear to show any extensive processing of bison. The Norby site presents a slightly different case in that it is a bison kill however with that in mind there is no extensive processing occurring there as the majority (96.8%) of the faunal assemblage consisted of identifiable bone. It is likely that the Atkinson site presented a similar scenario to the Dog Child site; whereby the majority of the assemblage was fragmented with only phalanges, carpals, tarsals, and sesamoids recovered whole (Nicholson and Playford 2009:36). Therefore, while bison was still the dominant taxon utilized by this occupation, they still had a supplemental dietary source and did not process the bison to the fullest extent.

Mule deer remains are not as common in archaeological assemblages as bison however they do appear at sites and in rare cases dominate the faunal assemblage (Frison 2004). According to Frison (2004) there are at least two sites on the Plains that show evidence of large scale deer processing: the Dead Indian Creek site and the Lookingbill site. There is no evidence of mule deer or white-tail deer trapping on the Plains (Frison 1978). Deer tend to be easy to hunt demonstrating "a fatal attribute in their behavior pattern which is to nearly always run a short distance when frightened and then stop to look back" (Frison 1978:271); therefore, the lack of deer remains in most sites is puzzling (Frison 2004). The mule deer would have been an ideal source of food if present in the Opimihaw valley. Currently white-tail deer inhabit the park and can frequently be seen in the early morning; therefore, it is not a stretch to assume that deer would have been present in such an ideal location. Mule deer would not only provide an additional dietary supplement to bison but would have been used to its fullest extent, which is supported by the antler tine pressure flaker that was also recovered from this level. It is wise to keep in mind that there is the possibility that the antler flaker may have been brought to the site from another location. In either case it shows that deer would have been utilized for more than one purpose. No other sites in the comparative sample have any deer remains; therefore, it is very likely that this species was acquired due to the convenience of their presence in the valley area. There were other artiodactyla remains recovered from two of the comparative sites. The Gowen 1 site contained elements representing at least one antelope, while a single tooth representing either an elk or moose was recovered from the Atkinson site.

There was an abundance of canid remains recovered from the Dog Child site. This includes an adult wolf, a juvenile wolf, two swift foxes, one red fox, one large-sized canid, and two medium- to large-sized canids. The abundance of these remains raises the question as to their purpose. It is very likely that many of these canid remains served a dual function for the occupants at this site. There is a wide range of uses for canids in a prehistoric context. Canids have been considered to be a supplemental food source at times; ethnographically they were not eaten on a regular basis but instead were often considered a delicacy (Walker, personal communication, 2007). A common use of canids on the Plains was for hauling and transportation. These animals were frequently used to carry bags or hooked up to a *travois* to haul items. Canids also played a role in Native American mythology. For instance, the coyote played an important role, often being referred to as the trickster in Old Crow mythology or as the God of the Plains on the Great Plains (Gese and Bekoff 2004:86). Dogs were also thought to be companions to the Plains people and were an important part of their lives as attested to by the evidence of purposeful burials of dogs (Morey 2006; Morey and Wiant 1992). Wolves were also an important canid and were the predators of bison, implying that if bison were in the area so too were wolves.

The furs of canids are frequently used for their quality and appearance. Therefore, it would not have been surprising to have seen their coats utilized as clothing or bedding. In fact the swift fox is of importance to many Plains Indian nations (Moehrenschlager and Sovada 2004:114). In the kit (swift) fox society of the Blackfoot Tribe of southwestern Alberta and northern Montana, the fox ranks high in status and were part of sacred functions to these people (Moehrenschlager and Sovada 2004:114). A second example is the Skidi Pawnee, who also had a fox society. The foxes, especially the swift fox, which has a soft and luxuriant coat, were used to provide skins for shirts that were used in ceremonies (Dorsey 1904). A third example comes from the Bracken Cairn site (DhOb-3), a prehistoric Pelican Lake burial in southwestern Saskatchewan, dated to 2465 ± 85 years B.P. (S-912) (Walker 1982). A minimum of nine swift foxes were recovered from the burial, likely serving a sacred or ceremonial function (Walker 1982). Not only would the furs have been utilized but the bones as well. At the Dog Child site numerous metapodials were identified in the faunal assemblage. It is possible that these bones were being utilized for jewellery production as a cut portion of a distal metapodial had been recovered with a hole purposefully made through the distal end and all of the cancellous bone removed. Canid remains were also recovered from the Gowen 1, Gowen 2, Norby, Long Creek, and Atkinson sites. With canid remains so frequently observed it is apparent that they played an important role in the Plains culture and way of life.

Rodents are another animal that is frequently recovered from archaeological sites. Often rodents are intrusive when recovered however it is possible that the Plains people may have set up some form of trap at the openings of burrows and used them as a dietary supplement. Some of the rodent remains recovered from Level 3b at the Dog Child site were burned and calcined, indicating that they may have been roasted or cooked. This is also observed at the Gowen 1 site, where a northern pocket gopher exhibited the same colouration and fracturing that was present on the much larger bison bones. Other sites including Gowen 2, Oxbow Dam, Long Creek, and Atkinson site also included rodent remains in the faunal assemblage. Larger rodents were also observed in the faunal assemblages of the Dog Child, Atkinson, and Gowen 2 sites. Specimens from an immature beaver were recovered from the Dog Child site. It is likely that the beaver would have been utilized for both its rich meat and pelt. Since beavers are located near the site in Opimihaw Creek they would have been in an ideal location for people to have procured them. Beavers were not recovered from any of the other sites however specimens belonging to a muskrat were recovered from the Gowen 2 site and an entire porcupine skeleton was recovered from the Atkinson site.

Lagomorphs are commonly utilized as a food source. Remains indicate the presence of at least one rabbit in the faunal assemblage at the Dog Child site. Only one other site, the Atkinson site, had remains from either a single rabbit or hare and remains from a second leporid (*Lepus sp.*). The remains from the Atkinson site were recovered near a hearth, suggesting that it was utilized as a food source. It is possible that the rabbit recovered from the Dog Child site may have been utilized for bait when capturing birds (Wilson 1928).

One of the most striking aspects of the faunal assemblage at the Dog Child site is the quantity of bird remains recovered. Not only are there a lot of bones present, but they are also attributed to a variety of different birds. The majority of bird remains present at the Dog Child site are from raptors and include a bald eagle, two red-tailed hawks, and a Swainson's hawk. Other birds include a grouse, a medium-sized bird, and a microbird. Both the medium-sized bird and the microbird did not present enough of the element in order to make an identification on the type of bird. It is likely that the grouse was utilized as a food source and may have been captured for the use of its feathers, as they typically have attractive plumage.

The most important and unique birds identified are the raptors. "For all Plains Indian tribes, birds not only provided one of these valued food supplements but also played a significant role in their mythology, symbolism and ceremonial activities" (Parmalee 1977:191). Therefore, it is believed that these birds were procured for their feathers as well as a source of nutrition. "Although raptorial birds appear to have been eaten on occasion by some Plains tribes, their inherent value was manifested in symbolic and ceremonial activities" (Parmalee 1977:203). The most important bird in activities of the Plains Indians was by far the eagle (Parmalee 1977; Wilson 1928). This is evident in the book *Hidatsa Eagle Trapping* (Wilson 1928), which explains the nature and use of the eagle and more importantly its feathers. Eagles are prominent in Native American mythology representing strength and courage. Feathers were often worn by people of high status or a particular standing (Parmalee 1977). Also mentioned is the use of hawk and/or eagle sternum being transformed into spoons (Parmalee 1977). While a portion of an eagle sternum was recovered from the Dog Child site, it did not give any indication that it may have been utilized as a spoon, and there were no obvious cut marks present on it. The most common bird elements recovered were those of the wing or leg, suggesting that they may have been procured primarily for their feathers.

Wilson (1928) explains that the Plains Indians would have dug eagle pits on a hill or at the bottom of a hill and subsequently made a cover frame of branches and grasses to hide the hole. A rabbit would have been utilized as bait, and an individual would have lain in the hole to wait. Once the eagle landed on the cover to eat the bait, they would have been seized by their legs. The tail feathers would have been plucked, and then the eagle would have been released as they are considered a sacred bird however sometimes the eagle would have been kept for a few days before being released (Wilson 1928). It is also very likely that the other raptors were also procured primarily for their feathers with use as a dietary supplement as a secondary reason. The Gowen 1 site was the only site in the comparative site analysis in which a bird, an American crow, was identified in the assemblage.

It is possible that the location of the Dog Child site, in a valley but near a hill, may have afforded the perfect environment and location in which to procure these birds. It is also a possibility that these elements may have been carried from another location and discarded here. This option does seem to be unlikely, as only a very minimal amount of eagle bones was recovered, and from accounts it is this portion that may have been left behind in the construction of a spoon. The remainder of the bird would have likely been utilized and taken with the people. As for the remaining raptors, particularly the red-tailed hawks, a great deal of the skeleton was recovered, including a large portion of the wing elements. Only some of the hindlimb elements were recovered from the Swainson's hawk, suggesting that they may have been discarded and the rest of the bird was taken with the people when they left. Either way it is evident that bird remains played a significant role in the faunal assemblage and lifeway of people occupying this site.

12.5 Summary of the Subsistence Patterns

One of the most notable aspects of all the sites analyzed is that they are located on or very close to a major water source. This would imply that there would be a constant supply of resources that could be utilized. Even with the availability of all these resources it is clear that there is still a primary reliance on bison. The Gowen 1 site specimens represented at least seven bison, the Gowen 2 site 14 bison, the Norby site 26 bison, the Oxbow Dam site one bison, the Long Creek site four bison, and the Atkinson site six bison. The Dog Child site had at least 13 bison in Level 3b and three bison in Level 3. Only three of the sites were supplemented by other artiodactyls, an antelope from the Gowen 1 site, an elk or moose from the Atkinson site, and a mule deer from the Dog Child site.

It is apparent that there was a secondary dependence on canids at most of the sites. All of the sites but the Oxbow Dam site had at least one canid present in the assemblage. It is possible that these animals were utilized as a food source however the literature suggests that canids were more than just a dietary supplement. Based on the amount of canid remains recovered at the sites they likely played an important role in Plains society. Various rodents were also recovered from all of the sites. While some of these were intrusive to the archaeological assemblage, there is also a strong possibility that they were part of the diet of the Plains people occupying these areas. Evidence from the Gowen 1 site indicates that at least one rodent was extensively processed in a similar fashion as the much larger bison. The Dog Child site had rodent remains that had been either burned or calcined, suggesting that they may have been cooked. Not only were small rodents recovered but three of the sites, Gowen 2, Atkinson, and Dog Child, had the remains of muskrat, porcupine and beaver, respectively. Leporids were recovered from the Atkinson site and the Dog Child site, suggesting that they were not a widely utilized resource.

The most interesting of the faunal remains is the plethora of bird remains recovered from the Dog Child site. Only one other site, Gowen 1, had evidence of bird remains in the assemblage. Bird remains tend to be relatively rare in archaeological assemblages in this region. When they are present they tend to receive very little attention as the remainder of the mammalian faunal assemblage often overshadows the sparse bird remains. What is unique to the Dog Child site is the large amount of raptors recovered from the excavation. It is very likely that these birds were initially procured for their feathers however consumption cannot be ruled out as it is reported, that even though they are sacred, Plains tribes have been known to consume them.

In terms of a very broad subsistence only the Gowen 1 site had plant remains recovered from excavation. Plant remains were not recovered from any of the other sites. The Dog Child site did have grinding implements present in the cultural assemblage, suggesting that plant utilization was undertaken at the site. Unfortunately no floral remains were recovered, likely due to the fact that the soil was only fine screened and no water/flotation screening was done.

It is believed that the Dog Child site shows a shift towards a broader subsistence pattern however it is evident that there is still a reliance on bison as the primary source of dietary nutrition. The large amount of fauna represented is believed to show an affinity for the procurement of local specimens. While no plant remains were recovered from Level 3b, two grinding slabs that were present suggest that they were utilizing plant materials to some extent. All of these attributes indicate that at this site, there was a shift in diet towards utilizing a larger variety of plants and animals.

Chapter 13

Conclusion

13.1 Summary of the Dog Child site

This thesis was designed to focus involved on analyzing the cultural assemblage at the Dog Child site. The Dog Child site (FbNp-24) is located within Wanuskewin Heritage Park. Situated on a terrace of the Opimihaw Creek, the Dog Child site has access to both the creek and the South Saskatchewan River. This site is a multi-component site that spans over 5,000 years of human history. The artifacts recovered from the site were recorded using three-point provenience. Detailed maps, photos, and stratigraphy were used to document the site in its entirety. The analysis of these artifacts forms the basis for this thesis. This thesis followed similar objectives to those set out by the 100-year Master Plan of Wanuskewin Heritage Park. The following objectives were addressed through this analysis:

(1) Reaffirming the cultural sequence identified by Cyr (2006);

(2) Analyzing and describing artifacts and features recovered from each level;

(3) Determining the number and types of fauna present in each level, and

(4) Identifying activity areas and interpreting seasonality and subsistence when possible.

The analysis of the site confirmed the presence of six cultural levels that were previously identified (Cyr 2006). Artifacts recovered from each level indicated that these occupations were habitation sites with associated activity areas indicating lithic work, food processing and cooking.

These six occupations levels are relatively compressed, with the deepest portion of the site approximately 80 cm below the surface. As noted in Cyr (2006) this relatively shallow deposition has resulted in compressed stratigraphy with some levels being difficult to differentiate. With that in mind it was important to note that in the 2004 to 2006 excavations, when the levels could not be differentiated, Level 1 (includes Level 1a and Level 1b), Level 2 (includes Level 2a and Level 2b), and Level 3 (includes Level 3a and Level 3b) were used. As excavations shifted towards the southern extent of the site the separation between the levels became clearer and the inclusive Level 1, Level 2, and Level 3 were not frequently used.

Diagnostic artifacts in Level 1a are attributed to a Plains Side-Notched/Protohistoric occupation with both projectile points and metal trade artifacts recovered. The 2007 to 2009 excavations did not yield any pottery however Mortlach complex pottery was recovered during previous field seasons (Cyr 2006). This level was not radiocarbon dated due to the fact that it was believed to be of a fairly recent occupation. Level 1b has a radiocarbon date of 300 ± 50 cal. years B.P. (BGS 2659) (Cyr 2006). This level is associated with the Prairie Side-Notched occupation, even though some Mortlach pottery and Plains Side-Notched projectile points were recovered from the level. Cultural Level 2a is associated with the McKean series based on the diagnostic artifacts recovered. Initially Cyr (2006) classed this as a Duncan/Hanna level however subsequent excavations uncovered McKean projectile points, and as such it has been classified as a McKean series occupation. This level has been radiocarbon dated to 3700 ± 45 cal. years B.P. (BGS 2660) (Cyr 2006,) placing it well within the McKean series date range. Based on projectile points recovered from Cyr (2006) as well as those from 2007 to 2009, Level 2b has been classified as an Oxbow occupation. Two radiocarbon dates have been obtained for the level; one is 4270 ± 50 cal. years B.P. (BGS 2661) (Cyr 2006), and the second is 4480 ± 40 cal. years B.P. (BGS 2890). The difference in dates has been explained based on the fact that the first radiocarbon sample submitted was a composite sample, which is notorious for producing erroneous dates. Level 3a was a very sparse assemblage, and unfortunately no projectile points were recovered from the 2007 to 2009 excavations. Based on Cyr (2006) it is possible that this level is a Gowen occupation or more likely a transitional Mummy Cave/Oxbow level. Two radiocarbon dates have also been obtained for this level. The first date 5310 ± 50 cal. years B.P. (BGS 2662) (Cyr 2006), and the second is 4830 ± 40 cal. years B.P. (BGS 2891). It is likely that the difference in dates is due to the lack of separation between Level 3a and Level 3b in the northern portion of the site from which the sample was obtained. Therefore, it is possible that the sample submitted for the first radiocarbon date may have been recovered from a depth that was not part of Level 3a. The last cultural level excavated at the Dog Child site is Level 3b. Based on projectile points recovered the occupation of this level has been classified as Gowen, a part of the Mummy Cave series. This level is the earliest occupation at both the site and in

Wanuskewin Heritage Park. Two radiocarbon dates have been obtained for this level; the first is 5530 ± 50 cal. years B.P. (BGS 2663) (Cyr 2006) and the second is 5890 ± 45 cal. years B.P. (BGS 2891). Again the first date obtained was composed of a composite sample, which has likely resulted in the difference between dates. This level was the richest cultural level at the site and a series of primary research objectives was addressed:

> (1) To provide an account of the paleoenvironmental record of the Hypsithermal (9000 to 4500 years B.P.) and the effect it may have had on people,
>
> (2) To survey a sample of Mummy Cave series occupations on the Northern Plains to determine subsistence patterns present, and
>
> (3) To examine the notion of a shift to a broader subsistence base at the Dog Child site during the Gowen occupation.

The Hypsithermal is not the hot and dry period that it was once thought to be. The literature suggests that the climate during this time was highly complex and was variable in both timing and intensity. Based on regional studies it appears that the climate, while warmer than today, was not overwhelmingly hot and presented a reduction in precipitation. It is evident that the Plains area was not abandoned during this period as was once previously thought however sites are still difficult to find and are few in number. The most common trend observed with sites from this period is their proximity to water sources.

The comparative sites analyzed suggest that there was still a heavy reliance on bison as the main source of food. In fact, the Gowen sites are the only sites to show extensive processing of bones, including the phalanges of bison and even rodent bones (Walker 1992). It is possible that this may have been the early stages of pemmican production. None of the other sites exhibit processing as extensive as this. Canids and rodents are also commonly found at these sites. Canids likely served more than one purpose, and it is possible that they may have been utilized as food, pets, beasts of burden or transportation, and for clothing. Rodents are frequently intrusive however, burned and calcined bones as well as processed bones indicate that they may have also been utilized as a source of dietary intake. Other faunal remains recovered include deer, antelope, moose or elk, rabbits, and birds, all of which were found at only a few of the sites, indicating that their usage was not as widespread. It is apparent that the major difference between the comparative sites is that the Dog Child site had a much large variety of faunal remains identified in its assemblage. Most noteworthy is the quantity of bird remains recovered from the Dog Child site, especially raptors. These birds, which include a bald eagle, two red-tailed hawks, a Swainson's hawk, and a grouse, are believed to have been procured primarily for their feathers and secondarily as a possible food source.

Also recovered from the Dog Child site were remnants of two grinding slabs. This indicates the possibility that plants may have been utilized at the site. Unfortunately, due to the lack of fine screening and flotation screening no plant remains were recovered. In fact plant remains were only recovered from the Gowen 1 site. This would imply that plant resources may not have been utilized very much during this period or that flotation screening is not a common part of the laboratory methodology. Nevertheless the large amount and variety of faunal remains recovered from the Dog Child site support the idea of a broader subsistence pattern with a dependence on bison.

13.2 Future Directions

This study highlighted a number of areas where future research is warranted. One of the problems with Mummy Cave occupations is the fact that there are few occupations and thus few sites with which to compare data. As more sites are discovered, a larger comparative database will be available. There is also little information on birds recovered from archaeological sites, especially on the Northern Plains. Bird remains tend to be difficult to identify in the faunal assemblage and are frequently overshadowed by the mammalian remains recovered from excavations. Most of the current knowledge of bird use by Native Americans on the Plains comes from ethnographic accounts. The ideal situation would be to have researchers document bird remains in sites on par with how well mammal remains are documented at archaeological sites. If a large amount of faunal remains are recovered from a site, having a specialist in zooarchaeology would be a huge asset to documenting the faunal remains correctly. Again, a larger comparative sample with bird remains would be ideal.

Also of interest would be determining the paleoenvironment of Wanuskewin Heritage Park. A considerable amount of work on paleoenvironment is being undertaken in the more southern portions of the province. As was noted in this thesis the climate was quite variable during the Hypsithermal period and also appeared to be regionally variable. Therefore, while data from southern sites may give us an overall picture of what was occurring regionally, it does not give an accurate analysis for Wanuskewin Heritage Park. Geological samples have been taken from the area which when analyzed will help with the understanding of processes that were occurring in the valley. Additionally, phytolith samples have been taken from the Dog Child site and are being housed at the University of Saskatchewan. It is the hope of the author that these samples will eventually be processed to determine if they will provide any insight into the paleoenvironmental record at the park.

The continued search for Mummy Cave archaeological sites on the Northern Plains and careful analysis of faunal remains at these sites will provide valuable insights into the Middle Holocene climate and its effect on the local populations.

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Appendix A

Flora Resources of the Saskatoon Region

Latin Name	Common Name
Aceraceae	**Maple Family**
Acer negundo	Manitoba Maple (Box Elder)*
Alismataceae	**Water-Plantain Family**
Sagittaria cuneata	Arum-Leaved Arrowhead*
Amaranthaceae (include former Chenopodiaceae)	**Amaranth Family**
Chenopodium berlandieri (*C. album*)	Lamb's Quarters*
Kochia scoparia	Summer-Cypress
Anacardiaceae	**Sumach Family**
Rhus radicans	Poison Ivy
Apiaceae or Umbelliferae	**Parsley Family**
Cicuta maculata	Water-Hemlock (Spotted Water-Hemlock)
Heracleum lanatum (*H. maximum*; *H. sphondylium*)	Common Cow-Parsnip*
Lomatium macrocarpus	Long-Fruited Parsley
Sanicula marilandica	Snakeroot (Black Sanicle)*
Sium suave	Water Parsnip*
Zizia aptera	Heart-Leaved Alexanders
Apocynaceae	**Dogbane Family**
Apocynum androsaemifolium (*A. sibiricum*; *A. cannabinum* var. *hypericifolium*)	Spreading Dogbane (Indian-Hemp)*
Araceae	**Duckweed Family**
Lemna minor	Lesser Duckweed (Common Duckweed)
Lemna trisulca	Ivy-Leaved Duckweed (Star Duckweed)
Araliaceae	**Ginseng Family**
Aralia nudicaulis	Wild Sarsaparilla*
Asclepiadaceae	**Milkweed Family**
Asclepias ovalifolia	Dwarf Milkweed*

Asteraceae or Compositae	**Aster, Daisy, or Sunflower Family**
Achillea millefolium (*A. lanulosa*; *A. borealis*)	Milfoil Yarrow (Wooly Yarrow; Common Yarrow)*
Agoseris glauca	Large-Flowered False Dandelion (Pale Agoseris; Prairie Agoseris)
Antennaria rosea	Rosy Everlasting (Rosy Pussytoes)
Antennaria neglecta (*A.campestris*; *A. canadensis*; *A. howellii*; *A. neodioica*; *A. obovata*)	Broad Leaf Pussytoes (Field Pussytoes)
Antennaria parvifolia (*A. nitida*; *A. microphylla*)	Small-Leaved Pussytoes (Small-Leaved Everlasting)*
Artemisia campestris (*A. canadensis*; *A. caudata*; *A. borealis*)	Plains Wormwood*
Artemisia frigida	Pasture Sagewort*
Artemisia ludoviciana var. *gnaphalodes*	Prairie Sage*
Aster ericoides (*A. pansus*; *A. multiflorus*; *Lasallea ericoides*; *Symphyotrichum ericoides*; *Virgulus ericoides*)	Tufted White Prairie Aster (Heath Aster; Many-Flowered Aster)*
Aster falcatus	White Prairie Aster*
Aster hesperius	Western Willow Aster*
Aster laevis	Smooth Blue Aster
Cirsium arvense	Canada Thistle
Cirsium vulgare	Bull Thistle (Spear Thistle; Plumed Thistle; Roadside Thistle)
Crepis runcinata	Scapose Hawk's-Beard
Crepis tectorum	Narrow-Leaved Hawk's Beard
Erigeron canadensis	Canada Fleabane*
Erigeron glabellus	Smooth Fleabane*
Erigeron philadelphicus	Philadephia Fleabane*
Gaillardia aristata	Great-Flowered Gaillardia*
Grindelia squarrosa	Gumweed*
Gutierrezia sarothrae (*G. diversifolia*)	Broomweed (Broom Snakeweed)
Heterotheca villosa	Hairy False Golden-Aster
Liatris punctata	Dotted Blazingstar
Lygodesmia juncea	Skeletonweed (Rush Skeletonplant)*
Matricaria matricarioides	Pineappleweed*
Petasites sagittatus	Arrow-Leaved Colt's-Foot*
Ratibida columnifera	Upright Prairie Cone-Flower
Rudbeckia hirta	Black-Eyed Susan*
Senecio canus	Silvery Groundsel (Prairie Groundsel)
Senecio congestus	Marsh Ragwort*
Solidago canadensis	Canada Goldenrod (Graceful Goldenrod)*
Solidago missouriensis	Low Goldenrod (Missouri Goldenrod)

Sonchus arvensis	Smooth Perennial Sow Thistle*
Taraxacum officinale	Common Dandelion*
Tragopogon pratensis	Showy Goat's-beard (Jack-go-to-bed-at-noon)
Betulaceae	**Birch Family**
Alnus tenuifolia (*A. incana* ssp. *lenuifolia*)	Speckled Alder (River Alder)*
Betula occidentalis (*B. fontinalis*)	River Birch (Water Birch)*
Betula papyrifera	White Birch (Paper Birch)*
Corylus cornuta	Beaked Hazelnut*
Boraginaceae	**Borage Family**
Cryptantha nubigena (*C. celosioides*)	Clustered Oreocarya
Lappula redowskii var. *occidentalis*	Western Bluebur (Desert Stickseed)
Lithospermum canescens	Hoary Puccoon*
Lithospermum incisum	Narrow-Leaved Puccoon
Brassicaceae or Cruciferae	**Mustard or Cabbage Family**
Brassica juncea	Indian Mustard*(Mustard Greens; Leaf Mustard)
Capsella bursa-pastoris	Shepard's-Purse*
Descurainia sophia	Flixweed (Tansy Mustard)*
Lepidium densiflorum	Common Pepper-Grass (Prairie Pepper-Grass)*
Rorippa islandica	Northern Marsh Yellow Cress*
Thlaspi arvense	Stinkweed (Pennycress)*
Cactaceae	**Cactus Family**
Escobaria vivipara (*Mammillaria vivipara*)	Purple Cactus (Spinystar)*
Campanulaceae	**Bluebell Family**
Campanula rotundifolia	Common Harebell (Bluebell)*
Caprifoliaceae	**Honeysuckle Family**
Lonicera dioica var. *glaicescens*	Twining Honeysuckle (Limber Honeysuckle; Red Honeysuckle)*
Symphoricarpos albus	Snowberry*
Symphoricarpos occidentalis	Western Snowberry (Buckbrush)*
Viburnum edule	Low Bush-Cranberry (Squashberry; Mooseberry)*
Viburnum opulus (*V. trilobum*)	High Bush-Cranberry (American Bush-Cranberry; Pembina)*

Caryophyllaceae	**Pink Family**
Arenaria lateriflora (*Moehringia lateriflora*)	Blunt-Leaved Sandwort
Cerastium arvense	Field Chickweed
Cornaceae	**Dogwood Family**
Cornus canadensis	Bunchberry*
Cornus stolonifera (*C. alba*; *C. sericea*)	Red-Osier Dogwood (Red Willow)*
Cupressaceae	**Cypress Family**
Juniperus communis	Common Juniper (Ground Juniper)*
Juniperus horizontalis	Creeping Juniper*
Cyperaceae	**Sedge Family**
Carex aquatilis	Water Sedge*
Carex lanuginosa (*C. pellita*)	Woolly Sedge
Carex utriculata (formerly *C. rostrata*)	Beaked Sedge
Carex stenophylla ssp. *Eleocharis* (*C. duriuscula*)	Low Sedge (Needle-Leaf Sedge)*
Carex filifolia	Thread-Leaf Sedge
Eleocharis acicularis	Needle-Spike Rush
Scirpus americanus	Three-Square Bulrush (Common Three-Square)
Scirpus acutus (*S. validus*; *S.lacustris* ssp. *glaucus*)	Great Bulrush (Hard-Stemmed Bulrush)*
Scirpus paludosus (*S. maritimus*)	Prairie Bulrush (Cosmopolitan, Alkali, or Saltmarsh Bulrush)
Elaeagnaceae	**Oleaster Family**
Elaeagnus commutata	Silverberry (Wolf Willow)*
Shepherdia argentea	Buffaloberry (Silver Buffaloberry)
Shepherdia canadensis	Canada Buffaloberry (Russet Buffaloberry; Soopolallie; Soapberry)*
Equisetaceae	**Horse-Tail Family**
Equisetum arvense	Common Horsetail (Field Horsetail)*
Equisetum hyemale	Common Scouring-Rush*
Ericaceae	**Heath Family**
Arctostaphylos uva-ursi	Common Bearberry (Kinnikinnick)*

Fabaceae	**Pea Family**
Astragalus americanus	American Milk-Vetch
Astragalus crassicarpus	Ground-Plum Milk-Vetch (Buffalo Plum)*
Astragalus gilviflorus	Plains Milk-Vetch
Astragalus missouriensis	Missouri Milk-Vetch
Astragalus pectinatus	Narrow-Leaved Milk-Vetch
Glycyrrhiza lepidota	Wild Licorice*
Lathyrus ochroleucus	Cream-Colored Vetchling (Creamy Peavine)
Melilotus officinalis	Yellow Sweet-Clover (Yellow Melilot; Common Melilot)*
Oxytropis sericea	Early Yellow Locoweed*
Oxytropis splendens	Showy Locoweed*
Petalostemon candidum	White Prairie-Clover (White Dalea)*
Petalostemon purpureum	Purple Prairie-Clover*
Psoralea agrophylla	Silverleaf Psoralea (Silverleaf Scurfpea)
Psoralea lanceolata	Lance-Leaved Psoralea (Lance-Leaved Scurfpea)
Psoralea esculenta	Indian Breadroot*
Thermopsis rhombifolia	Golden-Bean (Buffalo Bean)
Vicia americana	American Vetch
Gentianaceae	**Gentian Family**
Gentianella amarella (*Gentiana amarella*; *Gentiana acuta*)	Northern Gentian (Felwort)*
Grossulariaceae	**Currant Family**
Ribes hudsonianum	Northern Black Currant*
Ribes oxyacanthoides (*R. hirtellum*; *R. setosum*)	Northern Gooseberry (Canadian Gooseberry; Inland Gooseberry; Low Wild Gooseberry)*
Iridaceae	**Iris Family**
Sisyrinchium montanum	Common Blue-Eyed Grass (Strict Blued-Eyed Grass)
Juncaceae	**Rush Family**
Juncus balticus (*J. arcticus* ssp. *balticus*)	Baltic Rush (Wire Rush; Artic Rush)*
Juncus alpinus(*J. alpinoarticulatus*)	Alpine Rush
Juncus nodosus	Knotted Rush (Jointed Rush)

Juncaginaceae	**Arrow-Grass Family**
Triglochin maritima	Seaside Arrow-Grass*
Lamiaceae or **Labiatae**	**Mint Family**
Monarda fistulosa	Western Wild Bergamot*
Mentha arvensis	Wild Mint (Field Mint, Corn Mint)*
Physostegia virginiana	False Dragonhead
Scutellaria galericulata (*S. epilobiifolia*)	Marsh Skullcap*
Lentibulariaceae	**Bladderwort Family**
Utricularia vulgaris	Common Bladderwort
Liliaceae	**Lily Family**
Allium cernuum	Nodding Onion*
Allium textile	Prairie Onion (Textile Onion)*
Lilium philadelphicum var. *andinum*	Western Red Lily (Western Wood Lily)*
Maianthemum canadense	Two-Leaved Solomon's Seal (Wild-Lily-Of-The-Valley)*
Smilacina stellata	Star-Flowered False Solomon's Seal*
Linaceae	**Flax Family**
Linum lewisii	Lewis Wild Flax (Blue Flax)*
Linum rigidum	Yellow Flax (Stiffstem Flax)*
Malvaceae	**Mallow Family**
Sphaeralcea coccinea	Scarlet Mallow (Scarlet Globemallow)*
Nyctaginaceae	**Four O'Clock Family**
Mirabalis nyctaginea	Heart-Leaved Umbrellawort (Wild Four O'Clock)
Oleaceae	**Olive Family**
Fraxinus pennsylvanica var. *subintegerrima* (*F. lanceolata*; *F. campestris*)	Green Ash (Lance-Leaved Ash; Red Ash)*
Onagraceae	**Evening-Primrose Family**
Gaura coccinea	Scarlet Gaura (Scarlet Beeblossom)*
Orchidaceae	**Orchid Family**
Habenaria hyperborea (*Platanthera hyperborea*)	Green-Flowered Bog-Orchid (Northern Green Bog-Orchid)*

Plantaginaceae (Formerly Hippuridaceae)	**Plantain Family**
Hippirus vulgaris	Common Mare's-Tail*
Plantaginaceae	**Plantain Family**
Plantago major	Common Plantain (Whiteman's Foot)*
Poaceae	**Grass Family**
Agropyron dasystachyum (*Elymus lanceolatus*)	Northern Wheatgrass
Agropyron cristatum	Crested Wheatgrass
Agropyron smithii (*Pascopyrum smithii*)	Western Wheatgrass
Agropyron trachycaulum (*A.caninum*; *Elymus trachycaulus*)	Slender Wheatgrass
Agropyron repens (*Elyrigia repens*)	Couchgrass (Quack Grass)*
Agrostis scabra	Rough Hair Grass (Hair Bentgrass; Tickle Grass)
Andropogon scoparius (*Schizachyrium scoparium*)	Little Bluestem
Beckmannia syzigachne	Slough Grass (American Sloughgrass)*
Bouteloua gracilis	Blue Grama
Bromus anomalus	Nodding Brome
Calamogostris canadensis	Marsh Reed Grass (Bluejoint)*
Calamovilfa longifolia	Sand Grass (Prairie Sandreed)
Elymus canadensis	Canada Wild Rye (Nodding Wild Rye)*
Elymus glaucus	Smooth Wild Rye (Blue Wild Rye)*
Festuca hallii (*F. altaica*; *F. scabrella*)	Plains Rough Fescue (Northern Rough Fescue)*
Helictotrichon hookeri	Hooker's Alpine Oat Grass
Hierochloe odorata	Sweet Grass*
Hordeum jubatum	Foxtail Barley*
Hordeum vulgare	Wild Barley*
Koeleria cristata (*K. macrantha*; *K. gracilis*)	June Grass (Prairie June Grass)*
Muhlenbergia cuspidata	Prairie Muhly (Plains Muhly)
Muhlenbergia racemosa	Marsh Muhly
Muhlenbergia richardsonis	Mat Muhly
Oryzopsis hymenoides	Indian Rice Grass
Phalaris arundinacea	Reed Canary Grass*
Phleum pratense	Timothy*
Poa compressa	Canada Blue Grass
Poa palustris	Fowl Blue Grass*
Poa pratensis	Kentucky Blue Grass
Puccinellia nuttalliana	Nuttall's Salt-Meadow Grass
Spartina pectinata	Prairie Cord Grass
Sporobolus cryptandrus	Sand Dropseed

Stipa comata	Spear Grass (Needle-and-Thread Grass)*
Stipa viridula	Green Needle Grass*
Stipa spartea	Porcupine Grass*
Polemoniaceae	**Phlox Family**
Phlox subulata	Moss Phlox*
Phlox hoodii	Spiny Phlox*
Polygalaceae	**Milkwort Family**
Polygala senega	Seneca Snakeroot*
Polygonaceae	**Buckwheat Family**
Eriogonum flavum	Yellow Umbrella Plant (Alpine Golden Buckwheat)
Polygonum amphibium	Water Smartweed*
Rumex occidentalis	Western Dock
Primulaceae	**Primrose Family**
Androsace septentrionalis	Pygmyflower (Fairy Candelabra)
Lysimachia ciliata (*Steironema ciliatum*)	Fringed Loosestrife*
Pyrolaceae	**Wintergreen Family**
Orthilia secunda (*Pyrola seccunda*)	One-Sided Wintergreen*
Pyrola asarifolia	Common Pink Wintergreen*
Ranunculaceae	**Crowfoot Family**
Actaea rubra	Red & White Baneberry
Anemone canadensis	Canada Anemone*
Anemone cylindrica	Long-Fruited Anemone (Candle Anemone)
Anemone multifida	Cut-Leaved Anemone*
Anemone patens (*Pulsatilla ludoviciana*; *P. patens*)	Prairie Crocus (Pasque Flower)*
Caltha palustris	Yellow Marsh-Marigold*
Ranunculus cymbalaria	Seaside Buttercup (Shore Buttercup)*
Ranunculus glaberrimus	Shiny-Leaved Buttercup (Sagebrush Buttecup)
Ranunculus gmelinii	Small Yellow Water-Buttercup (Yellow Water-Crowfoot)
Ranunculus macounii	Macoun's Buttercup*
Thalictrum venulosum	Veiny Meadow-Rue*

Rhamnaceae	**Buckthorn Family**
Rhamnus cathartica	Buckthorn (Common Buckthorn; Purging Buckthorn)*
Rosaceae	**Rose Family**
Amelanchier alnifolia	Saskatoon (Serviceberry, Juneberry)*
Crataegus rotundifolia	Round-Leaved Hawthorn
Fragaria virginiana	Smooth Wild Strawberry (Virgina Strawberry, Wild Strawberry)*
Geum triflorum	Three-Flowered Avens (Old Man's Whiskers; Prairiesmoke; Torchflower)*
Potentilla anserina	Silverweed*
Potentilla pensylvanica	Prairie Cinquefoil*
Prunus pensylvanica	Pin Cherry*
Prunus virginiana	Choke Cherry*
Rosa acicularis	Prickly Rose*
Rosa arkansana	Prairie Rose*
Rosa woodsii	Wood's Rose*
Rubus idaeus (*R. strigosus*)	Wild Red Raspberry (American Red Raspberry)*
Rubiaceae	**Madder Family**
Galium boreale	Northern Bedstraw*
Galium triflorum	Sweet-Scented Bedstraw (Fragrant Bedstraw)*
Salicaceae	**Willow Family**
Populus balsamifera	Balsam Poplar*
Populus deltoides var. *occidentalis*	Cottonwood*
Populus tremuloides	Trembling Aspen (Quaking Aspen; White Poplar)*
Salix bebbiana	Beaked Willow (Bebb's Willow)*
Salix interior	Sandbar Willow*
Salix lutea	Yellow Willow*
Salix petiolaris (*S. gracilis*)	Meadow Willow (Basket Willow)*
Santalaceae	**Sandalwood Family**
Comandra umbellata (*C. pallida*; *Geocaulon umbellatum*)	Pale Comandra (Bastard Toadflax)*
Saxifragaceae	**Saxifrage Family**
Heuchera richardsonii	Richardson's Alumroot*

Scrophulariaceae	**Figwort Family**
Orthocarpus luteus	Yellow Owl's-Clover
Penstemon gracilis	Lilac-Flowered Beardtongue
Penstemon nitidus	Smooth Blue Beardtongue
Selaginellaceae	**Spike-Moss Family**
Selaginella densa	Prairie Selaginella*
Smilacaceae	**Greenbrier Family**
Smilax lasioneura	Carrion Flower*
Sparganiaceae	**Bur-Reed Family**
Sparganium eurycarpum	Broad-Fruited Bur-Reed (Giant Bur-Reed)*
Typhaceae	**Cattail Family**
Typha latifolia	Common Cattail*
Urticaceae	**Nettle Family**
Urtica dioica (*U. gracilis*)	Common Nettle (Stinging Nettle)*
Violaceae	**Violet Family**
Viola adunca	Early Blue Violet (Hookedspur Violet; Sand Violet; Western Dog Violet)*
Viola canadensis (*V. rugulosa*)	Western Canada Violet (Canada Violet)*
Viola nuttallii	Nuttall's Yellow Violet*

Note: After Rogal (1982)
* denotes ethnographic evidence for plant use Keane (2009), Johnson et al. (1995), Gilmore (1977), Yarnell (1964).

Additional References

Johnson et al. (1995), Looman and Best (1987)

http://planthardiness.gc.ca/ph_spp.pl?lang=en&genusid=1000482

http://www.eol.org/

http://plants.usda.gov/

Appendix B

Faunal Resources of the Saskatoon Region

Latin Name	Common Name
MAMMALS	
Bovidae	**Antelopes, Cattle, Sheep, and Goats**
Bison bison bison [E]	American Bison (American Buffalo*)
Antilocapridae	**Pronghorns**
Antilocapra americana americana[E]	Pronghorn (Prong Buck, Prnghorn Antelope, Antelope*)
Cervidae	**Deer**
Cervus elaphus nelsoni[E]	Elk (American Elk, Wapiti, Red Deer)
Odocoileus virginianus dacotensis	White-Tailed Deer (Northern-Plains White-Tailed Deer)
Odocoileus hemionus hemionus	Mule Deer
Felidae	**Cats**
Lynx lynx canadensis	Lynx
Felis concolor cougar	Mountain Lion (Cougar, Puma)[1]
Ursidae	**Bears**
Ursus americanus americanus[E]	American Black Bear
Ursus arctos horribilis[E]	Grizzly Bear
Canidae	**Dogs**
Canis lupus nubilus[E]	Buffalo Wolf (Great Plains Wolf)
Canis latrans latrans	Coyote (American Jackal, Prairie Wolf)
Canis familiaris	Domestic Dog
Vulpes vulpes regalis	Red Fox
Vulpes velox[E]	Swift Fox
Mustelidae	**Weasels and Allies**
Gulo gulo luscus[E]	Wolverine
Taxidea taxus taxus	American Badger
Mephitis mephitis hudsonica	Striped Skunk

Lontra canadensis preblei[E]	River Otter
Mustela erminea invicta	Ermine (Stoat, Shorttail, Short-Tail Weasel)
Mustela frenata longicauda	Long-Tailed Weasel (Prairie Long-Tailed Weasel)
Mustela vison lacustris (*Neovison vison*)[E]	American Mink
Mustela nivalis rixosa	Least Weasel (Dwarf, Pygmy, or Mouse Weasel)
Procyonidae	**Raccoon and Allies**
Procyon lotor hirtus	Raccoon (North American Raccoon, Common Raccoon, Coon, Northern Raccoon, Racoon)
Leporidae	**Rabbits and Hares**
Lepus americanus americanus	Snowshoe Hare (Varying Hare)
Lepus townsendii campanius	White-Tailed Jack Rabbit (Prairie Hare, White Jack)
Sylvilagus nuttallii grangeri	Nuttall's Cottontail (Mountain Cottontail)
Erethizontidae	**New World Porcupines**
Erethizon dorsatum dorsatum	North American Porcupine (Common Porcupine, Canadian Porcupine)
Castoridae	**Beavers**
Castor canadensis canadensis	North American Beaver (American Beaver, Canadian Beaver)
Dipodidae	**Jumping Mice and Jerboas**
Zapus princeps minor	Western Jumping Mouse
Heteromyidae	**Pocket Mice and Kangaroo Rats**
Perognathus fasciatus	Olive-Backed Pocket Mouse
Geomyidae	**Pocket Gophers**
Thomomys talpoides	Northern Pocket Gopher

Muridae	**Rats, Mice, and Voles**
Ondatra zibethicus	Muskrat (Muskbeaver)
Microtus pennsylvanicus	Meadow Vole (Field Mouse, Meadow Mouse)
Microtus ochrogaster	Prairie Vole
Clethrionomys gapperi	Gapper's Red-Backed Vole (Southern Red-Backed Vole)
Onychomys leucogaster missouriensis	Northern Grasshopper Mouse
Peromyscus maniculatus	North American Deer Mouse
Peromyscus leucopus	White-Footed Mouse
Scuridae	**Ground Squirrels**
Spermophilus franklinii (*Poliocitellus franklinii*)	Franklin's Ground Squirrel
Spermophilus richardsonii (*Urocitellus richardsonii*)	Richardson's Ground Squirrel (Flickertail, Gopher*)
Spermophilus tridecemlineatus (*Ictidomys tridecemlineatus*)	Thirteen-Lined Ground Squirrel (Striped Gopher*)
Marmota monax	Woodchuck (Groundhog, Whistle-Dog, Land Beaver)
Tamias minimus (*Eutamias minimus*)	Least Chipmunk
Soricidae	**Shrews**
Sorex cinereus	Masked Shrew (Cinereus Shrew)
Microsorex hoyi (*Sorex hoyi*)	American Pygmy Shrew
Vespertilionidae	**Bats (Evening Bats, Vesper Bats)**
Lasiurus cinereus	Hoary Bat (Hairy-Tailed Bat)
Lasiurus borealis	Eastern Red Bat
Eptesicus fuscus	Big Brown Bat
Lasionycteris noctivagans	Silver Haired Bat
Myotis lucifugus	Little Brown Bat

Podicipedidae	**Grebes**
Aechmophorus occidentalis	Western Grebe (Dabchick, Swan Grebe, Swan-Necked Grebe)
Aechmophorus clarkii	Clark's Grebe
Podiceps auritus	Horned Grebe (Slavonian Grebe)
Podiceps grisegena	Red-Necked Grebe (Holboell's Grebe)
Podiceps nigricollis californicus	Eared Grebe (Black-Necked Grebe)
Podilymbus podiceps	Pied-Billed Grebe
Gaviidae	**Loons**
Gavia immer	Common Loon (Great Northern Loon, Great Northern Diver)
Gavia pacifica	Pacific Loon (Pacific Diver) (formerly included in Artic Loon) ǂ
Pelecanidae	**Pelicans**
Pelecanus erythrorhynchos	American White Pelican (Rough-Billed Pelican)
Phalacrocoracidae	**Cormorants and Shags**
Phalacrocorax auritus	Double-Crested Cormorant
Anatidae	**Ducks, Geese and Swans**
Cygnus buccinator Olor buccinator)	Trumpeter Swan (Bugler Swan)
Cygnus columbianus (*Olor columianus*)	Tundra Swan (Whistling Swan) ǂ
Cygnus olor	Mute Swan
Branta canadensis	Canada Goose
Branta bernicla	Brant (Black Brant, Brent Goose) ǂ
Anser caerulescens (*Chen caerulescens*)	Snow Goose (Blue Goose) ǂ
Anser albifrons	White-Fronted Goose (Greater White-Fronted Goose, Greater Whitefront) ǂ
Anser rossii (*Chen rossii*)	Ross's Gooseǂ
Anas strepera	Gadwall
Anas cyanoptera septentrionalium	Cinnamon Teal♦
Anas platyrhynchos	Mallard

Anas clypeata	Northern Shoveler (Shoveler)
Anas acuta	Pintail (Northern Pintail)
Anas crecca (*Anas carolinensis*, *A. crecca carolinesis*)	Green-Winged Teal (Common Teal)
Anas americana	American Wigeon (Baldpate, American Widgeon)
Anas discors	Blue-Winged Teal
Aix sponsa	Wood Duck (Carolina Duck)
Bucephala albeola	Bufflehead (Wood Duck*)
Bucephala clangula americana	Common Goldeneye (American Golden-eye, Wood Duck*)
Mergus merganser americanus	Common Merganser (American Merganser, Gulaund, Goosander)
Mergus serrator	Red-Breasted Merganser
Aythya valisineria	Canvasback
Aythya affinis	Lesser Scaup (Little Bluebill, Broadbill)
Aythya americana	Redhead
Aythya collaris	Ring-Necked Duck
Aythya marila nearctica	Greater Scaup (Bluebill)
Oxyura jamaicensis jamaicensis	Ruddy Duck
Histrionicus histrionicus	Harlequin Duck (Lords and Ladies)[†2]
Melanitta nigra americana (*M. americana*)	Black Scoter (Common Scoter, American Scoter)
Lophodytes cucullatus	Hooded Merganser
Melanitta perspicillata	Surf Scoter
Melanitta fusca deglandi (*M. deglandi deglandi*)	White-Winged Scoter
Ardeidae	**Herons and Bitterns**
Ardea herodias herodias	Great Blue Heron (Crane*)
Botaurus lentiginosus (*Palaeophoyx columbiana*)	American Bittern
Casmerodius albus (*Ardea alba*, *Egretta alba*)	Great Egret (Common Egret, Great White Egret)
Nycticorax nycticorax hoactli	Black-Crowned Night-Heron (Night Heron)
Cathartidae	**New World Vultures**
Cathartes aura teter (*C. a. meridionalis*)	Turkey Vulture (Buzzard, Turkey Buzzard)

Accipitridae	**Ospreys, Eagles, Hawks, Kites and Harriers**
Haliaeetus leucocephalus alascanus (*H. l. washingtoniensis*)	Bald Eagle
Aquila chrysaetos canadensis	Golden Eagle
Accipiter cooperii	Cooper’s Hawk[3]
Accipiter gentilis atricapillus	Goshawk (Northern Goshawk)
Accipiter striatus velox	Sharp-Shinned Hawk
Buteo platypterus	Broad-Winged Hawk
Buteo jamaicensis calurus (*B. j. kriderii*)	Red-Tailed Hawk (Harlan’s Hawk, Chicken Hawk)
Buteo lagopus	Rough-Legged Hawk (Rough-Legged Buzzard)
Buteo swainsoni	Swainson’s Hawk (Grasshopper Hawk, Locust Hawk)
Circus cyaneus hudsonius (*C. hudsonius*)	Northern Harrier (Marsh Hawk, Hen Harrier)
Pandion haliaetus carolinensis	Osprey (Sea Hawk)
Buteo regalis	Ferruginous Hawk
Falconidae	**Caracaras and Falcons**
Falco sparveriu	American Kestrel (Sparrow Hawk)
Falco columbarius richardsonii	Merlin (Pigeon Hawk, Prairie Merlin)
Falco peregrinus anatum	Peregrine Falcon (Duck Hawk, Peregrine)
Falco rusticolus	Gyrfalcon
Falco mexicanus	Prairie Falcon
Strigidae	**Typical Owls (True Owls)**
Athene cunicularia hypugaea (*Speotyto cunicularia*)	Burrowing Owl
Bubo virginianus subarcticus	Great-Horned Owl
Asio otus (*Stix otus*)	Long-Eared Owl
Asio flammeus flammeus	Short-Eared Owl
Aegolius acadicus acadicus	Northern Saw-Whet Owl
Nyctea scandiaca (*Bubo scandiaca*)	Snowy Owl
Otus asio (*Megascops asio*)	Eastern Screech Owl
Strix varia	Barred Owl (Eight Hooter, Rain Owl, Wood Owl, and Striped Owl)

Tytonidae	**Barn Owls**
Tyto alba pratincola	Common Barn Owl[†4]
Phasianidae	**Partridges, Pheasants, and Grouse**
Bonasa umbellus	Ruffed Grouse (Partridge*)
Tympanuchus phasianellus jamesi (*Peioecetes phasianellus*, *Tetrao phasianellus*)	Plains Sharp-Tailed Grouse (Fire Grouse, Fire Bird, Prairie Chicken*)
Lagopus lagopus	Willow ptarmigan (Willow Grouse) [♦]
Phasianus colchicus	Ring-Necked Pheasant (Common Pheasant)
Perdix perdix	Gray Partridge (European Partridge, Hungarian Partridge, Hun)
Dendragapus canadensis canadensis (*Falcipennis canadensis*)	Spruce Grouse (Fool Hens)
Tympanuchus cupido pinnatus	Greater Prairie-Chicken[♦]
Gruidae	**Cranes**
Grus americana	Whooping Crane
Grus canadensis rowani	Sandhill Crane (Little Brown Crane)
Rallidae	**Rails, Coots, and Crakes**
Fulica americana	American Coot (Marsh Hen, Mud Hen)
Porzana carolina	Sora (Sora Rail, Sora Crake)
Rallus limicola	Virginia Rail
Coturnicops noveboracensis	Yellow Rail
Charadriidae	**Plovers, Dotterels, Lapwings**
Pluvialis dominica	Lesser Golden Plover (American Golden Plover)‡
Pluvialis squatarola	Black-Bellied Plover (Grey Plover)‡‡
Charadrius vociferus	Killdeer
Charadrius alexandrinus nivosus	Snowy Plover (Kentish Plover) (Casual)
Charadrius melodus circumcinctus	Piping Plover
Charadrius semipalmatus	Semipalmated Plover‡
Recurvirostridae	**Avocets and Stilts**
Recurvirostra americana	American Avocet (Blue Shanks)

Scolopacidae	**Sandpipers, Phalaropes, and Allies**
Gallinago gallinago delicata (*C. delicata*)	Wilson's Snipe
Capella gallinago	Common Snipe
Tringa melanoleuca	Greater Yellowlegs
Tringa flavipes	Lesser Yellowlegs
Tringa solitaria	Solitary Sandpiper‡
Limosa haemastica	Hudsonian Godwit
Limosa fedoa	Marbled Godwit
Calidris melanotos	Pectoral Sandpiper
Calidris alba	Sanderling‡
Actitis macularia	Spotted Sandpiper
Catoptrophorus semipalmatus (*Tringa semipalmatus*)	Willet
Bartramia longicauda	Upland Sandpiper (Upland Plover, Bartram's Sandpiper)
Arenaria interpres	Ruddy Turnstone (Turnstone)‡‡
Numenius phaeopus hudsonicus	Hudsonian Curlew (Whimbrel)‡‡
Numenius americanus	Long-Billed Curlew (Sicklebird, Candlestick Bird)
Calidris fuscicollis	White-Rumped Sandpiper‡
Calidris bairdii	Baird's Sandpiper‡
Calidris minutilla	Least Sandpiper‡
Calidris canutus	Red Knot‡‡
Calidris alpina	Dunlin (Red-Backed Sandpiper)‡‡
Calidris himantopus	Stilt Sandpiper‡
Calidris pusilla	Semipalmated Sandpiper‡
Tryngites subruficollis	Buff-Breasted Sandpiper‡
Limnodromus griseus hendersoni	Short-Billed Dowitcher‡
Limnodromus scolopaceus	Long-Billed Dowitcher‡
Phalaropus tricolor (*Steganopus tricolor*)	Wilson's Phalarope
Phalaropus lobatus	Red-Necked Phalarope (Northern Phalarope) ‡
Laridae	**Skuas, Gulls, Terns, and Skimmers**
Chlidonias niger surinamensis	Black Tern

Sterna hirundo	Common Tern
Sterna forsteri	Forster's Tern
Larus californicus	California Gull
Larus pipixcan	Franklin's Gull
Larus delawarensis	Ring-Billed Gull
Larus philadelphia	Bonaparte's Gull
Larus minutus (*Hydrocoloeus minutus*)	Little Gull♦
Larus argentatus	Herring Gull‡‡
Xema sabini	Sabine`s Gull‡‡
Sterna caspia (*Hydroprogne caspia*)	Caspian Tern♦
Stercoraridae	**Skuas and Jaegers**
Stercorarius pomarinus	Pomarine Jaeger (Pomarine Skua) ‡
Stercorarius parasiticus	Parasitic Jaeger (Artic Skua, Parasitic Skua) ‡
Stercorarius longicaudus	Long-Tailed Jaeger (Long-Tailed Skua)
Columbidae	**Doves and Pigeons**
Zenaida macroura	Mourning Dove[5]
Columba fasciata (*Patagioenas fasciata*)	Band-Tailed Pigeon♦
Cuculidae	**Cuckoos**
Coccyzus erythropthalmus	Black-Billed Cuckoo
Caprimulgidae	**Goatsuckers (Nightjars)**
Chordeiles minor	Common Nighthawk
Caprimulgus vociferus	Whip-Poor-Will
Trochilidae	**Hummingbirds**
Archilochus colubris	Ruby-Throated Hummingbird
Alcedinidae	**Kingfishers**
Ceryle alcyon (*Meaceryle alcyon*)	Belted Kingfisher
Picidae	**Woodpeckers and Wrynecks**
Picoides pubescens(*Dendrocopus pubescens*)	Downy Woodpecker
Picoides villosus (*Dendrocopus villosus*)	Hairy Woodpecker
Sphyrapicus varius	Yellow-Bellied Sapsucker

Melanerpes carolinus	Red-Bellied Woodpecker[♦]
Melanerpes erythrocephalus	Red-Headed Woodpecker
Picoides tridactylus	Three-Toed Woodpecker
Picoides arcticus	Black-Backed Woodpecker (Black-Backed Three-Toed Woodpecker)
Colaples auratus (*C.a. luteus, C.a. borealis, C.a. collaris*)	Northern Flicker (Common Flicker, Yellow-Shafted and Red-Shafted) [6]
Dryocopus pileatus	Pileated Woodpecker
Tyrannidae	**Tyrant Flycatchers**
Tyrannus tyrannus	Eastern Kingbird
Tyrannus verticalis	Western Kingbird (Arkansas Kingbird)
Sayornis phoebe	Eastern Phoebe
Myiarchus crinitus	Great Crested Flycatcher
Empidonax alnorum	Alder Flycatcher (formerly Traill's Flycatcher)
Empidonax minimus	Least Flycatcher
Empidonax traillii	Willow Flycatcher (formerly Traill's Flycatcher)
Contopus borealis	Olive-Sided Flycatcher‡
Contopus sordidulus	Western Wood-Pewee[♦]
Empidonax flaviventris	Yellow-Bellied Flycatcher‡
Sayornis saya	Say's Phoebe
Tyrannus forficatus	Scissor-Tailed Flycatcher[♦]
Alaudidae	**Larks**
Eremophila alpestris	Horned Lark (Shore Lark)
Hirundinidae	**Swallows and Martins**
Riparia riparia	Bank Swallow (Sand Martin)
Hirundo rustica	Barn Swallow (Swallow)
Tachycineta bicolor (*Irdoprocne bicolor*)	Tree Swallow
Progne subis subis	Purple Martin
Stelgidopteryx serripennis	Northern Rough-Winged Swallow
Hirundo pyrrhonota (*Petrochelidon pyrrhonota)*	Cliff Swallow
Corvidae	**Jays, Magpies, and Crows**
Pica pica hudsonia (*Pica hudsonia*)	Black-Billed Magpie
Cyanocitta cristata bromia	Blue Jay

Corvus brachyrhynchos hesperis	Common Crow (American Crow)
Corvus corax principalis	Common Raven (Northern Raven)
Perisoreus canadensis	Gray Jay (Canada Jay)
Nucifraga columbiana	Clark`s Nutcracker
Paridae	**Titmice and Chickadee**
Parus atricapillus	Black-Capped Chickadee
Sittidae	**Nuthatches**
Sitta canadensis	Red-Breasted Nuthatch
Sitta carolinensis	White-Breasted Nuthatch
Certhiidae	**Creepers**
Certhia americana montana	Brown Creeper (American Tree Creeper)
Troglodytidae	**Wrens**
Troglodytes aedon	House Wren
Cistothorus palustris (*Telmatodytes palustris*)	Marsh Wren (Long-Billed Marsh Wren)
Cistothorus platensis (*Telmatodytes platensis*)	Sedge Wren (Short-Billed Marsh Wren)
Troglodytes troglodytes hiemalis	Winter Wren (Northern Wren)
Mimidae	**Mockingbirds and Thrashers**
Toxostoma rufum	Brown Thrashers (Brown Thrush*)
Dumetella carolinensis	Gray Catbird
Mimus polyglottos leucopterus	Northern Mockingbird
Turdidae	**Thrushes**
Turdus migratorius migratorius	American Robin
Sialia sialis	Eastern Bluebird
Sialia currucoides	Mountain Bluebird
Catharus minimus	Gray-Cheeked Thrush‡
Catharus guttatus	Hermit Thrush
Catharus ustulatus swainsoni	Swainson’s Thrush (Olive-Backed Thrush)
Catharus fuscescens salicicola	Veery (Willow Thrush, Wilson’s Thrush)
Hylocichla mustelina	Wood Thrush♦

Ixoreus naevius	Varied Thrush‡
Myadestes townsendi	Townsend's Solitare
Regulidae	**Kinglets or Crests**
Regulus calendula	Ruby-Crowned Kinglet
Regulus satrapa	Golden-Crowned Kinglet‡‡
Sturnidae	**Starlings**
Sturnus vulgaris	European Starling (Common Starling, Starling)
Motacillidae	**Pipits and Wagtails**
Anthus spragueii	Sprague's Pipit
Anthus spinoletta	Water Pipit‡
Bombycillidae	**Waxwings**
Bombycilla garrulus	Bohemian Waxwing
Bombycilla cedrorum	Cedar Waxwing
Laniidae	**Shrikes**
Lanius ludovicianus	Loggerhead Shrike‡
Lanius excubitor	Northern Shrike (Great Grey Shrike, Northern Grey Shrike) ‡
Vireonidae	**Vireos**
Vireo olivaceus	Red-Eyed Vireo
Vireo gilvus	Warbling Vireo
Vireo solitarius	Blue-Headed Vireo (formerly Solitary Vireo) ‡
Vireo philadelphicus	Philadelphia Vireo‡
Parulidae	**Wood Warblers**
Setophaga ruticilla	American Redstart
Dendroica castanea	Bay-Breasted Warbler‡
Dendroica striata	Blackpoll Warbler‡
Dendroica virens	Black-Throated Green Warbler

Dendrocia pensylvanica	Chestnut-Sided Warbler
Dendroica palmarum palmarum	Palm Warbler‡‡
Dendroica magnolia	Magnolia Warbler
Dendroica coronata coronata	Yellow-Rumped Warbler (Myrtle, Audubon’s Warbler)
Dendroica petechia aestiva	Yellow Warbler
Geothlypis trichas	Common Yellowthroat (Maryland Yellow-Throat)
Vermivora celata	Orange-Crowned Warbler
Vermivora peregrina	Tennessee Warbler
Wilsonia canadensis	Canada Warbler‡
Wilsonia pusilla pusilla	Wilson’s Warbler
Seiurus aurocapillus	Ovenbird
Mniotilta varia	Black-and-White Warbler
Icteria virens	Yellow-Breasted Chat
Vermivora ruficapilla	Nashville Warbler‡‡
Dendroica tigrina	Cape May Warbler
Dendroica caerulescens	Black-Throated Blue Warbler‡
Dendroica fusca	Blackburnian Warbler‡‡
Seiurus noveboracensis	Northern Waterthrush‡
Oporornis agilis	Conneticut Warbler‡
Oporornis philadelphia	Mourning Warbler‡
Cardinalis cardinalis	Northern Cardinal♦
Thraupidae	**Tanagers**
Piranga olivacea	Scarlet Tanager
Piranga ludoviciana	Western Tanger
Icteridae	**Meadowlarks, Blackbirds and Orioles**
Dolichonyx oryzivorus	Bobolink (Rice Bird)
Molothrus ater	Brown-Headed Cowbird (Eastern or Nevada Cowbird)
Quiscalus quiscula	Common Grackle (Bronzed Grackle)
Icterus galbula	Northern Oriole (Baltimore or Bullock’s Oriole)
Euphagus cyanocephalus	Brewer’s Blackbird

Euphagus carolinus	Rusty Blackbird‡
Agelaius phoeniceus	Red-Winged Blackbird
Sturnella neglecta	Western Meadowlark
Xanthocephalus xanthocephalus	Yellow-Headed Blackbird
Icterus spurius	Orchard Oriole
Fringillidae	**Grosbeaks, Buntings, Finches and Sparrows**
Leucosticte tephrocotis	Rosy Finch (Grey-Crowned Rosy Finch
Carpodacus mexicanus	House Finch♦
Loxia leucoptera	White-Winged Crossbill (Two-Barred Crossbill)♦
Loxia curvirostra	Red Crossbill (Common Crossbill)♦
Carduelis tristis pallida	American Goldfinch (Wild Canary, Thistle Bird, Eastern Goldfinch)
Coccothraustes vespertinus (*Hesperphona vespertinus*)	Evening Grosbeak
Carduelis flammea flammea	Common Redpoll (Mealy Redpoll)
Carduelis hornemanni	Hoary Redpoll (Artic Redpoll)
Carduelis pinus	Pine Sisken
Ammodramus nelsoni	Nelson's Sharp-Tailed Sparrow
Pinicola enucleator	Pine Grosbeak
Carpodacus purpureus	Purple Finch
Cardinalidae	**Cardinals**
Pheucticus ludovicianus	Rose-Breasted Grosbeak
Pheucticus melanocephalus	Black-Headed Grosbeak
Spiza americana	Dickcissel
Passerina cyanea	Indigo Bunting♦
Passeridae	**Old World Sparrows**
Passer domesticus	House Sparrow (English Sparrow)
Emberizidae	**Warblers, Sparrows, and Allies**
Calcarius lapponicus	Lapland Lonspur (Lapland Bunting)‡
Calcarius pictus	Smith's Longspur‡‡
Calcarius mccownii	McCown's Longspur
Zonotrichia atricapilla	Golden-Crowned Sparrow♦
Calamospiza melanocorys	Lark Bunting

Chondestes grammacus	Lark Sparrow
Plectrophenax nivalis nivalis	Snow Bunting (Snowflake)
Passerculus sandwichensis nevadensis	Savannah Sparrow (Ipswich Sparrow)
Zonotrichia albicollis	White-Throated Sparrow
Zonotrichia leucophrys	White-Crowned Sparrow‡
Zonotrichia querula	Harris's Sparrow‡
Pooecetes gramineus	Vesper Sparrow
Passerella iliaca iliaca	Fox Sparrow (Red Fox Sparrow)‡
Melospiza melodia	Song Sparrow
Melospiza lincolnii	Lincoln's Sparrow‡
Ammodramus leconteii (*Ammospiza leconteii*)	LeConte's Sparrow
Ammodramus bairdii	Baird's Sparrow
Spizella pallida	Clay-Coloured Sparrow
Spizella passerina	Chipping Sparrow
Spizella arborea	Tree Sparrow (American Tree Sparrow)‡
Pipilo erythrophthalmus	Rufous-Sided Towhee (Eastern Towhee, Red-Eyed Towhee, Spotted Towhee)
Calcarius ornatus	Chestnut-Collared Longspur
Junco hyemalis	Dark-Eyed Junco (Slate-Coloured Junco, Oregon Junco, and Grey-Headed Junco)

Ambystomidae	**Mole Salamanders**
Ambystoma tigrinum	Tiger Salamander (Eastern Tiger Salamander)
Bufonidae	**True Toads**
Bufo hemiophrys	Canadian Toad
Hylidae	**Treefrogs and Relatives**
Pseudacris triseriata maculata (*Pseudacris maaculata*)	Boreal Chorus Frog
Ranidae	**Typical Frogs**
Rana pipiens	Leopard Frog (Northern Leopard Frog)
Rana sylvatica	Wood Frog
Colubridae	**Typical Snakes**
Thamnophis sirtalis	Red-Sided Garter Snake (Common Garter Snake)
Thamnophis radix	Plains Garter Snake

Acipenseridae	**Sturgeons**
Acipenser fulvescens	Sturgeon (Lake Sturgeon)
Esocidae	**Pikes**
Esox lucius	Northern Pike
Percidae	**Perches**
Perca flavescens	Yellow Perch
Stizostedion vitreum (*Sander vitreous*)	Walleye (Yellow Walleye)
Stizostedion canadensis	Sauger
Etheostoma exile	Iowa Darter
Catostomidae	**Suckers**
Catostomus commersonii	White Sucker
Catostomus catostomus	Longnose Sucker
Moxostoma macrolepidotum	Shorthead Redhorse
Moxostoma anisurum	Silver Redhorse
Carpiodes cyprinus	Quillback
Hiodontidae	**Mooneyes**
Hiodon alosoides	Goldeye
Cyprinidae	**Minnows and Carps**
Notropis atherinoides	Emerald Shiner
Notropis blennius	River Shiner
Notropis hudsonius	Spottail Shiner
Platygobio gracilis	Flathead Chub
Rhinichthys cataractae	Longnose Dace
Semotilus margarita	Pearl Dace
Gasterosteidae	**Sticklebacks**
Culaea inconstans	Brook Stickleback
Cottidae	**Sculpins**
Cottus ricei	Spoonhead Sculpin

MOLLUSCS	
Valvatidae	**Valve Snails**
Valvata sincera sincera	Ribbed Valve Snail (Boreal Turret Snail, Mossy Valvata)
Valvata tricarinata	Three-Keeled Valve Snail (Three-Ridge Valvata)
Hydrobiidae	**Spire Snails (Mud Snails)**
Probythinella lacustris	Flat-Ended Spire Snail
Amnicola limosa	Ordinary Spire Snail
Lymnaeidae	**Pond Snails**
Fossaria modicella	Modest Fossaria
Fossaria parva	Amphibious Fossaria
Bakerilymnaea bulimoides	Prairie Pond Snail
Bakerilymnaea dalli	Small Pond Snail
Lymnaea stagnalis jugularis	Great Pond Snail
Stognicola caperata	Blade-Ridged Stagnicola
Stagnicola catascopium	Lake Stagnicola
Stagnicola elodes	Common Stagnicola
Stagnicola reflexa	Striped Stagnicola
Physidae	**Tadpole Snails (Bladder Snails)**
Physa gyrina gyrina	Tadpole Snail
Physa jennessi skinneri	Blunt Prairie Physa
Aplexa hypnorum	Polished Tadpole Snail
Planorbidae	**Ramshorn Snails**
Gyraulus circumstriatus	Flatly Coiled Gyraulus
Gyraulus deflectus	Irregular Gyraulus
Gyraulus parvus	Modest Gyraulus
Armiger crista	Tiny Nautilus Snail
Promenetus exacuous exacuous	Keeled Promenetus
Promenetus exacuous megas	Broad Promenetus
Promenetus umbilicatellus	Umbilicate Promenetus
Planorbula armigera	Say’s Toothed Planorbid
Planorbula campestris	Prairie Toothed Planorbid
Helisoma anceps anceps	Two-Ridged Ramshorn

Helisoma trivolis subscrenatum	Larger Prairie Ramshorn
Unionidae	**Pearly Mussels (River Mussels)**
Lasmigona complanata	White Hell Splitter
Lasmigona compressa	Brook Lasmigona
Anodonta grandis grandis	Common Floater
Lampsilis radiata siliquoidea	Fat Mucket
Sphaeriidae	**Fingernail Clams and Pea Clams**
Sphaerium nitidum	Arctic-Alpine Fingernail Clam
Sphaerium rhomboideum	Rhomboid Fingernail Clam
Sphaerium simile	Grooved Fingernail Clam
Sphaerium striatinum	Striated Fingernail Clam
Sphaerium lacustre	Lake Fingernail Clam
Sphaerium securis	Pond Fingernail Clam
Sphaerium transversum	Long Fingernail Clam
Pisidium casertanum	Ubiquitous Pea Clam
Pisidium compressum	Ridge-Beak Pea Clam
Pisidium fallax	River Pea Clam
Pisidium ferrugineum	Rusty Pea Clam
Pisidium lilljeborgi	Lilljeborg's Pea Clam
Pisidium milium	Quadrangular Pea Clam
Pisidium nitidum	Shiny Pea Clam
Pisidium rotundatum	Fat Pea Clam
Pisidium subtruncatum	Short-Ended Pea Clam
Pisidium variabile	Triangular Pea Clam
Pisidium ventricosum	Globular Pea Clam
Pisidium punctatum	Perforated Pea Clam

Additional References: Banfield 1974 (Mammals), Godfrey 1986 (Birds), Salt and Salt (1976),
Stejneger and Barbour 1939 (Reptiles and Amphibians),
Harding 1997 (Reptiles and Amphibians),
Scott and Crossman 1973 (Fish), Clarke 1981 (Molluscs)

Notes: * Misnomer

ǂ Migrant/Transient

ǂǂ Rare Migrant/Transient

♦ Rare/Rare Visitant

† Casual Visitor/Wanderer

[1] Includes the previous subspecies and synonyms *arundivaga*, *aztecus*, *browni*, *californica*, *coryi*, *floridana*, *hippolestes*, *improcera*, *kaibabensis*, *mayensis*, *missoulensis*, *olympus*, *oregonensis*, *schorgeri*, *stanleyana*, *vancouverensis* and *youngi*

[2] Other names include painted duck, totem pole duck, rock duck, glacier duck, mountain duck, white-eyed diver, squeaker and blue streak.

[3] Other common names include Big Blue Darter, Chicken Hawk, Hen Hawk, Mexican Hawk, Quail Hawk, Striker and Swift Hawk

[4] Other common names include White Owl, Silver Owl, Demon Owl, Ghost Owl, Death Owl, Night Owl, Rat Owl, Church Owl, Cave Owl, Stone Owl, Monkey-faced Owl, Hissing Owl, Hobgoblin or Hobby Owl, Dobby Owl, Golden Owl, Scritch Owl, Screech Owl, Straw Owl, Barnyard Owl and Delicate Owl.

[5] Other names include the Western Turtle Dove or the American Mourning Dove or Rain Dove, and formerly the Carolina Pigeon or Carolina Turtledove.

[6] There are over 100 common names for the Northern Flicker. Among them are: Yellowhammer, clape, gaffer woodpecker, harry-wicket, heigh-ho, wake-up, walk-up, wick-up, yarrup, and gawker bird. Many of these names are attempts at imitating some of its calls.

Appendix C

Radiocarbon Dates

Table C.1: Level 2b calibrated radiocarbon ages (Stuiver et al. 1998, Stuiver and Reimer 1993).

Faunal Sample Number: BGS 2890	
Uncalibrated Age: 3938 ± 40 years B.P. Calculated with C12/13 Isotope Correction: 4020 ± 40 years B.P. ($\delta^{13}C$ = -19.87‰) Calibrated Age: 4480 ± 40 years B.P.	
Age Ranges Obtained By intercepts	
One Sigma	**Two Sigma**
4565 - 4420 cal. B.P.	4775 - 4412 cal B.P.
Best Age Ranges Obtained from Probability Distribution	
One Sigma	**Probability**
4524 - 4494 cal. B.P.	0.339
4494 - 4458 cal. B.P.	0.412
4452 - 4437 cal. B.P.	0.178
4429 - 4423 cal. B.P.	0.071
Two Sigma	**Probability**
4779 - 4771 cal. B.P.	0.009
4609 - 4599 cal. B.P.	0.012
4573 - 4410 cal. B.P.	0.979

Table C.2: Level 3a calibrated radiocarbon ages (Stuiver et al. 1998, Stuiver and Reimer 1993).

Faunal Sample Number: BGS 2891 Uncalibrated Age: 4168 ± 40 years B.P. Calculated with C12/13 Isotope Correction: 4237 ± 40 years B.P. ($\delta^{13}C$ = -20.68‰) Calibrated Age: 4830 ± 40 years B.P.	
Age Ranges Obtained By intercepts	
One Sigma	**Two Sigma**
4842 - 4741 cal. B.P.	4860 - 4649 cal. B.P.
Best Age Ranges Obtained from Probability Distribution	
One Sigma	**Probability**
4850 - 4813 cal. B.P.	0.499
4755 - 4728 cal. B.P.	0.317
4720 - 4709 cal. B.P.	0.094
4667 - 4657 cal. B.P.	0.09
Two Sigma	**Probability**
4866 - 4804 cal. B.P.	0.43
4796 - 4794 cal. B.P.	0.003
4764 - 4626 cal. B.P.	0.568

Table C.3: Level 3b calibrated radiocarbon ages (Stuiver et al. 1998, Stuiver and Reimer 1993).

Faunal Sample Number: BGS 2892 Uncalibrated Age: 5003 ± 45 years B.P. Calculated with C12/13 Isotope Correction: 5095 ± 45 years B.P. ($\delta^{13}C$ = -19.25‰) Calibrated Age: 5890 ± 45 years B.P.	
Age Ranges Obtained By intercepts	
One Sigma	**Two Sigma**
5911 - 5750 cal. B.P.	5928 - 5730 cal. B.P.
Best Age Ranges Obtained from Probability Distribution	
One Sigma	**Probability**
5909 - 5882 cal. B.P.	0.249
5871 - 5863 cal. B.P.	0.062
5827 - 5752 cal. B.P.	0.689
Two Sigma	**Probability**
5925 - 5738	1

Appendix D

Lithic Analysis of the Dog Child Site

Table D.1: Projectile point metric analysis: Level 1a to Level 2b.

Level	Catalogue Number	Max Length (mm)	Max Width (mm)	Max Thickness (mm)	Body Length (mm)	Max Body Width (mm)	Max Base Width (mm)	Internotch Width (mm)	Left Notch Depth (mm)	Left Notch Width (mm)	Distance Left Notch From Basal (mm)	Right Notch Depth (mm)	Right Notch Width (mm)	Distance Right Notch From Basal (mm)	Weight (g)
1a	17759	N/A	13.71*	3.48*	N/A	13.71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6
1a	18916	N/A	12.47*	3.4*	N/A	12.47*	11.91*	9.65	1.54*	2.80*	2.86*	1.33	3.71	3.28	0.6
1a	16971	N/A	13.55*	3.48*	N/A	13.55*	N/A	N/A	N/A	N/A	N/A	1.75	3.37	2.23	0.5
1a	17861	19.01	14.28	3.34	11.07	14.28	N/A	10.33	1.57	N/A	N/A	1.8	1.72	5.31	0.8
1a	15956	N/A	15.85	3.45	N/A	15.85	13.34*	10.21	0.86*	2.26*	3.83*	2.79	3.84	3.56	1.1
1a	16187	N/A	12.15*	3.45*	N/A	12.15*	N/A	N/A	1.28	3.31	5.37	N/A	N/A	N/A	0.5
1a	16504	N/A	16.66*	4.32*	N/A	16.66*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.1
1a	15435	N/A	16.10*	4.22	24.08	16.1	N/A	11.33*	2.53*	N/A	N/A	2.29*	N/A	N/A	1.9
2a	19681	25.15	14.67	3.69	21.21	14.21	14.67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.3
2a	18831	N/A	18.22	5.33	N/A	16.76	18.22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.5
2a	16432	26.65*	N/A	5.54	22.61	16.40*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.8
2b	17358	N/A	18.65*	3.68*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.8
2b	18450	N/A	13.74*	4.27*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.1
2b	19253	N/A	17.80*	5.38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.3
2b	16679	N/A	N/A	5.13*	N/A	N/A	18.78	13.76	2.57	8.90*	4.6	2.45	N/A	3.97	1.2

* Denotes an incomplete measurement.

Table D.2: Projectile point analysis: Level 3b.

Level	Catalogue Number	Max Length (mm)	Max Width (mm)	Max Thickness (mm)	Body Length (mm)	Max Body Width (mm)	Max Base Width (mm)	Internotch Width (mm)	Left Notch Depth (mm)	Left Notch Width (mm)	Distance Left Notch From Basal (mm)	Right Notch Depth (mm)	Right Notch Width (mm)	Distance Right Notch From Basal (mm)	Weight (g)
3b	22087	N/A	19.5	4.2	N/A	19.5	N/A	13.85	3.6	N/A	N/A	2.75	4.1	3.22	2
3b	22065	N/A	16.8	3.62	N/A	16.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.1
3b	22018	N/A	21.25	4.65	N/A	21.25	N/A	16.34	3.46	N/A	N/A	3.78	6.86	3.35	2.6
3b	18976	N/A	N/A	5.86*	N/A	N/A	17.7	15.03	2.77	5.97	3.99	3.74	3.33	2.98	1.5
3b	18238	24.52*	20.13	4.95	19.84*	20.13	19.4	16.42	1.66	4.17	2.73	2.39	3.75	3.16	2.6
3b	15997	N/A	15.28*	4.53*	N/A	15.28*	15.13	11.99	1.4	3.93	2.98	1.64	4.16	3.43	1
3b	16040	23.10*	12.27*	5.94	18.13*	12.27*	10.84*	9.45*	1.41*	3.80*	2.45*	0.98	2.63	3.58	1.4
3b	16472	N/A	15.91	5.45	N/A	15.91	16.6	9.83	1.61	3.27	2.71	1.43	2.93	1.52	1.8
3b	19871	30.48	17.79	6.03	23.95	17.79	16.6	13.84	1.5	4.99	1.63	1.94	3.18	3.77	2.8
3b	17927	26.48	19.01	5.38	20.12	19.01	17.67	14.41	1.7	4.21	3.43	2.18	4.43	2.71	2.8
3b	17941	29.31	16.03	5	23.81	16.03	N/A	9.88	4.41	N/A	N/A	2.05	4.63	2.25	2.1
3b	17975	N/A	N/A	4.80*	N/A	N/A	18.84	15.59	1.69	4.45	4.15	1.08	N/A	3.42	1.1
3b	17102	N/A	21.89*	5.33*	N/A	21.89*	18.4	14.34	2.63	4.3	4.7	2.75	4.72	3.95	2.1
3b	17100	N/A	16.23	5.1	N/A	15.92	16.23	12.21	1.42	3.85	N/A	1.93	3.39	N/A	1.5
3b	18779	N/A	16.20*	5.3	N/A	16.20*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.3
3b	18680	N/A	14.40*	4.06*	N/A	14.40*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
3b	18795	20	9.97	3.65	15.56	9.97	8.42	6.6	0.97	2.8	1.27	0.86	2.88	1..80	0.7
3b	19080	21.62	12.27	4.07	16.13	12.27	9.77	7.84	1.19	2.31	5.02	1.44	6.02	1.32	1
3b	19090	27.4	15.66	4.7	20.29	15.66	N/A	N/A	0.58	4.37	5.02	N/A	N/A	N/A	2
3b	17409	N/A	20.16	5.65	N/A	20.16	17.05	14.2	1.97	4.25	3.54	2.21	4.29	4.77	2.2
3b	17435	N/A	N/A	5.39*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.77	6.97	2.96	0.9
3b	18473	40.28	N/A	4.02	35.07	N/A	12.56	10.56	1.3	4.09	2.74	1.04	3.2	2.32	2.3
3b	17410	32.52	17.5	4.97	24.96	17.5	N/A	10.54	2.76	4.39	3.71	N/A	N/A	N/A	2.7
3b	17607	25.5	15.08	5.17	19.22	15.08	14.85	11.15	1.3	3.85	2.85	2.1	6.87	3.15	2

* Denotes an incomplete measurement.

Table D.3: Preform metric analysis: Level 3b.

Level	Catalogue Number	Max Length (mm)	Max Width (mm)	Max Thickness (mm)	Body Length (mm)	Max Body Width (mm)	Max Base Width (mm)	Internotch Width (mm)	Left Notch Depth (mm)	Left Notch Width (mm)	Distance Left Notch From Basal (mm)	Right Notch Depth (mm)	Right Notch Width (mm)	Distance Right Notch From Basal (mm)	Weight (g)
3b	18231	32.21*	16.45	4.72	29.64*	16.45	15.34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.6
3b	15020	N/A	19.36	6.37	N/A	19.36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.8
3b	17907	N/A	21.46	5.58	N/A	21.46	18.7	N/A	N/A	N/A	N/A	1.94	4.45	3.12	3.4
3b	18697	N/A	16.04	4.77	N/A	16.04	15.74	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2

* Denotes an incomplete measurement.

Table D.4: Projectile point non-metric analysis: Level 1a to Level 2b.

Level	Catalogue Number	Completeness (Missing Portions)	Cultural Affiliation	Material	Longitudinal Cross Section	Transverse Cross Section	Symmetry	Quality	Basal Corner Shape	Basal Margin Modification	Basal Margin
1a	17759	Base	Plains SN	Chalcedony	N/A	ABC	Asymmetric	Poor	N/A	N/A	N/A
1a	18916	Tip, LBC	Plains SN	Chert	ABC	ABC	Asymmetric	Poor	Straight	Thinned	Straight
1a	16971	Tip/Body, LBC	Plains SN	HT SRC	ABP	ABC	N/A	Good	Contracting	N/A	Convex
1a	17861	LBC	Plains SN	Sil. Peat	CC	CC	Symmetric	Good	Contracting	Thinned/Crushed	Straight
1a	15956	Tip, LBC	Plains SN	HT SRC	BC	BC	Asymmetric	Good	Contracting	Thinned	Straight
1a	16187	Tip/Body, RBC	Plains SN	HT SRC	BC	ABC	Symmetric	Poor	Contracting	Thinned	Straight
1a	16504	Tip, Base	Unknown	HT Chert	N/A	ABC	N/A	Good	N/A	N/A	N/A
1a	15435	Base	Plains SN	Sil. Peat	ABC	ABC	Symmetric	Good	N/A	N/A	N/A
2a	19681	RBC	McKean	Quartzite	ABC	ABC	Asymmetric	Good	Parallel	N/A	Concave
2a	18831	Tip	McKean	HT SRC	ABC	ABC	Asymmetric	Good	Expanding	N/A	Concave
2a	16432	LfBC	McKean	HT SRC	ABC	ABC	Asymmetric	Good	Contracting	Crushed/Ground	Concave
2b	17358	Tip, Base	Unknown	Siltstone	PC	PC	Asymmetric	Poor	N/A	N/A	N/A
2b	18450	Base	Unknown	SRC	CC	BP	Symmetric	Poor	N/A	N/A	N/A
2b	19253	Base, Very Tip	Unknown	HT SRC	BC	BC	Symmetric	Excellent	N/A	N/A	N/A
2b	16679	Body/Tip	Hanna	HT SRC	N/A	BC	N/A	Excellent	Convex	Thinned	Straight

Abbreviations: RBC = Right Basal Corner, LBC = Left Basal Corner, SN = Side-Notch, ABC = Asymmetrical Biconvex, ABP = Asymmetric Biplano, Sil. = Silicified, BP = Biplano, CC= Concave-Convex, BC = Biconvex, HT = Heat Treated, PC = Planoconvex, SRC = Swan River Chert.

Table D.5: Projectile point non-metric analysis: Level 3b.

Level	Catalogue Number	Completeness (Missing Portions)	Cultural Affiliation	Material	Longitudinal Cross Section	Transverse Cross Section	Symmetry	Quality	Basal Corner Shape	Basal Margin Modification	Basal Margin
3b	22087	Matches Cat.#22065	Gowen	Agate	N/A	ABC	Asymmetric	Good	Contracting Convex	Thinned/Ground	Subconcave
3b	22065	Matches Cat.#22087	Gowen	Agate	N/A	ABC	Symmetic	Good	N/A	N/A	N/A
3b	22018	Tip/Body	Gowen	HT SRC	N/A	ABC	Asymmetric	Good	Convex	Thinned/Ground	Subconcave
3b	18976	Tip/Body	Gowen	HT SRC	N/A	ABC	Asymmetric	Good	Expanding convex	Ground	Straight
3b	18238	Very Tip	Gowen	Sil. Peat	ABC	ABC	Asymmetric	Good	Convex	Thinned	Subconcave
3b	15997	Tip	Gowen	HT SRC	N/A	ABC	Asymmetric	Good	Expanding convex	Thinned	Straight
3b	16040	Dorsal longitudinal	Gowen	HT SRC	PT	PT	Asymmetric	Poor	Convex	Thinned/Ground	Straight
3b	16472	Very Tip	Gowen	HT SRC	BC	BC	Asymmetric	Excellent	Expanding convex	Ground	Subconcave
3b	19871	Complete	Gowen	HT SRC	ABC	ABC	Asymmetric	Good	Expanding convex	Thinning/Ground	Subconcave
3b	17927	Complete	Gowen	Chalcedony	ABC	BC	Asymmetric	Good	Convex	N/A	Subconcave
3b	17941	LfBC	Gowen	KRF	ABC	BC	Symmetric	Excellent	Convex	Ground	Straight
3b	17975	Tip/Body	Gowen	Sil. Wood	N/A	BP	N/A	Poor	Convex	Thinned/Ground	Subconcave
3b	17102	Tip	Gowen	Quartzite	N/A	BC	N/A	Excellent	Convex	Thinned/Ground	Straight
3b	17100	Basal Margin/Tip	Gowen	Mudstone	N/A	ABC	Asymmetric	Good	N/A	N/A	N/A
3b	18779	Very Tip/Base	Unknown	Chert	N/A	ABC	Asymmetric	Poor	N/A	N/A	N/A
3b	18680	Base	Unknown	HT SRC	N/A	BP	Asymmetric	Poor	N/A	N/A	N/A
3b	18795	Complete	Gowen	Gronlid Siltstone	BC	ABC	Asymmetric	Good	Convex	Thinned/Ground	Straight
3b	19080	Complete	Gowen	Quartzite	ABC	BC	Asymmetric	Good	Convex	Thinned/Ground	Straight
3b	19090	RBC	Gowen	HT SRC	CC	ABC	Symmetric	Poor	Convex	Thinned/Ground	Straight
3b	17409	Tip	Gowen	Quartzite	N/A	ABC	Symmetric	Good	Contracting Convex	Thinned	Straight
3b	17435	Tip/Body, LBC	Gowen	Sil. Peat	N/A	BC	N/A	Good	Convex	Ground	Straight
3b	18473	RBC	Gowen	Mottled Chert	BP	BP	Asymmetric	Good	Convex	Thinned/Ground	Angled
3b	17410	RBC	Gowen	HT SRC	BC	BC	Asymmetric	Excellent	Convex	Thinned/Ground	Straight
3b	17607	Complete	Gowen	Chalcedony	ABC	ABC	Asymmetric	Excellent	Convex	Thinned/Ground	Straight

Abbreviations: RBC = Right Basal Corner, LBC = Left Basal Corner, SN = Side-Notch, ABC = Asymmetrical Biconvex, ABP = Asymmetric Biplano, Sil. = Silicified, BP = Biplano, PT = Planotriangular, CC= Concave-Convex, BC = Biconvex, HT = Heat Treated, PC = Planoconvex, SRC = Swan River Chert, KRF = Knife River Flint.

Table D.6: Preform non-metric analysis: Level 3b.

Level	Catalogue Number	Completeness (Missing Portions	Cultural Affiliation	Material	Longitudinal Cross Section	Transverse Cross Section	Symmetry	Quality	Basal Corner Shape	Basal Margin Modification	Basal Margin
3b	18231	Broken in Half	Unknown	Unknown	PC	PT	Asymmetric	Poor	N/A	N/A	Subconcave
3b	15020	Tip	Unknown	Gronlid Siltstone	N/A	BC	Symmetric	Poor	N/A	N/A	Straight
3b	17907	Tip	Unknown	Chert	BP	BC	Asymmetric	Good	Convex	Thinning	Straight
3b	18697	Tip	Unknown	HT SRC	BP	BC	Symmetric	Good	N/A	Thinning	Subconcave

Abbreviations: SN = Side-Notch, ABC = Asymmetrical Biconvex, ABP = Asymmetric Biplano, Sil. = Silicified, BP = Biplano, PT = Planotriangular
CC= Concave-Convex, BC = Biconvex, HT = Heat Treated, PC = Planoconvex, SRC = Swan River Chert, KRF = Knife River Flint.

Table D.7: Flaked tool metric analysis: Level 1a to Level 3a.

Level	Catalogue Number	Weight (g)	Primary Working Edge (mm)	Secondary Working Edge (mm)	Max Length (mm)	Max Width (mm)	Max Thickness (mm)
1a	16188	3.6	14.2	11.93	27.42	15.02	8.48
1b	17632	2.7	19.31	16.21	19.01	20.94	6.44
1b	17333	10.3	30.27	34.85	36.06	29.25	8.19
1b	14918	22.8	51.15	20.32	55.26*	50.39	7.62
1b	14928	4.4	36.36	22.3	37.85	17.64	9.01
1b	19605	1.1	15.24	N/A	14.57	15.39	4.93
Sterile 1b/2a	15205	8.4	15.23	15.58	32.58	16.76	10.1
2a	16194	356.6	81.26	N/A	121.8	115.05	21.58
2a	15270	3.3	19.5	N/A	22.7	19.5	6.26
2a	14906	3	17.69	N/A	17.58	17.82	7.45
2b	19968	4.5	16.88	20.61	24.45	20.15	7.74
Sterile 2a/3a	15472	5	24.24	N/A	34.31	20.52	7.74

*Denotes incomplete measurement.

Table D.8: Flaked tool metric analysis: Level 3b.

Level	Catalogue Number	Weight (g)	Primary Working Edge (mm)	Secondary Working Edge (mm)	Max Length (mm)	Max Width (mm)	Max Thickness (mm)
3b	17434	3.5	13.21	N/A	19.81	16.86	9.98
3b	17431	3	N/A	N/A	18.25*	20.29	8.95
3b	17417	4.6	19.41	N/A	28.12	22.87	6.96
3b	17414	0.7	13.62	N/A	14.99	13.81	3.96
3b	19194	1	11.94	N/A	12.49*	11.94	4.52
3b	18681	1.7	14.17	N/A	22.46	16.69	4.2
3b	19274	2.5	18.7	N/A	19.69	19.06	7.1
3b	17976	1.9	19.08	N/A	22.72	24.01	2.82
3b	17956	1.4	14.01	N/A	15.93	15.73	4.74
3b	18862	3.9	17.4	N/A	22.29	19.9	9.03
3b	19872	2.4	13.28	N/A	26.38	19.71	3.75
3b	17678	3.3	17.89	16.7	19.91	22.06	7.39
3b	18248	3.2	14.62	N/A	18.85*	22.64	6.15
3b	18252	2.4	19.8	N/A	20.38*	17.73	5.33
3b	16220	3.2	15.66	N/A	21.88	19.77	6.28
3b	16244	6.6	22.9	N/A	22.43	31.33	10.68
3b	16724	27.8	30.44	39.65	53.8	42.02	17.41
3b	16232	2.1	19.2	N/A	16.62	19.83	5.27
3b	19630	9.2	25.7	18.16	36.88	33.94	6.62

*Denotes incomplete measurement.

Table D.9: Flaked tool metric analysis: Level 3b continued.

Level	Catalogue Number	Weight (g)	Primary Working Edge (mm)	Secondary Working Edge (mm)	Max Length (mm)	Max Width (mm)	Max Thickness (mm)
3b	19867	5.8	27.32	N/A	32.45	30.04	5.58
3b	16830	1.9	20.52	N/A	20.52	20.16	4.03
3b	16768	15.3	29.15	N/A	51.48	25.57	11.93
3b	17725	9.5	21.79	21.79	35.91*	29.07	9.8
3b	16229	7.8	26.99	23.07	23.98*	36.36	8.81
3b	18200	10	40.44	N/A	41.54	24.30*	10.66
3b	17436	6.2	25.73	N/A	43.55	19.52	6.9
3b	18852	13.7	23.78	31.84	32.88*	37.35	10.78
3b	17432	109.9	74.8	N/A	83.91	66.32	17.34
3b	17888	27.2	46.2	N/A	57.01	41.07*	13.15
3b	18484	58.1	57.72	69.8	70.22	48.13	13.29
3b	19081	18.6	42.16	N/A	52	26.41	16.65
3b	18875	62.8	87.51	N/A	91.69	48.05	9.77
3b	15255	137.5	56.21	59.94	84.17	60.16	22.05
3b	17661	103	64.7	65.79	65.83	57.59	23.32
3b	21997	8.1	32.15	N/A	26.1	31.05	11.85
3b	22089	1.8	20.01	15	24.35	18.95	3.3
3b	22132	25.6	38.01	36.95	44.2	38.01	11.62
3b	17718	140.8	98.94	51.39	99.42	57.66	22.35

*Denotes incomplete measurement.

Table D.10: Flaked tool non-metric analysis: Level 1a to Level 3a.

Level	Catalogue Number	Material	Tool Type	Modification	Shape	Primary Working Edge Location	Secondary Working Edge Location	Longitudinal Cross Section	Transverse Cross Section
1a	16188	HT SRC	Utilized Flake	Retouch	Rectangular	Lateral (Straight)	Lateral (Convex)	Rectangular	ABT
1b	17632	Chalcedony	End/Sidescraper	Retouch/Utilized	Discoidal	Distal (Convex)	Lateral (Contracting)	ASB	ABC
1b	14918	Sil. Wood	Uniface	Retouch/Utilized/ Hafted	Circular (Broken)	Distal (Convex)	N/A	ASB	BP
1b	17333	Quartzite	Biface	Utilized	Ovoid	Lateral (Convex)	Lateral (Convex)	BP	ABC
1b	14928	HT SRC	Biface	Retouch/Utilized	Lenticular	Lateral (Convex)	Lateral (Convex)	ABT	ABT
1b	19605	Chalcedony	Endscraper	Retouch	Triangular	Distal (Convex)	N/A	ASB	ASB
Sterile 1b/2a	15205	Partially HT SRC	Utilized Flake	Retouch	Rectangular	Distal (Straight)	Lateral (Convex)	PC	Square
2a	24-13-A008	Quartzite	Notched Uniface	Retouch/Utilized/ Hafted	Circular	Distal (Convex)	N/A	PC	PC
2a	16194	HT SRC	Endscraper	Retouch	Triangular	Distal (Convex)	N/A	ASB	Rectangular
2a	14906	HT SRC	Endscraper	Retouch/Utilized	Square	Distal (Straight)	N/A	ASB	PC
2b	19968	Chert	End/Sidescraper	Retouch	Ovoid	Distal (Convex)	Lateral (Convex)	SDB	PC
Sterile 2a/3a	15472	Sil. Peat	Utilized Flake	Retouch	Irregular	Lateral (Straight)	N/A	Irregular	ABT

Abbreviations: HT = Heat Treated, SRC = Swan River Chert, ABT = Asymmetrical Bitriangular, ASB = Angular Single Bevel, ABC = Asymmetrical Biconvex, BP = Biplano, PC = Planoconvex, SDB = Straight Double Bevel, Sil. = Silicified.

Table D.11: Flaked tool non-metric analysis: Level 3b.

Level	Catalogue Number	Material	Tool Type	Modification	Shape	Primary Working Edge Location	Secondary Working Edge Location	Longitudinal Cross Section	Transverse Cross Section
3b	17434	Gronlid Siltstone	Endscraper	Utilized	Ovoid	Distal (Convex)	N/A	ABC	APC
3b	17431	SRC	Endscraper	Broken	Square	N/A	N/A	ASB	PC
3b	17417	Sil. Peat	Endscraper	Retouch/Utilized	Ovoid	Distal (Convex)	N/A	Irregular	CC
3b	17414	Gronlid Siltstone	Endscraper	Utilized	Triangular	Distal (Convex)	N/A	ASB	PT
3b	19194	HT SRC	Endscraper	Utilized	Square	Distal (Convex)	N/A	PC	Square
3b	18681	HT SRC	Endscraper	Retouch	Rectangular	Distal (Convex)	N/A	Irregular	Irregular
3b	19274	HT SRC	Endscraper	Retouch/Utilized	Circular	Distal (Convex)	N/A	ASB	PC
3b	17976	Chert Pebble	Endscraper	Retouch	Triangular	Distal (Straight)	N/A	PC	PC
3b	17956	Chalcedony	Endscraper	Retouch	Square	Distal (Convex)	N/A	ASB	PC
3b	18862	Chert	Endscraper	Retouch	Triangular	Distal (Convex)	N/A	ASB	PT
3b	19872	Chert Pebble	Endscraper	Retouch	Ovoid	Distal (Convex)	N/A	BP	BP
3b	17678	Partially HT SRC	End/Sidescraper	Retouch	Square	Distal (Straight)	Lateral (Convex)	ASB	ASB
3b	18248	Quartzite	Sidescraper	Thinning/Retouch	Ovoid	Lateral (Convex)	N/A	N/A	PC
3b	18252	Cathead Chert	Sidescraper	Retouch	Ovoid	Lateral (Convex)	N/A	ASB	CDB
3b	16220	Chalcedony	Endscraper	Utilized	Square	Distal (Convex)	N/A	Rectangular	PT
3b	16244	Siltstone	Sidescraper	Utilized	Rectangular	Lateral (Convex)	N/A	Irregular	Irregular
3b	16724	Sandstone	End/Sidescraper	Retouch/Utilized	Triangular	Distal (Convex)	Lateral (Contracting)	ASB	PC
3b	16232	Chalcedony	Notched Endscraper	Hafted/Utilized	Square	Distal (Convex)	N/A	ASB	BP
3b	22089	Quartzite	End/Sidescraper	Retouch	Rectangular	Lateral (Straight)	Distal (Convex	BP	DB
3b	21997	Quartzite	Sidescraper	Retouch	Ovoid	Lateral (Convex)	N/A	Irregular	ASB

Abbreviations: HT = Heat Treated, SRC = Swan River Chert, ABT = Asymmetrical Bitriangular, ASB = Angular Single Bevel, ABC = Asymmetrical Biconvex, BP = Biplano, PC = Planoconvex, SDB = Straight Double Bevel, Sil. = Silicified, APC = Asymmetrical Planoconvex, CC = Concave-Convex, PT = Planotriangular, CDB = Concave Double Bevel, DB = Double Bevel.

Table D.12: Flaked tool non-metric analysis: Level 3b continued.

Level	Catalogue Number	Material	Tool Type	Modification	Shape	Primary Working Edge Location	Secondary Working Edge Location	Longitudinal Cross Section	Transverse Cross Section
3b	19867	Quartz	Utilized Flake	Thinning/Retouch	Rectangular	Lateral (Straight)	N/A	CC	BP
3b	16830	HT SRC	Utilized Flake	Retouch	Trapezoid	Lateral (Straight)	N/A	BP	PT
3b	16768	SRC	Utilized Flake	Retouch	Irregular	Lateral (Straight)	M	Irregular	Irregular
3b	19630	Sil. Peat	Utilized Flake	Retouch	Ovoid	Lateral (Straight)	Lateral (Convex)	Irregular	Irregular
3b	17725	SRC	Awl	Thinning/Retouch	Triangular	Lateral (Expanding)	Lateral (Expanding)	BC	BC
3b	16229	HT SRC	Biface	Bifacial Retouch	Triangular	Distal (Convex)	Lateral (Straight)	BC	N/A
3b	18200	HT SRC	Biface	Bifacial Retouch	Triangular	Distal (Convex)	N/A	PC	N/A
3b	17436	Basalt	Biface	Bifacial Thinning	Triangular	Lateral (Convex)	N/A	PC	PC
3b	18852	Sil. Peat	Biface	Thinning/Retouch	Triangular	Lateral (Convex)	Lateral (Straight)	N/A	Bp
3b	17432	Grey Chalcedony	Biface	Bifacial Retouch/ Thinning	Diamond	Lateral (Convex)	N/A	BP	DB
3b	17888	Sil. Peat	Biface	Thinning/Retouch	Triangular	Lateral (Convex)	N/A	BP	N/A
3b	18484	Quartzite	Uniface	Utilized	Ovoid	Lateral (Convex)	Lateral (Straight)	PC	PC
3b	19081	Silstone	Sidescraper	Retouch	Ovoid	Lateral (Straight)	N/A	PC	PT
3b	18875	Sil. Peat	Biface	Bifacial Retouch/ Thinning	Ovoid	Lateral (Convex)	N/A	BP	BP
3b	15255	Quartzite	End/Sidescraper	Thinning/Utilized	Rectangular	Lateral (Straight)	Distal (Convex)	ASB	PC
3b	17661	HT SRC	Uniface	Thinning	Square	Lateral (Convex)	Lateral (Straight)	PC	PC
3b	17718	Quartzite	Uniface	Thinning	Rectangular	Lateral (Straight)	Lateral (Convex)	PC	PC
3b	22132	Quartzite	Uniface	Utilized	Triangular	Distal (Convex)	Lateral (Convex)	BP	BP

Abbreviations: HT = Heat Treated, SRC = Swan River Chert, ABT = Asymmetrical Bitriangular, ASB = Angular Single Bevel, ABC = Asymmetrical Biconvex, BP = Biplano, PC = Planoconvex, SDB = Straight Double Bevel, Sil. = Silicified, APC = Asymmetrical Planoconvex, CC = Concave-Convex, PT = Planotriangular, CDB = Concave Double Bevel, DB = Double Bevel.

Appendix E

***Bison bison* Analysis at the Dog Child Site**

Table E.1: *Bison bison* animal units by landmarks for Level 1a.

	NISP	MNI			MNE		Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Cranium								
Molar indeterminate	1	1	-	1	-	-	0.17	19.32
Mandible								
Incisor/Canine	7	1	-	3	4	-	0.88	100
Second Premolar	1	1	-	1	-	-	0.5	56.82
Third Premolar	1	1	-	-	1	-	0.5	56.82
Fourth Premolar	1	1	-	1	-	-	0.5	56.82
Third Molar	1	1	-	-	1	-	0.5	56.82
Indeterminate Tooth	4	2	-	-	-	4	0.2	22.76
Radial carpal	1	1	-	1	-	-	0.5	56.82
Fifth metacarpal	1	1	-	-	1	-	0.5	56.82
Tibia								
Posterior Soliel Lines	1	1	-	-	-	1	0.5	56.82
Proximal	1	1	-	1	-	-	0.5	56.82
Second phalanx	1	1	1	-	-	-	0.13	14.77
Third phalanx	1	1	1	-	-	-	0.13	14.77
Proximal sesamoid	1	1	1	-	-	-	0.06	6.82

Table E.2: *Bison bison* animal units by landmarks for Level 1b.

	NISP	MNI	MNE				Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Cranium								
Zygomatic temporal	1	1	-	1	-	-	0.5	60.24
Indeterminate Premolar	2	1	-	2	-	-	0.33	39.76
Indeterminate Molar	5	1	-	2	1	2	0.83	100
Mandible								
Incisor/Canine	1	1	-	-	1	-	0.13	15.66
Metacarpal								
Shaft	1	1	-	-	1	-	0.5	60.24
Proximal	1	1	-	1	-	-	0.5	60.24
Distal	1	1	-	-	1	-	0.5	60.24
Ulnar Carpal	1	1	-	-	1	-	0.5	60.24
Internal Carpal	1	1	-	1	-	-	0.5	60.24
Fused 2nd/3rd Carpal	1	1	-	1	-	-	0.5	60.24
First Phalanx								
Forelimb	2	1	2	-	-	-	0.5	60.24
Second Phalanx	1	1	1	-	-	-	0.13	15.66
Lateral Malleolus	1	1	-	1	-	-	0.5	60.24
Proximal Sesamoid	1	1	1	-	-	-	0.06	7.23
Humerus								
Olecranon Fossa	1	1	-	-	-	1	0.5	60.24
Posterior Shaft	1	1	-	-	1	-	0.5	60.24
Rib								
Shaft	1	1	-	-	-	1	0.04	4.82

Table E.3: *Bison bison* animal units by landmarks for Level 2a.

	NISP	MNI	MNE				Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Mandible								
Coronoid	1	1	-	1	-	-	0.5	33.33
Symphysis	1	1	-	-	-	1	1	66.67
Incisor/Canine	4	1	-	-	4	-	0.5	33.33
Hyoid	1	1	1	-	-	-	1	66.67
Axis								
Odontoid Process	1	1	1	-	-	-	1	66.67
Lumbar Vertebra								
Transverse Process	1	1	1	-	-	-	0.1	6.67
Miscellaneous Vertebra	2	1	2	-	-	-	0.04	2.67
Humerus								
Head	2	1	-	1	1	-	1	66.67
Ulna	1	1	-	1	-	-	0.5	33.33
Radial Carpal	1	1	-	-	1	-	0.5	33.33
Internal Carpal	1	1	-	1	-	-	0.5	33.33
Ulnar Carpal	1	1	-	1	-	-	0.5	33.33
Metacarpal	1	1	-	-	1	-	0.5	33.33
Femur								
Shaft	1	1	-	1	-	-	0.5	33.33
Supracondyloid Fossa	1	1	-	-	1	-	0.5	33.33
Patella	1	1	-	-	1	-	0.5	33.33
Astragulus	3	2	-	1	2	-	1.5	100
First Phalanx	1	1	1	-	-	-	0.13	8.67
Second Phalanx	2	1	2	-	-	-	0.25	16.67
Third Phalanx	2	1	2	-	-	-	0.25	16.67
Proximal Sesamoid	1	1	1	-	-	-	0.06	4

Table E.4: *Bison bison* animal units by landmarks for Level 2b.

	NISP	MNI	MNE				Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Cranium								
Petrous Temporal	2	1	-	1	-	1	1	100
Miscellaneous Cranium	1	1	1	-	-	-	0.04	4
Second Premolar	1	1	-	1	-	-	0.5	50
Indeterminate Premolar	1	1	-	1	-	-	0.17	17
Mandible								
Corpus	2	1	-	1	-	1	1	100
Indeterminate Molars	2	1	-	2	-	-	0.33	33
Indeterminate Molar	1	1	-	-	-	1	0.17	17
Rib								
Shaft/Costal Groove	2	1	-	-	-	2	0.07	7
Scapula								
Glenoid Fossa	1	1	-	-	1	-	0.5	50
Ventral Border	1	1	-	-	1	-	0.5	50
Miscellaneous Vertebra	1	1	-	-	-	1	0.04	4
Humerus								
Head	2	1	-	-	1	1	1	100
Proximal	1	1	-	-	1	-	0.5	50
Radius	1	1	-	1	-	-	0.5	50
Radial Carpal	1	1	-	1	-	-	0.5	50
Metacarpal								
Distal	1	1	-	1	-	-	0.5	50
Innominate								
Acetabulum	1	1	-	1	-	-	0.5	50
Pubis	1	1	-	-	-	1	0.5	50
Tibia								
Distal	1	1	-	1	-	-	0.5	50
Lateral Malleolus	1	1	-	1		-	0.5	50
Metatarsal								
Proximal	1	1	-	1	-	-	0.5	50
First Tarsal	1	1	-	-	1	-	0.5	50
Astragulus	1	1	-	-	1	-	0.5	50
Calcaneous	1	1	-	-	1	-	0.5	50
Second Phalanx	2	1	2	-	-	-	0.25	25
Third Phalanx	1	1	1	-	-	-	0.13	13

Table E.5: *Bison bison* animal units by landmarks for Level 3a.

	NISP	MNI			MNE		Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Cranium								
Petrous Temporal	1	1	-	-	-	1	0.5	25
Premaxilla	1	1	-	-	1	-	0.5	25
Maxilla	1	1	-	1	-	-	0.5	25
Second Premolar	2	2	-	2	-	-	1	50
Third Premolar	1	1	-	1	-	-	0.5	25
Fourth Premolar	1	1	-	1	-	-	0.5	25
First Molar	3	2	-	2	1	-	1.5	75
Second Molar	1	1	-	1	-	-	0.5	25
Third Molar	1	1	-	1	-	-	0.5	25
Indeterminate Premolar	1	1	-	-	-	1	0.17	8.5
Mandible								
Incisor/Canine	3	1	-	2	1	-	0.38	19
Indeterminate Premolar/Molar	1	1	-	-	-	1	0.08	4
Stylohyoid	1	1	-	1	-	-	0.5	25
Thoracic Vertebra								
Centrum	2	1	2	-	-	-	0.14	7
Rib								
Tubercle	1	1	-	-	-	1	0.04	2
Shaft	2	1	-	-	1	1	0.07	3.5
Humerus								
Proximal	1	1	-	-	1	-	0.5	25
Ulna								
Proximal	2	2	-	-	2	-	1	50
Distal	2	1	-	1	1	-	1	50
Radius								
Proximal	1	1	-	-	1	-	0.5	25
Proximal Epiphysis	1	1	-	1	-	-	0.5	25
Distal	2	2	-	2	-	-	1	50
Metacarpal								
Proximal Articular Surface	2	2	-	-	2	-	1	50
Distal	1	1	-	1	-	-	0.5	25
Accessory Carpal	1	1	-	-	1	-	0.5	25
Fused 2nd/3rd Carpal	1	1	-	-	1	-	0.5	25
Radial Carpal	2	2	-	2	-	-	1	50
Ulnar Carpal	1	1	-	-	1	-	0.5	25
Unciform Carpal	1	1	-	-	1	-	0.5	25

Table E.6: *Bison bison* animal units by landmark for Level 3a continued.

	NISP	MNI			MNE		Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Innominate								
Acetabulum	1	1	-	-	1	-	0.5	25
Femur								
Shaft	2	1	-	1	1	-	1	50
Tibia								
Proximal	1	1	-	1	-	-	0.5	25
Distal	4	2	-	2	2	-	2	100
Fused Central/4th Tarsal	1	1	-	-	1	-	0.5	25
Lateral Malleolus	1	1	-	-	1	-	0.5	25
Calcaneous	1	1	-	1	-	-	0.5	25
First Phalanx	1	1	1	-	-	-	0.13	6.5
Forelimb	2	1	2	-	-	-	0.5	25
Hindlimb	2	1	2	-	-	-	0.5	25
Second Phalanx	3	1	3	-	-	-	0.38	19
Third Phalanx	2	1	2	-	-	-	0.25	12.5
Metapodial	1	1	-	-	-	1	0.25	12.5

Table E.7: Adult *Bison bison* animal units by landmarks for Level 3b.

	NISP	MNI			MNE		Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Cranium								
Occipital Condyle	1	1	1	-	-	-	0.5	7.69
Petrous Temporal	4	1	-	1	1	2	2	30.77
Presphenoid	1	1	1	-	-	-	1	15.38
Basisphenoid	1	1	1	-	-	-	1	15.38
Nasal Septum	1	1	1	-	-	-	1	15.38
Premaxilla	1	1	-	-	1	-	0.5	7.69
Maxilla	3	1	-	1	-	2	1.5	23.08
Second Premolar	5	3	-	3	2	-	2.5	38.46
Third Premolar	3	2	-	2	1	-	1.5	23.08
Fourth Premolar	3	2	-	2	1	-	1.5	23.08
First Molar	4	2	-	2	2	-	2	30.77
Second Molar	4	2	-	2	2	-	2	30.77
Third Molar	4	2	-	2	2	-	2	30.77
Indeterminate Premolar	5	1	-	-	1	4	0.83	12.77
Mandible								
Angular Process	1	1	-	-	1	-	0.5	7.69
Ascending Ramus	3	2	-	2	1	-	1.5	23.08
Condyle	2	1	-	1	1	-	1	15.38
Coronoid	1	1	-	-	-	1	0.5	7.69
Corpus	3	1	-	-	1	2	1.5	23.08
Symphysis	1	1	-	1	-	-	1	15.38
Incisor/Canine	15	1	-	5	7	3	1.88	28.92
Stylohyoid	7	3	-	3	2	2	3.5	53.85
Thoracic Vertebra								
Spinous Process	3	1	3	-	-	-	0.21	3.23
Centrum	3	1	3	-	-	-	0.21	3.23
Lumbar Vertebra								
Posterior Articular Facet	1	1	1	-	-	-	0.08	1.23
Transverse Process	1	1	1	-	-	-	0.08	1.23
Centrum	3	1	3	-	-	-	0.6	9.23
Caudal Vertebra	1	1	1	-	-	-	0.06	0.92
Miscellaneous Vertebra	1	1	-	-	-	1	0.02	0.31

Table E.8: Adult *Bison bison* animal units by landmarks for Level 3b continued.

	NISP	MNI			MNE		Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Scapula								
Acromial Spine	1	1	-	1	-	-	0.5	7.69
Blade	3	3	-	-	3	-	1.5	23.08
Humerus								
Proximal	1	1	-	1	-	-	0.5	7.69
Shaft	1	1	-	1	-	-	0.5	7.69
Distal	7	5	-	5	2	-	3.5	53.85
Ulna								
Proximal	2	2	-	-	2	-	1	15.38
Shaft	2	1	-	-	-	2	1	15.38
Distal	2	1	-	1	1	-	1	15.38
Radius								
Proximal	1	1	-	-	1	-	0.5	7.69
Distal	1	1	-	1	-	-	0.5	7.69
Metacarpal								
Complete	1	1	-	-	1	-	0.5	7.69
Distal	5	1	-	1	-	4	2.5	38.46
Internal Carpal	1	1	-	1	-	-	0.5	7.69
Fused 2nd/3rd Carpal	2	2	-	2	-	-	1	15.38
Radial Carpal	2	2	-	2	-	-	1	15.38
Innominate								
Ilium	1	1	-	-	-	1	0.5	7.69
Ischium	3	1	-	-	1	2	1.5	23.08
Femur								
Proximal	4	3	-	1	3	-	2	30.77
Distal	5	4	-	4	1	-	2.5	38.46
Shaft	1	1	-	1	-	-	0.5	7.69
Tibia								
Proximal	13	8	-	4	8	1	6.5	100
Distal	6	4	-	1	4	1	3	46.15
Metatarsal								
Complete	1	1	-	-	1	-	0.5	7.69
Proximal	1	1	-	-	1	-	0.5	7.69
Distal	1	1	-	-	1	-	0.5	7.69

Table E.9: Adult *Bison bison* animal units by landmarks for Level 3b continued.

	NISP	MNI			MNE		Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
First Tarsal	2	1	-	1	1	-	1	15.38
Fused 2nd/3rd Tarsal	2	1	-	1	1	-	1	15.38
Fused Central/4th Tarsal	1	1	-	-	1	-	0.5	7.69
Lateral Malleolus	2	2	-	-	2	-	1	15.38
Astragulus	1	1	-	-	1	-	0.5	7.69
Calcaneous	1	1	-	-	1	-	0.5	7.69
First Phalanx								
Hindlimb	3	1	3	-	-	-	0.75	11.54
Second Phalanx	7	1	7	-	-	-	0.88	13.54
Third Phalanx	4	1	4	-	-	-	0.5	7.69
Distal Sesamoid	2	1	2	-	-	-	0.13	2
Proximal Sesamoid	4	1	4	-	-	-	0.25	3.85

Table E.10: Fetal *Bison bison* animal units by landmarks for Level 3b.

	NISP	MNI			MNE		Total MAU	%MAU
			Axial	Left	Right	Indeterminate Side		
Incisor/Canine	8	2	-	5	3	-	1	66.67
Miscellaneous Tooth	3	1	-	-	-	3	0.15	10
Rib						-		
Shaft	25	1	-	-	-	25	0.89	59.33
Humerus								
Shaft	3	2	-	-	-	3	1.5	100
Thoracic Vertebra								
Spinous Process	5	1	5	-	-	-	0.36	24
Ulna								
Shaft	1	1	-	-	-	1	0.5	33.33
Vertebral Centrum	2	1	2	-	-	-	0.04	2.67
Vertebra	4	1	4	-	-	-	0.08	5.33
Metatarsal								
Shaft	3	1	-	-	-	3	0.75	50
Sternebra	2	1	2	-	-	-	0.33	22
Second Phalanx	1	1	1	-	-	-	0.13	8.67