

**The Thundercloud Site (FbNp-25):
An Analysis of a Multi-Component Northern Plains Site
and the Role of Geoarchaeology in Site Interpretation**

A Thesis

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By

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Abstract

The Thundercloud site is situated on the Northern Plains near the city of Saskatoon in Wanuskewin Heritage Park. The site is a multi-component processing / habitation site containing at least eleven components. These components range in age from the period of European contact to approximately 4,000 years before present. The site was chosen for the location of the University of Saskatchewan's archaeological field school for a period of six years between 1993 to 1998.

The major focus of this thesis project was to determine the cultural affiliation and cultural chronology for the occupations present at the site with an emphasis on the McKean Complex occupations. However, it was discovered during excavation that the natural stratigraphy of the site was extremely complex because of the natural and cultural site formation processes that affected the site during occupation prior to burial, and post-depositional. Soil horizons were compressed as well as degraded and determining where one occupation ended and another began often could not be easily discerned. Therefore, it was necessary to determine the types of site formation processes that affected the site and to recognize physical evidence of these processes. With this knowledge it was possible to identify previously unnoticed individual occupations within the larger natural soil horizons. The importance of detailed geoarchaeological studies at these types of sites is emphasized through this research.

Acknowledgments

This project could not have been completed without the assistance of a number of people. First of all, I would like to thank my advisor, Dr. Ernest G. Walker, for his encouragement and assistance. His guidance and advice helped to keep the project on track. I would also like to thank the other members of my committee, Dr. Richard E. Morlan and Dr. Margaret Kennedy for their assistance.

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My heartfelt gratitude, last but most important, is given to my family. My husband Gordon and my children Stephanie and Steven put up with the trials of having their wife and mother a full time student. I know that this was not always easy for them and their encouragement and love helped get me through the tough times and keep me on the path.

I dedicate this thesis to my parents, Kjeld and Ruth Andersen. I know at times they wondered what forces drove me to complete this degree but they always believed in me. I wish my father could have been here.

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Chapter 1

Introduction

1.1 Introduction

The excavations at the Thundercloud site (FbNp-25) commenced in 1993 as part of the University of Saskatchewan's archaeology field school and developed into a graduate thesis project. The size of the project and the amount of materials recovered soon led to the partitioning of the analysis into two research projects. Sean Webster of the University of Saskatchewan's Department of Anthropology and Archaeology undertook the analysis of the faunal materials and the fine screen samples and results can be accessed in his graduate thesis (Webster 1999). The project of analyzing the cultural materials and the features was undertaken by myself and the results of this research is contained within the following thesis.

1.2 Research Objectives

The archaeological excavations at the Thundercloud site had a number of objectives and concerns relating to determining the subsistence and settlements within a specific physiographic region during the Middle and Late Prehistoric periods. The specific research goals of this thesis are as follows:

- 1) To describe and discuss the occupation levels present at the Thundercloud site, in particular the associated material culture, excluding faunal remains.
- 2) To determine and discuss the past cultural sequence present at this site. This coincides with archaeology's traditional goal which is to determine where occupations fit within the Northern Plains cultural chronology framework.
- 2) With a focus on the McKean Complex occupation levels, to compare and contrast the recovered cultural materials from these levels with those materials recovered from the Redtail site (FbNp-10), Crown (FhNa-86) and Cactus Flower (EbOp-16) sites, all located within south-central Saskatchewan and Alberta.
- 3) To determine in what way that various site formation processes have affected the Thundercloud site deposits and the artifacts contained within.

1.3 Organization of Thesis

In this thesis, Chapter One contains a brief overview of the Thundercloud project and the aims and objectives of the thesis. Chapter Two contains a discussion concerning the biophysical environment of the Saskatoon region. Chapter Three involves a discussion of the precontact cultural chronology of the Saskatchewan as well as a brief discussion of the cultural chronology framework utilized in this thesis. Chapter Four is concerned with the natural and cultural stratigraphy of the site and the post-depositional processes that would have affected this location. Chapters Five

through Eleven contain detailed descriptions and analysis of the artifacts and features of the different occupation levels. Chapter Twelve includes a discussion relating the geoarchaeology of the entire site to the cultural stratigraphy and material remains recovered. Chapter Thirteen contains a discussion of the McKean Complex culture and a comparison of the cultural assemblages from the McKean Complex occupations from the Thundercloud, Crown, Cactus Flower and Redtail sites. Finally, Chapter Fourteen contains the summary and the conclusions that have been reached concerning the research at the Thundercloud site.

Chapter 2

Biophysical Environment

2.1 Introduction

The Thundercloud site (FbNp-25) is located in the northern portion of Wanuskewin Heritage Park (Figure 1.1) at 52°13' north latitude and 106°35" west longitude, three kilometers north of the City of Saskatoon (Walker *et al* 1994). The site is situated on the floor of the Opimihaw Valley, on a point bar on the east side of the meandering Opimihaw Creek. Wanuskewin Heritage Park is located within the physiographic region known as the Saskatchewan Rivers Plain Region and is characterized by ground moraine and glacial lake plains. Topographic relief is created by the presence of river valleys, glacial outwash channels and dune areas associated with glacial outwash (Christiansen 1970). Throughout the valley, excavations have revealed the valley was periodically flooded. The Thundercloud site is presently stabilized and covered by riparian vegetation typical of the South Saskatchewan River system. A consequence of this periodic flooding is that the occupation horizons have been sealed in alluvial deposits resulting in excellent preservation of the organic remains (Walker *et al* 1987:15).

The Hudson Bay slough northwest of the valley is the source of Opimihaw Creek. There are no perennial tributary streams. Groundwater supplies additional flows evidenced by several small springs along the valley wall. An important source of

moisture is the spring snowmelt. The creek drains southward into the South Saskatchewan River.

2.2 Regional Environment

Saskatchewan is characterized as having a continental climate, consisting of long, cold winters and short warm summers. The mean annual precipitation is 350 mm. The winter period extends from early November to early April (Maybank and Bergsteinsson: 1970).

In the winter the dominant air mass is the continental arctic air mass from the north, which is characterized by cold stable air. However, warmer Pacific air enters the region occasionally bringing warmer temperatures (Hare and Thomas 1974; Phillips 1990). Winter precipitation is mostly in the form of snow with continuous snow cover from early November to the end of March or early April. The greatest depth of snow cover is usually present by the end of February (Longley 1972). In summer, the dominant air masses change when the continental arctic air is replaced by the milder and moister maritime polar air masses. Pacific air masses cause the majority of precipitation while occasional moist air from the Gulf of Mexico will cause increased precipitation (Hare and Thomas 1974).

The coldest temperatures are found in January and February with the mean daily temperature highs of -10°C to -15°C , the mean daily lows of -20°C to -25°C . The record lows are -45°C to -50°C (Hare and Thomas 1974). While temperatures increase starting in March, precipitation levels do not increase greatly until April. The dominant form of precipitation starting in May is rainfall. Between April and August

WANUSKEWIN HERITAGE PARK

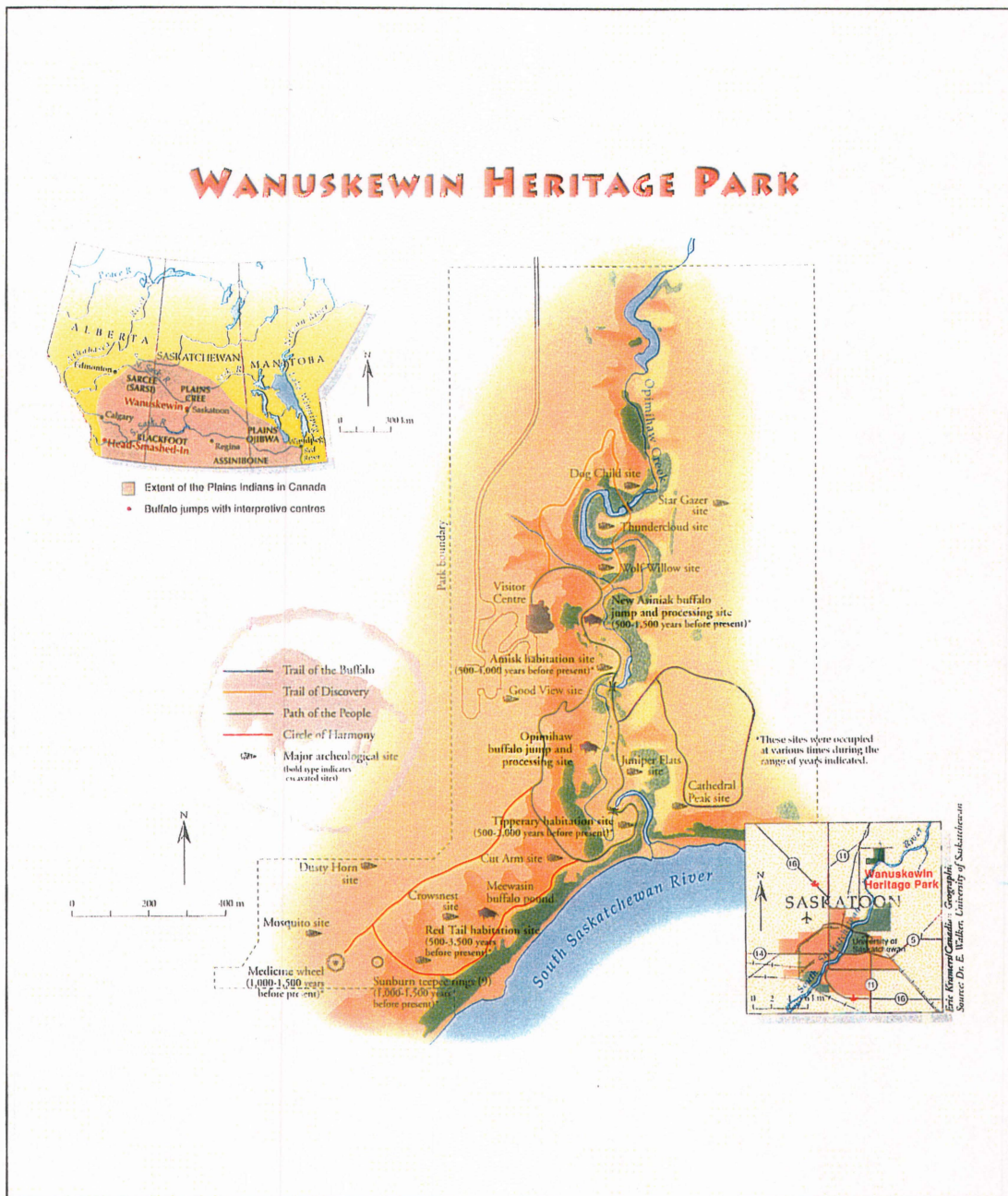


Figure 2.1 Location of the Thundercloud Site (FbNp-25) Map courtesy Canadian Geographic, September/October 1994: page 27.

Stipa spartea (porcupine grass) and *Koeleria cristata* (June grass). Of the non-herbaceous ground cover, almost 70% consist of *Solidago glaberrima* (low goldenrod), *Artemisia frigida* (pasture sage), *Anemone patens* (prairie crocus), *Antennaria microphylla* (small everlasting), *Phlox hoodii* (moss phlox) and *Cerastium arvense* (field chickweed). Two shrubs are significant in this area, *Symphoricarpos occidentalis* (western snowberry) and *Elaeagnus commutata* (wolf willow). The aspen poplar – *Populus tremuloides*, dominates the forested regions of the parklands. In the Saskatoon area, the important tree varieties include the aspen poplar, the Manitoba Maple (*Acer negundo*), and in the flood plains, the ash (*Fraxinus pennsylvanica*) and willow (*Salix sp.*).

2.4 Animal Resources

The fauna in the Saskatoon region has changed dramatically since precontact times in part because of modern agricultural practices and partly because of urban development. The dominant mammal on the grasslands prior to 1885 AD was the bison. McHugh (1971) has stated that the grasslands of the Great Plains contained approximately thirty-two million bison (*Bison bison*) with at least two million more in the regions that bordered the plains. Therefore, the bison had a tremendous influence on the plains people, their movements, technological adaptations, social organization and beliefs (Lowie 1985) since the majority of plains groups utilized bison as their major subsistence focus. Elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*) were also formerly residents of the Saskatoon

60% of the annual precipitation occurs, the majority usually in June (Phillips 1990). June, July and August have the warmest temperatures with daily mean maximums of 22°C to 26°C, mean daily lows of 8°C to 12°C and maximums of 38°C to 40°C (Phillips 1990).



Plate 2.1 Thundercloud Site viewed from southeast

1.3 Plant Resources

Wanuskewin Heritage Park is situated within the Aspen Parkland, a transitional zone between the mixed grass prairie in the south and the transitional mixed forest to the north (Archibald and Wilson 1980). The southern edge of the Aspen Parkland turns into the mixed grass ecoregion. Within the aspen parklands there are two primary plant communities – forest and parklands. In the Saskatoon area the grasslands are referred to as the *Festuca* grasslands (Archibald and Wilson 1980). The dominant basal cover consists of three grass species, *Festuca scabrella* (rough fescue),

region (Walker 1992). The mule deer and the white-tailed deer (*Odocoileus virginianus*) are the only artiodactyls still common in the region.

Carnivores currently present in the region include the coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), badger (*Taxidea taxus*), long-tailed weasel (*Mustela frenata*), least weasel (*Mustela nivalis*) and ermine (*Mustela ermina*). Red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*) and river otter (*Lutra canadensis*) are less common residents. The wolf (*Canis lupus*), swift fox (*Vulpes velox*), grizzly bear (*Ursus arctos*) and mountain lion (*Felis concolor*) are former residents (Walker 1992). Transient species occasionally seen at present are the black bear (*Ursus americanus*) and mountain lion.

Common residents include two varieties of Leporids, the snowshoe hare (*Lepus americanus*) and the white-tailed jackrabbit (*Lepus townsendii*). The white-tailed jackrabbit inhabits the fringes of aspen bluffs on the open prairie while the riverside thickets and aspen bluffs are preferred by the snowshoe hare (Walker 1992). Nuttall's cottontail (*Sylvilagus nuttallii*) is a former resident that has been observed recently in the valley.

Various forms of rodents are common in the area, in particular the Richardson's ground squirrel (*Spermophilus richardsonii*), Thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), Franklin's ground squirrel (*Spermophilus franklinii*), Northern pocket gopher (*Thomomys talpoides*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*) and various species of mice and voles (Walker 1992).

Migrating waterfowl and songbirds make up a significant amount of the abundant avifauna in the region. Some of the larger species of birds, in particular the raptors, have seen their numbers reduced or completely eliminated from the region in the past (Walker 1992). It appears however that the construction of the park has encouraged some of the larger species to return, including great horned owls (*Bubo virginianus*) and great blue herons (*Ardea herodias*). Small numbers of reptiles, amphibians and fish are also present.

2.5 Historical Background To Wanuskewin Heritage Park

The Saskatoon archaeological community has acknowledged the presence of archaeological sites in what is now known as Wanuskewin Heritage Park for many decades. The earliest known visits to the area by the Saskatoon Archaeological Society were in 1930 - 1932 with visits to the area continuing up to the present. In 1946 and 1952, Thad C. Hecker from the North Dakota State Historical Society conducted test excavations at two locations in the valley (Walker 1988). Thomas F. Kehoe, then Saskatchewan's provincial archaeologist from the Museum of Natural History in Regina, visited the area in the 1960s. With the assistance of members from the Saskatoon Archaeological Society, Kehoe excavated a small trench through a portion of the Medicine Wheel (Walker et al. 1984:3).

In 1965 the first of the University of Saskatchewan's excavations took place when Dr. Z.S. Pohorecky, a professor with the Department of Anthropology and Archaeology, took a group of students to carry out test excavations near the mouth of Opimihaw Creek (Walker 1983:11). The 1975 survey of boulder alignments

conducted by Alice and Thomas Kehoe (Kehoe 1979:23-28) contained mention of the Tipperary Creek Medicine Wheel (FbNp-2).

However, with this intermittent survey and excavation, Thundercloud was not located until the 1982 and 1983 detailed assessment of the region undertaken by Dr. Ernest G. Walker. This detailed survey of what has become Wanuskewin Heritage Park identified a total of 21 archaeological sites; two historic heritage sites relating to the first European settlement of the area and 19 pre-contact sites (Walker *et al.* 1984:4).

While all of the sites in Wanuskewin Heritage Park have had at least partial testing conducted, five sites have had extensive excavation and research. The former Tipperary Creek site (FbNp-1) was excavated in 1985 and 1986 and was found to contain 20 occupation levels, the oldest dating about 2400 years BP, however, without any associated diagnostic artifacts. (Walker *et al.* 1987:38). The Amisk (FbNp-17) and Newo Asiniak sites (FbNp-16) were both excavated during 1984 and 1985. Amisk is a multi-component site with levels 2 through 7 with dates over 3000rcy B.P., including a number of superimposed Oxbow levels. The lowest level, level 7, has a date of 5340+120rcy B.P. [S-2768] (Amundson 1986:50).

Newo Asiniak consists of a bison jump and associated processing area. The jump site itself represents a Late Precontact period site while the processing site contains older occupations. Levels 4 to 7 have been identified as Middle Prehistoric period occupations. Levels 5 to 7 unfortunately contain no diagnostic stone tools (Kelly 1986). There are problems with the radiocarbon dates of the lower levels,

however, a date has been assigned to level 6 of 4320±85rcy B.P. [S-2532] (Kelly 1986:176).

The Redtail site (FbNp-10) was excavated during the 1988 – 1989 field seasons. This is a multi-component site containing fifteen occupation levels. The lower levels were associated with the McKean complex. Level 13 had a radiocarbon date of 4280±80rcy B.P. [S-3009] (Ramsey 1993:90) and contained projectile points morphologically identified with the McKean lanceolate style. Level 15 did not produce any diagnostic items, but produced a radiocarbon date of 5010±90rcy B.P. [S-3007] (Ramsey 1993:90).

The 1983 test excavation of the Thundercloud site consisted of a 1 m square unit excavated to a depth of 60 cm. The test unit indicated a multi-component site, possibly a habitation or a secondary processing site, containing six occupation levels however, neither age nor cultural affiliations could be determined. The matter rested until 1993 when the first year of a six-year excavation project commenced.

In 1993, the University of Saskatchewan archaeological field school excavated at Thundercloud, starting with the establishment of a grid system that was oriented along the east-west axis of the site. During this field season, 21 1 metre square units were excavated by arbitrary 5 cm levels through the first cultural level. The 1994 and 1995 field schools consisted of the continued excavation of 20 of the previous units down through occupation levels 2 and 3 with the remaining unit remaining unexcavated until May of 1996.

The excavations continued at Thundercloud during the 1996 field school. The original 21 square metre units were excavated down to the surface of the old creek

bed through occupation levels 4 to 7. As well, six additional units were completely excavated. Excavations continued at Thundercloud during the spring and summer of 1997 when an additional ten full units and two half units were excavated.

This was to be the end of the excavations to occur at the Thundercloud site, however, as a result of the 1997 excavations, there appeared to be further separation of some of the deeper occupation levels. Therefore, the field school returned to Thundercloud during the spring of 1998 for the final season of excavation. During this season five and one half one-meter units were excavated bringing the total number of units excavated to 44 ½. The excavated materials from the final field season are not included within this thesis.

Chapter 3

An Overview of Northern Plains Prehistory

3.1 Cultural Chronology

During the past several decades a number of different cultural chronology frameworks have been proposed (Figure 3.1). Some of these chronologies (Mulloy 1958; Wheeler 1958; Malouf 1960; Wormington and Forbis 1965) can be rejected based on additional research that indicates no evidence for a cultural hiatus on the Northern Plains during the Altithermal (Walker 1992). According to Walker (1992) the chronology proposed by Frison (1978) contains terminology problems because of the term "Plains Archaic". This term is more appropriately used in Wyoming and surrounding areas than south central Saskatchewan because of the differences in subsistence patterns between the two regions. The chronology proposed by Reeves does have further distinctions made during the Middle Prehistoric Period, however, the usage of the terms Early I and Early II are awkward. The chronology proposed by Dyck (1983) has no finer chronological distinctions recognized for the time period between 2000 years BP and 7500 years BP. Since this period in particular is the main focus of this thesis, a chronology was required that had finer distinctions proposed for this time period. Therefore, the chronological framework used within this thesis is based upon Walker (1992).

The cultural chronology sequence adopted from Walker (1992) requires an additional chronological term, that of Protohistoric. This time period is a finer

distinction positioned at the end of the Late Prehistoric Period and the beginning of the Historic Period. This period encompasses the time just prior to and just after the initial contact between the native cultures and the European explorers and traders. These sites commonly contain a mixture of native cultural materials together with varying amounts of European items.

Years B.P.	Mulloy 1958	Reeves 1973	Frison 1978	Dyck 1983	Walker 1992
200	Historic	Historic	Historic	Historic	Historic
	Late Prehistoric	Late Prehistoric	Late Prehistoric	Late Prehistoric	Late Prehistoric
2000					
3000					
	Middle Prehistoric	Middle Prehistoric	Plains Archaic	Middle Plains Indian	Middle Prehistoric
	Late	Late	Late		Late
	Early	Early I	Middle		Middle
5000					
	Hiatus	Early II	Early		Early
7500					
	Early Prehistoric	Early Prehistoric	Paleo-Indian	Early Plains Indian	Paleo-Indian
10500					
				Pleistocene Hunters	
12000					

Figure 3.1 Cultural Chronology Sequence on the Northern Plains (From Walker 1992:120)

In the use of the cultural chronologies, it must be noted that different authors use different descriptors for separate cultural identities. Of particular importance to this discussion is the usage of the terms *complex* and *series*.

A *series* has been defined as “a higher-level category, grouping together several similar temporal types” (Thomas 1989:328). A more complete definition states:

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. A series is a crude unit of archaeological analysis used for convenience before sites, features, and artifacts are ready for reclassification into complexes and traditions. (Dyck 1983:69)

A *complex* is defined as “the total expression of a number of *assemblages* left by the same groups over a sufficiently narrow time period that cultural expressions undergo minor changes” (Syms 1977:70-71) while an *assemblage* is defined as the “... surviving materials, features, and evidence of activities of a single residential group over a short period of time at one site” (Syms 1977:70).

The definition that Dyck uses for a complex is as follows:

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).

It is also noted by Dyck (1983:69) that a complex may or may not be equivalent to ethnological groupings.

It is apparent from the above definitions that both terminologies can be appropriate when dealing with a discussion of cultural identities based on archaeological remains. For the purposes of this thesis the terminology in accepted common usage will be maintained.

3.2 Saskatchewan's Precontact Cultural Chronology

At the end of the Pleistocene Period, major environmental changes occurred, including changes in climate and vegetation. Climate changes resulted in alterations in hydrology, erosional-depositional cycles as well as changes in animal population densities and extinctions. Concurrent with these environmental changes was the spread of Paleoindian cultures. The environments encountered by these people have no direct parallels today in part because of the presence of glacial ice with its associated bodies of water. The faunal species present included extinct species such as mammoth, camel, horse and the large extinct varieties of bison (Wright 1995).

Surface collections reveal the presence of early Paleoindian artifacts in Saskatchewan. The presence of Clovis and Goshen projectile points indicate human occupation of Saskatchewan either as glacial retreat commenced or shortly thereafter. This suggests an initial occupation of approximately 11,500 years ago, a date which is based upon components excavated elsewhere in the Northern Plains (Frison 1991).

The Paleoindian tool assemblage is composed primarily of chipped stone tools. Particularly well known are the fluted spear points and knives of the Clovis and Goshen Complexes. The raw material of choice was high-grade cryptocrystalline rocks including Knife River flint from North Dakota (Wright 1995).

Later Paleoindian Complexes are identified as present in Saskatchewan, often as surface collections, but also from excavated sites. The Parkhill Site (Ebell 1980:4) contained an assemblage of 137 Agate Basin projectile points while the McLeod Site (Joyes 1997) had a collection of 76 Cody Complex projectile points. Both of these sites are surface collections. The Niska Site (Meyer 1985) and the Heron Eden Bison

Kill (Corbeil 1995) are both excavated Cody Complex sites, which provide excellent information concerning regional occupation. The radiocarbon dates of the Heron Eden site, located near the Great Sand Hills of southwestern Saskatchewan, are approximately 9,000 years B.P. A surface collection near Wanuskewin Heritage Park provided a Cody knife, implying occupation in the region during the Paleoindian Period (Walker pers. comm).

The Early Middle Prehistoric Period (7500 – 5000 years ago) coincides with the onset of the Altithermal and is sparsely represented in the archaeological record of the province. Theories have been proposed to explain the paucity of sites identified from this time period. During this period the climate was warmer and drier than at present. Some authors have considered that these warmer and drier conditions resulted in an overall abandonment of the Northern Plains (see Walker 1992:122-132 for discussion). However, more recent evidence suggests that this was unlikely. Populations instead would have started to congregate near sources of permanent water.

Early Middle Prehistoric sites have been identified in the Saskatoon region including three sites located on the Saskatoon Terrace. Gowen sites I and II (Walker 1992) and the Norby site (Zurbug 1991) have been dated between 6,000 and 7,000 years ago (Morlan 1993:26). Analyses of the faunal materials from the Gowen sites have indicated that the animals were completely processed (Walker 1992:97-109). This is consistent for the time period where an intensification of resource utilization and the maximization of extraction of proteins from animal carcasses were necessary

because of the climatic conditions (Frison 1991:84). It is also implied that there have been problems differentiating between the Early Middle Prehistoric Period projectile points and the later side-notched varieties. For these reasons Early Middle Period sites have been difficult to identify.

A shift in hunting technology which involved the use of the atlatl is apparent with the replacement by smaller side-notched projectile points of the earlier stemmed and lanceolate varieties (Frison 1991:79). Various terminologies have been proposed for the Plains assemblages from this time period. Reeves (1978) uses the term Mummy Cave Complex, while Mummy Cave Series is the term used by Dyck (1983). The usage of Mummy Cave Series recognizes the presence between 7700 and 4700 rcybp of a number of similar complexes occurring on the plains. Continuity between the Plains complexes and the western Mountains-Foothills complexes are implied in the usage of the above terminologies. The term "Gowen" is preferred by Forbis (1992:40) when materials from the short-grass plains are referred to. This effectively differentiates the Early Middle Prehistoric Period prairie expressions from the western Mountains-Foothills complexes.

The Middle Middle Prehistoric Period extends from 5,000 to 3,000 years ago (Walker 1992), a time period where it appears as if human populations were on the increase on the Northern Plains. The Oxbow Complex is the first identified complex within this period. The complex was first recognized at the Oxbow Dam site in southeastern Saskatchewan (Nero and McCorquodale 1958). The temporal span for the complex in Saskatchewan has been suggested by Dyck (1983:96) to be between

4700 and 3050 rcybp. Morlan (1993:38) has revised this time span to range between 6300 and 4400 calendar years BP. This revised date implies that before the Altithermal ended the Oxbow Complex was already in place on the Northern Plains. Walker (1992) states that the Oxbow Complex developed *in situ* from a local variant of the Mummy Cave Series. The Mummy Cave Complexes and the Oxbow Complexes have overlapping radiocarbon dates and questions have been raised concerning when Mummy Cave ends and Oxbow begins. An example of this occurs at Head-Smashed-In Buffalo Jump in Alberta where the basal occupation was initially referred to Oxbow / McKean (Reeves 1973) and later changed to terminal Mummy Cave (Reeves 1978).

The Oxbow Complex has been identified based upon its projectile point morphology. Generally the points are thick with side-notches near the base. The base is concave and thinned, which results in an "eared" or lobed appearance. Unnotched preforms are also recovered (Dyck 1983:96).

Identified Oxbow Complex sites include campsites and individual and mass human burials such as the Gray site (Millar 1981). The Majorville Cairn and Medicine Wheel located in southern Alberta appears to have had its origins during Oxbow times (Calder 1977). Human burials indicate the presence of ceremonialism in that burials were often multiple, associated with the burial of domesticated dogs (Savage 1974) and liberal use of red ochre (Millar 1981:105). The presence of exotic materials implies long-distance trade routes. The Gray burial site contained non-utilitarian items including native copper tube beads from the Great Lakes region and shell beads from the east coast (Millar 1978).

Subsistence patterns indicate that Oxbow Complex people relied heavily upon bison as their major faunal resource. The lack of well-documented Oxbow bison kill sites suggests that small scale hunts were the norm, as opposed to large scale communal hunting. While Dyck (1977:55-56) suggested that the Harder site was an example of an Oxbow communal hunt recent re-examination of the assemblage by Morlan (1994) indicates that the Harder site faunal assemblage was the result of several small scale hunts. The re-examination of the faunal material from the Oxbow Dam Site (Green 1998) indicates that the inhabitants had a very diverse diet.

The McKean Complex is also included within the Middle Middle Prehistoric Period. The complex includes three morphological styles of projectile points; McKean Lanceolate, Duncan and Hanna. While there are typological differences in the McKean, Duncan and Hanna projectile point styles, they are generally believed to be part of a single complex (Reeves 1970; Brumley 1975). Reeves (1970) argues that McKean and Duncan points are contemporaneous and that the Hanna points represent a later phase of the complex. Regional variability is also an important factor along with the chronological differences according to Brumley (1975). Reeves (1969) has suggested a direct evolution of the McKean Complex from the Oxbow Complex while others (Syms 1970; Brumley 1975) have postulated the migration of these populations onto the Plains in direct competition with the Oxbow complex.

The appearance of McKean Complex projectile points together with Oxbow projectile points suggests a link between the two complexes (Meyer 1982), however, areas outside the plains have been proposed as the areas of origin. The McKean

Complex is seen as a central and northern Rocky Mountain development from the earlier Plano Complexes by Husted (1968) while a Great Basin origin has been postulated by Jennings (1964) and Brumley (1975). Regardless of its area of origin the McKean Complex was well established on the Saskatchewan Plains by 4150 years BP and continued in existence until approximately 3350 years BP (Dyck 1983). A further discussion of the McKean Complex is located in Chapter 12.

The introduction of the Pelican Lake Complex appears with the demise of both the McKean and Oxbow Complexes approximately 3000 years BP and extends between 3300 and 1850 years BP (Dyck 1983). There are two basic varieties of Pelican Lake points (Dyck 1983). The first and the earliest type usually had straight sides and base and corner notches. The corner notches usually result in the presence of sharp barbs on the shoulder. The earliest forms of this variety have an almost stemmed appearance because of its very narrow base and large notches. Later versions have a base almost as wide as the shoulders. The points are still corner-notched, but the notches are narrower and often quite deep.

Appearing about the middle of the Pelican Lake sequence and continuing until the end is the second variety of point (Dyck 1983). This point has straight sides and corner-notches but instead of a straight base, the base is convex. Pelican Lake points can range in length from less than two centimeters to more than five centimeters. The presence of these small arrow-sized points together with the larger dart-sized points have suggested to some that the bow and arrow was in use relatively early. The similarity of the Pelican Lake point to the late Hanna points suggests to Reeves (1969, 1970) a common cultural tradition referred to as Tunaxa. By adding the

following Avonlea complex to this tradition Reeves implies a direct continuity from Oxbow into the Lake Prehistoric period.

The Pelican Lake chipped stone tool kit includes flat plano-convex and heeled end-scrapers, ovoid bifaces (large and small), elongated drills with convex butts as well as many unifacial tools. Bone tools are present, including bone awls and ornaments carved to replicate / simulate elk tooth pendants and bear claws. Shell gorgets and beads have been recovered as well (Dyck 1983). The selection of raw materials appears to be mostly locally available cherts and quartzites, however, Knife River Flint and black obsidian are also present.

Pelican Lake subsistence patterns are primarily oriented towards the procurement of bison. Bison pounds and jumps are commonly found types of sites as well as are tipi rings (Wettlaufer 1960; Kehoe 1974; Reeves 1978; Brumley 1975). Reeves (1969:34) characterized Pelican Lake people as nomadic communal bison hunters whose seasonal round was geared toward spring and fall bison drives. Ritualistic patterns of burial and concerns about the afterlife were well developed, shown by the presence of secondary interments and the use of grave goods especially at the Bracken Cairn burial site (King 1961). After 2000 BP Pelican Lake Complex materials are absent from the archaeological record.

The Besant Complex belongs to the Late Prehistoric period based on its dates of 2000 to 1150 BP (Dyck 1983), its projectile point technology and the presence of pottery. These points are dart tips that are side-notched and lanceolate in form and are used with the atlatl. Usually the bases are straight, however, they can be either

slightly convex or concave. Usually the notches are twice as broad as they are deep and the notches are normally situated in such a way that one edge of the notch is slightly above or touching the basal edge (Dyck 1983).

The predominant raw material used in tool construction recovered from Besant sites is Knife River Flint as seen at the Fitzgerald site (Hjermsted 1996), however, other Besant sites such as the Grandora site (Dyck 1972) show the use of local cherts and quartzites. The reliance on Knife River Flint by Besant people had not been seen since Early Paleoindian periods and was not present in later complexes (Dyck 1983).

This complex flourished for approximately 800 years, resulting in numerous sites spread widely over the Northern Plains, including bison pounds and jumps, burial mounds and campsites (Saylor 1979; Frison 1978). The subsistence pattern was predominantly bison procurement and as a result a sophisticated strategy of jumps and pound/corrals was developed (Frison 1978:213-223). The conical tipi was utilized; some of which appear quite large. A different habitation structure was also used, that of a post-in ground structure (Wettlaufer 1955). The post-in-ground type of dwelling is unlike the dwellings for other Northern Great Plains bison hunters. This type of dwelling was located at the Mortlach site (Wettlaufer 1955) and the La Roche site (Hoffman 1967, House 2). These dwellings are suggested to be reminiscent of bark or mat covered houses of the eastern early Woodland Complexes (Dyck 1983).

The first ceramics found on the Northwestern Plains belong to the Besant Complex. The pottery is generally conoidal in shape, is tempered with grit and sand and appears to have been formed using the paddle and anvil method. The surface

finish usually is cord marked or smooth, often called plain. Decoration is usually in the form of a single row of punctates parallel to the rim (Dyck 1983).

The eastern margin of the plains contains a number of burial mounds that are generally associated with the Sonota Complex. The Besant Complex is closely related to the Sonota Complex. While a possible ceremonial structure is located at the Ruby site in eastern Wyoming, no Besant Complex burial mounds are known in southern Saskatchewan or Alberta (Frison 1978).

The Avonlea Complex, which dates between 1900 and 900 years BP, has a considerable overlap with the Besant Complex and the two may have been in competition with each other for resources (Morlan 1993:40). The presence of small, thin triangular side-notched points as well as the presence of ceramics characterizes Avonlea. These projectile points are designed for use with the bow and arrow rather than with the atlatl (Burley and Meyer 1982). The Avonlea Complex is suggested by some to be the first to use the bow and arrow on the Northern Plains however, Avonlea is at least the first to use the bow and arrow to a large extent. Avonlea projectile points are triangular, very thin and have small shallow side-notches. The side-notches are positioned very close to the base. The base can be straight, however, it is usually slightly concave.

Since the largest of the Avonlea collections relate to bison traps, pounds and jumps, the information regarding the Avonlea tool kit is biased towards those tools, especially arrow points, that relate to bison killing. The tool kit includes a variety of stone and bone tools similar to other bison hunting complexes, including end

scrapers, unifaces, chipping hammers, awls and engravers. The most commonly used raw materials are locally obtained, including silicified wood, chert and chalcedonies (Dyck 1983).

Avonlea is also characterized by the presence of ceramics. The ceramics are generally conoidal in shape with three distinct types of surface finish: 1) net impressed (Hurley 1981:103) 2) spiral channeled or 3) smoothed exterior (Morgan 1979:352-54; Dyck 1980). Spiral channeled pottery appear not to have decorations near the rim, however, net impressed pottery may have one or more rows of punctates near the rim. Net impressed vessels also may have parallel horizontal incisions near the rim (Dyck 1983).

The end of the Prehistoric period and the beginning of the Historic period is referred to as the Protohistoric Period. During this period the use of pottery becomes more prevalent and vessel shape changes from conoidal to that of shouldered globular forms. Many types of pottery are associated with this time period and vessel shape and surface treatments vary greatly from region to region. Projectile point morphology changes to what Dyck (1983:126-139) has termed the Late Side-Notched Series, which contains Prairie Side-Notched and Plains Side-Notched forms. The Late Side-Notched Series projectile points are not associated with specific complexes, however, research has been conducted to determine their relationships to Historic Period native groups (Meyer 1983).

The terminology for the Prairie and Plains Side-Notched projectile points was introduced in 1964 by MacNeish (1954:40) and adopted by Wetlaufer (1955) and

Wettlaufer and Meyer-Oakes (1960). The most common materials used to construct these points appear to be local materials including Swan River chert, chert and silicified peat and wood as well as more exotic materials such as Knife River Flint.

The predominant subsistence pattern of this period is focused on bison procurement; bison jump sites are a major site type with open-air camps and tipi rings also present (Reeves 1978; Davis and Zeier 1978; Adams 1976).

The Late Side-Notched Series of projectile points appears midway through the Late Prehistoric Period, approximately 1150 years BP, continuing through the Protohistoric Period (Dyck 1983). The Prairie Side-Notched variety generally exhibits the earlier radiocarbon dates. This variety of projectile point is characterized as small, side-notched and irregular in form with notches that are low on the point. According to Kehoe (1966:830) the bifacial flaking of these points are “mediocre”, often portions of one surface is not flaked. In outline the flaking is comparatively irregular with poorly defined angles. Distinguishing features are poor quality flaking and a lack of symmetry (Kehoe 1966:830).

The Plains Side-Notched variety is later occurring, appearing in Saskatchewan approximately 550 years BP (Dyck 1983). Plains Side-Notched projectile points have a well-defined outline consisting of sharp angles at the notches and base. Usually the flaking is well executed and is always bifacial unlike that seen in the Prairie Side-Notched projectile points (Kehoe 1966:832).

Plains Side-Notched projectile points are occasionally recovered in associated with European trade goods. Approximately 300 years ago contact between native

cultures and European explorer and traders resulted in the introduction into native cultures of new materials. Protohistoric Period sites contain evidence of this contact in the form of metal projectile points, glass seed beads and brass fragments.

3.3 Discussion

The paleocultural sequence on the Northern Plains and in particular Saskatchewan is in no way complete. As can be seen from this brief outline, there are many areas that still require clarification. The majority of the established chronologies for the Middle Prehistoric period have been discerned from southern portions of the Northern Plains not necessarily from the Saskatchewan region. Therefore it is imperative for the further development of Saskatchewan archaeology that the cultural sequence is applicable to this region of study. Further research is necessary to adequately ascertain the missing sequences and how the existing sequences are interconnected.

Chapter 4

Chronometric Dating, Site Formation Processes and Stratigraphy

4.1 Excavation Methodology and Recording

The excavations conducted at the Thundercloud site were, for the most part, under the direction of Dr. E. Walker as part of the University of Saskatchewan archaeological field school. The author conducted further excavations with the assistance of Dr. Walker and a field crew of student volunteers. The excavation was conducted using arbitrary levels for the first three occupation levels due to the compressed stratigraphy. Natural levels were used where there was clear separation between levels, noticeably, occupation levels 4 through 7.

The excavations were conducted entirely with the use of hand tools except in areas where there was a clear separation between occupation levels or when the bottom of the unit was reached. This was to minimize the mixing of closely spaced or even superimposed occupation levels. Shovel-shaving was used where possible. Each unit was divided into four quadrants to achieve maximum accuracy for the recording of artifacts. All soil removed from the quadrants, with the exception of the northwest quadrant and the soil from features, was screened separately through a 6 mm screen. The soil from the northwest quadrants and features was bagged separately, labelled and removed to the laboratory for water screening or flotation. Artifacts larger than 3 cm were pedestalled, photographed and mapped on a planview

form. Artifacts smaller than 3 cm were left in place if they were significantly identifiable, otherwise they were collected into quadrant fragment bags. Three-dimensional provenience was taken from the northwest corner of each unit.

The planviewed artifacts were placed into individual bags along with an index card containing all pertinent information. The artifacts were then removed to the laboratory where they were washed, identified, catalogued and boxed according to unit and level. The cultural assemblage will remain in curation at Wanuskewin Heritage Park.

The lithic debitage was divided by material type and then further by flake size and/or the presence and amount of cortex on the dorsal surface. A primary flake was identified as any flake, regardless of size, containing 90% or more cortex on the dorsal surface and any flake over 6 cm in length, with or without cortex. Secondary flakes were identified as any flake greater than 1.5 cm and less than 6 cm in length and tertiary flakes were identified as any flake less than 1.5 cm. Shatter was identified by shape regardless of size.

The faunal material and all fine-screened samples were analyzed separately by Sean Webster and the results presented in a separate report (Webster 1999).

4.2 Chronometric Dating

Chronometric dates were obtained from two separate occupation levels of the Thundercloud site. Dates were obtained by radiocarbon dating and artifact analysis.

A single bone sample was submitted to the Saskatchewan Research Council for radiocarbon dating. The sample chosen for testing was a *Bison bison* distal left

humerus with a total weight of 627.8 grams. The bone was in an excellent state of preservation. The only alteration, besides breakage, was the presence of root etches on the bone's exterior surface. The sample was taken from unit #20S6E at a depth of 48cm below the surface in a paleosol. This bone was recovered in association with McKean complex projectile points. The age of the sample was determined to be 4140 \pm 90 rcy B.P. [S-3645]. The Delta C13 expressed relative to PDB is -18.4 ‰ parts per mil.

During the excavation of occupation level one a single expended cartridge case was recovered. Analysis by the R.C.M.P. Firearms Section of the Forensic Laboratory in Regina identified the shell casing as that of a 56-50 Spencer or 56-52 Spencer cartridge. This particular cartridge could have been used in several rifles, in particular the Spencer M1865 carbine. This effectively dates the occupation of level one as having occurred after 1860, the patent year for this particular rifle. The presence of Mortlach pottery implies that occupation was not much later.

4.3 Post-depositional Site Formation Processes

There are a number of natural processes that impact archaeological sites located in the type of region and environment that the Thundercloud site is located. These processes include cryoturbation and bioturbation. In order to fully comprehend the formation and preservation of the occupation levels at this site it is necessary to have an understanding of the types of environmental conditions that would have been present during and after the occupation of the site.

The three-dimensional patterning of a site is disturbed to some extent prior to and during burial. However, the spatial patterning of a site is not completely protected even when it is buried. A host of naturally occurring postburial processes continues, to different degrees, to impact the site. These processes, physiogenic and biogenic, can continue to affect a site often displacing artifacts from their original context.

Thundercloud is a stratified site comprising at least 4000 years of human activity. Stratified sites with different occupation levels have inherent problems in that it can be difficult to evaluate the amount of movement that is represented by the positions of the artifacts. Rowlett and Robbins (1982:74) use the example of pottery where small sherds are spread through the vertical levels.

“When considering the frequencies of some particular type, how can an archaeologist truly say that some small percentage of pottery in one level, followed by an increasing percentage in the next level up, did not reflect the true change in popularity of that particular type from one level to another?” (Rowlett & Robbins 1982:74)

The amount of upwards migration of artifacts and the processes responsible for this movement must be understood fully in order that the dynamics of culture change can be understood. It is important to realize that the dating of levels based on the presence of one sherd or one flint artifact is risky, as this one artifact may not be in its original depositional position (Rowlett and Robbins 1982:78).

4.3.1 Alluvial Environments

A meandering stream is characterized by two basic discharge patterns: normal streamflow and overbank flooding. Overbank flooding occurs periodically after

excessive rainfall or snowmelt. The stream channel fills beyond its maximum capacity resulting in the lateral spread of excess water over the adjacent low-lying areas. Floodwaters contain suspended sediments that are deposited as the water flow diminishes in velocity (Waters 1992:129).

During a flood episode, the force of the water dredges debris from the channel floor. Depending on the location of the stream, this debris can consist of bedload gravel and sand materials not usually discharged unless the flow is severe. As the velocity of the floodwaters slowly decrease the larger grained materials are deposited first, followed by increasingly finer particles. This results in a well-graded sequence in sediment composition. The point bar will continue to be periodically inundated until such time as the stream is downcut or the hydraulic regime of the area is altered. If the point bar is occupied between flood events, a layer of sediment during the next flood will bury any cultural debris remaining on the surface. If the site is repeatedly occupied and flooded a vertical sequence of horizontally stratified layers results with the occupation layers sealed in fine-grained overbank sediment. This, of course, is dependent upon the velocity of the floodwaters. Floods can result in the scouring of the surrounding area, partially or completely destroying those sites situated on the surface as well as those buried to a shallow depth. Differential erosion can erase part of a site and / or lead to the mixing of artifacts from different spatial and temporal portions of the site. Artifacts swept from a site are sorted according to density, lighter bone fragments are removed from the site, possibly deposited further downstream, while heavier items such as cobble tools and fire-broken rock are reworked into lines at the downstream end of the site (Waters 1992:133-143).

Alluvial environments are ever changing, both depositing and removing material from the surrounding landscape. A floodplain can be altered dramatically in hydrological conditions and physical appearance in a short time period. Changes to the alluvial environment are recorded in the stratigraphic record as sediments separated by unconformities, diastems and paleosols. The above represent periods of erosion, nondeposition and stability, respectively. This suggests that the archaeological record preserved in alluvial environments does not represent a complete record of human activities (Waters 1992:157-159).

4.3.2 Cryoturbation

Cryoturbation is the process by which archaeological remains become disturbed in a matrix that is periodically frozen and thawed. When the ground starts to freeze, the solidification begins at the surface, progressing downwards as the surface temperature drops below freezing. Between the sediment particles are voids and when the temperature drops below freezing the moisture contained within these voids also freezes. Additional moisture is pulled into the sediment by capillary action. This additional moisture reaches the freezing front and is transformed into segregated ice lenses that lie parallel to the ground surface resulting in soil heaving. The amount that the matrix expands can range between 7% and 70% dependent on a number of factors including the amount of ice lenses that form in the matrix and the composition of the matrix. The regions with the greatest depth and rate of freezing are those in which the matrix is composed of fine grained sediments, abundant

moisture is present and long periods of below freezing annual temperatures are the norm (Waters 1992:293-294).

During periods of freezing, objects can be physically rotated and pushed slightly upwards. Frost heave and frost pull processes are responsible for this movement. When freezing does not extend deeply enough to cover the entire artifact, frost pull occurs. The base of the artifact is situated in an unfrozen matrix. When the frozen matrix engulfing the top of the artifact expands the artifact is pulled upwards. If the matrix surrounding the entire artifact is frozen, ice lenses form directly under the artifact forcing the artifact upwards when the ground heaves. The upward movement of the artifact is slight, however, a void below the artifact is created. When the matrix thaws the artifacts remain displaced since the void becomes distorted when soil particles settle back, in part filling the void before the artifact can settle into its former position. This small, upward movement is cumulative, eventually the artifacts can be exposed (Waters 1992:295).

The effects of cryoturbation on archaeological sites can be dramatic according to Waters (1992), resulting in four major changes: the destruction of spatial relationships between artifacts, the homogenization of sediment layers, mixing of temporally separated artifacts, and damage or destruction of archaeological remains. The movement of artifacts in a single site can be differential, in part determined by depth of burial, size, orientation and composition of the artifacts. Artifacts that have long vertical dimensions and large surface areas tend to move upwards faster than smaller objects (Waters 1992:295).

The orientation of an artifact also affects the rate of upward movement. An object with its long axis perpendicular to the surface will travel upwards faster than an object that has the long axis parallel to the surface. The reasoning behind this is that the artifact with the parallel orientation must first be rotated vertically before it can be heaved upward. These artifacts in the process of upward movement are noticeable in an archaeological site by their degree of slant off parallel. Experiments have been conducted to determine the rate of rotation and how the position of an artifact determines upward movement (Waters 1992:297).

The depth at which the artifacts are buried in relation to the depth which the freeze/thaw cycle reaches, influences the amount of frost heave experienced by the artifacts. Those sites that are located closest to the surface tend to be subjected to more frost heave than those sites that are deeply buried. Since the depth which freezing extends varies each year, those layers located closest to the surface are likely to experience freezing on a more constant basis than more deeply buried sites which may only freeze during extreme freezes (Waters 1992:298).

Repeated freezing and thawing can contort stratigraphic layers and pedogenic horizons. This can result in the merging of stratigraphic layers so that the vertical distinctions between occupation levels can no longer be determined. Therefore, it becomes difficult to distinguish which artifacts belong to which occupation level (Waters 1992:298).

4.3.3 Bioturbation

This is the process by which an archaeological site is disturbed by the activities of animals that burrow into the ground. A distinction is made between

those animals that forage on the surface as opposed to those that forage below the surface. The results of various studies has indicated that different species of animals have different characteristic behaviour patterns which are related to the size of the animal and the amount of time spent below the surface. Those animals that forage underground can create the greatest amount of damage in that the constant churning of the soil in search of food disrupts the vertical and horizontal integrity of the soil stratigraphy and therefore, the archaeological remains. Schiffer (1987:207) states that severely disturbed sites can show evidence of burrows to a depth of 40 cm or more. Also, once abandoned, the burrows can collapse, causing artifacts at higher levels to drop to lower levels.

Surface foragers can still create a great deal of damage in a site, however, the extent of damage is usually limited to the actual burrow and / or tunnels. Since the amount of tunneling is reduced, the soil is not actively churned. A distinctive feature, seen as a result of surface foragers, are the infilled burrows called *Krotovina* which are distinguished by the lighter color of the depositional sediment which fills them. The activities of non-burrowing animals can also affect an archaeological site, especially surface artifact distribution. Research done in New Mexico on artificial lithic sites indicated that pack rats, ants and other animals significantly dispersed lithic debitage (Schiffer 1987:208-210).

4.3.4 Rodents

The effects of burrowing animals upon archaeological sites vary between species, sites and regions. However, in general, the result of their activity will be the

homogenization of cultural deposits, exhibited in the blurring of discrete features, activity areas and strata. The result of this disturbance will be a reduction in the degree of clarity with which archaeological reconstruction's can be proposed, especially in comparison with other sites (Erlandson 1984:789).

The findings of the experiments conducted in California on the activities of the pocket gopher (*Thomomys bottae*) on archaeological sites can be transposed into the Wanuskewin Heritage Park region since the Northern pocket gopher (*Thomomys talpoides*) is present in this area. Richardson's ground squirrel (*Spermophilus richardsonii*) is also present in large numbers. When climatic and environmental conditions are favorable, the highest densities of fossorial rodents are located in grassland environments. Therefore, the destructive potential of rodents upon archaeological sites is suggested to be greatest in grassland regions or areas covered by grasses as opposed to woodland regions (Bocek 1986:589).

The depth of the tunnels are determined by soil texture, horizon thickness, water table height, the depth of penetrating roots – a valuable food source, and most importantly, the species of animal. The pocket gopher tends to have tunnels located between 15 and 30 cm to a maximum of 200 cm below the surface. Ground squirrels spend much of their time above ground foraging, therefore their tunnels tend to be short, ranging from 1.5 to 10 metres in length, while the pocket gopher can have tunnels covering much larger areas, from 20 to 200 square metres (Bocek 1986:590).

Burrowing animals displace a tremendous amount of soil with estimates placed in metric tons. Research has indicated that rodent activity extends the depth of the soil mantle. The result is the downward displacement of archaeological remains,

especially those remains larger than 5 cm. The rodents avoid these larger objects with the tunnels being burrowed under them. Over time these objects are undermined and settle downwards where they can take on the appearance of “cobble beds”. Smaller objects are hauled to the surface and ejected into the backdirt mounds surrounding the burrow opening (Bocek 1986:590-591). These backdirt mounds are a useful surveying tool in that the archaeologist can obtain evidence of a subsurface archaeological site merely by screening the dirt in rodent mounds.

Rodent zones, situated between 0 to 30 cm below the surface, are constantly being reworked. If humans occupy an area and occupational debris is deposited in sufficient amounts, the site depth, relative to the bedrock, increases. This results in an upward rise of the rodent zone. When deposition at the site ceases, the rodent zone stabilizes again between 0 and 30 cm below the new surface. Bocek (1986:592) proposes that multicomponent sites with well-separated occupation layers should have soil profiles indicating evidence of multiple rodent zones. These separate zones indicate periods in which deposition did not occur. However, the absence of multiple zones does not necessarily indicate a single-component occupation. A series of thin cultural layers may have been deposited but not enough to significantly affect the site depth or the rodent zone.

4.3.5 Earthworms

Many types of bioturbation are easily and commonly observed in archaeological excavations such as ground squirrel burrows. However, the burrows

of some animals are so small that they are not readily detected: ants, earthworms, spiders and crickets are a few of these species.

Of the above species, the earthworm is especially destructive. It has been recognized that the activities of earthworms can have a profound effect on archaeological remains. Earthworm burrows are often undetected since they are frequently filled with excreta not material from another soil horizon. There are two major varieties of earthworms, those that deposit casts at the surface and those who deposit casts in soil crevices. Their extensive burrow networks are more or less vertical with branches occurring near the surface. During unfavorable surface conditions an earthworm can burrow down six metres (Stein 1983:277).

Archaeological sites most vulnerable to earthworm disturbance are those areas with a moderate amount of moisture, an adequate depth of sediment and the presence of preferred vegetation, including dogwood. Favorable areas located nearby rivers are levees, dry portions of the floodplains and colluvial fans (Stein 1983:286).

A consequence of earthworm activity is the blurring of natural or cultural boundaries. It is frequently noticed that the boundaries of a pit feature are blurred near the surface becoming increasingly defined the further down the excavation goes (Wood and Johnson 1978:327). Earthworm activity will effectively blur the boundaries between cultural and non-cultural deposits, especially such features as burial pits and hearths. This is due to the high organic content in these features that serve as an excellent food source (Stein 1983:280-281).

Earthworm activity can obliterate stratification by mixing sediments. Archaeologists tend to differentiate site profiles based on soil color and texture.

However, earthworms (especially the substrate casting species) can mix adjacent strata, blending color and texture into homogenized versions that is difficult to distinguish (Stein 1983:280).

The floral assemblage at a site can also be altered by earthworm activity in that small, carbonized plant seeds can be digested and decomposed. This is important in that the utilization of plant species by pre-contact people is usually identified by the presence or absence of plant seeds. To counteract earthworm activity in this regard, large amounts of soil must be processed to insure the recovery of these floral remains (Stein 1983:286).

4.3.6 Ants

Ant activity in archaeological sites can have a large impact. Small artifacts, burned earth, and charcoal are often found in surface anthills removed by the ants from their tunnels. In fact, searching through anthills can be an excellent way to determine the presence of a subsurface site during surface reconnaissance. Ants carry material to the surface from a depth of at least two meters. This results in the mixing and homogenizing of the soil. It also provides channels for surface water and air to move downwards. This affects the soil in other ways, such as aiding cryoturbation. Areas with a large ant infestation may contain a number of ant mounds. These mounds are used for several years at which time new mounds are created. This can result in a great deal of soil disturbance over time (Wood and Johnson 1978:321).

The activities of ants are important factors affecting the integrity of an archaeological site. Ants are often found in conjunction with earthworms, using the

upper portions of earthworm tunnels as entrances to ant nests. The ants enlarge the tunnels to better accommodate their nests. While the size of the surface mounds created by the ants vary by species, the amount of soil displaced is considerable no matter which species is involved. The study involving the behaviour of ants in the prairie region of Wisconsin has been utilized to estimate the amount of damage that could be expected to occur on the Canadian Plains. It was discovered that the vertical channels could extend down 165 cm from the surface. The position and fluctuations of the water table limits the frequency and depth of the ant's vertical tunnels, with poorly drained soils resulting in widely spread but shallow nests (Baxter and Hole 1967:425-428).

4.3.7 Treadage or Compaction

The influence of human activity upon an archaeological site prior to burial is a topic not frequently discussed or recognized. However, as the issue of site formation processes receives more interest the discussion of the impact of trampling upon an archaeological site becomes a valid concern. The vertical displacement of artifacts is suggested to be a result of human foot traffic as well as environmental displacement. Gifford-Gonzales *et al* (1985:803) state that conjoinable pieces of stone, bone or pottery have been recovered from sedimentologically distinct strata that can be separated by vertical distances of up to one metre. In cases where there is no physical indications of disturbance other explanations for this displacement are required. This is where the suggestion of trampling comes into consideration.

“Treadage of debris into the substrate by the creators of a site during the time they live at the locale is another source of vertical dispersal that is neither post-depositional nor post-abandonment.” (Gifford-Gonzales *et al* 1985:804).

Treadage by humans can result in the downward migration of debris especially objects lying on a loose substrate. Gifford-Gonzales *et al* (1985:804) discusses the experimental work done at Shaw's Creek in 1973. This was the first research to be conducted on the effects of trampling on archaeological sites. It was discovered that in a loose substrate objects could migrate down as much as 16 cm. It was therefore argued that trampling might also be responsible for the size dependent sorting of the remains observed in the upper portions of the excavations.

To test this hypothesis, Gifford-Gonzales *et al* (1985:804-816) set up two "sites", one on a loam substrate the other on medium-fine sand. The same number, type and size of "artifacts" were deposited over a more or less flat two by two metre area that had been staked and strung with string. Then two people wearing rubber sandals or soft-soled moccasins walked over the areas in a normal manner for several hours. At the end of this time period the "sites" were photographed, mapped and excavated to determine how and where the artifacts had been displaced. It was discovered that in the sandy soil the artifacts were buried to a depth between 3 and 8 cm below the surface. In the loamy soil the artifacts were not buried as deeply in that only a few objects penetrated below 2 cm. However, it was discovered that the act of walking on the surface increased the amount and depth of the loose layer of soil that lay on top of the more compact substrate. This, in effect, worked as a trap keeping small to medium sized flakes and bones from being dislodged. This would aid in the preservation of these smaller objects until a deeper sediment covering could form unless dramatic erosion removed the overburden thereby displacing the objects. In

addition to the vertical displacement the objects were also redistributed in a horizontal manner across the unit. The greatest concentration of objects still remained in the center of the unit where they had originally been deposited. This knowledge is useful in determining where an activity center actually was located.

While trampling or treadage caused both horizontal and vertical displacement it has been suggested that the actions of both people and animals are responsible or capable of creating this type of damage. This is not to state that all apparent movements in an archaeological site are a result of this process, other post-depositional processes are also at work. The above experiment has shown that variations in substrate composition and the amount of human activity can produce different artifact concentrations (Gifford-Gonzales *et al* 1985:817).

4.4 Natural and Cultural Stratigraphy of the Thundercloud Site

The Thundercloud site consists of an alluvial terrace which is situated 3.3 m to 3.55 m above the datum, and a colluvial slope with terrace remnants 6.46 m and 10.95 m above the datum (Burt 1997). The datum (0 m) is identified by Burt (1997) as located on the alluvial terrace which contains the Newo Asiniak site. This terrace is situated in the central portion of the Opimihaw Valley. According to the research conducted by Burt (1997) the stratigraphic profile at the Thundercloud site indicates a predominantly fluvial depositional history.

Burt (1997) in her thesis identifies the sediment present as different facies based upon the mean grain size and sorting of the particles as well as the average textural composition and the organic and inorganic carbon contents that comprise the matrix. Facies 1 has been subdivided into two subfacies based upon the organic

content and the texture of the sediment. Facies 1 has an absence of gravel and subfacies 1A is the finer-grained. Both subfacies are composed of muddy sand and sandy silt. Facies 2 is also divided into two subfacies. This division is also primarily based on the amount of organic content. This facies contains less than 5 percent gravel and the sediments are composed of slightly gravelly sandy mud or muddy sand. Facies 3 contains coarser sediments than those found in facies 2. Gravelly mud and gravelly muddy sand comprise the sediments in facies 3. The sediments defined as facies 4 are composed sand, muddy sand, slightly gravelly sand and slightly gravelly muddy sand. Organic content is low. Facies 5 is sandy, matrix-supported gravel sediment associated with stream channels.

The base of the alluvial terrace (90 cm and below) is sandy matrix-supported coarse gravel (facies 5)(Plate 4.1). No cultural materials were located in this level. The profile fines upward into sediments identified as a slightly gravelly sandy mud and slightly gravelly muddy sand. The level that has been termed occupation level 7, where present, is located at approximately 75 cm below the surface in a thin layer of facies 3. This level is intermittent, implying erosion of materials. These sediments were degraded when the river on its journey towards its present location covered the terrace. Few cultural materials have been recovered from this level. This is to be expected since facies 3, 4 and 5 are generally associated with stream bed deposits. Therefore, it is likely that the few cultural materials recovered from this level are the result of the deposition of transported materials.

The soil horizon situated between approximately 50 cm and 75 cm below the surface has been described by Burt (1997) as facies 2B. In the western units this sediment layer shows a gradual replacement of facies 2B by facies 4 within the same sediment layer. Since facies 4 consists of sand and muddy sand Burt suggests that this portion of the site was situated very close to the stream channel during this time period. The deposition of these sandy sediments represents fluvial activities where sediments were deposited onto the point bar in the form of channel sands. This sandy level continues upward to approximately 50 cm below the surface where a soil colour change occurs, signifying an increase in the presence of organic carbon.

Between approximately 37 and 50 cm below the surface is a layer of sediments identified as facies 2A. The majority of occupation levels 5 and 6 are located within this new stratigraphic level (Burt 1997). Occupation level 5 contains an increased organic carbon content, which decreases above this level. The level consists of a thick layer of muddy sand suggesting the presence of heavy flood conditions, either a single flood or multiple flood episodes. A thin inclusion of facies 1A was present at the bottom of this layer in the western units of the excavation. This layer corresponds with the occurrence of occupation level 6B that has been identified based on projectile point morphology as Oxbow. A thin layer of facies 1A is present near the surface of this soil horizon in the western portions of the site. This level contains portions of occupation level 5. Facies 1A contains less sand and the depositional history indicates the activities of overbank flows.

Separating occupation levels 4 and 5 is a thin layer of facies 1B. These fine-grained sediments include muddy sands and sandy silts (Burt 1997) and are finer than

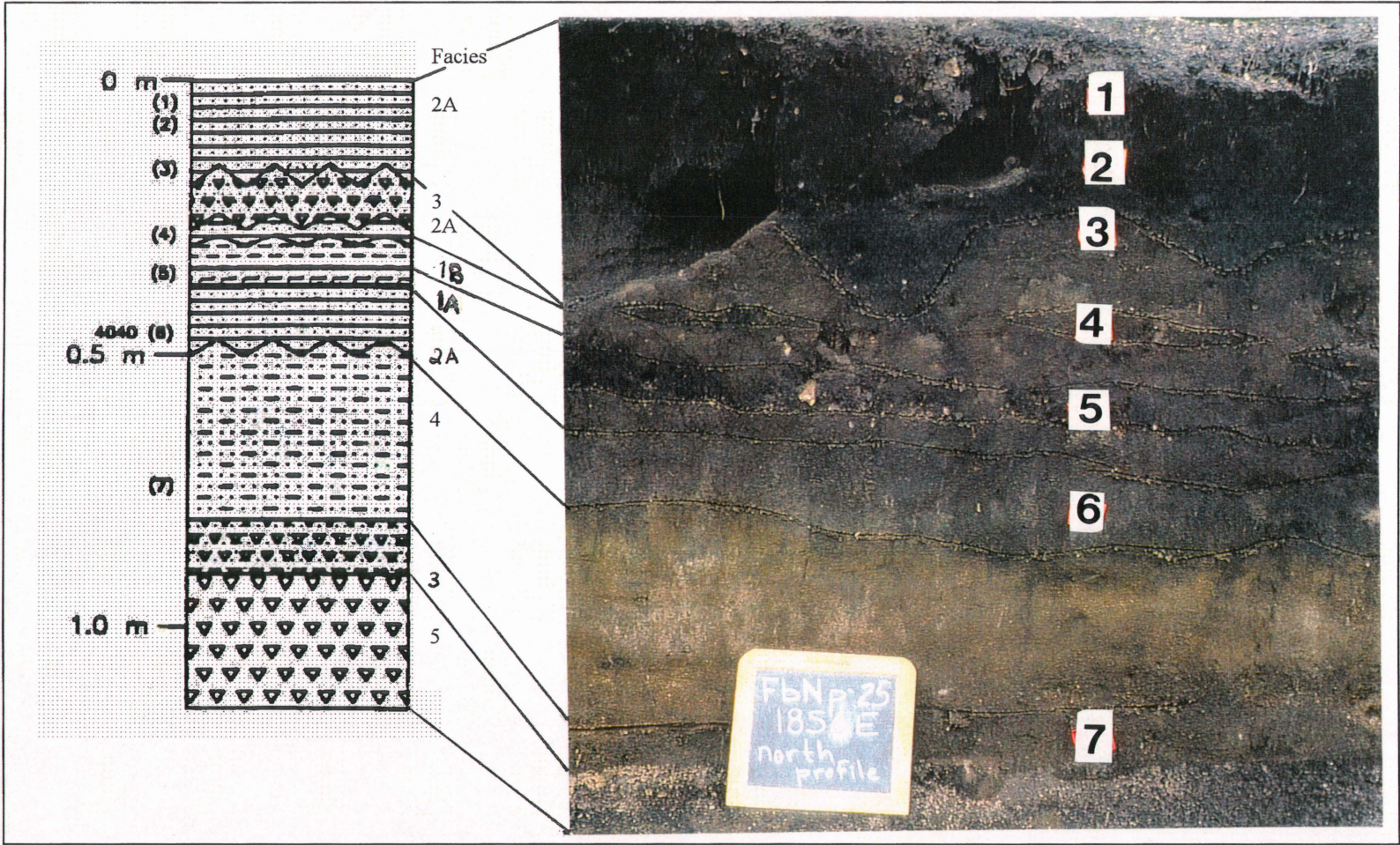


Plate 4.1 Natural and Cultural Stratigraphy at the Thundercloud site
(Natural Stratigraphy from Burt 1997:130)

the facies above. Depositional history for this layer and the layer immediately below it (facies 1A) suggests two possibilities: either during this time period the water levels were lower resulting in less common and less severe flooding or that marginal flood waters covered the site because the creek was farther from the terrace (Webster 1999).

Occupation level 4, located between 27 and 33 cm below the surface, is identified as a discontinuous, undulating level, noticeable by a change in colour due to organic content and identified as facies 2A (Burt 1997). The intermittent nature of this occupation level implies the removal of matrix and cultural material sometime after deposition.

Between the discontinuous organic-rich level 4 and occupation level 3 is a matrix that is composed of sediments containing gravelly mud and gravelly muddy sand. This level is significantly coarser in grain size, containing numerous small pebbles and is identified as facies 3 (Burt 1997). Little or no cultural materials are found within this deposit. The deposition of this coarser material is possibly the result of slope wash from the eastern slope. The presence of large boulders on the site's eastern border suggest that in the past severe slumping had occurred.

The upper three occupation levels are contained within a single organic-rich stratigraphic level. The matrix description for this level is a slightly gravelly, sandy mud and slightly gravelly muddy sand and is referred to as facies 2A. Occupation level 3 is present at the bottom of this stratigraphic level (between 15 and 25 cm below the surface), occupation level 2 at 10 to 15 cm and occupation level 1 between 2.5 and 10 cm (Burt 1997). The sod level ranges between 0 to 5 cm below the

surface. A thin layer of charcoal and stained earth is located directly below the sod but above the first occupation level. This thin layer has been interpreted as the remains of a prairie fire.

Burt (1997) has interpreted the depositional history of the Thundercloud site. The gravel base of the point bar is suggested to be a channel lag. The gravel units would have been deposited within the stream channel and would have been deposited prior to 4000 years ago, based upon the radiocarbon date obtained from occupation level 6 (4140±90rycbp [S-3645]). When the channel migrated away from the site pointbar sediments covered the channel lag. As the stream continued to migrate away from the site, sediments were deposited in a fining-upward sequence due to overbank sedimentation. This fining-upward sequence continued up to and including the deposits containing occupation level 5. The deposition of coarser sediments after occupation level 5 has implied two activities; either the stream was migrating back toward the site or the stream was transporting a higher sediment load because of higher discharges. The discontinuous nature of occupation level 4 implies erosion of the site probably because of a large flood episode. The deposition of the coarser material between occupation level 4 and occupation level 3 is a reflection of slope wash from the eastern slope. The continuous nature of the deposits above these coarser sediments indicates that periodic subaerial exposure of the site occurred resulting in repeated organic accumulation and human occupation of the site. The stratigraphic position of the organic layers varies depending upon the location in the site (Figure 4.1). The greater the distance from the stream the more compact and

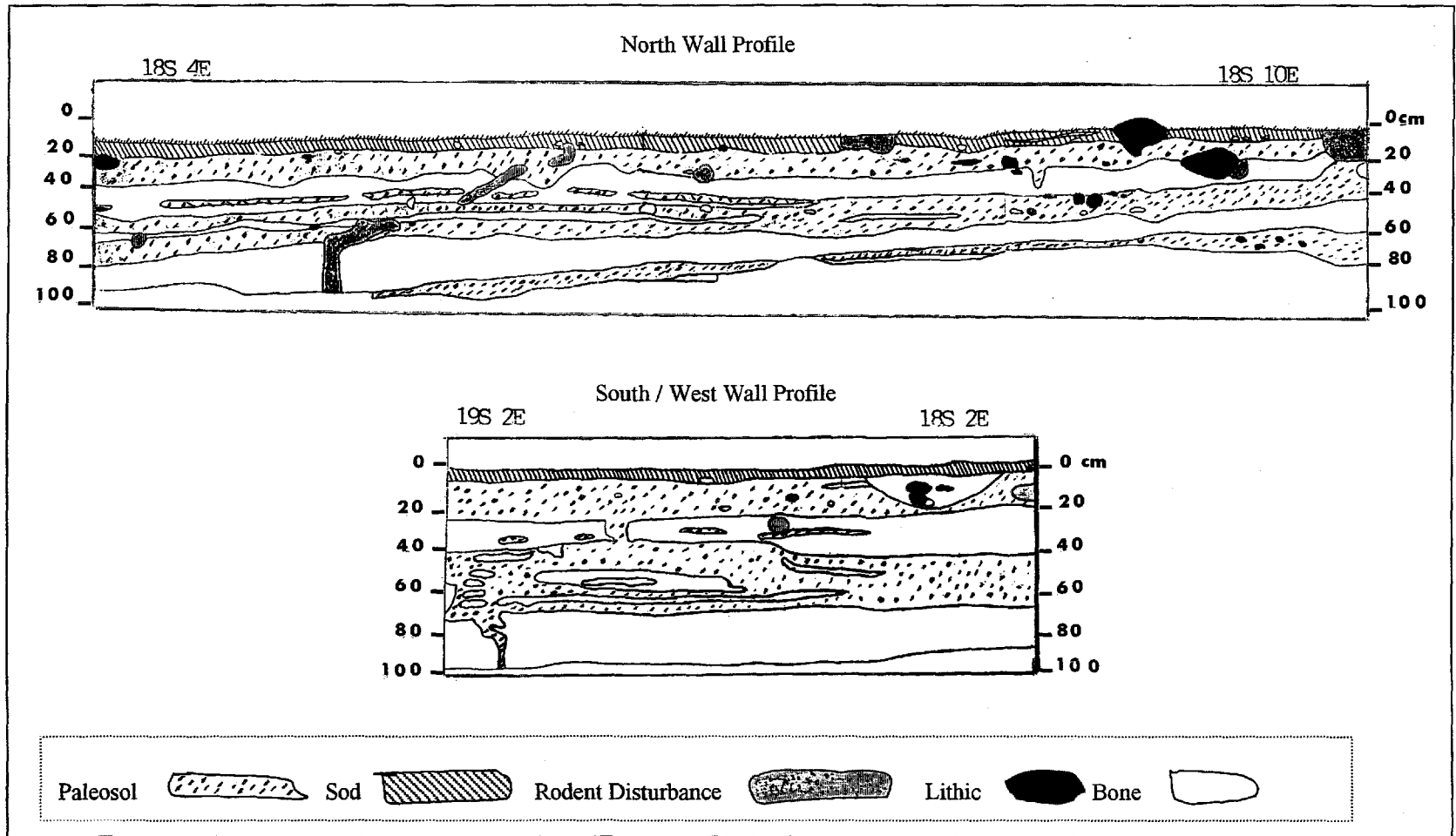


Figure 4.1 Stratigraphic Profiles of Soil Horizons at the Thundercloud Site

compressed the stratigraphy becomes. This is especially noted with the deeper stratigraphic levels. These levels have a distinct west to east slope that corresponds to the slope of the terrace. This slope is better expressed the deeper the level and the closer the distance to the stream.

Some of the cultural horizons split into separate levels the closer the distance to the stream. This is shown dramatically with levels 5 and 6. In the eastern portion of the site these two soil horizons are directly superimposed upon each other without any separating matrix. It is only possible to distinguish where the individual occupation levels are located based upon artifact position. As the profile extends towards the west a separation is first noted between these two levels by the presence of a brown sandy soil devoid of artifacts. As the soil horizons further extend westward the profile indicates a further breakdown in each of these levels (Figure 4.1). Level 5 is broken down into three separate occupation levels designated 5A, 5B and 5C while level 6 is divided into levels 6A and 6B. However, this further division is only noted in the furthest west excavated units. The more complex stratigraphy noted in the western units implies that if the excavation had continued towards the stream it would have been possible to better separate and analyze the McKean Complex cultural materials into their appropriate occupations.

It is also noted from the profile (Figure 4.1) that the appearance of occupation level 4 changes depending upon its location within the site. In the eastern portion of the site it is either non-existent or it is amalgamated with the top of the soil horizon containing occupation level 5. The presence of level 4 in this location of the site is determined by artifact location. As the profile continues westward level 4 is

distinguished by intermittent organic soil lenses that become increasingly more pronounced. The appearance of level 4 in the profile suggests the presence of an unknown number of flood episodes occurring sometime after the deposition of level 5 to sometime after the deposition of level 4. Since level 4 is located directly on top of level 5 in the eastern units and is separated from level 5 in the western units by sterile matrix it is evident that some flood action occurred to remove sediment and to deposit additional sediment to account for this positioning. The discontinuous nature of level 4 indicates the presence of fluvial action after the deposition of this occupation level.

Evident from the profiles is the amount of bioturbation that would have affected the integrity of the stratigraphic levels. Numerous old filled rodent burrows or *Krotovina* are present throughout the excavations. These burrows can be mapped to show that they extend from the surface of the sod to below the depth of the excavation's floor. The burrows also extend horizontally through a number of excavation units. Therefore the possibility exists that the activities of these rodents, both past and current, would have displaced artifacts from their original locations.

Also present in the profiles is the appearance of root casts which are the remains of the root systems of trees and bushes. These roots cut through the stratigraphic levels pushing the original soil and any artifacts contained within the soil either to the side or the roots compressed the soil displacing it downwards. There is no evidence in the profiles of the occurrence of tree fall activity affecting the site.

4.5 Discussion

The stratigraphy at the Thundercloud site is complicated, in part because of the geological processes naturally occurring at the site as well as a result of faunal and floral disturbances. The previously discussed natural processes have all affected the Thundercloud site in one form or another in the past. The fluvial actions no longer impact the site itself because the streambed has been down-cut to a depth where extensive flooding is no longer possible. However, the remaining natural processes continue to impact the site. Cryoturbation continues to occur as a result of the continental climate of the Saskatoon region. The continuing impact of bioturbation was obvious during excavation by the presence of a number of rodents, particularly ground squirrels, earthworms and ants at the site. Small shrubs grow in abundance across the flat portion of the site and down towards the creek. Trees and larger bushes rim the creek. The roots from these plants currently extend into the upper soil horizons resulting in the disturbance of soil and artifacts. These roots impact the organic artifacts present, growing into the bone fragments, furthering their fragmentation. Therefore, before making any statements regarding the activities occurring at an archaeological site it is necessary to take into consideration the possibility that any or all of these post-depositional processes could have affected the integrity of the site.

Chapter 5

Occupation Level 1

5.1 Introduction

The most recent occupation level present at Thundercloud is a level situated immediately below the sod layer. This occupation layer is situated within a large organic-rich stratigraphic level composed of slightly gravelly, sandy material.

This occupation level is considered to represent a Proto-historic occupation based upon the artifacts recovered. Included within the objects identified are; metal projectile points, glass trade beads, and a brass shell casing, in association with Mortlach pottery sherds and flaked stone projectile points. These artifacts imply cultural mixing or contact between Europeans and native peoples, thereby indicating a recent occupation. The pottery was recovered from a depth between 5 and 13 cm below the surface. Since some of the sherds from different depths could be conjoined and the pottery was all of the same morphological style, it has been analyzed as a whole within occupation level 1 since the majority of sherds were from this level.

5.2 Flaked Stone Tools

A total of 56 stone tools were recovered from the first occupation level. Table 5.1 lists the various categories of stone tools and their frequency within the total assemblage. Except for the anvil and hammerstones, the items listed in Table 5.1 can

be classified as chipped stone tools because of the presence of varying degrees of retouch. Cores are not included within this list. There was no evidence of ground stone tools.

Table 5.1 Frequency Distribution of Stone Tools Types of Occupation Level 1

Tool Type	Frequency	Percent
Projectile points	28	50.0
Spokeshaves	1	1.8
Perforators	2	3.6
Bifaces	3	5.4
Biface fragments	7	12.5
Endscrapers	6	10.7
Uniface fragments	2	3.6
Choppers	1	1.8
Anvils	2	3.6
Hammerstones	4	7.0
Total	56	100.0

5.2.1 Projectile points (N=28; Table 5.2; Plates 5.1,5.2,5.3)

A total of 28 complete or fragmented projectile points were recovered from the excavation of occupation level 1. The projectile points that can be identified as to morphological type belong to three types; Plains Triangular, Plains side-notched and Prairie side-notched projectile points. All projectile points, regardless of type, were recovered between 3 and 11 cm below the surface.

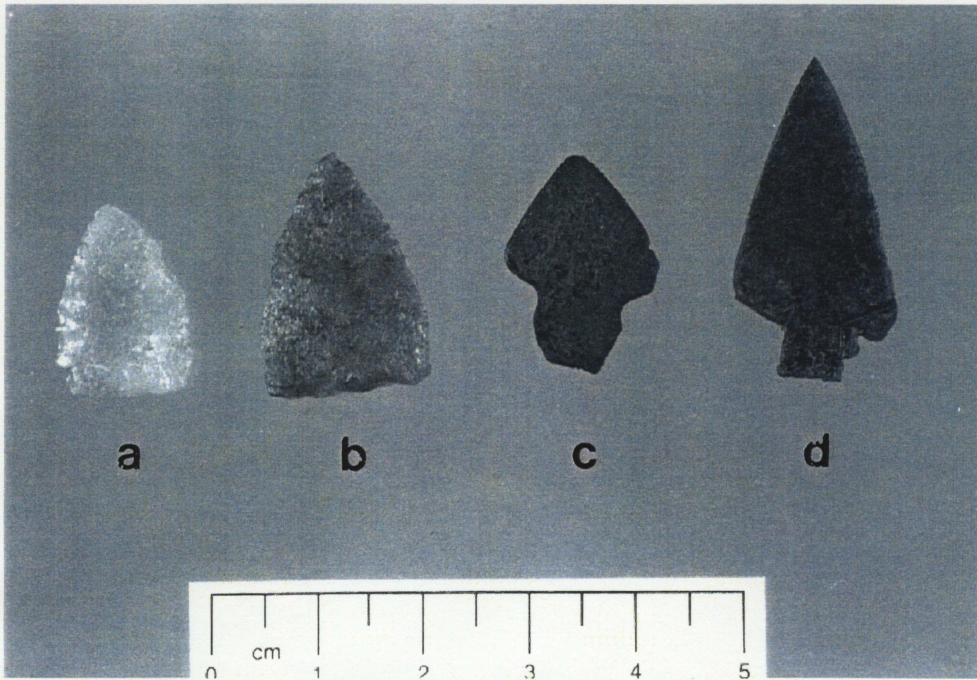
Two complete Plains Triangular projectile points were recovered, one fabricated of Swan River chert and the other of quartzite (Plate 5.1). The Swan River chert point was recovered from unit #20S7E at a depth of 5 cm below the surface (Plate 5.1, item a). The quartzite point was recovered from unit #20S6E at a depth of 9 cm (Plate 5.1, item b).

Table 5.2 Projectile Point Metric Attributes (mm) Occupation Level 1

Specimen Type	Maximum Length	Blade Width	Thickness	Basal Width	Left Notch Width	Right Notch Width
Plains Tri	17.9	11.9	2.7	11.2	-	-
Plains Tri	22.2	13.0	3.4	15.4	-	-
Plains S.N.	15.2	11.9	3.2	13.3	3.1	3.6
Plains S.N.	14.0	10.3	3.3	10.3	2.7	3.0
Plains S.N.	13.5	10.1	2.9	9.9	3.1	3.4
Plains S.N.	-	10.9	2.6	12.4	3.5	3.1
Plains S.N.	-	15.1	3.6	15.0	2.8	2.2
Plains S.N.	-	13.0	2.8	16.5	1.6	-
Plains S.N.	-	-	2.6	14.1	2.2	-
Prairie S.N.	25.7	13.5	4.6	13.1	5.9	6.0
Prairie S.N.	13.5	8.9	3.6	9.4	3.3	3.1
Prairie S.N.	19.3	10.2	2.1	10.1	4.1	3.5
Prairie S.N.	20.7	14.4	3.9	14.0	5.3	4.4
Prairie S.N.	26.1	16.1	3.1	12.9	4.0	3.4
Prairie S.N.	16.3	12.7	3.5	12.1	2.7	2.3
Prairie S.N.	-	13.7	1.9	-	3.9	-
Prairie S.N.	-	9.9	2.8	12.0	3.7	3.2
Prairie S.N.	-	10.7	3.4	-	2.9	-

Seven Plains side-notched projectile points were identified in occupation level 1 (Plate 5.2). Five of the points were fabricated using Swan River chert, one of basalt and one of silicified peat. Three of the points were complete while the others were missing portions of their bases, and / or more commonly the points were broken transversely, and minus the tip portion.

A total of nine Prairie side-notched projectile points were identified (Plate 5.3). Of these nine points, five points were complete. The sixth point was broken transversely near the tip although the tip was recovered. Six of the points were constructed of Swan River chert and one point each was constructed of chert, silicified peat and dolomite. The point made of dolomite was extremely thin with a thickness of only 1.9mm (Plate 5.3, item b). This very thin point was broken



**Plate 5.1 Plains Triangular and Metal Projectile Points
Occupation Level 1**

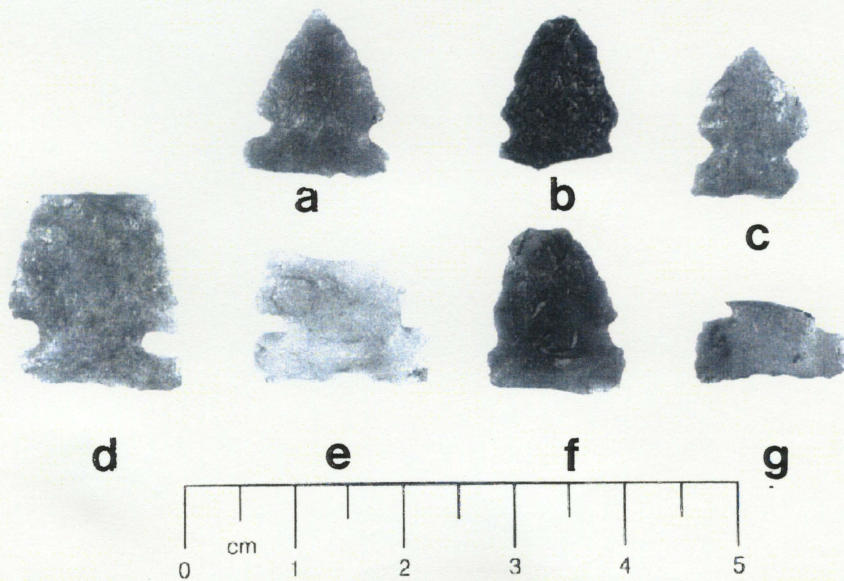


Plate 5.2 Plains Side-Notched Projectile Points Occupation Level 1

transversely and a small portion of the base was also missing. Some of the points were very crudely constructed; one complete point was flaked only on the dorsal surface.

Ten additional portions of projectile points were also recovered however their fragmented nature made cultural identification impossible. All but one of these non-diagnostic fragments was of Swan River chert; the remaining tip was quartzite.

5.2.2 Metal Projectile Points

Two metal projectile points were recovered from the excavation of occupation level 1 (Plate 5.1). Both projectile points were cut from thin rolled copper; the scoring marks still evident on the faces of the points. The metal projectile points are stemmed.

The first projectile point (Plate 5.1, item c) was recovered from unit #18S7E at a depth of 5 cm. The second metal projectile point was recovered from unit #21S5E at a depth of 10 cm (Plate 5.1, item d). This point was incomplete in manufacture since the stem on one side was not completely formed. The scoring marks are present indicating where the metal was to have been removed to create a true stemmed point.

5.2.3 Spokeshaves (N=1, Plate 5.4)

The single spokeshave (Plate 5.4, item c) was recovered from the surface of an unexcavated unit. This item is a large flake of Swan River chert that has been bifacially flaked around the edges. The distal end is concave with flaking along the edge and the proximal end is also flaked along the pointed tip. This implies that this

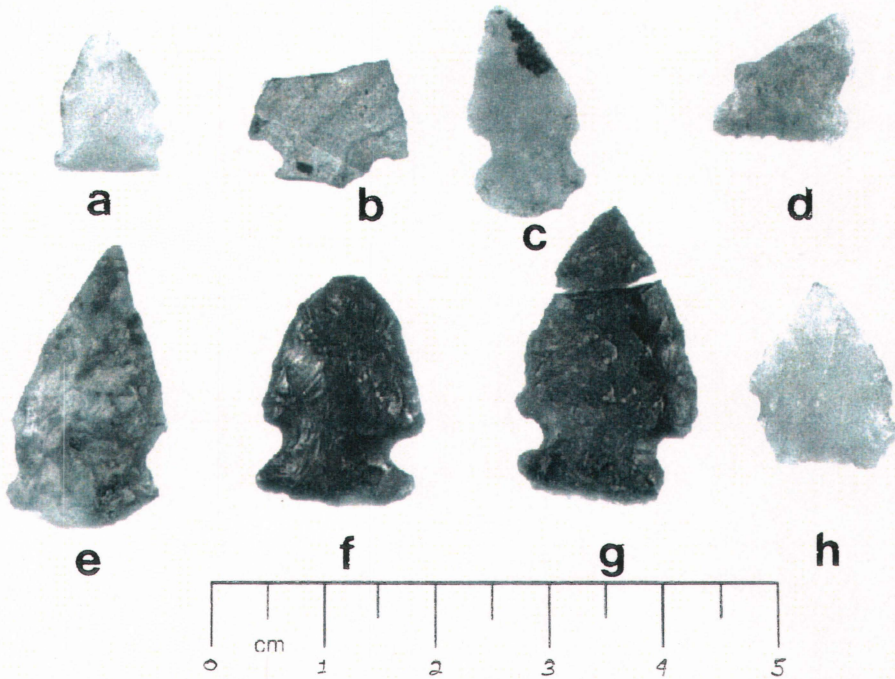


Plate 5.3 Prairie Side-Notched Projectile Points Occupation Level 1

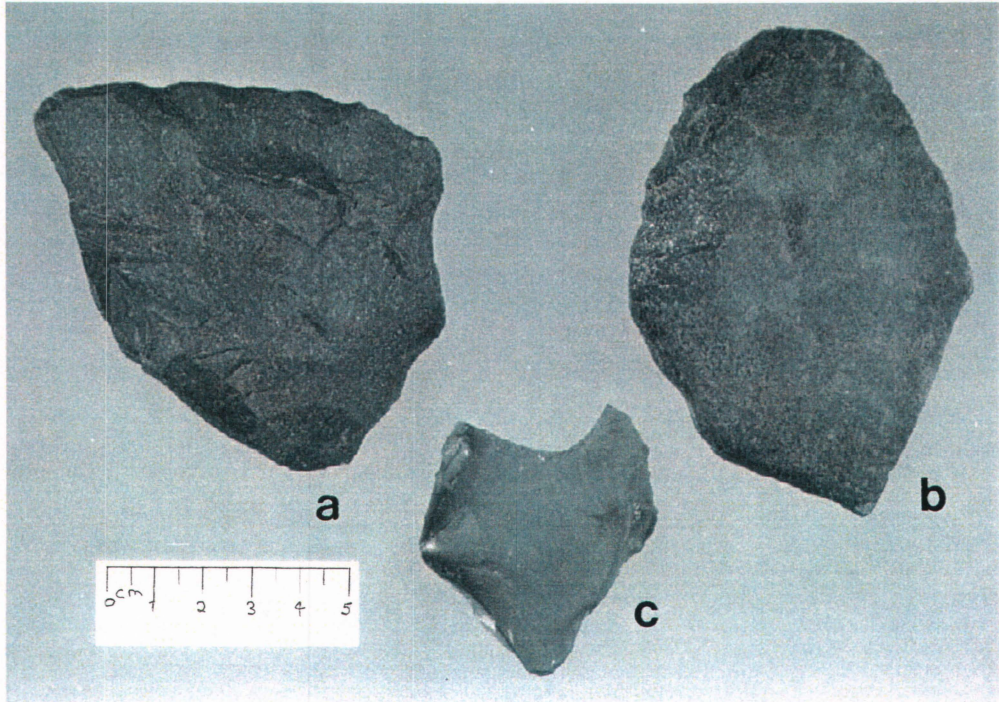


Plate 5.4 Bifacial Tools Occupation Level 1

tool served double use as a spokeshave and as a graver. The material is very fine grained.

5.2.4 Perforators (N=2)

The two perforators are complete, one constructed of Swan River chert and the other of burned silicified peat. Both perforators are bifacially flaked asymmetrical tools.

Table 5.3 Biface Metric Attributes (mm) Occupation Level 1

Specimen No.	Length	Width	Thickness
1	96.3	74.5	25.4
2	101.7	69.4	17.5
3	131.3	61.2	16.8
4	47.2	48.9	15.4
5	33.1	22.5	6.4
6	31.6	16.4	7.3
7	-	19.8	3.6
8	-	12.9	3.4
9	-	12.9	2.7
10	-	20.9	5.3
11	-	16.9	5.3
12	-	-	4.9
13	-	-	7.8

5.2.5 Bifaces (N=3, Plate 5.4)

The bifaces were constructed of metamorphosed greywacke / greenstone, quartzite and schist. The quartzite biface is made from a large primary flake; the dorsal surface contains cortex (Plate 5.4, item b). Bifacial flaking is present on the left lateral side and the proximal end. The right lateral edge is backed. The greywacke biface is triangular in shape, the two shorter edges are the bifacially flaked

working edges (Plate 5.4, item a). The longer edge is the proximal edge. This is a thickened non-flaked edge with grinding to provide backing. The schist biface is a crude expediency tool.

5.2.6 Unifacial Tools (N=8; Plate 5.5, Table 5.4)

A total of eight uniface were identified; six end scrapers and two uniface too fragmented to be identified as to tool type. The unidentified fragments were both fabricated of Swan River chert.

Only one of the end scrapers were complete, the others were broken transversely, laterally or both with only the distal working edge remaining. One of the fragments was constructed of silicified peat and the others of Swan River chert of varying qualities. The end scrapers were plano-convex in shape and the distal working edge was bevelled. The complete item was roughly triangular in shape.

No generalizations could be made concerning the other items.

Table 5.4 Uniface Metric Attributes (mm) Occupation Level 1

Specimen No.	Length	Width	Thickness
1	-	-	6.5
2	28.1	24.9	8.8
3	20.2	-	4.8
4	30.5	-	7.8
5	-	-	6.9
6	-	-	4.1
7	-	-	4.7
8	-	-	6.3
9	104.4	81.9	34.5

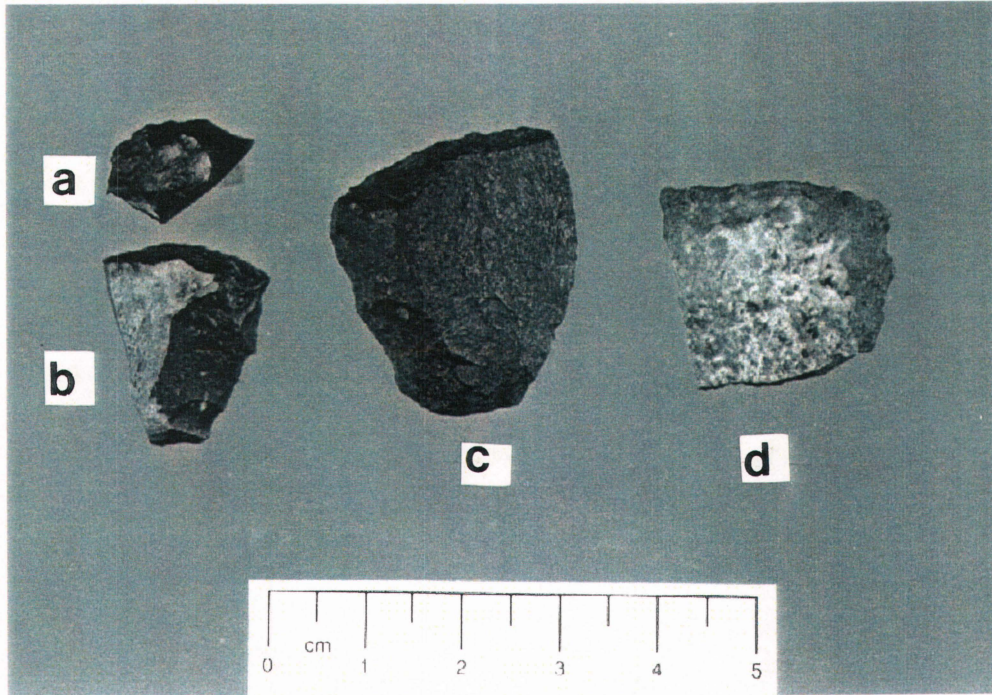


Plate 5.5 End Scrapers Occupation Level 1



Plate 5.6 Unifacial Chopper Occupation Level 1

5.2.7 Choppers (N=1; Plate 5.6)

The chopper was fabricated from a large flake of greywacke (Plate 5.6). This large tool weighed 365.7 grams. The distal edge was deeply beveled with the removal of several large flakes on the dorsal surface. The tool was probably an expediency tool.

5.3 Anvils (N=2; Plate 5.7)

Two anvils were identified during analysis. The anvils were both flattened granite cobbles with no evidence of modification for use. The anvils were broken and both had the presence of scorching marks resulting from burning suggesting a secondary use as fire-broken rock. The dorsal surfaces contained crushing or pecking indicating their primary use as anvils. The anvil in Plate 5.7 also had pecking present on the rounded unbroken end implying use as a hammerstone as well. The broken portions of the anvils were not recovered.

5.4 Hammerstones (N=4; Plate 5.8)

The four hammerstones were granite cobbles, three complete and one broken. Two of the complete hammerstones (Plate 5.8) were globular in shape. The larger item had crushing evident at both proximal and distal ends while the smaller item had crushing only on the distal end. Scorch marks were present on both items. The other complete hammerstone was oval in shape exhibiting crushing at both ends and burning overall. Three pieces remain of the broken hammerstone. The other fragments were not recovered. Crushing is evident at the distal end and scorching is present.



Plate 5.7 Anvil Occupation Level 1

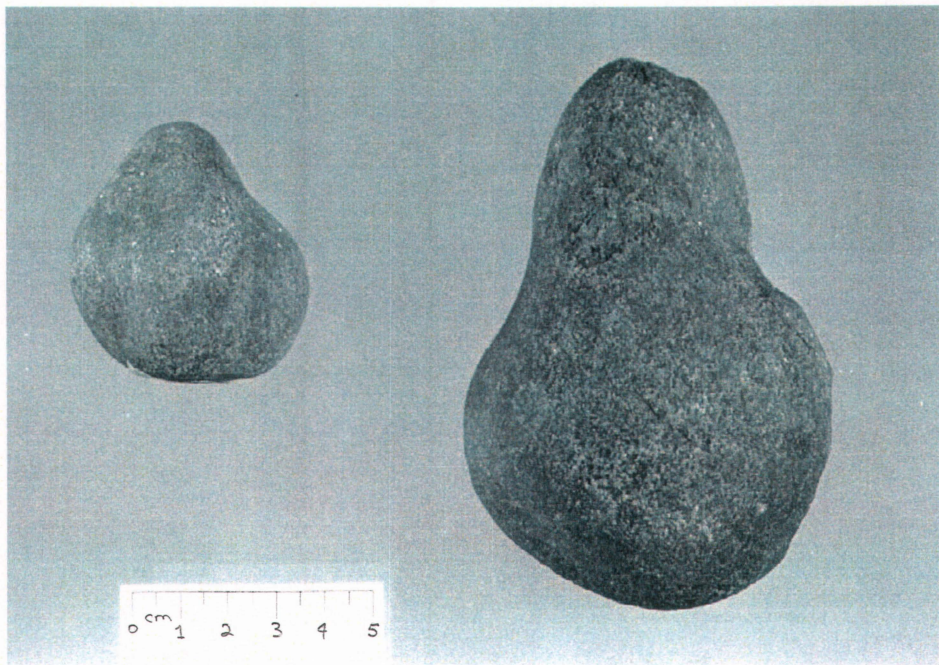


Plate 5.8 Hammerstones Occupation Level 1

5.5 Cores (N=4)

Four cores were identified; two quartz, one chert and one of gabbro. The two quartz cores were ovoid in shape with numerous flake scars present. The quality of the quartz varies from very coarse clear quartz to fine white quartz. Cortex is evident on the dorsal surface of the clear quartz core. No striking platforms were present.

The chert core was the remnant of a fine-grained block of material. The general shape of the core was that of a wedge. Numerous small blade flakes were removed from this core. One surface of the core had evidence of internal faults in the presence of small step fractures.

The gabbro core had an obvious striking platform with flakes removed from all sides around the platform. The core was rectangular in shape at the striking platform, narrowing into a wedge at the distal end. A single flake was recovered with the core that could be conjoined to the core.

5.6 Flaked Lithic Debitage

A total of 7,996 flakes and pieces of shatter were recovered from the excavation of occupation level 1. The most common material type by number was Swan River chert with a total of 3,574 flakes and pieces of shatter (see Table 5.5). This accounted for 44.7% of the flakes recovered. Chert was the second most common material comprising 34.3% of the total (2740 flakes). A distant third was silicified peat with 11.1% of the total amount of flakes (889 flakes). The remaining 9.9% of flakes by material type were divided among sixteen different material types.

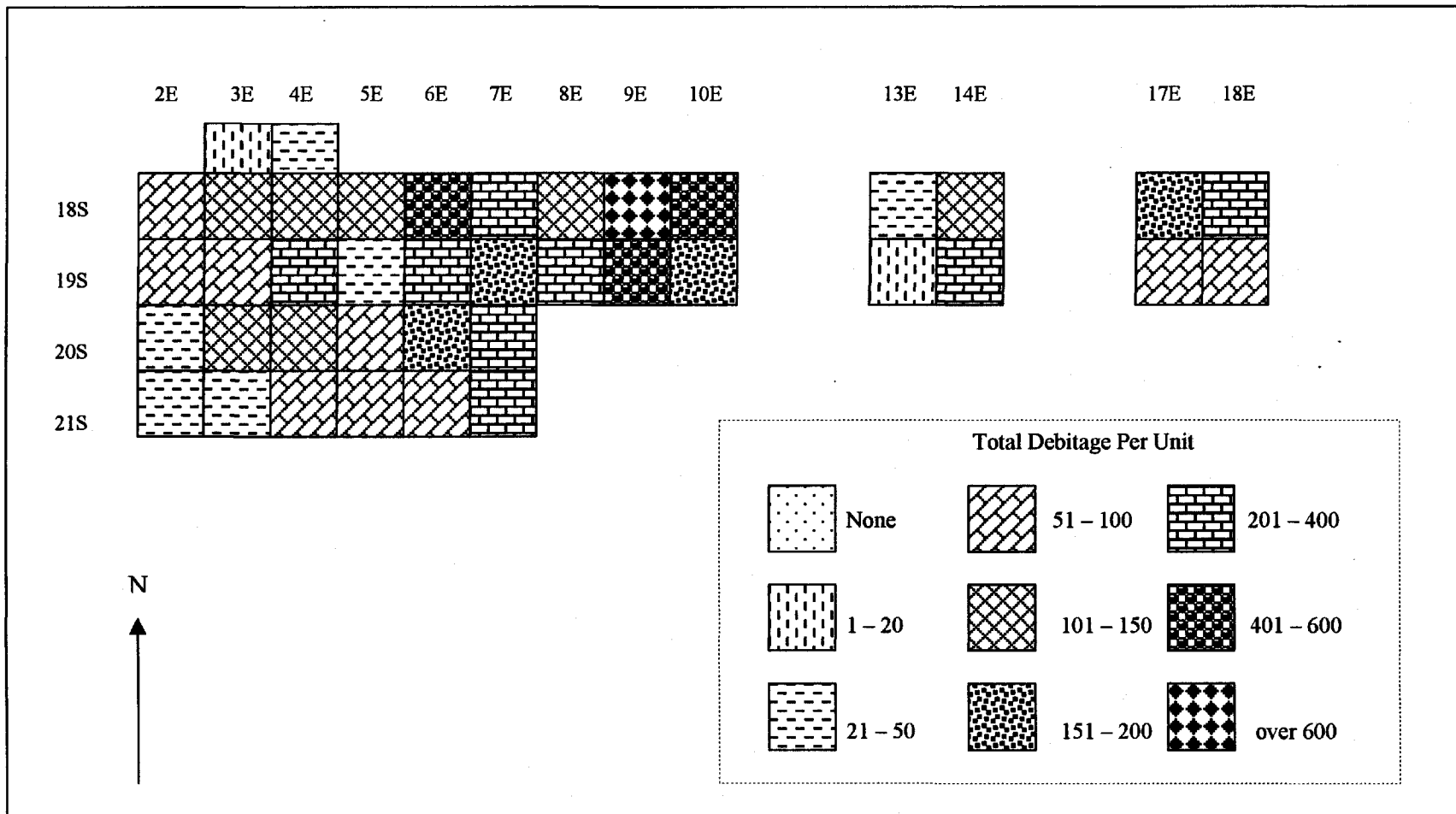


Figure 5.1 Lithic Debitage by Number Occupation Level 1

The majority of flakes and shatter recovered were tertiary flakes. A total of 88% of all flakes were tertiary, followed by secondary (8.2%), shatter (2.2%) and primary flakes (1.6%). This appears to indicate that the tools were more often being resharpened as opposed to being constructed. The low number of shatter further supports this conclusion.

As can be seen from the distribution map (figure 5.1), flakes are present throughout the excavation. The heaviest concentration of flakes and shatter occurs near the center of the site at the eastern edge of the large trench. This concentration is bordered by a hearth and a stone boiling pit to the west, implying tool working around the cooking stations (see feature descriptions).

Table 5.5 Flaked Lithic Debitage Occupation Level 1

Material type	Primary	Secondary	Tertiary	Shatter	Total
Swan River chert	86	421	2976	91	3574
Chert	7	8	2721	4	2740
Silicified peat	11	84	763	31	889
Knife River flint	0	3	178	0	181
Quartzite	9	46	75	3	133
Greywacke/greenstone	3	45	42	22	112
Quartz	0	14	59	18	91
Siltstone	2	4	70	0	76
Chalcedony	1	2	34	1	38
Fused shale	0	3	30	2	35
Silicified wood	0	16	9	6	31
Jasper	4	0	22	2	28
Gronlid siltstone	1	1	22	0	24
Agate	0	1	13	0	14
Obsidian	0	0	12	0	12
Diatomite	1	2	4	1	8
Shale	0	0	6	0	6
Cathead chert	1	2	0	0	3
Schist	1	0	0	0	1
Total	127	652	7036	181	7996

5.7 Fire-Broken Rock

A total of 2,952 fragments of fire-broken rock with a combined weight of 62.4 kilograms were recovered from the excavation of occupation level 1. The large majority (see Table 5.6) of the material was granite by both number and weight. Small numbers represented the other material types present.

Clustering of fire-broken rock was evident throughout the excavation (see figure 5.2). The heaviest concentration of fire-broken rock was located in unit #21S7E where a hearth was uncovered. From this unit 18.5 kilograms of fire-broken rock was recovered. Three other units also had heavy concentrations of fire-broken rock within them, units # 18S2E, 18S5E and 18S14E. Unit #18S2E contained the remains of a hearth feature represented by over 8 kilograms of fire-broken rock. The remains of a small, stone boiling pit was located within unit #18S5E, evidenced by the recovery of almost 6 kilograms of fire-broken rock. A small hearth feature located in unit #18S14E contained 2.6 kilograms of fire-broken rock.

Table 5.6 Fire-Broken Rock Occupation Level 1

Material type	Number	Weight
Granite	2880	59276.0
Quartzite	8	1261.6
Sandstone	34	898.4
Schist	16	581.2
Greywacke	13	283.0
Gneiss	1	81.8
Totals	2952	62382.0

Fire-broken rock was otherwise distributed throughout the excavation of occupation level 1. No units were excavated which did not contain fire-broken rock;

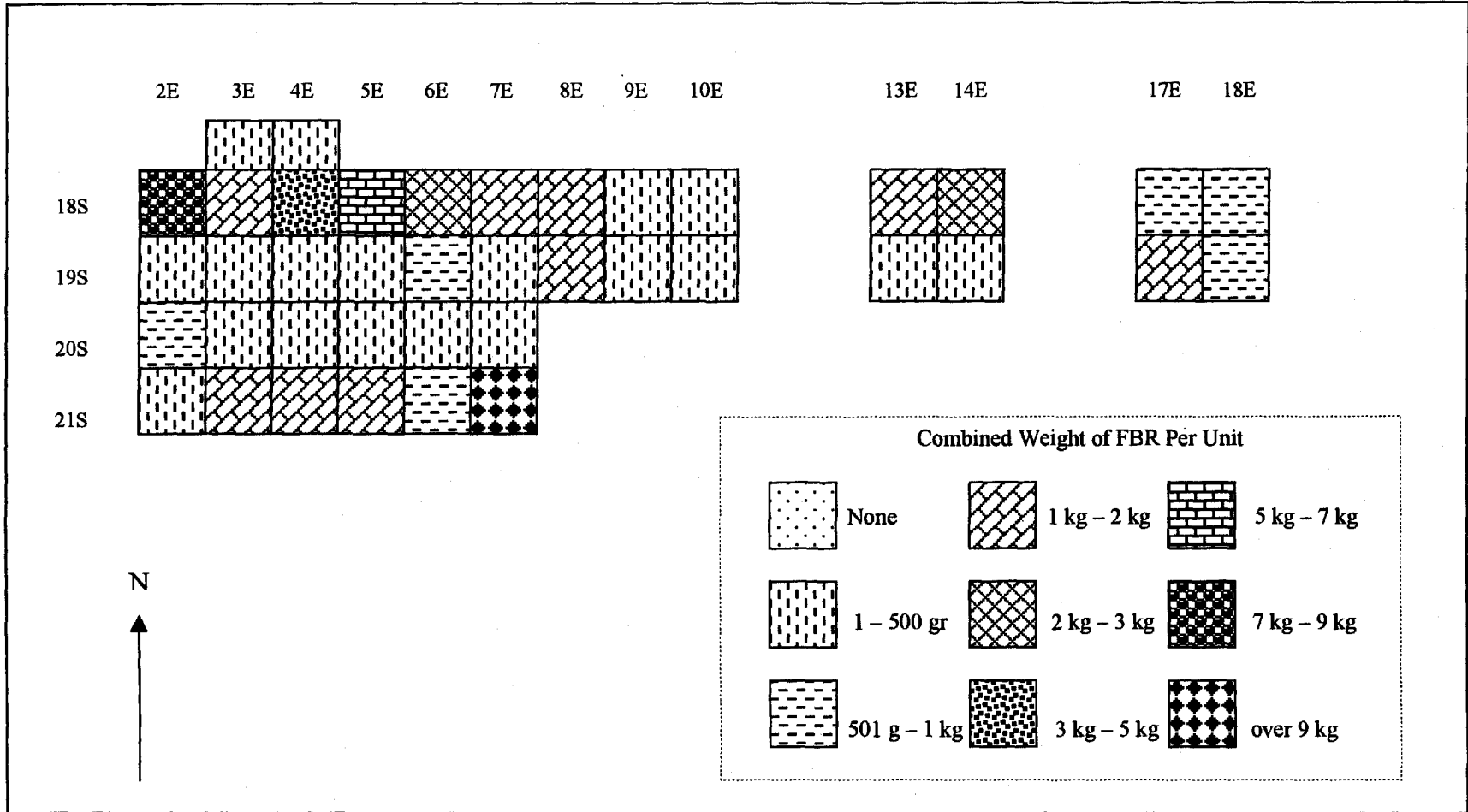


Figure 5.2 Fire-Broken Rock by Weight Occupation Level 1

however, the fire-broken rock was not evenly distributed in that some units contained less than 50 grams of rock while others contained upwards of 1 kilogram.

5.8 Metal Artifacts

Artifacts constructed of metal were recovered in small quantities. The artifacts included a brass shell casing, two projectile points (discussed previously) and miscellaneous metal fragments. Except for the shell casing, the metal fragments and projectile points were of rolled copper.

5.8.1 Brass Shell Casing (N=1, Plate 5.9)

A single brass shell casing was recovered at a depth of 25.5 cm below the surface. Although this item was recovered from occupation level 3, the shell casing was located from the bottom of a filled-in rodent burrow. Therefore, it is assumed that this artifact is intrusive from occupation level 1. The casing itself has a length of 30 mm, the diameter of the mouth is 14 mm, diameter of the rim is 16 mm and the total weight is 4.6 grams (Plate 5.9).

The presence of a single firing pin indentation on the rim indicates that there was sufficient energy for detonation. There is a slight bulging present on the case head. The mouth of the case contains small indentations on the exterior, evidence of the crimping of the case to the bullet. Oxidation of the brass is evident in the green, blotchy discoloration of the casing, both interior and exterior.

The presence of the bulging on the case head results from the failure of the breech bolt to fit against the face of the chamber snugly. It does not result from being

fired in a different model of weapon than perhaps intended. Some of the early weapons were prone to misfires, a situation that could be compounded if the breech pin was dirty or rusty. A very hard blow would be required for the firing pin to penetrate the cartridge rim deep enough to detonate the primer especially so if the breech pin was not in good working order (Scott & Fox 1989: 70-72).

The case head had evidence of six attempts at extraction in the form of cut marks in the brass. It is apparent that these marks are consistent with an outside pressure, such as the tip of a knife, applied to the cartridge in an effort to eject it from the chamber. Using the firing pin indentation to orientate the cartridge it appears that the toolmarks are present on the top of the cartridge case. This would be the most accessible location to attempt to pry from the chamber a jammed expended cartridge case (R.C.M.P. pers comm).

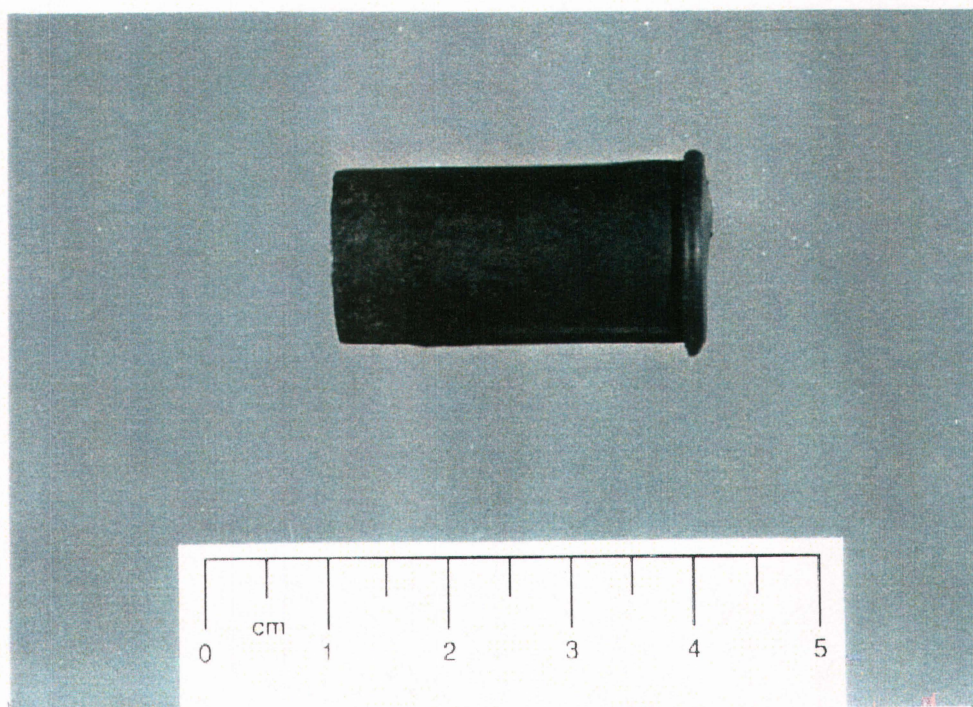


Plate 5.9 Shell Casing Occupation Level 1

The shell casing has been identified as either a 56-50 Spencer or a 56-52 Spencer rim-fire shell. These two cartridges were interchangeable. This type of cartridge could be used in a variety of rifles and carbines including the Spencer, Remington, Sharps and Peabody. Examination of a Spencer Model 1865 rifle at the R.C.M.P. Museum in Regina, Saskatchewan indicated that this cartridge could have been fired from this type of weapon. The design and location of the firing pin indentation is consistent with having been fired from a Spencer rifle (R.C.M.P. pers com).

A rimfire cartridge contained a primer charge and a charge of propellant powder. The bullet was placed in the mouth of the case that was then crimped in place so that the bullet would not come loose. The loaded cartridge was then placed in the weapon's chamber. Pulling the trigger would cause the firing pin to strike the primer, causing an action-reaction that would fire the bullet. In a rimfire cartridge the primer charge was placed around the interior edge of the case, therefore when the trigger was pulled the firing pin would strike the edge or the rim of the case leaving the distinctive firing pin indentation (Scott & Fox 1989:50-51).

The Spencer repeating carbine was a .50 caliber rifle with a 20-inch barrel. The weapon was a seven shot repeater that could be fired very rapidly. This carbine was patented in March 1860. An improved design was patented in July 1862. The weakness in the extractor caused the expended cartridge to jam in the chamber. The War Department ordered Spencer repeating carbines for use during the American Civil War. While some of these weapons were delivered during the conflict most

arrived too late to be of much use. After the Civil War, these weapons were issued to American troops in the West to be used in the “Indian Wars”. As a result this type of weapon was referred to as the “Indian model”. This was the type of weapon used by General Custer’s Seventh U.S. Cavalry (Sharpe 1938).

5.8.2 Miscellaneous Metal Fragments (N=12)

There were a total of 12 fragments of metal recovered from occupation level 1. These copper fragments were all recovered at a depth of between 5 and 10 cm below the surface. All fragments are small; the largest weighs only 0.7 grams. Two of the fragments have been cut and one fragment has cut curved and straight edges. It appears as if this fragment was a “tab” broken off of a larger item. The other nine fragments are all non-descript, broken fragments of metal. All of the fragments are very thin implying that they were originally rolled pieces of metal.

5.9 Beads

A scattering of beads were recovered from the excavation of occupation level 1. These beads were a mixture of glass trade beads and bone beads of native construction, underlying the implied Proto-historic nature of this occupation level.

5.9.1 Bead Analysis (N=7, Plate 5.10)

A total of five glass beads, one metal bead and one bone bead were recovered from the excavation of occupation level 1 (Plate 5.10). The glass beads were all monochrome tube beads. There was one dark green seed bead (Plate 5.10, item d),

two dark blue intermediate beads (Plate 5.10, item a,f) and two emerald green pony beads (Plate 5.10, item b,c). The seed bead was 1mm in diameter and the intermediate beads were 3mm in diameter. These beads were all highly rounded and polished indicating that they were subjected to further heat treatment (Kidd and Kidd 1970:49).

The two pony beads are of a different form than the other beads. The beads are both 3.5mm in diameter and the lengths of the tubes are 2.5mm and 3mm respectively. These beads are tubular in shape with slightly rounded ends and one end more rounded than the other. The ends are broken unevenly. The glass itself is coarse and bubbles throughout the glass are easily evident to the naked eye. The rough exterior belies the use of secondary heat treatment. The length designation is stated to be standard (Karklins 1994).

The metal bead (Plate 5.10, item g) was recovered from the fine screen sample. This brass bead is 2mm in diameter. One end is cut smooth while the other end has been faceted.

The bone bead (Plate 5.10, item e) was cut from a bird limb element, and the bone has been highly polished. To form the bead the bone was partially incised and then broken. The uneven break is still evident near the hole portion of the ends. The ends of the bead have been rounded and polished as well. This bead consists of two segments that have not been completely separated and because of the highly polished condition of the bead it is apparent that this bead was the finished product. The total length of the bead is 9mm with the individual segments measuring just over 4mm each.

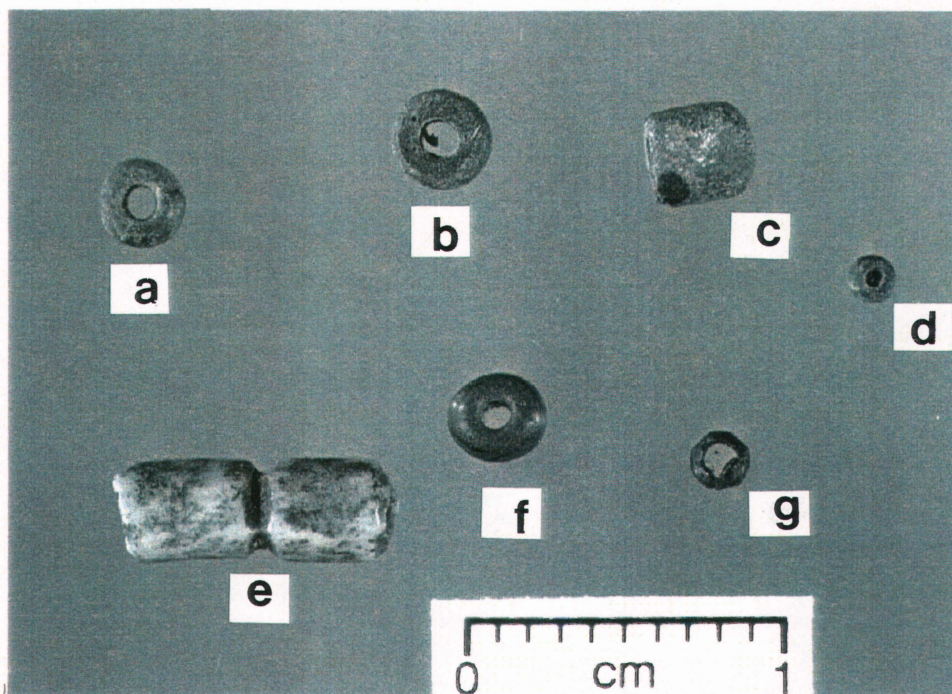


Plate 5.10 Beads Occupation Level 1

5.9.2 Bead Construction

There are two main methods for constructing beads. In the first method a bubble of molten or viscid glass is drawn out into a long slender tube. The second method consists of winding threads of molten glass around a wire that is later removed (Kidd and Kidd 1970:48).

The most commonly occurring beads that are found in most archaeological sites are drawn beads. Other names for this construction style of beads are tubular drawn, cane and hollow-cane (Sprague 1991:141). Kidd and Kidd (1970:50) refer to these beads as tube beads. These beads are primarily used for beadwork on garments. In shape these beads are generally oblate, spheroidal or subcylindrical and there is often much variation in size (Lehmer *et al* 1978). Smaller embroidery beads are

usually referred to as seed beads. They have also been referred to as micro beads, sand beads, and beadwork beads. Those larger varieties of drawn beads also used in beadwork are called pony beads or pound beads. Size differentiation has been defined by Conn (1970:7-8) in that seed beads are between 0 – 2mm, intermediate beads are between 2 – 3mm and pony beads are 3 – 5mm in diameter.

This first method of construction requires the presence of two people so that a bubble of molten glass can be stretched. Once the required tube size is obtained and the glass has cooled and can no longer be stretched further, the rigid tube of glass is placed on wooded slabs to further cool. Once the tube is sufficiently cooled the tube is broken into increasingly smaller pieces until the desired bead size is reached. The beads are often subjected to further heat treatment to obtain rounded or oval beads. These tube beads are considered to be mass-produced because thousands of beads can be made from a single bubble of glass (Kidd and Kidd 1970:48-49).

Wire wound beads, the second method, are individually produced. A chalk-covered wire is heated at the same time as a solid rod of glass. A thread of molten glass from the rod of glass is wound around the wire until the required size and shape of the bead is obtained. The wire is removed once the glass is cooled (Kidd and Kidd 1970:49).

Both of the above methods of forming beads allow for the addition of different colours and designs. Tube beads can be twisted while being pulled, leading to different shapes. The bubble can be dipped into different coloured glass before being pulled creating different hues in the finished product. Rods of coloured glass can be fused to the bubble allowing for striped beads. Many different variations are

possible, however, all of the beads made from the same tube will be the same (Kidd and Kidd 1970:48-49).

Colour can also be added to wire wound beads during the initial forming by winding different coloured molten glass onto the wire. Glass insets such as dots, rosettes and flowers can be pressed into the matrix while it is soft. This type of bead construction results in “almost infinite variation” making attempts at classification difficult (Kidd and Kidd 1970:49).

5.10 Pottery

The pottery from the Thundercloud site has been recovered *in situ* from the first three arbitrary levels of the excavation which comprise the distance between 0 and 15 cm below the surface. There is very little, if any, sterile soil separating these upper occupation levels and so the excavation was conducted in arbitrary 5 cm levels. These arbitrary levels were once thought to be divided in this way: arbitrary levels 1 and 2 were considered to belong to occupation level 1 and arbitrary level 3 was the top portion of occupation level 2. It now appears as if occupation level 1 extends to perhaps 12 cm below the surface, the maximum depth from which the pottery is recovered. The pottery from these different arbitrary levels all appears to belong together. This tends to further illustrate the impact that natural site formation processes had on the site making the separation of occupation levels 1, 2 and 3 extremely difficult.

The pottery was separated into rim sherds, body sherds and those sherds too small to be identified. A total of 588 sherds of pottery with a combined weight of

411.1 grams were recovered. Unfortunately, there were only seven sherds that could be identified as rim sherds. Based on profiles, rim decoration, and exterior surface finish three vessels could be identified.

5.10.1 Pottery Analysis Rim Sherds (N=7, Plate 5.11)

The identification of pottery is based on rim shape and surface finish. The surface finish of the pottery recovered from the Thundercloud site fall into three categories: smoothed, brushed, and cord-roughened exteriors. Smoothing removes traces of previous surface treatment whether it is cord-roughened or cord-wrapped paddle or fabric impressed. Continued rubbing can bring about a dull finish. Brushing also removes traces of the previous surface and is identified by numerous fine shallow striations, usually oriented more or less parallel to each other. Brushing is usually restricted to the neck and rim areas and occurs horizontally. Cord-wrapped paddle or cord-roughened finishes are identified by a repeated series of equally spaced cord impressions across the exterior of the vessel, usually in a horizontal fashion (Johnson 1977:40-41). There were no sherds identified with check-stamping in the assemblage. Some degree of smoothing is seen on the interiors of most sherds, with a number of sherds exhibiting striations either from the initial smoothing or from abrasion during use (Johnson 1977:41).

Three vessels have been identified on the basis of the decoration and surface finish of rim sherds. In total, seven rim sherds were recovered from two excavation units, #21S5E and #21S6E. Figure number 5.3 indicates the variety of brim decorations commonly found on Mortlach pottery. Of importance to this discussion

are the schematics of cord-wrapped tool and cord-wrapped oblique brim decorations.

Figure number 5.4 contains the schematics of rim decorations. Important for this discussion is the exterior pinched and the exterior incised line patterns.

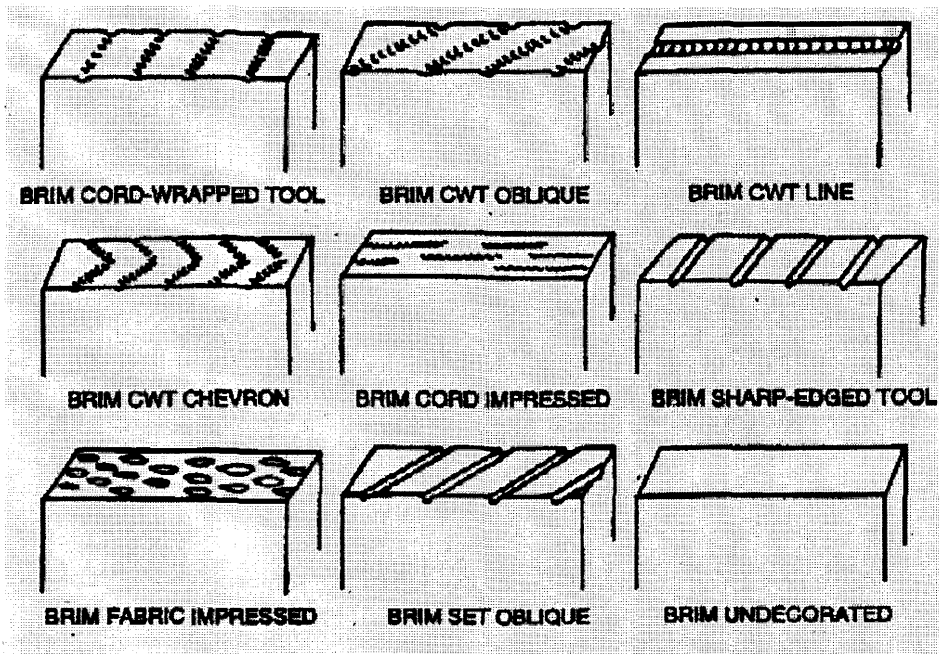


Figure 5.3 Brim Decorations (Malainey 1995)

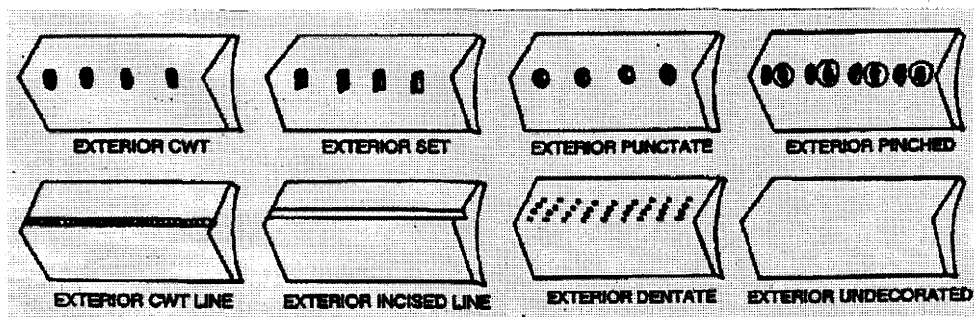


Figure 5.4 Rim / Shoulder Decorations (Malainey 1995)

Two rim sherds which could be rejoined represent vessel number 1 (Plate 5.11, item a). These sherds belong to a vessel that had a wedge profile. The reconstructed brim section is decorated with five deep, oblique, cord-wrapped tool impressions angled in a left diagonal fashion. After the brim was decorated it appears as if a finger was dragged along the brim, in part smudging or blurring the impressions. The brim measures 12.0 mm; the rim measures 6.0 mm thick. The exterior surfaces of the vessel are partially smoothed and cord-roughened. The cord-roughened marks are vertical and slightly oblique with the upper ends towards the right of the vessel. The interior surface is smoothed with evidence of horizontal striations. The clay is compact with a very small grit temper, seen as a glint of possibly feldspar within the clay. The clay is a uniform dark brown colour throughout.

Four rim sherds, two of which could be joined, represent the second vessel Plate 5.11, items b,c,d). The brim portion of the rim is 12 mm thick while the rest of the vessel is thin measuring between 4mm and 5mm. The brim has prominent outer and inner corners, however, decoration is only seen on the flat portion of the brim. The decoration is in the form of a cord-wrapped tool impression straight to very slightly oblique across the brim.

The exterior surface of the vessel has been brushed as is evident by horizontal striations across the surface including the outer corner of the rim. No decoration is apparent on the exterior. The interior surface is smooth with the presence of striations both on the wall and the inner corner. The inner corner is uneven in

expression, deeper in part and shallower in others. The clay is compact with fine grit temper. The outer surface is mottled tan and dark brown and the interior surface is a dark brown.

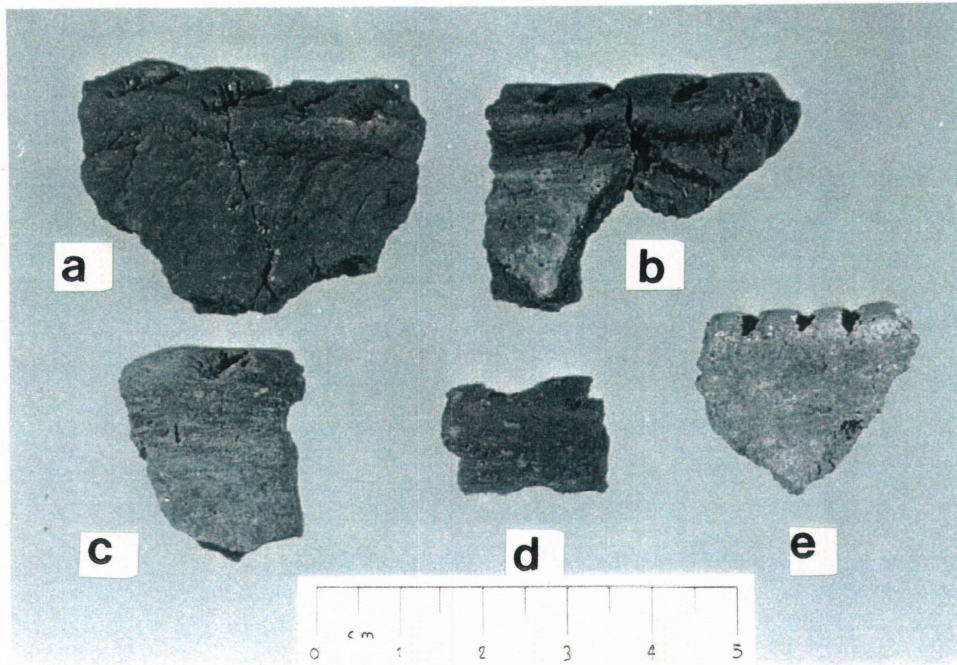


Plate 5.11 Pottery Rim Sherds Occupation Level 1

A single rim sherd represents the third vessel Plate 5.11, item e). The exterior is smoothed with no evidence of striations. The exterior surface has a polished feel. The brim is slightly flared and is decorated with cord-wrapped tool impressions. These impressions are narrow, deep, and close together and are positioned straight across the brim. The brim thickness is 11 mm while the rim at 7 mm is much thicker than seen in the other vessels. The exterior of the sherd near the bottom of the sherd is flaring out possibly suggesting the presence of finger pinching on the rim. The sherd is a tan color throughout and the interior surface is smooth. Grit temper is present, identified as feldspar and is coarse, up to 4 mm thick.

the appearance of “quartering marks” on the lips. When these marks are viewed from above they “divide” the vessel into four quarters. Overall, Mortlach assemblages are heterogeneous in vessel forms, exterior surface finish and decoration (Walde *et al*; 1995).

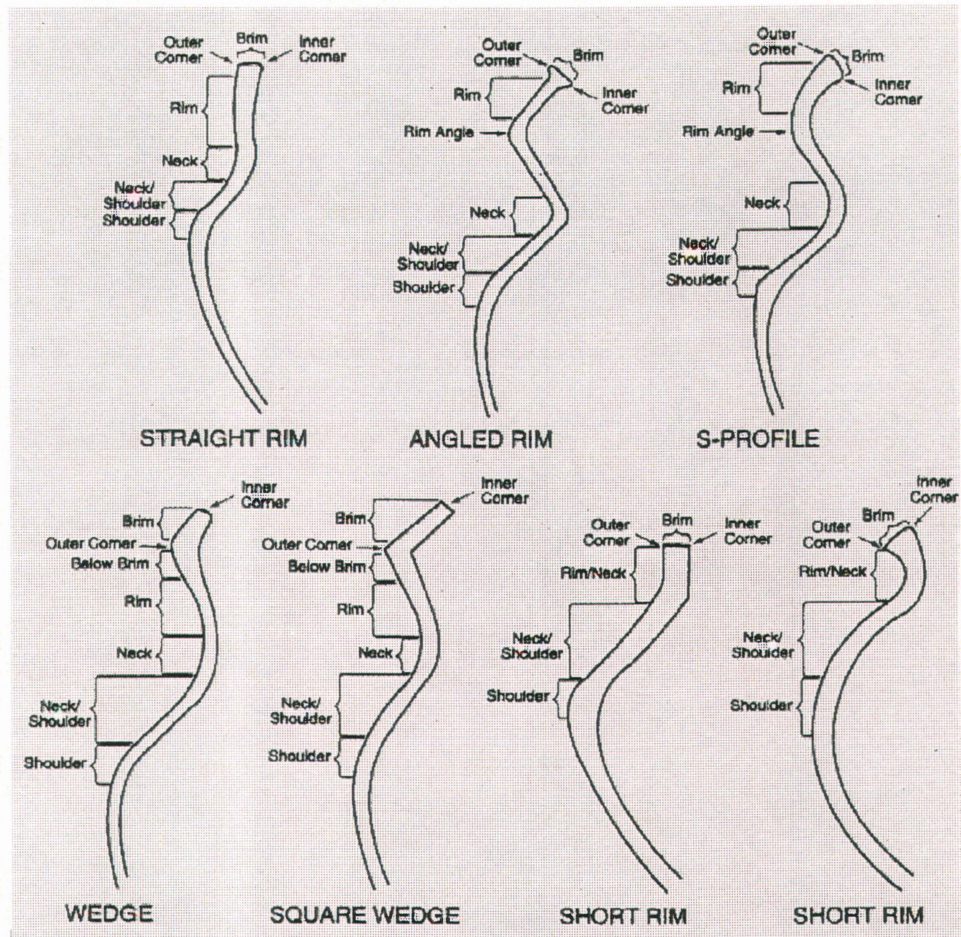


Figure 5.5 Mortlach Vessel Profiles (Malainey 1995)

Joyes (1973), Meyer (1988:62) and Syms (1977:125) have characterized the Mortlach phase as one that is associated with Plains side-notched projectile points. Plains side-notched points in Saskatchewan appear about AD 1300 and continue in use until European contact about AD 1750. The ceramics are believed to contain attributes that were derived from the Middle Missouri regions. Both Dyck

5.10.2 Pottery Analysis Body Sherds (N=583, Plate 5.12)

A total of 583 sherds of pottery (not including rim sherds) was recovered from the excavation (Table 5.7). Of this number, the greatest portion (486 sherds) were so small that it was impossible to determine surface finish. As well, the majority of these sherds were tiny, exfoliated pieces containing no surfaces, either interior or exterior. The extreme fragmentation of the pottery could be a result of the action of freeze and thaw cycles or more likely the result of trampling. These natural processes would have had a great deal of effect on the deposited pottery since the majority of the pottery was recovered between 8 and 11 cm below the surface, well within the range for these natural processes to be working. Of the sherds that were large enough and / or complete enough to be identified regarding their surface finishes, 43 sherds (7.4%) had been smoothed, the original surface treatment could not be determined. Of these sherds, 27 (4.6%) showed evidence of brushing in the presence of striations on the exterior surfaces. The striations consisted of very thin marks, suggesting the possibility that a fabric was used to smooth the surface. If grass had been used to smooth the surface, the striations would have appeared much coarser (Meyer personal communication 1997). It was not possible to determine whether any previous surface finish had been present before smoothing.

Nineteen sherds were recovered that had evidence of cord-roughening on the exterior surface. This consisted of 3.3% of the total amount of non-rim sherds recovered. The indentations are present in the form of short, relatively straight lines that appear to all run in the same direction. This would imply that if paddling formed this pottery, the paddling was done in only one direction.

There were also eight sherds recovered which contained evidence of finger pinching. The sherds in question appear to be rim or shoulder sherds at least from the appearance of one sherd (Plate 5.12, item d). This sherd shows a slight rounding of

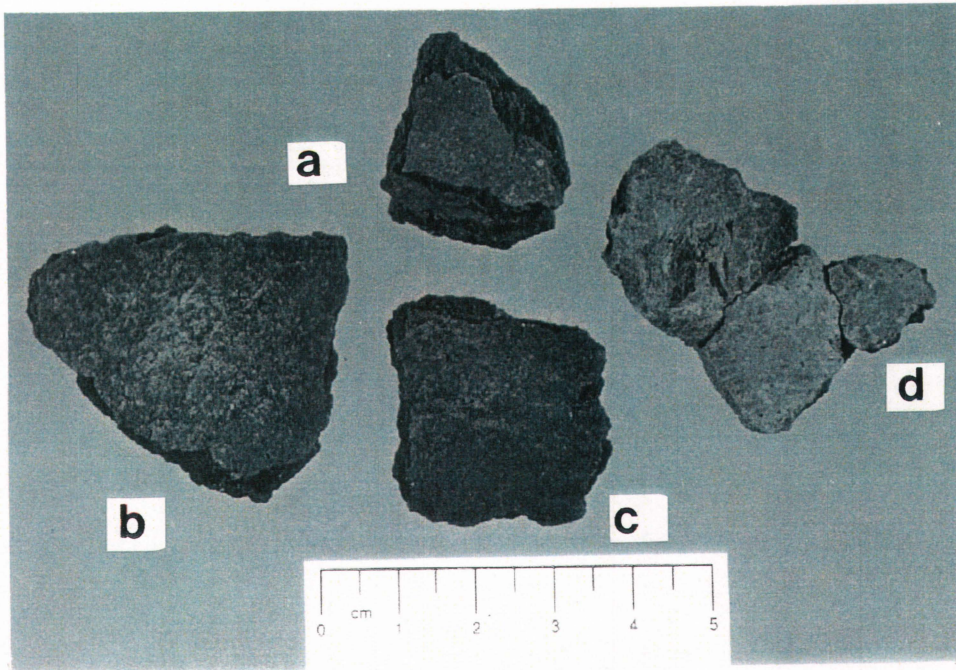


Plate 5.12 Pottery Body Sherds Occupation Level 1

the interior as well as evidence on the exterior of cord roughening which had been partly smoothed. It was possible to join this sherd to two other sherds. The sherds are not large enough to determine definitely its location; however, they resemble the angle of the Angled Rim profiles. The thickness of the sherd at the angle is 10 mm while the thinnest part of the sherd is 7 mm thick. The other seven sherds are not large enough to show any evidence of location or surface treatment; however, it is assumed that they are all located in the same area.

One smoothed exterior body sherd contained a distinctly straight incised line. The incised line is different from the striations found on the brushed sherds and cannot have been formed by smoothing. The shallow, incised line is 12 mm in length

and runs the entire portion of the sherd suggesting that the line continued around the vessel. This is the only incised sherd recovered.

Table 5.7 Surface Finish on Body Sherds

Finish	Number	Percent
Brushed	27	4.6
Smoothed	43	7.4
Cord Roughened	19	3.3
Finger pinched	8	1.3
Undetermined	486	83.4
Totals	583	100.0

5.10.3 Cultural Affiliation

Pottery of the Mortlach Phase was first identified as such in 1954 by Boyd Wettlaufer (1955) at the Mortlach site (EcNI-1) and Wettlaufer and Mayer-Oakes (1960) at the Long Creek site in 1957. Notable sites that contain Mortlach pottery include the Evans site in North Dakota (Schneider & Kinney 1978); the Dune Buggy site in southeast Montana (Johnson 1977); and the Shippe Canyon site in northeast Montana (Joyes 1973).

Characteristics of Mortlach pottery include walls that are relatively thin and compact. Vessel profiles have four major shapes, Vertical, angled Rim, S-Rim and Wedge Rim (Figure 5.5). Exterior surfaces also can have a number of surface treatments; smoothed surface, check-stamped surfaces – incised square and diamond shapes, simple-stamped, and cord/fabric roughened surfaces. These patterned surfaces are created with carved or cord wrapped paddles. A variety of tools were used to create decorations including cord wrapped objects, dentate stamps, quills, various shaped tools (solid, pointed, notched), and fingers. A frequent occurrence is

(1983:132) and Kehoe (1973:78) see a source area for these points either from the Middle Missouri (Dyck 1983) or from the Mississippian cultural tradition through the Middle Missouri (Kehoe 1973). Meyer (1988) suggests that while Mortlach pottery appears related to Middle Missouri ceramics there are also attributes present which indicate a relationship to the forest/parklands Selkirk ceramics as well as some traits of the Old Woman's Phase, in particular the Saskatchewan Basin Complex: Late Variant. It is proposed that after AD 1300 Mortlach displaces the Old Women's phase from the Saskatchewan Plains except for an area situated between the two branches of the Saskatchewan River west of Saskatoon (Meyer 1988).

The Mortlach Complex is located primarily in southern Saskatchewan and northern Montana; however, there are Mortlach occupations in other regions such as the Cherry Point site in southwestern Manitoba (Syms 1977:125). The range of Mortlach sites in Saskatchewan is found throughout the grasslands. The only possible exception to this is the northwestern portion of the province between the North and South Saskatchewan Rivers. The southern portion of the Parklands also has evidence of Mortlach components, for example, the Lozinsky site (Malainey 1995) located northeast of Saskatoon. As of yet, no Mortlach components have been identified in the southern edge of the forest (Meyer 1990:336). The boundaries of this complex are unclear in that stamped ceramics of the Mortlach variety have been found at the Morkin site in southern Alberta. These materials have been assigned to the Cluny Complex (Byrne 1973). The Cluny Complex is stated to contain attributes not found in other Mortlach Complex assemblages, therefore, the distribution of these

two types are not considered synonymous and in Alberta Mortlach is labelled part of the Cluny Horizon (Byrne 1973).

In the dating of Mortlach sites, the temporal evidence suggests a protohistoric and/or early historic period. This is based on the small quantities of historic materials recovered from a number of sites including Shippe Canyon (Joyes 1973), Long Creek (Mayer-Oakes and Wettlaufer 1960), Mortlach (Wettlaufer 1955) and Thundercloud (Mack 1996).

There are few absolute dates available on Mortlach components. The Bill Richards site has yielded two thermoluminescence dates, AD 1630 \pm 70 (Dur88TL124-1BS) and AD 1680 \pm 80 (Dur88TL124-2BS) (Meyer *et al* 1995). Also available are several uncorrected radiocarbon dates: the Lake Midden site (380 \pm 100BP (S-2246)) (Watrall 1979) and the Evans site (395 \pm 80BP (I7358)) (Schneider and Kinney 1978). These dates, together with the presence of European trade goods at many Mortlach sites imply a temporal span extending from approximately AD 1500 to the period of direct contact.

5.10.4 Pottery Pattern Distribution

There is a definite clustering of pottery throughout the excavation. While there were seven sherds recovered from the eastern most units of the site; the majority of the sherds are recovered from three units; #20S5E, #21S5E and #21S6E (Figure 5.5). A scattering of sherds were recovered from an additional six units all located in close proximity to the above mentioned units. The heaviest concentration of pottery sherds were situated in close proximity to the stone boiling pit and one of the hearths

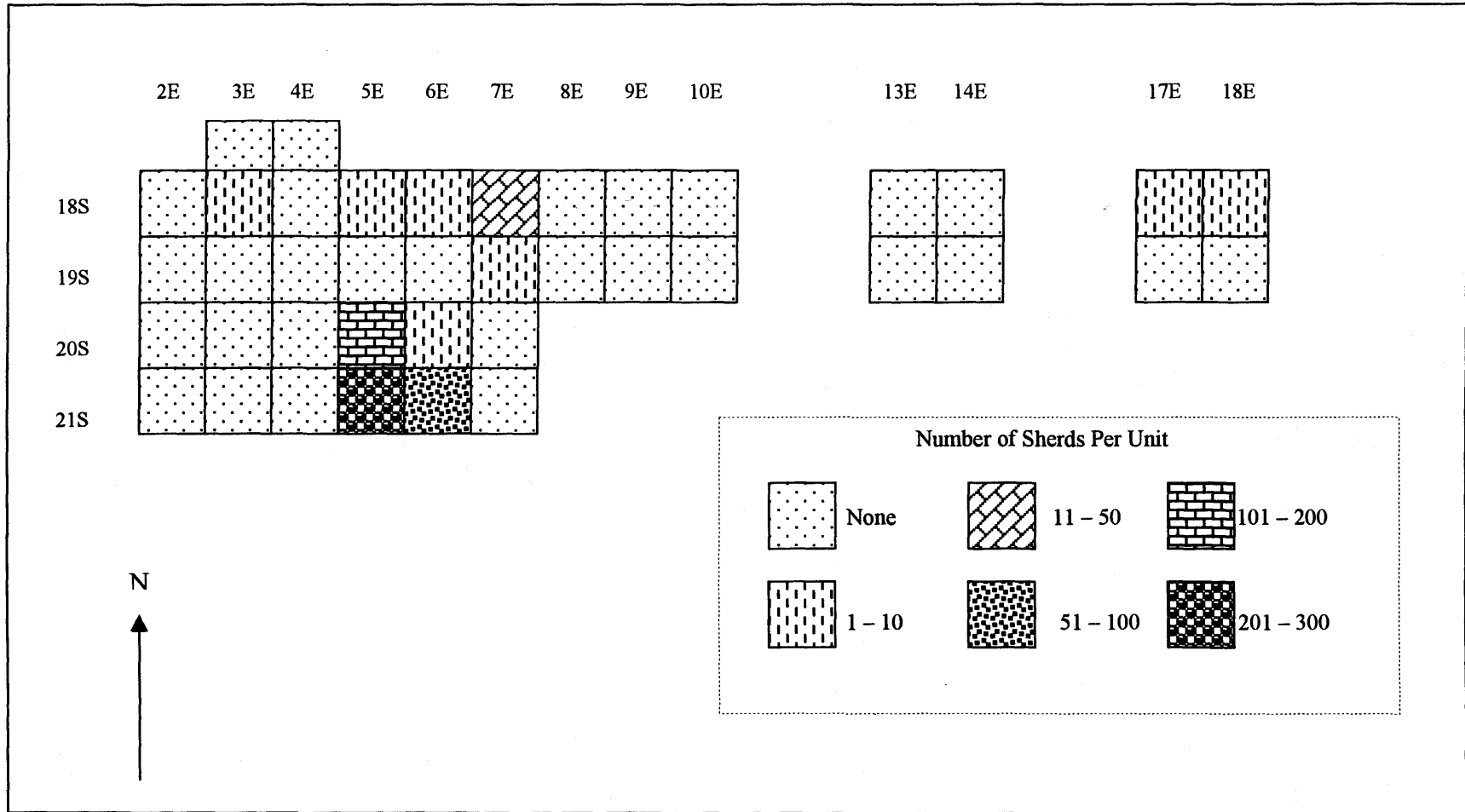


Figure 5.6 Pottery Distribution Occupation Level 1

located within occupation level 1, as well as several of the organic stains. This implies the possibility of pottery breakage occurring during the action of cooking.

After breakage, the pottery was discarded.

5.10.5 Pottery Disks (N=2, Plate 5.13)

Two pottery disks, identified as gaming pieces were recovered from occupation level 1 (Plate 5.13). Both disks are constructed from native pottery sherds that were abraded and polished into flattened, rounded disks. Temper is evident along the polished edges of the disks. The grit temper has been identified as feldspar. In colour both disks are a blackish-brown. The larger of the two disks was recovered from unit #18S6E at a depth of between 5 and 10 cm. This disk is 18 mm in diameter, 7 mm thick and weighs 3.8 grams. The smaller of the two disks was recovered from unit #19S4E at a depth of 10 cm. This disk weighs 2.4 grams and has a diameter of 10 mm and a thickness of 7mm. There is no evidence of any type of decoration on either surface of the disks.

Similar types of pottery disks have been recovered from archaeological sites in North America including the Cross Ranch site in North Dakota (Calabrese 1972:20). The artifacts from this site included two pottery disks cut from body sherds and abraded into shape. The disks were from two different styles of pottery; one check-stamped and the other a smoothed surface. In diameter, the disks were 34 mm and 46 mm respectively. The Cross Ranch site has produced a radiocarbon date of 420+100(M-2368) having a standard conversion date of AD1530+100 years (Calabrese 1972:20).

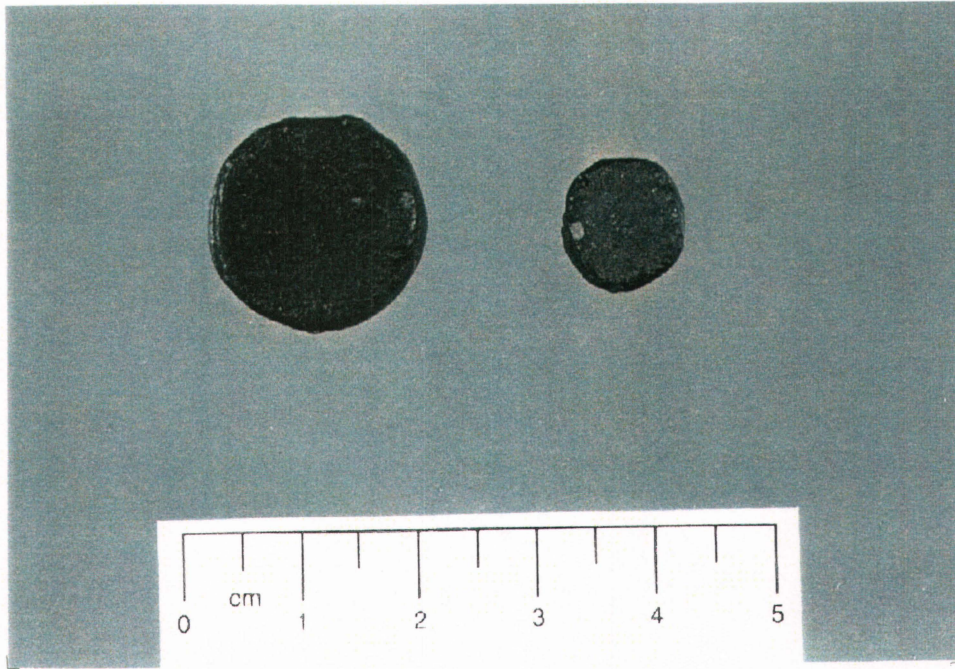


Plate 5.13 Pottery Disks Occupation Level 1

The Shermer site (32EM10) in North Dakota contained disks of carved bone (2) and shell (5) similar in type to the pottery disks recovered from Thundercloud (Sperry 1968:73). The bone disks have some form of decoration in the form of drilled holes and engraved lines while most of the shell disks were plain. There was no evidence of clay disks at the Shermer site. Dating of the Shermer site by projectile point typology is similar to Thundercloud given the presence of Triangular, Prairie and Plains side-notched points.

Smith (1972) discusses similar types of objects recovered from Fort Berthold and Like-A-Fishhook village in North Dakota. At these sites, disks made from chipped glass and glazed earthenware had been recovered. These materials were ground into the desired shape resembling the disks found at Thundercloud.

A single disk was recovered from the Rock Village site (Lehmer *et al.* 1978:310). This disk was different from the others discussed previously in that it represented a modeled and fired clay disk, purposely made, not abraded from a discarded sherd. This disk was 22 mm in diameter and 6 mm thick.

Research has suggested that these disks are dice-like objects (Cullin 1973:44). While the exact game played is unknown, the general format of the game is that a number is determined by throwing at random, disk or dice-like objects. This type of game appears to have existed throughout North America (Culin 1973:44)

5.11 Occupation Level 1 Features (Figure 5.7)

Nine features were located during the excavation of occupation level 1. The features ranged from small ash deposits to more substantial hearths. The concentrations of features are localized in the center of the excavation. Important to note is the scarcity of information concerning some of the diffuse features in that during excavation these features were sometimes not recognized.

Feature 1-1, located in the northwest and northeast quadrants of unit 18S10E, is a thin layer of ash extending from 1.5 to 3.5 cm below the surface. This deposit of ash is extremely thin suggesting a small ash dump. This same unit contained an ashy/gray, sandy soil at approximately 12 cm below datum in the southwest quadrant. Present in this layer was a large cranial fragment of a bison that had ash compacted upon it. Black, greasy soil was located in pockets throughout the unit.

Feature 1-2 was located in unit 18S5E, covering over 50% of the unit, in particular the northwest and southwest quadrants. This feature contains a large

concentration of fire-broken rock in a shallow round pit feature. In addition, a large grease stain covered most of the NW quadrant. This grease stain consisted of a heavier primary stain portion and a less concentrated secondary stain. Within the feature was a distal right tibia, a right distal metatarsal, and a left first phalanx. Also recovered was a Rocky Mountain Quartzite hammerstone that showed considerable evidence of battering on its edges and its central surface. The hammerstone is broken and appears to have been discarded into the pit feature. Eight large (over 1-kg) pieces of fire-broken rock are present. This, together with the absence of any significant amounts of charcoal or bone fragments, would indicate that this feature is a stone boiling pit as opposed to a hearth.

Feature 1-3 was located in unit #18S2E. This basin-shaped pit filled with unburned, fragmented bone and fire-broken rock was located in the northwest and southwest quadrants between 10 and 23 cm below the surface. The feature extends into the unit to the west, 18S1E. The surface of the feature has a north - south dimension of 74 cm and an excavated west - east dimension of 50 cm. The base of the feature has a north - south width of 40 cm. A definite basin shape to the feature is evident in the profile of the west wall of the excavation.

The surface of the feature contains a large amount of fragmented unburned bone and fire-broken rock. Of the bone recovered, 67 specimens with a combined weight of 2.2 kilograms could be identified as to species and element. All but one of the identified bones were bison; the other was a fragmented atlas of a pronghorn. The majority of the identified bones were bison limb elements. Seven bison bones were complete all of them bison foot bones.

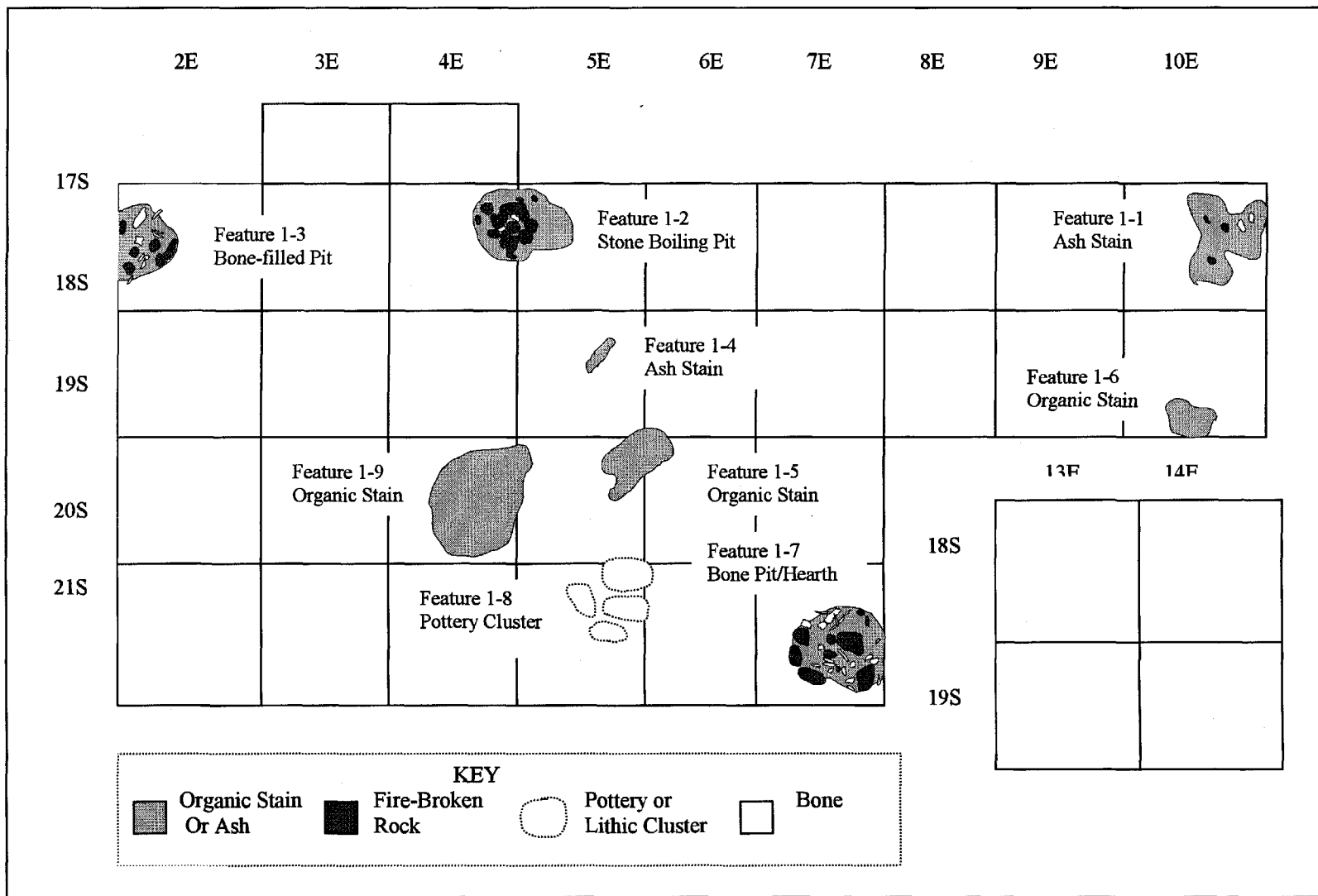


Figure 5.7 Feature Location and Description Occupation Level 1

The majority of the fire-broken rock was small fragments of granite, however, there were five large pieces of fire-broken rock recovered from a semi-circular position along the southeast portion of feature delineating the outside edge of the feature. Near the bottom of the feature charcoal concentrations were present, spread out throughout the feature. The largest concentration of charcoal weighed less than two grams. As well, charcoal fragments were recovered spread throughout the feature.

It is interesting to note that there is almost no debris from the rest of the unit, only a few isolated fragments of bone and fire-broken rock. There was no evidence of oxidization of the matrix at the base of the feature. Old filled rodent burrows extend through the feature causing some of the bone to fall down to lower levels. In some cases this results in bone being recovered below the large pieces of fire-broken rock. The profile of this feature implies a two stage usage; the primary use as a small hearth with a secondary use as a repository for bone debris.

Feature 1-4 is described as a soil stain containing some ash located in the northeast quadrant of unit #19S5E, the test pit. Fine screen analysis indicated the presence of seeds. No measurements or descriptions were recorded during the excavation of this feature.

Feature 1-5 has been described as an organic stain that is located in the northeast quadrant of unit #20S5E. The soil is described as greasy in texture. This stain was present between 8 and 10 cm below the surface. The actual dimensions of the feature are unknown as the eastern and northern borders extend into units where the presence of the feature was not noted on the planviews.

Feature number 1-6 is a large stain found in the southwest quadrant of unit 19S10E which has been attributed to an organic stain, possibly due to carcass decomposition. The stain is present between 8 and 11.5 cm below the surface and the matrix has been described as being greasy. The southern border of the stain extends into the unexcavated unit.

Feature 1-7 is a hearth that covered all quadrants within unit 21S7E (Plate 5.14). The hearth extended to a depth of 18 cm below the surface and was first indicated by the presence of a dark stain and fire-broken rock. Cross-section of the feature implies a two-stage usage; the darkest staining and the presence of charcoal occurred at the bottom most portion of the feature. The underlying soil was heavily oxidized. The surface of the feature contained a dense concentration of unburned bone, both identifiable bison elements and heavily processed fragments. This portion of the feature contained 1,404 fragments of unburned bone with a combined weight of 2,850.0 grams. Also present were five large granite cobbles arranged in a circular position delineating the hearth. Contained within the hearth underneath the unburned bone were a small number of fragmented burned bones. Only 3% of the bone recovered from the feature had been burned. Sixty-two pieces of charcoal weighing 9.3 grams were recovered from this portion of the feature as well as 63 fragments of fire-broken rock - 62 granite (18,321.4 grams) and one of greywacke (174.1 grams).

Feature 1-8 is a cluster of pottery sherds recovered near the bottom of occupation level 1 and the very top of occupation level 2. These sherds of pottery appear to be clustered into three units, #20S5E, #21S5E and #21S6E, with a scattering of sherds elsewhere. In total 517 sherds were recovered with a total



Plate 5.14 Feature 1.7 Hearth in Unit 21S7E

weight of 367.0 grams. Of this total, 506 sherds with a weight of 356.2 grams were recovered from the above mentioned units, by weight 97.1% of the total sherds. Seventy sherds with a total weight of 44.1 grams were recovered from the upper portion of occupation level 2. These sherds morphologically are similar to the sherds recovered from cultural level 1 and such, due to the cultural mixing of these levels, the pottery has been analyzed together.

The final feature of occupation level 1 (feature 1-9) has been described as a soil stain present in unit #20S4E appearing at 4 cm and extending to 8 cm below the surface. The stain is present in the southeast and northeast quadrants, extending into the western quadrants by approximately 10 cm. The matrix contained a large amount of burned and calcined bone (237 fragments with a weight of 36.9 grams). A

moderate amount of fire-broken rock was also recovered in an extremely fragmented state (64 fragments, weight 146.1 grams). There is no evidence of a hearth implying the possibility of a refuse dump.

5.12 Occupation Level 1 Interpretations

A number of interpretations can be proposed for the occupation of level 1. These interpretations are based on both the information gathered within the preceding pages and the interpretations based on the faunal analysis conducted by Webster (1999). The faunal analysis indicates that occupation of this level occurred during the late spring, in particular, sometime in May (Webster 1999). This is based upon the reproductive cycle of bison in that calving occurs at this time. Among the bison elements recovered were three bones that could be identified as belonging to immature bison. Two of the elements were identified as belonging to calves between newborn and three weeks of age. One specimen had a date between 10 months to a year, however the identification of this specimen is not definite.

Other faunal remains were also present indicating the presence of badger, skunk and ground squirrel (Webster 1999). Badgers and skunks hibernate until March while the ground squirrels hibernate until April. The ground squirrels appear to be non-cultural; some of the bones are in articulation. It is not known if the badger and skunk materials are cultural since no cut marks or burning are present on the remains, however, the remains are found with the processed bison elements thereby suggesting they are cultural by association.

The types of features present imply that the site was used as a secondary-processing site. The sites identified include hearths, a stone boiling pit, and the bone

feature. A large amount of fragmented unburned bone was recovered as well as seeds. The majority of the bison bones identified were limb elements indicating secondary- processing. The lack of burning present on the faunal remains together with the stone boiling pit and the presence of seeds suggests that pemmican production was being undertaken. Of the identified bison bones (1200 elements) only one element had been burned. The identification as a secondary-processing site is possible not only because of the materials recovered but because of the location of the site. Approximately 100 metres from this site is the remains of a bison pound referred to as Wolf Willow (FbNp-26). Only test excavations have been conducted at this site and therefore it is not possible to know whether there is any association between the two.

Cultural affiliation of occupation level 1 has been identified as late Prehistoric with a Protohistoric element. This is based upon the mixture of cultural materials recovered, which include European trade items as well as objects of native construction. Cultural mixing is obvious when the cultural materials are studied. All of the projectile points, regardless of form, were recovered from a depth between 3 to 11 cm below the surface. The metal projectile points were recovered from 5 and 10 cm below the surface while the Plains Triangular points were located at 5 and 9 cm below the surface. The positioning of the Plains and the Prairie Side-Notched projectile points are similar. Therefore, no definite statements can be proposed regarding which cultural materials belong to which occupation. Based upon projectile point morphology several occupations of this site occurred, however little soil deposition occurred to delineate the extent of the occupations. The pottery

assemblage attributed to the Mortlach Complex is consistent with the suggested age range of AD 1500 to the time of contact. The identification of the expended cartridge case by the R.C.M.P. further narrows the period of the Protohistoric occupation to a time period after A.D. 1860.

Chapter 6

Occupation Level 2

6.1 Introduction

Occupation level 2 is located between approximately 12 cm and 15 cm below the surface within a large organic-rich stratigraphic level that extends from the sod level to 19 cm below the surface. Three occupation levels are contained within this stratigraphic unit; occupation level 2 is the middle level. Some mixing of cultural materials is evident based upon the different types of artifacts recovered. Four different styles of projectile points were identified: Plains Side-Notched, Prairie Side-Notched, Plains Triangular and Avonlea Triangular projectile points. These styles range in age from 170 years B.P. to 1750 years B.P. (Dyck 1983).

A small amount of native pottery sherds were also recovered from the top of the stratigraphic level. The sherds are associated with the Mortlach Complex and as such have already been discussed with the pottery recovered from occupation level 1.

6.2 Flaked Stone Tools

A total of fifty-three stone tools were recovered from the excavation of occupation level 2. Table 6.1 lists the various categories of these stone tools and their frequency within the total assemblage. The items listed in Table 6.1 can be classified as chipped stone tools because of the varying degrees of retouch except for the

abrader and the hammerstones. Cores are not included within this list. There was evidence of ground stone tools in the site in the presence of an abrader.

Table 6.1 Frequency Distribution of Stone Tool Types of Occupation Level 2

Tool Type	Frequency	Percent
Projectile points	19	35.8
Hafted Biface	1	1.9
Knives	7	13.2
Perforators	1	1.9
Choppers	1	1.9
Biface fragments	11	20.8
Endscrapers	5	9.4
Choppers	2	3.8
Uniface fragments	4	7.5
Abraders	1	1.9
Hammerstones	2	3.8
Total	53	100.0

6.2.1 Projectile Points (N=19; Plate 6.1 , Table 6.2)

A total of 19 complete and partial projectile points were identified during the analysis of occupation level 2 lithic materials. The identifiable projectile points belong to five different types that represent an unknown number of cultural traditions, a good indication of the stratigraphic mixing present in the upper portions of the site. Comprising this mixture is Prairie side-notched, Plains side-notched, Plains Triangular and Avonlea Triangular as well as a broken base identified as a large side-notched point.

Four projectile points have been identified as Prairie side-notched points (Plate 6.1, items i,j,k). Two of the points are constructed of Swan River chert; one of silicified peat and the remaining point was constructed of siltstone. The Swan River chert projectile points are made from flakes that have been unifacially flaked on the

dorsal surface. The bases are slightly convex and the notches are rounded and shallow. Overall, these points are crudely constructed. The projectile point constructed of silicified peat is bifacially flaked. The base is concave and the corners are rounded. The distal tip was not recovered. The siltstone projectile point is complete and contrasts with the preceding points in that it is extremely well made. The blade is triangular, the base is straight and thinned and the notches are rounded, symmetrical and evenly spaced on the point.

Plains side-notched projectile points accounted for two of the points recovered (Plate 6.1, items g,h). The points were constructed from Swan River chert. The bases are straight to slightly concave, the notches are small and shallow and are positioned evenly near the base of the point. One of the points had been broken into three pieces. The distal tip was not recovered. The complete point had been broken laterally on the blade and was reworked resulting in an asymmetrical blade.

A projectile point identified as Plains Triangular was recovered broken into three pieces; the distal tip was not recovered (Plate 6.1, item c). This Swan River chert point has a straight base that has been thinned and the point itself has carefully flaked on both sides. There is no evidence of grinding.

A single large unidentified base has been tentatively labelled as a large side-notched projectile point (Plate 6.1, item f). It is possible this item is the base of a hafted knife. The item was broken transversely just above one notch and partway through the other. Therefore not enough remains to accurately identify it to cultural tradition. What remains of the base indicates that the tool was very thick. The base is slightly concave, thinned and ground. The remaining notch is very wide and shallow.

The remaining four identified projectile points have been identified as Avonlea Triangular (Plate 6.1, items a,b,d,e). All of the points are broken transversely through the mid-point. One of the points can be reconstructed because both portions were recovered. Two of the projectile points were constructed from silicified peat and the remaining two of Swan River chert. The bases range from straight to slightly concave and they have been thinned but not ground. The points are finely-flaked bifacially. The end result is an overall thin point with an average thickness of only 2.8mm.

Seven fragmented projectile points were recovered that were not diagnostic. This total included six distal ends and one point broken transversely in three. The base was not recovered. Five of the fragments were of Swan River chert, one of quartzite and one of silicified peat.

Table 6.2 Projectile Point Metric Attributes(mm)

Specimen	Maximum Length	Blade Width	Thickness	Basal Width	Left Notch Width	Right Notch Width
Prairie SN	27.2	17.8	6.9	15.5	5.4	5.2
Prairie SN	30.0	15.6	5.2	12.7	7.2	-
Prairie SN	22.0	10.1	3.0	11.6	5.4	3.7
Prairie SN	15.1	11.6	2.4	-	-	3.7
Plains SN	18.4	13.8	4.8	13.9	3.9	5.0
Plains SN	-	11.2	2.8	-	3.0	2.2
Plains Tri	-	17.9	3.8	17.5	-	-
Large SN	-	-	5.9	20.4	7.1	-
Avonlea T	-	-	2.8	14.2	-	-
Avonlea T	-	11.3	2.2	11.5	-	-
Avonlea T	-	14.6	3.4	14.2	-	-
Avonlea T	22.9	10.8	2.7	13.8	-	-

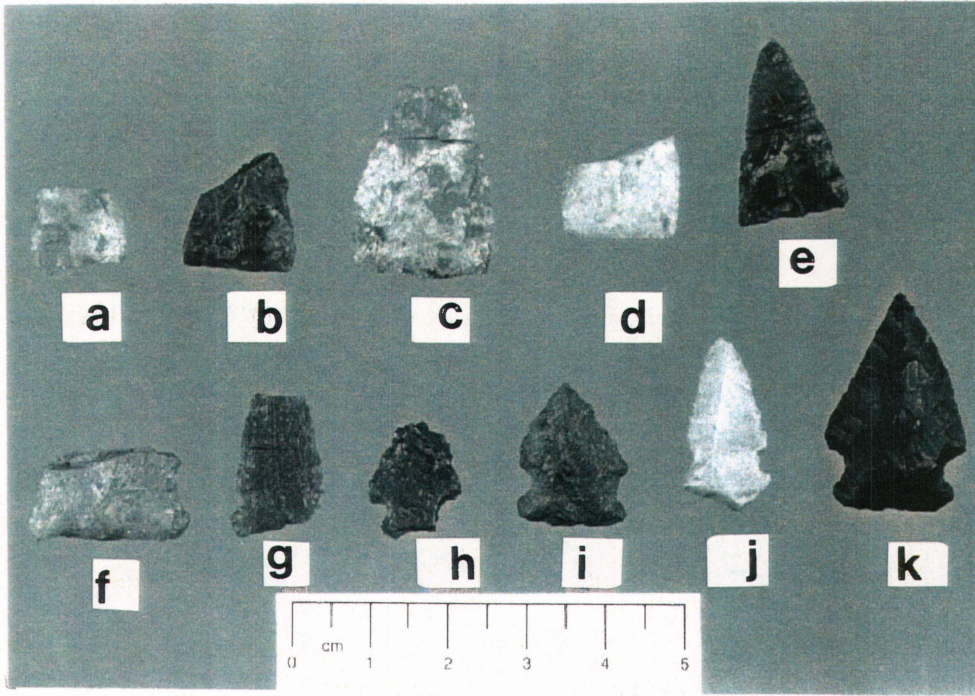


Plate 6.1 Projectile Points Occupation Level 2

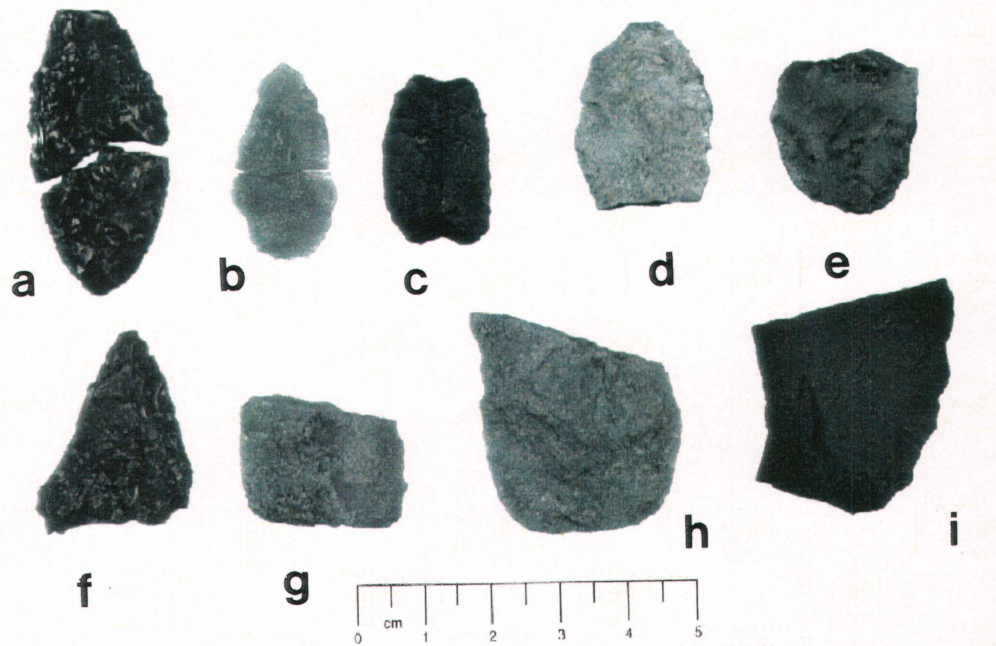


Plate 6.2 Bifacial Tools Occupation Level 2

6.2.2 Bifacial Tools (N=21; Plate 6.2, Table 6.3)

During the analysis of the lithic materials from the excavation of occupation level 2 19 bifacially flaked stone tools were identified including; one hafted biface, six knives, and 12 fragments too fractured to be identified.

The hafted biface is complete and was constructed of a split siltstone pebble (Plate 6.2, item c). The lateral edges are notched for hafting. The proximal edge is straight and the distal working edge is convex. The biface is flaked bifacially on the working edge and the lateral notched edges. Approximately 50% of the ventral surface contained flaking.

Six bifacial tools were identified as knives (Plate 6.2, items a,b,d,e). Two of knives were broken transversely through the mid-shaft (items a,b); fortunately both halves were located and could be conjoined. These two knives were made of Swan River chert and silicified peat. These two asymmetrical knives narrowed towards the proximal end.

Four partial knives of Swan River chert were identified. One knife, broken both transversely and along one lateral edge is distinctly asymmetrical (Plate 6.2, item e). The completed form might have been hafted, unfortunately the transverse break removed all evidence of a possible haft. The second knife is symmetrical; both lateral edges are convex, narrowing towards the proximal portion (Plate 6.2, item d). This biface is broken near the proximal end. The two remaining knives are amorphous in shape due to breakage patterns. However, they are definitely bifacial knives, possibly asymmetrical in shape.

The remaining 11 fragments of bifacial tools were, for the most part, too fragmented to identify tool use. Three of the larger fragments, all of Swan River chert, appear to be the bases of bifacial tools and possibly knives (Plate 6.2, items g,h). These fragments are all rounded “U” shapes and are relatively thick. While they have been bifacially flaked the edges do not appear to have been used for cutting since they have been blunted. The remaining eight fragments can not be identified. Five of the fragments are Swan River chert and one each of silicified peat, Gronlid siltstone and metamorphosed greywacke / green stone..

Table 6.3 Biface Metric Attributes(mm) Occupation Level 2

Specimen	Length	Width	Thickness
1	15.8	23.5	5.9
2	40.8	20.4	6.5
3	-	21.5	6.3
4	24.3	13.1	4.3
5	29.3	15.7	3.8
6	-	20.3	6.7
7	18.5	20.6	4.3
8	-	22.8	6.4
9	-	23.9	8.9
10	-	28.4	11.5
11	-	-	7.9
12	-	-	4.9
13	-	-	6.5
14	-	-	9.3
15	-	-	3.9
16	-	13.8	5.8
17	-	-	6.6
18	-	13.9	5.5
19	-	25.6	11.9
20	-	11.8	3.5

6.2.3 Perforators (N=1, Plate 6.2, item f)

The single perforator is constructed of silicified peat and is broken transversely near the proximal end. The blade is asymmetrical, one lateral edge is

straight and the other is slightly concave, curving down and out. The distal end is complete.

6.2.4 Unifacial Tools (N=9; Plate 6.3, Table 6.4)

Five end scrapers and four unidentified unifacial fragments were identified during the analysis of the cultural material from occupation level 2 (Plate 6.3, items a-c). The end scrapers range in quality of material and manufacture from the well-flaked Knife River Flint scraper to the coarsely flaked basalt scraper. Jasper and Swan River chert scrapers were also recovered. The end scrapers are roughly triangular in shape with the base of the triangle being the convex working edge. The proximal end forms the apex. The working edge is steep and is oriented

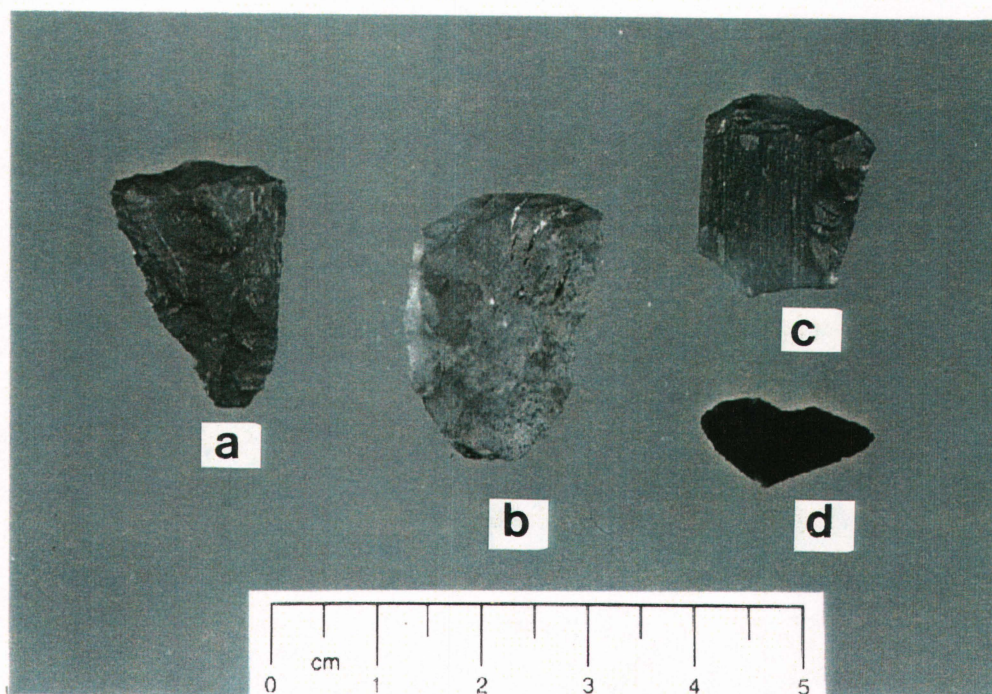


Plate 6.3 Unifacial Tools Occupation Level 2

perpendicular to the longitudinal axis. In cross-section, the end scrapers are plano-convex with slightly convex lateral edges except for one of the Knife River flint scrapers, which has straight lateral edges.

Four unidentified fragmented unifacial tools of quartzite, Swan River chert, obsidian and split siltstone pebble were recovered. The fragmented nature of these tools means that original use could not be determined. Of interest is the obsidian fragment (Plate 6.3, item d). This small fragment has unifacial flaking evident along the curved notch and the left curved surface. The flaking along this fragment is fine and well executed.

Table 6.4 Uniface Metric Attributes(mm)

Specimen	Length	Width	Thickness
1	24.4	13.9	3.4
2	36.3	22.7	6.8
3	18.1	15.3	3.6
4	25.3	17.2	4.9
5	23.1	15.8	5.6
6	-	-	3.0
7	24.6	-	5.6
8	-	-	6.7
9	-	-	2.4

6.2.5 Choppers (N=2)

Two choppers of quartzite were identified from the cultural assemblage. Both choppers were constructed from primary decortication flakes. One chopper had flaking present only on the ventral surface, the dorsal surface containing cortex. The addition of the ventral flaking to the sharp flake edge resulted in a workable expediency tool. The second chopper was constructed of a large flake (504.2 grams).

The dorsal surface is completely worked and the ventral surface has been slightly flaked. A striking platform is evident; the edges of the platform have been ground giving the chopper a “backed” effect.

6.3 Abraders (N=1)

The abrader, constructed of schist, was fragmented and only one fragment was recovered from this cultural level at a depth of 12.5cm below the surface. Another fragment was recovered from occupation level 3 at a depth of 17cm below the surface. These two fragments were also recovered three horizontal metres away from each other. The abrader is grooved on the interior working edge and flat on the exterior edge. Scorch marks are present on the exterior surface.

6.4 Hammerstones (N=2)

Two hammerstones were recovered from the excavation of occupation level 2. The hammerstones were quartzite cobbles with water-worn exteriors. One of the cobbles had crushing evident on the distal end and on one lateral side. The other hammerstone had crushing on the distal surface. Both hammerstones were fractured although there was no evidence of burning on any of the surfaces.

6.5 Cores (N=13)

A total of 13 cores were identified among the lithic material of occupation level 2. Swan River chert accounted for 11 of the cores, Cathead chert one, and Knife River flint one. One of the Swan River cores was a bipolar split pebble. The dorsal

surface was cortex and there was a single flake scar present on the ventral surface.

Crushing was evident at both ends.

The Cathead chert core was a random, irregularly shaped core that contained the remnant of a striking platform at one end. Flakes were removed from both ends as is evidenced by crushing and step fractures seen at both ends. A large vug was present at the opposite end of the striking platform.

Of the remaining 11 cores, one is heat treated with burning present on the dorsal surface, three have striking platforms, six have crushing at one end, and three have crushing at both ends. One of the cores had the striking platform prepared by the removal of two flakes. Based on the direction of the flake scars and the presence of step fractures, four cores had flakes removed from more than one direction.

6.6 Flaked Lithic Debitage

The excavation of occupation level 2 revealed a total 8,368 flakes and pieces of shatter (Table 6.5). The majority of flakes by material type were Swan River chert 39.9% (3,338) and chert 29.3% (2,453). Recovered were 987 pieces of silicified peat (11.8%), 658 flakes of quartzite (7.9%) and 387 pieces of Knife River flint (4.6%). The remaining 6.5% of flakes and shatter were divided between 15 different material types.

Tertiary flakes accounted for the largest category of flakes and shatter recovered from this occupation level, consisting of 83.1% of lithic debitage recovered. Secondary flakes were the second most common with 12.4% followed by shatter (2.5%). Primary flakes composed only 2% of the debitage recovered.

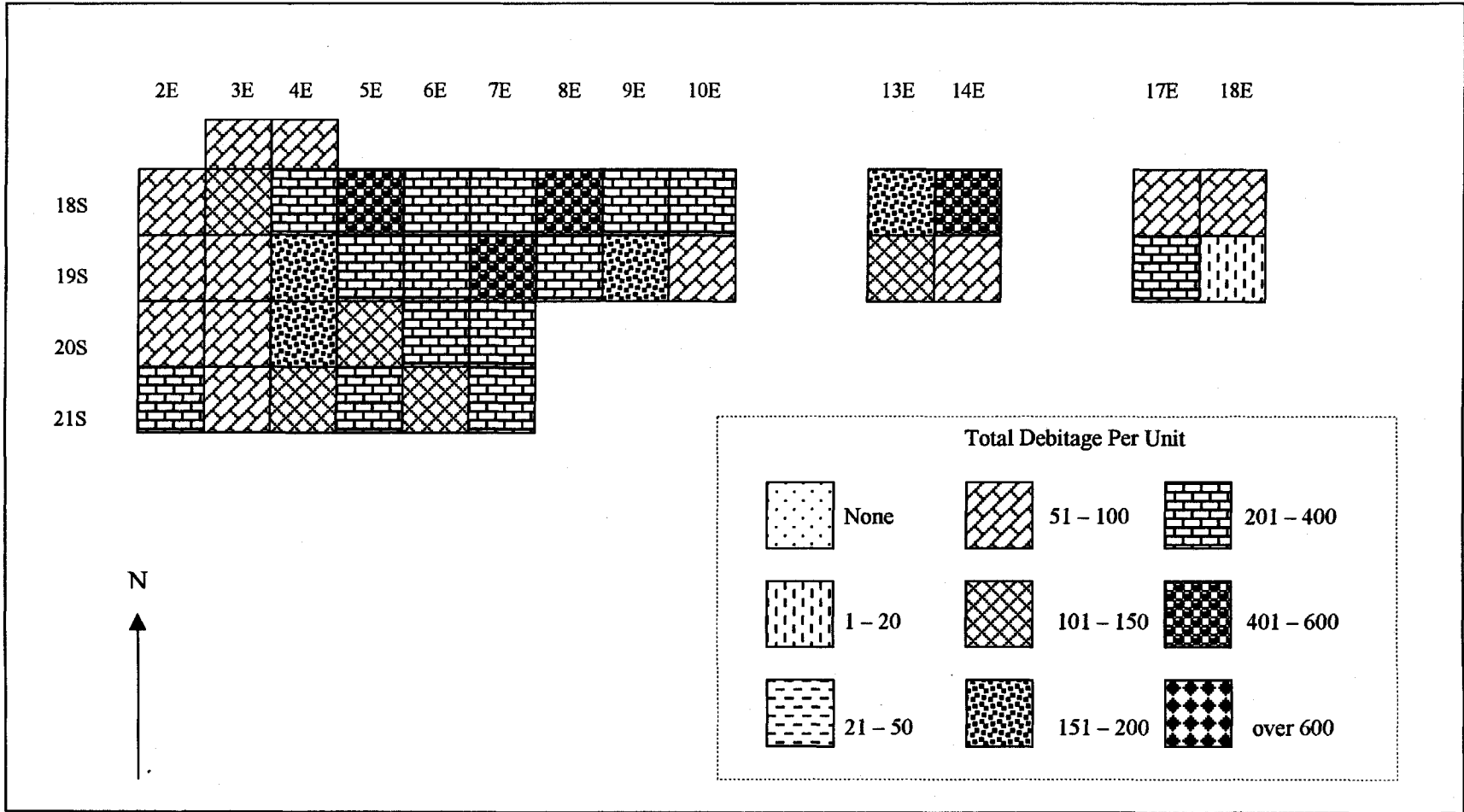


Figure 6.1 Lithic Debitage by Number Occupation Level 2

Table 6.5 Flaked Lithic Debitage Occupation Level 2

Material type	Primary	Secondary	Tertiary	Shatter	Total
Swan River chert	113	615	2510	100	3338
Chert	5	1	2447	0	2453
Silicified peat	13	153	779	42	987
Quartzite	11	149	492	6	658
Knife River flint	0	2	384	1	387
Quartz	5	61	114	39	219
Gronlid siltstone	9	4	92	2	107
Greywacke	2	25	33	10	70
Siltstone	1	2	28	0	31
Jasper	2	5	14	0	21
Chalcedony	0	1	19	0	20
Agate	0	2	17	0	19
Fused shale	3	5	7	1	16
Diatomite	1	6	1	5	13
Obsidian	0	0	13	0	13
Silicified wood	2	4	5	2	13
Cathead chert	0	1	0	0	1
Sandstone	0	0	0	1	1
Schist	0	0	0	1	1
Totals	167	1036	6955	210	8368

Heavy concentrations of lithicdebitage are evident from the pattern distribution map (Figure 6.1). The heaviest concentrations are located in the centre of the excavation towards the eastern portion of the main excavation trench. The eastern most units contain littledebitage (19S18E contains 1 flake, 18S18E and 18S17E contained only 74 and 59 flakes respectively). The units with the heaviest concentrations ofdebitage are those located near to excavated hearths. Hearths were located in units18S14E, 18S7E, and the border of units 19S5E and 19S6E. Two features were identified as lithic reduction stations; one located in unit 21S2E (feature 2-8) and the other in unit 21S7E (feature 2-9).

6.7 Fire-Broken Rock

Occupation level 2 contained a total of 2,942 fragments of fire-broken rock with a total weight of 24.2 kilograms (Table 6.6). Granite composed 92% of all fire-broken rock recovered by weight.

There was no obvious clustering evident during the excavation of occupation level 2 (Figure 6.2). Even though there was evidence of three hearths within this excavation, these hearths were small, containing little fire-broken rock. The fire-broken rock recovered was distributed throughout the excavated units; the most concentrated unit contained 1.9 kilogram of material. The two most eastern units, 18S18E and 19S18E, contained no evidence of fire-broken rock.

Table 6.6 Fire-Broken Rock (Grams) Occupation Level 2

Material type	Number	Weight
Granite	2903	22236.9
Greywacke	11	838.9
Quartzite	14	585.0
Sandstone	11	379.3
Schist	3	118.8
Totals	2942	24158.9

6.8 Occupation Level 2 Features

Ten features were located during the excavation of occupation level 2 including three hearths, two lithic reduction stations, an ash lens, a bone pit and three organic stains. One of the organic stains appears to be either a spill or a discard region.

Two features were located in the northeast quad of unit 18S7E. Feature 2-1 is a hearth and directly to the south of the hearth is Feature 2-2 a small bone pit. The

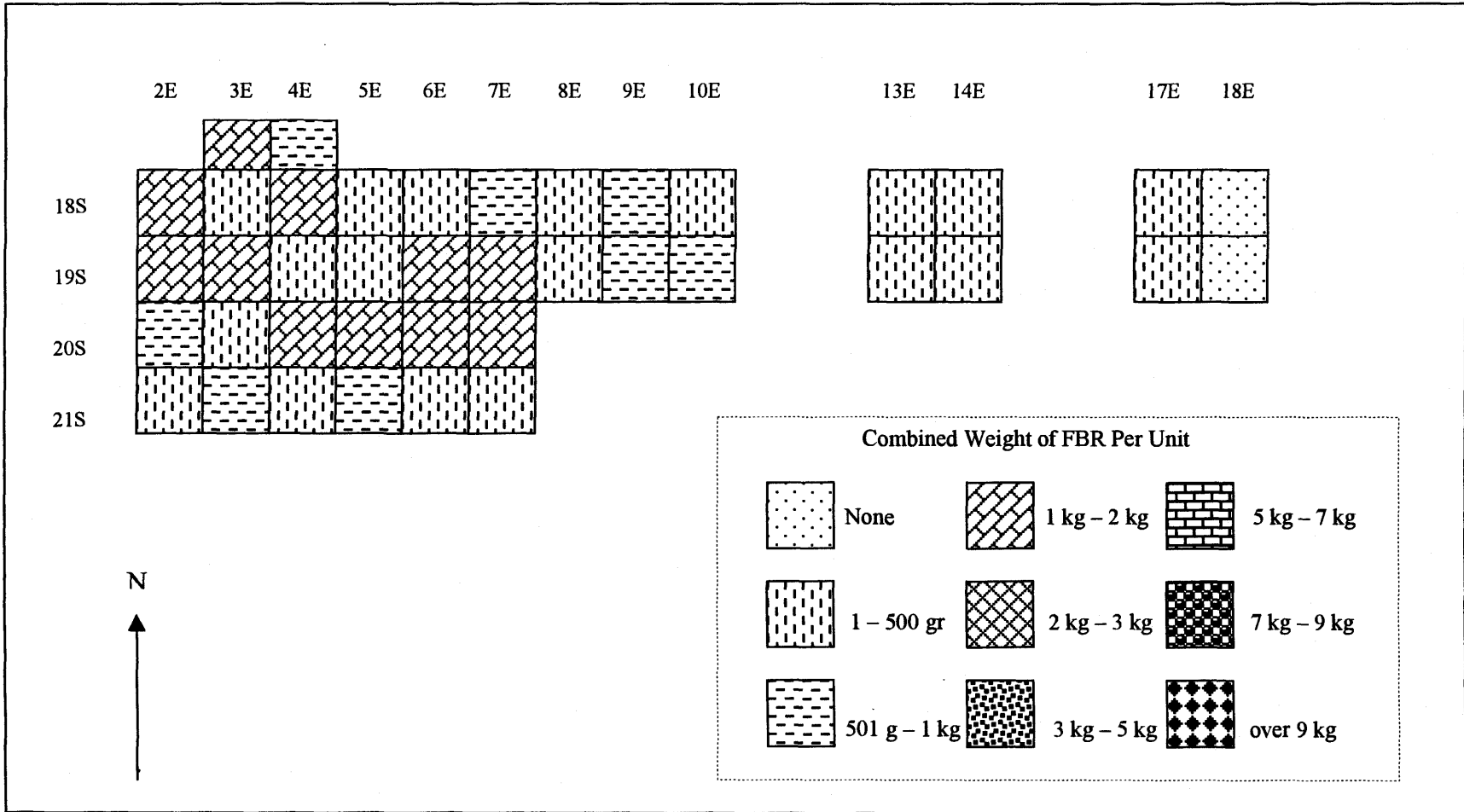


Figure 6.2 Fire-Broken Rock by Weight Occupation Level 2

hearth was present between 7 and 10 cm below the surface, totally disappearing at 10 cm below the surface. It extended from the north wall 30 cm and from the east wall 38 cm. The black matrix contained red streaks indicating where the soil had been oxidized from the heat of the fire. The stain was widest at the north wall of the unit implying an extension of the hearth into the unexcavated unit to the north. Calcined bone was recovered from the hearth in small quantities. The fine screen analysis of the soil from the hearth (Webster 1999) contained almost all of the seeds recovered from the excavation of occupation level 2.

The second feature (2-2), the bone pit, is located directly south of the hearth. The feature was excavated in two stages. The depth below the surface of this feature is between 9.5 and 11.5 cm in the first exposure of the feature and down to 14 cm in the second exposure. A large amount of unidentifiable bone fragments were recovered from this area along with a number of identifiable elements. An ulna fragment, scapula fragments, and an unspecified long bone exhibiting cut marks were recovered from the exposure of the bone concentration. The second exposure yielded a tibia fragment, a third phalanx, the fragmented mandible and deciduous teeth identified with an immature bison and again a large amount of unidentifiable bone fragments. In the first exposure, the concentration was centred in the central eastern portion of the northeast quadrant shifting to the southeast corner of the northeast quadrant in the second exposure. A nodule of red ochre was recovered from the first exposure and a heat-treated nodule of Swan River chert was recovered from the second exposure.

Feature 2-3 is the possible result of the decomposition of an organic matter located in unit 18S6E. This feature is circular in composition with dimensions of 17 cm by 16 cm located close to the center of the unit. This feature diminishes with depth disappearing by the end of the second occupation level. The matrix is described as having a greasy texture and is black. Canid elements were associated with the organic stain.

Feature 2-4 was located in unit 19S6E in the northwest quadrant near the bottom of occupation level 2 and the top of occupation level 3. This feature is half-moon in shape and appears to be the edge of a fire pit or hearth based on the red staining of the pit suggesting the oxidization of the soil and the evidence of a moderate amount of charcoal in the area. There are, however, no rocks or stones demarcating the feature. The feature has been identified as a roasting pit, most likely for the immediate consumption of small mammals. Analysis of the faunal remains recovered from the pit indicates the presence of very few bison elements. Also recovered was a considerable amount of burned elements from rabbit, vole and weasel (Webster 1999). Little else can be determined about this feature since most of the feature appears to have been part of the test pit that is located to the west of this unit, therefore some of the borders were estimated because they were not drawn on planviews.

Feature 2-5 is a very large feature covering all quadrants of units 20S4E and 20S5E, the northeast and southeast quadrants of 21S4E, the northeast and northwest quadrants of 21S5E and 21S6E. This feature consists of a greasy, dark stained soil filled with extremely fragmented burned and calcined bone. Portions of the feature

contain almost no matrix just fragmented bone. The depth of the feature averages between 8 and 13 cm below the surface. Some of the borders of the feature have been estimated because the presence of the feature was not drawn on the appropriate plan views. The appearance of the feature implies dispersal of the original feature from west to east, possibly the result of over bank flooding.

Feature 2-6 is described as a soil stain present in the northwest quadrant of unit #20S2E. The stain has an irregular shape, extending into the northeast quadrant of unit #20S1E, which has not been excavated. Fragments of bone and fire-broken rock were recovered from the interior of the stain as well as a silicified wood bifacial knife.

Identifiable bison and non-bison bone found within the stain include fragmented bison humeri, long bone shafts, metatarsals, cervical vertebrae and a complete fused 2nd and 3rd tarsal. All of the bones were fragmented and unburned. Small amounts of charcoal were recovered from the stain, however, not enough to be collected and catalogued. This implies a possible dump of materials or the result of the decomposition of organic materials together with discarded butchering elements.

Feature 2-7a was located in unit 18S14E. The feature was first located as a black, greasy stain in the northeast and southeast quadrants at an initial depth of 8 cm. Between 10-15 cm below the surface, excavation revealed a circular, basin-like deposit concentrated in the northeast quad with small portions in the southeast and northwest quadrants. The stain appeared to be composed of a reddish-orange clay-like substance. The most likely explanation for this feature would suggest a type of hearth. The stain disappeared at a depth of 16.5 cm. There was no significant

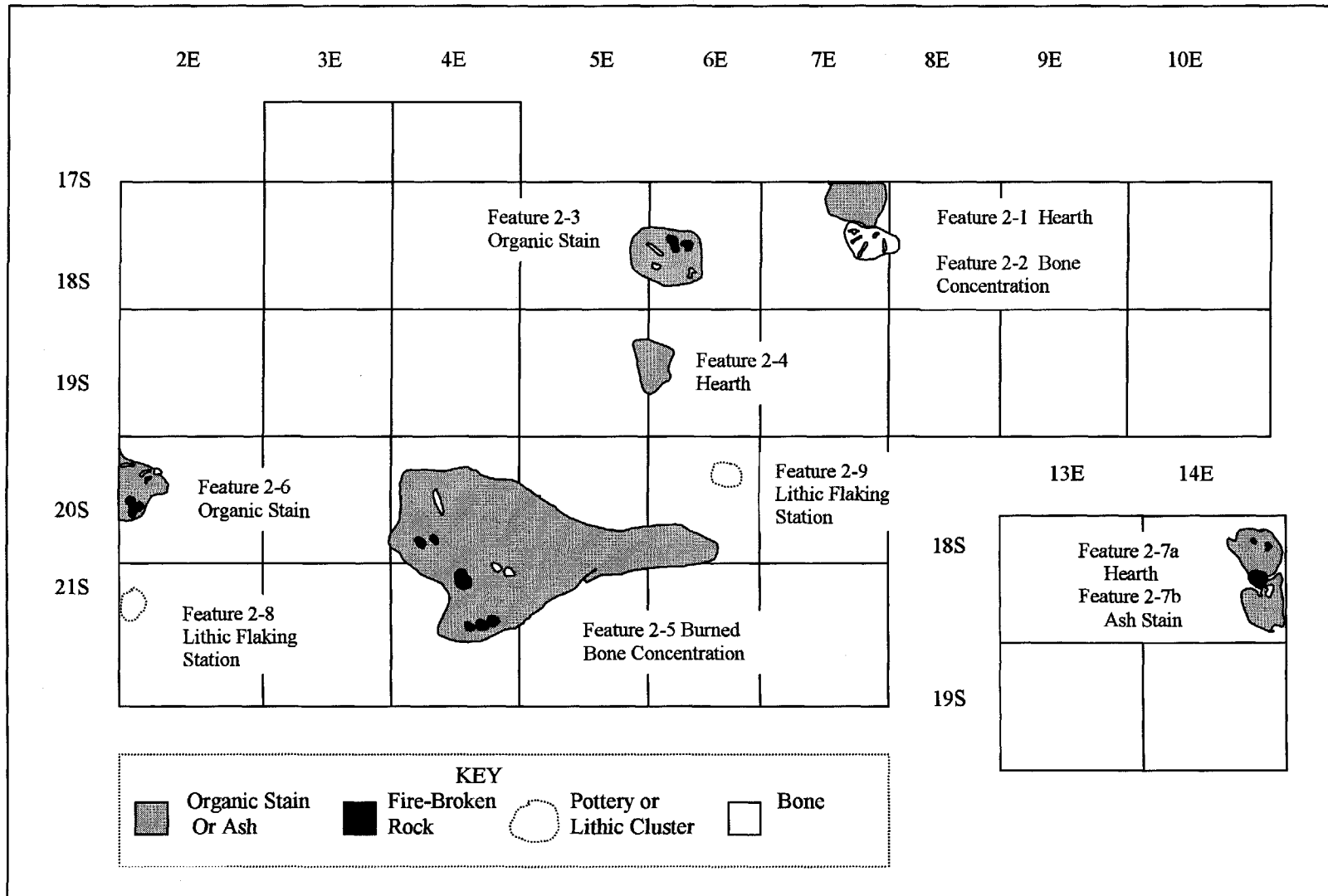


Figure 6.3 Feature Location and Description Occupation Level 2

amount of charcoal or burned artifacts found within the feature, however, the soil from within and around the feature was collected and bagged for flotation.

Neighboring units (18S13E and 19S13E) contain conjoinable rib fragments, a partially complete bison maxilla and two large anvil stones suggesting secondary bone breakage was occurring in the vicinity of the hearth. Feature 2-7b is described as an ash lens protruding from Feature 2-7a. Burned bone, charcoal and fragmented fire-broken rock are present. Configuration of ash lens indicates rodent disturbance.

Feature 2-8 appears to be a flaking station concentrated in the northwest quadrant of unit #21S2E. The lithic concentration appears at a depth below the surface of 13.5 cm. This concentration of lithics contained 169 flakes with a total weight of 6.1 grams. Of these flakes, 163 were tertiary and 6 were secondary. All of the flakes have been identified as Swan River chert.

Feature 2-9 was a lithic flaking station located in the southwest quadrant of unit #20S7E at a depth of 7.5 to 10 cm. In total area the flaking station has a diameter of only 10 cm. During excavation, a large number of chert tertiary flakes were observed so the matrix around and including the station was collected and dry-fine screened. The result of this fine screening was the recovery of 199 chert tertiary flakes with a total weight of 4.6 grams. These items obviously indicate secondary retouch.

6.9 Occupation Level 2 Interpretations

Occupation level 2 is a culturally mixed level containing four morphologically different projectile points; Prairie Side-notched, Plains Side-notched, Plains

Triangular, and Avonlea Triangular. The projectile points were recovered from depths varying between approximately 6 cm to a depth of 18 cm below the surface.

The Avonlea Triangular points were recovered from two excavated units: unit 18S5E (3) and unit 19S3E (1). Three of the projectile points were recovered *in situ* with a depth of between 12 and 13.5 cm below the surface. The fourth point was recovered from a fragment bag with an overall depth of 10 to 15 cm. This would indicate that even with the mixing of the matrix, the Avonlea Triangular projectile points were located near the base of the stratigraphic level. Only two projectile points were recovered at a depth lower than that seen with the Avonlea Triangular: one of the Prairie Side-notched points was recovered from a depth of 18 cm and a single Plains Side-notched points was recovered from 14 cm below the surface. The remaining Prairie Side-notched, Plains Side-notched and Plains Triangular projectile points were recovered between 6 and 11 cm below the surface.

The majority of the features appear to be located in the central portion of the excavation. Only one hearth and its associated ash lens are located near the eastern portion of the site. The extreme east of the excavation has no evidence of features. Therefore, it appears as if the main activity area of the site was located around the center of the trench.

Although the heaviest concentration of lithic debitage was centred in or around the units that contained the hearth features (Figure 6.2), all of the units except for unit 19S18E contained over 50 pieces of debitage. The large amount of debitage scattered over the entire excavation indicates a great deal of lithic activities. Considering that 83.1% of the lithic debitage were tertiary flakes and only 2% were

primary flakes, this would indicate that the primary lithic activity was the re-sharpening of already constructed tools as opposed to the making of new tools. This would be consistent with a secondary-processing site where tools were re-sharpened during the processing of faunal materials.

Fire-broken rock was scattered fairly evenly throughout the site. The total weight of all of the fire-broken rock came to only 24.2 kilograms. This is a relatively low amount considering the presence of three hearths; however, the hearths themselves contained little fire-broken rock. There were no accumulations suggesting the presence of stone-boiling pits or any activities suggesting the processing of bone grease.

There is no indication of any habitation structure present on this location. All of the excavated units are cluttered with debris, either lithic, faunal or both. The amount of debris is more consistent with an activity area as opposed to a habitation area. As well, the condition of the faunal remains (Webster 1999) indicates that these elements were being further processed instead of initial butchering. Therefore, this occupation was most likely a secondary-processing site for already butchered animals.

The faunal remains (Webster 1999) have determined seasonality for this occupation level. The faunal remains include bison foetal elements, elements identified as belonging to a seven to ten month old bison calf and several elements from a bison calf identified as being approximately one week in age. Identified species also include badger and skunk. The foetal elements and the seven to ten month old would indicate an occupation of winter while the one-week-old bison calf

would indicate a spring occupation. The presence of the badger and skunk would tend to support a spring occupation because these two species would be hibernating during the winter. Therefore, the faunal remains would suggest multiple occupations, which would be consistent with the cultural materials recovered.

Chapter 7

Occupation Level 3

7.1 Introduction

The third occupation level is situated at the base of the upper-most organic-rich stratigraphic level in what Burt (1997) has identified as a slightly gravelly, sandy mud. Artifacts belonging to this level have been recovered from depths varying between 15 and 25 cm below the surface. The thickness of this stratigraphic level indicated the possibility that more than one occupation was included within the profile, however, there was no clear demarcation visible to indicate where such separation might be located. The exception to this is in the extreme western units of the excavation where sterile soil was located separating occupation level 3 into two separate levels. However, since the materials from these extreme western units are not included within the analysis of the site, occupation level 3 is analyzed as a single level.

Four different types of projectile points were recovered from this level of the excavation; Besant, and Avonlea Triangular, small corner-notched and and a large Side-Notched variety. Besant projectile points range in age between 2000 and 1150 years B.P. and Avonlea between 1750 and 1150 years B.P. (Dyck 1983). Therefore it

can be stated that the period of occupation for this occupation level should be between the extremes of the above dates.

7.2 Flaked Stone Tools

A total of 90 partial or complete stone tools were recovered from the excavation of occupation level 3. Table 7.2 lists the various categories of these stone tools and their frequency within the total assemblage. The majority of the items listed in Table 7.1 can be listed as chipped stone tools because of the varying degrees of retouch. Cores are not included in this table.

Table 7.1 Frequency Distribution of Stone Tool Types of Occupation Level 3

Tool Type	Frequency	Percent
Projectile points	13	14.4
Knives	17	18.9
Perforators	7	7.9
Gravers	1	1.1
Choppers	6	6.8
Biface fragments	11	12.2
End scrapers	18	20.0
Unifacial gravers	2	2.2
Spokeshaves	3	3.3
Choppers	1	1.1
Unifacial fragments	3	3.3
Abraders	1	1.1
Burnisher	1	1.1
Grooved mauls	2	2.2
Hammerstones	4	4.4
Total	90	100.0

7.2.1 Projectile Points (N=13; Plate 7.1, Table 7.2)

A total of 13 complete or partial projectile points were recovered from this level of the excavation. A mixture of points from different cultural affiliations attests

to the stratigraphic mixing present in the site. Projectile points types included within this occupation level are Besant (4 points), large side-notched points (2 points), one small corner-notched point and two Avonlea Triangular points.

Two of the four Besant Series projectile points are complete (Plate 7.1, items c,d). The third projectile point (Plate 7.1, item b) is broken near the distal end, removing the tip and part of one lateral edge while the fourth point has been broken transversally through the distal end and through the base. All four points are side-notched with shallow, rounded notches. Two of the bases are straight and two are concave. The notches have all been thinned, however, there is no evidence of grinding.

Two partial projectile points have been identified as large side-notched points (Plate 7.1, items g,h). Both points have been broken transversally with only the base remaining. These points were constructed of Swan River chert. Both bases were thinned while one was ground as well. The notches that were present are wide, shallow and rounded.

Two Avonlea Triangular projectile points were identified (Plate 7.1, items f,j). Item j is broken transversally near the distal tip, which was not recovered. The point is very thin in width and could be stated to be delicate. The corner-notched projectile point was complete with deep notches and sharp barbs. The blade was triangular and the base was straight, thinned and ground. This contrasts with the final projectile point recovered from this occupation level (Plate 7.1, item f). The point is constructed from siltstone and it is asymmetrical in form. One lateral edge is slightly convex in shape while the other lateral edge has the appearance of a definite shoulder.

This edge has been broken and reworked. The base is thinned on only one surface and there is not evidence of grinding. The blade portion is also thickened in the center. The appearance of this projectile point indicates that after it was broken an attempt was made at repair which does not appear to have been successful.

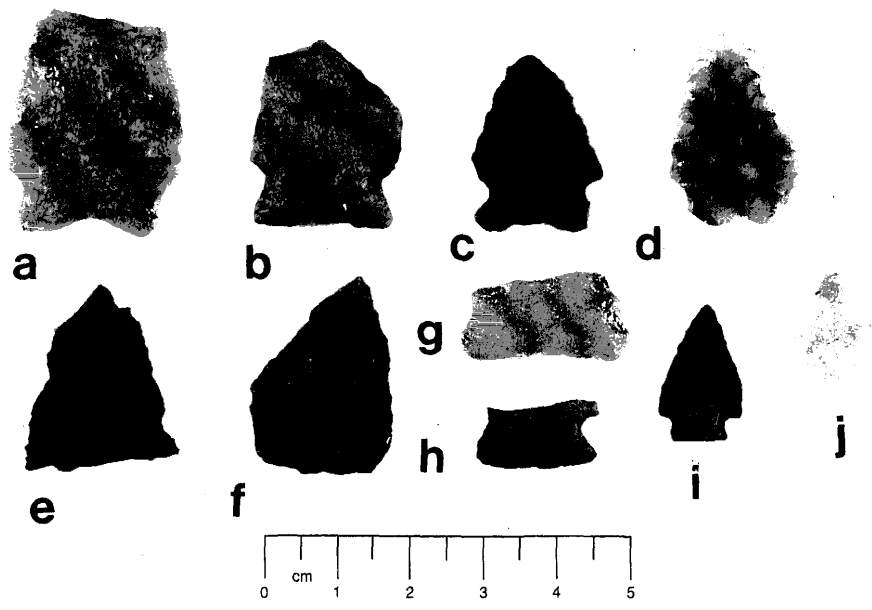


Plate 7.1 Projectile Points Occupation Level 3

Also included are one preform, two distal tips and a partial base. The preform is constructed of fused shale (Plate 7.1, item e). There is no base, however, there is some evidence of an attempt at notching. The preform is broken transversally at the proximal end and the appearance is that of breakage while notching the base. The preform is crudely flaked and the lateral edges are jagged. The partial base is constructed of silicified peat and the distal tips are made of chert and quartzite. None of these four fragments are diagnostic.

Table 7.2 Projectile Point Metric Attributes(mm) Occupation Level 3

Specimen	Maximum Length	Blade Width	Thickness	Basal Width	Left notch Width	Right Notch Width
Besant	24.8	14.4	3.8	15.7	5.2	3.9
Besant	-	20.5	5.7	19.9	5.8	5.9
Besant	26.7	16.4	5.2	13.6	5.6	4.8
Late PrairieSN	-	23.9	6.5	20.7	6.5	6.4
Late PrairieSN	-	-	4.7	23.2	5.1	4.9
Late PrairieSN	-	-	4.9	16.4	-	4.3
Avonlea	18.6	11.4	2.9	7.8	3.7	3.5
Avonlea T	-	-	2.9	14.5	-	-
Avonlea T	27.1	19.7	5.2	16.4	-	-
Preform	24.6	14.0	4.9	21.4	-	-

7.2.2 Knives (N=17; Plate 7.2, 7.4, Table 7.3)

17 complete or partial knives were recovered from the excavation. Eight of the knives were complete and a ninth was broken transversally near the distal end however both segments were recovered (Plate 7.2, items b,d). Three of the knives were leaf-shaped and the remaining knives were asymmetrical in shape. All of the knives were lenticular in cross-section.

The incomplete knives were broken transversally through the blades, with either the proximal or the distal end remaining. Six of these knives were constructed of Swan River chert and the seventh of Knife River flint. The distal end of the Knife River flint knife was recovered (Plate 7.2, item i). This knife was finely flaked and asymmetrical in shape. Four of the Swan River chert knives consisted of broken proximal ends. One of these proximal ends was crudely constructed. The two distal portions were well constructed. Unfortunately, not enough remains to determine the outline of the knives.

7.2.3 Perforators (N=7, Plate 7.3)

Seven bifacial tools were identified as perforators, five were complete and two were fragmentary. One of the fragmentary perforators was constructed of obsidian (Plate 7.3, item f), the other of Swan River chert. Four of the complete perforators were constructed of Swan River chert and the remaining artifact of silicified peat. One perforator is a reworked projectile point broken laterally near the distal end (Plate 7.3, item g). The remaining portion of the distal end was reworked into the perforator.

7.2.4 Graver (N=3)

The analysis of this occupation determined the presence of three gravers. The graver identified in Plate 7.3 (item a) is unifacially flaked except for the distal edge which is bifacially flaked. This graver is constructed of Swan River chert and is complete. The tool is triangular in shape; the proximal end is the base of the triangle with the working edges the apex. Two other gravers were identified, one of cathead chert and the other of Swan River chert. Both were flaked unifacially and appear complete. The cathead chert engraver has the engraving point on one lateral edge. Flakes have been removed from this distal lateral edge in a burin-like manner to form the working point. The other engraver has the working portion located at the distal point.

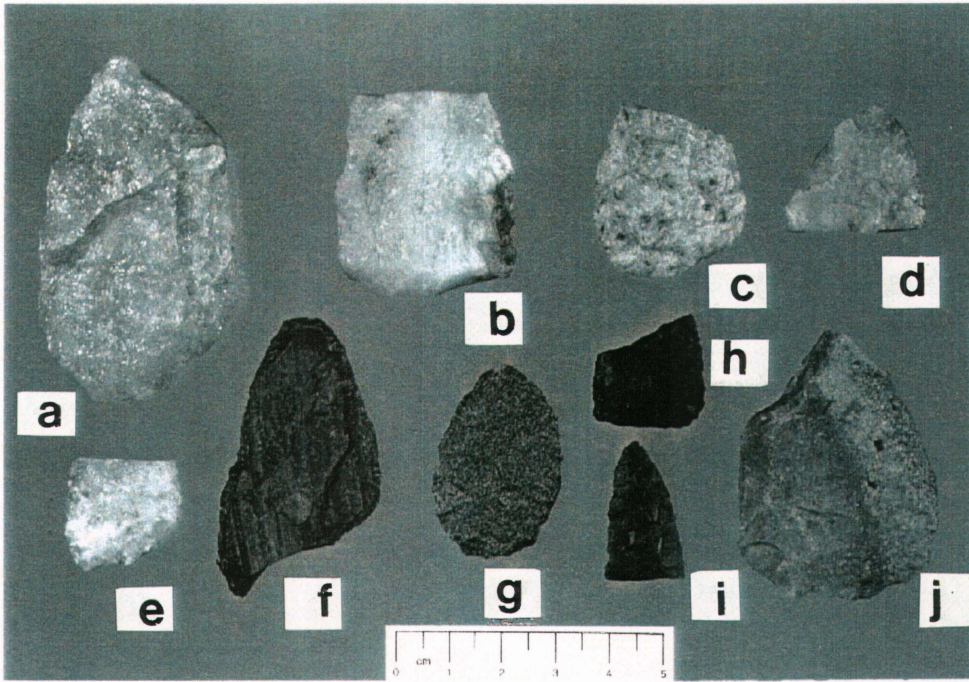


Plate 7.2 Bifacial Knives Occupation Level 3

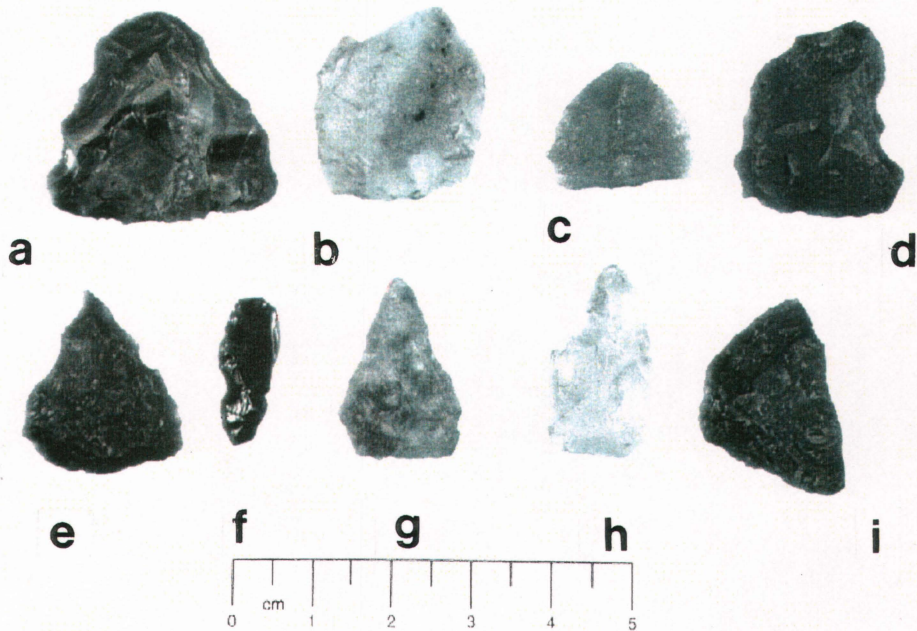


Plate 7.3 Bifacial Tools Occupation Level 3

Table 7.3 Bifacial Tool Metric Attributes Occupation Level 3

Specimen	Length	Width	Thickness
Chopper/graver	104.6	60.5	23.3
Chopper	-	77.6	26.9
Knife	82.1	52.3	16.9
Knife	111.8	63.1	16.5
Knife	80.9	67.3	24.5
Chopper	125.2	77.7	39.7
Knife	63.3	44.9	13.9
Chopper	139.9	85.7	46.7
Chopper	123.7	100.9	44.5
Chopper	120.9	78.0	24.5
Knife	34.8	22.4	7.9
Knife	-	30.3	4.2
Knife	63.9	38.2	13.3
Perforator	23.6	13.8	4.3
Perforator	22.4	15.4	4.9
Perforator	23.9	19.2	5.3
Perforator	-	-	3.4
Perforator	21.4	18.4	9.3
Knife	36.2	24.3	9.5
Perforator	22.9	20.9	4.9
Knife	50.7	36.6	10.4
Knife	-	13.8	3.9
Knife	-	29.6	12.9
Graver	26.2	28.3	8.9
Knife	-	18.2	6.5
Knife	-	21.3	7.3
Knife	-	26.6	6.6
Knife	60.7	28.4	8.5
Knife	-	-	8.7
Chopper	74.7	78.4	29.6
Perforator	18.6	-	3.4
Unid	-	-	4.1
Unid	-	20.2	4.6
Unid	-	-	6.9
Unid	-	22.6	7.1
Unid	-	-	3.9
Unid	-	-	5.9
Unid	-	-	7.9
Unid	-	-	10.2
Unid	-	-	9.4
Unid	-	-	11.9
Unid	-	-	4.2

7.2.5 Choppers (N=6)

Six bifacial choppers were identified, four of quartzite, and one each of Swan River chert and metamorphosed greywacke / greenstone. Five of the choppers were complete and two had evidence of burning. The incomplete chopper was broken midshaft (Plate 7.4, item d). Striking platforms were present on two of the choppers and three were backed. One was ovate, four were elongate and the fragmented chopper indeterminate. One of the choppers (Plate 7.4, item f) contained a striking platform and a backed lateral edge. The distal end was also flaked to form a graver.

7.2.6 End scrapers (N=17)

18 end scrapers were recovered from this portion of the excavation. The end scrapers were constructed from a variety of material types; Swan River chert end scrapers were the most common in that eight were identified. Two end scrapers were identified from each of the following; cathead chert, diatomite and quartzite while Gronlid siltstone, agate and Kinfe River flint each accounted for one end scraper.

The majority of the end scrapers were complete, only five of the 17 end scrapers were fragmented. One of the quartzite end scrapers was fragmented into a number of pieces, three of which were recovered (Plate 7.5, item a). The other quartzite end scraper was also fragmented into several pieces, only one was recovered. The other end scrapers were broken transversally through the tool; the proximal portions were not located.

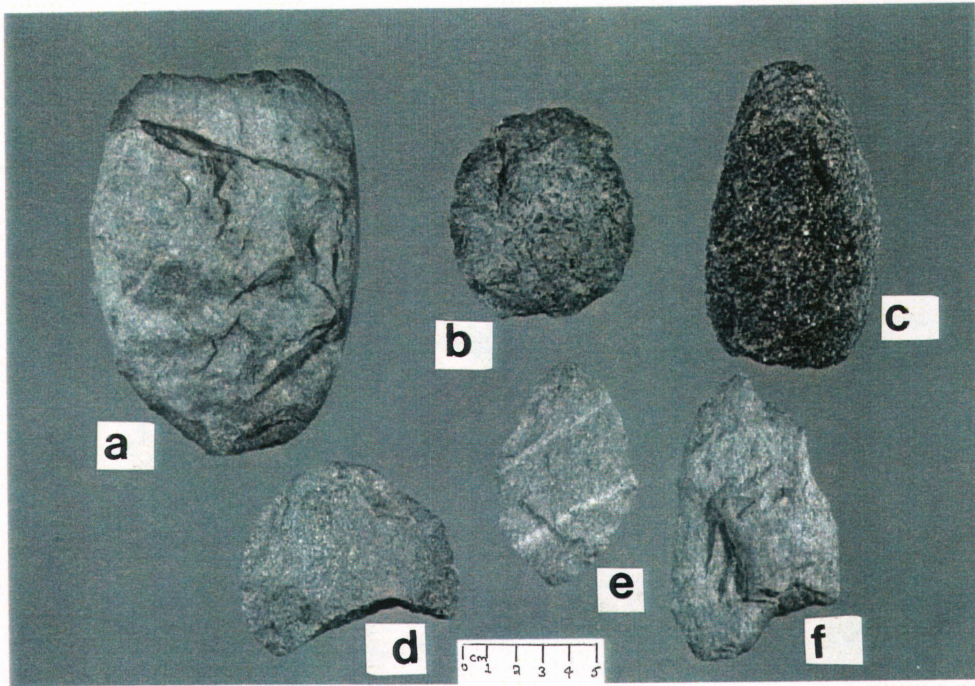


Plate 7.4 Unifacial Choppers (a) Bifacial Choppers (b,d,f) Knives (c,e)

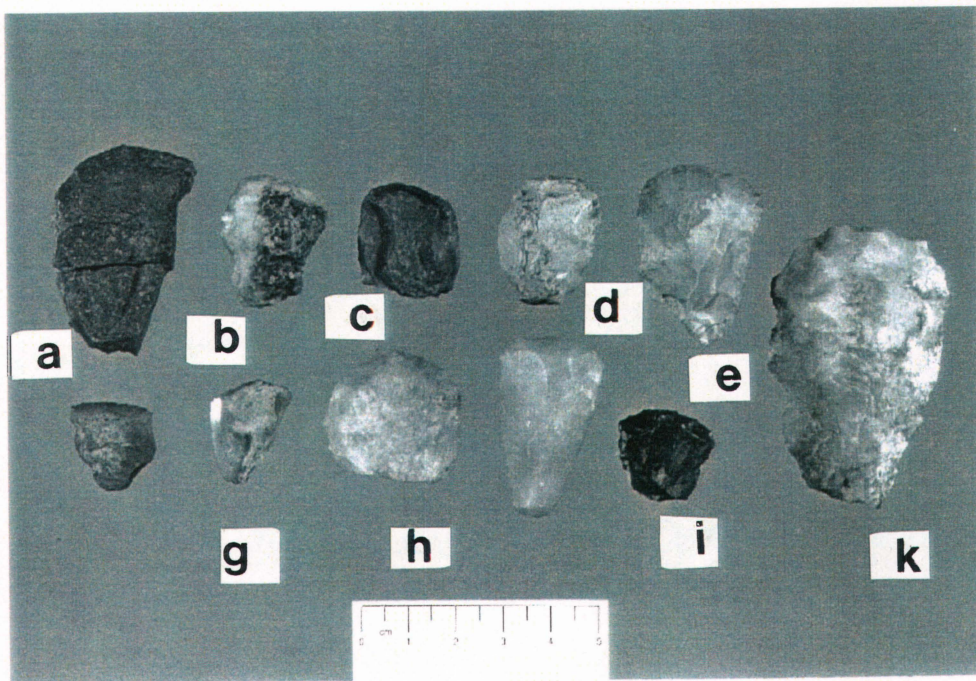


Plate 7.5 End Scrapers Occupation Level 3

The quality of flaking varied among the tools. Some of the tools were finely flaked over the entire dorsal surface while others were crudely flaked just enough to form the tool. This sometimes was a reflection of the quality of the material utilized; the diatomite end scrapers were rough tools as were the scrapers constructed from coarse Swan River chert containing large vugs. End scrapers constructed from fine quality Swan River chert and cathead chert tended to exhibit better flaking.

Overall, the scrapers followed a general pattern in that the end scrapers were plano-convex in cross-section. The overall shape is triangular; the base of the triangle is the distal working edge, which is usually slightly to moderately convex. The apex of the triangle is the proximal end. The lateral edges are usually slightly convex, however parallel straight and asymmetrical lateral edges are seen.

7.2.8 Spokeshaves (N=3)

The three spokeshaves are coarsely constructed unifacial tools that appear as if they were expediency tools. The spokeshaves were constructed of diatomite, quartzite, and Swan River chert. All three appear fragmentary in that only a portion of the curved flaked region remains.

7.2.8 Choppers (N=1)

The unifacial quartzite chopper (Plate 7.4, item a) is crudely flaked, resembling an expediency tool. This large tool has been constructed from a decortication flake; the dorsal surface is entirely cortex and a few flakes have been

removed from one lateral edge on the ventral surface. No evidence of sharpening is present, implying discard after initial use.

Table 7.4 Unifacial Tool Metric Attributes (mm) Occupation Level 3

Specimen	Length	Width	Thickness
Chopper	133.2	98.4	45.9
End scraper	57.6	36.5	18.8
End scraper	19.8	20.5	5.8
End scraper	38.5	21.8	10.9
End scraper	21.9	17.2	5.6
End scraper	37.1	25.9	12.9
End scraper	20.3	28.6	9.5
End scraper	28.5	20.8	11.7
End scraper	18.9	17.1	5.3
End scraper	43.4	54.8	8.5
End scraper	-	21.3	5.7
End scraper	-	28.1	9.2
End scraper	34.3	20.3	7.9
End scraper	-	-	7.8
End scraper	24.3	15.1	4.9
End scraper	-	-	8.6
Engraver	27.7	12.9	5.4
Spokeshave	28.2	37.5	14.4
Engraver	22.8	17.3	4.9
End scraper	-	20.7	6.7
End scraper	33.8	14.1	5.7
End scraper	28.7	17.7	6.9
Spokeshave	-	-	10.7
Spokeshave	-	-	11.7
Unidentified	-	-	5.7
Unidentified	-	-	11.8
Unidentified	-	-	12.2

7.3 Abrader (N=1)

The schist abrader (Plate 7.6) has a grooved working surface on the interior portion of the tool. The exterior is flat and contains evidence of burning. The abrader has been fragmented and this fragment was recovered from a depth of 17 cm below the surface. An additional fragment was recovered during the excavation of

occupation level 2 at a depth of 12.5 cm three horizontal metres distance. This is an indication of the stratigraphic mixing of materials present in this site.

7.4 Burnisher (N=1)

The burnisher (Plate 7.7) is a small oval granite pebble that has been polished and has evidence of burning on one surface. This small pebble weighs only 24.1 grams. There is no evidence of pecking or crushing on any of the surfaces. It is likely that this is a burnisher for pottery.

7.5 Grooved Mauls (N=2)

The third occupation level contained two examples of grooved mauls. The larger of the two (Plate 7.8) was recovered from the large boiling pit located in unit #19S13E at a depth of 81cm. The maul was almost complete yet friable. Evidence of burning and its location within the bottom of the boiling pit implies use as fire-broken rock. The granite cobble was grooved completely around the center to a depth of 9.0mm. The groove itself was 31.0mm wide and the maul weighed 2.4 kilograms.

The second grooved maul (Plate 7.9, item a) was recovered from the smaller of the boiling pits at a depth of 21cm below the surface. The granite maul was broken lengthwise and the other portions were not recovered. This maul is considerably smaller than the previous one weighing only 165.7 grams. The groove is 10mm wide and shallow. The interior surface has evidence of burning implying use of fire-broken rock most likely after it was originally broken. The distal surface that remains contains no evidence of pecking or crushing.

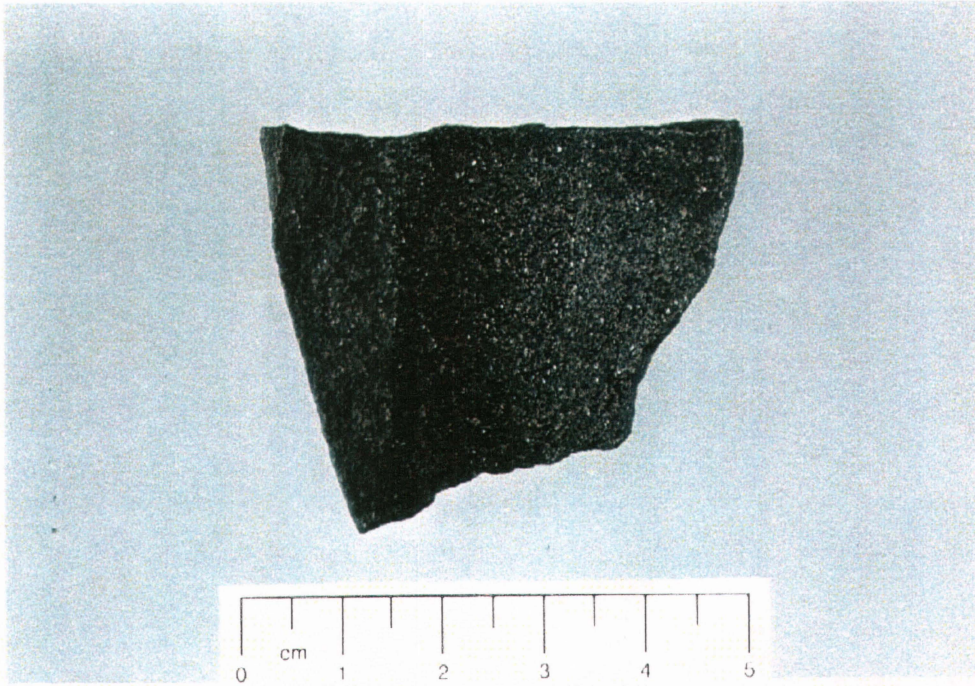


Plate 7.6 Schist Abrader Occupation Level 3



Plate 7.7 Burnisher Occupation Level 3

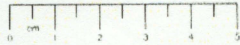
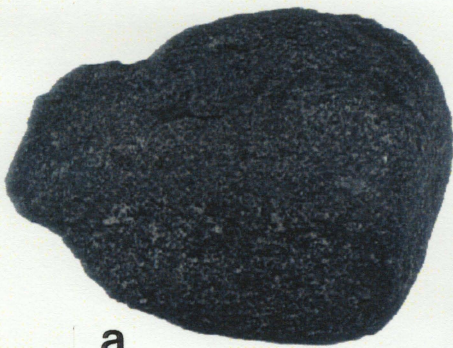


Plate 7.8 Grooved Maul Occupation Level 3



a



b

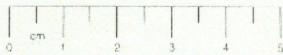


Plate 7.9 Grooved Maul, Hammerstone Occupation Level 3

7.6 Hammerstones (N=4)

Four hammerstones were recovered, one of quartzite (Plate 7.9) and three of granite. The quartzite hammerstone is a smooth, oval cobble that has been broken lengthwise. The distal end has evidence of heavy crushing as does the dorsal surface remaining. There is no evidence of burning on any of the remaining surfaces. The three granite hammerstones are complete. The largest of the hammerstone is 503.3 grams and the smallest only 68.9 grams. The larger is a smooth oval cobble with slight crushing at either end and burning present on all surfaces. The two smaller hammerstones are triangular in shape with crushing evident on the distal apex. There is no evidence of burning on these two items.

7.7 Cores (N=26)

A total of 26 cores were identified. The cores ranged in weight from 2.9 grams to 173.4 grams and included six different materials types as well as three different general styles of cores. There were two Swan River chert bipolar cores with crushing occurring at both ends. There also were 11 flake cores, representing cores where flakes had been removed from large flakes. This category contained three quartz cores, three Swan River chert and five quartzite cores. One of the quartz cores had crushing evident at one end and cortex on the dorsal surface. Of the Swan River chert cores, one had crushing at one end with a step fracture. Two of the quartzite cores had cortex on the dorsal surface, two had a number of striking surfaces. One of the cores had a striking platform and crushing was present on the end of one core.

13 cores could be classified as having a random irregular shape. These cores were of the following material types; siltstone, basalt, jasper, quartzite Swan River chert and quartz. Seven of the cores were Swan River chert of varying quality. Three had pronounced vugs. One of the cores was heat-treated and three others were of very fine quality Swan River chert. Overall, striking platforms were present on seven of the cores and cortex was seen on the dorsal surface of one. The striking platforms did not appear to have been previously prepared.

7.8 Flaked Lithic Debitage (Table 7.5, Figure 7.1)

The excavation of occupation level 3 revealed a total of 13,926 flakes and pieces of shatter (Table 7.5). Of this total, 46.2% (6,438) were Swan River chert, 13.8% (2,067) were chert, 12.3% (1,713) were quartz and 11.4% (1,591) were quartzite. The remaining 15.3% of the recovereddebitage was split among seventeen different material types. While the materials most numerous were local materials, more exotic materials were also present, including 240 flakes of obsidian and 307 flakes of Knife River flint. All except one of the Knife River flint flakes were tertiary flakes and all of the obsidian flakes were tertiary flakes.

Tertiary flakes were the most common type ofdebitage recovered from the excavation of occupation level 3 in that 9,949 (74.4%) tertiary flakes were counted. There were 2,725 secondary flakes (19.7%) and 476 (3.3%) primary flakes. There was a total of 785 (5.6%) pieces of shatter.

There were heavy concentrations ofdebitage throughout the excavation of occupation level 3, however, there did appear to be some patterning to the

concentrations (Figure 7.1). A lithic reduction station was located in unit 19S8E, a hearth in unit 21S5E and two boiling pits, one situated in unit 19S4E and the other in unit 19S13E. Heavy concentrations of debitage were located in and around these features. Another heavy concentration of debitage was located in the three units situated to the farthest south and east of the excavation. No apparent features have been located near by to explain the presence of this concentration.

Table 7.5 Flaked Lithic Debitage Occupation Level 3

Material type	Primary	Secondary	Tertiary	Shatter	Total
Swan River chert	344	1496	4286	312	6438
Chert	2	17	2035	13	2067
Quartz	20	334	1172	187	1713
Quartzite	30	566	963	32	1591
Silicified peat	19	90	490	26	625
Greywacke	7	81	104	136	328
Knife River flint	4	11	291	1	307
Obsidian	0	2	238	0	240
Gronlid siltstone	23	14	129	4	170
Diatomite	4	37	34	24	99
Jasper	2	11	67	10	90
Fused shale	6	29	39	4	78
Siltstone	2	19	36	0	57
Silicified wood	2	7	23	8	40
Chalcedony	0	6	25	0	31
Slate	0	0	1	23	24
Shale	0	2	8	0	10
Agate	0	0	8	0	8
Sandstone	0	1	0	3	4
Schist	0	1	0	2	3
Cathead chert	2	1	0	0	3
Totals	467	2725	9949	785	13926

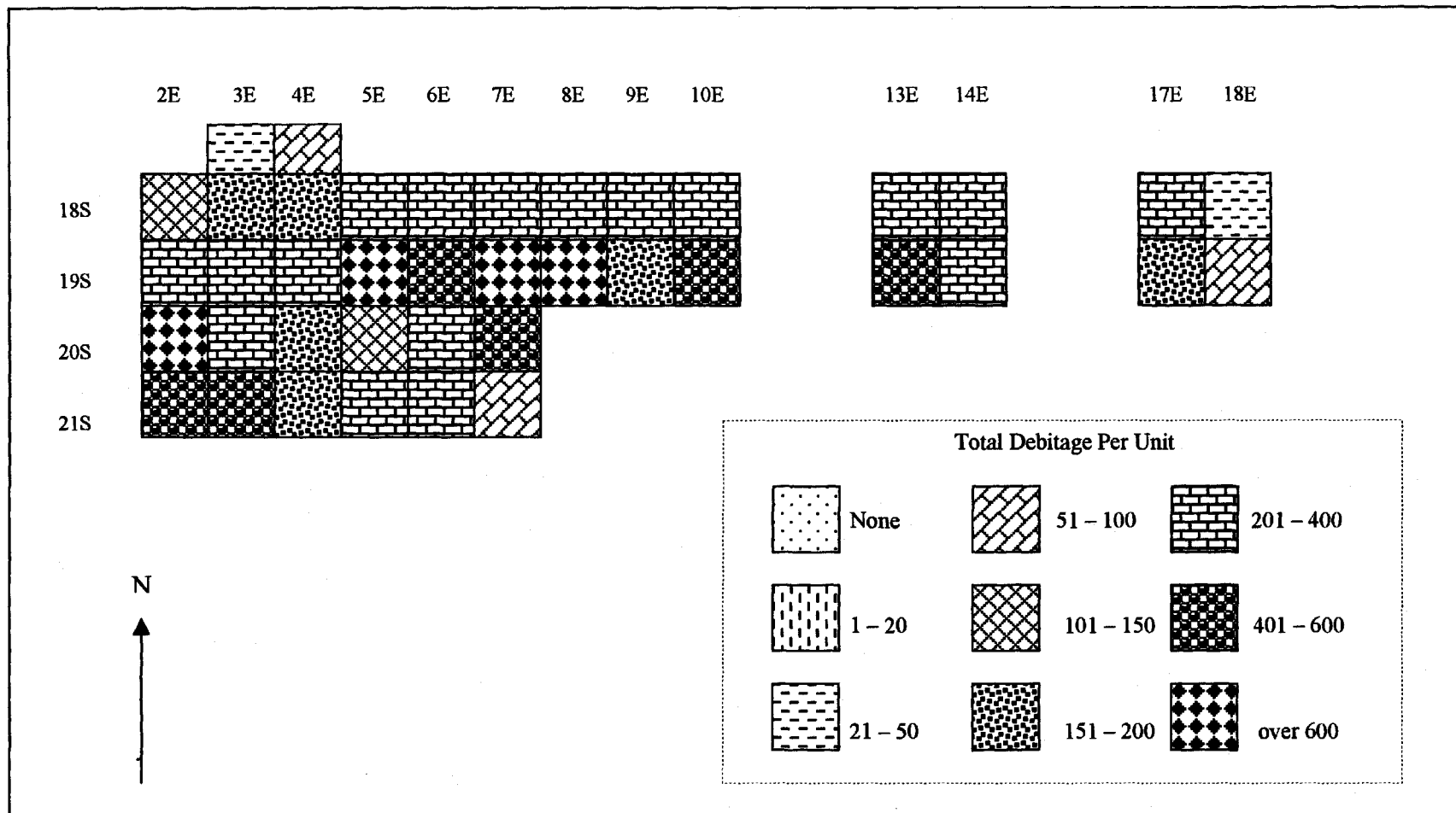


Figure 7.1 Lithic Debitage by Number Occupation Level 3

7.9 Fire-Broken Rock (Table 7.6, Figure 7.2)

A total of 5,816 fragments of fire-broken rock with a total weight of 420.7 kilograms were recovered from the excavation of occupation level 3 (Table 7.6). Of this total by weight, 95.3% of the fire-broken rock was granite.

Clustering of fire-broken rock was evident in that the heaviest concentration is closely related to the distribution of the features throughout this occupation level (Figure 7.2). This level contains the remains of two stone boiling pits and one definite hearth as well a feature that has been identified as an organic stain that however contains a good deal of fire-broken rock. Feature 3-1 is the smaller of the stone boiling pits. This feature is located in unit #19S4E and contains 58.1 kilograms of fire-broken rock. The units to the west and south of this feature also have a heavy concentration of fire-broken rock.

Unit #19S13E contains the remains of the second and larger of the two stone boiling pits. This unit contains over 285 kilograms of fire-broken rock; much of it heavily processed to the point of crumbling. The units to the west and south of this unit have not been excavated and the units to the east and north that have been excavated contain between 600 and 1,100 grams of fire-broken rock. This implies that heavier debris from the feature should extend into the unexcavated units.

A small hearth is located in unit 21S5E. This feature contains just over 6 kilograms of fire-broken rock; however, the units directly to the east and north also contain a large amount of debris. The size of the hearth raises questions concerning the location of another hearth in the vicinity that had not been excavated since the amount of fire-broken rock seems excessive. There is a feature identified as an

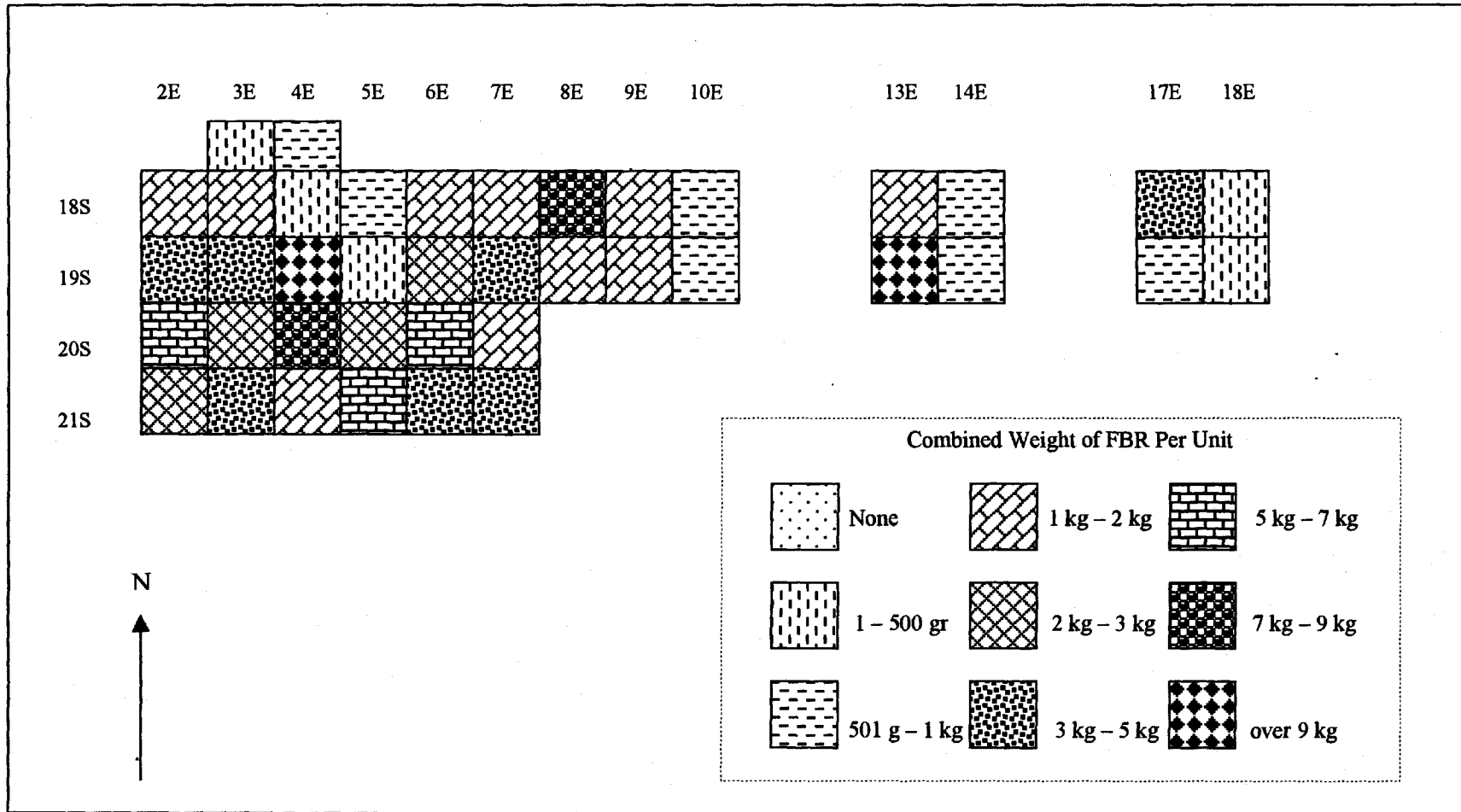


Figure 7.2 Fire-Broken Rock by Weight Occupation Level 3

organic stain located mostly within unit #21S6E that could possibly be the source of this debris, however, there does not seem to be any organized structure to this feature that could identify it as a hearth.

Unit #18S8E contains 8.5 kilograms of fire-broken rock, however, there is no indication of any features near to this unit that could be seen as a source for the fire-broken rock, implying that the hearth or stone boiling pit is located somewhere to the north of the excavation.

All units within this cultural level contain fire-broken rock. The only unit with a questionable level of fire-broken rock is the test pit, unit #19S5E. This unit contained only 36.1 grams of fire-broken rock; the smallest amount throughout the level. It is possible that this could be an indication that during the original test excavation the majority of fire-broken rock was not kept.

Table 7.6 Fire-Broken Rock Occupation Level 3

Material type	Number	Weight
Granite	5573	420.7kgs
Schist	80	3942.0g
Sandstone	73	2797.5g
Greywacke	36	2091.4g
Quartzite	32	1864.2g
Dolomite	14	8369.1g
Gneiss	3	263.0g
Swan River chert	3	1153.9g
Siltstone	1	49.4g
Quartz	1	63.8g
Totals	5816	441294.3g

7.10 Bone Tools (N=3; Plate 7.10)

Three bone tools were identified from occupation level 3. A bone awl was fabricated from an unidentified bone splinter (Plate 7.10, item a). Both the distal and

proximal ends are broken and although the awl is polished on the shaft portion the polishing does not extend over the breaks indicating that the awl was not utilized after breakage. Cut marks are incised onto the shaft of the awl near the distal end.

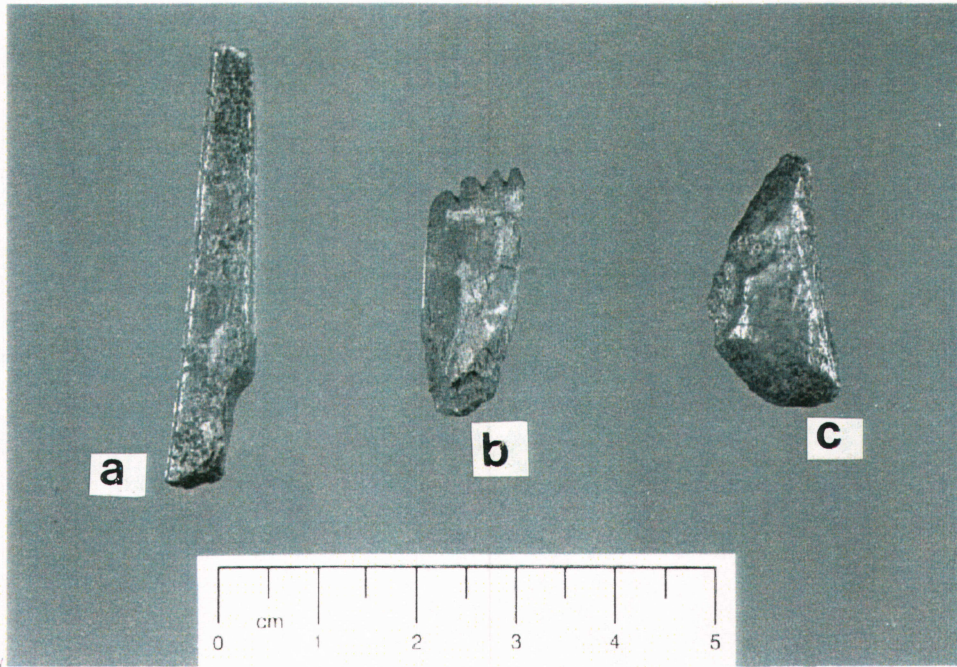


Plate 7.10 Bone Tools Occupation Level 3

The two other bone tools are unusual. The first of these tools is a bone end scraper constructed from a bone flake (Plate 7.10, item b). This fragment is likely the broken end of a hide scraper. The scraper is extensively polished and the scraper is triangular in form with a steep, convex working edge. In cross section the scraper is plan-convex. In form the scraper is asymmetrical with one lateral edge straight and the other convex. The third bone tool is constructed from a smoothed slightly polished bone flake rectangular in shape and plano-convex (Plate 7.10, item c). It is broken at the proximal end and at one lateral side. The other lateral edge is beveled and smoothed. The distal end exhibits four notches that were carved in. These notches have been worn and slightly chipped indicating use. Considering the size and

sharpness of the notches, use as a flesher is unlikely but possibly the tool was used for decorating pottery. Transverse striations are evident on both dorsal and ventral surfaces near the distal end of the tool. The striations do not appear to be the result of butchering but rather use-wear marks.

7.11 Pottery

Occupation level 3 contained a total of 18 sherds of pottery scattered amongst eight excavation units. Of these sherds, there were two rim sherds, four body sherds and 12 sherds either too small or too exfoliated to be useful for analysis.

7.11.1 Pottery Analysis Rim Sherds (N=2, Plate 7.11)

Two rim sherds were recovered from the excavation of occupation level 3. The larger of the two sherds was recovered from unit 19S4E at a depth of 34 cm and weighed 3.8 grams. This sherd was been identified as resembling the Avonlea style. The sherd is net impressed on the exterior up and over the brim while the interior is smoothed. The exterior colour is a mottled tan and black while the interior is tan in colour. Grit temper is evident, however, the temper is small averaging approximately 1mm in diameter. In thickness the rim measures 8mm.

The second rim sherd is too small to determine surface finish. This sherd, recovered in the fragment bag for unit 21S2E somewhere between 17 and 30 cm, has a weight of 0.5 grams. The rim angles in up towards the brim, with the brim having a thickness of 3mm and the thickest part of the rim measuring 5mm. Interior and exterior colour of the sherd is black.

This sherd is of a different style than that of the first sherd, implying a presence of two vessels. There are no other sherds recovered that resemble this sherd in form.

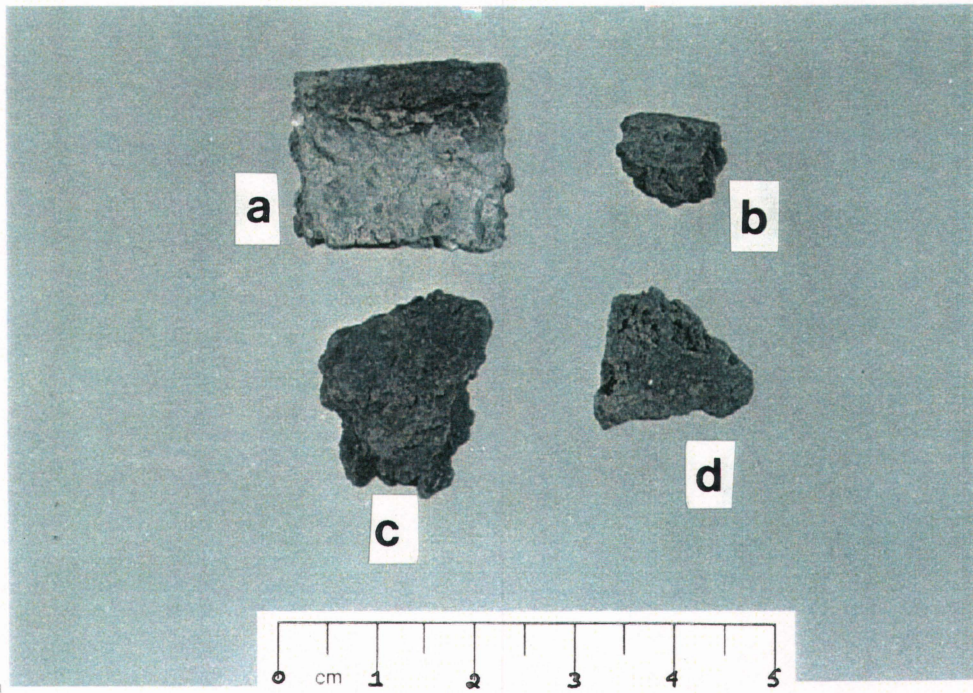


Plate 7.11 Pottery Rim and Body Sherds Occupation Level 3

7.11.2 Pottery Analysis Body Sherds (N=4)

There are 16 non-rim sherds recovered from the excavation. Of these sherds four can be identified as body sherds. These four sherds are fabric impressed on the exterior, resembling the Avonlea rim sherd discussed previously. The interiors of the sherds are smoothed. Exterior colour is a dark brown to dark tan. Sherd thickness averages between 5mm and 7mm.

The additional sherds recovered cannot be used to determine cultural affiliation since these fragments are heavily exfoliated and too small to be identified

as anything besides pottery fragments. The 12 sherds have a total weight of 2.5 grams.

Table 7.7 Pottery Sherds Occupation Level 3

Types	Number	Percent
Rim sherds	2	11.1
Body sherds	4	22.2
Undetermined	12	66.7
Total	18	100.0

7.11.3 Cultural Affiliation

Avonlea type pottery is identified based upon the exterior surface finish. There appears to be three variations of Avonlea pottery: net or fabric impressed, parallel grooved and an obliterated or smoothed surface finish.

Net or fabric impressed pottery appears prevalent on the long grass prairies and parklands of central Saskatchewan, extending into Manitoba and Alberta. This type of Avonlea pottery has also been recovered from sites in the Nipawin region situated on the southern edge of the Saskatchewan boreal forest (Meyer *et al* 1988). This pottery is characterized as having on the exterior the impression of a fine-mesh net (Walde *et al* 1995). Vessels are conoidal in shape with round bases (Byren 1973) or conical with pointed bases (Landals 1994). Decoration, where present, consists of a single row of punctates along the rim. These punctates are often pushed upwards at an angle. Horizontal incisions are occasionally present (Walde *et al* 1995).

Morgan (1979) has determined in a reanalysis of the Avonlea material from the Long Creek site that there are two types of net impressed rim sherds. One type of rim sherd is flattened and thickened while the other contracts towards a rounded lip.

The net impressed rim sherds from the Sjovold site (Dyck and Morlan 1995) as well as the sherds from Thundercloud resemble the second type.

Parallel grooved pottery is identified from south central Saskatchewan and northeastern Montana. This pottery style has been identified at the Sjovold site (Dyck and Morlan 1995), at the Garratt site together with net impressed sherds (Morgan 1979) and from the Avonlea type site (Klimko and Hanna 1988) among others. Therefore, it appears that these two varieties of pottery have a geographical overlap in occurrence. According to Dyck and Morlan (1995), the parallel grooved variety is found only on the Northern Plains associated with Avonlea Complex occupations.

The exterior finish consists of spiraling parallel grooves that cover almost the entire exterior of the vessel. These grooves slope downward from rim to base in a right to left direction. In general the grooves are rounded and smooth. Between the grooves the ridges are usually flat or slightly rounded and smoothed. In appearance the grooves form continuous channels that occasionally wobble or change in dimensions either becoming thinner or shallower. The impressions appear to have been applied by using a thong-wrapped or peeled-twig wrapped paddle (Dyck and Morlan 1995).

A third type of pottery assemblage has been recovered from southern Alberta and northern Montana and is characterized as having a smoothed surface finish with the decoration of a cord-wrapped tool on the outer lip corner. These vessels have complex profiles in that the vessels are shouldered. The necks are slightly constricted and the rim outcurving (Quigg 1988). It has been suggested (Walde *et al* 1995) that this third variety of Avonlea pottery has similarities with the succeeding Old

Women's Phase thereby implying continuity in this region between Avonlea and Old Women's pottery.

7.12 Features Occupation Level 3

Eight features were located during the excavation of occupation level 3.

These features included two stone boiling pits and associated ash lens, a lithic cluster, hearth, an organic stain and bison bone uprights.

Feature 3-1 is the remains of a stone boiling pit located in unit #19S4E (Plate 7.12). The southwest quadrant contains the majority of the feature, however, all four



Plate 7.12 Feature 3-1 Boiling Pit Occupation Level 3

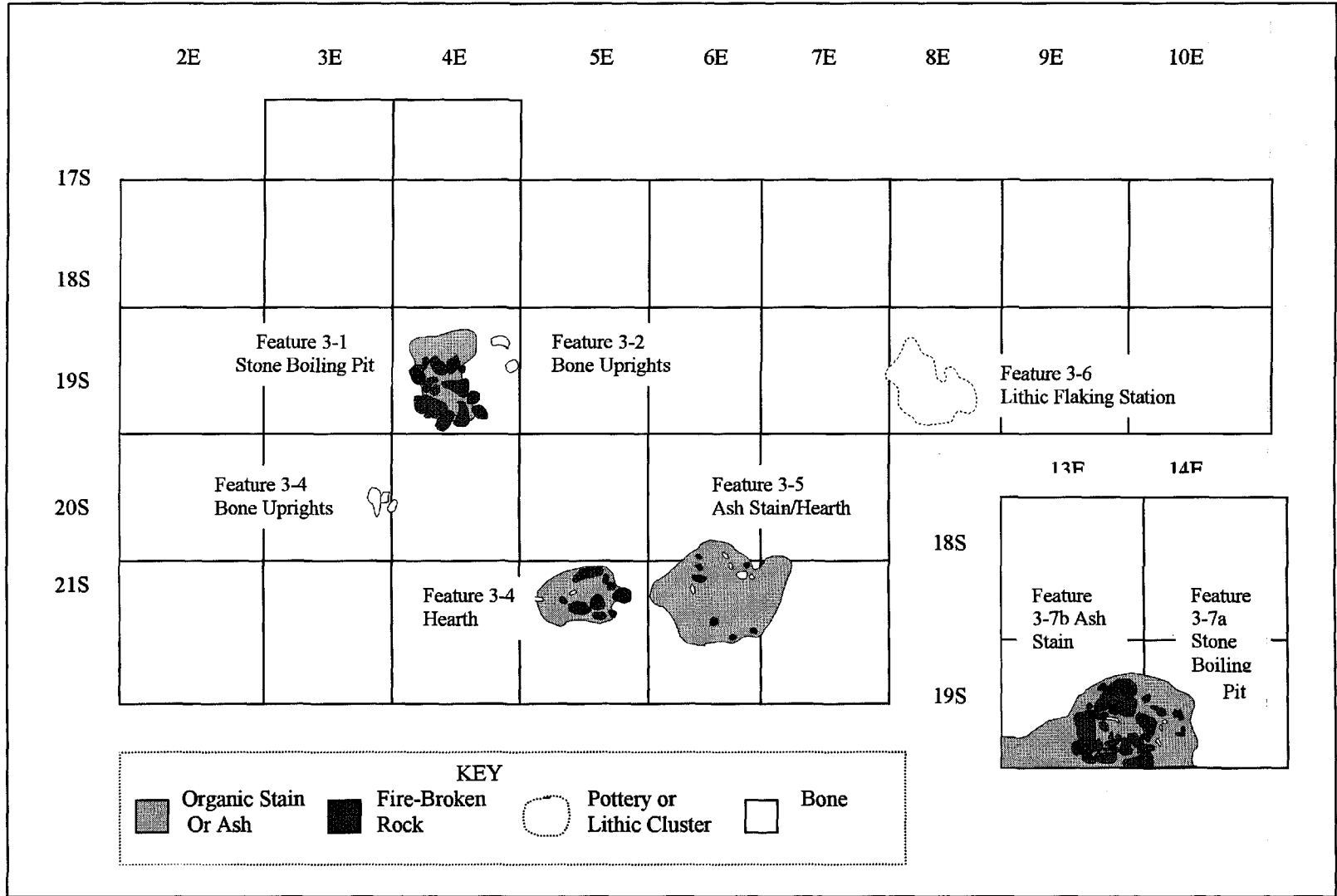


Figure 7.3 Feature Location and Description Occupation Level 3

quadrants contained portions of the feature. The northern portion of the northwest quadrant contained a fairly large soil stain, which was located directly north of the boiling pit. The stain was located at a depth of 16 cm below the surface. The stain extends from 10 to 24 cm east and 48 to 56 cm south and was approximately 2 cm thick. There were no artifacts contained within the stain. The boiling pit contained numerous large pieces of fire-broken rock as well as a number of bone fragments. The fragments located in the pit were for the most part larger than those found elsewhere in the unit. The boiling pit contains 56.9 kilograms of fire-broken rock. The pit started at a depth of 25 cm, continuing until 45 cm below the surface.

Feature 3-2 is two vertically placed bison rib bones located standing in the northeast and southeast quadrants at approximately the same easting (79E and 78E). The ribs were 14 cm apart and reached a depth of 18 cm below the surface. The rib fragments were broken at both the proximal and the distal ends possibly the result of soil disturbance or cultural intervention. The relative lack of cultural remains between the vertical ribs and the soil stain located to the west (feature 3-1) suggest the possibility that they are in some way related. If, as can be hypothesized, the ribs are the remaining stakes for a boiling bag, the lack of artifacts in the central area of the unit could be a result of the covering of the area by the staked bison hide. This would effectively cover the area protecting it from debris.

Feature 3-3 (Plate 7.13) is the recovery of a right proximal bison humerus recovered upright. This was first present in the northwest quadrant of unit 20S4E at a depth of 20 cm. Dark, loosely packed soil was found around the humerus while the rest of the matrix in the unit was light brown sand. The bottom of the humerus had a

depth of 31 cm. The dark soil continued downwards through occupation levels 4 and 5 in this location. A bison distal radius and distal humerus were additionally excavated from this dark soil at depths of 44 cm and 47 cm, respectively.



Plate 7.13 Feature 3-3 Bone Uprights Occupation Level 3

Two hypotheses have been suggested for the presence of this feature. The first hypothesis suggests that this is the remains of a posthole, where the bison bones were placed or forced into position to steady the post. There have been no other features resembling this located during the excavations at Thundercloud so therefore there is no precedent to base this theory on. However, this type of activity is not unknown on the Northern Plains so it is possible that we have simply failed to uncover any additional postholes present at the site.

The second hypothesis suggests that the presence of this bone is the result of a collapsed, abandoned rodent burrow. As the rodent burrow collapsed, the bone was

lodged in the ground in an upright position. This is suggested because of the presence of an old, sand filled rodent burrow in occupation level 4 that traverses the northwest quadrant of this unit. However, a noticeably different soil type is found in the rodent burrow that from the dark soil surrounding the bone uprights. The soil in the burrow was yellow, unconsolidated sand, whereas the soil surrounding the bones was a dark loam. As well, the bones were firmly lodged into the dark soil.

Feature 3-4 is a small hearth located in the northeast and northwest quadrants of unit #21S5E. This small hearth is filled with large pieces of fire-broken rock and smaller fragments of fire-broken rock. The hearth is circular in shape and large pieces of fire-broken rock are situated in a semi-circular position within the hearth. The soil within the hearth is stained and contains burned and calcined bone fragments and charcoal. The hearth has no evidence of oxidation of the soil, and the hearth is located between 17 and 22 cm below the surface.

Feature 3-5 is described as a large dark organic stain or ash deposit located in the southeast and southwest quadrants of unit #20S6E and the northeast and northwest quadrants of unit #21S6E. Present in the stain was a small amount of burned bone as well as some ash. The average depth of the stain was 15 to 22 cm. Burned soil was present below the stain. The total extent of the stain is unknown, as the eastern edges were not mapped.

Unit 19S8E contained feature 3-6, which has been designated as a tool-manufacturing site, based on the massive amounts of lithic flakes and debitage that were recovered. The clusters of lithic flakes appeared in the southwest quadrant first, followed by the southern half of the northwest quadrant. Decortication flakes were of

a relatively large size and were found throughout the unit. An apparent pattern emerged with large primary and secondary decortication flakes recovered at a depth of 12 to 15 cm surrounded by dense clusters 2 to 3 cm in depth of secondary and tertiary flakes. These flakes were composed primarily of Swan River chert of the same colour - mottled grey/green and pink. Located near the densest cluster was a polished bone flake. The reason for this apparent pattern is not certain, however, a suggestion would be that the large decortication flakes were removed first in an effort to shape the nodule of chert into preforms that could be further reduced into the tools sought. This would result in the smaller secondary and tertiary flakes that were removed during the finishing knapping to accumulate on top of the larger decortication flakes. This feature also contains a large (5,991.0 grams) rounded quartzite cobble placed directly above a flat slab of limestone. While it was originally suggested that the rounded cobble served as a maul, there is no evidence of pecking or scarring to indicate this usage. It is also quite large, almost unwieldy, to suggest use as a maul. However, the majority of the flakes recovered in the area had cortex attached which does lend support to a theory of core splitting or knapping activities having occurred.

Feature 3-7a (Plate 7.14) was located within unit #19S13E and was the largest of the two pit features located in cultural level 3, containing 275 kilograms of fire-broken rock. This feature filled most of the southeastern portion of the unit and part of the northeastern as well as the northwest and southwest quadrants of unit #19S14E. It also appears as if the feature extends into the unit to the south, #20S13E. The feature started at a depth of 23 cm and continued to a depth of 81 cm

below the surface. At a depth of 81 cm a grooved maul was recovered with a weight of 2,427.8 grams. The maul was complete except for one corner. The surface was friable, resulting from thermal shock. A lot of debris was recovered from the stone boiling pit including burned bone and a large amount of charcoal. Raw bone fragments were also recovered.



Plate 7.14 Feature 3-7a Boiling Pit Occupation Level 3

The deeper the fire-broken rock was located within the feature the more friable the rock was to the point that large cobbles that looked intact upon first contact fell apart when attempts were made to move them. The majority of the rock

recovered from the feature was granite in composition; however, there were a significant amount of dolomite slabs also recovered. Some of the dolomite showed evidence of staining either from the soil or perhaps from fire. The position of the dolomite implies that it could have been used to line the pit.

Feature 3-7b is associated with the stone boiling pit (feature 3-7a) discussed previously. This feature has been identified as an ash stain present in the southeast and southwest quadrants of unit #19S13E. The stain is an irregular feature situated to the west of the pit and encroaching into the pit. The stain was stated as being present at a depth between 40 and 50 cm. The stain continues into the unexcavated units to the south and west. Fine screen faunal analysis of Features 3-7a and 3-7b has indicated the presence of canid remains and rodent elements including both small and micro-vertebrates (Webster 1999).

Unit 18S 17E contained fragmented unburned bison bone in addition to a large amount of preserved seeds. In fact, the majority of the seeds recovered from this occupation level were recovered from this unit (Webster 1999). This implies the presence of a feature located in the unexcavated portions of the site surrounding this unit.

7.13 Occupation Level 3 Interpretations

The variety of projectile points recovered from the excavation of occupation level 3 clearly indicates the mixed nature of this level. There was no discernable separation in the matrix that could be identified during excavation either by colour or texture change therefore it was necessary to excavate the level as a single entity. The

projectile point morphology indicates that this occupation contains components of both Besant and Avonlea occupations as does the recovery of net impressed Avonlea pottery sherds. It is not possible to identify the position of the separate occupations based upon the depth at which the various projectile points were recovered since the different projectile points are recovered throughout the stratigraphic level.

Seasonality for the occupation has been determined to be spring based upon the faunal remains recovered. Immature bison elements were identified which imply a spring occupation. As well, faunal elements from fish, clam and frog were also identified (Webster 1999) further supporting the suggestion of a spring occupation based upon availability of these particular animal species during certain seasons.

Occupation level 3 has been identified as a secondary-processing site involving the manufacture of bone grease and pemmican. This can be stated in part because of the condition of the faunal materials recovered. The amount of faunal materials present in the level is considerable and the majority is extremely fragmented and unburned. The presence of two large stone boiling pits further supports the above hypothesis.

While only one cluster of lithic debitage was identified as a feature (19S 8E feature 3-6) the deposition of flakes and shatter was heavily concentrated throughout the excavation with the exception of the easternmost units which are sparse. This is consistent with the idea that the excavated portion of the site was used as a working area. The identification of the site as a secondary processing site would necessitate the resharpening of tools during butchering activities which is evidenced by the large amount of tertiary (74.4%) and secondary flakes (19.7%) present.

While the amount of lithic debitage was fairly consistent throughout the excavation of occupation level 3 the recovery of fire-broken rock was concentrated into three areas of the excavation. Two of the concentrations are explained by the location of stone boiling pits. The third concentration is not located near any hearths or stone boiling pits implying the presence of this type of feature nearby in the unexcavated portion of the site. This further validates the secondary-processing activities implied to have occurred during occupation level 3.

Chapter 8

Occupation Level 4

8.1 Introduction

Occupation level 4 is a discontinuous, undulating level located variously between 27 and 33 cm below the surface. Where present, occupation level 4 can be determined by a change in matrix colour due to an increase in organic matter. The discontinuous nature of this occupation level is due to erosion, possibly a flood episode.

8.2 Flaked Stone Tools

A total of 18 stone tools were recovered from the excavation of occupation level 4. Table 8.1 lists the various categories of stone tools and their frequency within the total assemblage. Not included within this list are the few cores recovered. The items listed in Table 8.1 can be classified as chipped stone tools because of the presence of varying amounts of retouch except for the hammerstone. There was no evidence of ground stone tools recovered from occupation level 4.

8.2.1 Projectile Points (N=2)

Two partial projectile points were recovered. These fragments were not diagnostic. One of these non-diagnostic fragments was a Swan River chert distal end fragment while the other was a midshaft without either distal or proximal portion.

Table 8.1 Frequency Distribution of Stone Tool Types from Occupation Level 4

Tool Type	Frequency	Percent
Projectile points	2	11.1
Bifacial knives	3	16.6
Graver	1	5.6
Biface fragments	4	22.2
End scrapers	3	16.6
Side scrapers	1	5.6
Chopper	1	5.6
Unifaces	2	11.1
Hammerstones	1	5.6
Total	18	100.0

8.2.2 Bifacial Tools (N=8; Plate 8.1, Table 8.2)

Eight bifacial tools were identified in occupation level 4 including three bifacial knives, one graver and four bifacial tool fragments. The knives, constructed of Swan River chert, are asymmetrical and are well flaked on both surfaces. One large bifacial knife is constructed of coarse Swan River chert that exhibits vugs (Plate 8.2, item c). The knife has one broad ground lateral surface and can be considered a “backed” knife. A striking platform is present on the proximal end. A graver of Swan River chert and five bifacial fragments were also recovered.

Table 8.2. Biface Metric Attributes (mm). Occupation Level 4

Specimen No.	Length	Width	Thickness
1	47.3	32.5	13.4
2	41.3	25.5	11.4
3	30.4	16.5	5.3
4	-	17.1	5.2
5	-	16.8	4.8
6	-	14.1	4.2
7	-	-	3.5
8	-	-	2.8



Plate 8.1 Bifacial Tools Occupation Level 4

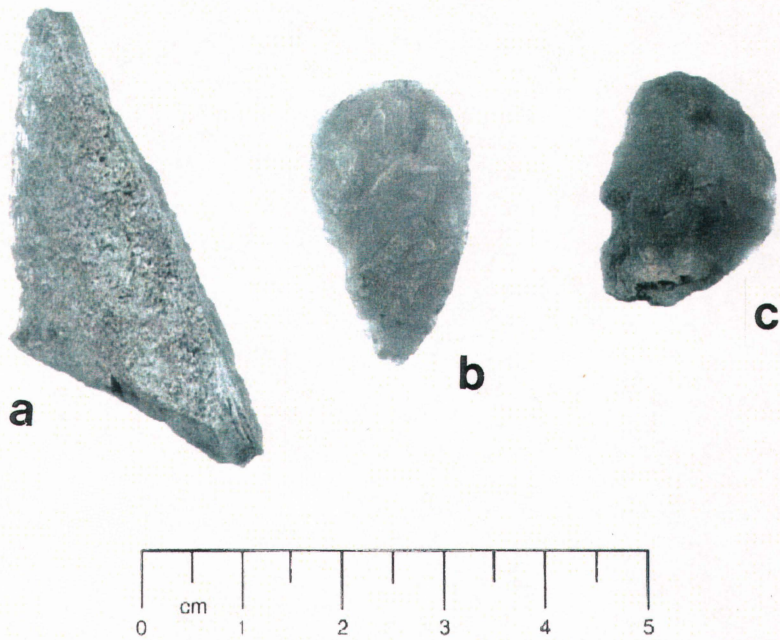


Plate 8.2 Unifacial Tools Occupation Level 4

8.2.3 Unifaces (N=6; Plate 8.2, Table 8.3)

Three end scrapers and one side scraper, all of Swan River chert, were present in this portion of the site. The Swan River chert in all four items is of a good quality. The end scrapers are roughly triangular with the proximal end forming the apex (Plate 8.2, item b). The base of the triangle is the convex working edge. The working edge is steep and is oriented perpendicular to the longitudinal axis. The end scrapers are plano-convex in cross-section with slightly convex lateral margins. The side scraper has a working edge that is decidedly convex while the other lateral edge is parallel (Plate 8.2, item c).

The remaining two unifacial items are too fragmented to determine use.

Table 8.3. Uniface Metric Attributes (mm). Occupation Level 4

Specimen No.	Length	Width	Thickness
1	17.4	22.9	8.5
2	28.3	16.0	4.5
3	46.7	37.4	10.8
4	-	-	11.8
5	35.1	24.6	9.2
6	-	15.5	5.2

8.2.4 Choppers (N=1)

A single chopper, constructed from a large flake of granite is flaked unifacially on one lateral surface. The chopper is broken at the proximal end so it is not possible to determine the actual length of the tool. The dorsal surface of the flake is smoothed except for the flaked edge. The opposite lateral edge is the smoothed exterior of the flake making deliberate smoothing unnecessary.

8.3 Hammerstones (N=1)

A single granite hammerstone was recovered. This average sized water-smoothed cobble (271.9 grams) showed little use except for a slight crushing present on the distal end. The cobble was ovoid in shape.

8.4 Cores (N=3)

Three cores were identified including two of Swan River chert and one of quartz. The cores are random irregularly shaped cores that have only a few flakes removed from each core. The average is three flake scars per core. The chert cores are composed of fine quality chert containing minute vugs that are well separated. One of the chert cores has crushing evident on the distal end and the core is broken transversally. The quartz core has cortex on the dorsal and one lateral side with flake scars present on the ventral surface.

8.5 Flaked Lithic Debitage (Table 8.4, Figure 8.1)

A total of 1,225 flakes and pieces of shatter were recovered from the excavation of occupation level 4. Of this total 32.0% (403) of the debitage was Swan River chert, 29.6% (362) was chert, 12.9% (158) was quartzite, and 9.6% (117) was quartz. These four material types totaled 85% of all of the lithic debitage recovered from this occupation level. The remaining 15% of the total debitage by number were divided between ten different material types. The four most common materials recovered are common to the region, however exotic materials were present in small

numbers; including 14 tertiary obsidian flakes, 5 tertiary, and 1 secondary Knife River flint flakes.

Tertiary flakes were the most common type of flake recovered in that 72.8% (892) of the flakes were tertiary, 19.6% (240) of the flakes were secondary and 3.1% (38) were primary flakes. There was a total of 55 pieces of shatter (4.5%) recovered.

Distribution of lithic debitage throughout most of occupation level 4 is sparse. The majority of the units had less than 20 pieces of debitage (Figure 8.1) and several units had none. Only one feature was identified during the excavation. This feature was a hearth located in units 18S2E and 19S2E, however, there were only a total of 51 pieces of debitage recovered from these two units. Unit 19S5E had the heaviest concentration of lithic debitage in that 254 pieces of debitage was recovered. There is no corresponding feature to account for this clustering.

Table 8.4 Flaked Lithic Debitage Occupation Level 4

Material type	Primary	Secondary	Tertiary	Shatter	Total
Swan River chert	18	130	229	26	403
Chert	0	4	356	2	362
Quartzite	3	31	120	4	158
Quartz	8	43	59	7	117
Silicified peat	0	6	47	1	54
Siltstone	0	2	33	0	35
Gronlid siltstone	5	10	19	0	34
Greywacke	4	6	4	10	24
Obsidian	0	0	14	0	14
Jasper	0	2	1	5	8
Knife River flint	0	1	5	0	6
Fused shale	0	1	4	0	5
Silicified wood	0	4	0	0	4
Chalcedony	0	0	1	0	1
Totals	38	240	892	55	1225

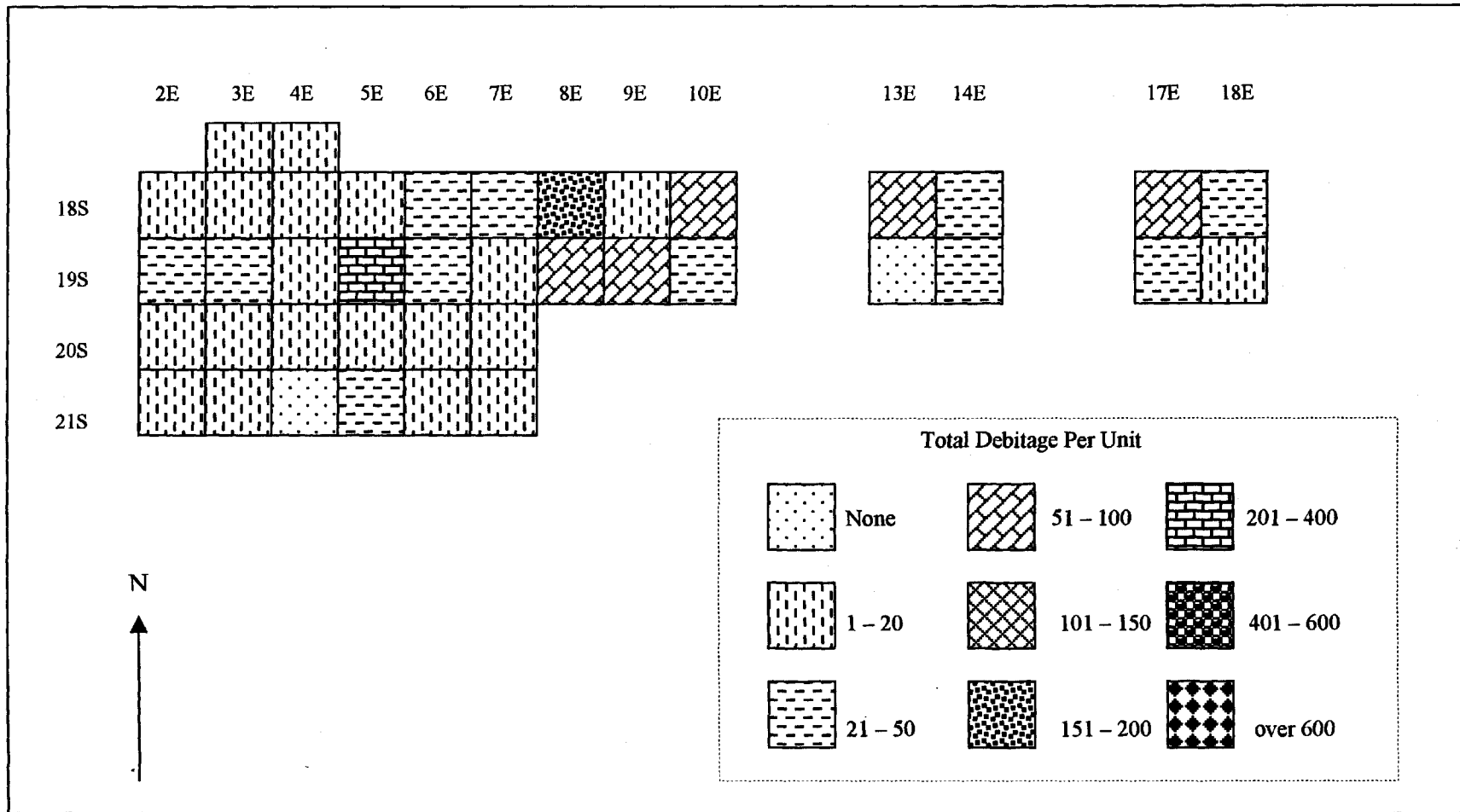


Figure 8.1 Lithic Debitage by Number Occupation Level 4

8.6 Fire-Broken Rock (Table 8.5, Figure 8.2)

The excavation of occupation level 4 recovered a total of 630 fragments of fire-broken rock with a total weight of 20.5 kilograms. The majority of fire-broken rock recovered by weight (93.8%) was granite. Small numbers of other material types were recovered (Table 8.6).

The intermittent nature of occupation level 4 was evident in the number of units which contained no evidence of fire-broken rock (4 units) as well as the units which contained only trace amounts of fire-broken rock (10 units contained less than 10 grams). Clustering did not appear to be significant in that the location of the single hearth did not contain the largest amount of fire-broken rock (Figure 8.2). The hearth was located in units #18S2E and #19S2E and while higher levels of fire-broken rock was concentrated around these levels, (approximately 1 kilogram per unit), the heaviest concentration of fire-broken rock (4.5 kilograms) was recovered from unit #19S8E. It is possible that the unexcavated units to the south of unit #19S8E contain a hearth.

Table 8.5 Fire-Broken Rock (Grams) Occupation Level 4

Material type	Number	Weight
Granite	592	19191.4
Schist	11	494.6
Sandstone	9	410.5
Quartzite	12	196.7
Greywacke	3	110.3
Gneiss	3	65.1
Totals	630	20468.6

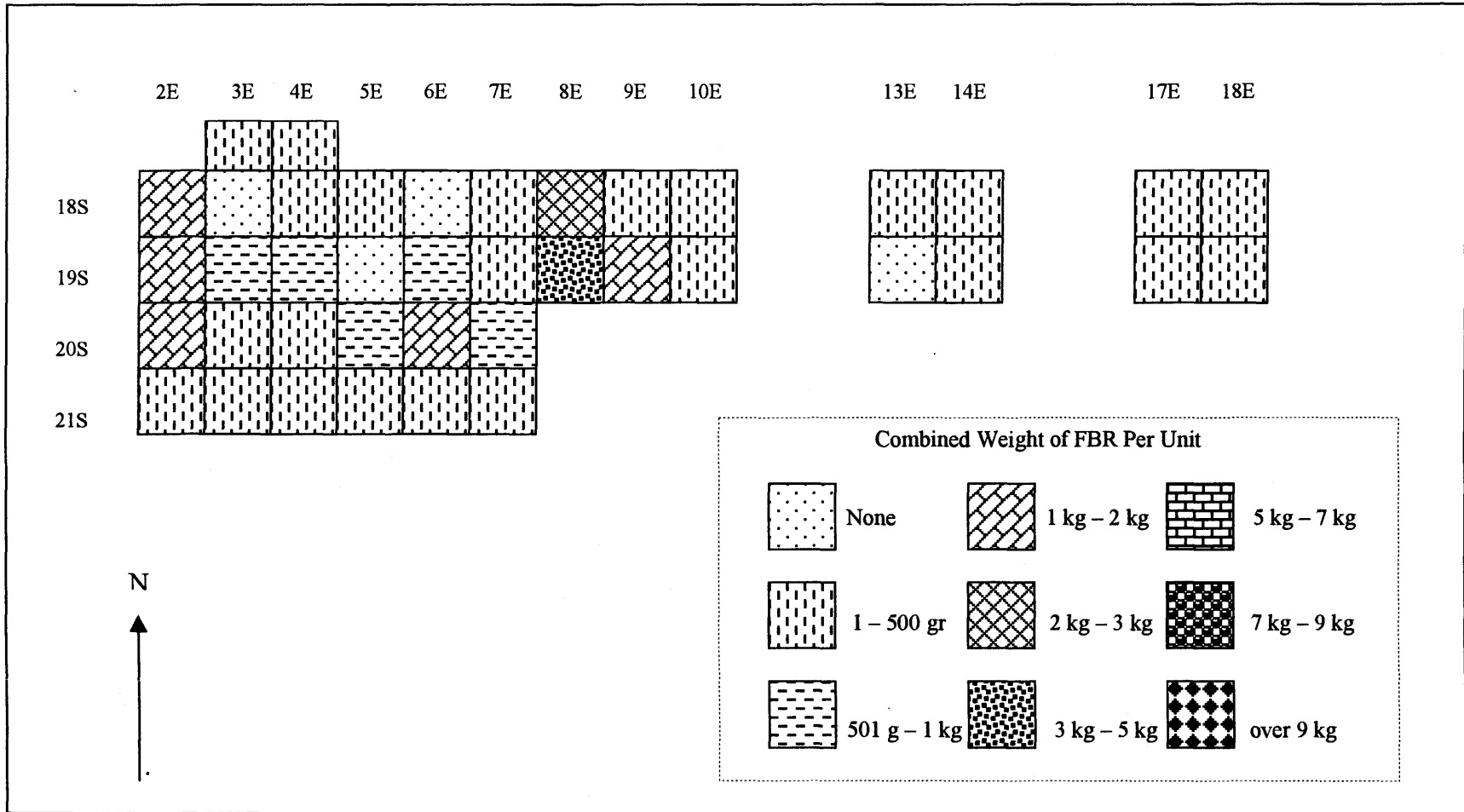


Figure 8.2 Fire-Broken Rock by Weight Occupation Level 4

8.7 Bone tools (N=2; Plate 8.3)

Bone tools were a rare occurrence in occupation level 4 in that only two fragments of worked bone were recovered. This item was constructed from the proximal portion of a rib possibly bison. Both ends show deep transverse incisions where the bone was scored before being broken. The ends have been ground and smoothed. The exterior of the bone has been highly polished and the medullary cavity has been smoothed. Fine transverse cut marks are present along one lateral edge of both bone fragments. These fine, closely spaced cut marks resemble butchering marks.



Plate 8.3 Bone Tools Occupation Level 4

Both bone fragments were recovered from the same unit only 9 cm from each other. The two bone fragments can be joined indicating a tool with a total length of 15.1 cm. The tool has also been broken laterally and only one half remains, therefore

the total width remaining is 2.3 cm. The function of this bone tool is unknown, however, some kind of handle is the most likely hypothesis.

8.8 Occupation Level 4 Features

There was only one feature (4-1) located during the excavation of occupation level 4 (Figure 8.3). Feature 4-1 has been identified as a small hearth containing a dark greasy soil. The hearth was located in unit #19S2E in the northeast quadrant, extending into the southeast quadrant of unit #18S2E. The average depth of the hearth was between 31 and 35 cm and the diameter of the hearth was approximately 30 cm, however, the full extent of the hearth is not known since the eastern edge of the feature was not noted or mapped.

The matrix is black and greasy with no evidence of oxidation. There was a large amount of raw bone present in the region of the hearth as well as small amounts of burned and calcined bone and charcoal. Those fragments identifiable were bison limbs and ribs, as well as canid remains, burned garter snake elements and non-identifiable microvertebrates. The portion of the hearth in unit #19S2E contained fire-broken rock in a close relationship to the hearth. Within 30 cm of the hearth were eight pieces of fire-broken rock with weights ranging between 20.7 to 257.6 grams. The portion of the hearth located in unit #18S2E had no fire-broken rock associated near it.

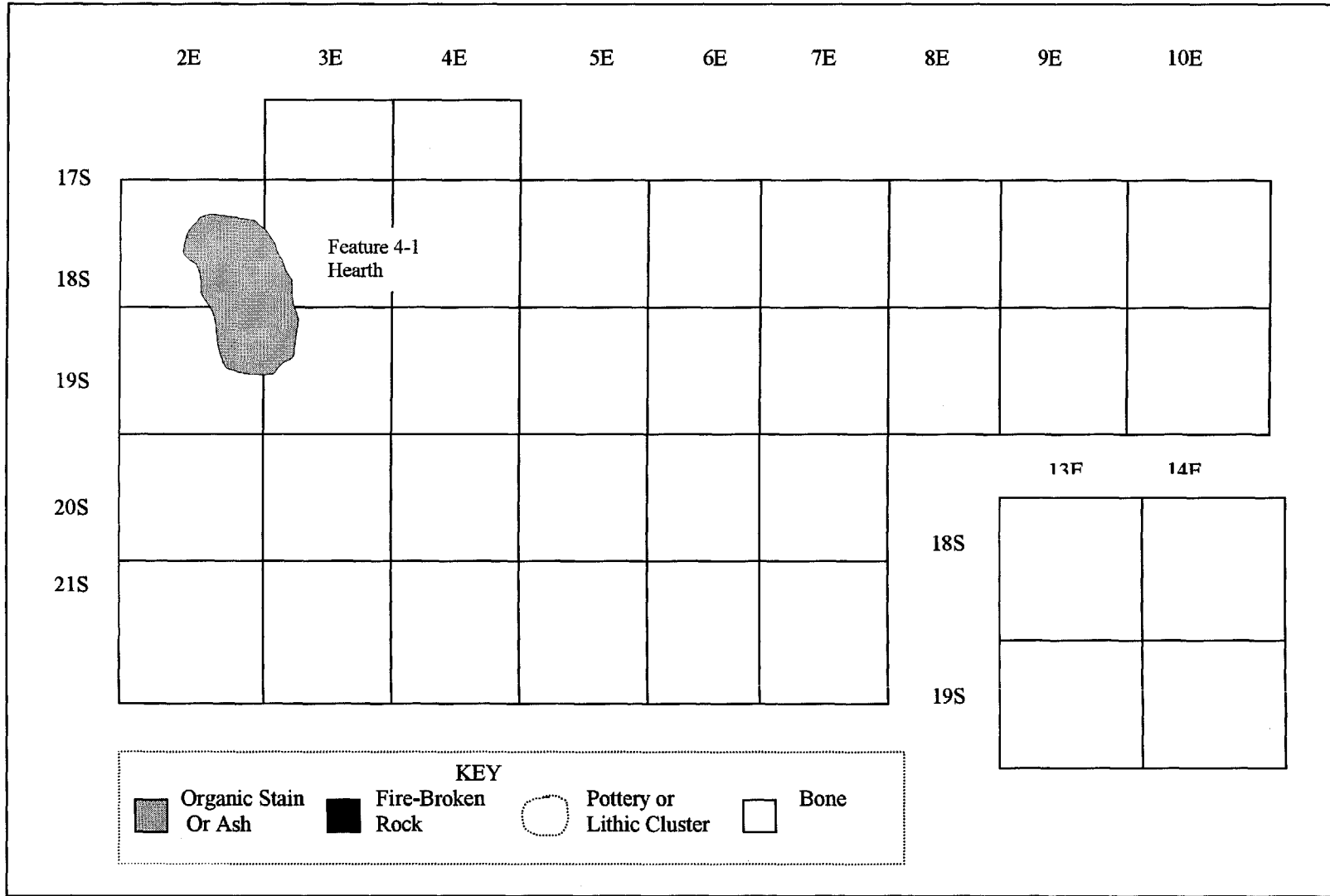


Figure 8.3 Feature Location and Description Occupation Level 4

8.9 Occupation Level 4 Interpretations

Occupation level 4 is a discontinuous level, its appearance formed by erosion possibly that of a large flood. As a result of post-depositional processes, the majority of cultural remains were removed along with the supporting matrix. From the materials remaining it is possible to determine seasonality. It is not possible to determine cultural affiliation for occupation level 4 because of the lack of diagnostic items.

Heavier concentrations of fire-broken rock and faunal remains recovered from units 18S7E and 18S8E imply the presence of an activity area outside of the excavation area. Distribution patterns would indicate that the activity area is most likely located to the south of the excavated portions. Faunal remains recovered from the above units contain bison elements as well as elements identified from rabbit, vole, snake and frog (Webster 1999).

The two units located at the extreme east of the excavation (units 18S18E and 19S18E) contain almost no evidence of lithic materials indicating little cultural activity in this portion of the site. This contrasts with the information obtained by Webster (1999) in his analysis of fauna from the site. His analysis indicates the presence of faunal elements identified as antelope, meadow vole and duck.

The only feature identified in occupation level 4 was a single hearth located in the western portion of the excavation. No other features were identified therefore concise activity patterns can not be determined.

Seasonality can be inferred based upon the faunal materials identified. Elements from two immature bison calves were identified; one individual has an age

estimate slightly older than ten months while the other is estimated to be approximately one week in age (Webster 1999). Based upon the gestation period for bison, specimens of these ages imply a spring occupation. Faunal elements from duck, frog, snake and ground squirrel have also been identified in this level of the site. The presence of these species of animals support the idea of a spring occupation in that these animals either hibernate or they migrate south during the winter.

Chapter 9

Occupation Level 5

9.1 Introduction

Occupation level 5 is situated between 33 and 47 cm below the surface above a thick layer of yellow sand. The stratigraphic appearance of this level in the eastern portion of the site is of a single occupation superimposed on top of occupation level 6. As the excavation continued west towards the creek the profile separates into separate components of level 5 and level 6, each level separated by a sterile matrix. In the extreme western portion of the excavation occupation level 5 separates into three distinct components, each separated by matrix of a different colour and texture. These occupations have been designated occupation levels 5A, 5B and 5C. Although it is clear from this portion of the site that more than one occupation occurred at this period the majority of the site has no such clear separation. Therefore, all materials designated occupation level 5 will be discussed as one unit.

Seven projectile points that could be identified as to cultural affiliation were recovered from the level designated occupation level 5. These projectile points have been identified as belonging to the McKean Complex. This complex has a range of dates between 4150 – 3100 years B.P. (Dyck 1983).

9.2 Flaked Stone Tools

A total of 27 chipped-stone tools were identified from the excavation of occupation level 5. These items were classified as chipped stone tools because of the presence of varying amounts of retouch. The various categories of stone tools and their frequency within the total assemblage are listed in Table 9.1. There was no evidence of ground stone tools or hammerstones within the assemblage. Cores are not included in this table.

Table 9.1 Frequency Distribution of Stone Tool Types from Occupation Level 5

Tool Type	Frequency	Percent
Projectile points	10	37.1
Knives	4	14.8
Perforators	2	7.4
Unidentified bifacial fragments	4	14.8
End scrapers	4	14.8
Unidentified unifacial fragments	3	11.1
Total	27	100.0

9.2.1 Projectile Points (N=10; Plate 9.1, Table 9.2)

Ten complete and partial projectile points were identified. Seven projectile points could be identified as to cultural affiliation. The seven projectile points were all included within the McKean Complex in that they were Hanna, Duncan or McKean Lanceolate points. The three points that could not be identified included a distal end or "tip" and a midshaft. Both of these items were lenticular in cross-section. The third item was a base that was too incomplete to identify. All of the unidentified items were fabricated from Swan River chert.

One of the two complete points recovered was a Swan River chert McKean Lanceolate projectile point (Plate 9.1, item d). This point was constructed from very

fine quality Swan River chert. The point had been broken and reworked into its present shape. The basal notch was deeply concave. The other complete point was one of the two Hanna projectile points identified (Plate 9.1, item a). The complete Hanna point was constructed of chert. There was evidence of stemming on one lateral edge, the other edge had been broken and reworked. Shoulders are distinct. There is no basal notching. The second Hanna point also appears to have been previously broken, reworked and re-broken (Plate 9.1, item g). One lateral edge is missing and the opposite edge is broken immediately above the obvious shoulder in a transverse manner. There is no basal notching.

Four Duncan points have been identified, none of which are complete (Plate 9.1, items b,c,e,f). Three of the Duncan points are constructed of Swan River chert, one heat treated, and the other of Gronlid siltstone. The bases that remain identify all four points. The points are broken transversely through the midpoint of the blades and the distal portions were not recovered. The basal edges were notched. The stem was well expressed in one item, weakly expressed in two and because of the position of the break, could not be identified in the fourth. The lateral edges of the stems were ground in three of the specimens and blunted but not ground in the fourth.

Table 9.2 Projectile Point Metric Attributes (mm) Occupation Level 5

Specimen	Maximum Length	Blade Width	Thickness	Basal Width
Hanna	32.2	20.0	5.8	12.2
Duncan	-	17.3	5.1	13.3
Duncan	-	15.8	6.8	15.5
McKean L.	30.4	19.4	4.1	20.9
Duncan	-	15.4	5.1	14.5
Duncan	-	-	4.8	16.6
Hanna	-	-	4.2	12.7

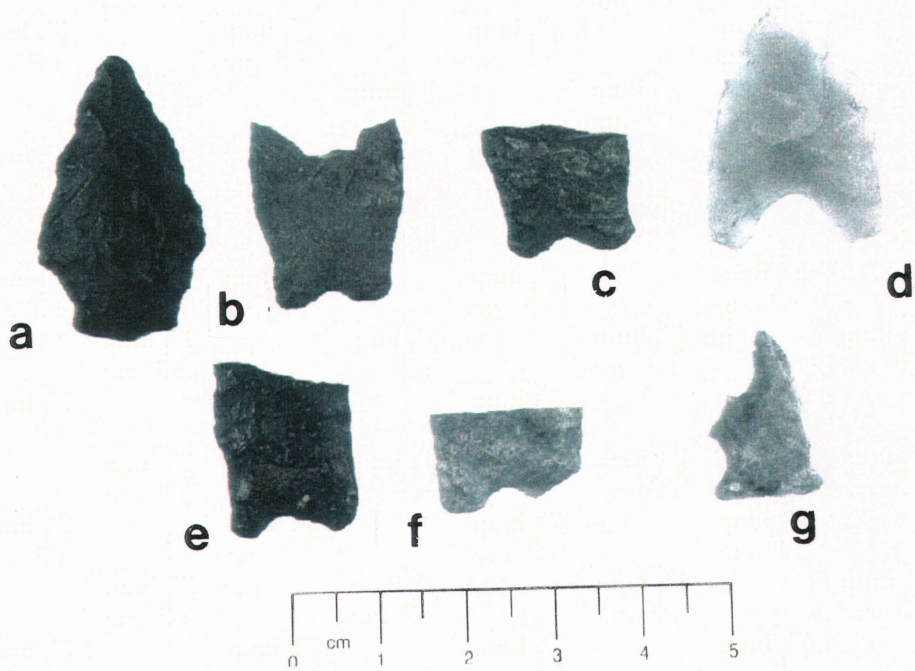


Plate 9.1 Projectile Points Occupation Level 5

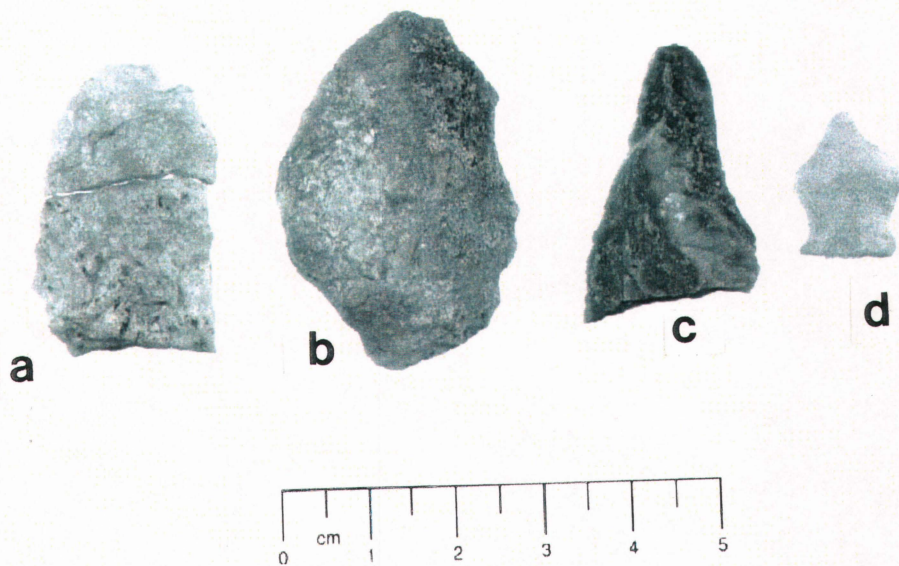


Plate 9.2 Bifacial Tools Occupation Level 5

9.2.2 Knives (N=4; Plate 9.2, Table 9.3)

Four complete or partial knives were identified from the excavation of occupation level 5. Three of the knives were fabricated from Swan River chert and the fourth of silicified wood. One of the knives had a transverse break through the mid-section, fortunately both fragments were recovered (Plate 9.2, item a). The other knives were complete. The two complete Swan River chert knives were asymmetrical (Plate 9.2, item b). The straight lateral edges on the knives had been blunted while the convex working edges have evidence of use-wear. The silicified wood knife is a large flake with bifacial flaking on one lateral edge near the distal end. The rest of the tool was not modified. There are step fractures on both dorsal and ventral surfaces of the flake. The workmanship on this tool implies an expediency tool.

9.2.3 Perforators (N=2; Plate 9.2, Table 9.3)

Two bifacial perforators of Swan River chert were identified. One of the perforators was constructed from a reworked broken projectile point (Plate 9.2, item d). The basic shape of the perforator indicates that the unbroken point form was a Hanna projectile point. The appearance of the other perforator indicates original construction as a perforator (Plate 9.2, item c). Both perforators were broken at the proximal ends.

Table 9.3 Bifacial Tools Metric Attributes (mm) Occupation Level 5

Specimen	Length	Width	Thickness
1	41.1	27.8	9.9
2	36.8	22.2	11.4
3	32.8	-	5.4
4	63.3	23.3	6.5
5	-	16.4	6.7
6	-	15.5	3.8
7	-	-	7.9
8	-	-	3.8
9	-	-	3.6
10	-	-	2.1

9.2.4 End Scrapers (N=4; Table 9.4)

Four end scrapers were identified from the cultural materials recovered from occupation level 5. Three of the end scrapers are constructed of Swan River chert, the fourth of Gronlid Siltstone. Two of the end scrapers are complete and two are broken transversely with the proximal portion not recovered. The end scrapers are roughly triangular in shape with the proximal end forming the apex. The distal working edge is the convex base of the triangle. The working edge is steep and is oriented perpendicular to the longitudinal axis. Three of the end scrapers are plano-convex in cross-section with slightly convex lateral margins while the fourth is flattened on both dorsal and ventral surfaces.

Table 9.4 Unifacial Tools Metric Attributes (mm) Occupation Level 5

Specimen	Length	Width	Thickness
1	20.2	15.2	9.6
2	13.5	13.7	5.4
3	-	17.3	8.4
4	-	20.9	5.3
5	-	-	3.4
6	-	-	4.2
7	50.9	34.4	12.9

9.3 Cores (N=3)

Three cores were identified from this occupation level, one core of each of the following lithic materials; quartzite, Swan River chert and Cathead chert. The quartzite core was a large core with a random irregular shape. Flakes were removed from all surfaces however there was no evidence that the core had been prepared before flakes were removed. Crushing was evident on all surfaces indicating that flakes had been removed in a random manner.

The Swan River chert and the Cathead chert cores are both triangular in shape with flakes removed from the apex which is located on the dorsal surface. Crushing is evident on the apex. Flakes are removed from all sides of the apex.

9.4 Flaked Lithic Debitage (Table 9.5,9.6,9.7,9.8)

Occupation level 5 is distinguished as a single occupation level throughout the majority of the excavation however, seven of the furthest west units present a separation of occupation level 5 into three separate occupations. These occupations have been designated occupation levels 5A, 5B and 5C. For discussion purposes the lithic debitage from all three occupations will be discussed both as a single entity and as separate occupations.

The excavation level designated occupation level 5 contained 2,260 pieces of debitage (Table 9.5). Of this total 38.0% (869) of the debitage was Swan River chert, 34.5% (780) was chert and 15.3% (346) was quartzite. These three material types accounted for 87.8% of the debitage of occupation level 5 by material type. The remaining 12.2% of the debitage was divided among 12 different material types. The

three most common material types were all local materials as was the majority of the lithic material recovered. Exotic materials such as Knife River flint were present in the form of 39 tertiary flakes.

Overwhelmingly the most common flake types present were tertiary flakes, which made up 77.5% (1,751) of the total amount of debitage. Following distantly were secondary flakes comprising 16.1% (364) of the total and primary flakes with 2.7% (61). The shatter category contained 3.7% (84) of the total debitage.

Table 9.5 Flaked Lithic Debitage Totals Occupation Level 5

Material type	Primary	Secondary	Tertiary	Shatter	Totals
Swan River chert	40	203	578	48	869
Chert	0	0	780	0	780
Quartzite	7	109	226	4	346
Quartz	6	24	32	24	86
Siltstone	2	2	41	0	45
Knife River flint	1	2	36	0	39
Greywacke	1	6	15	6	28
Silicified peat	1	6	10	0	17
Gronlid siltstone	0	1	12	0	14
Fused shale	0	3	8	0	11
Chalcedony	0	3	7	0	10
Jasper	3	3	2	1	9
Silicified wood	0	2	1	0	3
Obsidian	0	0	2	0	2
Diatomite	0	0	1	0	1
Totals	61	364	1751	84	2260

The majority of the units in this occupation level contained either less than 20 pieces of debitage (18 units) or less than 50 pieces of debitage (9 units) (Figure 9.1). A heavier concentration of lithic debris was noted in portions of the excavation. Two of the concentrations are associated with the presence of a hearth, in particular feature 5-6 (19S6E) and feature 5-8 (18S8E). The other concentration located in unit

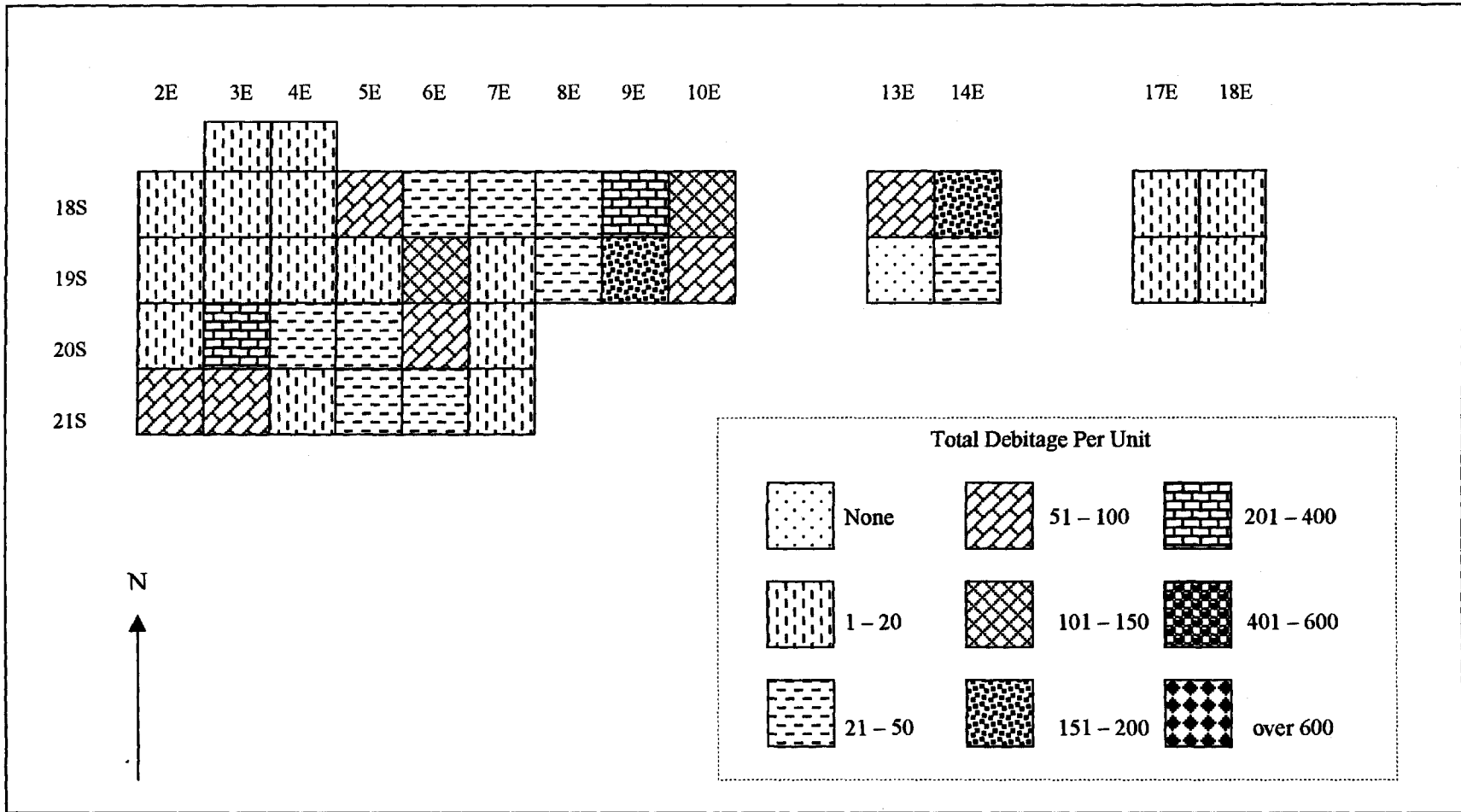


Figure 9.1 Lithic Debitage by Number Occupation Level 5

#18S14E had no known feature associated with it however it is possible that a feature lies outside of the excavation perimeters.

9.4.1 Lithic Debitage Separated Levels

Those units where the separation of occupation level 5 was present did not contain evidence of all three levels in all of the units. Occupation level 5A is located in five of the units, level 5B in three of the units and level 5C in six of the units.

Occupation level 5A contains a total of 44 pieces of debitage (Table 9.6). The most common material type was chert with 40.9% (18) of the debitage. The additional 59.1% by number were divided between seven other material types however none was dominant. The majority of the lithic material was of local extraction except for three flakes of Knife River flint.

Tertiary flakes composed the largest category of debitage by number with 68.2% (30), followed by secondary flakes (13.6%, 6 flakes) and primary flakes (9.1%, 4 flakes). There were 4 pieces of shatter (9.1%).

Table 9.6 Flaked Lithic Debitage Occupation Level 5A

Material type	Primary	Secondary	Tertiary	Shatter	Totals
Chert	0	0	18	0	18
Swan River chert	0	2	3	2	7
Quartz	0	0	5	2	7
Knife River flint	1	2	0	0	3
Quartzite	1	1	1	0	3
Siltstone	2	0	1	0	3
Fused shale	0	0	2	0	2
Silicified peat	0	1	0	0	1
Totals	4	6	30	4	44

Occupation level 5B contained a total of 121 pieces of debitage (Table 9.7).

The most common material type present was chert (66.0%, 80 pieces) followed by siltstone (14.0%, 17 pieces) and Swan River chert (12.4%, 15 pieces). The remaining 7.6% of lithic debitage by number were divided between six other material types.

The majority of the debitage was of local extraction however a flake of Knife River flint and a single obsidian flake were also recovered, indicating the presence of more exotic materials.

Table 9.7 Flaked Lithic Debitage Occupation Level 5B

Material type	Primary	Secondary	Tertiary	Shatter	Totals
Chert	0	0	80	0	80
Siltstone	0	0	17	0	17
Swan River chert	2	1	9	3	15
Greywacke	0	0	3	0	3
Quartzite	0	2	0	0	2
Knife River flint	0	0	1	0	1
Obsidian	0	0	1	0	1
Quartz	0	0	1	0	1
Silicified peat	0	0	1	0	1
Totals	2	3	113	3	121

The largest category of debitage was tertiary flakes in that 93.3% (113) of all debitage recovered from occupation level 5B were tertiary flakes. The remaining 6.7% of debitage were divided evenly between the other categories.

Occupation level 5C has the heaviest concentration of lithic debitage of the three expressions of occupation level 5 in that a total of 268 pieces of debitage were recovered from the excavation of these seven units. Of the total, 227 pieces of debitage or 84.7% were Swan River chert (Table 9.8). The remaining 15.3% of debitage by number was divided among 11 different material types. The large

majority of material was of local extraction however there was three flakes of Knife River flint and a single tertiary flake of obsidian implying a limited use of more exotic material.

Table 9.8 Flaked Lithic Debitage Occupation Level 5C

Material type	Primary	Secondary	Tertiary	Shatter	Totals
Swan River chert	10	57	146	14	227
Quartzite	1	5	7	0	13
Gronlid siltstone	0	0	10	1	11
Jasper	2	2	1	0	5
Knife River flint	0	0	3	0	3
Greywacke	0	0	1	1	2
Silicified peat	0	0	2	0	2
Chalcedony	0	1	0	0	1
Chert	0	0	1	0	1
Diatomite	0	0	1	0	1
Obsidian	0	0	1	0	1
Siltstone	0	1	0	0	1
Totals	13	66	173	16	268

Tertiary flakes were the most frequently occurring type of flake recovered from occupation level 5C in that 64.5% (173) of the flakes are tertiary. Secondary flakes occurred 24.6% of the time (66 flakes) and only 13 (4.9%) primary flakes were recovered. A total of 16 pieces of shatter was recovered accounting for 6.0% of the total amount ofdebitage.

It is difficult to determine the presence of clustering of artifacts in that only seven units are involved. Three hearths and one bone pit are located either in or around these seven units. The heaviest concentration of lithic debris for levels 5B and 5C occurs in unit #20S3E, which contains feature 5-4, a hearth. This unit contains no evidence of occupation level 5A.

9.5 Fire-Broken Rock (Table 9.9, Figure 9.3)

A total of 1,655 fragments of fire-broken rock with a combined weight of 62.2 kilograms were recovered from all expressions of occupation level 5. The majority of the fire-broken rock was granite (96.1%) with other material types represented by scattered fragments (Table 9.9).

Table 9.9 Fire-Broken Rock Occupation Level 5

Material type	Number	Weight
Granite	1603	59836.6
Schist	11	886.8
Basalt	25	623.3
Sandstone	8	588.5
Quartzite	8	317.9
Totals	1655	62253.1

Clustering of fire-broken rock was evident in that the heaviest concentrations of fire-broken rock were located in or near the units which contained evidence of hearths (Figure 9.3). In particular, hearths were located in or near units # 19S2E, 19S3E, 20S3E, 20S5E and 18S9E. The heaviest concentration of fire-broken rock was recovered from the hearths situated in the western portion of the excavation trench. The eastern-most units of the excavation did contain fire-broken rock, however the amounts were sparse. Unit #19S5E contained no evidence of fire-broken rock, which would appear unusual considering that the units surrounding contained some of the largest amounts. This unit was the location of the original test pit excavated in 1983 and it is possible that the fire-broken rock was present but not collected during excavation.

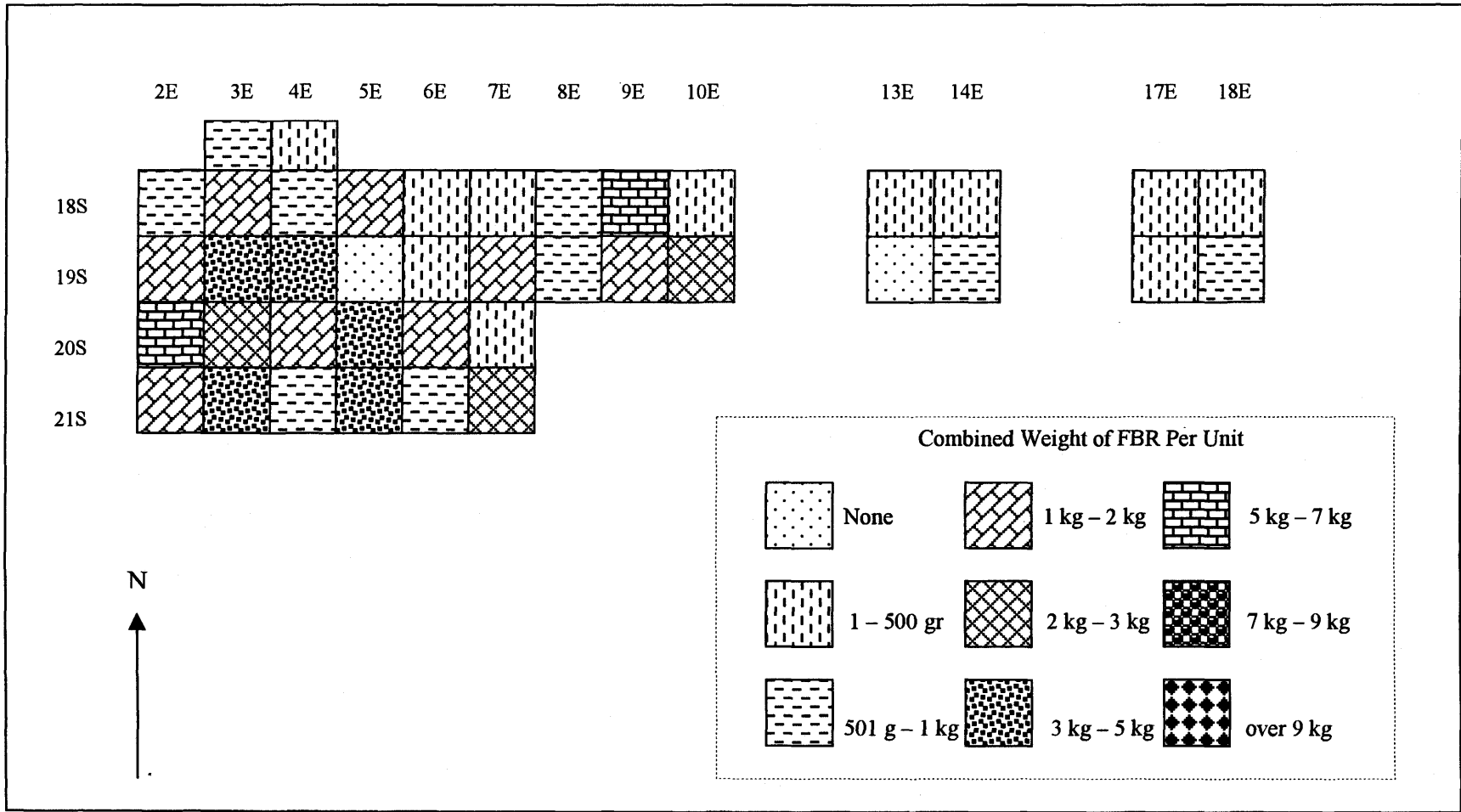


Figure 9.2 Fire-Broken Rock by Weight Occupation Level 5

9.5.1 Fire-Broken Rock Separated Levels

The separate expressions of occupation level 5 are only evident in the western-most portion of the excavation, in particular the seven units to the west and south of the excavation area. Three components representing occupation level 5 were found in some portions of these units however not all components contained debris. A total of 433 fragments of fire-broken rock were recovered from all three separate exposures for a total weight of 17 kilograms. The most common material type was granite with 93% of fragments by weight.

The heaviest concentrations of fire-broken rock in the units in question appear to be those units that contained evidence of hearths, in particular units # 19S3E, 20S3E and 21S3E in occupation level 5C. This did not continue through all exposures in that occupation level 5A contained no debris in unit #20S3E and occupation level 5B contained no evidence of fire-broken rock in unit #21S3E.

9.6 Bone Tools (N=2; Plate 9.3)

Two fragmented bone tools were recovered from the excavation of occupation level 5. There is not enough bone present to determine which element or species the fragments are from. The first tool is polished on both surfaces and edges (Plate 9.3, item b). The distal end is abraded into a rounded curve and the proximal end has broken off and was not recovered. The general shape of this tool implies use as a spatula, however its size limits its use in that it is only 10mm wide at the distal end and the tool is only 2mm thick.

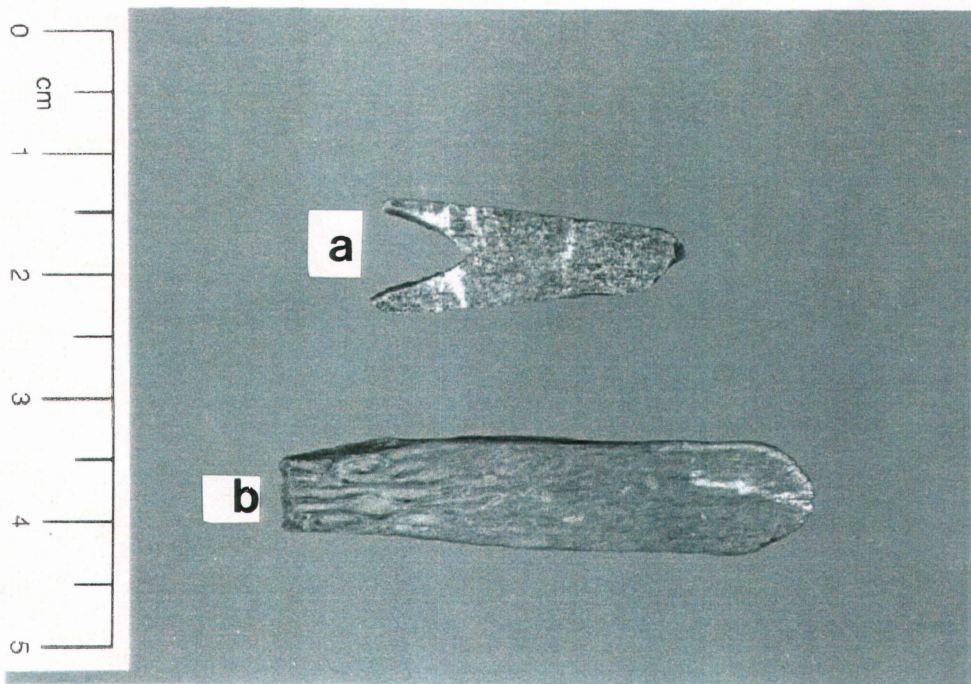


Plate 9.3 Bone Tools Occupation Level 5

The second bone tool is notched forming two prongs at the distal end (Plate 9.3, item a). The lateral edges of the prongs have been cut into shape. The tips of the prongs are worn. The proximal end has been broken and not recovered. The proximal end is more constricted than the distal end. The dorsal surface has been worn, striations are present across the surface most notably near the distal end. The interior surface has not been worn.

9.7 Occupation Level 5 Features

Nine features were recovered from the excavated portion of occupation level 5 (Figure 9.3). The majority of the features were hearths or organic stains associated

with these hearths. The exception is feature 5-2, which consisted of a cluster of bone fragments.

Feature 5-1 was located in the northeast quadrant of unit #19S2E at a depth of 50 cm. The dimensions of the hearth were 17 cm north to south and 23 cm west to east. The matrix is black without any evidence of oxidation. Ash and charcoal are present within the hearth. The bone recovered was highly processed with only very small fragments recovered. The bone was unburned, burned and calcined. Only a few pieces of bone were identifiable and these were all bison limb elements. There was only one large (667.3 grams) fire-broken rock recovered along with several smaller fragments. It is likely that this small hearth is associated with the larger hearth, feature 5-3.

Feature 5-2 has been identified as a concentrated bone feature located in the northwest quadrant of unit #19S3E. The feature has an over-all depth of 3 cm, is located between 50 and 53 cm below the surface and has a diameter of approximately 20 cm. Within this feature is a concentration of heavily processed unburned bone. The identified bone recovered from this feature was restricted to bison remains in particular cranial and vertebral elements. There was no noticeable change in soil color or texture.

Feature 5-3 was located in the southeast quadrant of unit #19S2E and the southwest quadrant of unit #19S3E and a small portion of the northeast quadrant of unit #20S2E. The depth of the hearth extends from 48 cm to 61 cm below the surface. The hearth contains unburned, burned and calcined bone all heavily processed and mostly unidentifiable. Identifiable elements included rabbit and grouse

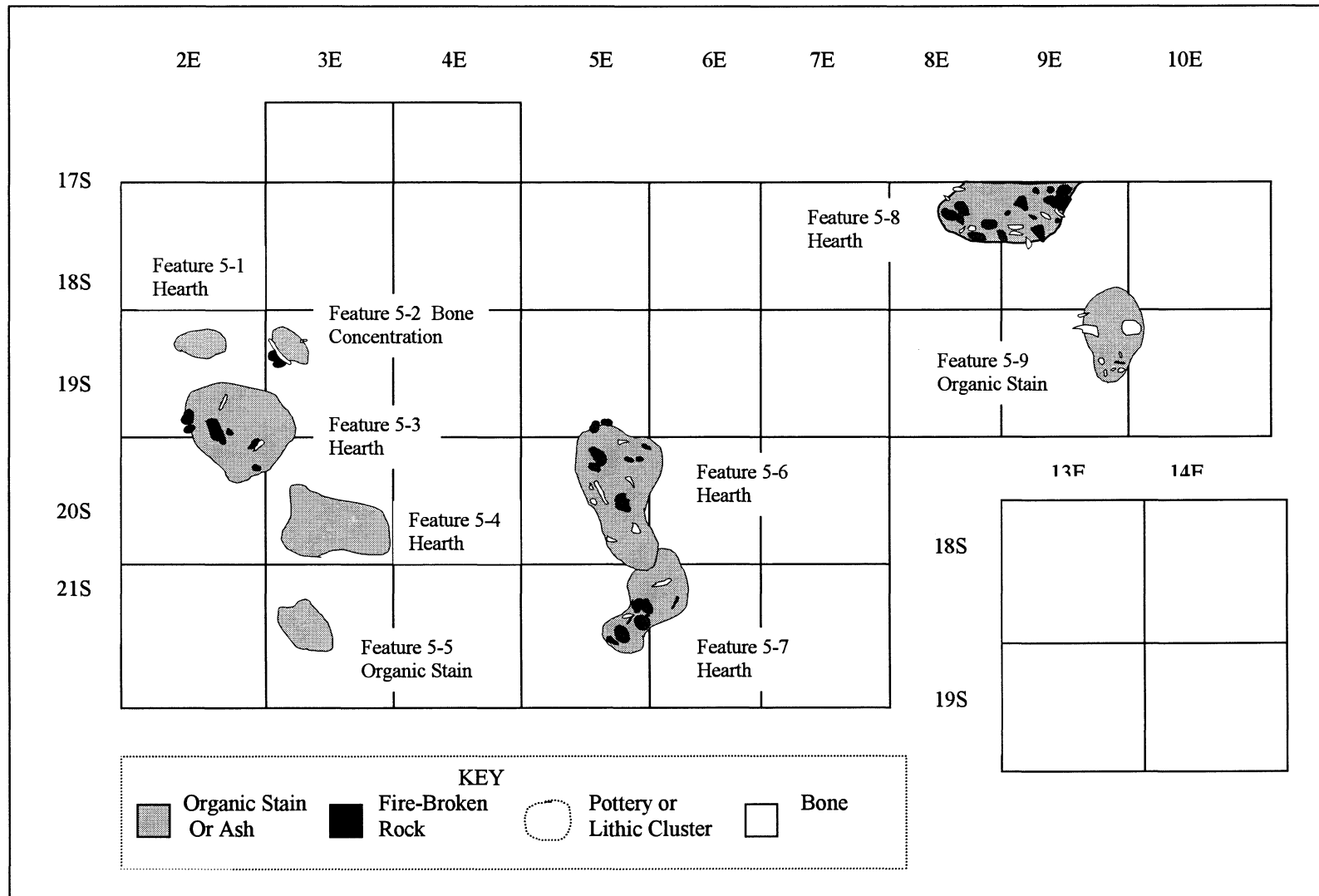


Figure 9.3 Feature Location and Description Occupation Level 5

as well as bison. Granite fire-broken rock was recovered including seven pieces with a weight of 636.1 grams. The southwest quadrant of unit #19S2E contained a considerable amount of fragmented fire-broken rock outside of the actual hearth suggesting a possible dumping area for debris. No description of the matrix was noted.



Plate 9.4 Feature 5-2, Unit #19S 3E, Occupation Level 5

Feature 5-4 appears to be a large hearth located between 49 and 55 cm below the surface in the northwest and northeast quadrants of unit #20S3E. The northern extent of the hearth apparently encompasses the majority of the center of the unit, however, the southern border of the hearth was not indicated on the planviews. The dimensions drawn indicate that the hearth extends into the southern quadrants of unit

#20S3E. The unit report notes that the entire hearth was located within the unit boundaries. Ash, charcoal and a large amount of burned bone was recovered from the hearth as well as very friable granite fire-broken rock. Identifiable bone recovered from this feature includes bison, canid and rabbit.

Feature 5-5 has been identified as a small, dark, organic stain located in the northwest and northeast quadrants of unit #21S3E at a DBS of between 40 and 46 centimeters. Contained within the stain was some burned bone. It is suggested that this stain might be associated with feature 5-4.

Feature 5-6 is identified as a hearth encompassing the southeast quadrant of unit #19S5E (test pit) the northeast and southeast quadrants of unit #20S5E and the northwest quadrant of unit #20S6E. The hearth was located between a depth of 36 and 48 cm. Contained with the hearth is a quantity of burned and calcined bone, in particular a lot of burned cranial fragments. Elements from small rodents were recovered from the fine-screen including burned vole remains. Ash and charcoal were also present. Feature 5-7 is most likely associated with the hearth.

Feature 5-7 is located below and to the south of the hearth in feature 5-6. It was originally recorded as a separate hearth in the southwest quadrant of unit #20S6E. This feature contains charcoal stains and is most likely the result of rodent disturbance through a portion of feature 5-6. The western and southern limits of the disturbance have not been noted.

Feature 5-8 was identified as a hearth located in the northeast quadrant of unit #18S8E and the northwest quadrant of unit #18S9E. The hearth continues into the northern portion of the unexcavated unit #18S8E and #18S9E. The feature consists of

a dark matrix containing fragments of charcoal, small concentrations of fire-broken rock, and fragmented burned and calcined bone. Faunal elements recovered from the hearth contained less bison elements than identified at other features. Identified from this hearth was a large amount of micro-vertebrates including pocket gopher, meadow and sagebrush vole and small birds as well as various indeterminate small mammals.

Feature 5-9 was originally identified as a soil stain however it is most likely a small hearth. This feature is present in the southeast quadrant of unit #18S9E at a depth of 35 to 40 cm. The matrix is stained dark and the base of the stain contains oxidized soil. The matrix surrounding the feature was tan in colour. The feature contains few artifacts. Included within the feature were one fragment of fire-broken rock, a single lithic flake and two bone fragments - one unburned and one burned fragment. While the feature does not appear to rest entirely within this unit the southern border was not noted or mapped in the surrounding units.

9.8 Occupation Level 5 Interpretations

Occupation level 5 is a compacted stratigraphic level consisting of a single level throughout the majority of the site and three separate occupations present in the western portion of the site. All three expressions are associated with the McKean Complex.

Projectile points were recovered from the three morphological styles generally associated with the McKean Complex. The McKean Lanceolate projectile point was recovered from a depth of 51 cm, the two Hanna projectile points were located at depths of 42 and 44.5 cm and the four Duncan projectile points were recovered at

depths of 41, 55, 53.5 and 54 cm below the surface. From these depths it appears that the McKean Lanceolate and three of the four Duncan projectile points are associated with the deeper levels of occupation level 5 while the two Hanna and the fourth Duncan projectile points are associated with the more shallow levels. It does not appear possible to separate the appearance of these different projectile point styles to different occupations.

Hearths accounted for seven of the nine features identified during the excavation of occupation level 5. The numbers and types of features identified suggest that the major activity associated with this occupation was one of secondary processing of bison and initial processing of medium to small mammals, birds and rodents. There is no evidence of habitation at this location.

A heavy concentration of fire-broken rock was situated in or near the units that contained hearth features. The other units contained varying amounts of fire-broken rock including the units located at the eastern border of the excavation. The presence of fire-broken rock does not appear to have been hindered dramatically by the debris slope located at the eastern border

Although no lithic reduction stations were identified as features during the excavation, concentrations of lithic debitage are apparent. The majority of these concentrations are located surrounding the hearth features indicating sharpening of tools during work related activities. One concentration of debitage is located in unit 18S 14E. This portion of the site is far removed from the identified features suggesting the presence of a feature located in the unexcavated portion of the site.

Season of occupation for level 5 has been determined by faunal analysis to indicate two separate periods of occupation, a winter occupation and a spring / early summer occupation. The winter occupation, perhaps between November and March, is indicated by the presence of elements from a bison calf aged at death between seven and ten months of age. The spring / early summer occupation (April to July) is based on bison remains aged between one and three weeks of age. This season for this occupation is also supported by the recovery of elements from badger, skunk, green wing teal as well as toad and clam (Webster 1999).

Chapter 10

Occupation Level 6

10.1 Introduction

Occupation level 6 is the second of the two occupation levels in the site where in the extreme western portion of the site the level is separated into two distinct occupation levels. However, since this separation is only present in four excavation units the material remains from the excavation are discussed as one occupation level. Two identifiable projectile points were recovered; both identified as Oxbow projectile points. This indicates that the time period of occupation for this occupation level is between 3050 years B.P. and 4700 years B.P. (Dyck 1983).

10.2 Flaked Stone Tools

A total of twelve stone tools were recovered from the excavation of occupation level 6. Table 10.1 lists the various categories of stone tools and their frequency within the total assemblage. The items listed in Table 10.1 can be classified as chipped stone tools because of the presence of varying degrees of retouch except for the hammerstones. However, cores are not included within this list. There was no evidence of ground stone tools.

Table 10.1 Frequency Distribution of Stone Tool Types in Occupation Level 6

Tool Type	Frequency	Percent
Projectile points	3	30.8
Knives	2	16.7
Preforms	1	8.3
Unidentified Bifaces	1	8.3
End scrapers	1	8.3
Hammerstones	4	33.4
Total	12	100.0

10.2.1 Projectile Points (N=3, Plate 10.1)

Three items were identified as projectile points. All of the projectile points were fragmented, two were diagnostic. The third partial projectile point was a siltstone midshaft that was lenticular in cross-section, however, without the base no identification was possible.

Both of the diagnostic projectile points were identified as Oxbow projectile points. The first of the Oxbow points consisted of a Swan River chert point that was missing one ear (Plate 10.1, item a). This projectile point was small (weight 0.7 grams) and had been reworked. The base is concave. The other Oxbow projectile point consists of a single ear broken at the notch (Plate 10.1, item b).

10.2.2 Knives (N=2; Plate 10.2 Table 10.2)

Two knives were identified from the artifacts relating to occupation level 6. The large knife fabricated from quartzite is asymmetrical and complete and had been backed for ease of use (Plate 10.2, item a). Flaking only occurs on the non-backed lateral edge and is more pronounced on the ventral surface. The distal end is pointed, possibly for use as an engraver. The second identified knife (Plate 10.2, item c),

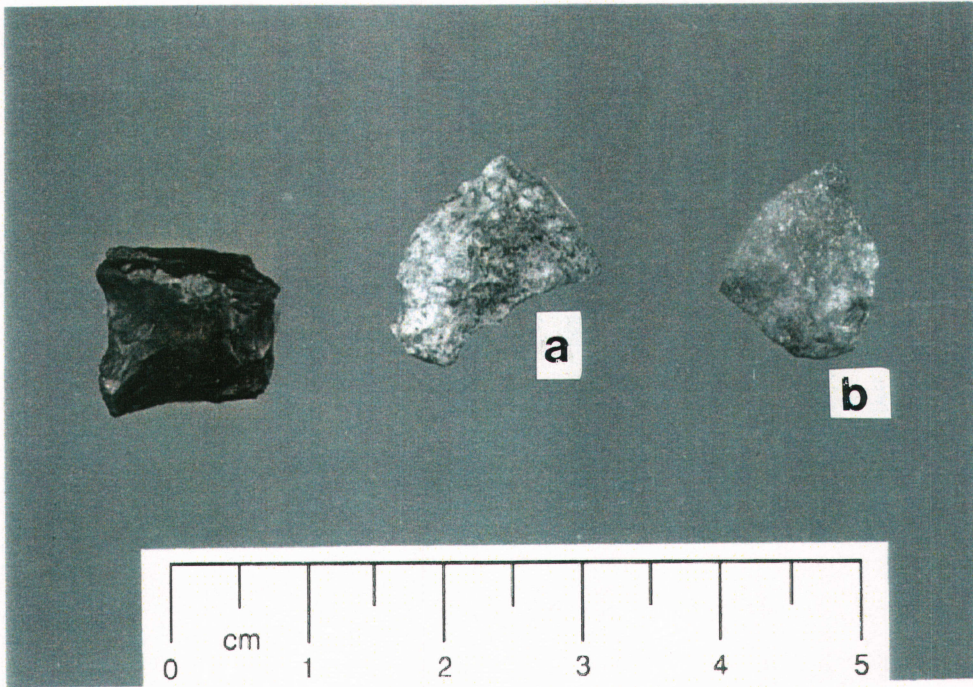


Plate 10.1 Projectile Points Occupation Level 6

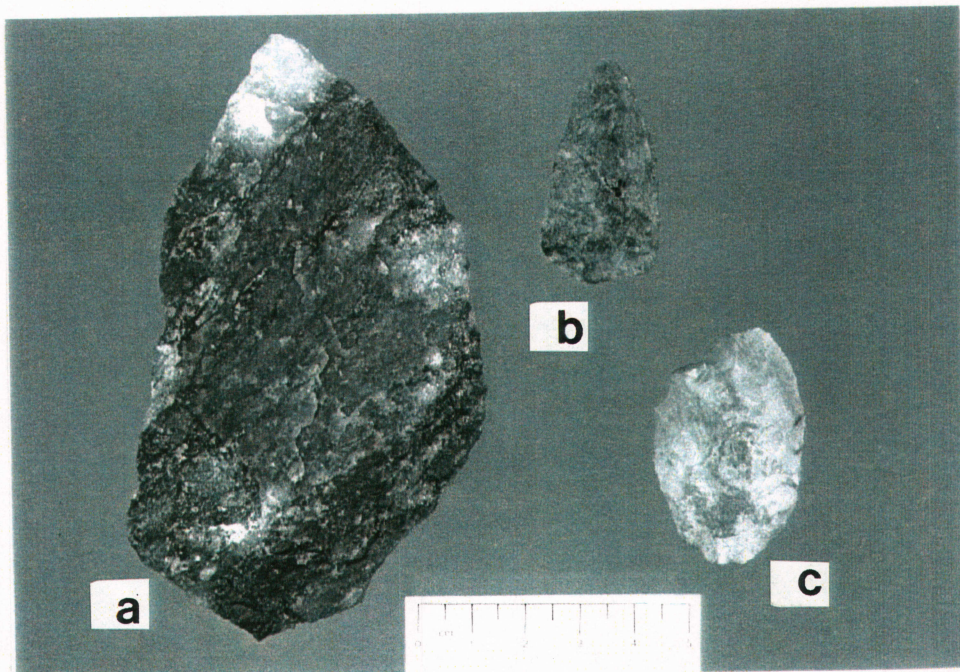


Plate 10.2 Bifacial Tools Occupation Level 6

fabricated from Swan River chert, is complete and ovate in form, with cortex present on the a portion of the dorsal surface.

10.2.3 Preforms (N=1; Plate10.2, Table 10.2)

The tool identified as a preform is complete and was constructed from Swan River chert (Plate 10.2, item b). The preform is triangular in shape. The convex base is flaked and ground and the lateral edges show no evidence of edge wear. This, together with the large vug located centrally on the dorsal surface and a thin transverse crack also on the dorsal surface implies that this tool was discarded before use because of structural weakness.

10.2.4 Unidentified Bifacial Tools (N=1)

The final bifacial tool is possibly an engraver or a perforator, however the bifacial flaking is marginal. Flaking is evident on one lateral edge and the rounded narrow distal end. A flake has been removed from one lateral edge resulting in the appearance of an engraver at the distal end.

Table 10.2 Bifacial Tools Metric Attributes (mm) Occupation Level 6

Specimen No.	Length	Width	Thickness
1	116.5	63.9	14.4
2	43.2	23.1	9.1
3	46.2	28.2	10.4
4	26.3	20.1	9.9

10.2.4 End Scrapers (N=1)

A single end scraper of Swan River chert was identified. This end scraper is crude in that the working edge is not well defined. The proximal end distinctly shows the striking platform. The dorsal and ventral edges of the striking platform have been ground and abraded. Since both surfaces have been treated this is more indicative of finishing treatment as opposed to platform preparation. The dorsal surface contains cortex. The final appearance of this tool suggests an expediency tool. The end scraper has a length of 22.8mm a width of 22.3mm and a thickness of 8.4mm.

10.3 Hammerstones (N=4; Plate 10.3)

Four hammerstones have been identified in this occupation level. Three of the hammerstones are granite cobbles and the fourth is a gneiss cobble. The cobbles are water worn and are oval to tear drop in shape. All four of these implements show evidence of use in the form of battering at one or both ends, ranging from slight to heavy. All four tools could have been used as hand tools as the weight ranged from 790.7 grams to 55.8 grams. One hammerstone had evidence of scorch marks on one surface implying secondary use.

10.4 Cores (N=3)

Three cores were identified; two Swan River chert and one Cathead chert. The Cathead chert core had numerous blade flake scars present as well as evidence of crushing at one end. Both the Swan River chert cores had been heat-treated, one core had been lightly treated so as to turn orange and the other heavily treated. The

heavily treated core had been burned black and the material was very dense. This core had a step fracture on the dorsal surface and three flake scars present. The ventral surface was deeply encrusted with calcium carbonate and therefore any treatment on this surface could not be determined. The lightly treated core had the remains of a striking platform on one end and cortex on the dorsal surface. Flakes were removed from the ventral surface and there was one step fracture present.



Plate 10.3 Hammerstones Occupation Level 6

10.5 Flaked Lithic Debitage

Occupation level 6 is characterized as a single occupation level in all except four excavation units located to the far west and south of the main excavation. In these four excavation units occupation level 6 is separated into two occupation levels designated occupation levels 6A and 6B.

Occupation level 6 contained a total of 1,408 pieces of debitage (Table 10.3). Of this total 1,108 pieces of debitage or 78.7% consisted of Swan River chert, 8.7% (123 pieces) were quartzite and 8.2% (116 pieces) were chert. The above mentioned materials totaled 95.6% of lithic debitage recovered from this portion of the excavation. The remaining 4.4% of recovered material were distributed between eight other material types. The majority of material by type was of local extraction however trace amounts of exotic materials were present in the form of Knife River flint and obsidian.

Table 10.3 Flaked Lithic Debitage Occupation Level 6

Material type	Primary	Secondary	Tertiary	Shatter	Totals
Swan River chert	17	167	887	37	1108
Quartzite	1	41	79	2	123
Chert	1	0	115	0	116
Quartz	0	7	20	1	28
Silicified peat	1	3	1	2	7
Greywacke	2	1	1	1	5
Fused shale	0	1	1	0	2
Siltstone	0	1	1	0	2
Jasper	0	0	1	0	1
Knife River flint	0	1	14	0	15
Obsidian	0	0	1	0	1
Totals	22	222	1121	43	1408

The most common type of flake recovered were tertiary flakes in that 79.6% (1121) of the recovered flakes were tertiary, 15.8% (222) of the flakes were secondary and 1.6% were primary. There were 43 (3.0%) pieces of shatter recovered.

Clustering of debitage was evident in this portion of the site (Figure 10.1). The heaviest concentration of lithic debitage was present in unit #20S4E and two of the units surrounding this unit. This unit is the site of feature 6-1a and 6-3. These features were a hearth and a lithic scatter respectively. The only other unit that

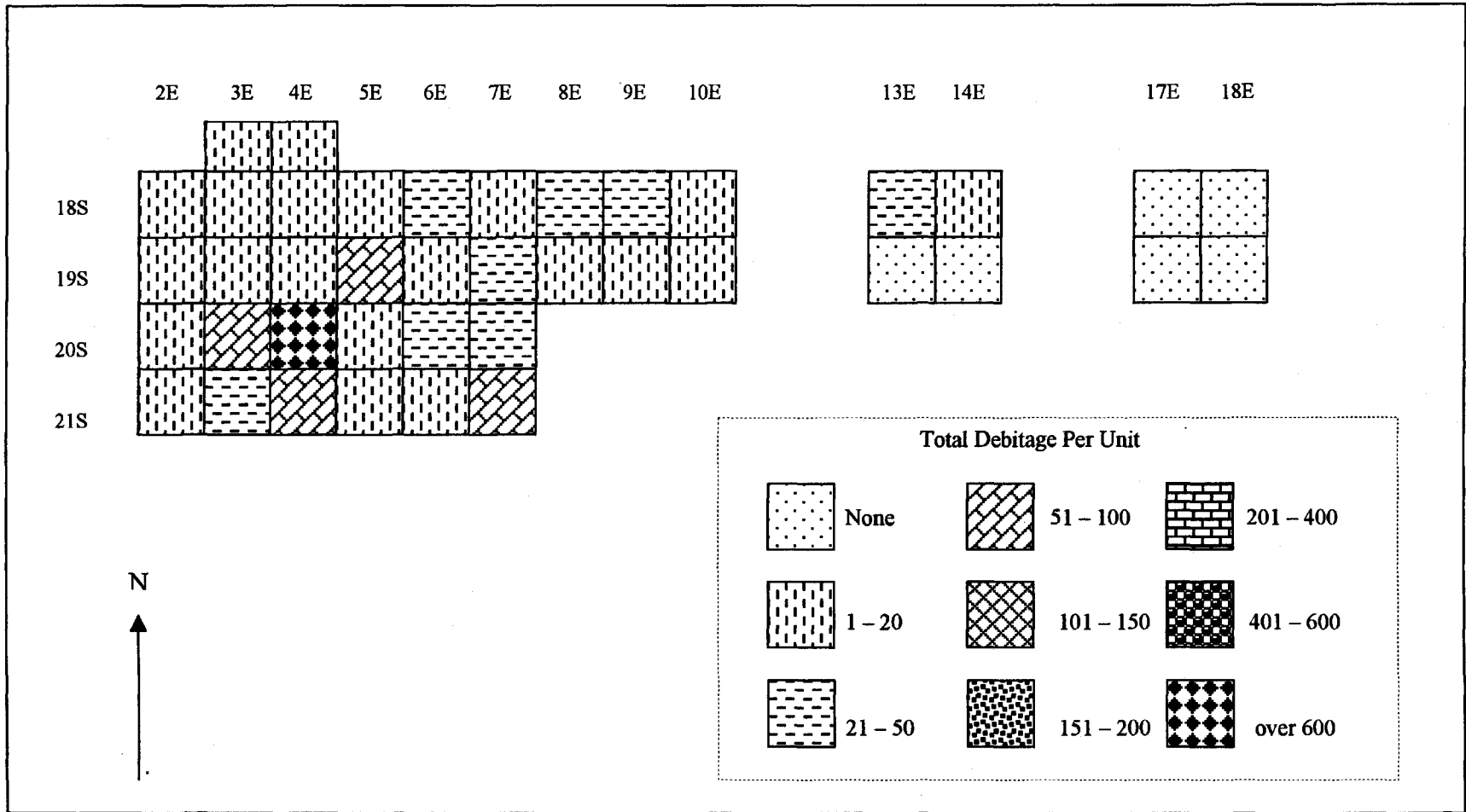


Figure 10.1 Lithic Debitage by Number Occupation Level 6

contained an elevated amount of debitage was unit #21S7E however there is no feature excavated that appears to be associated with this higher concentration. The majority of the units contained less than 20 pieces of debitage. The four units located farthest to the east contained no debitage at all. This is a result of the presence of the debris slope, which eliminated occupation in this location.

Occupation level 6A is located in only four units and contains a total of 80 pieces of debitage, 79 of which are Swan River chert. The other material type is silicified peat. All of the recovered material could be acquired locally. The types of flakes present are closely split between tertiary and secondary flakes. Of the 80 pieces of debitage present 77 are either tertiary (44) or secondary (33). There is one primary flake and two pieces of shatter.

Occupation level 6B contains a total of 61 pieces of debitage. The most common lithic material recovered was Swan River chert in that 45 pieces (73.8%) belonged in this category. The second most common material type was Knife River flint in that 14 flakes (23.0%) were recovered. As well, two quartzite flakes were recovered. Occupation level 6B contained no primary flakes. A total of 26 (42.6%) secondary flakes, 29 (47.6%) tertiary flakes and 6 (9.8%) pieces of shatter were recovered.

10.6 Fire-Broken Rock (Figure 10.2)

Occupation level 6 is represented by a single occupation level in most of the site, however in two of the western units occupation level 6 is separated by sterile matrix into two different occupation levels identified as 6A and 6B. The total weight

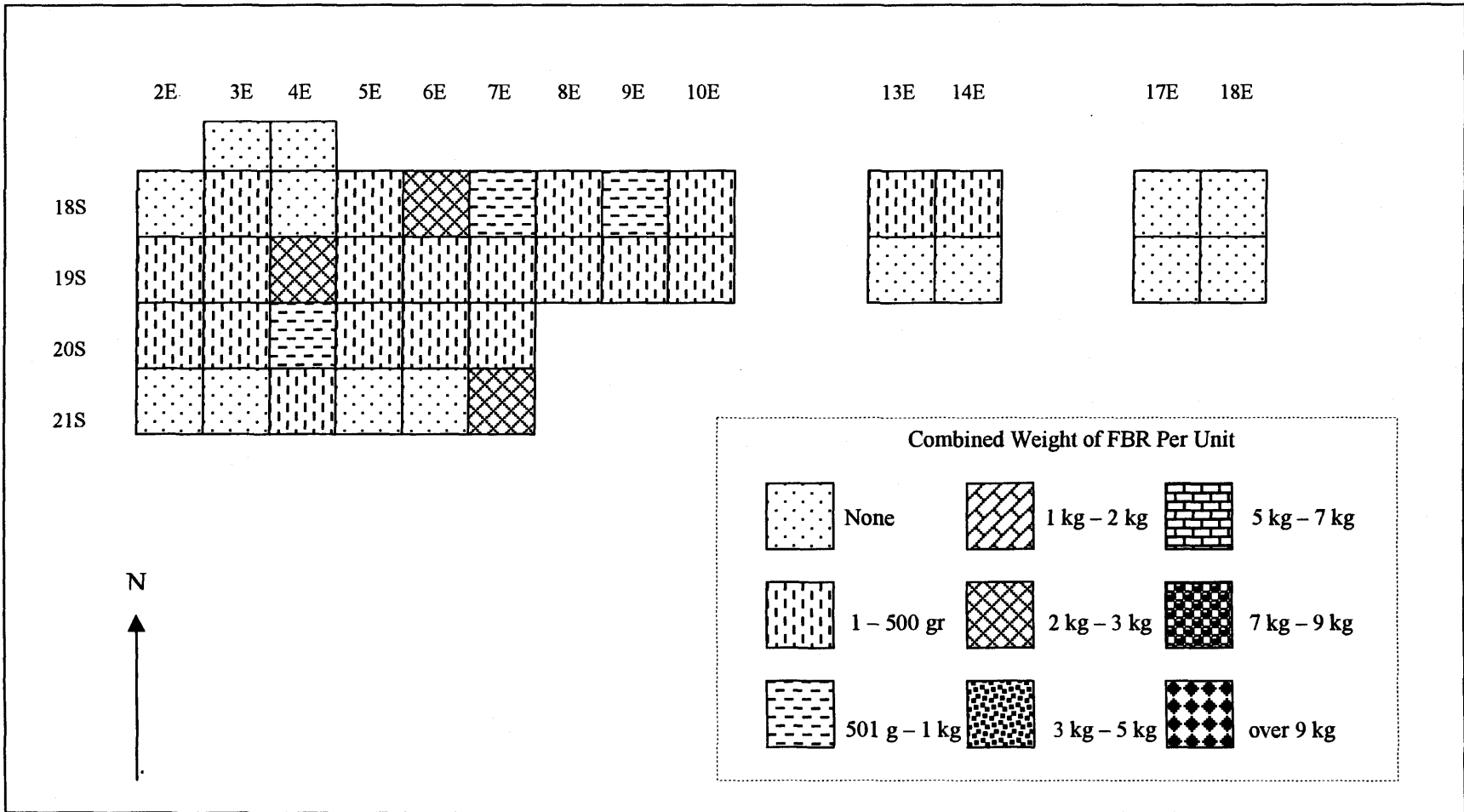


Figure 10.2 Fire-Broken Rock by Weight Occupation Level 6

of fire-broken rock recovered from the separated levels 6A and 6B is 309.1 grams. Therefore, the analysis of fire-broken rock from occupation level 6 will be based upon the expression of occupation level 6 as an entire entity.

A total of 250 fragments of fire-broken rock were recovered from the excavation of occupation level 6 with a total weight of 10.6 kilograms. The majority of fire-broken rock by material type is granite, which comprised 97.3% of the recovered fire-broken rock. Other material types were present in small amounts.

Occupation level 6 contained 14 units that had no evidence of fire-broken rock during excavation (Figure 10.2). The eastern and the western-most units of the excavation contained no debris. The heaviest concentration of fire-broken rock is situated within the center of the excavation. Evidence of one hearth was found in unit #20S4E. Three units had over 2 kilograms of fire-broken rock, including the unit directly to the north of the hearth as well as units 18S6E and 21S7E. Units bordering the last two stated units have not been excavated therefore it is possible that hearths are located near these units.

10.7 Bone Tools (N=1; Plate 10.4)

An awl was the only bone tool recovered from cultural level 6. The awl was constructed from an unidentified bone splinter carved and polished at the distal end into a point. The distal end is complete and shows wear. The proximal end is broken and does not show evidence of polish over the broken end indicating little use after breakage.

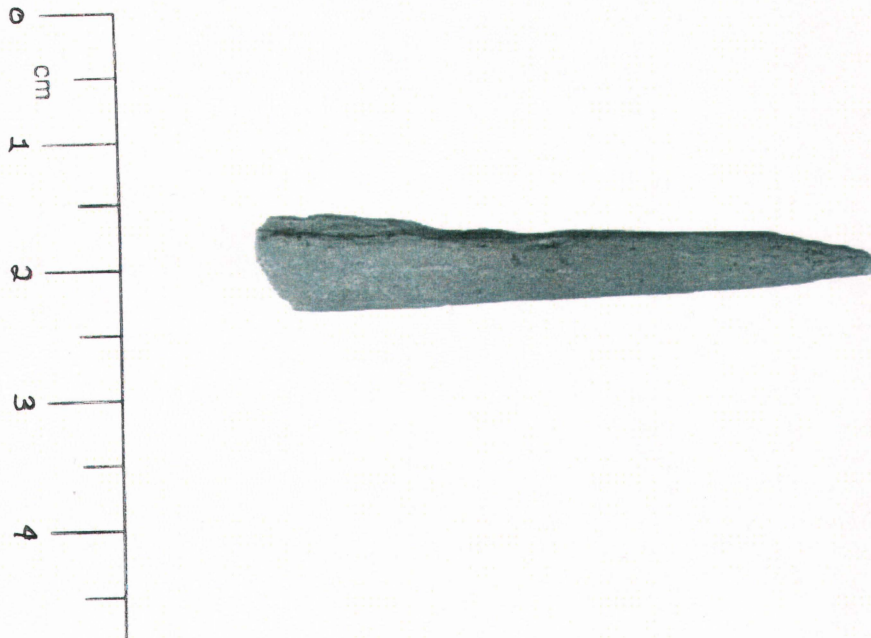


Plate 10.4 Bone Awl Occupation Level 6

10.8 Occupation Level 6 Features

The excavated portion of occupation level 6 contained the remains of four features including a hearth and associated ash lens, a lithic scatter and an organic stain (Figure 10.3). Three of the features were located in the center of the excavation area while the ash lens was situated towards the eastern portion of the trench. The eastern-most portion of the excavation contained no evidence of features.

Feature 6-1a has been identified as a small hearth located within the northeast quadrant of unit #20S4E. The hearth is situated at a depth between 60 and 67 cm. Contained within the hearth is a small quantity of charcoal and calcined bone.

Feature 6-1b appears to be an extension of feature 6-1a. The feature is present in unit #20S4E in the northwest quadrant at a depth of 60 to 69 cm. The feature has been identified as an ash lens consisting of a large piece of fire-broken rock surrounded by blackened soil and large pieces of burned bone. The feature is visible in the northern profile of the unit extending into the northwest quadrant of the unit located directly to the west. This feature probably represents the remains of a rodent burrow that passed through feature 6-1a.

Feature 6-2 appears to be a thin organic stain containing charcoal, fire-broken rock and fragmented bones. The bones appear to be a concentration of bison elements, in particular forelimbs and cranial fragments. This feature is located between 41 and 42 cm below the surface in the northeast and southeast quadrants of unit #19S9E and the northwest and southwest quadrants of unit #19S10E.

Feature 6-3 is a lithic scatter of Swan River chert flakes located in the southeast and southwest quadrants of unit #20S4E. Evidence of the scatter was first identified at a depth of 65 cm. The soil from the area was collected and fine dry-screened. The result of this dry screening was the recovery of 647 tertiary Swan River chert flakes (19.8 grams). The presence of these tertiary flakes of one material type implies a lithic retouch area.

10.9 Occupation Level 6 Interpretations

Occupation level 6 is a superimposed level consisting of two separate occupations distinguished only in the extreme western portion of the site.

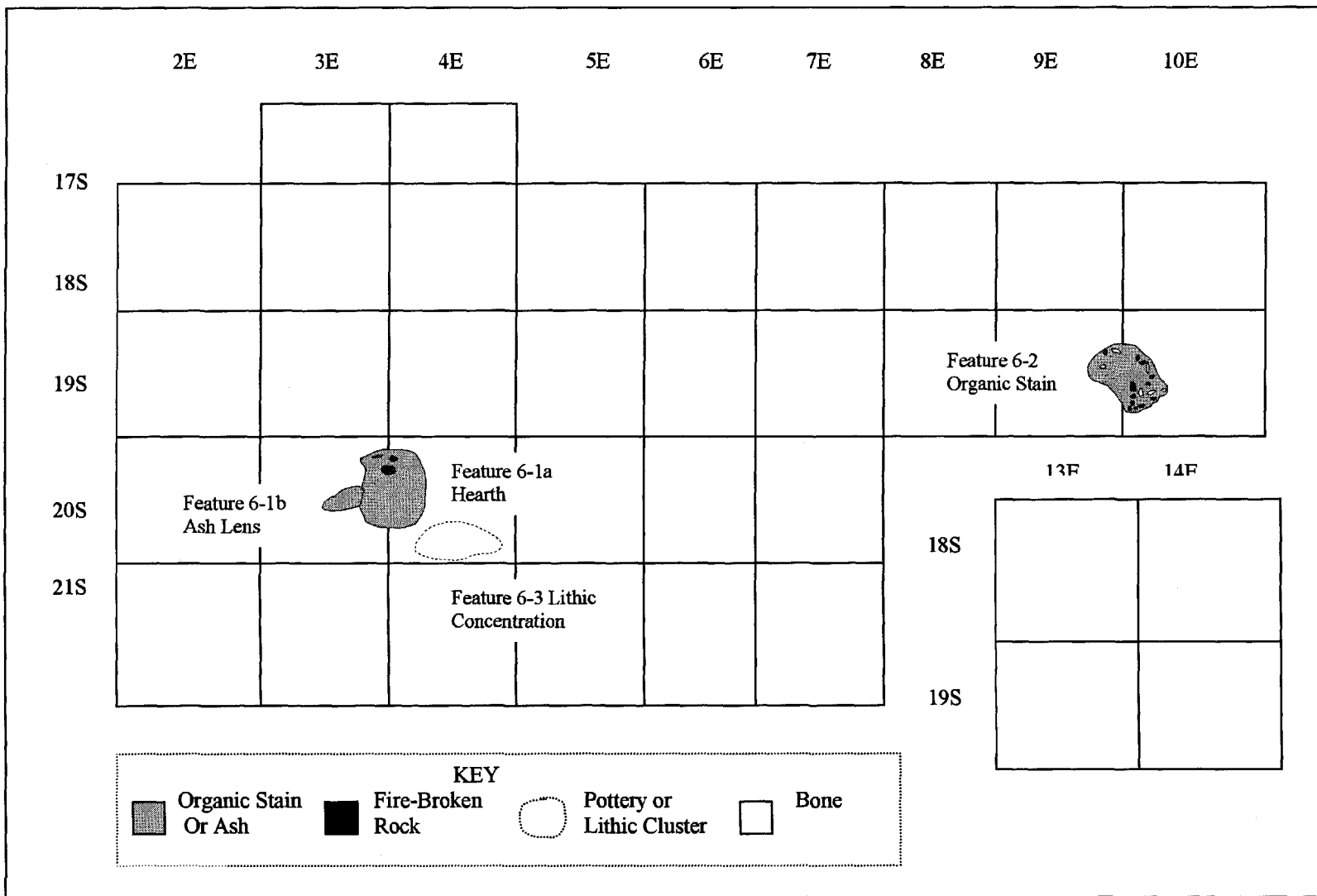


Figure 10.3 Feature Location and Description Occupation Level 6

Throughout the majority of the excavation occupation level 6 is identified as a single occupation level because of the lack of separating matrix, therefore identifying which cultural objects were identified with which occupation level could only be determined within four excavation units. As such, the majority of cultural remains from this level have been discussed as a single occupation level. The occupation level was located between 45 and 57 cm below the surface.

The two Oxbow projectile points were recovered from 50.5 and 65.5 cm below the surface, clearly separated from the above McKean Complex levels by depth and a level of sterile matrix. Based upon the depth at which these points were located it is apparent that occupation level 6B is an Oxbow occupation level. No projectile points have been recovered from occupation level 6A, however, based upon the close association with the Oxbow component and the clear stratigraphic separation from the McKean Complex occupation it is likely that occupation level 6A is also associated with the Oxbow Complex.

The distributions of cultural materials throughout the excavation, while sparse, enable interpretations concerning cultural activities. The excavation units located towards the far eastern portion of the excavation contain no cultural remains. This is a result of the debris slope present in this location. The distribution of fire-broken rock (Figure 9.2) shows heavier concentrations in three units. One of the units with the heavier concentrations of fire-broken rock is situated directly north of the identified hearth (unit #20S4E). The other units are located on the periphery of the excavation area suggesting the location of hearths nearby but unexcavated. The

distribution of lithic debitage indicates the heaviest concentration in the unit with the lithic reduction station (unit 20S4E) with reduced amounts in the units directly surrounding this feature. An increased concentration of debitage was also recovered from unit 21S 7E. This unit also had higher concentrations of fire-broken rock identified further implying the presence of an activity area located outside of the excavation area.

The depths at which the features were located make it possible to identify which features belong in occupation level 6A and which belong in level 6B. The organic stain, feature 6-2, was identified at a depth of 41 to 42 cm below the surface. The depth clearly places this feature within occupation level 6A. The other identified features were all located between 60 and 69 cm below the surface, indicating that these features were associated with the identified Oxbow occupation.

Seasonality for the occupation of this portion of the site can not be determined based upon the faunal materials recovered.

Chapter 11

Occupation Level 7

11.1 Introduction

Occupation level 7 is an intermittent level present in some portions of the site and absent in others. Where level 7 is present, it is located below a thick, yellow sand layer identified by Burt (1997) as sandy mud. The intermittent nature of this level suggests that erosion of the occupation level occurred sometime after deposition.

Figure 11.1 indicates the distribution of this occupation level. Cultural remains in the form of lithic debitage have been recovered from only 17 of the 46 excavation units. The degraded nature of this occupation level leaves few cultural remains with which to determine anything concerning the nature of the occupation.

11.2 Lithic Materials

There was a single tool recovered from occupation level 7 (Plate 11.1), that of a Knife River flint unifacial endscraper recovered from unit #20S5E at a depth of 70 to 75 cm below the surface. This complete endscraper weighed 3.0 grams and was heavily patinated. The distal working edge was bevelled and both lateral and proximal edges were flaked. Ventral and dorsal surfaces were flat. There were no other tools or fragments of tools recovered from this level.

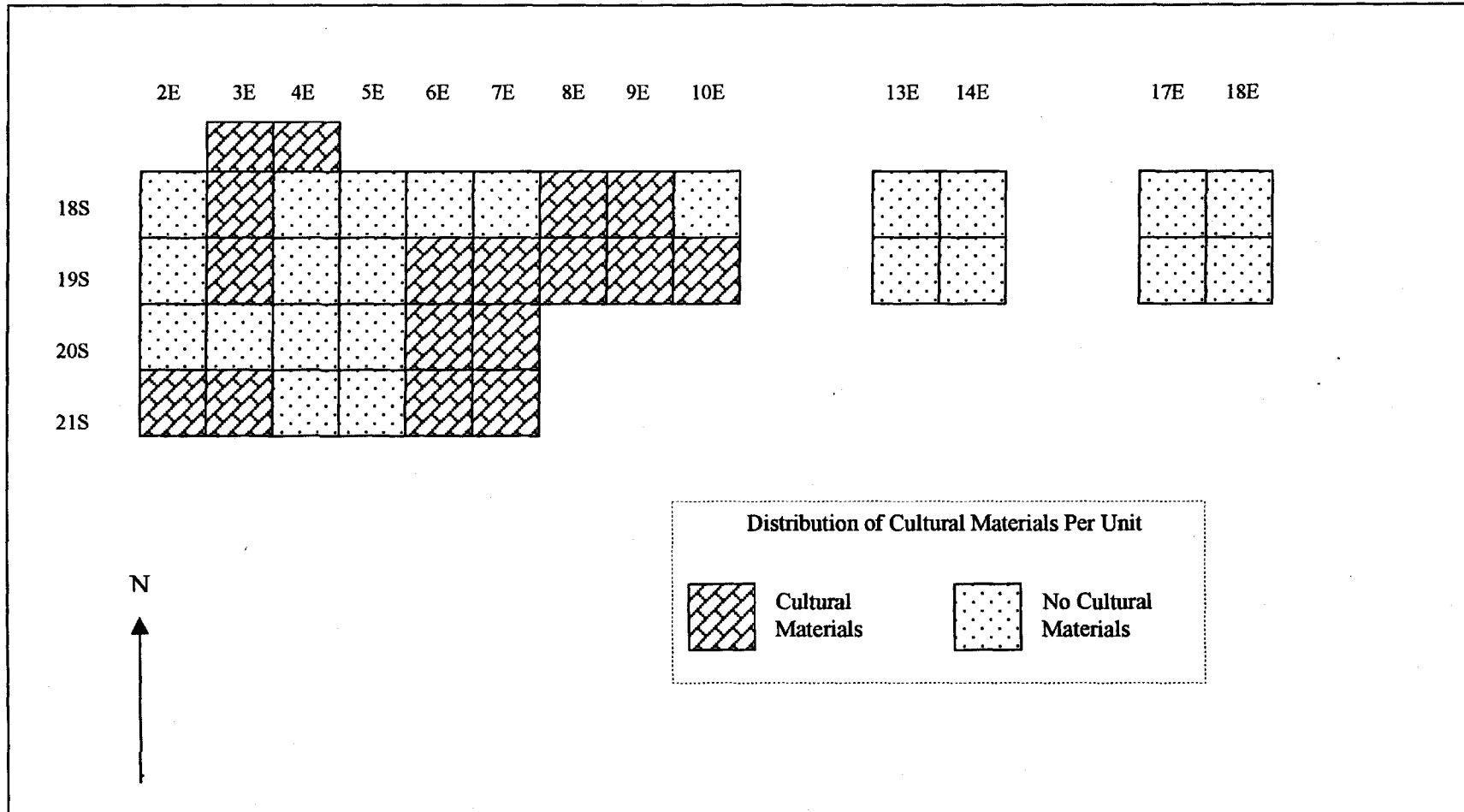


Figure 11.1 Distribution Map Occupation Level 7

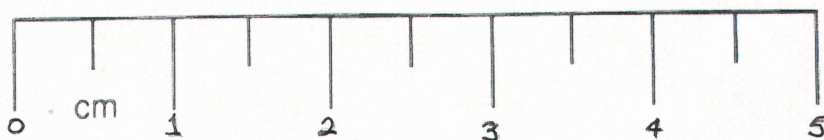


Plate 11.1 End Scraper Occupation Level 7

11.3 Flaked Lithic Debitage

Lithic debris from occupation level 7 was recovered from a total of 17 units including three units which had debris present only in the fine screen samples (Figure 11.2). Including the fine screen samples there was a total of 239 lithic fragments recovered with a total weight of 164.2 grams.

As seen in the attached table (Table 11.1), the most common flake type identified were tertiary flakes followed distantly by secondary flakes. A few fragments of primary flakes and shatter were also recovered. The prevalence of tertiary and secondary flakes appears to indicate the sharpening of already constructed tools as opposed to the construction of new tools.

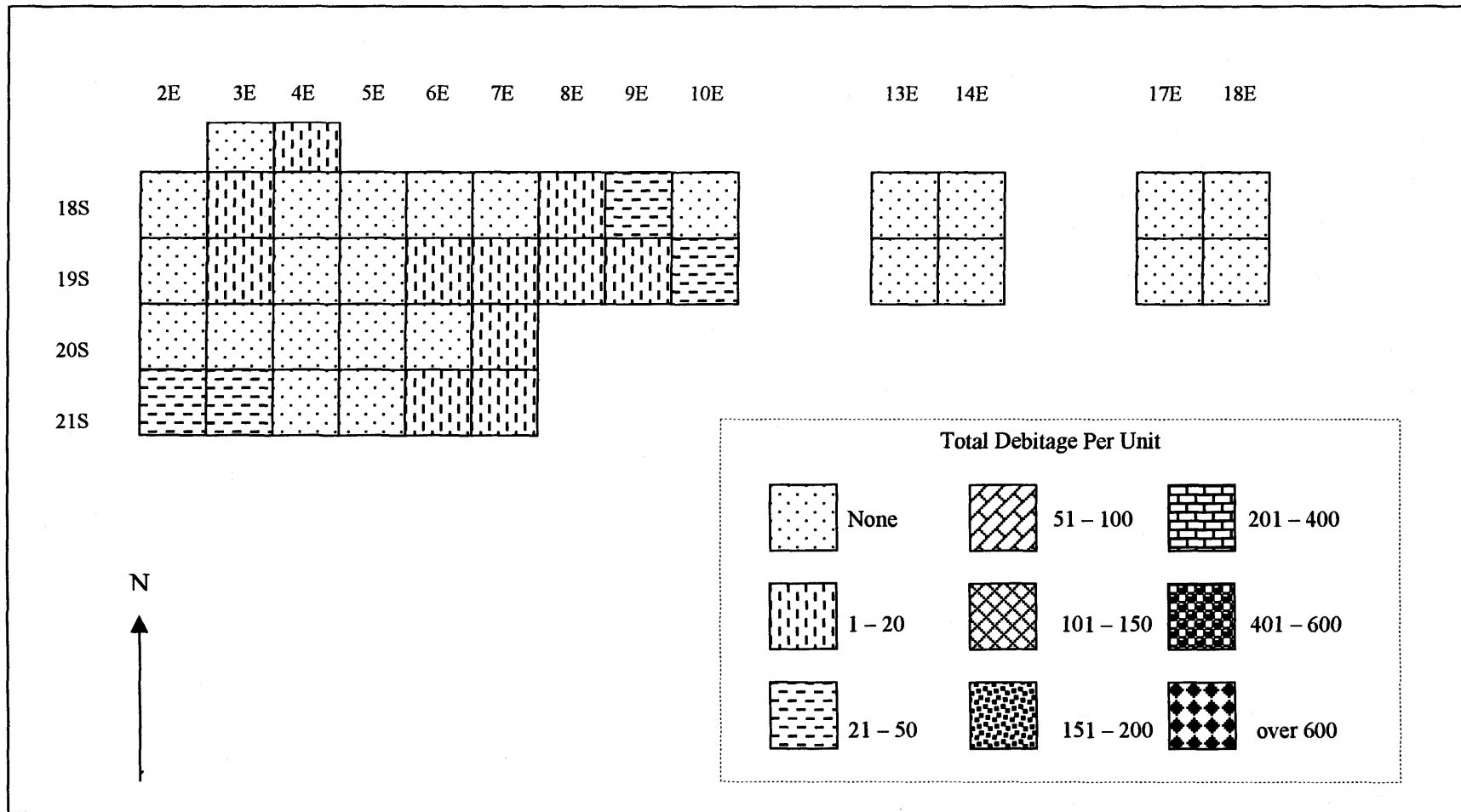


Figure 11.2 Lithic Debitage by Number Occupation Level 7

The most utilized raw material was Knife River flint (81) followed by unidentified chert (66) and Swan River chert (59). The other material types were recovered in insignificant amounts.

Table 11.1 Flaked Lithic Debitage Occupation Level 7

Material type	Primary	Secondary	Tertiary	Shatter	Total
Knife River flint	0	25	56	0	81
Chert	0	1	64	1	66
Swan River chert	5	28	23	3	59
Quartzite	0	7	1	4	12
Quartz	0	8	1	2	11
Silicified peat	0	3	2	0	5
Silicified wood	0	0	1	0	1
Gronlid siltstone	1	0	0	0	1
Fused shale	0	1	0	0	1
Greywacke	0	1	0	0	1
Siltstone	0	0	0	1	1
Totals	6	74	148	11	239

11.4 Fire-Broken Rock

A total of 24 fragments of fire-broken rock were recovered from the excavation of cultural level 7 with a total weight of 262.1 grams. The majority of the fragments consisted of granite (23 fragments, 219.9 grams) with one fragment of metamorphosed greywacke / greenstone (42.2 grams). Out of the 46 units excavated, cultural remains were recovered in the form ofdebitage from 17 units (Figure 11.3). Fire-broken was recovered from eight of these 17 units. The only patterning identified for fire-broken rock in this cultural level was the tendency for the fragments to be recovered from the western portion of the site. This is not important since it appears that the slope to the east eliminated occupation of that area past cultural level 5

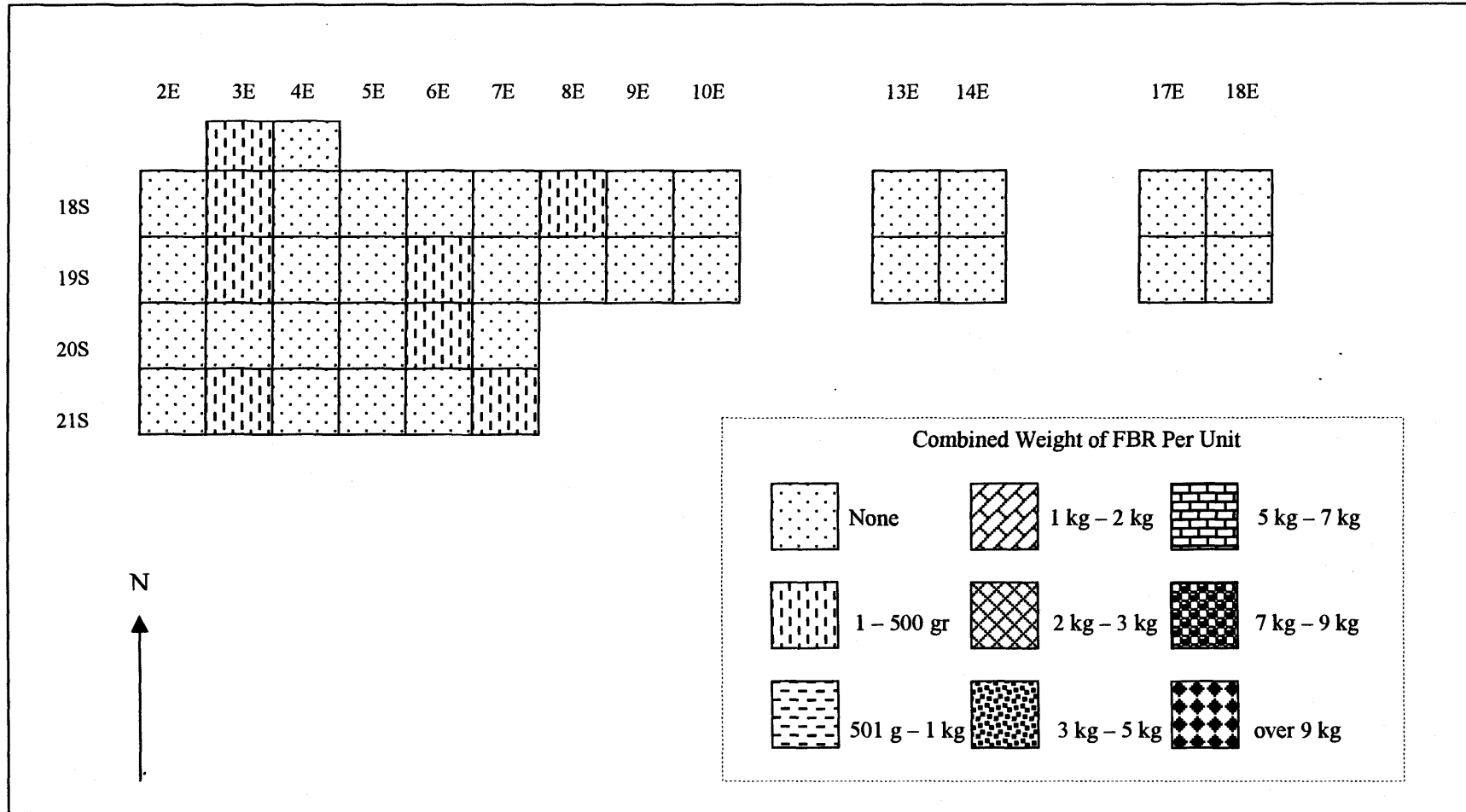


Figure 11.3 Fire-Broken Rock by Weight Occupation Level 7

11.5 Level 7 Interpretations

Occupation level 7 is an intermittent level located in only 17 of the 46 excavation units. Few cultural materials were present within this level. Where found the level is present below a thick, yellow sand layer that contained a number of gastropod shells. The nature of the deposits indicates erosion of the occupation level sometime after deposition.

The only cultural materials present were a single complete end scraper and a small amount of flaked debitage and fire-broken rock. No features were identified and there was a limited amount of faunal remains present. Based on stratigraphic position the deposition of this level presumably predates the Oxbow materials located in level 6A and 6B. Determining information concerning the nature of the occupation is not possible considering the paucity of cultural materials, however, it is likely that this level is a natural level. This conclusion is based upon the natural stratigraphic profiles described by Burt (1997). The stratigraphic profiles suggest that this portion of the site was composed of streambed deposits and therefore any cultural materials contained within the deposits are secondary deposits (see Chapter 4 for discussion).

Chapter 12

Geoarchaeology of the Thundercloud Site

12.1 Introduction

The natural and cultural stratigraphy of the Thundercloud site is complex partially as a result of the natural processes that affected the site, however, cultural activities also affected the integrity of the cultural remains. This chapter is an attempt to detail how these processes and activities affected the site and the artifacts contained within. To do this analysis it is necessary to divide the site into segments dealing with each natural stratigraphic unit separately. Therefore, since the first natural level contains occupations 1, 2 and 3 this level will be dealt with as a whole. Occupations 4 through 7 will be discussed as part of individual stratigraphic levels.

12.2 Occupation Levels 1, 2 and 3

The first stratigraphic level was identified as a thick sediment layer of slightly gravelly sandy mud with a high organic content (Burt 1997:95). This layer, on average, extends from 5 cm to 24 cm below the surface and is situated below a thin sod layer. Below the sod layer is a thin layer of stained earth and charcoal that has been interpreted as the remains of a prairie fire. The sediment of the first soil horizon was deposited during periods of overbank flooding and the fine-grained texture of the sediments suggests that the terrace was some distance from the creek channel during

this time period. Only small amounts of sediments were deposited onto the site at any one time, therefore, making it difficult to adequately seal and / or separate the previous occupations.

Due to the composition of the sediments, it was not possible to excavate the upper portion of the stratigraphic level by natural levels and hence an excavation by arbitrary 5 cm levels was conducted in an effort to eliminate as much as possible any mixing of cultural artifacts. This type of excavation was largely successful. Based upon artifact position it was possible to determine where the occupations had occurred and to determine that a minimum of three occupations were present in this first natural stratigraphic level. Originally it was assumed that the first occupation of the site was contained within the first two arbitrary levels and that the third arbitrary level was the top portion of the second occupation. Analysis of the position of the artifacts later revealed that the depth for occupation level 1 most likely extended to approximately 12 cm below the surface.

The first occupation level most likely consists of two separate occupations that can not be distinguished stratigraphically. This conclusion is based upon the artifact analysis that identifies a Proto-historic occupation (Plains Side-Notched and Historic) and a slightly earlier Prairie-Side-Notched occupation. Dating of these two occupations is excellent in that the presence of the brass shell casing narrows the period of occupation of the Proto-historic level to sometime after A.D. 1860 while the presence of the Mortlach pottery suggests a range of age between A.D. 1500 to the time of contact for the older occupation. Artifact analysis indicates the presence of Plains Triangular, Plains Side-Notched and Prairie Side-Notched projectile points in

addition to metal projectile points and glass trade beads. These artifacts were recovered from varying depths throughout the level.

An overview of the site as a whole provides little information concerning position and location of the stratigraphic levels. However, when the positions of the cultural remains are viewed with the assistance of a scatter graph (Figure 12.1) and the stratigraphic profiles (Figure 4.1) a more accurate view of the occupation is obtained. Artifact mixing has occurred, however, because of the careful excavation techniques that were used this appears to have been kept to a minimum. For the most part, excavating the upper portions of the first natural level by arbitrary levels has greatly assisted in the assigning of artifacts to their proper level.

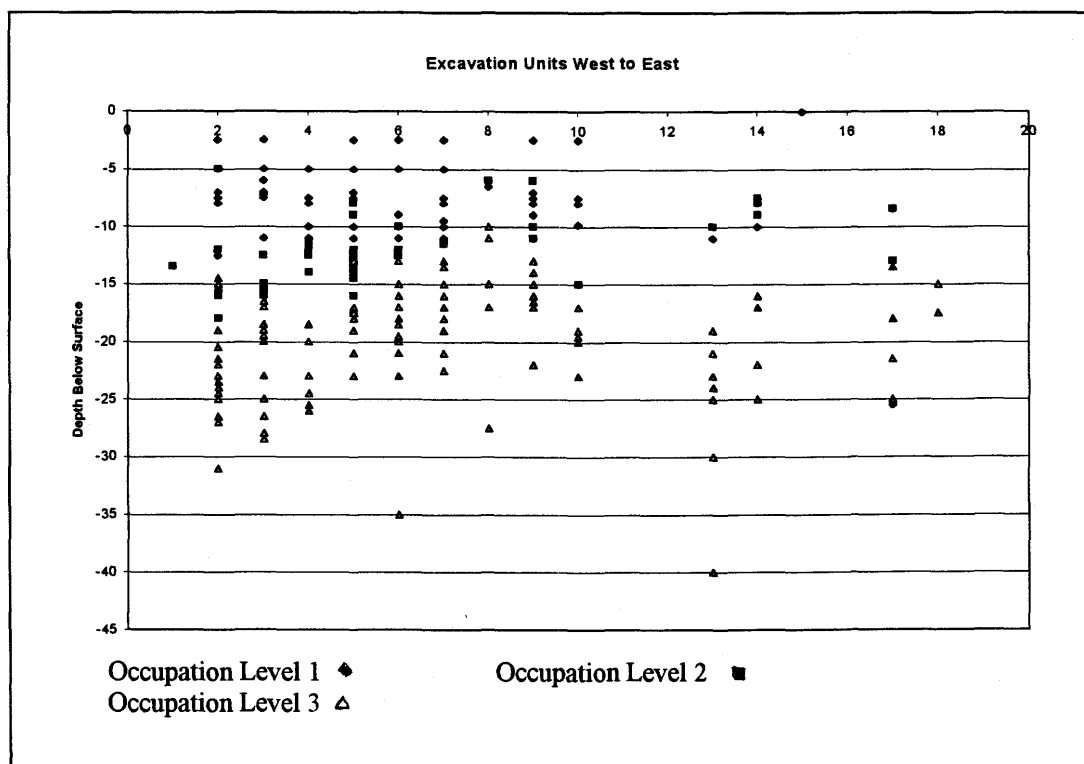


Figure 12.1 Scatter Graph Diagnostic Artifacts From Occupations 1, 2 and 3

It is evident from the scatter graph that the main portion of the occupation occurs in the western portion of the terrace. The area towards the east contains relatively few artifacts per occupation level. Two broad bands between units 10E and 13E and 14E and 17E contain no artifacts at all. This corresponds to the units that were not excavated.

It appears that the range of the artifacts in the scatter graph closely matches that of the stratigraphic profile. When the depths of the positions of the artifacts curve downward it is associated with a corresponding downward curve in the profile. Using the scatter graph, it is possible to determine the rough borders of the two separate occupations included within the broad designation of occupation level 1. The Proto-historic occupation appears to be positioned between 2.5 and 5 cm below the surface while the slightly earlier occupation is positioned between 5 and 13 cm below the surface.

There is blending between these two occupations that is the result of a variety of activities. The stratigraphic profile (Plate 12.1) clearly shows the amount of rodent disturbance present in portions of the site. The particular burrows shown here are the result of the activities of modern rodents tunneling through the site. Present also are the remains of ancient burrows that have been filled with debris. Rodent disturbances are obvious in the location of two particular artifacts. The brass shell casing identified as dating after A.D. 1860 was recovered from a *Krotovina* at a depth of 25.5 cm below the surface. This depth is equated with artifacts from occupation level 3. The second artifact in question is identified as a bifacially flaked spokeshave that was recovered from the surface in a rodent backfill mound. Both of these artifacts were

removed from their original positions by the activities of rodents and it is likely that a number of additional artifacts also had their original positions altered by rodents.

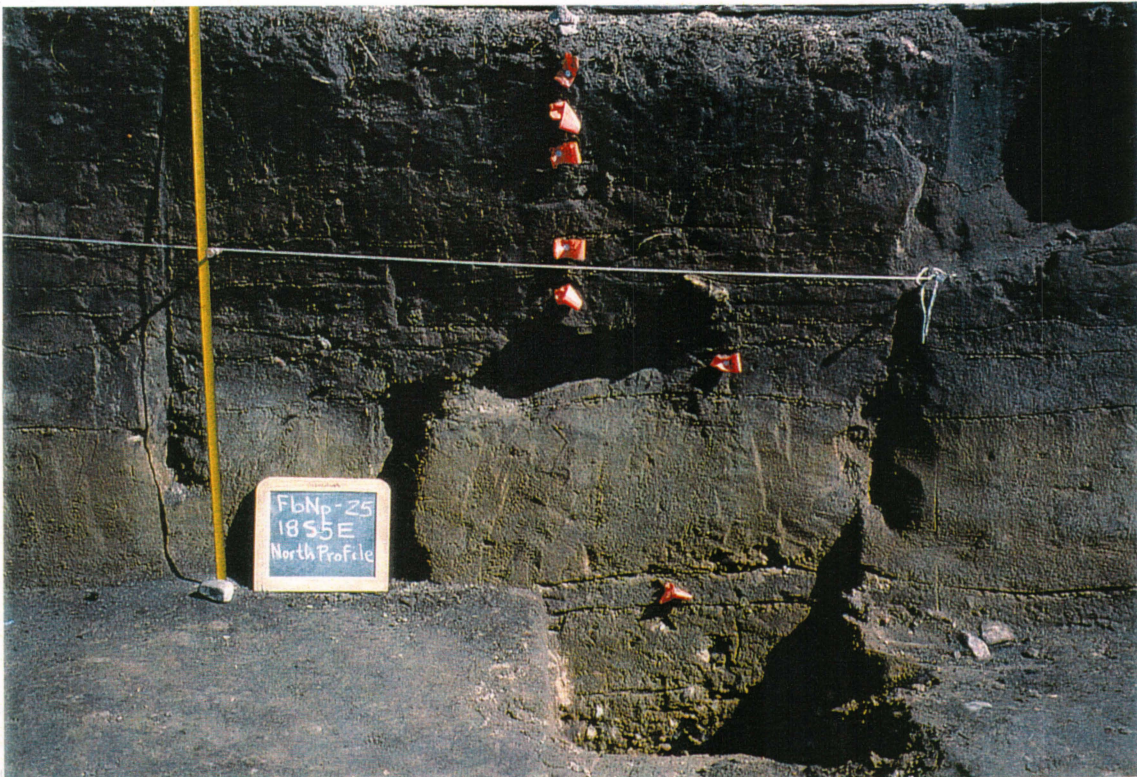


Plate 13.1 Stratigraphic Profile 18S 5E Rodent Disturbance

The activities of ants and earthworms were prevalent at the site. Earthworm burrows are difficult to detect because they are not filled with material from different soil horizons but instead are filled with excreta. Since earthworm burrows can extend downward up to six metres it is obvious that significant movement of artifacts could have occurred. The most important aspect of disturbance by these animals would be the blurring of the boundaries between occupations. These boundaries are already vague because of the small amount of deposition that occurred. As well, earthworm activities tend to focus on areas with higher organic content, which should suggest that hearths would be affected. This was seen during excavation in that some of the

boundaries of the features were vague and difficult to discern. However, as evidenced from the scatter graph the disturbance was not so severe as to eliminate the general pattern of activity.

Mortlach pottery sherds were recovered from a depth between 5 and 13 cm below the surface, however, there were a few sherds recovered from depths outside of these boundaries (Figure 12.2). All of the sherds recovered from this level of the excavation were of the same morphological style and many could be conjoined therefore they were analyzed as a whole within occupation level 1 even though some of the sherds were initially identified as belonging to occupation level 2.

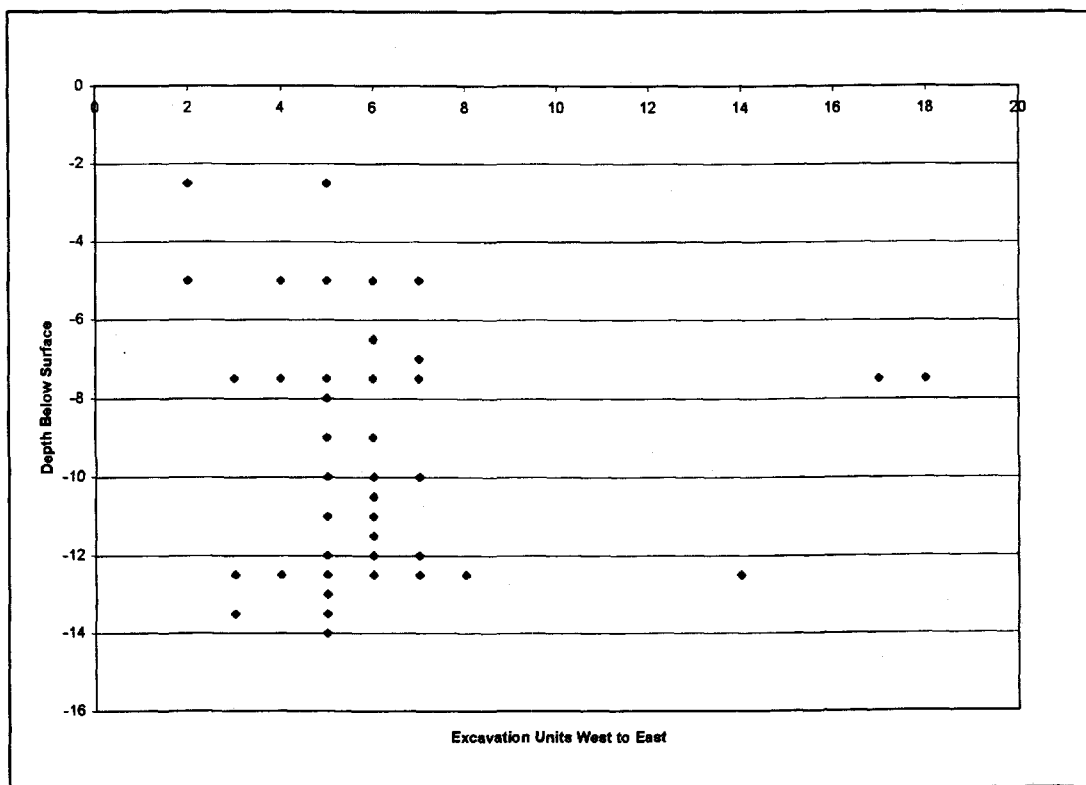


Figure 12.2 Scatter Graph Occupation Level Pottery Each Diamond Represents Single Sherd or Cluster of Sherds

The distribution and the fragmented condition of the sherds could be a result of compaction over the site by both humans and animals after breakage of the vessels. Human foot traffic has been shown to result in the vertical and horizontal displacement particularly of small artifacts. This is seen at Thundercloud where fragments of pottery from adjoining excavation units could be conjoined. As well, while the pottery fragments were distributed vertically over approximately 8 cm, horizontally the fragments were concentrated within four excavation units.

Additional evidence of cultural activities impacting upon the remains of the first natural level is the identification of a large hearth and a stone boiling pit in occupation level 1. Unit 18S 2E contains the remains of a stone boiling pit and unit 20S 4E the remains of a large hearth. Both of these features can be located on the scatter graph (Figure 12.1) as areas with inconsistencies concerning artifact depth.

Occupation level 2 is the most difficult of the occupations within this soil horizon to have its exact location determined. Analysis of artifact location (Figure 12.1) indicates that the majority of occupation level 2 is situated between approximately 12 cm and 16 cm below the surface, although there are exceptions to this. In part, this deviation in depth is present because of an error in excavating procedure that occurred at the start of the second year of excavation. Unfortunately the accurate repositioning of individual datums was not undertaken and as a result the depths of some of the artifacts from occupation level 2 are not recorded as deeply as they should have been. This error aside, the location of artifacts within this occupation level tend to follow the general east to west slope of the terrace which is more obvious even at this shallow depth than the previous occupation level.

Occupation level 3 is characterized by an undulating distribution of artifact positions that closely follow that seen in the natural stratigraphic profiles. Throughout the majority of the site it is not possible to distinguish separate occupations of level 3 within the natural stratigraphic level, however, artifact analysis suggests that a minimum of two, possibly three, occupations are present. This is based upon the presence of Avonlea Triangular and Besant projectile points as well as projectile points referred to as Large Side-Notched points. The excavation of unit 17S 4E revealed the stratigraphic separation of occupation level 3 into two distinct layers which were designated levels 3A and 3B. This separation was not seen elsewhere and could possibly represent the presence of a depression where artifacts and later soil was deposited.

Of interest in this level is the effect that human activities have upon artifact distribution and position. Occupation level 3 contained the remains of two stone boiling pits. The largest of the pits was located in unit 19S 13E and when the scatter graph is studied for this level it is noticed that the artifacts for occupation level 3 are scattered over a great depth. This is related to the activities conducted in and around the boiling pit. As those who used the pit initially excavated it, artifacts deposited in earlier occupations would have been removed. As the pit was used contemporary materials would have either been discarded or lost into the pit thereby explaining the extent of the depth of these materials.

Rodent disturbance was extensive throughout the western segment of this level. This accounts for the artifact recovered from a depth of 35 cm below the surface. This artifact was recovered from the "elbow" or bend of the burrow,

indicating that it was repositioned downward from its original location. It is also likely that the absence of artifacts noticed in the scatter graph around units 18S8E and 19S 8E is related to the presence of rodent activity in that numerous rodent burrows are listed in the unit reports for this area. During excavation of their burrows the rodents would have removed any artifacts that impeded their progress depositing them elsewhere.

12.3 Occupation Level 4

A sterile layer of gravelly mud separates occupation level 3 and level 4. This sediment is the result of the deposition of colluvium from the eastern slope. This sediment has been deposited in an undulating fashion that suggests the presence of flood waters reworking materials.

The soil horizon that contains occupation level 4 is poorly developed and intermittent in appearance. The sediments are composed of slightly gravelly sandy mud and are fine-grained. The condition of this soil horizon suggests that flooding from the creek was still occurring but that the velocity of the floods were not as dramatic as those that occurred between levels 3 and 4 or between levels 4 and 5.

The scatter graph for the artifacts from occupation levels 4, 5 and 6 contains fewer diagnostic artifacts therefore it is not as easy to distinguish the stratigraphic patterns than it was in the above occupations (Figure 12.3). Inconsistencies are seen with the distribution of artifacts for levels 4 and 6 in the unit 19S 5E. These particular artifacts were from the original test pit that had been excavated in 1983. The recorded depths are not consistent with the depths recorded in the rest of the site

for these occupations and therefore these depths should be discarded when analysis of the profiles is conducted.

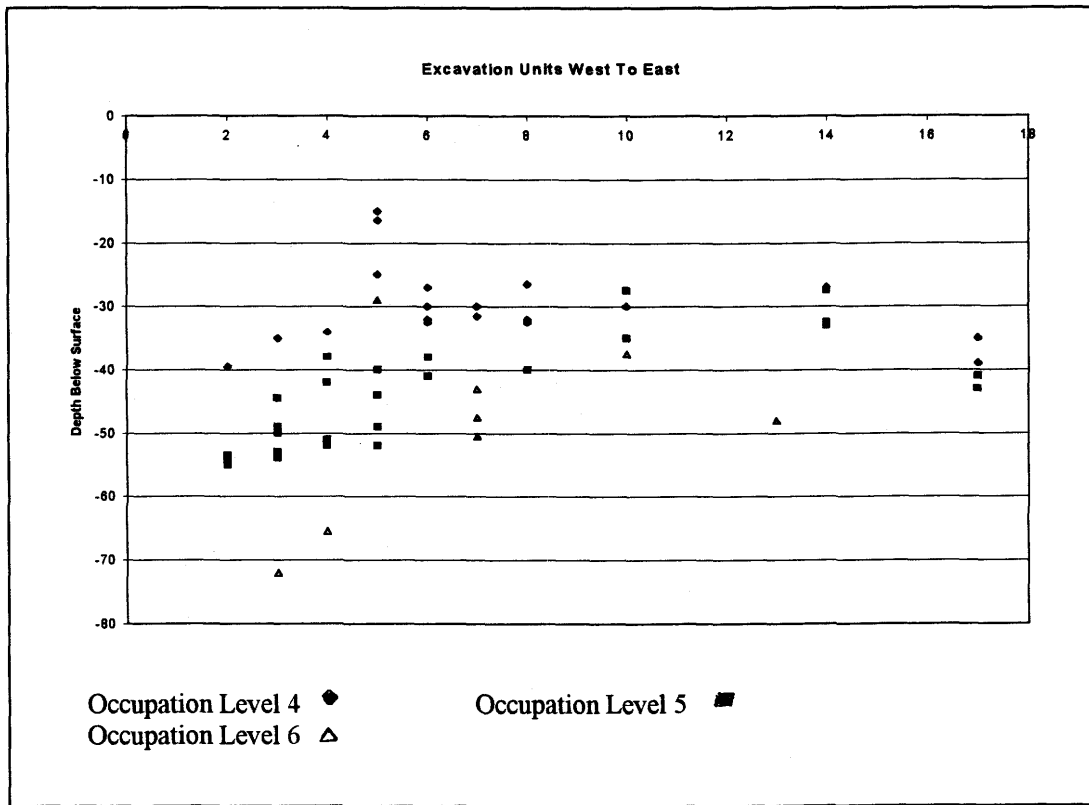


Figure 12.3 Scatter Graph Diagnostic Artifacts From Occupations 4, 5 and 6

The scatter graph indicates the discontinuous nature of occupation level 4. The majority of the artifacts plotted indicate that occupation level 4 is generally situated between approximately 27 cm to a maximum of 40 cm below the surface. The artifacts are sparse but do appear across the entire profile. The appearance of occupation level 4 is different from the occupations either above or below it. The maximum depth to which artifacts are recovered are the same at both the eastern extent of the site as at the western extent, while the depths noted from the middle of the profile are shallower. The artifact depths together with the profile clearly

indicates the undulating expression for the soil horizon which is consistent with the concept that a portion of the site below and including this occupation had been degraded. The undulating nature of the profile suggests that the erosion was a result of fluvial actions.

The result of the natural processes that occurred during this phase of site development is that cultural materials are obviously less abundant. Only a single feature was recorded during excavation and this feature was a small hearth. At its maximum depth the hearth was only 4 cm in depth and therefore classifies as a surface hearth that would displace little in the way of previously deposited cultural materials.

12.4 Occupation Level 5

The soil horizons that comprise occupation levels 5 and 6 are composed of sediments with increased organic carbon contents. These sediments consist of muddy sand and the depositional history for these types of sediments suggests marginal flood waters. It is likely that the low velocity of these flood waters would deposit materials and thus represent an aggradational phase of site development.

It has previously been stated that occupation level 5 consists of at least 3 separate occupations that were not distinguishable during excavation except in the furthest west portions of the site. This is consistent with the evidence from the scatter graph that shows some evidence for separation.

The artifact depths from units 18S 10E, 19S 19E, 18S 14E and 19S 14E are not consistent with those seen in the rest of the occupation in that the depths are very

shallow and are more consistent with the depths characterized for occupation level 4. The questionable artifact depths are situated between 29 and 35 cm below the surface. If these depths are rejected the rest of the artifacts for occupation level 5 fall into two clearly identified bands. The first cluster of artifacts is situated between approximately 38 cm to 44 cm below the surface while the other band of artifacts ranges between 49 cm and 55 cm below the surface. There is a clear separation of 5 cm between these two bands that contain no artifacts thereby clearly delineating these two occupations. The upper occupation contains both Hanna and Duncan projectile points while the deeper of the occupations contains Duncan and McKean Lanceolate projectile points. It is not possible to further separate the occupations of level 5 by using artifact depth.

Cultural activities are likely to have affected the distribution of artifacts throughout occupation level 5. Seven hearths were recorded during excavation and these hearths were scattered over most of the main body of the excavation. Most of the hearths were quite small and would have had little impact on the distribution of deeper artifacts, however, several of the hearths were quite large. These larger hearths had the capability of displacing artifacts from deeper levels, and considering the distribution on the scatter graphs probably did affect the distribution of occupation level 6 materials.

12.5 Occupation Level 6

In the western portion of the excavation occupation level 6 is separated into two occupations while throughout the rest of the excavation level 6 is identified as a

single entity often directly connected to occupation level 5. The soil horizon slopes considerably from east to west. The lower extent of the level in the eastern units is located at a depth between 40 to 45 cm and in the western units at a depth of 75 to 80 cm. These depth variances affect the appearance of the scatter graph in that at first glance it appears as if the artifact plotting is incorrect. Actually, only a single artifact with a depth of 29 cm below the surface appears incorrect. This artifact is in the same unit as the questionable artifacts in occupation level 4. This unit again represents the original test pit. Artifact analysis based upon position clearly indicates the presence of two distinct occupations. Both occupations appear to be Oxbow Complex and / or McKean Complex. The more recent of the two occupations is situated stratigraphically between 39 and 51 cm below the surface. The older of the two occupations is located between 65 and 72 cm below the surface. While this distance between occupations seems extreme it is necessary to take into consideration the severe sloping that occurs in the site at this depth. Occupation 6A also contains a Duncan projectile point that most likely belongs to occupation level 5C based upon depth and cultural association.

Features were not common in occupation level 6 and, therefore, would not have had much of an impact on the distribution or displacement of cultural materials. However, the hearths recorded in occupation level 5 would have impacted the location of level 6 artifacts. Of particular importance would be the hearths located in units 20S 5E, 18S 8E and 21S 5E. These three hearths surround the more questionable artifact depths suggesting that the relatively high placement of these artifacts could be a result of the original excavation of the hearth prior to use.

12.6 Stratigraphic Profiles

The stratigraphic profile present at Thundercloud suggests a location with a complex history of development. As detailed in Chapter 4, the formation of the terrace reflects deposition of sediments in or adjacent to a stream channel. The base of the point bar is channel lag and as the stream channel migrated away from the terrace floodplain sediments covered the channel lag. These sediments were deposited in a fining-upward sequence as the stream continued to migrate away from the site. This form of deposition continued for most of the site's history, broken by periods of degradation and / or increased deposition of coarser material. Both of these activities would have been the result of varying degrees of flood action.

The stratigraphic levels situated the farthest distance from the stream channel tend to be more compact (Plate 12.2). This is an artifact of distance from the stream channel. As the stream channel migrated towards its present location greater volumes of water were required to heavily flood those portions of the site situated eastward of the stream. Those portions of the site located closer to the stream would have required less volume of water to adequately cover the terrace. A result of this is that the stratigraphic profile of the western portions of the site show much greater separation of stratigraphic levels (Plate 12.3). This additional deposition of sediments makes it possible to identify individual occupation levels not discernable elsewhere. In fact, the stratigraphic profile for unit 21S 2E shows the separation of occupation level 5 into three separate occupations and level 6 into two occupations. It is possible that if the excavation had extended closer to the creek bed further separation of the occupation levels would have been present.



Plate 12.2 Stratigraphic Profile 18S 8E

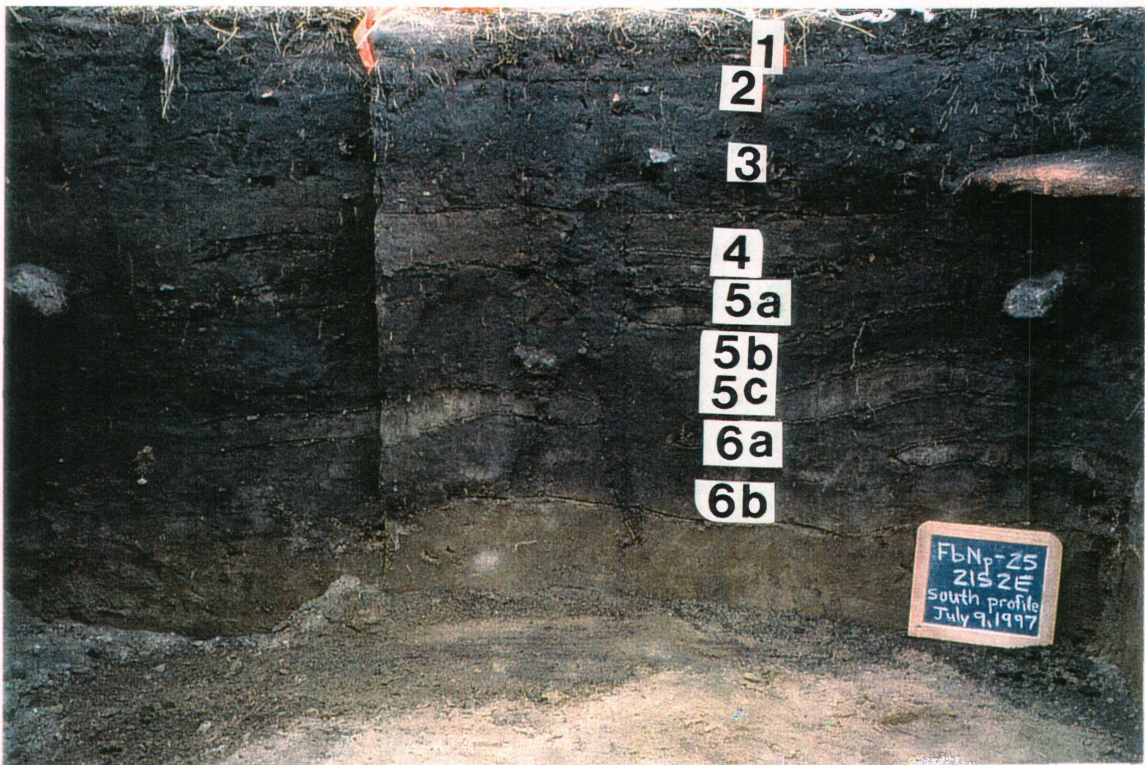


Plate 12.3 Stratigraphic Profile 21S 2E

The upper three occupation levels in the site are contained within a single large soil horizon. Regardless of location in the site there is no separation of these occupations by sterile matrix. This is a result of the decreased deposition of sediments that occurred during this portion of site development and is related to either decreased water flow or the result of the downcutting of the channel bed.

It is important to note that other sites in the valley at Wanuskewin Heritage Park show the same form of depositional history. The upper levels of both the Amisk (Amundson 1986) and Newo Asiniak (Kelly 1986) sites contain closely superimposed levels that could not be separated. This clearly indicates that during the later part of the formation of the sites in Wanuskewin Heritage Park there was less deposition occurring.

12.7 Discussion

From the above discussion it is obvious that when analyzing the artifacts from an excavation it is necessary to take into consideration not only the current distribution of the artifacts but also the site formation processes that would have impacted the site during occupation, prior to burial and post burial. If these processes, cultural and natural, are not considered it is possible that erroneous conclusions may be reached.

It is also necessary that the analysis of the soil profiles be conducted together with graphs that depict the pattern of artifacts recovered so that a better impression of the stratigraphic levels can be obtained. The use of scatter graphs makes it possible to determine the location within a natural level of the corresponding cultural level.

The use of the above methods of analysis was particularly useful in determining the distribution of cultural artifacts within their occupation level in the upper three occupation levels. It was not possible to separate these occupations by natural levels because of the absence of any separating sterile matrix. As well, the cultural materials recovered indicated that more than one cultural occupation had taken place within these broad designations unfortunately during the initial excavation this finer distinction could not be determined.

The study of cultural site formation processes makes it possible to comprehend the reasons behind the unusual locations for some artifacts. Of note is the distribution of pottery fragments in occupation level 1. By understanding the impact that compaction can have on a site it is possible to comprehend why artifacts that are clearly part of one occupation can be found within part of another occupation. As well, understanding the impact that the excavation and use of stone boiling pits and hearths can have on artifacts clarifies the misconceptions that can be raised concerning the displacement of certain artifacts.

Natural site formation processes include anything that could have had an impact on the site at any time during its history. Not all of the processes will have impacted each site or even all the different portions of the same site. Therefore, it is necessary to be able to identify the characteristic signatures of the different processes, in the field if possible and if not, later in the laboratory. This has been possible at the Thundercloud site by incorporating information obtained from a number of sources so that a comprehensive picture of the establishment of the site could be formed.

Chapter 13

Comparison of Thundercloud with Other Sites

13.1 Introduction

The following comparison between the Thundercloud site and other sites in the region is focused upon the McKean Complex occupations. The reason for this focus is a result of the research conducted by Sean Webster (1999) in his thesis which focused on the subsistence patterns of the McKean Complex occupations at the Thundercloud site.

13.2 McKean Complex Origin

McKean Complex sites are located throughout the Northern Plains with the greatest concentration of published sites from Wyoming. Morphologically similar points have been recovered from the Plateau and Great Basin regions, however, the relationship between these geographic areas has had little systematic analysis (Syms 1970). McKean Complex sites on the Northern Plains tend to be abundant in the foothills and short grass prairies. Higher altitude sites are generally smaller in regard to total area and artifacts recovered. Sites tend to be located along or near water sources, especially in areas where shelter from the northwest winds is available and the winter Chinooks are present (Morris *et al* 1985).

Many theories have been advanced regarding the origin of the McKean Complex which has been stated to date between 4500 and 3000 years B.P., perhaps as late as 2600 B.P. in the marginal Canadian Plains (Syms 1970;131). It has been proposed that the McKean Complex was a regional variant of the Desert Culture, entering the Plains from the Great Basin either during the Altithermal (Jennings 1964; 153) or immediately after the Altithermal (Wedel 1961; 254-255). Support for this hypothesis is based on the morphological similarity between the McKean Lanceolate, Duncan and Hanna point types and the projectile points recovered from the Little Lake site (Keyser and Davis 1985). The Little Lake points are classified as Humboldt Series and Pinto Tradition point styles characteristic of Great Basin Archaic sites (Brumley 1978: 188). Benedict and Olson (1973: 323) find difficulty with this hypothesis in "...the controversial age of Great Basin projectile point styles believed ancestral to the McKean Complex."

It is the opinion of Brumley (1978: 188) that the initial origin of the McKean Complex was in the Great Basin region. This is based on projectile point similarities in style and age between the McKean Complex that have been documented in Great Basin sites and cultural inventories in Wyoming which suggest an Archaic lifestyle. It is suggested that these Great Basin people continued their Archaic lifestyle in the southern Northern Plains, only abandoning it upon further spread north when a specialized, single focus subsistence pattern based on bison was adopted. Brumley notes that the environment of Wyoming is more similar to the Great Basin than any other part of the Northern Plains (Brumley 1978).

A second hypothesis listed by Benedict and Olson (1973) is that the complex evolved from Paleo-Indian cultures in the Central and Northern Rocky Mountains, as an outgrowth of Late Paleo-Indian complexes including Pryor Stemmed, Lovell Constricted and Jimmy Allen. These Paleo-Indian Complexes are believed to represent Plains hunters who retreated to the highlands during the worst period of aridity of the Altithermal. These Terminal Paleo-Indian Complexes represent the earliest broad-based, archaic-like adaptations, however, a problem with deriving the McKean Complex from these Paleo-Indian Complexes is the several thousand-year gap between Terminal Paleo-Indian and McKean Complex (Keyser and Davis 1985). The Pryor and Absaroka Mountains east of Yellowstone Park contain a number of instances of the recovery of large side-notched point forms that date to the early Archaic period. These points are found stratigraphically between Late Paleo-Indian and McKean Complex points (Keyser and Davis 1985). A difficulty with this proposal results from the lack of solid archaeological evidence for cultural continuity between these two complexes. As a result of Benedict's and Olson's excavation at the Fourth of July site above the timberline in Colorado, Keyser and Davis believe that at least part of the development of the McKean Complex originated in these high altitudes.

The Fourth of July Valley site in Northern Colorado suggests continuity of lanceolate, indented base point forms. This site has a radiocarbon date of 5880 \pm 120 B.P. [I-6544] and 6045 \pm 120 B.P. [I-6545] (Benedict and Olson 1973). While these dates occur much before the recognized period of McKean Complex, the classifiable projectile points recovered from the excavation appear to be typologically

intermediate between the Pryor Stemmed, Lovell Constricted and Jimmy Allen points and the McKean/Duncan projectile points. The Fourth of July points are slender, symmetrical and in cross section are lenticular. The heavily ground bases have shallow, longitudinal flakes removed from each side and the hafting areas are ground smooth. Basal notches are present and are either lightly ground or not ground. Benedict and Olson (1973) do not believe that the complete development of McKean Complex from Paleo-Indian occurred in the Southern Rocky Mountains. It is their opinion that the regional climate began to improve approximately 5000 years B.P. when an increase in precipitation allowed the reintroduction of people into the previously arid regions.

While it has been suggested that the McKean Complex developed from the Early Archaic Oxbow Complex, there is not much evidence to support this theory. Reeves (1978: 171-172) suggests that McKean hunters were not indigenous to the region based on the absence of McKean levels at Head-Smashed-In (southern Alberta). If McKean Complex hunters had been native to the region they would have been able to operate a complex communal drive. This part of the theory is negated when the Scoggin site in Wyoming (Lobdell 1973: 10-14) is considered. At this bison jump site the McKean Complex communal bison hunting strategy is well demonstrated. The Cordero site (Wyoming) is also indicative of communal bison hunting (Reher et al. 1985).

The dispersal of the McKean Complex across the Northern Plains appears to have been rapid starting shortly after it first originated. Keyser and Davis (1985) refer to Syms' mapping of radiocarbon dates to demonstrate the spread of the

complex. This mapping of radiocarbon dates indicates that the oldest McKean Complex sites are present in the mountain ranges around the Big Horn Basin with the younger sites occurring further east and north. Keyser and Davis (1985) agree in part that Syms' work implies an outward migration of people, however, a simple expansion of people is seen as unlikely since the local ecological adaptations were so different (ie. Brumley 1975). Instead Keyser and Davis (1985) see the evidence as indicating the diffusion of a techno-complex among a series of *in situ* populations and that the McKean Complex is comprised of several major cultural traditions.

13.3 McKean Complex Tool Assemblage

The tool kit evident for the McKean Complex, for the most part, is composed of what would be expected for the Northern Plains region; plano-convex endscrapers, spokeshaves, bilaterally-flaked knives, bilaterally percussion flaked cores and projectile points mostly constructed of local materials. Hafted knives and spokeshaves are also recovered as are crudely-flaked ovoid choppers and finely knapped ovoid knives. However, part of the tool kit is not usually associated with migratory hunters on the Northern Plains and that is the presence of manos and metates. Complete and fragmentary manos and metates were recovered from the McKean Complex type-site, as well as others, all made of local lithic materials (Mulloy 1954).

McKean, as a term, has been used to identify a lanceolate shaped projectile point as well as a complex composed of three projectile point types; McKean Lanceolate, Duncan and Hanna types. Other varieties have also been included into

this complex at different times such as Mallory and Yonkee points. The confusion with this terminology originates with the first usage of the term by Mulloy (1954) and Wheeler (1954). Mulloy treated the three projectile point types as variations of a single type, based on their association in the lower component of the McKean site (northeastern Wyoming). Wheeler was working in the same region when he recovered the individual projectile point types in separate components at different sites. Therefore, his assumption was that these point forms belonged to different cultural groups, that they were not variations of a single type. As the number of sites excavated increased, the number of variations in the point types increased as well further confusing the issue (Quigg 1986). This has led to differences of opinion between those researchers who “split” and those who “lump” based on projectile point morphology.

The distribution of McKean Lanceolate, Duncan and Hanna points in sites, either one or more styles together or separately, has caused confusion. The distribution could be indicative of a wide variation in point type that crosscuts cultural boundaries. It could also reflect several different styles each used by a particular group or signify a different type of adaptation. It is also possible that the different point types reflect different uses (Keyser and Davis 1985). However, this is not evident from the data available.

The projectile points are medium-sized, narrow, lanceolate shaped points with concave bases. They range in length between 25mm and 60.5mm, the majority under 50mm. The sides of the points are parallel or curved with the distal portions tending to converge towards the base. The Duncan and Hanna varieties are stemmed points.

The stem and shoulders of the Duncan and Hanna points contain lateral grinding while the McKean Lanceolate variety has lateral grinding confined to the basal end (Syms 1970). Duncan points are constructed with a parallel sided stem with sloping, non-barbed shoulders while Hanna points have an expanding stem with in-sloping or straight, slightly barbed shoulders (Wheeler 1954:7-8). The degree of stemming varies dramatically between the three types. The Lanceolate points are not stemmed while the stems on some Duncan specimens are only one half the width of the body. In between these are points with pseudo-stems and comparatively little shoulders. Between the two varieties the typological boundary can be arbitrary if the specimens are questionable. According to Syms (1970:125), Hanna projectile points are difficult to identify since "the absence of a distinct typological boundary between a flaring stem and a shallow, corner-notched form necessitates an arbitrary decision". Syms states that Hanna points often can only be identified when in association with other McKean Complex varieties.

The Mallory point is characterized as a wide, very thin point with deep side-notches and straight, slightly concave or deeply indented bases. Occasionally a deep, narrow basal notch is present (Frison 1978:50). Mallory points are occasionally recovered in the same context along with the lanceolate and stemmed styles. During the Early Middle and Middle Plains Archaic, side-notching is considered rare. Their appearance is intriguing as they abruptly appear, earlier than expected (Lobdell 1974). While it has been suggested by Strong (1935:233) that these side-notched points might represent an appearance of an earlier, larger prototype of the Late Prehistoric notched points, Lobdell indicates that the long, unexplained time period

between the appearance of these two types of notched points makes this concept unlikely. Mallory, or Mallory variant points have been recovered from Wyoming, Utah and Colorado in levels attributed to the McKean Complex and occasionally in association with McKean Complex points, however, they are recovered in limited quantities. The Mallory point recovered from the Kinney Spring site was located 70 cm deeper in the excavation than the McKean Complex points (Morris *et al.* 1985). This raises the question of site integrity or lack of continuity between these point types. It is the opinion of Lobdell (1974) that these large side-notched points represent a variation of McKean Complex, not a distinct type separate from McKean Complex and its variations. Forbis (1985) proposes that Mallory points are not part of the McKean Complex, that instead their presence is a result of intentional collection by McKean Complex people, transient occupation of the area or perhaps culture contact of some unknown type. Brumley (1975:102) notes the relatively restricted geographical distribution of the Mallory projectile points that, when recovered, are located in association with the earlier dated McKean Complex components. Brumley proposes that Mallory points are an earlier McKean Complex point form displaced soon after entrance onto the Plains.

Yonkee projectile points are restricted to the Powder River Basin, southern Montana and adjacent Wyoming. These points are usually side-notched and occasionally corner-notched with either basal notching or basal indentations. In general shape the points are long and narrow with concave to straight blade edges (Frison 1978:50,203). Radiocarbon dating has recently questioned the validity of older dates assigned to the Yonkee sites. Frison (1991:192) states that the original

dates for Yonkee sites were between 4400 B.P. to 2600 B.P., however, more recent excavations have corrected these dates to where it now appears that the older dates range approximately 3,000 years B.P. It is obvious that more research needs to be conducted so that this issue can be clarified.

Morris *et al* (1985) proposes that it is likely, in time, that improved stratigraphic control and / or radiocarbon dating will reveal geographical, temporal and cultural differences between these point types, however, for now it appears as if they occur together. Mulloy's original work at the McKean site identified two distinct cultural strata, and while Mulloy realized that these components were the result of multiple occupations, he did not theorize that these occupations could have spanned at least a thousand years or that they could be isolated. Therefore, the lower occupations that contained McKean Lanceolate, Duncan and Hanna projectile points were used as the type-site for the McKean Complex. This started the assumption that these three point styles belonged to one cultural system. Further research at the McKean site in 1983 determined that these two cultural strata in fact were composed of a number of soil lenses with different occupations contained in what previously was referred to as two soil horizons. Therefore, artifacts that were originally believed to be contemporaneous now appear to belong to different occupations (Kornfeld and Frison 1985). Morris *et al* (1985) points out that the morphological differences which have been inferred to identify different cultures in fact could partially represent the quality of the lithic raw material utilized and / or the skill of the person constructing the tools. As Morris states "...when is a concave or straight, or for that matter a

convex base, merely a 'botched notch?'" (Morris *et al* 1985:12) . As well, variations in blade edge morphology and total length reflect wear, breakage and resharpening.

Plant food exploitation is seen as one part of the multifocused subsistence economy of the McKean Complex. The large numbers of manos, metates and roasting pit hearths present in McKean Complex sites led Frison (1978:352-354) to regard the complex as a "florescence" of the plant food gathering adaptation. As well, this apparent plant food reliance is what induced a number of authors to propose a Great Basin Desert culture origin for the McKean Complex (Mulloy 1954; Brumley 1975).

Manos and metates in association with roasting pits are a common occurrence in McKean Complex sites in the southern portion of the Northern Plains. Fragmented and whole manos and metates have been recovered from at least ten sites to date in Wyoming, Montana, Colorado, Nebraska and South Dakota. Most of these sites also contain a hearth type proposed to be a roasting pit: a deep, often rock-filled or lined pit, which could have been used as "ovens" to roast vegetable foods (Keyser 1986).

It has been suggested by Tratebas and Vagstad (1979:220-221) that instead of using the manos and metates for processing seeds and plant resources they were instead used to crush small bones or other non-plant materials. This is not seen as likely by other authors (eg. Frison 1978:352-354; Mulloy 1954) who suggest, based on ethnographic evidence from the Great Basin, that these items were primarily for the purpose of seed processing. While it is definitely possible that manos and metates had other uses, Keyser (1986) indicates that the major function for these tools was the processing of plant resources.

Use wear analysis on the surfaces of manos assumed to be used in the processing of plant resources in fact showed use in the processing of hides. While it had been assumed that these manos were used with metates for plant processing, ethnographic evidence led Adams (1988:307) to recognize there were other uses for the manos, and that use-wear analysis could be used to determine these activities. The importance in this use wear analysis rests in the assumption made by archaeologists that the presence of these stones in archaeological sites signifies the extensive use of plant resources, suggesting a more foraging type of subsistence pattern. "Subsistence strategies, economic bases, and cultural histories have been developed emphasizing the presence of food-grinding tools." (Adams 1988:307).

The northern portion of the Northern Plains, as opposed to the southern regions, does not contain manos and metates. Their absence has been interpreted as reflecting a different economic orientation between the southern and northern McKean Complex groups. The McKean Complex components excavated at the Cactus Flower site in southern Alberta (Brumley 1975) contained no evidence of manos and metates and their absence is noted at other excavated sites in Saskatchewan (Mortlach [Wettlaufer 1955] and Long Creek [Wettlaufer 1960]), North Dakota (Mondrian Tree [Toom and Gregg 1983]) and Manitoba (Keyser 1986). These items also have not been recovered from Manitoba sites. Syms (1979) proposes that their absence could signify that the types of plant materials that required grinding were not utilized or were prepared in some other manner.

13.4 Dwellings

The presence of stone circles on the Northern Plains first occurred during the Middle Prehistoric Period. These stone circles appear in all environments and localities, either singly or in large groups. In size the circles vary between three and seven metres in diameter. In form the circles can consist of a single ring of stones that can either touch each other or be separate. Some circles are composed of a wide band of stones. The reasoning suggested for this configuration is that the stones were piled on top of each other while the structure was erected. When the structure was removed the stones became jumbled (Frison 1991:92). Some of the stone rings have impressions of hearths located in the center, either small rock piles or vague circles, however many stone circles do not contain any evidence of hearths. It is inferred that these stone circles are all that remain once the superstructure was removed or disintegrated. Often the stone circles have a heavier concentration of stones located on the windward side of the rings. The theory behind this orientation is that the extra stones provided more protection from strong winds. This would be especially necessary during longer occupations. Unfortunately, from an archaeological point of view, excavations of stone circles are noted for the general lack of diagnostic cultural artifacts (Frison 1991:97).

McKean Complex sites show evidence of the construction of pit houses similar to those found in the Early Middle Prehistoric. Evidence of pit houses was located in the Wyoming Basin and northwest Wyoming (Frison 1991:84). While structural details are scarce, the soil profiles indicate that the structures were usually circular, however, they could also be elongate or oval in shape. Postholes

occasionally are uncovered and their presence makes it possible to determine the general shape of the roof, suggested to be either conical or gabled in shape. Features located on the interior of the pit houses are hearths and storage pits (Frison 1991:84).

The fourth occupation level at the Red Fox site (southwestern North Dakota) yielded two hearths and a cache pit located inside a 3 m square depression (Syms 1970:134). This depression was 15 cm deep and had the appearance of being the result of human construction. A tentative hypothesis suggests that the depression could have been the remains of a dwelling structure. Syms (1970:134) speculates on the possibility that McKean Complex people had semi-permanent structures when food resources were abundant.

13.5 Burials

Burials from the Middle Prehistoric Period are scarce with only approximately 21 burial sites identified in the Northern Plains. Only a few of these sites have had reports published and, unfortunately, many of these lack adequate descriptions and / or radiocarbon dates. As such, relatively little is known about burials from this time period.

What is known indicates that the McKean Complex burial pattern is completely different from the pattern exhibited by other burials on the Northern Plains. Paleoindian burials are associated with grave goods and the use of red ochre. Red ochre coats the remains and is often sprinkled in the fill dirt (Haspel and Wedel 1985). McKean Complex burials do not include the presence of red ochre pigments either on the remains or in the buried depressions and fill. This feature is at odds with

the practices of the contemporary Oxbow burial sites and the later Pelican Lake sites. Both of these other cultures used a substantial amount of red ochre in their burials. Another distinguishing feature between McKean burials and the Oxbow and Pelican Lake burials is reflected in the location in which the remains are located. All of the McKean Complex burials were recovered below occupation floors while Oxbow burials are either in the form of isolated burials away from campsites or in the Gray site burial ground. Pelican Lake burials appear to consist of isolated burials often in subsurface depressions or pits, which are then covered by stone cairns. These burials are commonly situated on a hill or other type of prominent area (Walker 1984).

13.6 McKean Complex Site Comparison

In order to determine the similarities or the presence of any anomalies inherent in the Thundercloud site with the general McKean Complex assemblages it is necessary to compare its cultural assemblage with other sites. Therefore, three sites have been chosen for comparative analysis; the Cactus Flower site (EbOp-16), the Crown site (FhNa-86) and the Redtail site (FbNp-10).

13.7 Cactus Flower (EbOp-16)

The Cactus Flower site, excavated between 1972 and 1974, is located in the southeast corner of Alberta. The site is situated on the bank of the South Saskatchewan River and has been identified as a multi-component site ranging in age from Pelican Lake occupations in levels I and II to McKean Complex occupations in levels III to IX. It was not possible to accurately assign cultural affiliation to level X

since no diagnostic projectile points were recovered from this level. However, the radiocarbon date from this level provided a date consistent with McKean Complex radiocarbon dates 3725 \pm 95 B.P. [S-821](Brumley 1975:111). No radiocarbon dates were obtained from occupation level III. Radiocarbon dates from levels IV, VI and VIII (3620 \pm 95B.P.[S-822] to 4130 \pm 85B.P.[S-782])(Brumley 1975:111) were also consistent with McKean Complex dates. The only anomalous date came from a charcoal scatter identified in occupation IX which revealed a date of 2130 \pm 130B.P.[S-783](Brumley 1975:111). This date is much too recent and was discarded.

Distribution and types of cultural debris recovered are indicative of a secondary processing and tool manufacturing camp according to Brumley (1975:95). Tool manufacture is primarily of local materials; however, small amounts of exotic debitage such as obsidian were also recovered.

No identifiable tools for the processing of floral matter were recovered from the site. Brumley suggests that this indicates that the McKean Complex occupations relied either heavily or completely upon hunting for subsistence, particularly of bison. However, since soil was screened through a ¼ inch mesh and no flotation of samples was conducted, this conclusion could be a result of sampling errors.

The presence of habitation structures was inferred based upon the identification of the remains of postholes from occupation VIII. The orientation of these post holes were indicative of some type of circular structure suggested by Brumley to be similar to tipis used by historic people in the region (Brumley 1975:95).

McKean Lanceolate, Duncan, and Hanna style projectile points were all recovered from Cactus Flower, apparently having "...overlapping distribution interpreted as reflecting cultural continuity from Occupation IX through III." (Brumley 1975:72) In relative frequency the McKean Lanceolate projectile points occur with the least frequency and are most commonly found in occupation IX and VIII which appear to be the initial McKean Complex occupations. Duncan and Hanna point styles occur with equal frequency; Duncan style projectile points predominate in the earlier occupations and Hanna points are the dominate style in the later occupations.

Very few artifacts were recovered from occupations III. The only cultural materials identified were a single Duncan projectile point and two Hanna points (Table 13.1)

Bifacial tools were more prevalent in the older occupations with hafted bifaces not evident until occupation VII. Pointed and ovate bifaces were also sparsely represented in the more recent levels.

End scrapers generally were small and triangular in form and were accounted for in relatively equal numbers in all levels except level III where no end scrapers were identified. Spokeshaves, hafted or not, were very rare in that only three hafted and a single non-hafted spokeshave were recovered. Gravers were another category little utilized at Cactus Flower. A total of three gravers were identified, a single item in each of levels VII, VII and IX.

An interesting omission noted was the apparent lack of identified hammer stones and anvils in this site. No hammer stones were located until level VIII when

two were noted. Five hammer stones were recovered from level IX and a single one from level X. Anvils were only identified in level VI (1) and VIII (2).

Table 13.1 Cactus Flower Comparative Data

Occupation	III	IV	V	VI	VII	VIII	IX	X
Lithic Tools								
McKean Lanceolate	-	1	-	-	-	2	1	-
Duncan	1	1	1	1	2	5	-	-
Hanna	2	2	-	3	-	2	-	-
Hafted bifaces	-	-	-	-	3	1	-	-
Pointed bifaces	-	1	-	1	1	6	-	-
Ovate bifaces	-	2	-	2	2	3	4	-
End scrapers	-	3	3	5	3	8	5	-
Side scrapers	-	-	-	-	-	-	-	-
Spokeshaves, hafted	-	1	-	-	-	2	-	-
Spokeshave	-	1	-	-	-	-	-	-
Gravers	-	-	-	-	1	1	1	-
Cores	-	11	3	16	8	55	9	1
Hammerstones	-	-	-	-	-	2	5	1
Anvils	-	-	-	1	-	2	-	-
Stone disk	-	-	-	1	-	-	-	-
Stone pipe	-	-	-	-	-	1	-	-
Bone / Antler tools								
Awls	-	4	1	4	-	3	-	-
Beads	-	1	-	-	-	2	-	-
Other	-	1	2	7	2	9	-	-
Other								
Shell beads	-	1	-	-	-	-	1	-
Shell disk	-	-	-	1	-	-	-	-

Two shell beads were recovered that were identified as *Natica clausa* and *Olivella biplicata*. Both forms are marine, commonly occurring along the West Coast of North America, indicating trade networks and cultural interaction of considerable distance (Brumley 1975:69). Other non-utilitarian items were recovered including ground stone disks, part of a stone pipe and an ammonite septa (Brumley 1975:97). Bone implements in the form of awls and beads were also identified as well as bone tools which could not be identified as to usage because of their fragmented condition. Awls were identified in four of the eight occupation levels, beads in two.

13.8 Crown site (FhNa-86)

The Crown site is located in east central Saskatchewan near Nipawin on the North Saskatchewan River. The site was first discovered during the 1976 survey of the region conducted in anticipation of the construction of nearby hydroelectric facilities. The site occupies a narrow terrace on the west side of a small unnamed creek that drains into the river. While test excavations were conducted at the site actual excavations did not occur until 1981 when the Nipawin Reservoir Heritage Study crew led by Dr. D.A. Meyer returned to the area. Excavation continued through 1984 (Quigg 1986:2-25).

The Crown site has been determined to be a multi component stratified site containing a Late Prehistoric component followed by multiple Hanna and McKean Lanceolate occupation levels. The McKean Complex occupation levels were discontinuous in nature, therefore, it was difficult to trace the individual levels for any distance. There was, however, sufficient deposition of soil between the Hanna and

McKean Lanceolate occupations to successfully separate these two occupations. As a result of this separation the McKean Lanceolate material remains were analyzed as a whole, separate from the Hanna occupations which were also analyzed as a single component.

The McKean Lanceolate occupations apparently were the earliest to occur, with the occupations located beneath a sterile layer of soil. A total of six separate organic layers were detected in a single unit, however, most units contained evidence of only two or three organic layers. The Hanna projectile points were recovered from a series of thin organic layers that were also not continuous across the site. Analysis by Quigg (1986) suggests the presence of three, perhaps four occupations.

Radiocarbon dating of bone from the Hanna and McKean Lanceolate occupations provide dates between 3330+/-110 B.P. [S-2292] and 4330+/-115 B.P. [S-2520] (Quigg 1986:32). Based upon analysis of the artifacts recovered, the occupations have been identified as small, temporary campsites where a number of activities were conducted. The activities included hide working, tool manufacture and food processing (Quigg 1986:101).

The Crown site contrasts with the majority of sites that have been attributed to the McKean Complex in that these sites usually have Duncan and / or Hanna projectile points associated with the McKean Lanceolate points. The Crown site McKean occupation levels contained only McKean Lanceolate projectile points. As well, there were no projectile point forms that might possibly be considered to be stylistically intermediate between McKean Lanceolate and Duncan or Hanna styles (Quigg 1986:63). The Hanna occupations yielded no McKean Lanceolate or Duncan

projectile points. Present in the Hanna levels was a single Oxbow projectile point and a single, large side-notched point identified as Mummy Cave. Quigg (1986) suggests that the presence of these two projectile points does not imply the presence of another cultural occupation at the site, but instead are suggested to be a result of interaction of contemporaneous cultures or perhaps valued keepsakes.

The predominant lithic material utilized in the McKean levels were local materials including Swan River chert and quartz, both of which are easily obtained in the river gravels. Exotic lithics were entirely absent from the Hanna occupations in that only locally available lithic materials were present. Extensive trade networks are implied because of the presence of dentalium shell in the upper McKean component. The large amount of debitage and the numerous cores together with hammer stones and an antler flake provide evidence of extensive tool manufacturing activities.

Hafted bifaces that Quigg (1986) indicates are similar to other McKean assemblages were present at the Crown site. Absent are unnotched bifaces that have been well formed and flaked. Quigg has suggested that these types of bifaces in actual fact are projectile point preforms (Table 12.2).

30 end scrapers of various morphological styles and two side scrapers were identified from the McKean Complex components. 12 end scrapers and the two side scrapers were contained within the McKean Lanceolate component while 18 end scrapers were from the Hanna component. The majority of the scrapers are small in size and triangular in form.

Various types of cores were identified from both components in relatively even numbers. The exception to the above is seen with the multiple platform cores in

that 15 were identified from the McKean component while a mere six were from the Hanna component.

Table 13.2 Crown site Comparative Data

Occupation	McKean (2-3 occupations)	Hanna (3-4 occupations)
Lithic tools		
McKean Lanceolate	7	-
Duncan	-	2
Hanna	-	7
Oxbow	-	1
Mummy Cave	-	1
Hafted bifaces	2	7
Pointed bifaces	5	-
Ovate bifaces	2	4
Irreg bifaces	5	-
End scrapers	12	18
Side scrapers	2	-
Spokeshaves, hafted	-	-
Spokeshaves	-	-
Gravers	-	-
Cores	43	33
Hammerstones	8	5
Anvils	4	1
Bone / Antler tools		
Awls	-	-
Beads	-	-
Other	4	3
Other		
Shell beads	-	-
Shell disks	-	-

Absent from the Crown site lithic tool assemblage are a number of items used to define the McKean Complex. Manos and metates are absent and their presence was used by Mulloy (1954) to define the complex. However, these implements are generally absent from northern McKean Complex sites. Significant also was the absence of tools identified as spokeshaves, graters, chisels and large scrapers. These tools are considered to represent specific tool kits used for hafting projectile points or used in the working of bone and wood (Quigg 1986).

Identifiable bone or antler tools are not present in either component. The possibility of these types of tools is implied by the presence of fragments tentatively identified as having been worked. Due to the fragmented condition of these items no further identification is possible.

Of significance in the Hanna occupations was the discovery of the burial of a single sub-adult individual immediately below the lowest Hanna occupation. On the Northern Plains, Middle Middle Prehistoric Period burials are rare in that only four McKean Complex burials have been identified. It is apparent from the research conducted by Walker (1986) that McKean Complex mortuary behaviour generally consists of the interment of the dead beneath occupation floors. Also characteristic is the absence of the use of red ochre in these burials. Oxbow interments are not situated underneath habitation floors but instead are located as single burials or mass interments. As well, red ochre was used liberally in Oxbow burials (Walker 1986:260).

13.9 The Redtail site (FbNp-10)

The Redtail site is located in the southwestern corner of Wanuskewin Heritage Park within a small basin approximately 300 m from the edge of the South Saskatchewan River and 700 m south of the Thundercloud site. Initial assessment of the site occurred in 1982 with full excavation starting in 1988 and completed in 1989 (Ramsay 1993:1).

The Redtail site is a multi-component site containing 15 occupation levels many of which are further divided. Of importance to this discussion are occupation levels 11 through 13 as these levels have been identified as belonging to the McKean Complex because of the recovery of projectile points consistent with this complex. Occupation level 13 was divided into 13(1), 13(2), 13(3) and 13(4). Level 13(4) contained two projectile points identified as McKean Lanceolate. In addition, two projectile points were recovered from level 13(2). Both of the above points are basal fragments tentatively identified as having morphology similar to Duncan in style (Ramsay 1993:117).

Occupation level 12 contained six complete or partial projectile points. The complete projectile points have been identified as Hanna or in the case of a reworked point, a side-notched / stemmed point resembling a Hanna projectile point (Ramsay 1993:111). The three partial points were basal fragments. Unfortunately not enough remained to clearly identify the cultural association.

Occupation level 11 contained a single partial projectile point identified by Ramsay (1993:111) as Hanna even though the base was absent below the shoulders.

Samples from levels 11 to 13(4) were submitted for radiocarbon dating. These dates range from 3480+/-80 [S-3372] from occupation 11 to 4280+/-80 [S-3009] (Ramsay 1993:90) from occupation 13(4), all are dates consistent with established dating for the McKean Complex.

Few identified lithic tools were recovered from the Redtail site (Table 12.3). Lithic debitage present indicates the utilization of locally available materials. The predominant lithic material was identified as Swan River chert.

A single large hafted biface was recovered from level 12 and 13(1) while large pointed bifaces were identified from levels 12, 13(2) and 13(3). A single ovate biface was recovered from level 11. In total, six bifacial tools were identified from these levels.

End scrapers were rare in all the McKean Complex occupation levels in that a single irregular end scraper was identified in level 13(2). Absent was any evidence of side scrapers. Two large unifacial choppers were recovered, one in each of levels 12 and 13(4). As well, a fragment of a grooved abrader was recovered from level 13(1).

The most common lithic tool recovered were gravers in that a single graver was identified in each of level 11 and 12 while two gravers were located in level 13(2). No spokeshaves, either hafted or not, were identified.

Cores were identified from all McKean Complex levels, however the distribution of these items is unusual in that a single amorphous core was recovered from level 11 while 20 cores of varying types were recovered from level 12. After the high incidence of cores in this level the number of cores steadily decreases

through the different exposures of level 13. The most common type of core identified was that of a bifacial core with multiple flake scars.

Table 13.3 Redtail site Comparative Data

Occupation	11	12	13(1)	13(2)	13(3)	13(4)
Lithic Tools						
McKean Lanceolate	-	-	-	1	-	2
Duncan	-	1	-	-	-	-
Hanna	1	2	-	-	-	-
Side-Notched	-	3	-	-	-	-
Hafted bifaces	-	1	1	-	-	-
Pointed Bifaces	-	1	-	1	1	-
Ovate bifaces	1	-	-	-	-	-
End scrapers	-	-	-	1	-	-
Side scrapers	-	-	-	-	-	-
Spokeshave,hafted	-	-	-	-	-	-
Spokeshave	-	-	-	-	-	-
Gravers	1	1	-	2	-	-
Cores	1	20	11	6	3	3
Hammerstones	-	4	-	-	-	2
Anvils	1	2	-	-	-	-
Choppers	-	1	-	-	-	1
Abrader	-	-	1	-	-	-
Bone / Antler tools						
Awls	-	-	-	-	-	-
Beads	-	-	-	-	-	-
Other	2	2	-	1	-	-
Other						
Shell beads	-	-	-	-	-	-
Shell disks	-	-	-	-	-	-

Hammerstones and anvils were identified in three of the levels (11, 12 and 13(4)). The most numerous were from level 12 where four hammerstones and two anvils were identified.

Features were evident throughout all of the McKean Complex levels. The most common type of feature was that of a shallow surface hearth. Deeper, basin-shaped hearths were located in occupation levels 11 and 13(2). Level 12 contained a basin-shaped pit which had a high amount of fire-broken-rock associated both around its perimeter and inside the feature. The feature does not resemble a rock-lined hearth but instead resembles a two-use structure with use first as a hearth and then a midden. Occupation 13(1) contained a feature identified as either a cache pit and / or a processing pit because of the faunal remains contained within it.

Occupation levels 11 and 12 each contained a circular or oval debris concentration about three meters in diameter. These debris concentrations are associated with feature clusters and are considered to be the outlines of temporary living structures. The general outlines of these concentrations appear similar to that identified at the Cactus Flower site by Brumley (Ramsay 1993:312-313).

13.10 Thundercloud site (FbNp-25)

The cultural artifacts recovered from the Thundercloud site indicate that the levels in question belong to the Middle Middle Prehistoric Period. However, not all of the categories of tools normally associated with McKean Complex occupations were recovered from the excavations. This could be an artifact of sample size in that

the excavations at Thundercloud were considerably smaller than those undertaken at the comparison sites.

Occupation level 5 belongs to the McKean Complex because of the recovery of McKean Lanceolate, Duncan and Hanna projectile points. Occupation level 4 is assumed to be associated with this complex based upon the analysis of the fragmented projectile points recovered. The fragmented portions are not diagnostic but the general shape suggests that at least one of these projectile points is Duncan in morphology. The second component of occupation level 6 contained two fragmented Oxbow projectile points while the first component contained a midshaft that was lenticular in cross-section. This point was missing a portion of the base and therefore definite identification was not possible, however the portion of the base remaining suggest that the style of the point was Hanna.

No hafted bifaces were recovered from the McKean Complex levels of the Thundercloud site. A single pointed biface was identified from occupation level 6. The tool appears to have been discarded before completion because of flaws within the Swan River chert. The general form of this tool appears to be that of a McKean Lanceolate projectile point without the basal indentation. Ovate bifaces were identified within all components.

Bifacially-flaked graters and perforators were present as well through the majority of the occupations. The construction of the graters was one of apparent expediency in that bifacial flaking was undertaken upon a single point on the stone. The majority of the rest of the artifact was unmodified. One of the perforators was constructed from a broken and reflaked Hanna projectile point.

Table 13.4 Thundercloud site Comparative Data

Occupation	4	5	6
Lithic tools			
McKean Lanceolate	-	1	-
Duncan	1(?)	5	-
Hanna	-	2	1(?)
Oxbow	-	-	2
Hafted bifaces	-	-	-
Pointed bifaces	-	-	1
Ovate	3	4	2
End scrapers	3	4	1
Side scrapers	1	-	-
Spokeshave, hafted	-	-	-
Spokeshave	-	-	-
Gravers	1	-	1
Perforators	-	2	-
Choppers	1	-	-
Cores	3	3	3
Hammerstones	1	-	2
Anvils	-	-	-
Bone / Antler tools			
Awls	-	1	-
Beads	-	-	-
Other	2	2	-
Other			
Shell beads	-	-	-
Shell disks	-	-	-

The excavations at Thundercloud did not record the presence of other types of stone tools such as abraders nor were there any non-utilitarian stone items such as

disks, beads or pipes recovered from the McKean Complex occupations. The recovery of bone tools was also sparse from these levels, however, it was evident that bone was utilized as a tool material in that fragments of unidentified bone tools were recovered from levels 4 and 5 and a single bone awl was identified from occupation 6.

Locally available raw materials were the predominant source for tool construction. The majority of lithic debitage was composed of Swan River chert, other cherts and quartzite. A scattering of exotic lithics was recovered including obsidian and Knife River flint. The Oxbow occupation level (6B) contained a small cluster of Knife River flint tertiary flakes within a single excavation unit, implying that reworking of a tool of this material type occurred there.

The majority of the features discovered during the excavation of Thundercloud have been identified as shallow hearths and the ash deposits associated with these hearths. As well, a single feature identified as a lithic scatter was also found. There was no evidence of deep roasting pits nor was there any evidence for the presence of dwelling structures.

13.11 Discussion

The analysis of the above four sites indicates that there are few obvious differences between them. Those differences that are present could be a result of sample size as well as an artifact of the location chosen for actual excavation. It is possible that if another portion of the Thundercloud site had been chosen for

excavation the artifact count would have been different. It is also likely that the types of features identified would have been altered.

Of importance in the analysis of the McKean Complex occupations is the extremely complex stratigraphy present in the Thundercloud site due to the direct superimposition of portions of the occupation levels. The complexity of the stratigraphy renders the complete separation of cultural materials extremely difficult, forcing the researcher to study the occupations as a whole, not as separate entities.

Unlike the tool assemblages recovered from the Cactus Flower, Crown and Redtail sites the Thundercloud site contained no identifiable hafted bifaces although ovate bifaces and a single pointed biface were present. Variations were also present in the occurrence of other bifacially-flaked tools in that level 5 at Thundercloud contained two identified perforators, a tool category not present at the other sites. Gravers were scarce or absent at all of the sites as were crude choppers either unifacially or bifacially flaked.

Side scrapers are either low in representation or absent at all of the sites researched. The appearance of end scrapers varied between the sites in that the Crown site contained 30 identified end scrapers in the McKean Complex levels, Cactus Flower revealed end scrapers throughout the majority of the levels in relatively equal numbers and Redtail contained a single end scraper throughout the excavation. Thundercloud revealed the presence of end scrapers in all three occupations with occupation level 6 exhibiting a single item.

The distribution of cores indicated an unusual pattern between the sites. Cores of different morphological styles were in abundance at the three comparison

sites, however, cores were few in number at Thundercloud. This could be related to the low incidence of hammerstones and the absence of anvils recovered from Thundercloud. The identified cores were varied in morphology in that the cores were irregular in shape and varied greatly in the amount of flake scars present. Some of the cores appeared to have been little used while others contained numerous flake scars on all surfaces.

An analysis of the different types of features present in the above sites indicates some differences between them. Excavations at the Cactus Flower and Redtail sites reveal the presence of some type of habitation structures suggested by Brumley (1975) and Ramsey (1993) to be reminiscent of circular structures such as tipis. The Crown site contained the burial of a sub-adult individual below the living floor of the Hanna occupations. All of the sites contained shallow hearths and none contained any evidence of stone-lined roasting pits commonly associated with McKean Complex sites further south.

All three styles of projectile points were recovered from the Thundercloud site in occupation level 5. Occupation level 5 was analyzed as a complete entity, however, the stratigraphic level contained three separate occupations. These occupations were separated by little or no sterile matrix thereby suggesting that a short period of time separated these occupations. This pattern is reminiscent of that seen at the Cactus Flower site where projectile points of all three varieties were recovered from multiple occupations. A different pattern is present at the Crown site where multiple McKean Complex occupations were separated from multiple Hanna

occupations with no cultural mixing between the two. To a lesser degree the pattern present at the Crown site is also present at the Redtail site.

According to Quigg (1986) the pattern present at the Crown site supports Wheeler's (1954) hypothesis of three distinct cultural groups that co-existed in the same general region during the same general time period. Quigg (1986) proposes that McKean Lanceolate, Hanna and Duncan projectile point types each represent a different cultural group and that when these points are found together in the same component it does not indicate that these point types are part of the same assemblage. Instead, Quigg states that it is more likely suggestive of social interaction or component mixing. When the excavations at the other three comparison sites are analyzed it is apparent that the complexity of the natural stratigraphy has an impact on the association of these different projectile point types. It is possible that if the stratigraphy present at these different sites were less complex it would be possible to accurately assign these different projectile points and their accompanying artifacts to their appropriate occupation. Therefore, it is necessary to take into consideration site formation processes when attempting analysis of cultural materials.

Chapter 14

Summary and Conclusions

This thesis was designed to analysis the cultural materials from the Thundercloud site (FbNp-25) located in Wanuskewin Heritage Park. The Thundercloud site is a Northern Plains multi-component processing / habitation site. Analysis has determined that the site contains a minimum of 11 separate occupations that date back to at least 4,000 years before present, five more occupations than originally perceived.

During excavation it was discovered that the stratigraphy at the site was extremely complex as a result of both natural and cultural site formation processes. Because of this complexity it was difficult to assign cultural artifacts to their appropriate occupation. It was also difficult to determine the number of components present in the site. Since a major aspect of the research problem was to determine the past cultural sequence at Thundercloud it was necessary to determine which site formation processes would have affected the site and what evidence these processes would leave behind in the archaeological record.

The process of discussing the occupation levels present at the Thundercloud site and determining the cultural sequence required an understanding of the site formation processes that affected the site. It would not be possible to adequately analyze the individual occupations contained within the site without understanding what activities affected the site during its history. This is particularly noticeable with the analysis of the

first three occupation levels. Initial excavations at the site indicated the compressed nature of the upper soil horizon and the resulting ambiguity regarding the exact location and numbers of occupation levels contained within this soil horizon. Excavating this soil horizon by 5 cm arbitrary levels made it possible to keep any cultural mixing to a minimum. Understanding the signatures of site formation processes made it possible to determine the presence of two occupations within occupation level 1. Part of this involved an understanding of compaction and its impact on artifacts especially in regard to the distribution of pottery sherds. The analysis of artifacts together with the use of artifact scatter graphs made it possible to determine the approximate location of the Proto-historic / Plains Side-Notched component from the slightly earlier Prairie Side-Notched occupation.

Further analysis of the artifacts of occupation level 3 determined that a minimum of two occupations was involved in this portion of the site. This was determined on the basis of projectile point morphology, however, even with the use of stratigraphic profiles and scatter graphs it was not possible to determine where one occupation left off and another began. The sediment levels were too compressed for further separation. Further separation of occupation level 3 was seen in the last year of excavation in the extreme western units of the site where sterile matrix divided the occupation into two components. This division was only noted in the western profiles of two units. However, these units did not comprise part of this thesis. It is possible that if the excavation continued towards the creek further separation of occupation level 3 would be noted.

Without understanding the depositional history of the site interpretation of occupation level 4 would have been impossible. While it was not possible to definitively

state the cultural association of this occupation level because of the lack of diagnostic artifacts it was possible to determine its location and to understand why this occupation level was in the condition it was. It is unlikely, based upon the knowledge of the flood activity that affected this level, that further excavation would in any way increase our knowledge concerning this occupation.

The McKean Complex occupations have the greatest potential for increased knowledge if further excavations were conducted towards the west. The stratigraphic profiles have shown that the units situated towards the eastern portion of the site contain directly superimposed occupation levels. As the excavation extended towards the west the occupations became more separated, resulting in the separation first of occupation levels 5 and 6 followed by the further separation of these levels into separate components. It is likely that an increased number of units excavated westward would have shown a better separation of McKean Complex projectile points into separate components of McKean Lanceolate, Duncan, and Hanna occupations. For now, the McKean Complex occupations can be separated into three occupations identified by projectile point morphology. It appears as if the Hanna projectile points are located between 42 and 44.5 cm below the surface and the Duncan projectile points are situated between 53.5 and 55 cm below the surface. The McKean Lanceolate projectile point was recovered from 51 cm below the surface. The only point that does not follow the above pattern is a Duncan projectile point recovered from 41 cm below the surface. It is possible that this point actually belongs to occupation level 4 and that the depositional activities that affected the distribution of occupation level 4 was responsible for the location of this artifact. It

appears as if separate occupations of McKean Lanceolate, Duncan, and Hanna were present in the site.

Final analysis of occupation level 6 indicates that two occupations were present. Occupation level 6B is clearly Oxbow in cultural affiliation as a result of the recovery of a Oxbow projectile point from a depth of 65.5 cm below the surface. The identity of occupation level 6A is more problematic. Two projectile points were recovered from this level; an Oxbow (50.5cm) and a Duncan (43cm) projectile point. The depths at which these two points were recovered strongly suggest mixing resulting from cultural activities. A series of hearths identified in occupation level 5 would have had the ability to disturb the original deposition of these two points. Regardless of the recorded depths it is clear that the occupation in question is either Oxbow or McKean Complex in origin.

The above research has clearly indicated the need to determine the presence of site formation processes when undertaking the analysis of an archaeological site. Without this knowledge it is likely that mistakes in identification of cultural components will occur. It is imperative that close scrutiny of stratigraphic profiles and the reason for their formation is conducted in conjunction with the actual cultural materials recovered so that a comprehensive picture of the archaeological site can be obtained. Using this approach made it possible for the research objectives of this thesis to be achieved.

This research especially has indicated the importance of geoarchaeological research within the Opimihaw Valley of Wanuskewin Heritage Park. The previously excavated sites in this valley consistently show evidence of either directly superimposed occupation levels or occupation levels separated by small amounts of sterile matrix. If the geological history of the valley can be determined, especially for the more recent time

periods, this information can be expanded to assist with the analysis of sites outside of the confines of the valley. This merger of geology and archaeology will increase the depth of information that can be determined from an archaeological site and it is the opinion of the author that future excavators within Wanuskewin Heritage Park should make the most of what these different disciplines have to offer.

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