

The Cory Site (FaNq-75) and the Mummy Cave/Oxbow
Transition on the Northern Plains

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By

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Abstract

The Cory site (FaNq-75) is a multicomponent Middle Period site located in Saskatoon in south-central Saskatchewan, Canada. The site was excavated in 2001 by Stantec Consulting Ltd. as part of a remediation program for a SaskWater pipeline project. Four occupation levels were identified with one complete and two fragmentary projectile points identified. Level II of the Cory site contained a complete projectile point, which was an atypical Gowen point, and was radiocarbon dated to 5910 ± 60 rcybp. The collection from the site was obtained from the Royal Saskatchewan Museum for a more thorough analysis as part of this thesis. Three new radiocarbon dates were obtained for previously undated levels of the site.

In addition to the description of the Cory site, this thesis also reviews the published material from a number of Middle Period sites on the Northern Plains. This review led to a reconsideration of the traditional classification of Middle Period archaeological cultures. Previously, the Gowen complex and the Oxbow complex had been considered separate, but related entities. In this thesis, a new classification is proposed with the Gowen complex and the Oxbow complex combined into a single archaeological culture.

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I know that as soon as this is submitted I will think of someone I should have included on this list. Please do not take your omission from this list as a slight but as a failing of my memory.

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Chapter 1 : Introduction

The Cory site (FaNq-75) is a multicomponent habitation site located in Saskatoon, Saskatchewan. It was excavated in 2001 by Stantec Consulting Ltd. as part of a heritage resource management project for the Cory Potash Mine and SaskWater (Walker et al. 2002). Six occupation levels were identified in the original study and designated as Levels A, B, I, II, III, and IV. Level B and Level I were identified as Oxbow occupations based on the presence of incomplete Oxbow points in both levels. Level II was identified as a Gowen occupation based on the presence of an atypical Gowen point and a radiocarbon date of 5910 ± 60 radiocarbon years before present (rcybp) (Beta-168248). For consistency all of the radiocarbon dates discussed in this thesis are presented as uncalibrated dates in radiocarbon years before present (rcybp) with their lab sample numbers. The other levels were not assigned cultural affiliations.

The Gowen complex existed between around 6100 and 5200 rcybp and is typified by side notched projectile points with flat or slightly concave bases. Walker (1992) defined the Gowen point type and included them as part of the Mummy Cave series, a loosely defined collection of side-notched points that spanned from around 7500 rcybp to 5000 rcybp. Peck (2011) defined the Gowen complex as a stand-alone entity.

The Oxbow complex follows the Gowen complex and lasted from about 5200 to 3800 rcybp. Side-notched projectile points with deeply concave bases that have a distinct “eared” appearance typify the complex. The complex was first defined by Wettlaufer and Mayer-Oakes (1960) based on the material from the Long Creek site and the Oxbow Dam site (Nero and McCorquodale 1958).

Suggesting a connection between the Mummy Cave series and the Oxbow complex is by no means a new idea (cf. Reeves 1973); however, this connection was based primarily on the similarity and co-occurrence of projectile points from sites. This thesis will take a broader view at the material cultures of both the Gowen and Oxbow complexes and look for similarities beyond projectile points, including other lithic material and faunal remains.

The goal of this thesis is to provide an in-depth reanalysis and a more thorough presentation of the material collected from the Cory site. It also seeks to place the site in the larger context of sites on the Northern Plains during the Middle Precontact Period. The objective

is to establish that there is a clear continuity between the Gowen and Oxbow cultural complexes on the Northern Plains, by completion of the following tasks:

- 1) Provide a detailed analysis of the material collected from the Cory site.
- 2) Examine other Gowen and Oxbow manifestations on the Northern Plains.
- 3) Propose a framework for a Gowen-Oxbow series.

1.1 Structure of the Thesis

Chapter 2 of this thesis looks at the biophysical environment of the Cory site including climate, soils, and faunal and floral resources. It also contains a brief look at the culture history of the Mummy Cave series and the Oxbow complex.

Chapter 3 describes the material collected from the Cory site by level. The background and methodology of the original excavation are also discussed. The radiocarbon dates for the Cory site are also presented here.

Chapter 4 discusses other sites from the Northern Plains that also contain Mummy Cave series and/or Oxbow complex components. They are compared to the Cory site and some overarching thoughts on the culture history of the region are given.

Chapter 5 lays out the framework for a proposed Gowen-Oxbow series and defines the attributes of the Gowen and Oxbow complexes that make up the series. This includes the start and end dates of the two complexes along with a description of the subsistence patterns, lithic technology including projectile points, burial practices, and habitation range.

Chapter 2 : Biophysical Environment of the Cory Site

The Cory site is located near the southern extent of the Saskatchewan Rivers Plain in south-central Saskatchewan (Figure 2.1). This is a relatively flat floodplain with elevations between 500 and 520 m which was formed by Glacial Lake Saskatoon and adjacent eroded glacial till plains. Uplands surrounding the river valley consist mostly of mixed-grass prairie or cultivated farmland with isolated aspen stands. The South Saskatchewan River valley is dominated by mostly shrub and aspen. The southern portion of the region consists of Dark Brown loamy soils, but further north the depth of these deposits decrease and the soil begins to be dominated by gravelly glacial till (Acton et al. 1998).

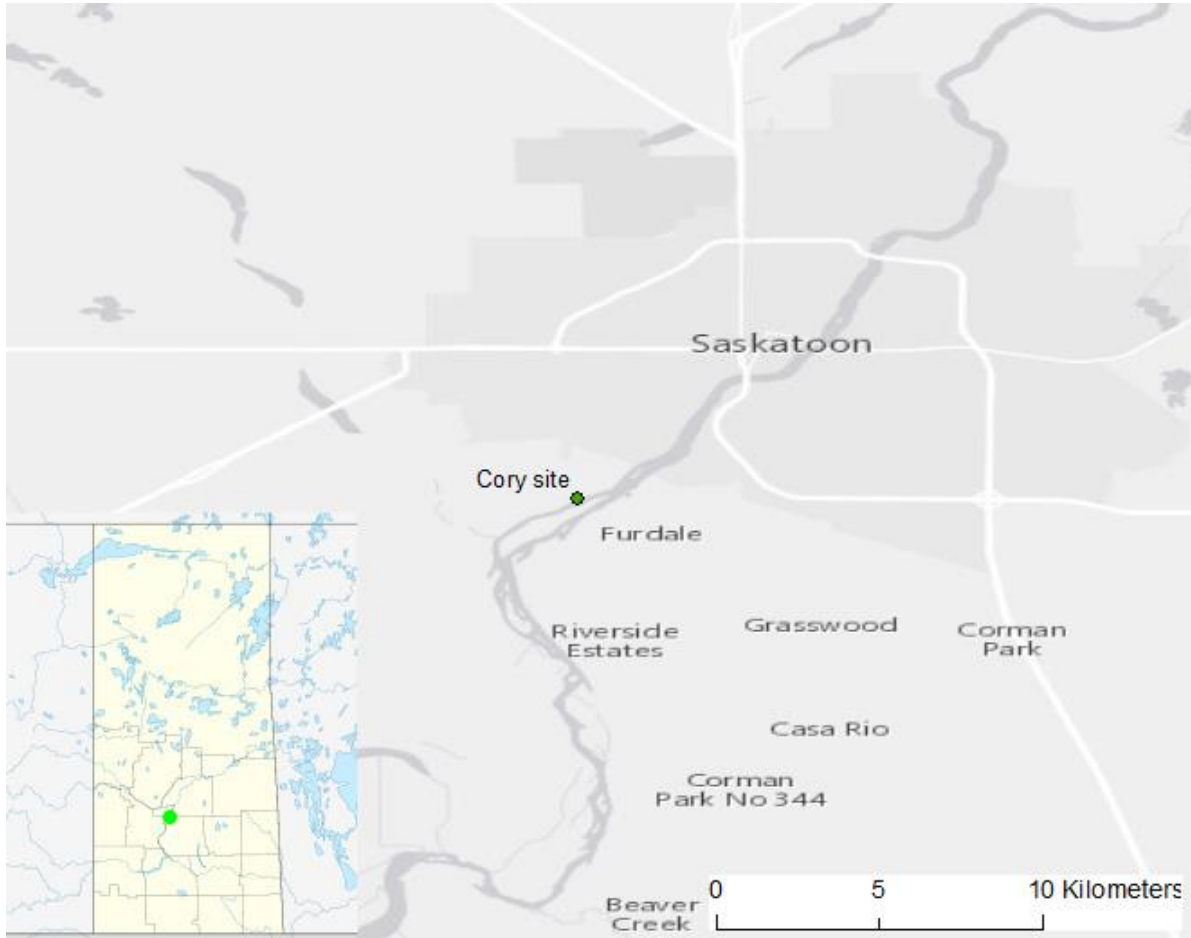


Figure 2.1: Location of the Cory site (FaNq-75)

The original site report for the Cory site (Walker et al. 2002) describes the sediments as “well-sorted, massive, aeolian sands ... [which were] deposited in a delta of the Pleistocene

Glacial Lake Saskatchewan and were subsequently reworked by the South Saskatchewan River and by the wind” (Walker et al. 2002: 4.1). The sand shows evidence of layering with thin layers of clay that result from periodic flooding or heavy rainfall events (Walker et al. 2002: 4.1).

The Cory site is located in an area that was covered by Glacial Lake Saskatoon which was formed by the meltwater from the Wisconsin ice sheets. According to the maps prepared by Christiansen (1979), the Cory site would have been free of ice by 11 500 rcybp, but remnants of Glacial Lake Saskatoon remained until around 9000 rcybp (Walker 1992). The Cory site is located about 100-200 m northwest of the present bank of the South Saskatchewan River on a landform known as the Saskatoon Terrace. This river terrace was initially formed from sediment laid down by Glacial Lake Saskatoon and experienced a period of degradation and erosion until around 7000 rcybp followed by a laying down of a thin layer of overbank flood deposits (Walker 1992).

Around 6000 rcybp there was a shift in the climate of the Northern Plains (Yansa 2007). This is during a period known as the Hypsithermal (or Altithermal) which lasted from about 8000 rcybp to 5000 rcybp (Yansa 2007). At this time, the climate temperatures were very similar to modern temperature averages, but it was much more arid with peak warmth and aridity occurring from 6000 to 5000 rcybp. Annual precipitation decreased by about 65mm, with frequent, multi-year droughts (Yansa 2007: 131). Schiele and Walker (2013) note that the Hypsithermal was not consistently dry and warm, but contained many periods of cooler, drier conditions. Analysis of isotope ratios in bison teeth from southern Saskatchewan indicate that the average difference in seasonal temperature was greater during the Hypsithermal, but this also varied over the course of the Hypsithermal (Schiele and Walker 2013). Currently, the Saskatoon region is in a grassland/aspen parkland ecotone zone although around 6000 rcybp the ecotone boundary was about 200 km further north (Yansa 2007).

Based on modern average climate data from 1971-2010 (Environment Canada 2011), the annual average temperature in Saskatoon was 2.2 °C with five months of the year averaging below freezing (November through March). The coldest month of the year was January, at an average of -17 °C with a range from an average maximum of -11.8 °C and an average minimum of -22.3 °C. The warmest was July, at 18.2 °C with a range from an average maximum of 24.9 °C and an average minimum of 11.4 °C. The Saskatoon region receives an average of 12.25 days above 30 °C a year and an average of 16.5 days below -30 °C. There is a yearly average

precipitation level of 350 mm which consists of 265.2 mm of rain and 97.2 cm of snow (10 cm of snow is roughly equivalent to 10 mm of rain). June and July have the most precipitation with 68.6% of the yearly precipitation occurring during May through September mostly in the form of rain. Wind in the region has an average speed of 15.7 km/h predominantly from the west, but with southerly and easterly winds in the spring.

2.1 Modern Faunal Resources

Many mammal species in the region could be utilized for food resources including large game such as mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*), wapiti or elk (*Cervus elaphus*), moose (*Alces alces*), and pronghorn (*Antilocapra americana*) (Banfield 1987). Bison (*Bison bison*) were common in the area until the arrival of Europeans and are currently extirpated.

Small game likely utilized for food include white-tailed jackrabbit (*Lepus townsendii*), Nuttall's cottontail (*Sylvilagus nuttallii*), snowshoe hare (*Lepus americanus*), woodchuck (*Marmota monax*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and porcupine (*Erethizon dorsatum*) (Banfield 1987).

There are several types of carnivores that are present, but were not necessarily used as food resources. They may have been taken for food or furs and the claws and teeth may have been used for personal adornments, or alternatively, the remains may simply be intrusive in some sites. These include raccoon (*Procyon lotor*), least weasel (*Mustela nivalis*), mink (*Mustela vison*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), river otter (*Lontra canadensis*), coyote (*Canis latrans*), gray wolf (*Canis lupus*), red fox (*Vulpes vulpes*), black bear (*Ursus americanus*), grizzly bear (*Ursus arctos*), mountain lion (*Felis concolor*), lynx (*Lynx lynx*), and bobcat (*Lynx rufus*) (Banfield 1987). While not a wild animal, domestic dogs (*Canis familiaris*) were commonly found among indigenous groups on the Northern Plains (cf. Morlan 1994).

There are also many species of small rodents that are occasionally found in archaeological deposits. Some of these can be found contemporaneously with the occupation, but they are often intrusive. In this region, these can include the least chipmunk (*Eutamias minimus*), Richardson's ground squirrel (*Spermophilus richardsonii*), Thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), red squirrel (*Tamiasciurus hudsonicus*), Northern pocket

gopher (*Thomomys talpoides*), deer mouse (*Peromyscus maniculatus*), Northern grasshopper mouse (*Onychomys leucogaster*), Gapper's red-backed vole (*Clethrionomys gapperi*), heather vole (*Phenacomys intermedius*), meadow vole (*Microtus pennsylvanicus*), prairie vole (*Microtus ochrogaster*), and Western jumping mouse (*Zapus princeps*) (Banfield 1987).

There are a wide variety of birds in the Saskatoon region with numerous species of both migratory and resident populations. The migratory birds include Canada goose (*Branta canadensis*), sandhill crane (*Grus canadensis tabida*), great blue heron (*Ardea herodias*), pelicans (*Pelecanus erythrorhynchos*), and the now very rare whooping crane (*Grus americana*). There are also many varieties of duck (Family Anatidae), with mallard (*Anas platyrhynchos*), Northern Shoveler (*Anas clypeata*) and blue-winged teal (*Anas discors*) being among the most common. There are also many species of birds of prey, including several members of Family Accipitridae (hawks and eagles), such as red-tailed hawk (*Buteo jamaicensis*) and bald eagle (*Haliaeetus leucocephalus*), and of Family Strigidae (owls). Crow (*Corvus brachyrhynchos*) and raven (*Corvus corax*) are also common in the region. See Leighton et al. (2002) for a complete list.

There are an abundance of fish resources in the South Saskatchewan River. Lake sturgeon (*Acipenser fulvescens*), lake whitefish (*Coregonus clupeaformis*), Northern pike (*Esox lucius*), sauger (*Stizostedion canadense*), walleye (*Stizostedion vitreum vitreum*), and burbot (*Lota lota*) can all be found in the river channel. Other species, such as yellow perch (*Perca flavescens*), bigmouth buffalo (*Ictiobus cyprinellus*), shorthead redhorse (*Moxostoma macrolepidotum*), white sucker (*Catostomus commersoni*), and longnose sucker (*Catostomus catostomus*) can often be found in the small streams and oxbow lakes adjacent the river (Ransom 1981; Saskatchewan Watershed Authority n.d.).

There are very few reptiles and amphibians in the Saskatoon region. The only reptiles found near Saskatoon are gartersnakes (Genus *Thamnophis*) (Canadian Herpetological Society 2012), while the amphibians in the region are the northern leopard frog (*Lithobates pipiens*), the wood frog (*Lithobates sylvaticus*), the boreal chorus frog (*Pseudacris maculate*), the Canadian toad (*Anaxyrus cognatus*) and the gray tiger salamander (*Ambystoma mavortium diaboli*) (Canadian Herpetological Society 2012).

2.2 Modern Floral Resources

The Upland Prairie Zone of the Saskatoon Plain and the South Saskatchewan River drainage is covered by short grass prairie, mainly consisting of rough fescue (*Festuca scabrella*), porcupine grass (*Stipa spartea*), spear grass (*Stipa comata*), northern wheat grass (*Agropyron dasystachyum*), blue gamma grass (*Bouteloua gracilis*), and June grass (*Koeleria crisata*), along with a variety of sedges (*Carex* spp.) (Bird 1961). There are scattered stands of aspen (*Populus tremuloides*) with a low shrub layer consisting of rose (*Rosa* sp.), wolf willow (*Elaeagnus commutate*), wild red raspberry (*Rubus idaeus*), western snowberry (*Symphoricarpos occidentalis*), chokecherry (*Prunus virginiana*), and Saskatoon berry (*Amelanchier alnifolia*).

The Valley Slope Zone is an area of mostly stable slopes with periods of active slumping. Lineman (2000) included a study area near the Cory site in his study of the vegetation of the South Saskatchewan River valley. The stable portions are covered with stands of trees such as white birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*) as well as shrubs, including chokecherry, Saskatoon berry, pussy willow (*Salix discolor*), Buckbrush (*Symphoricarpos occidentalis*), Woods' rose (*Rosa woodsii*), red-osier dogwood (*Cornus sericea stolonifera*), and wolf willow (Lineman 2000). Forbs found on the valley slope include northern bestraw (*Galium boreale*), wild licorice (*Glycyrrhiza lepidota*), and wild sarsaparilla (*Aralia nudicaulis*) (Lineman 2000).

The Floodplain Zone is very diverse with many distinct landforms. These include gravel point bars, low-lying backswamps, low and high terraces, sandbars, levees, abandoned channels, islands, and oxbow lakes (Walker 1992). The Cory site is located in a terrace zone known as the Saskatoon Terrace. While the natural environment around the site has been disturbed by agriculture and other development, these terraces are often dominated by red-osier dogwood and wolf willow with scattered tall shrub layer of *Salix lutea* and a mid shrub layer of *Rosa* and *Symphoricarpos* species. Chokecherry and Saskatoon berry are often found associated with the low shrub layer. There are also stands of balsam poplar (*Populus balsamifera*) and cottonwood (*Populus deltoides*) with water birch (*Betula occidentalis*) on the edges of the terrace. Common herbs found on the terraces include sandwort (*Arenaria lateriflora*), anemone (*Anemone canadensis*), meadow-rue (*Thalictrum venulosum*), and vetch (*Vicia americana*) (Hall 1973).

2.3 Middle Period Culture History

This section will look at the cultural chronology of the Northern Plains, in particular the Middle Precontact Period that spans from approximately 7500 rcybp to 2000 rcybp. The terminology in this section utilizes Cyr (2006) which is based on Walker (1992). The main changes made by Cyr (2006) are the replacement of the word “prehistoric” and “historic” with “precontact” and “contact” and the addition of a Protocontact period (Cyr 2006: Table 3.1). The Middle Period is further subdivided into three sections: the Early Middle Period (approximately 7500 rcybp to 5000 rcybp), the Middle Middle Period (approximately 5000 rcybp to 3000 rcybp), and the Late Middle Period (approximately 3000 rcybp to 2000 rcybp). This section focuses on the Early Middle Period and the first half of the Middle Middle Period, as this is the time frame relevant to the thesis.

Most of the terminology in this thesis follows Dyck (1983). A *complex* is “a large composite archaeological unit. It consists of interconnected sites, features, and artifacts, tied together by similarities in function, style, technology, and subsistence-settlement system. The parts of a complex are found within a common geographical distribution and within a common segment of time” (Dyck 1983: 69). A *series* is “a sequence of archaeological components sharing a common geographical space (sometimes within a single site, sometimes within a region), but belonging within separate segments of time” (Dyck 1983: 69). The term series is usually used to describe groups of components, sites, features, and artifacts that are not ready to be classified into complexes or traditions (Dyck 1983). A *tradition* is “an element of a complex (or a group of elements), often diagnostic, which occurs in sequential complexes” (Dyck 1983: 69).

The beginning of the Early Middle Period on the Northern Plains is marked by the appearance of the Mummy Cave series. Originally named after the type site in northwestern Wyoming (Husted and Edgar 2002, Reeves 1973), this cultural sequence is typified by the first appearance of side-notched projectile points on the Plains. The Mummy Cave series is not a complex, but a grouping of a number of projectile point styles. Walker (1992) identified several distinct point styles that had been grouped under the Mummy Cave series. Peck (2011) identified several more point styles and grouped several of the points into their own taxonomic grouping. One of the point styles identified by Walker (1992) was the Gowen point, and Peck (2011) used this as the diagnostic projectile point for his Gowen complex. Gowen points are side-notched projectile points with flat or slightly concave bases. The blade margins are usually straight or

convex with the greatest width at the shoulder. They have wide, shallow side notches low on the lateral margin (Figure 2.2). This point style is one of the later styles in the Mummy Cave series first appearing around 6100 rcybp (Peck 2011).



Figure 2.2: Typical Gowen point from Walker (1992)

(Used with permission)

The Mummy Cave series starts around 7500 rcybp, about 500 years after the beginning of the Hypsithermal. It was once thought that there was a hiatus in the occupation of the Northern Plains during this time period due to the climactic changes (Mulloy 1958; Willey 1966), but there is sufficient climatological and archaeological data to reject this idea (Oetelaar 2011; Reeves 1973; Walker 1992). Changes in erosional patterns during the Hypsithermal may have led to many sites being eroded while others were deeply buried (Oetelaar 2011).

During this time period, there was a shift away from a reliance on big game hunting to a more diversified subsistence base and there was an intensification of the processing of animal remains (Oetelaar 2011; Schiele and Walker 2013; Walker 1992). On the Northern Plains, bison remained the dominant prey animal although there was a shift from large communal hunting strategies to more opportunistic hunting strategies (Oetelaar 2011). These smaller kills were often single animals or small groups and tended to be found in refugia areas (Oetelaar 2011). These remains were also often heavily processed with long bones being broken open for marrow and bones being fractured and boiled to extract grease. This is not universal, as there are some sites such as the Norby site that do not show that level of processing (Zurburg 1991). It should be noted that extensive processing of bison remains is not confined to times of resource shortage. Evidence of boiling bones for grease is also found at large bison kills like Head-Smashed-In buffalo jump where food would have been abundant (Brink 2008). Significant sites from this

time period include the Stampede site (Gryba 1975), the Gowen sites (Walker 1992), the Norby site (Zurburg 1991) and the Dog Child site (Cyr 2006; Pletz 2010).

Around 4800 rcybp there is the emergence of a new projectile point style. This point style is typified by shallow side-notches and a deep basal concavity that give the points a distinctive “eared” appearance. This point type is used to define a cultural complex named the Oxbow complex after the Oxbow Dam site where the points were first identified (Green 1998; Nero and McCorquodale 1958; Wettlaufer and Mayer-Oakes 1960). Wettlaufer and Mayer-Oakes (1960) compared points found in levels 7 and 8 of the Long Creek site with the material from the Oxbow Dam site to form the base definition of the Oxbow complex. The complex existed from around 4800 rcybp to around 4000 rcybp. Varying end dates have been given for the complex. Peck (2011) lists ca. 4100 rcybp, Brink (2008) gives 3700 rcybp, and Nicholson and Webster (2011) give 3869 rcybp. Peck (2011) also proposes that a cluster of Oxbow people may have lasted as late as 3500 rcybp in central Montana based on the upper levels of the Sun River site (Greiser et al. 1985). Based on the radiocarbon dates of sites looked at in this thesis 3800 rcybp would be an appropriate end date with a possible outlier round 3500 rcybp.



Figure 2.3: Typical Oxbow point from Oetelaar (2005)

(Used with permission)

Peck (2011) proposed an altered definition of the Oxbow complex. Rather than a complex he defined it as a tradition with two distinct phases: the Estevan phase (ca. 4900-4500 rcybp) and the Oxbow phase (ca. 4500-4100 rcybp). In this model, the Estevan phase is represented by two point styles. The Long Creek point has deep side notches and a slightly concave base, while the Souris point was a flat base and shallow corner notches (Peck 2011).

The Oxbow phase is represented by the Oxbow point described above with its deep basal concavity and eared appearance.

The Oxbow complex was characterized by small short-term campsites. The subsistence strategy of Oxbow occupations was likely very similar to the subsistence strategies of Mummy Cave series sites. The primary animal food source was bison, but sites may also contain deer, canids, hares, birds, fish, and possibly rodents and clams. Bison were taken in small hunting events rather than mass kills. The lithic assemblage was produced primarily from local materials, but can also contain exotic materials such as Knife River flint. The tool assemblage also contains bone and antler tools (Johnston 2005). This definition is used as the basis for the Oxbow phase discussed in Chapter 5.

Some excavated sites on the northern plains containing Oxbow components include the Oxbow Dam site (Green 1998; Nero and McCorquodale 1958), the Long Creek site (Bryant 2002; Wettlaufer and Mayer-Oakes 1960), the St. Louis site (Johnston 2005), the Below Forks site (Johnston 2005), the Stampede site (Gryba 1975), the Dog Child site (Cyr 2006; Pletz 2010), the Amisk site (Amundson 1986), the Wolf Willow site (Walker, pers. comm.), the Harder site (Dyck 1970; Morlan 1994), the Moon Lake site (Dyck 1970), the Sun River site (Geiser et al. 1985), and the Gray site (Millar 1978).

The Cory site contains a cultural sequence representative of both of these complexes and forms the basis of a reconsideration of the adaptive responses, subsistence practices, and tool production patterns of these complexes and their relationship to one another.

Chapter 3 : The Cory Site

3.1 Introduction

This chapter deals with the material excavated from the Cory site. The interpretations of artifacts have been refined from the original investigation. The six levels of the site (Levels A, B, I, II, III, and IV) (Figure 3.1) are each discussed individually and are presented in order of youngest (Level A) to oldest (Level IV).

During the reanalysis of Level B it was determined that it was a disturbed component, which is not unexpected considering it was collected from grader back dirt. By extension Level A and the impacted portion of Level I are also considered disturbed and mixed and cannot be used to make any definitive interpretations. These levels and the artifacts attributed to them are still included in this chapter for the sake of completeness; however, they will not be included in any larger interpretations of the site.

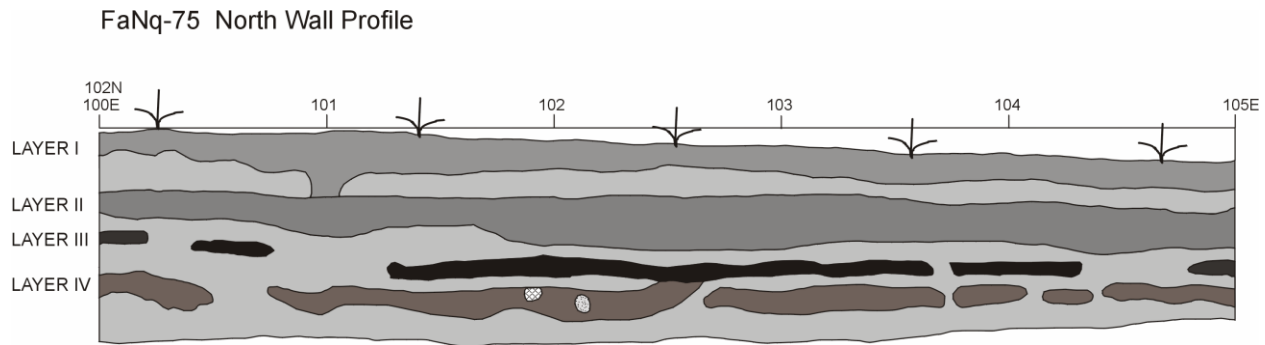


Figure 3.1: Cory site North Wall profile, Units 102N, 100E to 105E.

(Image courtesy of Stantec Consulting Ltd.)

3.2 Background to Excavation

FaNq-75 was excavated as a mitigation project in 2001. SaskWater contracted Stantec Consulting to survey the path of a water pipeline that would lead from the South Saskatchewan River to the Cory potash mine (Figure 3.2). The site was named the Cory site after the potash mine. It was initially found as a surface scatter of artifacts as part of a survey of the right of way for the proposed pipeline. Five deep test units were excavated at 100 m intervals along the proposed right of way for the pipeline. Deep Tests 1 and 2 showed evidence of buried

components at the site producing a mixture of both lithic flakes and fragmented bison bone at 1.6m below surface (Walker et al. 2002).

A grader was used to remove overburden from an area comprising 250 m² in total. As artifacts were located, they were collected and their locations and elevations were recorded. Ten 1 m deep test holes were excavated during overburden removal to determine where the highest concentrations of artifacts were located. When a concentrated area was reached with the grader, the heavy equipment activity was stopped and an excavation with hand tools started (Figure 3.2).



Figure 3.2: The Cory site during excavation, 2001

(Photo courtesy of Dr. Ernie Walker)

A 5 m x 5 m grid (25 m², or 10% of the total study area) was laid out over the excavation area, divided into 25 1 m² units. These units were excavated in 50 cm x 50 cm quadrants using a square edged shovel. All of the fill from the site was screened and any artifacts were collected by Unit, Quadrant, and Level, and each artifact was given a unique number. Any large or mappable

artifacts were left *in situ* and drawn on a level record before collection. During excavation it became clear that artifacts were concentrated in certain areas and excavation in these areas was given more attention. In total, 17 units were excavated not the planned 25. Four levels were identified during the hand excavation (named Levels I through IV) with two more levels identified by monitoring during the overburden removal stage (named Level A and Level B) (Figures 3.3 and 3.4).



Figure 3.3: Site profile showing Levels I to IV, Units 102N, 101E to 104E.

(Photo courtesy of Dr. Ernie Walker)

After the excavation all of the artifacts were hand-washed in water or by dry brushing. Some artifacts were only lightly handled due to their fragile nature and were wrapped in aluminum foil for storage. All of the artifacts were catalogued in an electronic database

(Microsoft Access) and stored in a zipper closure poly bag containing a 3x5 index card with the Borden number of the site and the catalogue number of the artifact written on it.



Figure 3.4: Cory site north wall, units 102N, 100E to 103E.

(Photo courtesy of Dr. Ernie Walker)

3.3 Radiocarbon Dates

Only a single radiocarbon date was obtained for the site during the original investigation. A right proximal bison metatarsal from Level II was submitted to Beta Analytic Inc. for testing (Beta-168248). It returned a date of 5910 ± 60 rcybp (Walker et al. 2002). Three new radiocarbon dates were obtained for this thesis. A piece of bison humerus shaft from Level B was dated to 4370 ± 30 rcybp (Beta-414917). An unidentifiable bone sample from Level I was dated to 4260 ± 30 rcybp (Beta-414915). A petrous temporal from a large mammal (likely bison)

from Level III was dated to 5900 ± 30 rcybp (Beta-414916). These dates will be discussed more in the relevant sections below.

3.4: Level A

Both Level A and Level B were identified during overburden removal by a grader. Whenever an artifact was found it was marked and the location and elevation of the artifact were recorded. Level A is the uppermost level and was quite sparse. In total 13 artifacts were recovered from Level A most of which was fire broken rock. These items are summarized in Table 3.1 which breaks them down by material type.

Table 3.1: Level A Artifacts and Faunal Remains by Material Type

Material	Quantity	Weight (g)
Bone	3	484.5
Limestone	8	835.8
Quartzite	1	428.8
Swan River Chert	1	8.2

3.4.1: Lithic Artifacts

COARSE ROCK (N=8):

Eight of the artifacts in Level A were originally catalogued as pieces of fire broken rock made of limestone. Due to their bulky nature none of these pieces of rock were retained for the collection and as such were not available for reanalysis. The designation as FBR is dubious as limestone was not normally used for heating stones. Since the pieces are not available for analysis it is impossible to determine if these pieces were misidentified as fire broken rock or if the material type was misidentified as limestone.

PECKED OR GROUND STONE TOOLS (N=1):

One of the artifacts collected in this level is catalogued as a hammerstone made of quartzite (FaNq-75-755). There are some impact scars on one surface of the stone, but it does not appear to be an actual hammerstone. The scars are not on the ends or edges of the stone and therefore are likely just caused by impact from the grader. This is likely just a stone that was misidentified.

DEBITAGE (N=1):

There is a single piece of lithic debitage in Level A. It is a secondary flake of Swan River Chert. The material has a pinkish hue and is likely heat-treated.

3.4.2: Faunal Remains

BONE (N=3):

There were three bone elements collected in Level A. There was a right bison metacarpal that is complete and from a mature individual. Also found was a rib shaft from a large mammal, possibly bison, moose, or elk.

The third element was a badly deteriorated bone which is possibly from an immature individual. The element is in two pieces that cannot be articulated. There is a large amount of exposed trabecular bone and the portions of remaining cortical bone have the “woven” texture of immature bone. The element is a long bone from an immature large mammal.

3.5: Level B

Level B was also quite sparse with only 12 artifacts and faunal remains found in this level the majority of which is bone. The one diagnostic artifact found in this level was an Oxbow point made of Swan River Chert. Unfortunately, a pig (*Sus scrofa*) bone was also found in this level which is obviously inconsistent with the Oxbow point. The artifacts from Level B are summarized in Table 3.2 by material type.

Table 3.2: Level B Artifacts and Faunal Remains by Material Type

Material	Quantity	Weight (g)
Bone	7	836.3
Limestone	2	3685
Granite	2	258.6
Swan River Chert	1	2.6

3.5.1: Lithic Artifacts

COARSE ROCK (N=4):

Two pieces of fire broken rock were recovered from Level B both made of granite. There were also two pieces of limestone collected and catalogued as “Field Stone” but no further information was given as to their possible cultural significance. Since these limestone cobbles were not retained, it is impossible to offer any further analysis on them or to speculate as to their significance.

PROJECTILE POINT (N=1):

There was a single formed tool from this level. It is an Oxbow projectile point made of Swan River Chert that was broken longitudinally down the centre of the point (Figure 3.5). The portion that remains is 15 mm wide and 33.5 mm long, suggesting that the complete point would be about 30 mm wide. This artifact was not available for study at the time of writing so these interpretations are based solely on the catalogue and a photograph of the point taken at the time of writing of the original report.

3.5.2: Faunal Remains

BONE (N=7):

Most of the faunal remains from Level B are bison including a 1st phalanx, a left radius, a left humerus, and a cervical vertebra. All of these bones have been impacted by the grader but

are still easily identifiable. The radius and the cervical vertebra are likely immature. There is also a single radial carpal from a pig (*Sus scrofa*). Since pigs are not native to the region and were imported by Europeans this means that Level B and likely Level A and the top of Level 1 are not secure assemblages and have some degree of mixing. The remaining pieces are small, unidentifiable fragments.



Figure 3.5: Oxbow point from Level B
(Photo courtesy of Stantec Consulting Ltd.)

3.5.3: Radiocarbon Date

A radiocarbon date was obtained from a portion of the left bison humerus. It was dated to 4370 ± 30 rcybp (Beta-414917). This sample was submitted after the identification of the pig bone so it was known to be from a disturbed context. This date is slightly older (by about a hundred years) than the date obtained for Level I, but it is still consistent with the Oxbow point found in Level B. It is possible this bone was picked up by the grader from another portion of the site and deposited higher up. It doesn't change the level designation as disturbed.

3.6: Level I

Level I is the most prolific level in the site. It was partially impacted by the grader and the artifacts that were impacted will be assessed separately to minimize the chance of a mixed assemblage. A single point base was found in Level I. The material type was not identified in the original catalogue and like the point from Level B it is unavailable for study so I am unable to definitively determine the material type, but based on the photograph and the description of the material it is likely Gronlid Siltstone. The majority of the assemblage is bone although much of it is highly fragmentary. Table 3.3 summarizes the artifacts in this level by material type.

Table 3.3: Level I Artifacts and Faunal Remains by Material Type

Material	Quantity	Weight (g)
Bone	1576	4726.7
Tooth Enamel	27	43.5
Charcoal	1	0.05
Chalcedony	5	0.8
Chert	9	4.2
Gneiss	1	1.4
Granite	3	17.5
Gronlid Siltstone	3	0.7
Knife River Flint	3	0.6
Ocher	1	0.2
Petrified Wood	9	1.85
Quartz	3	1.0

Quartzite	9	12.6
Sandstone	5	98.5
Silicified Peat	5	0.55
Swan River Chert	47	67.8
Unidentified	1	0.2
Unknown	1	0.9

3.6.1: Lithic Artifacts

PROJECTILE POINT (N=1):

The single bifacial tool from Level I is the broken base of a projectile point (Figure 3.6). It appears that the person making the point roughed out the shape of the point and when they began notching it the base fractured off. The material type is unknown, but is described as being a medium grained, “soft,” black material in the original catalogue. It is likely Gronlid Siltstone as there are other examples of that material in the collection, but without the original artifact to study that determination remains tentative. There is a small concavity in the base. It is likely an Oxbow point preform.

DEBITAGE (N=93)

The lithic debitage from Level I is mostly in the form of flakes with 61 of the artifacts being flakes and the other 32 shatter. Table 3.4 breaks down the debitage into primary, secondary, and tertiary reduction stages. There are a few examples of primary debitage, but the majority of the debitage from this level is secondary or tertiary. There appears to have been a mix of lithic production stages taking place in this level of the site. There are 11 pieces of debitage in this level that have some cortex on them. There is some reduction of cores or pebbles here, but the majority of the flakes are from shaping preforms into tools or resharpening tools.



Figure 3.6: Projectile point base from Level I

(Photo courtesy Stantec Consulting Ltd.)

The overall amount of debitage is small compared to the quantity of faunal remains in this level which means that tool production was not a major activity in the portion of the site that was excavated. There is also only a single instance of a discarded tool in the excavated portion of the Level I. This level has evidence of tool production, but very few discarded tools meaning that the tools being produced were formed tools intended for extended use or they were making point blanks or preforms for later tool production rather than expedient tools intended to be discarded shortly after.

Table 3.4: Level I Debitage by Reduction Stage

Type	Quantity	Weight (g)
Primary	5	8.9
Secondary	26	60.9
Tertiary	62	20.0

COARSE ROCK (N=9):

There were nine pieces of fire broken rock found in the excavated portion of Level I. Five of these pieces were sandstone, three were granite, and one was gneiss. There were many more pieces found in the disturbed portion of Level I and they will be discussed below.

3.6.2: Faunal Remains

BONE (N=1576):

The majority of the bone pieces in this level are unidentifiable fragments (1553 pieces). The elements that can be identified include bison, bird, and ground squirrel. The ground squirrel elements are likely intrusive. The categories of faunal remains are summarized in Table 3.5.

Of the identifiable bison or possible bison remains (n=25), six of them are long bone portions (two tibiae, one radius, one radioulna, and two humeri). One of these elements, the radioulna (FaNq-75-319) is missing and is not available for further analysis. The other five elements are distal and proximal ends with the shafts broken. The other remaining identifiable elements are a mixture of carpals, phalanges, ribs, and vertebrae.

TEETH AND TOOTH ENAMEL (N=27):

Of the 27 pieces of enamel only two elements could be positively identified and both are bison. One is an extremely worn premolar from an older individual, while the other is a molar.

Table 3.5: Level I Faunal Remains by Taxon

Taxon	Quantity	Weight (g)
Aves	9	0.3
Bison	19	4092.21
Bison?	6	66.0
Ground Squirrel	9	1.41
Unidentified	7	150.6
Unidentifiable	1553	455.65

3.6.3: Radiocarbon Date

A radiocarbon date was obtained for Level I from a piece of unidentified long bone shaft. The piece was dated to 4260 ± 30 rcybp (Beta-414915). This age is typical for the Oxbow complex and helps confirm that the projectile point base found in Level I is indeed from an Oxbow point. This date is slightly younger than the date obtained for Level B, which overlays Level I, but it was determined that Level B was too impacted by grader activity to be of much interpretive value.

3.7: Level I Disturbed Portion

As mentioned above this portion of the assemblage is being analyzed separately from the rest to avoid any potential contamination from mixing of assemblages. Because this portion of the assemblage was collected from grader finds, the level of detail of the collected artifacts is not as fine as the portion that was excavated by hand. The backfill was not screened and as a result this portion consists mainly of large pieces of bone, fire broken rock, and debitage. The material types of these items are summarized in Table 3.6.

Table 3.6: Level I Disturbed Portion Artifacts and Faunal Remains by Material Type

Material	Quantity	Weight (g)
Bone	55	1401.7
Basalt?	2	1095.4
Gneiss	6	3541.6
Granite	12	15115.8
Gronlid Siltstone	1	1.0
Limestone	7	1793.3
Quartzite	2	36.9
Sandstone	5	2111.3
Swan River Chert	1	12.7

3.7.1: Lithic Artifacts

RETOUCHED FLAKES (N=1):

There is a single retouched flake made of Swan River Chert. Its right lateral edge is concave and has been unifacial retouched, perhaps for use as a spokeshave. The left lateral edge is convex and also has some unifacial retouching. The flake is broken into three pieces but it is unclear if this happened during use and was the reason it was discarded or if it was caused by impact from the grader.

DEBITAGE (N=3):

There is very little debitage found in this part of Level I which is unsurprising given the nature of the collection method. There are two secondary flakes of quartzite as well as a piece of shatter from Gronlid Siltstone. The piece of shatter was originally misidentified as welded tuff. It

consists entirely of the outer portion of Gronlid Siltstone with none of the inner black material that tools are usually made from.

COARSE ROCK (N=32):

The coarse rock of this level is difficult to analyze as only a single small piece of granite was retained and the other 31 artifacts were not. As such, I have to rely on what was originally catalogued for most of the pieces. Of these 32 pieces 18 are catalogued as fire broken rock while 14 are catalogued as “Field Stone.” It is very likely that the items identified as field stones are non-cultural.

The only piece of coarse stone retained for the collection was a small piece of fire broken rock made of granite. The material was originally identified as quartzite, but there are inclusions of feldspar and mica that make it closer to granite than quartzite so the identification was changed.

3.7.2: Faunal Remains

BONE (N=55):

Only 22 of the 55 pieces of bone collected from the disturbed portion of Level I could have their species positively identified and all 22 of them are bison. The composition of identified elements is broadly similar to the excavated portion of Level I. There are four identified long bones, all of which have been broken, but unlike the excavated portion we cannot assume that their incomplete nature is due to being processed for food. All four show evidence of being impacted by the grader. The rest of the elements that are identified are low utility elements, such as vertebrae, phalanges, metapodials, and carpals and tarsals.

3.8: Level II

Level II drew attention during the original excavation and report since a projectile point found in this level that may be transitional between Oxbow and Gowen type points.

Table 3.7: Level II Artifacts and Faunal Remains by Material Type

Material	Quantity	Weight (g)
Bone	317	103.3
Tooth Enamel	11	5.9
Charcoal	2	0.2
Chalcedony	3	0.8
Chert	12	3.5
Gneiss	6	1212.6
Gronlid Siltstone	5	6.2
Knife River Flint	11	7.1
Limestone	1	11.1
Petrified Wood	10	5.1
Quartz	2	0.4
Quartzite	3	1.5
Red Ochre	2	2.1
Sandstone	6	46.4
Silicified Peat	13	10.6
Swan River Chert	70	90.1
Unidentified	3	2.7

3.8.1: Lithic Artifacts

OCHRE (N=2):

Two pieces of ochre were collected from Level II, both of them orangish-red in colour.

BIFACES (N=2):

There are two bifacially worked tools from Level II both of which are projectile points. Like the points in Level B and Level I these two points are unavailable for study at the time of writing so my interpretations of them are based on photographs and descriptions of the points in the catalogue and the original report.

One is a projectile point blade made of silicified peat (FaNq-75-196). The base is broken and the point cannot be attributed to any particular point style. Even though this point is incomplete it is still larger than the complete point. This is likely because it broke early in its use life and was not as extensively resharpened as the complete point.

The complete point (FaNq-75-640; Figure 3.7) was a main point of interest for the original investigators which prompted them to obtain the radiocarbon date for this level. It was originally catalogued as an “Oxbow or Gowen-Oxbow transitional point.” In the final report it was simply listed as a Gowen point (Walker et al. 2002). The date of 5910 rcybp points this level firmly in the timeframe of the Gowen Complex and about 900 to 1000 years before the traditional start date for the Oxbow Complex (usually given to be around 5000-4900 rcybp).

The catalogue lists the point’s material type as heat-treated Swan River Chert. However, the material appears to be a homogenous orangish-brown which is not a colour usually associated with Swan River Chert, but it is not unheard of. The base of this point seems large compared to the size of the blade and this is likely a result of the point being resharpened multiple times over the course of its use until it was eventually discarded or lost.

The base morphology is atypical of a Gowen point. Most Gowen points have a straight base or a slightly concave base with a curve that extends from the whole width of the base. The base of the projectile point is concave, but it does not extend to the edge of the base like a typical Gowen point. However, neither the basal notch nor the side notches are as deep as it would be in a typical Oxbow point. They also do not form the distinctive “ears” of an Oxbow point. Overall,

this point may represent a transitional specimen as it has some of the elements of Oxbow points, but they are not as defined as stereotypical Oxbow points.



Figure 3.7: Gowen-Oxbow point from Level II

(Photo courtesy of Stantec Consulting Ltd.)

DEBITAGE (N=124):

The debitage in Level II is more evenly distributed across the three reduction stages than the debitage in Level I. There are 23 pieces of primary debitage, 28 secondary, and 69 tertiary. This data is summarized in Table 3.8. This would seem to indicate that the whole process of reducing lithics from cobbles and pebbles to finished tools occurred in this occupation. The debitage is mostly Swan River Chert and other local materials. The only notably exotic material is Knife River Flint (See Table 3.7).

Table 3.8: Level II Debitage by Reduction Stage

Type	Quantity	Weight (g)
Primary	23	21.5
Secondary	28	40.8
Tertiary	69	20.9

COARSE STONE (N=15):

There were 14 pieces of fire broken rock collected from Level II. Six were gneiss, six were sandstone, and two were left unidentified. The two unidentified pieces were not retained so they will have to remain unidentified. One piece of gneiss and three pieces of sandstone were retained and I agree with their identification and classification as fire broken rock. The rest of the pieces were not retained.

CORE (N=1):

There is a single core fragment from Level II (FaNq-75-334). This fragment is made from a very fine-grained, high quality Swan River Chert. It is a platform revitalization fragment and was detached from a core to create a new striking platform.

UTILIZED FLAKES (N=2):

The first of the two utilized flakes from Level II (FaNq-75-211) is a small artifact made of Knife River Flint. It has a very minimal amount of unifacial retouching on the right lateral edge. The other retouched flake from this level (FaNq-75-327) is also unifacially retouched on the right lateral edge. This piece is made of Gronlid Siltstone.

UNIFACE (N=1):

There is a single, possibly unfinished, uniface from Level II. Made from Swan River Chert, the uniface has a very thick bulb of percussion with unifacial retouching on the left lateral edge. The bottom portion of the tool is broken and the retouching likely extended into this missing portion. It is likely a sidescraper.

3.8.2: Faunal Remains

BONE (N=317):

The bone from Level II is highly fragmentary and the majority of it cannot be attributed to a particular taxon (N=304). One element, a carpal, was attributed to mule deer in the original catalogue (FaNq-75-194) but this has been revised to bison. There other identifiable taxa are avian (N=6) and ground squirrel (N=7). Both of these are likely intrusive. The high degree of fragmentation in the assemblage for this level likely indicates that the bone was being heavily processed for grease extraction.

TOOTH ENAMEL (N=11):

None of the enamel pieces found in Level II can be confidently attributed to a particular taxon as they are all fragmentary. Some of the pieces are clearly from large herbivores most likely bison.

3.8.3: Radiocarbon Date

Stantec obtained a single radiocarbon date during their original investigations from a right proximal bison metatarsal. This metatarsal was analyzed by Beta Analytic Inc. (Beta-168248) and returned a date of 5910 ± 60 rcybp (Walker et al. 2002). This age is consistent with Gowen age occupations and is very similar to dates from the nearby Gowen 1 and 2 sites (Walker 1992).

3.9: Level II+III

At the Cory site there are three units (100N 100E, 100N 102E, and 104N 101E) where Levels II and III were collected together. It is unclear why these units were collected this way as they were omitted from the original report. It is possible that the excavators were not able to differentiate between Levels II and III in these units. I have decided to include them here out of thoroughness even though their mixed nature means they cannot be used for analysis. The material types found in these levels is summarized in Table 3.9.

Table 3.9: Level II+III Artifacts and Faunal Remains by Material Type

Material	Quantity	Weight (g)
Bone	28	279.41
Tooth Enamel	4	0.61
Chalcedony	3	0.7
Knife River Flint	10	5.0
Petrified Wood	33	21.3
Quartzite	2	2.9
Silicified Peat	4	7.0
Swan River Chert	6	2.0

3.9.1: Lithic Artifacts

UTILIZED FLAKES (N=2):

There are two utilized flakes from Level II+III. The first is made of Knife River Flint and has unifacial retouching on the distal end and the proximal portion of the left lateral edge. The second utilized flake is the proximal portion of a petrified wood flake. This piece has unifacial retouching on the left lateral edge. It is broken laterally so it is unclear how large the flake was and how far down the lateral edge the retouching extended.

DEBITAGE (N=56):

The reduction stages in Level II+III are of a similar compositions as the reduction stages in Level II, and slightly different from the stages seen in Level III below. This level has a mixture of all three reduction stages again suggesting that the whole range of lithic production is taking place here similar to Level II but different from Level III. The data for Level II+III is

summarized in Table 3.10. The material composition is slightly different from Level II and Level III. Both of these levels are dominated by Swan River Chert, while in Level II+III the most common lithic material is petrified wood.

Table 3.10: Level II+III Debitage by Reduction Stage

Type	Quantity	Weight (g)
Primary	12	8.5
Secondary	12	16.5
Tertiary	32	9.1

3.9.2: Faunal Remains

BONE (N=28):

Faunal remains are quite sparse in the units that were collected as Level II+III. Of the 28 pieces of bone collected, 10 of them are actually from ground squirrels (*Spermophilous sp.*) and are likely intrusive. The ground squirrel remains include three mandibles which all have multiple teeth still intact. These are discussed below. There are two pieces that are identifiably bison: a metatarsal and a fused central+4th tarsal. The rest of the bones are unidentifiable fragments.

TEETH AND TOOTH ENAMEL (N=4):

There are two pieces of unidentifiable enamel fragments, and two complete molars from a ground squirrel (*Spermophilous sp.*). There were also a total of seven teeth still articulated with the ground squirrel mandibles. These included three incisors, one premolar, and three molars.

3.10: Level III

Level III has no diagnostic artifacts but a radiocarbon date was obtained for this level. Artifacts are summarized by material type in Table 3.11.

Table 3.11: Level III Artifacts and Faunal Remains by Material Type

Material	Quantity	Weight (g)
Bone	167	486.5
Basalt?	1	0.6
Chalcedony	3	0.4
Chert	11	4.7
Clear Chalcedony	1	0.05
Gneiss	2	1.4
Granite	1	0.8
Gronlid Siltstone	9	2.1
Knife River Flint	4	0.7
Petrified Wood	26	10.1
Quartz	2	14.7
Quartzite	3	53.3
Sandstone	2	26.3
Silicified Peat	20	32.5
Siltstone	3	2.4
Swan River Chert	23	54.85
Yellow Chert	1	0.6

Unidentified	1	0.4
Unknown	2	0.3

3.10.1: Lithic Artifacts

CORE (N=1):

There is only a single non-debitage lithic artifact in Level III. It is a pebble of silicified peat that has had one edge broken off. However, it is uncertain that this is even an artifact. It is possible that this is simply a naturally broken pebble.

In the original report there was another artifact identified as a core made of chalcedony (FaNq-75-522). This artifact it is not a core fragment but an unusually thick bipolar flake. It is also not made of chalcedony, but instead from high quality Swan River Chert.

DEBITAGE (N=109):

The types of debitage we see in Level III are more similar to the types of debitage in Level I than Level II. There is a greater percentage of secondary and tertiary flakes than there is of primary flakes, suggesting that there was not as much reduction of cobbles as there is in Level II. The people making tools here were likely making them from blanks and prepared cores and resharpening old tools that had been brought with them.

Table 3.12: Level III Debitage by Reduction Stage

Type	Quantity	Weight (g)
Primary	7	22.5
Secondary	41	116.6
Tertiary	61	17.3

3.10.2: Faunal Remains

BONE (N=167):

The faunal remains in Level III tell a very similar story to the remains in Levels I and II. The majority of the remains are unidentifiable fragments that have been heavily fragmented for marrow and grease extraction. The pieces that are identifiable are mostly bison (n=16) with two examples of ground squirrel and two pieces that were originally tentatively identified as *Odocoileus* but that identification is being questioned. One other element that was identified in the original report as *Odocoileus* sp. was changed to bison. Of the bison remains, they are primarily phalanges, carpals, sesamoids, and metapodials, as well as one rib fragment.

The most interesting of the faunal elements in Level III is the distal portion of a bison metacarpal that has been broken midshaft. The broken portion comes to a point, and there is a small polished portion at the tip. It is possible that this bone was used as an expedient tool. Since the area of polish is quite small the tool was likely not used for a long period of time.

3.10.3: Radiocarbon Date

A radiocarbon date was obtained from petrous temporal of a large mammal. It was dated to 5900 ± 30 rcybp (Beta-414916). This date is almost identical to the date obtained for Level II, overlapping with it at one standard deviation. Level II and Level III are separated stratigraphically, which suggests there was a flood event or other depositional event between when the site was occupied during Level III and when it was occupied during Level II. Although no diagnostic artifacts were recovered during the excavation of Level III, given its age and location, it is likely a Gowen occupation.

3.11: Level IV

Level IV is the sparsest of the levels that were excavated. Material types are summarized in Table 3.13.

Table 3.13: Level IV Artifacts and Faunal Remains by Material Type

Material	Quantity	Weight (g)
Bone	59	193.85
Tooth Enamel	2	0.3
Chalcedony	2	1.5
Gneiss	1	0.6
Granite	1	0.3
Knife River Flint	1	0.05
Petrified Wood	8	6.9
Red Ochre	1	0.8
Quartz	1	4.8
Quartzite	1	1.6
Sandstone	1	0.2
Silicified Peat	6	7.6
Siltstone	1	0.2
Swan River Chert	8	51.7

3.11.1: Lithic Artifacts

OCHRE (N=1):

There is a single nodule of red ochre from Level IV.

CORES (N=2):

There are two cores or core remnants from Level IV. One is made of silicified peat and the other is made of Swan River Chert.

One of the cores (FaNq-75-356) was originally catalogued as a retouched flake made of silicified peat with the catalogue suggesting it was an unfinished end scraper. The piece does not have the features of a flake; in particular it does not have a single clean surface like a normal flake. Additionally the retouching is actually just step fracturing with possible crushing on the opposite end of the artifact. This artifact is not a retouched flake, but rather a remnant of a bipolar core that has been exhausted.

The second core is made from Swan River Chert that is pinkish in colour and likely heat-treated. This core is only worked on one edge with a flat surface on the opposite end that still has cortex. There is some crushing along the worked edge which could be from the maker preparing new striking platforms before the core was discarded.

There was another artifact (FaNq-75-721) that was originally catalogued as a core, but it is actually a bipolar flake made of petrified wood. It was re-catalogued as a flake.

DEBITAGE (N=27):

There is not much debitage in Level IV but it is all secondary and tertiary. This is likely because most of the tool production in Level IV was in the form of sharpening tools or making tools from preforms, but it is also possible that the amounts are skewed by the small sample size.

Table 3.14: Level IV Debitage by Reduction Stage

Stage	Quantity	Weight (g)
Primary	0	0
Secondary	9	16.1
Tertiary	18	3.25

COARSE ROCK (N=2):

There are two small pieces of fire broken rock in Level IV. One is made of granite and the other of gneiss.

3.11.2: Faunal Remains

BONE (N=59):

Only a small portion of the bone remains from Level IV is identifiable. Two are from bird, three from ground squirrel, and six are bison. The ground squirrel and bird remains are likely intrusive.

Of the bison remains, four of the elements are phalanges, one is a metatarsal, and one is a radial epiphysis. The radial epiphysis is from the right radius of an immature bison. The metatarsal represented is a fragment of shaft that has been split longitudinally. In the original catalogue it is suggested that the narrowest end of the element has possibly been worked, but there is no clear evidence of this on the artifact. I do not think the metatarsal fragment was used as a tool.

TOOTH ENAMEL (N=2):

Both of the fragments of enamel in Level IV are too small to be identified.

3.12 Overview of the Cultural Sequence

3.12.1 Levels A & B

In the original report for the Cory Site, Level A and Level B were presented as being in a relatively secure context. Even though they were identified during overburden removal with a road grader the artifacts clustered into discrete groupings when their depths were mapped on a computer. Unfortunately the identification of a pig bone in Level B, the same level an Oxbow point was attributed to, means that both of these levels and the disturbed portion of Level I are all mixed and cannot be interpreted with any degree of confidence. While this is disappointing, it is not a major loss as there was very little material collected in these levels.

3.12.2 Level I

As mentioned above it cannot be assumed that the disturbed portions of Level I are free of mixing. Fortunately, even if the disturbed portion Level I is excluded it is still the most prolific level in the site. This interpretation of Level I will focus on the undisturbed portion of the level and will exclude material from the disturbed portion.

The projectile point base found in Level I was fragmentary but identified as an Oxbow point based on its stratigraphic position below a (admittedly disturbed) level with a definitive Oxbow point and above a component dated to 5910. The radiocarbon date of 4260 ± 30 rcybp from Level I appears to confirm this association with the Oxbow complex. The identification of its material as Gronlid Siltstone remains tentative, as the artifact was not available for study at the time of writing.

The projectile point found in Level I was the only formed tool in the undisturbed portion of the level. All of the other lithic material found is debitage or fire broken rock.

The debitage in Level I is mainly secondary and tertiary debitage with only a few examples of primary debitage. There is only one example of a formed tool and no secure examples of expedient tools in this level. This means that the tool production in this level consisted of people making tools from pre-made blanks and cores brought with them to the site, or they were re-sharpening tools that had been brought with them to the site. The low amount of primary flakes means that they were not reducing cobbles or pebbles to cores or preforms at this location. They were also making formed tools, not expedient tools that would have been discarded shortly after use.

The vast majority of the lithic material from Level I is local lithic material that is common to the South Saskatchewan River valley and the surrounding area. The only exceptions are three pieces of Knife River Flint probably sourced to North Dakota.

The identifiable faunal remains in Level I are predominantly bison or probably bison with a few examples of ground squirrel and bird remains. There is also a very large quantity of unidentifiable fragments of bone. The bison remains show evidence that they were processed for more than simple butchering. All of the long bone elements are distal or proximal ends with the shaft broken in the middle. This is a sign that the bones were being broken open so the marrow plug could be extracted. Since the ends of the bones are still intact grease extractions was likely not a major activity in this level. There was likely some grease extraction because there is a large

quantity of highly fragmented bone along with fire broken rock which usually indicates grease processing. The rest of the bones found in this level are a few rib fragments and some low utility bones, such as carpals, phalanges, and vertebrae.

It is likely Level I represents a short term Oxbow campsite. There is evidence for both lithic production and food processing, but neither appears to be the main focus of the occupation. It appears to be a short term, general use occupation.

3.12.3 Level II

Level II is less prolific than Level I, but it has a more diverse collection of lithic tool types. The faunal remains in Level II, however, are more fragmentary with fewer identifiable pieces than Level I.

Level II contains the only complete projectile point in the Cory site. It has a more deeply concave base than most Gowen points, but it is not as deep a concavity as a traditional Oxbow point would be expected to have. The concavity is also in a more defined area rather than extending out to the edges of the base like in other Gowen points with concave bases. The base seems disproportionately large in relation to the rest of the point, but this is because the point was re-sharpened repeatedly before it was discarded. Unfortunately, the other point fragment found in Level II is just the tip of a point meaning that we cannot interpret anything from it.

The other lithic material in Level II includes an unfinished sidescraper, a core fragment, and two utilized flakes. This is not a dramatic increase in lithic tools over Level I, but it is still the most diverse assemblage of tools of any level in the site. The reduction stages of debitage found in Level II are also slightly different from Level I. There is a higher percentage of primary debitage, suggesting there was more reduction of cobbles and pebbles going on in this level. Overall there was more tool production in Level II than Level I and there were more tools discarded during this occupation. These tools and the debitage are from a variety of local materials with Knife River Flint being the only non-local material.

The faunal remains in Level II are more fragmentary than the remains from Level I. The only identifiable specimens are small bones from bird and ground squirrel, but there are no identifiable specimens from bison or other large mammals. Most of the fragmentary remains, however, do appear to be from bison based on their size. It is likely that the people occupying this site during Level II were processing bison more intensely than the people who occupied the

site during Level I. As mentioned in Chapter 2 the period from 6000 to 5000 rcybp was one of extreme aridity, which may have affected the availability of food resources. If the people occupying the site during Level II were under some form of resource shortage then more intense processing of available animal remains for grease and marrow is to be expected.

Level II is overall fairly similar to Level I. The faunal remains are more intensely processed, and there is more evidence of tool production, although they are very similar.

3.12.4 Level III

Level III is again less prolific than the level above, but the assemblage is quite similar to the material in Levels I and II. There are no formed tools in Level III and most of the lithic material in this level is debitage. The distribution of debitage by reduction stage is very similar to Level I. There is very little primary debitage, suggesting that most of the debitage was produced by making tools from preforms or from sharpening tools.

Level III has the only bone tool in the Cory Site. The other faunal remains are highly fragmented, but mainly consist of bison with some examples of ground squirrel and a few that may be deer.

3.12.5 Level IV

Even with Level IV's sparse assemblage it does seem to be broadly similar to the other levels in the Cory Site; however, the interpretation of this level is made knowing that the assemblage may be skewed by sampling errors. It is possible that this level has a small assemblage because there was very little activity at the site that left artifacts behind, or it could be because the main concentration of artifacts in this level is outside the study area.

Since there are no pieces of primary debitage it is likely that the lithic material was all brought to the site. There are two cores, one made from Swan River Chert and the other from silicified peat. These cores are the only formed lithic artifacts in the level. The faunal remains are also similar the other levels. The main source of faunal remains is bison, with some bird and ground squirrel.

All of the levels in the Cory Site are remarkably similar. All four levels are dominated by bison remains and local lithic material. The only exotic material is Knife River Flint, but there are examples of it in every level. There are also examples of bird and ground squirrel bones in

every level. There seems to be a clear cultural continuity between these levels. Through all four levels, the faunal remains and lithic materials are consistent. There is no influx of exotic materials or changes in procurement patterns. This site represents a clear continuity of culture across the whole timespan of the site.

Chapter 4 : Gowen and Oxbow Sites on the Northern Plains

The Cory site is a rare find in Saskatchewan as a site that contains both Gowen and Oxbow occupations. This chapter will look at other sites with Gowen and Oxbow occupations from the Northern Plains and compare their assemblages to the Cory site (Figure 4.1). The goal is to find common links between the Gowen and Oxbow complexes. The numbering of cultural levels of sites in this section will be based on the number in the original sources.

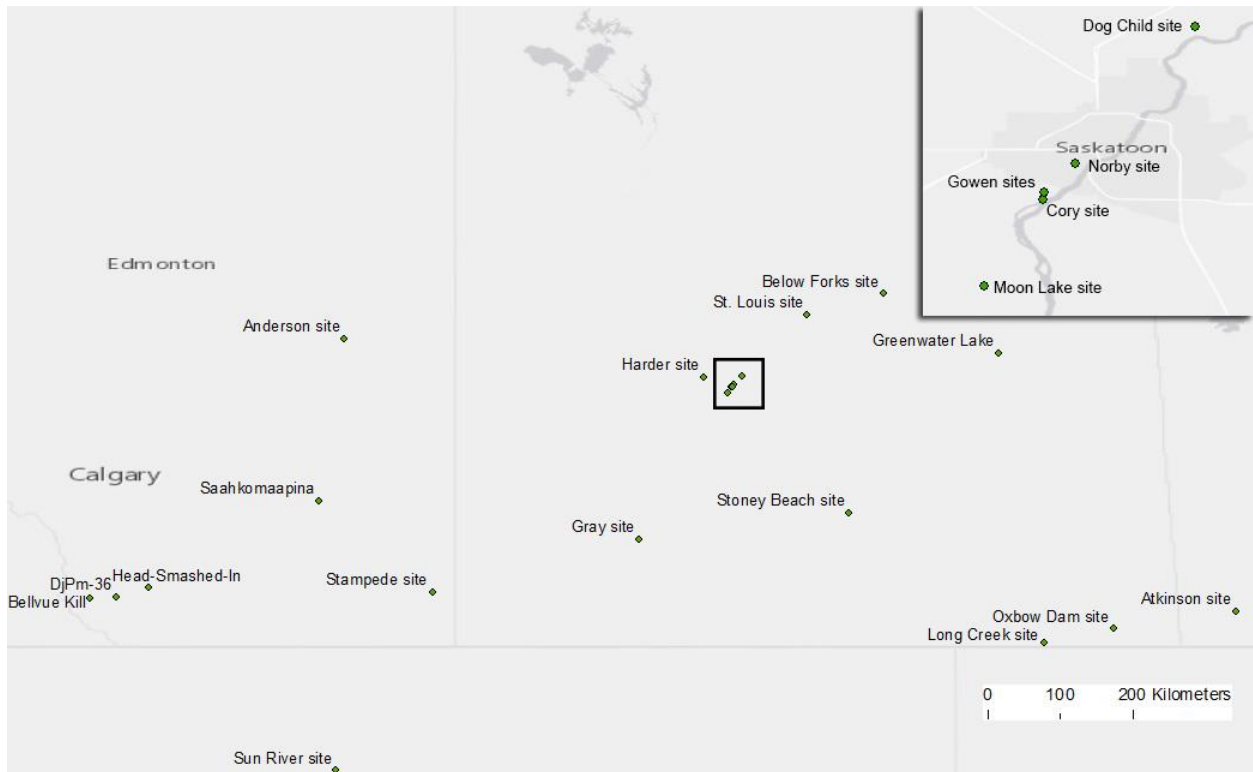


Figure 4.1: Gowen and Oxbow sites on the Northern Plains.

Inset: Sites of the Saskatoon area.

Each site in this chapter was selected for different reasons and provides a different set of information. The Gowen, Moon Lake, Norby, Dog Child, and Harder sites were chosen because they are the closest sites to the Cory site in the same time period. St. Louis and Below Forks were picked as more northerly Gowen and Oxbow complex sites. The Gray site is a very important site for the Oxbow complex, and Stoney Beach and Greenwater Lake are the only two burials from the Gowen and Oxbow complexes in Saskatchewan. Long Creek and Oxbow Dam

are important sites for the history of the Oxbow complex as they are the sites where the complex was first defined. Atkinson was chosen as a more recent and most easterly example of the Gowen complex. The Anderson and Saahkomaapina sites were chosen as more recent Gowen complex sites. The Stampede site is a large, multicomponent site that contains both Gowen and Oxbow complex occupations. Head-Smashed-In is one of the most well known archaeological sites in Canada and the lower components are some of the few examples of Gowen complex mass kills. DjPm-36, Snyder Farm Locality and Bellevue Kill were chosen as examples of the Oxbow and Gowen complexes from the foothills and Crownest pass in Alberta.

4.1 Gowen 1 and 2 Sites

In September of 1977, earth-moving operations in Saskatoon, Saskatchewan uncovered a portion of an archaeological site in a borrow pit. Work ceased and the site was excavated by archaeologists and students from the Department of Anthropology and Archaeology at the University of Saskatchewan (Walker 1992). The site, which would later be called Gowen 1 (FaNq-25), consisted of a single artifact-bearing layer sealed between two layers of archaeologically sterile sediment. Excavations were conducted until mid-October of 1977. After the excavations, fill removal continued on the borrow pit and the site was destroyed. In September of 1980, another site (Gowen 2; FaNq-32) was found about 70 m west of Gowen 1. This site also consists of a single occupation layer. Excavations ran from September to late October, and then resumed as a field school in May of 1981. After excavations were completed the site area was destroyed by expansion of the borrow pit.

Nine radiocarbon samples were obtained between the two sites. One of the samples from Gowen 1 (S-1526) was dismissed as being aberrant (Walker 1992) and the remaining eight have an average age of 5870 ± 48 rcybp.

The Gowen 1 site produced 23 projectile points. All of the points are side-notched with shallow, wide notches and have straight or slightly concave bases that show signs of basal grinding. There is also 1 projectile preform, 4 hafted bifaces, 15 bifacial knives, 35 end/side scrapers, 11 unifaces, 23 gouges, 2 spokeshaves, 9 perforators, 88 retouched flakes, 5 anvil stones, and 15 hammerstones. Lithic materials used at the site include cherts and quartzites, and a lesser amount of chalcedony and petrified wood. Exotic materials such as agates and Knife River flint are present in low frequencies. Most of the materials found at the site could have been found in the nearby South Saskatchewan River valley (Walker 1992). There was also a large quantity

of coarse-grained stone in the form of fire broken rock. Several bone tools were also recovered from the Gowen 1 site. The most interesting of these is a metacarpal from a pronghorn (*Antilocapra americana*) that has been modified into a tube. There are also several flaked bone tools that were used as expedient tools, three bone awls, and several incised pieces of bone. These incised pieces are likely a byproduct of bone bead manufacturing (Walker 1992).

The Gowen 2 site produced 87 projectile points. Most of the points have a similar morphology to the points from the Gowen 1 site, with broad, shallow side-notches and straight or slightly concave bases. Two points, however, have much deeper basal concavities and may be better classified as Oxbow points (Walker 1992). The site also produced 5 projectile preforms, 3 hafted bifaces, 23 bifacial knives, 55 end scrapers, 18 unifaces, 37 gouges, eight perforators, 110 retouched flakes, an anvil stone, and 3 hammerstones. The lithic resources utilized at the Gowen 2 site are generally similar to the resources utilized at the Gowen 1 site. These include large quantities of chert pebbles. While these pebbles are found in glacial till they are not found in the quantities seen at these sites (Walker 1992). This means large quantities of these pebbles must have been transported to the site (Walker 1992). These pebbles were split bipolarly by placing the pebble on an anvil and striking the top with a hammerstone. The Gowen 2 site also has a large quantity of fire-cracked rock. The Gowen 2 site also produced five bone awls, two flint-knapping tools, and several bone tools of uncertain function. There is also a small bone splinter that is heavily stained with red ochre on one end. This tool was likely used in the preparation or application of red ocher (Walker 1992).

Faunal remains at the Gowen 1 site include crow (*Corvus brachyrhynchos*), northern pocket gopher (*Thomomys talpoides*), wolf (*Canis lupus*), medium-sized canids (*Canis sp.*), pronghorn (*Antilocapra americana*), and bison (*Bison bison*). The faunal remains from the Gowen 2 site include least chipmunk (*Eutamias minimus*), northern pocket gopher (*Thomomys talpoides*), deer mouse (*Peromyscus maniculatus*), muskrat (*Ondatra zibethicus*), fox (*Vulpes sp.*), coyote (*Canis latrans*), gray wolf (*Canis lupus*), medium-sized canids (*Canis sp.*), and bison (*Bison bison*). Based on the dental eruptions and bone fusions of the bison sample from Gowen 1 the site was determined to be a late summer occupation (Walker 1992). The seasonality of Gowen 2 could not be determined.

Burn features at the Gowen 1 site were sampled for plant macrofossils and produced six carbonized seeds of Chenopodiaceae (Goosefoot). It is possible that the Chenopods were used as

a smudge material or were present in bison dung that was used as fuel (Walker 1992). The seeds are available in late summer and autumn with supports the late summer seasonality suggested by the faunal samples (Walker 1992).

4.2 Dog Child Site

The Dog Child site (FbNp-24) is one of the many sites located inside Wanuskewin Heritage Park north of Saskatoon. The site was excavated as part of a University of Saskatchewan field school from 2004 to 2009 (Cyr 2006; Pletz 2010). The Dog Child site is a multicomponent site containing six occupations from five cultural complexes or series: Plains Side-Notched complex (Level 1a), Prairie Side-Notched complex (Level 1b), McKean series (Level 2a), Oxbow complex (Level 2b), and Mummy Cave series (Levels 3a and 3b) (Cyr 2006). In some portions of the site, the stratigraphy is compressed and it is not possible to distinguish between the a and b portions of each level. Relevant to this chapter are Levels 2b, 3a, and 3b. Because this site was described in two separate theses (Cyr 2006; Pletz 2010), all of the data have been combined and the site is interpreted as a whole.

Level 2b is likely an Oxbow complex occupation. The 2004 to 2006 excavations found two Oxbow projectile points as well as three projectile point preforms and two Early Side-Notched points (Cyr 2006). Both of the Oxbow points were found in disturbed contexts. One was in the sterile level above Level 2b, while the other was found in the sterile level below Level 2b, adjacent to a root cast (Cyr 2006). The 2007 to 2009 excavations found three broken points that are likely Oxbow points along with the base of an Early Side-Notched point (Pletz 2010). Two radiocarbon dates were obtained for this level. Cyr (2006) obtained a radiocarbon date of 3867 ± 50 rcybp (BGS 2661) from a combined sample of a metacarpal shaft and a left distal bison radius. Pletz (2010) obtained a date of 3938 ± 40 rcybp (BGS 2890) from three pieces of os coxae. Both of these dates fall firmly within the accepted age range of the Oxbow complex.

The lithic assemblage of Level 2b is dominated by local lithic materials with Swan River chert, quartz, quartzite, and various cherts being the most common. The only exotic material is Knife River flint, which is represented by an end scraper and 1.4% of the lithic debitage. All of the projectile points and point preforms found in Level 2b are made from local lithic materials. Level 2b also contained 11951 faunal remains. By mass, 59.2% of the remains are unidentifiable. Of the unidentifiable remains 29.2% are burned or calcined (13.0% by mass). The identifiable

remains include individuals from at least eleven taxa (Cyr 2006; Pletz 2010). The mammals identified in Level 2b include at least three bison (*Bison bison*), a mule deer (*Odocoileus hemionus*), a medium or large-sized canid (*Canis sp.*), a striped skunk (*Mephitis mephitis*), a Richardson's ground squirrel (*Spermophilis richardsonii*), and a meadow vole (*Microtus pennsylvanicus*). Identified birds include a purple finch (*Carpodacus purpureus*), a medium-sized bird (likely *Larus sp.*), and a micro-bird (Order Passiformes). A single fish bone from a catfish (Order Siluriformes) and snail shell fragments (Class Gastropoda) were also found.

Level 3 had the least separation of any of the levels during the 2004 to 2006 excavations, with clear separation in only three of the units and partial separation in two (Cyr 2006). However, Levels 3a and 3b were distinguishable during the 2007 to 2009 excavations with no units where they could not be separated (Pletz 2010). In the units where it was separable, Level 3a was the least prolific level of the site (Cyr 2006; Pletz 2010).

Level 3a is a Mummy Cave or transitional Mummy Cave/Oxbow level. Two diagnostic artifacts were found, both of which were identified as Gowen points by Cyr (2006). Two radiocarbon dates were obtained for this level: Cyr (2006) obtained a date of 4597 ± 50 rcybp (BGS 2662) from a bone sample, and Pletz (2010) obtained a date of 4168 ± 40 rcybp (BGS 2891) from a left proximal radius.

The lithic assemblage from Level 3a is again dominated by local lithic materials, with Swan River chert, quartz, and quartzite being the most common. The only tools associated with Level 3a are two Gowen points (Cyr 2006) and two hammerstones (Cyr 2006; Pletz 2010). A total of 3270 faunal remains weighing a total of 5665.8 g were associated with Level 3a representing six taxa. These include at least four individual bison (*Bison bison*), a wolf (*Canis lupus*), a medium-large canid (*Canis sp.*), a mink (*Mustela vison*), a Richardson's ground squirrel (*Spermophilis richardsonii*), and snails (Class Gastropod). There is very little burning evident on the faunal remains, with 92.7% of the assemblage unburned.

In contrast to Level 3a, Level 3b is the most prolific level in the site. Level 3b is also a Mummy Cave occupation. Two radiocarbon dates were obtained for this level. One returned an age of 4780 ± 50 rcybp (BGS 2663) from a bison mandible and ulna (Cyr 2006) and the other returned a date of 5003 ± 45 rcybp (BGS 2892) from a metacarpal (Pletz 2010). Additionally, four Gowen points were found during the 2004 to 2006 excavations (Cyr 2006) and 22 Gowen

points and two Early Side-Notched points were found during the 2007 to 2009 excavations (Pletz 2010).

The lithic assemblage is dominated by local materials, with the most common being Swan River chert, quartzite, quartz, and silicified peat. One of the projectile points is made of Knife River flint, one is made of agate, and the rest are made from local lithic materials. Five projectile point preforms were also found in Level 3b. Two were made from basalt and the other three were made from local materials (Swan River chert and Gronlid siltstone) (Pletz 2010). A total of 28500 faunal remains were collected from Level 3b, 96.9% of which is unidentifiable fragments. Burned or calcined bone and enamel makes up only 28.0% of the faunal assemblage. Mammals represented in the assemblage include at least ten bison (*Bison bison*), two wolves (*Canis lupus*), a medium-large canid (*Canis sp.*), two swift foxes (*Vulpes velox*), a beaver (*Castor canadensis*), a white-tailed jackrabbit (*Lepus townsendii*), two Richardson's ground squirrel (*Spermophilis richardsonii*), and two northern pocket gophers (*Thomomys talpoides*) (Cyr 2006; Pletz 2010). Birds include a bald eagle (*Haliaeetus leucocephalus*), two red-tailed hawks (*Buteo jamaicensis*), a Swainson's hawk (*Buteo swainsonii*), a medium bird (*Aves* indeterminate), and a micro bird (Order Passeriformes) (Pletz 2010). Fragments of snail shells (Class Gastropoda) were also present (Pletz 2010).

4.3 Below Forks Site

The Below Forks site (FhNg-25) is a multicomponent site located on the Saskatchewan River 2.5 km east of the confluence of the North and South Saskatchewan Rivers (Johnston 2005). The site was tested in 1980 and 1989 and excavated in 2000, 2001, and 2002. Small test excavations (1m x 2m) were conducted in 1980 and 1989. Excavations occurred in two main areas during the 2000-2002 field seasons, called the central and eastern blocks. Twenty-four 1 m² units were excavated in the central block and twenty-two units were excavated in the eastern block. Since the central and eastern blocks are separated by about 60 m and the site stratigraphy was very complex it was not possible to correlate the occupation levels between the two blocks (Johnston 2005). Because the blocks could not be correlated, they will be discussed separately.

The central excavation block contained seven occupation levels. Four of the occupations could be assigned a cultural affiliation: two Oxbow complex occupations, one indeterminate

occupation that is either Oxbow or Mummy Cave, and one Mummy Cave series occupation (Meyer et al. 2016; Johnston 2005).

Occupation IV was a short-term occupation represented by a sparse assemblage and was radiocarbon dated to 4750 ± 90 rcybp (TO-10196) (Meyer et al. 2016: Table 1). Although no diagnostic artifacts were recovered, the radiocarbon date suggests that this is an early Oxbow occupation (Dr. David Meyer, personal communication 2015). This occupation contained a single hearth feature. Lithic debitage in this level was concentrated around the hearth and was predominantly Swan River chert and ironstone (Dr. David Meyer, personal communication 2015). Ironstone is an unusual material to be used for stone tools but the debitage shows clear signs of being flaked. It may have been used because of a scarcity of good quality tool stone (Dr. David Meyer, personal communication 2015). Other materials present in low quantities include quartz, quartzite, and feldspathic siltstone. Feldspathic siltstone is the only type that cannot be obtained locally and is represented by only a single flake (Dr. David Meyer, personal communication 2015). No tools were recovered and the debitage recovered is mostly in the form of shaping and sharpening flakes, suggesting that the main activity was shaping tools from bifacial preforms (Dr. David Meyer, personal communication 2015). Seven Swan River chert flakes and one ironstone flake were produced through bipolar splitting. The only core recovered is an exhausted bipolar core of quartz. Twenty pieces of fire broken rock were recovered but they were generally quite small, with 16 of the pieces being less than 1 cm across (Dr. David Meyer, personal communication 2015).

Two species could be identified from the faunal remains recovered from Occupation IV: snowshoe hare (*Lepus americanus*) and sharp-tailed grouse (*Tympanuchus phasianellus*). Some of the remains of the hare show signs of thermal alteration which may indicate human intervention (Johnston 2005), but the grouse remains show no cultural modifications. The rest of the faunal remains were fragmentary and could only be assigned to size classifications (Johnston 2005). The use of local lithics and a variety of food sources is consistent with the settlement pattern seen in other Oxbow occupations from this time period.

Occupation V was assigned to the Oxbow complex based on the presence of an Oxbow point fragment and a radiocarbon date of 4790 ± 70 (TO-10085) (Meyer et al. 2015: Table 1). This date would place this occupation early in the timespan of the Oxbow complex. The only feature in this level is a cluster of calcined bone that is likely from a cooking fire (Dr. David

Meyer, personal communication 2015), but no hearth feature was recovered. The hearth feature may have been in a portion of the site that eroded away (Dr. David Meyer, personal communication 2015). Two small pieces of red ochre were also recovered from this hearth area. The projectile point fragment that was recovered is a rounded ear from the base of an Oxbow point and is made from pink Swan River chert (Dr. David Meyer, personal communication 2015). Other lithic tools recovered from this occupation include a biface fragment, a utilized flake, three marginally retouched flakes, and a hammer stone. There were also two large stones, both of which have smoothed surfaces, which may have been used as grinding stones for grinding fruits or dried meat (Dr. David Meyer, personal communication 2015). Most of the debitage from this occupation is Swan River chert, with small amounts of quartz, quartzite, ironstone, and Gronlid siltstone. The majority of Swan River chert flakes are either shaping or pressure flakes, with smaller amounts of bipolar, decortication, and core reduction flakes. There were also twelve cores or core fragments, eleven of which were Swan River chert and one of quartz. The quartz core and two of the Swan River chert cores are exhausted bipolar cores (Meyer pres. comm.)

The faunal assemblage from Occupation V contains 3225 specimens, 94.4% of which are unidentifiable. The specimens that are identifiable include bison (*Bison bison*), snowshoe hare (*Lepus americanus*), and Northern pocket gopher (*Thomomys talpoides*), and some fish and bird bones. The bison bones show evidence of butchering and burning, and the snowshoe hare and pocket gopher remains show signs of burning which could be cultural (Johnston 2005).

Occupation VI was only discernable in four of the excavated units. This occupation was not radiocarbon dated but it falls between an Oxbow occupation dated to 4790 rcybp and a Gowen occupation dated to 6100 rcybp. It is possibly an Oxbow complex or Mummy Cave series occupation (Dr. David Meyer, personal communication 2015). The only lithic tool collected from this occupation was a pièce esquillée made of Swan River chert. The other tool collected was a billet made from caribou antler and was likely used as a percussion flaker (Johnston 2005). Five pieces of red ochre were collected from the same unit as the antler billet. Occupation VI produced 146 pieces of debitage, 131 of which are Swan River chert. The rest of the debitage is quartz, quartzite, ironstone, and Gronlid siltstone (Dr. David Meyer, personal communication 2015). The majority of the Swan River chert flakes recovered were pressure flakes, with a few shaping flakes, bipolar flakes, decortication, and core reduction flakes. The

debitage suggests that lithic production in this occupation was mainly in the form of reducing cobbles to cores and in sharpening tools, with little evidence for the shaping of tools or preforms (Dr. David Meyer, personal communication 2015). Five core fragments of Swan River chert were collected from this occupation, four of which would be refitted. The four pieces that could be refitted formed half of a nodule of Swan River chert that appears to have been split in half by bipolar means and then heated, either as a heating stone or in an unsuccessful heat treating attempt (Dr. David Meyer, personal communication 2015). The material is very coarse and may have been discarded as unusable (Dr. David Meyer, personal communication 2015). There were also two cobbles and nine small pieces of fire broken rock collected from this level.

The faunal assemblage from Occupation VI was highly fragmented and 96.8% of the 285 remains were unidentifiable. Bison, snowshoe hare, caribou (*Rangifer tarandus*), fish, and other small mammals were identified in this assemblage. The antler billet is the only caribou specimen collected. Since there are no other caribou remains in the assemblage and the present day range of the caribou is north and east of the site location, Johnston (2005) suggests that it was likely brought to the site from another location, possibly as a trade item.

Occupation VII has the densest concentration of cultural remains at the Below Forks site. The artifacts in this level were visible from the cut bank and are what initially attracted archaeologists to the site (Meyer et al. 2016). Occupation VII was assigned to the Gowen phase based on the presence of a Gowen style projectile point and a radiocarbon date of 6100 ± 140 rcybp (TO-9354) (Meyer et al. 2016: Table 1). Two small hearths were encountered in this level but they were not associated with any ash, charcoal, or calcined bone. A projectile point and a point preform were collected from this occupation. The point is a Gowen point made of Swan River chert. The preform is also made from Swan River chert and is only partly flaked around its edges. One of the corners is missing and may have prompted the maker to discard the piece (Meyer et al. 2016). This component also produced two biface preforms and seven fragments of preforms. One of the fragments is made of quartz and the rest of the pieces are Swan River chert. The two complete preforms are roughly teardrop-shaped with relatively flat ventral surfaces (Meyer et al. 2016). Four of the fragments appear to have been of a similar design before breaking (Meyer et al. 2016). The other three fragments are irregularly shaped and have rough bifacial flaking (Meyer et al. 2016). Other lithic tools from this component include a large biface chopper, two chopper fragments, six endscrapers, seven marginally retouched flakes, two

concave unifaces, two hammerstones, three anvils, two combination hammerstones/anvils, two grinding stones, a pestle, and a multifunction tool that appears to have been used as both a scraping plane and a stone chipping tool (Meyer et al. 2016). The grinding stones and pestle may indicate that dried plants or dried meat were being processed at the site (Meyer et al. 2016). There were also two organic tools collected. One is a bone rod made from a canid ulna and was likely used as a pin, and the other is an antler tine that was likely used as a pressure flaker (Meyer et al. 2016). Three bone fragments that are highly polished and have fine parallel striations may have been from a tool such as an awl (Meyer et al. 2016). Red ochre was fairly common in the occupation, with 22 pieces collected (Meyer et al. 2016). Twenty-nine cores were collected, which were made from Swan River chert, quartz, quartzite, rhyolite, and (unusually) limestone (Meyer et al. 2016).

The faunal assemblage from Occupation VII contained 10549 specimens, of which 97.4% were unidentifiable. The identified specimens include bison (*Bison sp.*), snowshoe hare, white-tailed jackrabbit (*Lepus townsendii*), beaver (*Castor canadensis*), northern pocket gopher, large and medium sized canids (*Canis sp.*), and an indeterminate cervid (Johnston 2005). The cervid remain is the antler tine mentioned above. Since it is the only identified cervid remain in this component it is possible that it was brought to the site from elsewhere (Dr. David Meyer, personal communication 2015). Some of the bison, canid, snowshoe hare, and jackrabbit remains show signs of cultural modifications such as burning or cut marks, while the beaver and northern pocket gopher do not (Johnston 2005). The bison in this assemblage are larger than modern bison and may represent an extinct species like *B. occidentalis* or *B. antiquus* (Johnston 2005). Three of the bison remains were immature and based on development may indicate a late winter to early summer occupation (Meyer et al. 2016); however, these remains are from a larger extinct form of bison and the rate of development may not be the same as modern bison (Meyer et al. 2016).

The eastern block contains three occupation levels, but only one could be assigned a cultural affiliation. The lower occupation was associated with the Mummy Cave series based on the presence of Early Side-Notched projectile points and three radiocarbon dates: 5520 ± 60 (TO-10083), 5920 ± 70 (TO-11020), and 6010 ± 80 (TO-9355) rcybp (Johnston 2005). These Early Side-Notch points resemble Gowen points (Kasstan 2004) and Peck (2011) assigns this component to the Gowen complex. This occupation is likely associated with the Gowen

occupation in the central block but they could not be tied together stratigraphically (Johnston 2005).

The lower occupation contained a faunal assemblage with 26317 specimens. The assemblage was highly fragmented and over 99% of the assemblage was unidentifiable (Johnston 2005). The identified specimens include examples of bison (*Bison sp.*), large canid, snowshoe hare, beaver, pocket gopher (indeterminate Geomyid), ground squirrel (*Spermophilus sp.*), deer mouse (*Peromyscus maniculatus*), meadow vole (*Microtus pennsylvanicus*), catfish (Family Ictaluridae), and bivalve (Family Sphaeriidae) (Johnston 2005). The bison remains are not identified to species level as they are larger than modern bison and may represent an extinct form such as *B. antiquus* or *B. occidentalis* (Johnston 2005). The canid remains represent either *Canis lupus* or a large domestic dog. These remains come from one individual and show signs of butchering and burning (Johnston 2005). Some of the snowshoe hare, ground squirrel, and catfish specimens are burned, and the beaver remains were found in association with other burned remains so are assumed to be culturally modified (Johnston 2005). Catfish do not currently live in the Saskatchewan River near the Below Forks site, but they do live in the Red Deer River and Qu'Appelle River that connect to the South Saskatchewan (Johnston 2005). The pocket gopher, deer mouse, and meadow vole do not show any signs of cultural modification and may be intrusive (Johnston 2005).

The 1980 test excavations were located more than 30 m west of the central block and could not be linked to the other blocks stratigraphically. The Mummy Cave occupation was correlated with the rest of the site based on a radiocarbon date of 5845 ± 140 rcybp (S-2245) (Johnston 2005). Since the test excavation only consisted of two 1 x 1 m units the assemblage is small, with only 60 faunal specimens. The only identified genus in the assemblage is bison (*Bison sp.*) (Johnston 2005).

4.4 St. Louis Site

The St. Louis site (FfNk-7) was excavated in 2002 by Stantec Consulting Ltd. and in 2003 by Dr. David Meyer and Jenna Johnston from the University of Saskatchewan (Johnston 2005). Level I was tentatively assigned to the Oxbow complex based on a radiocarbon date of 4590 ± 60 rcybp (Beta-173608) (Johnston 2005). Level II and Level III were not assigned a cultural affiliation. Level IV was tentatively assigned to the Mummy Cave series based on a

radiocarbon date of 6220 ± 70 rcybp (Beta-173611) (Johnston 2005). No diagnostic artifacts were found in these four levels. There were additional levels at the St. Louis site, but only the first four will be looked at as they are the levels that are pertinent to this thesis. Because heavy equipment was used to excavate portions of the top four levels of the St. Louis site there may be a sampling bias in the assemblage. It is possible that some smaller bones were missed and almost all of the specimens were damaged by the equipment.

Level I produced an assemblage of 1692 faunal specimens, 77.4% of which was unidentifiable. Approximately 23.5% of the assemblage is burned or calcined. Only two taxa are represented in Level I, bison (*Bison bison*) and *Canis sp.* The bison remains show evidence of cultural modification in the form of cut marks, scraping marks, and chopping marks (Johnston 2005). Most of the remains are in the size range of modern bison; however, a bison skull recovered had a tip-to-tip horncore measurement of 72 cm, which falls in the range of extinct forms of bison (Johnston 2005). The canid remains are a similar size to *Canis lupus* and are likely a wolf or large domestic dog (Johnston 2005). The canid remains show no signs of cultural or thermal modification (Johnston 2005).

Level II is a sparse level that contained 280 specimens, 61.8% of which are unidentifiable. The small assemblage size may be due to the excavation procedure as heavy equipment was used to excavate the upper levels (Johnston 2005). Two species were identified in Level II including bison and large canid. The bison remains show signs of cultural modification (cut marks) but are not burned or calcined (Johnston 2005). The canid remains are similar in size to *Canis lupus* but the teeth are slightly smaller and may represent a domestic dog (Johnston 2005). The canid remains show no sign of thermal or cultural alteration.

The Level III assemblage contains 146 specimens, 80.8% of which are unidentifiable. The only identified taxon is bison (Johnston 2005). There is evidence of cultural modification and carnivore activity, but no evidence of thermal alteration (Johnston 2005).

Level IV produced an assemblage containing 749 specimens, 63.8% of which were unidentifiable. Five different taxa were identified in this level: bison (*Bison sp.*), large canid, snowshoe hare, vole (*Microtus sp.*), and sharp-tailed grouse (*Tympanuchus phasianellus*). Johnston (2005) suggests that the bison remains in this level represent a large extinct form of bison like *B. occidentalis* or *B. antiquus*, but admits that there were not enough specimens to test this statistically. The bison remains show signs of cultural and thermal alterations and carnivore

activity. The canid remains are slightly larger than *Canis lupus* and likely represent a wolf or large domestic dog (Johnston 2005). All of the canid remains were intact or broken by modern forces. The snowshoe hare, vole, and grouse remains showed no signs of cultural or thermal modification but show the same taphonomic forces as the rest of the assemblage (Johnston 2005).

4.5 Oxbow Dam Site

First excavated in 1956 (Nero and McCorquodale 1958), the Oxbow Dam site (DhMn-1) was one of the first professionally excavated archaeological sites in Saskatchewan. The Oxbow complex was named after this site, as it is where the Oxbow style of point was first identified (Wettlaufer and Mayer-Oakes 1960). The site was dated to 5200 ± 130 rcybp (S-44) using charcoal recovered from a hearth (Nero and McCorquodale 1958). In 1995 and 1996, the site was reexamined by D'Arcy Green of the University of Saskatchewan (Green 1998). This reanalysis, which included both a reexamination of the original excavation and material as well as new excavations, showed that what was thought to be a single component site actually had multiple components and that the radiocarbon sample had likely been a mixed sample (Green 1998).

Green (1998) identified seven occupation levels at the site in his 1995/1996 excavations. Levels one through four could not be assigned to any specific cultural group due to a lack of diagnostic artifacts and radiocarbon dates were not obtained for these levels. Level five was assigned to the McKean/Duncan/Hanna complex based on the presence of a Hanna-style projectile point base (Green 1998).

Level six is an Oxbow occupation and the most prolific level at the site. Level six contained six projectile points that could be assigned to the Oxbow complex (Green 1998). A single radiocarbon date was obtained for the level: 3760 ± 80 rcybp (S-3648) (Green 1998). Level six also produced one projectile point preform and two hafted bifaces, along with several bifaces, unifacial knives, end/side/concave scrapers, and retouched flake tools. Faunal remains from level six include bison (*Bison bison*), pronghorn (*Antilocapra americana*), various canids (*Canis sp.*), Richardson's ground squirrel (*Spermophilus richardsoni*), various cricetids (Family Cricetidae), a frog (Order Anura), a cottontail (*Sylvilagus sp.*), a western painted turtle

(*Chrysemys picta belli*), a snake (*Thamnophis sp.*), and some freshwater clams (Family Unionidae).

Level seven is a sparse occupation just below level six. The levels are separated by less than 5 cm in some areas (Green 1998). Green (1998) obtained a radiocarbon date of 6810 ± 90 rcybp (S-3644). There were no diagnostic artifacts recovered from this level. A single projectile preform was recovered. Faunal remains recovered include bison and scurids. The bison bones from this level show some evidence of carnivore gnawing but no sign of cultural modification with no sign of marrow and grease extraction that is common at other sites of this age (Green 1998). It is possible that this activity took place at another portion of the site (Green 1998).

The radiocarbon dates from the 1995/1996 excavations fall on either side of the original radiocarbon date (5200 ± 130 rcybp [S-44]). However, the average of the two new dates is 6019 rcybp which falls within one standard deviation of the original calibrated age (Green 1998). Green (1998) suggests that the original sample was contaminated as field notes indicate that the hearth the sample was taken from cut into the level below it. As such the site is likely not an early Proto-Oxbow site, but rather a typical Oxbow occupation and a much earlier occupation (Green 1998).

4.6 Long Creek Site

The Long Creek site (DgMr-1) is located south of the town of Estevan, Saskatchewan. It was located and excavated by the Saskatchewan Museum of Natural History in 1957 as part of a survey of Long Creek for the construction of the Boundary Dam (Bryant 2002; Wettlaufer and Mayer-Oakes 1960). It was reanalyzed by Laureen Bryant (2002) of the University of Saskatchewan because at the time of the original excavation it was only the third site excavated in the province. Bryant (2002) looked at the original material as well as the field notes from the excavation to provide a more detailed description of the site and to reinterpret the attribution of cultural levels based on current research.

There are nine distinct cultural levels in the site. Level 5 produced two radiocarbon dates, one from the upper member at 3363 ± 115 rcybp (S-63a) and another from the lower member at 4513 ± 170 rcybp (S-63b) (Bryant 2002 p.54) although the provenience on this date may be suspect due to cataloging errors (Wettlaufer and Mayer-Oakes 1960). A new date was obtained for level 5 at 3856 ± 55 rcybp (Bryant 2002). No radiocarbon date was obtained for level 6.

Level 7 had one date at 4613 ± 150 rcybp (S-50). Level 8 produced two dates at 4600 ± 80 rcybp (S-52) and at 4650 ± 150 rcybp (S-53). Bryant (2002) obtained a new date from the material at 4960 ± 70 rcybp (Beta-168214). Bryant (2002) noted that Level 8 is likely a combination of three levels which she named 8A, 8B, and 8C. The field notes indicated that the original radiocarbon sample was taken from 8A, likely representing the youngest date for the level. The bone used for the new radiocarbon date by Bryant (2002) was collected from Level 8 but does not have the provenience data to determine which member it came from. It is possible that Level 8A is an Oxbow occupation circa 4600 rcybp, and 8B and/or 8C are Mummy Cave occupations circa 4900 rcybp. Level 9 produced a date of 4993 ± 125 rcybp (S-54) (Bryant 2002).

Level 5 produced a Duncan-Hanna point from the upper member, which is consistent with the radiocarbon date, but the date from the lower member is too old to be a typical McKean complex date. No diagnostic artifacts were obtained from level 6, so it can only be listed a Middle period occupation, as it exists between a known McKean complex occupation and a known Oxbow occupation (Bryant 2002).

Level 7 produced two Oxbow projectile points, which matches with the radiocarbon date for the level. There is also a single fragment of shell from a freshwater clam. This shell appears to have been cut to form a piece of jewelry (Bryant 2002). The only identifiable faunal remains in Level 7 are bison. These include axial elements suggesting that bison were processed at the site (Bryant 2002).

Level 8 is one of the most prolific levels in the Long Creek site. It is possible that there is some mixing of components in Level 8 as it is actually three levels that are compressed in some areas of the site (Bryant 2002) and due to a lack of adequate provenience data it is not possible to attribute all of the artifacts to a particular member of level 8. Bryant (2002) termed these members 8A, 8B, and 8C. At least one of the radiocarbon dates was taken from a sample recovered from Level 8A, but Bryant's new date cannot be associated with a member. Twelve projectile points, two point fragments, and two point preforms were recovered from this level. Bryant (2002) identifies only two of the points as part of the Mummy Cave series and does not assign a taxonomic group to the rest. Most of the points are side-notched with concave bases that show some degree of basal thinning and/or grinding. Bryant (2002: Figure 14.1) compares one of the points found in level 8 to the Oxbow points in level 7. Another of the points from level 8 (Bryant 2002: Figure 14.1e) is broken longitudinally and has a deeper basal concavity than the

other points in this level. This breakage pattern is very common in Oxbow points and it is possible that this point is an Oxbow point as well. Unfortunately, neither of the possible Oxbow points has depth information so it is impossible to tell what part of level 8 they are from. Wettlaufer and Mayer-Oakes (1960) called level 8 an Oxbow occupation by comparing it to the material from the Oxbow Dam site (Nero and McCorquodale 1958). Since it is now known that the assemblage used to define the Oxbow culture at the Oxbow Dam site was actually a mixed Oxbow/Mummy Cave assemblage (Green 1998) Bryant (2002) called level 8 of the Long Creek site a Mummy Cave or series Mummy Cave/Oxbow transitional levels. It is also possible that Level 8A is an Oxbow occupation ca. 4600 rcybp, and 8B and/or 8C are Mummy Cave occupations ca. 4900 rcybp. The faunal remains from level 8 are predominantly bison with some medium-sized canid and scurid remains. There are also shells from freshwater clams and snails in this level (Bryant 2002).

Level 9 produced no diagnostic projectile points, but there was a single large hafted biface (Bryant 2002). This hafted biface is asymmetrical with a flat base and deep side notches and is made of Knife River flint. Other lithic materials found in this level include a biface made of fused shale, several retouched flakes made of Knife River flint, and a single unworked flake of Knife River flint (Bryant 2002). Based on the radiocarbon date and its location beneath a Mummy Cave/Oxbow transition level, Bryant (2002) calls level 9 a Mummy Cave series occupation. The only identified faunal remains found in level 9 are a bison scapula and incisor found near a hearth feature (Bryant 2002).

4.7 Atkinson Site

The Atkinson site (DiMe-27) is a multicomponent site located north of the town of Lauder, Manitoba near the Souris River (Nicholson and Playford 2009). A total of eleven 1 m² units were excavated between 2003 and 2006 and four occupations were identified: a Late Woodland occupation, a Besant occupation, and McKean occupation, and a Gowen occupation. The Gowen occupation is the one that is relevant to this thesis. Two radiocarbon dates were obtained for the Gowen occupation: 5280 ± 50 rcybp (TO-10640) and 5580 ± 120 rcybp (TO-13365).

The Gowen occupations contained a hearth with associated faunal remains and lithic materials. The hearth is in a matrix of silt/clay but directly underneath a level of coarse sand. Nicholson and Playford (2009) note that any natural forces capable of depositing the sand would

have destroyed the hearth in the process, and suggest that the hearth was intentionally quenched with sand. It is not clear why sand was used as opposed to water or snow. Nicholson and Playford (2009) suggest several possibilities: sand may have been more readily available than water at the time the site was occupied, the occupants needed to quench the fire in a way that would not create smoke and steam, or the hearth was used for slow cooking and the sand was placed over the bed of coals to hold heat.

Seven Gowen points were recovered from the site, along with five bifaces. One point was made from red quartzite, two from Knife River flint, two from Swan River chert, and from other cherts. The bifaces were made from Swan River chert with exception of one made of Knife River flint. No cores were recovered from the occupation and all of the debitage is consistent with tool retouching (Nicholson and Playford 2009).

Faunal remains recovered from the Gowen occupation were highly fragmentary and quite fragile (Nicholson and Playford 2009). The dominant species was bison (*Bison* sp.) but the assemblage also included large canids (*Canis* sp.), and indeterminate large cervid (Family Cervidae, likely moose or elk), a fox (*Vulpes* sp.), a porcupine (*Erethizon dorsatum*), and rabbit or hare (Family Leporidae). The bison remains include fetal remains which seem to indicate a late winter to spring occupation (mid-February to May) (Nicholson and Playford 2009). The bison remains are heavily processed and the elements found favour appendicular to axial elements, suggesting that selective butchering took place in the field and only high utility elements were brought to the site (Nicholson and Playford 2009). Limb elements were processed for marrow and grease extractions but low utility bones such as phalanges were not processed (Nicholson and Playford 2009). The non-bison remains were also likely used as a food resource (Nicholson and Playford 2009).

4.8 Anderson Site

The Anderson site (FdOt-1) is a multicomponent site near Hardisty, Alberta (Quigg 1984). The most prolific component in the Anderson site was dated to around 4725 rcybp and assigned to the Mummy Cave series based on the projectile points recovered. Quigg (1984) referred to the points as Bitterroot points and called the occupation a Bitterroot occupation. The radiocarbon date is an average of four dates from two samples: 4345 ± 160 rcybp (GX6129-A) and 4725 ± 150 rcybp (GX6129-G) from one sample and 4370 ± 210 rcybp (GX6130-A) and 5460 ± 160 rcybp (GX6130-G) from another. Two of the dates were obtained from bone apatite

(GX6129-A and GX6130-A) and the other two from gelatin (GX6129-G and GX6130-G) (Quigg 1984).

The faunal remains from the Mummy Cave component were highly fragmentary with the exception of a few carpals, tarsals, and phalanges (Quigg 1984). All of the remains were attributed to bison with all of the parts of the bison present except for the forelimbs (Quigg 1984). It is possible these elements were removed from the site for further processing elsewhere, or were so thoroughly processed as to be completely unidentifiable.

Tools recovered from the occupation include three bifaces, six projectile points, eight endscrapers, three unifaces, fifteen marginally retouched tools, and an anvil and hammerstone, along with 740 pieces of debitage. The debitage is primarily quartz and quartzite along with small chert pebbles and silicified wood (Quigg 1984). All of the endscrapers were made from chert pebbles that had been split bipolarly. Three of the projectile points were made from split chert pebbles, while two were made from white chert and one from silicified wood (Quigg 1984). The bases of the projectile points are straight or concave, while the blade margins are straight or slightly convex. The three unifaces are made from quartzite with cortex still present on the unworked side of the tool (Quigg 1984). The tools are consistent with butchering and hide processing and were likely manufactured, used, and discarded at the site (Quigg 1984).

4.9 Stampede Site

The Stampede site (DjOn-26) was found in 1971 as part of a survey of proposed development areas in Cypress Hills Provincial Park (Gryba 1975). It is a deeply stratified, multi-component site located on the northern slope of the Cypress Hills near the town of Elkwater, Alberta. Several test excavations were conducted in 1971 to determine the nature of the site and a large excavation was conducted in 1972. Fourteen occupation levels were identified during the original excavations (Gryba 1975). The lower levels are relevant to this chapter, starting at Culture Level 6.

Culture Level 6 is a sparse Oxbow occupation. This level produced an Oxbow point made of red argillite, lithic debitage from locally-sourced materials and the remains of a bison and possibly a deer. Gryba (1975: 101) mentions that “very few of the scraps are charred” but doesn’t not give a precise percentage of burned bone for this level.

Culture Level 7 and 8 could not be differentiated in all portions of the site (Gryba 1975). Some portions of the assemblage are grouped as Culture Level 7 and 8, others are arbitrarily

divided into upper and lower portions and some portions are fully separated into Culture Level 7 and Culture Level 8 (Gryba 1975). Level 7 is the less prolific of the two levels. The artifacts that could be definitively assigned to Level 7 include to bifacially retouched flakes made of cherts and a quartzite chopper, 242 pieces of debitage (all local material), and 141 faunal remains. Of the faunal remains only one could be identified, which is a distal fibula from a deer or pronghorn (Gryba 1975). Culture Level 8 is much more prolific than Level 7 and represents one of the most prolific levels in the site (Gryba 1975). Culture Level 8 produced seven projectile point fragments from seven different points. One of these point fragments is the base of an Oxbow point. The assemblage also contained two bifacially retouched flakes, one unifacially retouched tool, 2682 pieces of lithic debitage, a possible hammerstone, 407 unidentifiable faunal remains, and “several” identifiable bison remains (Gryba 1975: 111). In the undifferentiated assemblage there was an Oxbow point base made of Swan River chert and another fragment of a corner-notched point also made of Swan River chert. There were also two quartzite choppers, a chert biface, a quartzite unifacially retouched flake, and 1424 pieces of debitage. Additionally, 257 pieces of debitage were from the arbitrarily separated upper portion and 390 were from the lower portion. There were three identifiable faunal remains from the undifferentiated assemblage, all bison, along with 702 unidentifiable fragments.

Culture Level 9 produced an abundant lithic assemblage, but had a very sparse faunal assemblage. The only projectile point found in Level 9 is a broken tip made of brown jasper with no diagnostic characteristics. Also found in this level were two quartzite choppers, a biface, two unifacial choppers, five scrapers, seven retouched flakes, and three worked cobbles. This level produced 1467 pieces of lithic debitage of local material. The materials utilized are ones found in the Cypress Hills and in the surrounding glacial till plain (Gryba 1975). The faunal remains are well preserved but sparse, with only four identifiable specimens representing deer and bison and with 62 unidentifiable fragments. Two hearths and a possible third were found in Culture Level 9. An unlined hearth was found during the 1971 test excavations but was lost when part of the wall collapsed in the spring of 1972 (Gryba 1975). A stone lined hearth and a possible stone lined hearth were found during the 1972 excavations but since they partially extended into the unexcavated portions of the site they were left on pedestals (Gryba 1975). There were no diagnostic artifacts found in Culture Level 9 but it is located below a known Oxbow level and above a level of Mount Mazama ash, which dates to around 6600 B.P. (Gryba 1975).

Culture Level 10 was very sparse and produced no diagnostic artifacts. The lithic assemblage is represented by a single utilized flake and nine pieces of flakes and debitage. The faunal remains include a proximal bison tibia, four rib fragments, and 41 unidentifiable fragments of bone and teeth. Level 10 is beneath the Mazama ash and separated by almost a meter of sediment (Gryba 1975).

Culture Level 11 was the deepest level reached during the 1971 excavation and is beneath the Mazama ash band. Even though no diagnostic artifacts were found, this level's position below the Mazama ash and above a level dated to 7245 ± 255 rcybp means that this level falls in the time range of the early side-notched tradition (Gryba 1975). Culture Level 11 had abundant faunal remains but the lithics were relatively sparse. The lithic artifacts included a large bifacially worked core chopper, a small portion of a biface, two worked flakes, two utilized flakes, one retouched flake, an end scraper, and a unifacially worked core chopper, along with 360 flakes and fragments. There were 529 unidentifiable bone and tooth fragments found in Level 11, none of which had been burned. The identifiable remains represent bison, a large dog or wolf (*Canis sp.*), and possibly an elk. One of the bison mandibles was from a calf. Dental eruption indicated that the calf was a few weeks old when it was killed (Gryba 1975). Since most bison calves are born in April and May this places the occupation of Culture Level 11 in May or June (Gryba 1975).

Culture Level 12A was a very prolific level. A sample of charred bone from a hearth was radiocarbon dated to 7245 ± 255 rcybp (NMC-571) (Gryba 1975). Level 12A produced one unfinished projectile point and six fragments. Four of the point fragments were bases that were all side-notched points that Gryba (1975) compares to Bitterroot points. There were also two large bifaces, two pieces of quartzite that show partial flaking, and a drill made of brown jasper. There were seven retouched flakes, eight utilized flakes, two small unifacially worked pieces of red argillite, three globular cores, 11 bipolar cores, and 4620 pieces of debitage. The faunal remains in Level 12A are extremely well preserved. Included in these is the tip of a bone needle made from a splinter of a long bone. The fragment is missing the base and there is no indication of an eye (Gryba 1975). The identifiable remains represent bison, elk, and a small rodent (possibly *Citellus sp.*). Two fragments of the rodent remains show signs of burning and may have been a food source. There were also 940 unidentifiable fragments of bone, with some of them showing cut marks, although the exact number of these is not specified (Gryba 1975). The fragmented

faunal remains appear to cluster around the hearth in the northwest area of the site (Gryba 1975). This hearth is an unlined circular depression. Burned bone fragments were found in and around the edges of the hearth. Since there are no post moulds or cobbles in the area it is possible that the hearth was an outdoor feature (Gryba 1975). The presence of burned bone fragments may indicate the production of bone grease (Gryba 1975).

Culture Levels 12B and 12C were recovered from a single buried paleosol and were both very sparse. Level 12B produced 16 pieces of lithic debitage and Level 12C produced 34 pieces of debitage, one of which was a utilized flake (Gryba 1975). Gryba (1975) suggest that it may not be necessary to separate the two components, but only 1 m² was excavated during the 1972 excavation so it is hard to make any firm interpretations of these levels.

Through the length of its occupation the Stampede site was used as a campsite and habitation site rather than a quarrying or kill site (Gryba 1975). The Cypress Hills offer a variety of resources including abundant water springs, wooded areas for shelter and for fuel and lodge frames (Gryba 1975). The surrounding plains would have been occupied by herds of bison, pronghorn, and elk, and the till plains and Oligocene Conglomerates would be sources of raw lithic materials (Gryba 1975).

Additional excavations at the Stampede site were conducted during the 2000s. Unfortunately, during the interim parts of the site had slumped and it was not possible to reconcile the paleosols identified in the new excavations with the levels defined by Gryba (1975). Paleosols 5b to 10 produced materials and radiocarbon dates relevant to this thesis (Oetelaar 2005, Falzarano 2014). However, some of the radiocarbon dates do not appear to be a good match for the material found in the paleosols they are associated with. Paleosol 5b had a radiocarbon date of 3000 ± 70 rcybp (TO-10926) but produced Oxbow projectile points. Paleosol 5c also contained an Oxbow point and was dated to 2980 ± 40 rcybp (Beta 254778). Both of these dates are much later than is typical for the Oxbow phase and are possibly the result of contamination of samples or mixing in the deposits.

Paleosol 6 contained projectile points that are consistent with Gowen points, but was dated to 4510 ± 60 rcybp (TO-12153). This would be late for Gowen phase occupation, but it still falls within the time frame of the Gowen-Oxbow complex. Paleosol 7 is one of the most prolific levels in the site. Falzarano (2014) suggests that it may be a palimpsest deposit. Paleosol 7 has three radiocarbon dates associated with it: 4660 ± 38 (OxA-11579), 5230 ± 100 (TO-

10922), and 5290 ± 40 (Beta 254777) rcybp. The two earlier dates are both consistent with to Gowen points found in paleosol 7 but the date of 4660 ± 38 rcybp is not. Paleosols 8 through 10 all produced similar radiocarbon dates. Paleosol 8 produced a date of 6100 ± 90 rcybp (TO-10925) along with several Gowen points. Paleosol 9 did not contain any projectile points but was dated to 6195 ± 45 . A Gowen style point was recovered from Paleosol 10 and two radiocarbon dates were obtained for this level: 5990 ± 50 (Beta-254780) and 6110 ± 90 (TO-10924). The dates from paleosols 8 to 10 are all consistent with the projectile point types found within them.

4.10 Saahkómaapína (Boy Chief) Site

The Saahkómaapína Site (EeOv-68) is a multicomponent campsite near Dinosaur Provincial Park in Alberta that was excavated in 1990 and 1994 (Head et al. 2003). The excavation was divided into multiple excavation blocks, with the oldest occupations being associated with Excavation Block 3.

Block 3, Occupation 1 is the most thoroughly dated occupation from the site with five radiocarbon dates obtained. These are: 4360 ± 80 rcybp (AECV 2025C), 4420 ± 90 rcybp (AECV 2027C), 4530 ± 80 rcybp (AECV 2028C), 4500 ± 70 rcybp (AECV 2029C), and 4350 ± 90 rcybp (Beta-43912). These dates average 4439 ± 36 rcybp (Head et. al 2003). The only diagnostic point from this occupation was a Mummy Cave series point that the authors called a Bitterroot point. This point is made from petrified wood. Other lithic tools include two side scrapers, five flake tools, and 13 cores, choppers, or core fragments. Lithic materials are mostly quartzite and chert, with smaller amounts of quartz, petrified wood, and chalcedony. The chert specimens include local pebbles that have been reduced bipolarly. Faunal remains from this occupation include *Bison bison*, *Spermophilus* sp. Family Canidae, and Order Aves.

Block 3, Occupation 2 is an Oxbow occupation with two good radiocarbon dates: 4350 ± 90 rcybp (AECV 2026) and 4280 ± 90 rcybp (AECV 2030C). A third date of 3220 ± 150 rcybp (Beta-43911) was also obtained from this occupation but was rejected by the original authors as too young (Head et al. 2003). Four projectile points were collected from this occupation. Three of the points were Oxbow points and the fourth was missing its base and couldn't be identified (Head et al. 2003). All four points were made from chert. Other lithic tools from Occupation 2 include two bifaces, one end scraper, one side scraper, one wedge, eight modified flakes, one chopper, and nine cores or core fragments. The material is mostly chert, quartzite, and petrified

wood, with smaller amounts of siltstone, chalcedony, and quartz. There are six examples of bipolar reduction of chert pebbles. Faunal remains from this occupation include *Bison bison*, Family Canidae, *Erathizon dorsatum* (porcupine), and a gastropod shell. The authors considered the porcupine and gastropod intrusive (Head et al. 2003).

Block 3, Occupation 3 produced three Oxbow points and was radiocarbon dated to 4350 ± 80 B.P. Other lithic tools from this occupation include six bifaces, ten end scrapers, 2 side scrapers, and six wedges. Lithic material from this occupation was mainly quartzite, chert, siltstone, and petrified wood, with lesser amounts of quartz and chalcedony. Faunal remains consist of *Bison bison* and Family Canidae. Most of the artifacts from Occupation 3 were associated with two hearths in the southwest corner of the excavation (Head et al. 2003).

Block 3, Occupation 4 contained three Oxbow points and point fragments but was not radiocarbon dated. Other lithic tools include ten bifaces, twelve end scrapers, eight side scrapers, two wedges, a uniface, 32 retouch flakes, and 47 cores or core fragments. Lithic material is mainly quartzite and chert with lesser amounts of siltstone, petrified wood, chalcedony, limestone, and porcelanite. Faunal remains represent *Bison bison* and Family Canidae. Three hearths were found in this occupation.

4.11 Bellevue Kill

The Bellevue Kill (DjPo-9) is a kill and campsite complex near the town of Bellvue in the Crowsnest Pass in Alberta (Fig. 4.1) (Calder et al. 1980; Lifeways 1977, 1979). The site area consists of a central swale with higher areas to the north and south suitable for campsites (Lifeways 1977). The site was originally tested in 1975 (Lifeways 1977) with additional excavations of the north area in 1976 (Lifeways 1979) and the south area in 1979 (Calder et al. 1980). The lithic material from this site is primarily from local or nearby sources, mostly local cherts and quartzites, with smaller amounts of exotic cherts, tourmaline, and Knife River Flint (Calder et al. 1980, Table 2).

The north area consisted of a stratified campsite with five occupation levels. Occupation 1 and Occupation 2 are mixed Mummy Cave and Oxbow occupations, Occupations 3 and 4 are Pelican Lake and Besant respectively, and Occupation 5 had no diagnostic artifacts nor was it dated. Occupations 1 and 2 are mixed in some areas of the site and unfortunately no projectile points were found in the unmixed portion of Occupation 1. However, a Bitterroot point, and

Oxbow point, and something called a Pass Creek Valley Corner Notch point were found in the mixed portion. The original report authors described Pass Creek points as being part of the Mummy Cave series (Lifeways 1976). A Bitterroot point was found in the unmixed portion of Occupation 2. The presence of an Oxbow point in the mixed portion but no clear Oxbow occupation makes these occupations are too mixed to provide much interpretive value.

The south area seems to exhibit less mixing than the north area. The 1979 excavation was split over two areas, Area A and Area B. Occupation 1 was radiocarbon dated to 4690 ± 130 (RL-507) (Calder et al. 1980) and was present in Area A but not Area B. This occupation was quite sparse but did produce a Bitterroot point, a core, an endscraper, and two retouched flakes. The only identifiable species of the faunal remains was *Bison bison*. Occupation 2 was identified in both Area A and Area B. Three different diagnostic points were recovered from this occupation: a Bitterroot point, a Pass Creek point, and two Oxbow points. Other lithics from this occupation include seven bifaces, 21 utilized flakes, four endscrapers, and two pièce esquillées plus debitage. Faunal remains include *Bison bison*, *Cervus elaphus*, and *Canis* sp.

4.12: DjPm-36, Snyder Farm Locality

DjPm-36 (Van Dyck 1994) is a multicomponent site in southwestern Alberta, near the confluence of the North Fork of the Oldman River and the Crowsnest River and was excavated between 1988 and 1990 as part of the Oldman River Dam project. The site was excavated in two separate areas: the northwest area (named the Snyder Farm Locality) and the central area (the Welsch Locality). The Snyder Farm Locality contained six occupations with the oldest being around 5920 rcybp and the youngest being around 410 rcybp. The Welsch Locality contained a bone bed that was dated approximately between 7920 and 8190 rcybp. The Welsch Locality is older than the focus area of this thesis and occupations 2 (McKean series) through 6 (Old Woman's phase) of the Snyder Farm Locality are younger so this section will focus on occupation 1.

Occupation 1 was radiocarbon dated to 5920 ± 170 rcybp (AECV 1200C) (Van Dyck 1994). It was very production with 10842 lithic and faunal remains collected. This includes 5599 faunal remains, 5131 pieces of lithic debitage, 32 pieces of fire-broken rock, 78 stone tools, and two bone tools.

The vast majority of the faunal remains were bison (99.7%), with the few other remaining pieces being deer, large and medium sized canids, birds, and unidentified mammal (Van Dyck 1994). The bison remains represent four individuals, including two fetal bison. The age of the fetal remains suggests a late winter to spring occupation (Van Dyck 1994).

The lithic collection of the site is primarily made up of various cherts (mostly Etherington chert), quartzite, and siltstone, with lesser amounts of limestone, quartz, basalt, and argillite (Van Dyck 1994). The debitage is clustered in two areas of the site, which Van Dyck (1994) suggests may be associated with activity areas inside of housing structures. Formed tools include 36 core tools, 12 projectile points, 12 endscrapers, 12 retouched flakes, two bifaces, two unifaces (a unifacial knife and a plane/scrapper), an anvil, a hammerstone, and two bone tools. The projectile points are consistent with Gowen points, which fits with the radiocarbon date (Van Dyck 1994).

4.13: Head-Smashed-In Buffalo Jump

Head-Smashed-In bison jump (DkPj-1), located in southwestern Alberta, is a multicomponent site with a history of bison jumping going back 5500 years (Brink 2008, Reeves 1978). The site complex can be divided into three areas: the kill, the campsite, and the gathering basin. Since the kill is the only part of the site that produced archaeological material from the time period relevant to this thesis this section will focus on that. For a complete explanation of the site, and how it was operated, see Brink (2008). The kill is a bonebed at the base of a cliff that averages 10-12 meters high and extends laterally for 260 meters. Three areas of the kill were excavated in the 1960s and 1970s, called the north, south, and east excavation areas (Reeves 1978). In the south excavation area, 17 stratigraphic levels were identified, with the youngest containing post-contact tools and the oldest associated with the Mummy Cave series. Ten stratigraphic levels were identified in the north excavation area, with level 10 being associated with the Mummy Cave series. The eastern block lacked the stratigraphy of the other two and appeared as an 2.5 meter thick bone bed.

The Mummy Cave series at Head-Smashed-In is represented in two levels, both of which have been radiocarbon dated. Level 10 of the north excavation area is a single geologic layer with at least three bone layers present. Two radiocarbon dates were obtained from this Level: one from the top of the level at 5160 ± 120 rcybp (RL-333) and one from the bottom of the level at 5740 ± 100 rcybp (RL-334) (Reeves 1978). Level 16 of the south excavation area is composed of

three buried soil horizons, which Reeves (1978) named 16a, 16b, and 16c. Reeves (1978) considered these levels to be correlated with level 10 from the north area. 16a was dated to 4130 ± 100 rcybp (Gak-1476) while 16c was dated to 5490 ± 300 rcybp (GSC-803). The 4130 date is significantly later than the other dates from this level or level 10 north that it might be erroneous, but Reeves (1978) does not reject it outright. However, he does say that he prefers the later date of 5160 ± 120 rcybp from level 10 north, as no Oxbow points were recovered from the excavation (Reeves 1978). For the earlier Mummy Cave dates Reeves (1978) suggests an average date of ca. 5600 rcybp.

Reeves (1978) described the Mummy Cave projectile points (14 in total) from Head-Smashed-In as Bitterroot and Salmon River styles, but Walker (1992) later showed that they were consistent with Gowen style projectile points, which is the interpretation that will be used here. Other tools from the site include a biface knife, a bone awl, and five utilized flakes made of locally available quartzite. The bone found in the Mummy Cave levels does not show signs of burning or charring.

4.14: Stoney Beach Site

The Stoney Beach site (EdNh-1) is a multicomponent site northeast of Moose Jaw, SK, which included a burial pit (Milsom 2012, Walker and Milson 2013). This was a primary flexed burial of an adult female and an infant. Grave goods interred with the remains include a piece of red ochre, bison and canid bones, and a shell pendant (Milsom 2012, Walker and Milson 2013). A radiocarbon date of 6050 ± 40 rcybp (Beta-177965) was obtained from a bison bone associated with the remains (Milsom 2012, Walker and Milson 2013). No projectile points were recovered with the burial, but the radiocarbon date is appropriate for an early Gowen-Oxbow series date and the manner of burial and grave goods are consistent with other burials associated with the complex.

4.15: Gray site

The Gray site (EcNx-1a) (Millar 1978) is a large burial ground near the town of Swift Current, Saskatchewan. The Gray site has some of the oldest known Oxbow dates at 5250 ± 160 rcybp (SFU-160) (Morlan 1993) and some of the burials have been radiocarbon dated to be even

older than that, with the oldest being 5720 ± 320 rcybp (SFU-297) (Morlan 1993). It is possible that use of the site started during the Gowen complex and continued through the Oxbow phase. Ninety-nine burial units were excavated and the remains of 304 individuals were recovered. These burials were a mix of primary and secondary burials, with the primary burials being extended and supine burials and the secondary ones being compact bundle burials (Millar 1981). Grave goods interred with the burials include projectile points, bifaces, other tools, and items of personal adornment. Some of these items must have been obtained through long distance trade. These include shell gorgets made from marine shells and pieces of rolled copper from the Old Copper Culture around Lake Superior (Millar 1978). Additionally some elements were rubbed with red ochre and some of the burials had red ochre sprinkled in the fill (Millar 1981).

The oldest radiocarbon date from the site is from Burial Unit 97 which produced a radiocarbon date of 5720 ± 320 rcybp (SFU-297) (Morlan 1993). Unfortunately, no projectile points were found in Burial Unit 97 so it cannot be assigned to a complex. The radiocarbon date would place the burial during the Gowen complex and implies that the site was used continuously through to the Oxbow complex. However, no Gowen points were recovered from any of the excavated burial units at the site. The only points recovered were Oxbow points. Burial Unit 46 produced the oldest dated projectile point, an Oxbow point, and was dated twice: one date was 5250 ± 160 rcybp (SFU-160) (Morlan 1993) and the other was 5200 ± 390 rcybp (S-390) (Millar 1978).

4.16: Greenwater Lake site

The Greenwater Lake site (FcMv-1) is a primary extended burial associated with the Oxbow Complex (Walker 1981). The only diagnostic artifact recovered with the remains was an Oxbow projectile point. The remains appear to have been sprinkled with red ochre before interment and several nodules of red ochre were included in the burial (Walker 1981). A rib fragment sent for radiocarbon dating returned a date of 4390 ± 105 rcybp (S-1447), being consistent with the Oxbow point found with the remains (Walker 1981).

4.17: Moon Lake site

The Moon Lake site (FaNq-5) is located southwest from Saskatoon, Saskatchewan. It was discovered in 1966 as part of a survey conducted by Ian Dyck (1970) of Oxbow sites near Saskatoon. The site was identified when it was partially exposed during road construction. A total of 16 four by four foot units (1.52 m²) were excavated (196 square feet or about 18.2 m²).

Two features were observed: A hearth feature that contained calcined bone, lithic debitage, and fire broken rock, and a linear feature of four post holes each about 2.5 inches (about 6cm) across. Dyck (1970) suggests the post holes may have been part of a structure like a windbreak built by the people occupying the site. Four Oxbow points were collected during the excavation along with two points that are likely preforms of Oxbow points. Other lithic tools recovered include bifaces, a drill, endscrapers (including six small ones and two much larger ones), and several retouched flakes. No mention is made of material types in the report. Faunal remains from the site included bison, unidentified large ungulate, and avian remains. The avian remains are likely Goose (family Anatidae) (Dyck 1970). A radiocarbon date of 4180 ± 90 rcybp (S-403) was obtained from an aggregate sample of charred bone fragments (Dyck 1970). Dyck (1970) suggested that the site was a short-term campsite, likely in the spring or fall based on the presence of goose bones.

4.18: Harder site

The Harder site (FbNs-1) is a single component Oxbow site northwest of Saskatoon, Saskatchewan. Dyck (1970) conducted test excavations at the site in 1966 and further excavations between 1969 and 1972 (Dyck 1977). The site is located in a sand dune depression and extends underneath a modern roadway. The north-south extent of the site was determined by looking at exposures in the ditches of the road and the east-west extent was determined with special dug backhoe trenches (Dyck 1977). A series of four by four foot units (1.52 m²) were excavated in areas where artifacts seemed concentrated.

Identifiable faunal remains from the Harder site are mostly bison, with lesser amounts of Canid (*Canis* sp.), hare (possibly *Lepus americanus*), and red fox (*Vulpes vulpes*), with individual elements of swift fox (*Vulpes velox*), fisher (*Martes pennanti*), badger (*Taxidea taxus*), deer (Family Cervidae), moose (*Alces alces*), and an unidentified bird (Morlan 1994). Dyck (1977) suggests that this was a short-term occupation, perhaps related to the operation of

bison pound or other hunting trap. Morlan (1994) in his reanalysis of the faunal remains suggests that an attritional hunting strategy is more likely, but doesn't completely reject the possibility of a pound. Both suggest that the site was occupied during the winter. Dyck (1977) based his estimation on the lack of fresh water sources nearby, meaning ground snow would be the easiest source of water. Morlan (1994) indicates that tooth eruption patterns are consistent with a winter occupation. Morlan (1994) also determined that the bone breakage pattern in some specimens is indicative of the bones being broken while frozen.

A total of 4062 pieces of lithic material was collected from the Harder site, with 178 formed tools (Dyck 1977). (Note: the original report stated that there were 188 formed tools, but the sum of the individual tool counts only equals 178). These tools included 73 projectile points, 25 of which were complete, 22 projectile preforms, 5 perforators, 44 endscrapers, 7 uniface knives, 7 biface knives, and 20 retouched flakes. The projectile points that had identifiable features all fit with the Oxbow style of point. Material type used in the site was mainly silicified wood and chert, with lesser amounts of quartzite, fused shale, chalcedony, quartz, and basalt. Dyck (1977) notes that the main mode of core reduction at the Harder site is bipolar splitting. Unfortunately an exact count of the cores recovered from the site is not given. Six bone tools were also collected from the site. Some of these bone tools (including an antler tine) appear to have been used in knapping, one is a long bone scraper, and the last is a spatulate bone of indeterminate use (Dyck 1977). A large quantity of coarse stone (about 29.9 kg) was recovered from the site, and while Dyck (1977) suggests several possible uses these stones might have had, such as boiling stones, hammer stones, anvils, and abraders, he does not give any exact counts. The material collected was granite, sandstone, gneisses, and diabases.

A total of five radiocarbon dates were obtained from bone samples at the Harder site. Dyck (1977) reports two dates both from samples made up of charred bone fragments: 3425 ± 105 rcybp (S-668) and 3360 ± 120 rcybp (S-490). Morlan (1994) had previously conducted an assessment of radiocarbon dates from Saskatchewan (Morlan 1993) that concluded that some Oxbow complex dates might have appeared younger than usual due to improper treatment of samples to control for potential contamination. Morlan (1994) then submitted three new samples for dates: 3420 ± 140 rcybp (S-3453), 4410 ± 150 rcybp (S-3444), and 4190 ± 90 rcybp (S-3452). Two of these dates are much older and more consistent with expected Oxbow dates, while one is quite similar to Dyck's (1977) dates. Morlan (1994) concluded that this is likely a result of

a form of contamination that even new procedures cannot control for. The alternative would be the presence of two occupations, but Morlan (1994) points out that the remains at the site come from a single geologic strata and were likely all buried shortly after the site was abandoned. Thus Morlan (1994) accepts the two older dates as being indicative of the true age of the site.

4.19: Norby site

The Norby site (FbNp-56) is a large Mummy Cave series bison kill site located in Saskatoon, Saskatchewan (Zurburg 1991). It is located on the Saskatoon Terrace, the same landform the Gowen 1 and 2 sites and the Cory site are on. Students from the University of Saskatchewan excavated the site in 1989. Due to the constraints of the urban environment the excavation was divided over four areas totalling 50 m². The lithic material assemblage from the Norby site is small, consisting of only 176 artifacts, 20 of which are formed tools.

Of the formed lithic tools six are projectile points, two point preforms, five biface tools, ten unifacial tools (mostly retouched flakes), and an anvil/hammerstone (Zurburg 1991). Swan River chert is the most common material used at the site, with lesser amounts of silicified peat, Knife River Flint, Montana agate, chalcedony, Gronlid siltstone, fused shale, quartzite, silicified wood, and chert. Several of these materials, including Montana agate, silicified wood, and chert, are represented as debitage but not as formed tools (Zurburg 1991). Only four of the projectile points are complete enough to assign a classification to. Three of the points are Gowen points while the fourth was listed as a “Manitoba” point by Zurburg (1991). These Manitoba points are stemmed projectile points but, in the time since Zurburg’s thesis was written, Manitoba points have not been recorded in many other Gowen sites making the presence of this point somewhat mysterious.

The faunal remains at the Norby site show a severe degree of weathering, suggesting they were exposed for a long period of time. The vast majority of the remains are bison. The only non-bison remains collected from the site are two rabbit (*Lepus* sp.) metatarsals and the mandibles of a canid, likely a wolf (*Canis lupus*) (Zurburg 1991).

For the bison remains 2970 complete or incomplete bones were collected along with 82.6 kg of fragmented unidentifiable bone. A minimum number of individuals (MNI) of 26 was calculated using the fused central and fourth tarsal (Zurburg 1991). Discriminate function analysis of long bones, metapodials, astragali, calcanei, and phalanges all indicated that the

majority of the bison at the site were male (Zurburg 1991). Tooth eruption and wear was used to determine the age of the specimens. There were no specimens younger than 2.7 years present, and only a few from 2.7 to 2.75 (Zurburg 1991). This is consistent with a male herd as young bison and female adults tend to form nursing herds, with the male bison leaving to join the male herd when they are grown (Zurburg 1991). The ages were around 0.7 to 0.75 years after the calving season that is usually from late April to late June, putting the kill event around January or February (Zurburg 1991). Since the kill is on the Saskatoon Terrace a jump or bog kill is unlikely (Zurburg 1991). It's possible a snow bank was modified to use as a trap or a small group was ambushed on its way to the river for water (Zurburg 1991).

Chapter 5 : The Gowen-Oxbow Series

Traditionally the Oxbow complex was considered a stand-alone entity while the Gowen phase is included in the more amorphous Mummy Cave series. However, the Oxbow complex is considered an *in situ* development out of a preceding Mummy Cave series manifestation (Peck 2011; Reeves 1973; Walker 1992). One of the initial goals for this thesis was to try and refine the start date for the Oxbow complex. However, since the change between the two complexes is an evolution, it is not possible to define a tight time frame for this transition. The shift between the two point styles apparently occurs around 5200 to 4700 rcybp, and this change in point styles is arguably the only significant change between the complexes.

Peck (2011) defined the Gowen complex on the basis of the inclusion of Gowen side-notched points. He assigns the complex a time span from 5900 to 5200 rcybp. Peck (2011) includes six sites in this complex: the Snyder Farm Locality (DjPm-36), the Spring Kill site (EgPs-51), the Gowen sites (FaNq-25 and FaNq-36), the Norby site (FbNp-56), and the Below Forks site (FhNg-25). I have added to this grouping the Cory site (FaNq-75), the Anderson site (FdOt-1), the Atkinson site (DiMe-27), and the lower levels of Head-Smashed-In (DkPj-1). The definition for Gowen side-notched points in this thesis follows Walker (1992).

Peck (2011) proposed a new classification scheme for the Oxbow complex. In his model, it is an Oxbow tradition with two phases: the Estevan phase which lasted from 4900 to 4500 rcybp and the Oxbow phase which lasted from 4500 to 4100 rcybp. The two phases are distinguished by different point styles. The Estevan phase has two associated point styles that Peck (2011) identified, which he labeled as Long Creek points and Souris points. Long Creek points are similar to classical Oxbow points, but have a shallower basal concavity and rectangular ears. Souris points have shallow corner notches and a relatively straight base. The Oxbow phase is represented by classical Oxbow points have a deeply concave base with wide, shallow side notches creating an eared appearance to the base. The blade margins are straight to convex.

In this chapter a new series is proposed. The Gowen-Oxbow series consists of two complexes: the Gowen complex and the Oxbow complex. The Gowen complex begins around 6100 rcybp and exhibits Gowen points. It ends around 4700 rcybp. The Oxbow complex begins around 5200 rcybp and lasts to around 3800 rcybp and is distinguished by Oxbow points. The

period between 5200 and 4700 is a transition period in which it is possible to find both styles of points. The Gowen complex and has the same characteristics as presented by Peck (2011). The Oxbow complex, however, is not subdivided into an Estevan phase and an Oxbow phase as it is in Peck's (2011) definition. It is a single complex that lasts from 5200 rcybp to around 3800 rcybp. Peck's (2011) division makes it seem as if there is a hard line between the various point styles but the reality is more complex. What he (and I) consider "classic Oxbow" points can be found during the entire length of the Oxbow complex and not just to the later period as he says.

The use of the term "series" in this instance is not a perfect match. The definition of series given in Chapter 2 is based on Dyck (1983) and is used in instances where archaeological material cannot be organized into complexes, such as the Mummy Cave series. It has also been used for assemblages that are clearly related but don't have clear divisions like the McKean series. Ideally the Gowen-Oxbow series would have a taxonomic designation that more clearly expresses its intended relationship. It is meant to be a higher order of taxonomy, similar to how, in biology, species are grouped into genera and genera are grouped into families. There is not a currently accepted term to use in this instance so series is used as the next best option.

The upper and lower dates for these complexes are based on a review of radiocarbon dates of components with these complexes present. The radiocarbon dates looked at in this thesis are listed in Appendix 1. Because radiocarbon dating is not an error proof dating method (samples can be contaminated or from mixed components, for example) these start and end dates are considered approximate and may change as new information is added.

In addition to have a well-defined temporal range Gowen-Oxbow sites are also found in the same area. Gowen and Oxbow sites are primarily found in south and central Saskatchewan, southern Alberta, southwestern Manitoba, with one outlying site in Montana, the Sun River site (Greiser et al. 1985).

The point found in Level 2 of the Cory site was dated to the beginning of the Gowen phase and should not be considered a transitional specimen, but it serves to illustrate the diversity of the Gowen point morphology and the potential overlap with Oxbow point morphology. It may not be so clear what is and is not an Oxbow point. It may be better to think of Gowen and Oxbow points as two portions of a continuum of point morphology. It would not be unreasonable, in the absence of a radiocarbon date, to think that the point from Level 2 of the Cory site is an Oxbow

point. Perhaps a metric analysis of the points, similar to the analysis done for the Mummy Cave series (Walker 1992) would help delineate the two point styles.

The two complexes have been grouped into one series to emphasize the similarities between them rather than an arbitrary division based on projectile points. They inhabit a similar range, settle in similar locations, and have similar methods of subsistence and lithic procurement. The projectile points are the main difference and remain in the definition of each complex. Creating a series that ties the two complexes together emphasizes the similarities between the two and sets down taxonomically the notion that the complexes are related in some way, an idea that has been in that archaeological literature for decades (Peck 2011; Reeves 1973; Walker 1992). This approach also allows sites that may be ambiguous or transitional to be categorized at least to the Gowen-Oxbow series, even if they cannot be confidently assigned to either the Gowen or Oxbow complex. It is possible that this series should be extended further in time, perhaps including other parts of the Mummy Cave series. However, at this time the relationship between the Gowen complex and components of the Mummy Cave series is not understood and is an area for future research.

One site that falls into this ambiguous category is the Anderson site (FdOt-1), a multicomponent site near Hardisty, Alberta (Quigg 1984). The Anderson site includes a component that was dated to around 4725 rcybp and assigned to the Mummy Cave series based on the projectile points recovered. This date is an average of four radiocarbon dates from two samples: 4345 ± 160 rcybp (GX6129-A) and 4725 ± 150 rcybp (GX6129-G) from one sample and 4370 ± 210 rcybp (GX6130-A) and 5460 ± 160 rcybp (GX6130-G) from another. Two of the dates were obtained from bone apatite (GX6129-A and GX6130-A) and the other two from gelatin (GX6129-G and GX6130-G) (Quigg 1984). If you take only gelatin (soluble collagen) dates into account, which is preferable due to apatite being more susceptible to contamination (Morlan 1994, Rutherford and Wittenberg 1979), you get an average radiocarbon date of 5092.5 ± 155 rcybp (average of 4725 ± 150 rcybp [GX6129-G] and 5460 ± 160 rcybp [GX6130-G] [Quigg 1984]). However, there appears to be a mix of point styles in this component. Peck (2011) asserted that the occupation is a palimpsest based on the presence of two disparate radiocarbon dates. He assigned some of the points in this component to his Estevan phase as they matched the template for Long Creek points and the others he assigned to the Maple Leaf Complex. I agree with Peck's (2011) assertion that the occupation is mixed, but I disagree with

his assignment of points to the Maple Leaf complex. The points do not seem to vary significantly from Gowen points in design. The component clearly falls into the Gowen-Oxbow series and possibly represents occupations from both the Gowen and Oxbow complexes. Alternatively, this component represents a single Gowen occupation and the average date from the soluble collagen would support this. This is one of the advantages of this approach. We have a series this site can be assigned to based on projectile point morphology and radiocarbon dates even if it cannot be assigned to a specific complex.

Hunting strategies for the Gowen-Oxbow series are focused on lone stalking of game. During the early Gowen complex there are some examples of larger kills notably the Norby site (Zurburg 1991) and the lower levels at Head-Smashed-In (Reeves 1978). The Norby site is a bison kill located in Saskatoon that has a composite radiocarbon date of ca. 5700 rcybp (based on three dates: 5640 ± 120 rcybp [S-3206], 5820 ± 110 rcybp [S-3205], 5965 ± 265 rcybp [S-3006] [Zurburg 1991]). Excavations of the bone bed recovered the remains of at least 26 bison. The kill was unusual as it was mainly adult males and most mass kills are nursing herds composed of adult females and subadults. No comparable kill sites have been found for the Oxbow complex. This may be the result of a sampling error or it may indicate a shift away from large scale hunting over the course of the series. This change may be tied to the increased aridity from 6000 rcybp to 5000 rcybp.

The utilization of faunal resources during the Gowen-Oxbow series is focused on bison, but a wide array of animals were also utilized including canids, deer, pronghorn, birds, fish, rodents, and freshwater clams. Canid remains are found in almost every component looked at in Chapter 4 of this thesis with the Cory site being one of the few sites that has no identified canid remains present. Levels 7 and 8 from the Long Creek site both had clam shells with the shells in Level 7 showing signs of having been modified to use as personal adornment (Bryant 2002). At least three freshwater clams were present in the Oxbow level at the Oxbow Dam, site but they were not extensively examined due to their fragility (Green 1998). The lower occupation of the eastern block of the Below Forks site also produced bivalve shells (Johnston 2005). It is unclear if these clams were used as a food source or if they were only collected so the shells could be used to manufacture personal adornments.

Unfortunately, very little is known about the utilization of floral resources during this time. The presence of grinding stones in an Oxbow level at the Below Forks site suggests that

grinding plant matter took place at the site (Dr. David Meyer, personal communication 2015). It is possible that charred Chenopodiaceae seeds found at the Gowen 2 site were utilized as a smudge material (Walker 1992).

Lithic resources are usually locally sourced materials with Knife River flint being the most common exotic material. Swan River chert and local quartzites are the most common materials across all of these sites. The Gowen sites have large quantities of black chert pebbles and while they are local to Saskatchewan they are not found in the area of the sites, meaning they were brought there intentionally (Walker 1992). The same pattern is not repeated at the Cory site, even though the sites are in close proximity. Three of the projectile points recovered from the Anderson site were produced from black chert pebbles (Quigg 1984). Silicified wood and peat were also commonly used at sites where it is available. Fused shale, miscellaneous cherts, and quartz are also common materials for the complex. The materials used vary from site to site in the complex as local materials are emphasized over imported materials from other areas, so the most prolific material at each site will depend on what is locally available.

The black chert pebbles are usually split with a bipolar technique, a technique that is used during both the Gowen and Oxbow complexes. Bipolar splitting involves placing the core or pebble on an anvil stone and striking the opposite end. This produces distinctive flakes with evidence of crushing on both ends. The distal ends of the flakes do not feather out, instead the force of the blow is reflected back into the core, creating what appears to be a second, less pronounced bulb of percussion. The Cory site had several examples of bipolar reduction of cores in Levels 3 and 4. These are likely a way of using an exhausted core for the maximum amount of material. Evidence of bipolar reduction in the form of bipolar flakes and cores was also present at the Below Forks site in Occupations IV through VII, appearing in both Oxbow and Gowen complex occupations. The chert pebbles used at the Anderson site were also split bipolarly (Quigg 1984), as were the chert pebbles in the Saahkómaapina site (Head et. al. 2003) and the Gowen 1 and Gowen 2 sites (Walker 1992).

The Gowen sites contained numerous gouges, unifacial tools worked on the ventral side of the flake and likely used for scraping hard material like wood or bone (Walker 1992). A similar tool was recovered from Occupation VI of the Below Forks site, although it was called a *pièce esquillée* instead (Dr. David Meyer, personal communication 2015; Johnston 2005). Several large unifaces were also collected from the Gowen sites. These were likely used for a

variety of functions including cutting and scraping (Walker 1992). Three unifaces similar to these were also found at the Anderson site (Quigg 1984) and another was recovered from Level 6 of the Oxbow Dam site (Green 1998). The two large endscrapers described by Dyck (1970) at the Moon Lake site likely fall into this group as well. Use wear analyses conducted on large unifaces by Matthew Stewart (2010) indicated that these tools were likely used for woodworking or possibly hide scraping.

Burials associated with the series are uncommon outside of the Gray site. Burials both at the Gray site and outside of it can be either primary or secondary bundle burials. The primary burials at the Gray site and the burial at the Greenwater Lake site were extended, while the primary burial at the Stoney Beach site was flexed. Grave goods were interred with the deceased but they tended to be sparse, usually a few tools or personal adornments. Burials occasionally involved red ochre, either interred with the remains or rubbed or sprinkled on the remains before burial.

The Gowen-Oxbow complex has two distinct, but related projectile point styles associated with it: the Gowen point and the Oxbow point. It is suggested here that it is best to think of these two styles as two sections of a continuum of point morphology rather than as two separate types. This continuum is also time transgressive, with the Gowen portion being older and the Oxbow portion being younger. Because this point styles exist on a continuum of morphology it is not possible to draw a clear dividing line between the two. Over the course of the Gowen-Oxbow series there is a general trend of a deepening of the basal concavity and the side notches. The notches also move slightly up the point to compensate for the deep basal concavity. One of the areas that this thesis does not explore and is worthy of further research is determining the relationship of Gowen points to other points of the Mummy Cave series.

Other lithic technologies associated with the complex include large uniface choppers, unifacial gouges, and bipolar splitting of cores and pebbles. Faunal resources collected include bison, cervids, canids, birds, rodents, fish, and clams. Shell jewelry is found during both complexes. Very little is known about the use of floral material during the complex. Burials associated with the complex can be either primary or secondary and contain few, if any, grave goods.

Combining Oxbow and Gowen into one taxonomic category emphasizes the similarities between the two complexes. By defining them as two separate entities based on the difference in

projectile points ignores both the ambiguity in point styles found in the transitional period and the similarities in the rest of the material. Organizing the complexes this way is not to be seen as a way of homogenizing the two complexes. Most components that contain projectile points and have reliable radiocarbon dates will likely be assigned to one of the complexes with confidence. But by combining them into one overarching series it creates a sense of continuity and allows sites that do not have a clear designation (such as sites without projectile points or radiocarbon dates or when these are ambiguous) to still receive an archaeological culture designation.

Chapter 6 : Conclusion

While the excavations at the Cory site were not extensive, the material collected adds to the body of evidence of a poorly understood period in archaeological record of the Northern Plains. Sites that contain both Gowen and Oxbow material are rare and can help shed light on the transition period between the two phases. An evolutionary connection between Gowen and Oxbow material has been theorized for many years, but they have always been presented as two separate groups, divided based on the difference in projectile points.

This thesis presents Gowen and Oxbow still as two complexes now classified under a unifying series. These complexes are still divided and defined by the differences in the projectile points associated with each complex. This division was kept both to make the new Gowen-Oxbow series relatable to previously published research and to aid in field research. Preliminary assessments of components are made based on diagnostic artifacts and it would be foolish to remove that possibility in favour of combining two complexes into one. There is also no clear dividing line between the two complexes. Gowen points evolved into Oxbow points and it is not possible to draw a clean line between the two point styles. The use of *series* as the term for this unifying taxonomic designation is less than ideal but it is the closest analogue currently used in archaeological literature. Creation of a new term to be used instead of series would be preferable but beyond the scope of this thesis.

Archaeological cultures are often divided based on the presence of diagnostic artifacts, but this places a heavy emphasis on a single point of evidence and ignores all other lines of evidence. If the projectile points are briefly set aside there are striking similarities in the archaeological material associated with the Gowen-Oxbow series. The series spans from northern Montana and southern Alberta through south and central Saskatchewan into southwestern Manitoba. Early on in the Gowen complex there are a few examples of large bison kills, but this falls off and the series becomes typified by small kills. While bison is the primary prey animal a wide range of other animals were taken as well, either as food or for other uses such as to create personal adornments. Lithic tools are made primarily from locally sourced materials but exotic materials such as Knife River flint appear consistently through the series in small amounts. Bipolar technology, the splitting of small pebbles or cores for tool making, is found during both phases, as well as the use of large unifacial tools. Burials associated with the

complex can be either primary or secondary and contain few grave goods. Now when the projectile points are added back into the picture rather than being the defining elements of two complexes they are a single artifact type that changes over the course of a series of complexes. This approach of creating a unifying taxonomic category de-emphasizes the difference in projectile point construction in favour of looking at the archaeological material holistically, while not discounting the points as they still serve as a reliable indicator of time depth.

This thesis is not intended to be the final word on the reclassification of archaeological complexes. It is intended as a beginning, a first step, with the hope that others will re-evaluate other parts of the northern plains archaeological record to see if there are better ways of classifying and organizing the archaeological cultures.

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Appendix: Radiocarbon Dates for Gowen and Oxbow Sites

Site	Borden	Age (rcybp)	Assigned Culture	Sample No.	Reference	Notes
Stampede paleosol 5c	DjOn-26	2980 ± 40	Oxbow	Beta 254778	Oetelaar 2005	
Stampede paleosol 5b	DjOn-26	3000 ± 70	Oxbow	TO-10926	Oetelaar 2005	
Gray	EcNx-1a	3015 ± 85	Oxbow	S-1449	Millar 1978	rejected for SFU-296
Harder	FbNs-1	3360 ± 105	Oxbow	S-490	Morlan 1994	Rejected
Long Creek Level 5	DgMr-1	3363 ± 115	McKean	S-63a	Bryant 2002	
Harder	FbNs-1	3420 ± 140	Oxbow	S-3453	Morlan 1994	Rejected
Harder	FbNs-1	3425 ± 120	Oxbow	S-668	Morlan 1994	Rejected
Sun River Level IV	24CA74	3450 ± 350	Oxbow	Beta-5536	Greiser et al. 1985	
Gray	EcNx-1a	3515 ± 105	??	S-1450	Millar 1978	
Gray	EcNx-1a	3585 ± 195	??	S-706	Millar 1978	
Gray	EcNx-1a	3650 ± 295	??	S-693	Millar 1978	
Oxbow Dam	DhMn-1	3760 ± 80	Oxbow	S-3648	Green 1998	
Gray	EcNx-1a	3850 ± 180	Oxbow	S-707	Millar 1978	Date only
Gray	EcNx-1a	3855 ± 100	Oxbow	S-646	Millar 1978	Date only
Long Creek Level 5	DgMr-1	3856 ± 55	??	BGS 2362	Bryant 2002 (p.155)	
Dog Child Level 2b	FbNp-24	3867 ± 50	Oxbow	BGS 2661	Cyr 2006	
Dog Child Level 2b	FbNp-24	3938 ± 40	Oxbow	BGS 2890	Pletz 2010	
Head-Smashed-In	DkPj-1	4130 ± 100	Mummy Cave	GaK-1476	Reeves 1978	
Moon Lake	FaNq-5	4180 ± 90	Oxbow	S-403	Dyck 1970	
Harder	FbNs-1	4190 ± 90	Oxbow	S-3452	Morlan 1994	

Site	Borden	Age (rcybp)	Assigned Culture	Sample No.	Reference	Notes
Dog Child Level 3a	FbNp-24	4237 ± 40	Mummy Cave/Transitional	BGS 2891	Pletz 2010	
Cory	FaNq-75	4260 ± 30	Gowen	Beta-414915	This volume	
Saahkómaapína (Boy Chief)	EeOv-68	4280 ± 90	Oxbow	AECV-2030 C	Head et al. 2003	
Saahkómaapína (Boy Chief)	EeOv-68	4350 ± 80	Oxbow	Beta-43910	Head et al. 2003	
Saahkómaapína (Boy Chief)	EeOv-68	4350 ± 90	Oxbow	AECV-2026 C	Head et al. 2003	
Saahkómaapína (Boy Chief)	EeOv-68	4350 ± 90	Mummy Cave	Beta-43912	Head et al. 2003	
Saahkómaapína (Boy Chief)	EeOv-68	4360 ± 80	Mummy Cave	AECV-2025 C	Head et al. 2003	
Cory	FaNq-75	4370 ± 30	Gowen	Beta-414917	This volume	Disturbed context
Sun River Level V	24CA74	4370 ± 110	Oxbow	Beta-5518	Greiser et al. 1985	
Greenwater Lake	FcMv-1	4390 ± 105	Oxbow	S-1447	Walker 1981	
Sun River Level V	24CA74	4390 ± 110	Oxbow	Beta-5531	Greiser et al. 1985	
Harder	FbNs-1	4410 ± 150	Oxbow	S-3444	Morlan 1994	
Gray	EcNx-1a	4420 ± 190	Oxbow	RIDDL-515	Morlan 1993	Date only
Saahkómaapína (Boy Chief)	EeOv-68	4420 ± 90	Mummy Cave	AECV-2027 C	Head et al. 2003	
Gray	EcNx-1a	4440 ± 190	Oxbow	GX-3373	Morlan 1993	Date only
Saahkómaapína (Boy Chief)	EeOv-68	4500 ± 70	Mummy Cave	AECV-2029 C	Head et al. 2003	
Gray	EcNx-1a	4510 ± 140	Oxbow	RIDDL-512	Morlan 1993	Date only
Stampede paleosol 6	DjOn-26	4510 ± 60	N/A	TO-12153	Falzarano 2014	
Long Creek Level 5	DgMr-1	4513 ± 170	N/A	S-63b	Bryant 2002	
Saahkómaapína (Boy Chief)	EeOv-68	4530 ± 80	Mummy Cave	AECV-2028 C	Head et al. 2003	
Sun River Level V	24CA74	4560 ± 70	Oxbow	Beta-5523	Greiser et al. 1985	
St. Louis Level I	FfNk-7	4590 ± 60	Oxbow	Beta-173608	Johnston 2005	Date only
Dog Child Level 3a	FbNp-24	4597 ± 50	Mummy Cave/Transitional	BGS 2662	Cyr 2006	
Gray	EcNx-1a	4600 ± 130	Oxbow	RIDDL-514	Morlan 1993	Date only

Site	Borden	Age (rcybp)	Assigned Culture	Sample No.	Reference	Notes
Gray	EcNx-1a	4600 ± 170	Oxbow	RIDDL-513	Morlan 1993	
Long Creek Level 8	DgMr-1	4600 ± 80	Mummy Cave/Transitional	S-52	Bryant 2002	Multiple components
Long Creek Level 7	DgMr-1	4613 ± 150	Oxbow	S-50	Bryant 2002	
Sun River Level VI	24CA74	4640 ± 120	Oxbow	Beta-5520	Greiser et al. 1985	
Long Creek Level 8	DgMr-1	4650 ± 150	Mummy Cave/Transitional	S-53	Bryant 2002	Multiple components
Stampede paleosol 7	DjOn-26	4660 ± 38	Gowen	OxA-11579	Falzarano 2014	
Bellvue Kill Occupation 1	DjPo-9	4690 ± 130	Bitterroot	RL-507	Calder et al. 1980	
Gowen 1	FaNq-25	4725 ± 130	Gowen	S-1526	Walker 1992	Rejected
Anderson	FdOt-1	4725 ± 150	Mummy Cave	GX6129-G	Quigg 1984	
Below Forks Occupation IV	FhNg-25	4750 ± 90	Oxbow	TO-10196	Meyer et al. 2016	Date only
Dog Child Level 3b	FbNp-24	4780 ± 50	Mummy Cave	BGS 2663	Cyr 2006	
Below Forks Occupation V	FhNg-25	4790 ± 70	Oxbow	TO-10085	Meyer et al. 2016	
Gray	EcNx-1a	4850 ± 160	Oxbow	SFU-295	Morlan 1993	Date only
Long Creek Level 8	DgMr-1	4960 ± 70	Mummy Cave/Transitional	Beta-168214	Bryant 2002 (p.206)	Multiple Components
Long Creek Level 9	DgMr-1	4993 ± 125	Mummy Cave	S-54	Bryant 2002	
Sun River Level VI	24CA74	5040 ± 320	Oxbow	Beta-5519	Greiser et al. 1985	
Gray	EcNx-1a	5055 ± 165	Oxbow	S-619	Morlan nd, Millar 1978	
Dog Child Level 3b	FbNp-24	5095 ± 45	Mummy Cave	BGS 2892	Pletz 2010	
Head-Smashed-In	DkPj-1	5160 ± 120	Mummy Cave	RL-333	Reeves 1978	
Oxbow Dam	DhMn-1	5200 ± 130	Oxbow	S-44	Green 1998	Rejected
Gray	EcNx-1a	5200 ± 390	Oxbow	S-647	Morlan nd, Millar 1978	
Stampede paleosol 7	DjOn-26	5230 ± 100	Gowen	TO-10922	Falzarano 2014	
Gray	EcNx-1a	5250 ± 160	Oxbow	SFU-294	Morlan 1993	
Atkinson	DiMe-27	5280 ± 50	Gowen	TO-10640	Nicholson and Playford 2009	

Site	Borden	Age (rcybp)	Assigned Culture	Sample No.	Reference	Notes
Stampede paleosol 7	DjOn-26	5290 ± 40	Gowen	Beta-254777	Falzarano 2014	
Sun River Level VI	24CA74	5310 ± 110	Oxbow	Beta-5517	Greiser et al. 1985	
Gray	EcNx-1a	5420 ± 160	Oxbow	SFU-296	Morlan 1993	Date only
Anderson	FdOt-1	5460 ± 160	Mummy Cave	GX6130-G	Quigg 1984	
Head-Smashed-In	DkPj-1	5490 ± 300	Mummy Cave	GSC-803	Reeves 1978	
Below Forks Eastern Block	FhNg-25	5520 ± 60	Mummy Cave	TO-10083	Johnston 2005	
Atkinson	DiMe-27	5580 ± 120	Gowen	TO-13365	Nicholson and Playford 2009	
Norby	FaNq-56	5640 ± 120	Gowen	S-3206	Zurburg 1991	
Sun River Level V	24CA74	5660 ± 470	Oxbow	UGa-4632	Greiser et al. 1985	
Gowen 2	FaNq-32	5665 ± 110	Gowen	S-2037	Walker 1992	
Gowen 1	FaNq-25	5670 ± 135	Gowen	S-1527	Walker 1992	
Sun River Level VI	24CA74	5670 ± 190	Oxbow	Beta-5527	Greiser et al. 1985	
Gray	EcNx-1a	5720 ± 320	Oxbow	SFU-297	Morlan nd	Date only
Head-Smashed-In	DkPj-1	5740 ± 100	Mummy Cave	RL-334	Reeves 1978	
Gowen 1	FaNq-25	5760 ± 135	Gowen	S-1448	Walker 1992	
Norby	FaNq-56	5820 ± 110	Gowen	S-3205	Zurburg 1991	
Below Forks 1980 Block	FhNg-25	5845 ± 140	Mummy Cave	S-2245	Johnston 2005	
Cory	FaNq-75	5900 ± 30	Gowen	Beta-414916	This volume	
Gowen 2	FaNq-32	5910 ± 165	Gowen	S-2036	Walker 1992	
Cory	FaNq-75	5910 ± 60	Gowen	Beta-168248	Walker et al. 2002	
Gowen 2	FaNq-32	5915 ± 130	Gowen	S-1970	Walker 1992	
Below Forks Eastern Block	FhNg-25	5920 ± 70	Mummy Cave	TO-11020	Johnston 2005	
Sun River Level VI?	24CA74	5960 ± 210	Oxbow	Beta-5533	Greiser et al. 1985	
Norby	FaNq-56	5965 ± 265	Gowen	S-3006	Zurburg 1991	

Site	Borden	Age (rcybp)	Assigned Culture	Sample No.	Reference	Notes
Stampede paleosol 10	DjOn-26	5990 ± 50	Gowen	Beta-254780	Falzarano 2014	
Below Forks Eastern Block	FhNg-25	6010 ± 80	Mummy Cave	TO-9355	Johnston 2005	
Stoney Beach	EdNh-1	6050 ± 40	Mummy Cave	Beta-177965	Milson 2012	Date only
Gowen 1	FaNq-25	6065 ± 200	Gowen	S-1488	Walker 1992	
Gowen 2	FaNq-32	6075 ± 160	Gowen	S-1971	Walker 1992	
Below Forks Occupation VII	FhNg-25	6100 ± 140	Gowen	TO-9354	Johnston 2005	
Stampede paleosol 8	DjOn-26	6100 ± 90	Gowen	TO-10925	Falzarano 2014	
Stampede paleosol 9	DjOn-26	6110 ± 90	Gowen	TO-10924	Falzarano 2014	
Gowen 1	FaNq-25	6150 ± 110	Gowen	S-1457	Walker 1992	
Stampede paleosol 9	DjOn-26	6195 ± 45	Gowen	OxA-11621	Falzarano 2014	
St. Louis Level IV	FfNk-7	6220 ± 70	Mummy Cave	Beta-173611	Johnston 2005	Date only
Oxbow Dam	DhMn-1	6810 ± 90	N/A	S-3644	Green 1998	