An Examination of Late Plains Period Occupations as Seen from FbNp-1

A Thesis
Submitted to the College Graduate Studies and Research
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Master of Arts
In the Department of Archaeology

By
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Abstract

FbNp-1 (formerly Tipperary Creek) is a habitation site located in Wanuskewin Heritage Park, two miles north of Saskatoon, Saskatchewan. Excavations conducted over the course of three consecutive summers from 1985 – 1987 revealed the presence of 15 cultural levels, all of which belong to the Late Plains Period. These cultural levels show 2,000 years of repeated occupation at the site. This repeated use of the site has produced projectile points from multiple levels of Late Plains Period occupations, particularly Old Women's and Mortlach, which provides an opportunity to examine new projectile point classification systems as well as approaches used in producing these typologies. In addition to the projectile points, pottery excavated from this site provides insight into some of the recent debates regarding Late Plains Period pottery typology. Overall, FbNp-1 serves as a link between earlier occupations within Wanuskewin Heritage Park and modern First Nations populations.

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Chapter 1

Introduction to FbNp-1

1.1 Introduction

FbNp-1 (formerly the Tipperary Creek site) was excavated over three consecutive summers from 1985 – 1987 as part of a research grant funded by the Social Sciences Humanities Research Council of Canada. Excavations revealed the presence of 15 cultural levels in this deeply stratified site. This thesis is concerned with an examination of the cultural materials recovered during these excavations. Faunal remains recovered from FbNp-1 were analyzed by Dr. Ernest Walker from the University of Saskatchewan and Dr. Dick Morlan, Canadian Museum of Civilization, Ottawa.

Site FbNp-1 is located within the confines of Wanuskewin Heritage Park located two miles north of Saskatoon, Saskatchewan. The site is one of 19 precontact sites, which include habitation/processing sites, bison kills, tipi rings, and one medicine wheel. FbNp-1 is an important part of the overall research design for Wanuskewin Heritage Park because of its exceptional record of Late Plains Period occupations. The site serves as a cultural bridge from the many earlier archaeological deposits within the park area to the contemporary First Nations people for whom the National Historic Site is dedicated.

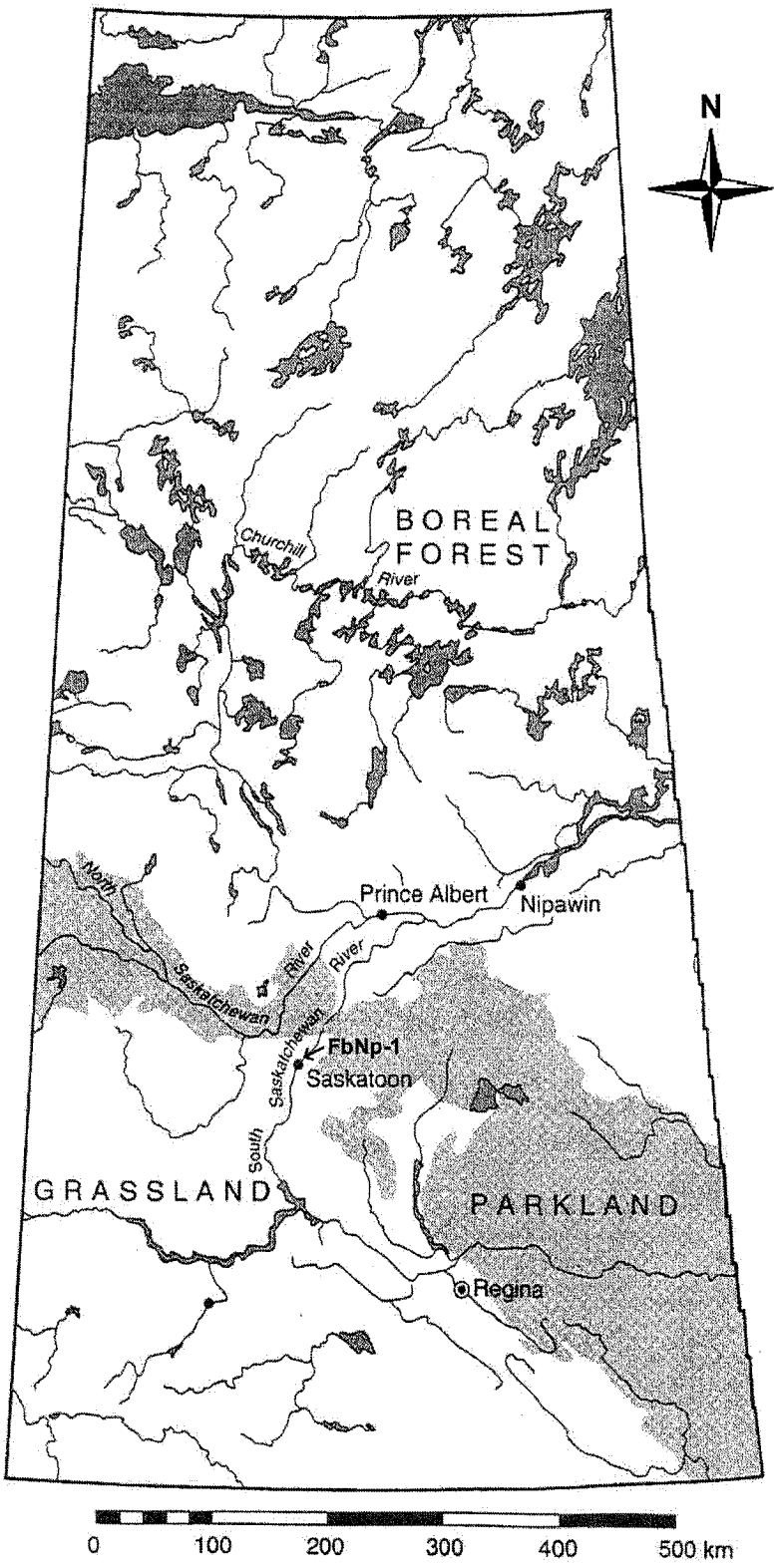

Figure 1.1 Location of Wanuskewin Heritage Park

1.2 Research Objectives

Excavations at FbNp-1 were undertaken in an effort to advance paleo-environmental reconstruction of the Wanuskewin Heritage Park area as well as to further knowledge of cultural occupations prior to European contact. Since excavations at this site, several others have been excavated within the park providing a better opportunity for a greater understanding of human occupation in the area. To that end, the main objectives of this thesis are as follows:

1) To describe the pottery and lithic materials recovered during excavations, including establishing a connection between the materials found and the corresponding archaeological entities.
2) To determine the cultural sequence at FbNp-1.
3) To establish a cultural chronology and overview for the Late Plains Period in Wanuskewin Heritage Park.
4) To determine the validity of existing Late Plains Period projectile point and pottery typologies used on the Northern Plains when applied to recovered materials from Wanuskewin archaeological sites.

1.3 Organization of Thesis

In this thesis, Chapter One outlines the aims and objectives of this research. Chapter Two provides an overview of laboratory methodologies used in the analysis of artifacts recovered from this site. Chapter Three provides a cultural chronology and description of the biophysical environment for the Saskatoon area. In addition, Chapter Three also places sites from Wanuskewin into the existing culture history

scheme. Chapters four through six focus on describing the material remains recovered during excavations. These chapters are ordered by cultural affiliation and are further broken down by level. Hence, the artifacts from each level are described, analyzed and placed into the corresponding cultural association. Chapter seven includes a discussion of projectile point and pottery typology on the Northern Plains for the Late Plains period as well as comparative data from other Late Period sites on the Northern Plains. Chapter eight contains the conclusions reached as a result of this research.

Chapter 2

Methodology and Analytical Constructs

2.1 Introduction

FbNp-1 was excavated over the course of three summers. Each field season the focus was on a different area, with two large main blocks being excavated at either end of the site connected by two adjoined trenches (see figure 2.1). By the end of the third field season, 56 1mX1m units were excavated to a depth of 2.1m and revealed the presence of at least 15 occupation levels. Radiocarbon dating returned uncalibrated dates confirming that the occupations levels all belong to the Late Plains period. All C14 dates reported in this thesis are uncalibrated. For a complete list of dates both calibrated and uncalibrated, please see Appendix D.

Excavations at the site were primarily conducted by trowel, but below cultural level 12 shovel shaving was also employed. Screening was done with ¼" mesh in most cases, but during the second year of excavation it was decided to waterscreen the western half of each unit in order to recover smaller data that would normally have been lost in the larger mesh.

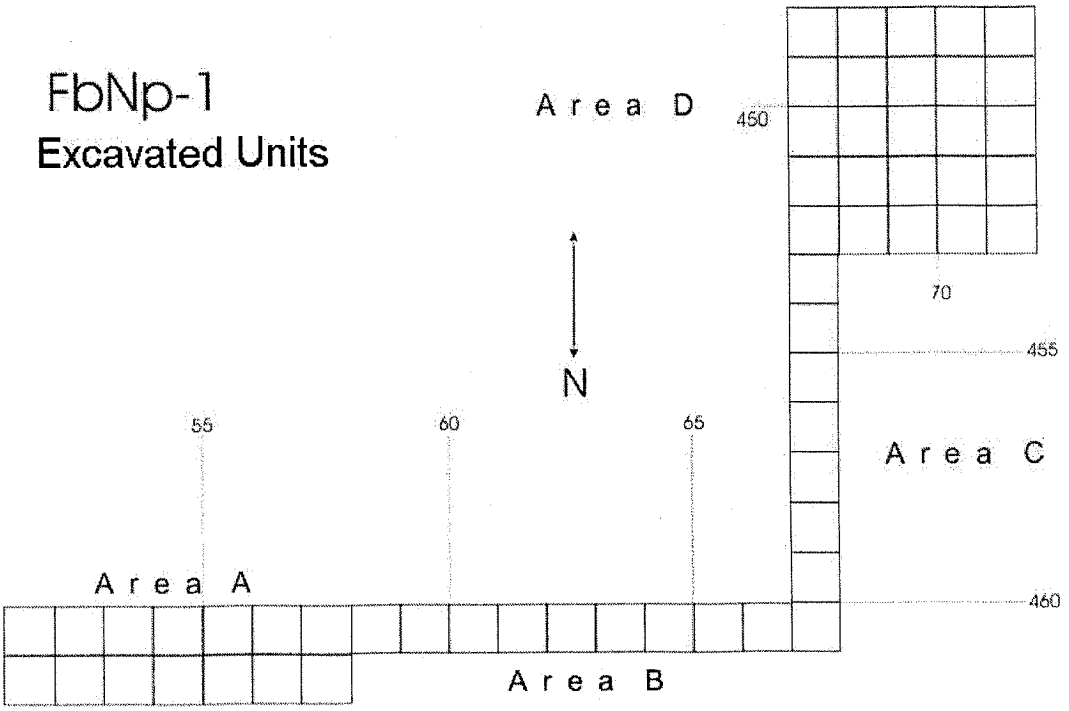

Figure 2.1 Excavated Units at FbNp-1

The stratigraphy of FbNp-1 is complex. While paleosols were revealed to be present in the lowest levels of the site, there were no diagnostic artifacts and only a sparse scattering of cultural materal. The lowest levels (those below level 13) are dominated by thick fluvial sand deposits with only intermittent paleosols. It appears that the stream channel at one time ran directly through Area B. This is evidenced by the "pavement of riverine pebbles and cobbles mixed with course sand" that overlays level 16 (Walker et.al. 1987: 24). The levels below level 16 are, therefore, believed to have been redeposited as a result of riverine action. Above level 13 are a series of thin paleosols, all of which contain cultural materials. These paleosols are sealed in thin veneers of clay and silt, more characteristic of overbank than fluvial deposits (Walker et.al. 1987). Levels 1 through 5 correspond with Morlach occupations, 6 though 10

correspond with Old Women's occupations, and 11 through 13 are Avonlea/Besant levels.

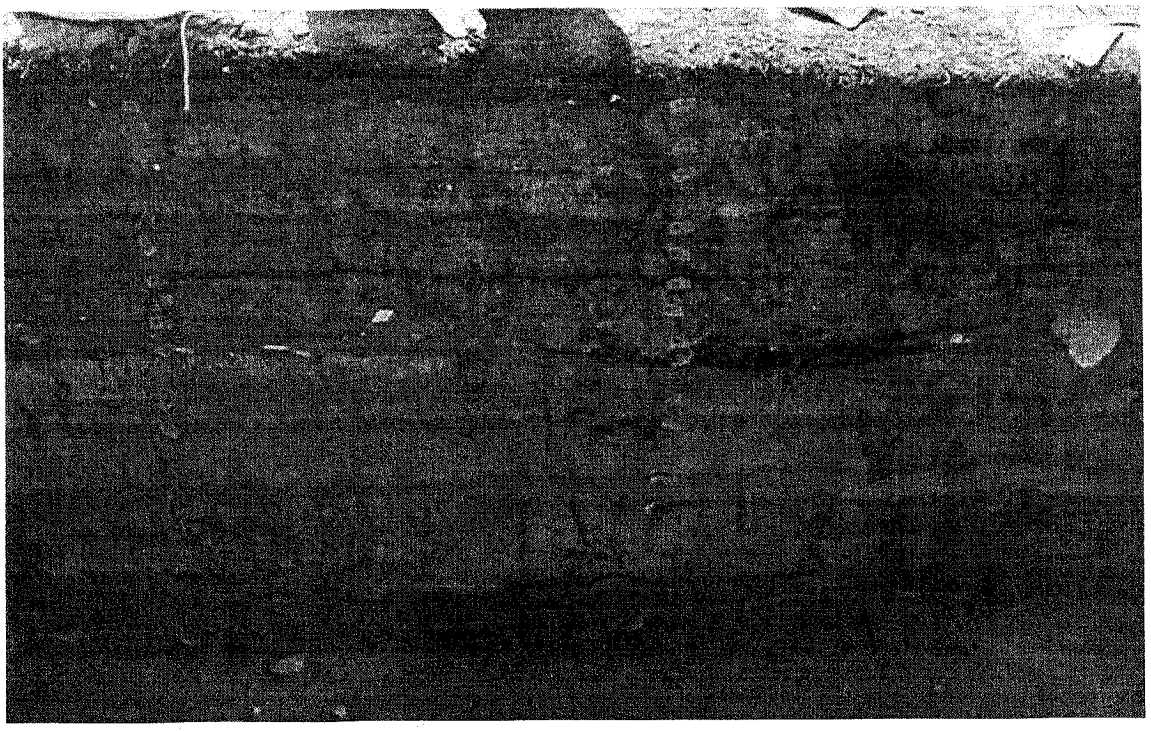

Figure 2.2 Stratigraphic Profile of FbNp-1

2.2 Lithics

2.2.1 Cores and Debitage

The debitage recovered from FbNp-1 was differentiated by size as well as presence/absence of cortex. All flakes showing cortex were presumed to be decortication flakes, with those showing > 49% cortex assigned to the primary decortication category, and those showing ≤ 49% assigned to secondary decortication. Following Ericson (1984: 3-4), the application of a cortex index gives a percentage to total of decortication flakes versus total debitage. The resulted index was then applied

against a model for site type, assuming that certain sites are more prone to produce a particular type of debitage, as well as proximity to the quarry.

Taking this model one step further, breaking down the cortex bearing flakes by material type can be useful in determining the importing of exotic raw materials for stone tool manufacture as well as those found locally. Identification of material type was primarily reliant on Eldon Johnson's (1998) work with Saskatchewan lithics. In addition to Eldon Johnson, I also relied heavily on Peggy McKeand's (2001) descriptions of common lithic types found in Saskatchewan.

All remaining debitage was divided between flakes and shatter, and placed into size categories, corresponding secondary and tertiary flaking during the tool manufacturing process. Following stages of reduction, flakes containing cortex were considered early in the manufacturing process. Larger flakes lacking cortex were considered to be the second stage wherein initial shaping of the preform occurs, and the smallest flakes were considered to be the final stages of production, allowing for final shaping and sharpening of the tool. Using Ahler (1989), Ericson (1984) and Whittaker (1994) as guidelines, breakdown of the size categories are as follows: secondary flakes were considered to be greater than 10mm, and tertiary flakes were considered to be smaller than 10mm. Flakes showing retouch or use-wear were included in the size categorization, but the areas of use or retouch were noted. Assuming that flake size is indicative of the stage of reduction (Ahler 1989, Kooyman 2000), the size categories are used as indicators of the stage in manufacturing taking place at the site. This serves to reinforce the results from the cortex index in determining the type of site and activities represented in the cultural remains present, as well as reinforcing such conclusions as relative distance to lithic source material.

2.2.2 Tools

The initial categorization of tools excavated at FbNp-1 included separating formed tools from non-formed tools. Formed tools recovered during excavations were divided into projectile points and non-projectile points. The attributes by which the non-projectile point tools were analyzed include the following:

- Shape
- Cross-section
- Area of retouch
- Type of retouch
- Haft element
- Completeness
- Material
- Length
- Width
- Thickness
- Weight

The same attributes were examined for both bifacial and unifacial tool types, though the distinction between the two types of flaking was made. If the tool type was able to be determined (eg. end-scraper, drill etc), it was noted. Projectile points were analyzed following Peck and Ives (2001). The following is a list of metric attributes noted:

- Body length
- Stem length
- Total length
- Completeness
- Maximum body width
- Minimum stem width

- Base width
- Width of each notch
- Depth of each notch
- Height of each basal edge
- Maximum body thickness
- Maximum stem thickness
- Weight

ANOVA tests were run on each attribute measured, followed by a Scheffe test, to determine grouping of the projectile points. In addition to the points from FbNp-1, projectile points from Amisk, Newo Asiniak, and Thundercloud sites were also subjected to the testing routines. This was done in hopes of establishing a more cohesive picture of the Late Plains Period within Wanuskewin Heritage Park.

2.3 Pottery

Due to the highly fragmented nature of the pottery recovered from FbNp-1, reconstruction was not possible on a large scale. The sherds were refitted where appropriate, but the majority were simply too fragmented to allow for much more than small sections of refits. Vessel numbers were assigned primarily based on the following rimsherd attributes:

- Interior and exterior finish
- Temper
- Paste
- Rim profile
- Rim/brim decoration
- Lip shape

- Lip decoration

Other attributes recorded for rimsherds include the following:

- Maximum and minimum lip thickness
- Maximum thickness measured 2.5 cm below the brim (when possible)
- Weight

Body sherds were not generally used for vessel determination due to the inability to distinguish between vessels based solely on body attributes. If, however, body sherds exhibited attributes that did not fit with any of the rim sherds, it was given a separate vessel number assignment. The following attributes were recorded for body (including shoulder and neck) sherds:

- Exterior and interior finish
- Temper
- Paste
- Vessel part (if determinable, otherwise assigned to the general 'body' category)
- Maximum and minimum thickness
- Weight

Once the various attributes were recorded for all the pottery, a ware assignment was made based on existing classification systems including a review of both Malainey's (1991) and Walde's (2003) Mortlach classificatory schemes. Rim shape was based on Walde's work as well as Syms (1986), but it should be noted here that contrary to Walde's vessel designations, whenever rim sherds displayed a similarity

in attributes (rim shape, decoration, paste, and finish), they were given a single vessel number.

Chapter 3

Biophysical Environment, Cultural Chronology and History of Wanuskewin Heritage Park

3.1 Culture History

No description of cultural chronology can be complete without a discussion of taxonomic terms and their common usage. Following Willey and Phillips (1958), the smallest taxonomic unit to be used in this discussion is the component. A component is the manifestation of a single occupation period at any given site. Hence, an excavation with material remains from only one level can be considered a single component site. A phase is a series of components limited spatially by a locality or region, and temporally to a relatively brief period of time. A tradition is the persistence of a single technology or other cultural expression that appear with temporal continuity. A horizon is represented by cultural traits that show a broad and rapid expansion. A series is a set of components that display progressive change over time in a common spatial area (Dyck, 1983).

The first attempt at establishing a cultural chronology for the Plains region was by Mulloy (Mulloy 1958; Frison 1991) in the late 1950's. Mulloy based his chronology

on work at the Pictograph Cave site (24YL1) in Montana, and used other, smaller sites to complement his initial findings based on the cave excavations. Mulloy set up a simple scheme dividing Plains occupations into various time periods using key cultural indicators such as projectile points. These time periods reflected major changes which occurred in the archaeological record. Today many components of Mulloy's scheme are still in use, and are still heavily reliant on projectile point morphology as the basis for defining cultural phases found on the Northern Plains. There are, however, some changes that must be noted in order to have a more up-to-date understanding of the cultural history of the region.

Mulloy's (1958) cultural chronology began with what he termed the "Early Prehistoric Period" from 13,000 to 6,000 years ago. The Early Prehistoric Period is followed by a cultural hiatus from 6,000 to 3,500 years ago, an "Early Middle Prehistoric" from 3,500 to 2,000 years ago, a "Late Middle Prehistoric" from 2,000 to 1,500 years ago and a "Late Prehistoric" period from 1,500 years ago until contact of the aboriginal groups with European groups, which he placed around A.D. 1800.

Mulloy's concept of a cultural hiatus occurs during what was previously thought to have been a great drought in the Plains area, but which we have since come to understand as a general warming and drying trend. This period is subject to much debate by scientists regarding the actual changes that occurred both environmentally and culturally. It appears that the warming and drying trend (Altithermal) did have an affect on people living on the Plains at this time, but not to such a great extent as to lead to total abandonment as suggested by Mulloy (Frison 1974; Reeves 1973, Walker 1992). While there is no universally agreed upon theory as to the impact of the Altithermal on

the Plains, it is generally understood that the environment at the time was warmer and drier than at present, which led to a greater reliance on plant and other non-bison foods.

3.1.1 Paleoindian Period

In 1978, Frison laid out a cultural chronology for the Northwestern Plains. In this, he replaced the term "Early Prehistoric" with "Paleoindian." Paleoindian has become the accepted term for the first human occupants of the New World (Frison 1991). The time of the initial populating of the Americas is currently the subject of much discussion. At the time of this writing, the oldest accepted date based on the newest accepted research from is approximately 13,000 B.P. This date was returned from an occupation level located at the Monte Verde site in Chile. The site was excavated by Tom Dillehay (2000), and is currently the oldest generally accepted date for human occupation in the New World.

Due to the Laurentide Ice Sheets, followed by Glacial Lake Saskatchewan, human occupation in the area of Wanuskewin Heritage Park prior to approximately 10,000 B.P. was most likely not possible. Surface finds near the park have included Clovis projectile points (Ernie Walker, personal communication 1998), which suggest that humans were following closely behind the retreat of the ice sheets. Unfortunately, the Clovis artifacts were not found *in situ*, and cannot be associated with an intact site in or near the park. There are several PaleoIndian phases and horizons recognized in Saskatchewan, and they are identified by their reliance on high-grade cryptocrystalline raw materials such as Knife River silicified sediment(Wright 1995) as well as their carefully crafted lanceolate projectile points.

3.1.2 Middle Period

Following the Paleoindian period, Frison recognizes what he terms the Archaic. Walker (1992) uses the term Middle Period to refer to this same time. According to Walker, the term Archaic implies a change in subsistence strategies - primarily a lessened dependence on hunting - for which he sees no archaeological evidence, thus Middle Period is a more appropriate descriptor for the Northern Plains region. Middle Period occupations are generally characterized by an increased reliance on local lithic materials and the appearance of side-notched projectile points. These side-notched projectile points represent a new technology heretofore unseen on the Northern Plains. They were most likely used with atlatls, reflecting a change in hunting subsistence strategies as well as lowered mobility of the population (Frison 1991: 79). The Middle Period also represents the beginning of the occupations within Wanuskewin Heritage Park. In the summer of 2001, a field school excavation was conducted at the Cut Arm (FbNp-22) site in the park, where evidence was found that the first occupation in the valley may date to the beginning of the Middle period. This is based on the recovery of what appears to be an early side-notched projectile point (Ernie Walker, personal communication 2003) assignable to the Mummy Cave series. If this initial identification proves to be accurate, the Cut Arm Site will become the oldest site located within the park, at approximately 6,000 B.P. Prior to this discovery at the Cut Arm site, the oldest confirmed occupation within the park also dated to the Middle period, but belonging to the slightly younger Oxbow Complex. While some dates from the Amisk (FbNp-17) (Amundsen 1986: 194) and Redtail (FbNp-10) (Ramsay 1993:30) sites correspond to dates associated with the Mummy Cave series, no Mummy Cave diagnostics were found at these sites. An Oxbow occupation was found at the Amisk site, just upstream from

FbNp-1. According to Walker (1999:25), the Oxbow complex time span is from approximately 4700 to 3800 B.P.

Slightly later and partially contemporaneous with Oxbow, is the McKean series. The McKean series is thought to be the expression of an intrusive cultural entity and is represented in the archaeological record by three distinct projectile point styles - McKean lanceolate, Duncan and Hanna. All three McKean series projectile point styles have been found within the park. Thundercloud and Redtail both contain multiple levels of the McKean series (Webster 1999: 21), and during the summers of 2001 and 2003 both Duncan and Hanna style projectile points were found at the Meewasin site. At the time of this writing, however, analysis had not yet been completed on the Meewasin site materials. Pelican Lake is the terminal Middle Period occupation that is present in Wanuskewin. A Pelican Lake occupation was found at the Newo Asiniak bison jump, with a corresponding radiocarbon date that establishes the occupation firmly within the Pelican Lake horizon (Kelly 1986).

3.1.2 Late Plains Period

Following the Middle Period is the Late Precontact Period, which is the primary focus of this thesis. Dyck has termed this time period the Late Plains Indian Period (1983), but Walde et al. (1995) have employed the term Late Plains Period, which will be used in this work. The Late Plains Period is primarily defined on the Northern Plains by the presence of pottery as well as a series of side-notched projectile points believed to be associated with bow and arrow technology (Walker 1999: 26). These new technological changes first began appearing approximately 2500 years ago and can be found in association with Besant complex finds.

Pottery normally associated with Besant occupations is not well understood, though it is generally conoidal in shape and tempered with grit or occasionally sand, cord roughened and has a row of punctates or bosses just below and running parallel to the rim. It appears to have been made using the paddle and anvil method (Dyck 1983). Walde and Meyer (2003:138) have stated that pottery associated with Besant finds is generally undecorated, but point out that when decoration is present, it tends to take the form of bosses created by forming punctates on the interior of the vessel, that then forms a row of bossing on the exterior. Pottery from Besant sites has been found in association with burial mounds from the Sonota complex, and can be viewed as evidence of contact with the Eastern Woodlands (Neuman 1975; Walde and Meyer 2003:138). Other evidence that suggests an affinity with the Eastern Woodlands is the presence of post-in-ground dwellings as seen at the Mortlach site. Also found at the LaRoche site (39ST9) in South Dakota (Dyck 1983:113), this type of dwelling technology is previously unknown among Great Plains bison hunting groups, but is reminiscent of the bark covered houses of the early Woodland period. Post-in-ground dwellings are not the only type of housing that was used by the people during Besant times, however, as there is also ample evidence of very large tipis - some up to 9 metres in diameter (Dyck 1983:113).

Besant shows a return to exotic raw materials such at Knife River flint, but not to the complete exclusion of local lithic materials and marks the transition between the Middle Period and the Late Plains Period. This heavy reliance on Knife River flint is more prominent in the earlier Besant sites and appears to taper off in the later sites as it gives way to more local lithic reliance (Dyck 1983). The predominance of Knife River Flint also appears to occur more often at the large kill sites for which the Besant

Complex is best known. Walde et al. (1995) suggest that the large kill sites may represent the seasonal joining together of various local bands for a communal hunt. This theory is supported by ethnographic data that shows the same tendency during the contact period of smaller local bands coming together for an annual hunt (McMillan and Yellowhorn 2004). Projectile points associated with Besant finds are typically side-notched with very broad and shallow notches. The lower notch edge frequently touches the basal edge of the point (Kooyman 2000). Within Wanuskewin, a possible Besant occupation was found at the Meewasin site during fieldschool excavations in the summer of 2000.

Avonlea follows the Besant complex on the Northern Plains, and is generally found across the Canadian Plains by 1500 BP (Walde et al. 1995:24) and can be recognized until 1100 BP (Reeves 1983). The main identifying feature of the Avonlea horizon is the small, thin and finely worked, pressure flaked projectile point (Kehoe: 1966; Walde et al.:1995; Kooyman 2000: 124). Avonlea points generally have low, shallow notches and a concave base. These points were most likely manufactured by pressure thinning the blanks (Kooyman 2000: 124). Avonlea projectile points are considered to be true arrow points as opposed to most of the earlier Besant points that were used with atlatls and darts. Projectile points belonging typologically to Avonlea tend to be fairly homogeneous, but are associated with pottery that demonstrates regional variation (Walde and Meyer 2003).

There are three main types of pottery associated with the Avonlea horizon, and all are based on characteristic surface finish: Rock Lake Net-Impressed, parallel grooved, and cord roughened. The most widespread pottery associated with this time period is Net-Impressed pottery. Centred mainly on long-grass prairie and parklands of

central Saskatchewan, extending into Alberta and Manitoba, net impressed pottery is the type of pottery associated with Avonlea projectile points that one would expect to find at Wanuskewin Heritage Park. Net impressed pottery may be conoidal or bag-shaped with round or pointed bases. When decoration is present, it tends to take the form of a single row of punctuates on the exterior of the vessel rim, and are often pushed at an upward angle. Some rims also bear horizontal incisions (Walde and Meyer 2003).

Following the Avonlea horizon is a series of small side-notched projectile points found in association with pottery. The Old Womens phase is the term used to describe the cultural occupation following Avonlea, and it is noted for the thick, poorly consolidated pottery found in association with Plains and Prairie Side-notched projectile points. Walde and Meyer (2003) have made the case for establishing a solid relationship between pottery of this era and Ethridge Ware pottery found in Avonlea sites. Later sites bearing Ethridge Ware pottery tend to have vessels with more complex profiles, and can also demonstrate a certain amount of regional variation (Walde and Meyer 2003). This later occurrence of pottery similar to Ethridge Ware is commonly referred to as Old Womens pottery. Byrne (1973) refers to this as Saskatchewan Basin Ware, Late Variant.

Immediately following, and to a certain extent overlapping with, Old Womens occupations is the Mortlach phase (Walde 2003; Malainey 1991). Mortlach occupations tend to contain Plains Side-notched projectile points with Mortlach pottery, with some vessels in more northern collections that tend to be synchretic with Selkirk pottery found in the Boreal Forest (Malainey 1991). Mortlach vessels generally tend to be much thinner than the preceding Old Women's pottery, and also have more varied rim profiles as well as sophisticated decorations and finishes (Walde et al. 1995).

In Wanuskewin Heritage Park, both Old Womens and Mortlach pottery have been found. Mortlach pottery is generally found in the uppermost pottery-bearing levels and in association with plains side-notched projectile points. Old Womens pottery can be found in association with both plains and prairie side-notched points, and tends to be in levels dating earlier than those with Mortlach pottery. Pottery as well as Plains and Prairie Side-notched projectile points have been found at the Amisk (FbNp-17), Thundercloud (FbNp-25), and Newo Asiniak (FbNp-16) sites in relative abundance compared to other sites within the park.

3.2 Site History and Location

FbNp-1 is a Late Plains period site located in the southern portion of Wanuskewin Heritage Park, on a point bar at the mouth of Opimihaw Creek, where the creek flows into the South Saskatchewan River, in Section 36, Township 37, Range 5, West of the 3rd Meridian. Between 1985 and 1987, this large habitation site was excavated to a depth of 2.4 metres.

This site was originally recorded in 1959 by Tom Kehoe, but was well known to local collectors and amateur archaeologists prior to its registration with the Saskatchewan Museum of Natural History. A high yield of surface finds made the area a popular spot for collectors, and eventually various small-scale projects were carried out at the site, leading to speculation about its potential importance for the cultural history and understanding of the area (Walker 1983). Other well-known sites in the area were also the destination of many collectors, and in 1982 and 1983 an extensive survey was carried out to determine the location of all the sites within the proposed

Wanuskewin Heritage Park. This survey revealed the presence of 21 archaeological sites, 19 of which were precontact.

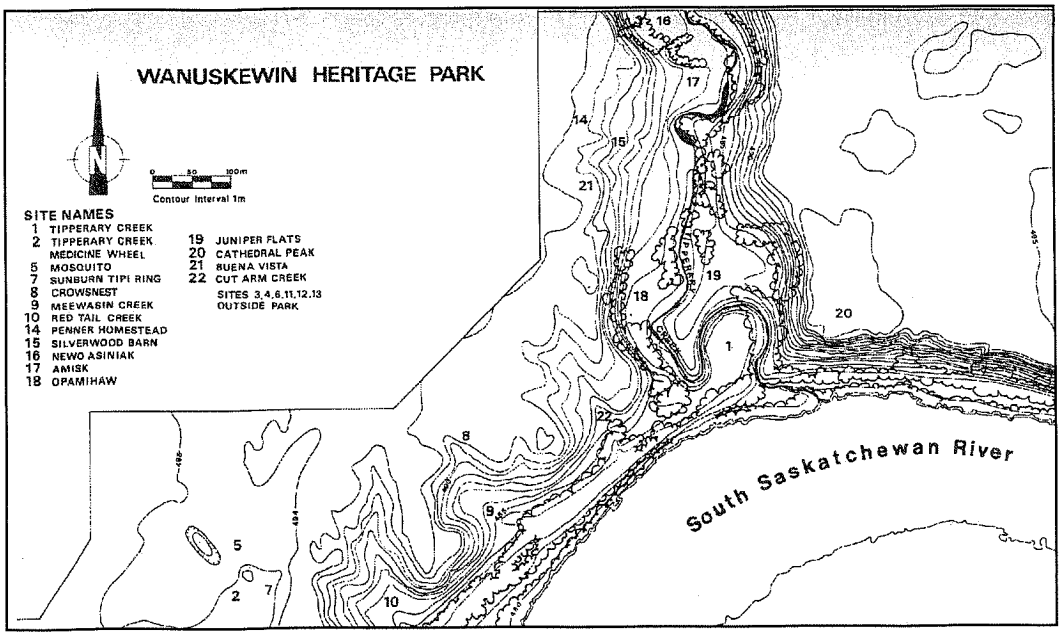

Figure 3.1 Location of Sites Within Wanuskewin Heritage Park (FbNp-1 is #1 on the map)

In 1983 the Meewasin Valley Authority took stewardship of the 64 hectares of land in which the archaeological sites were contained, and began work on establishing what would become Wanuskewin Heritage Park (Walker 1983). In the same year, a long-term research program was established to carry out research in the area in an attempt to better understand the history of the area and its people. This project was established with the help of First Nations peoples to emphasize the cultural importance of the site not only to non-native people, but to native people as well.

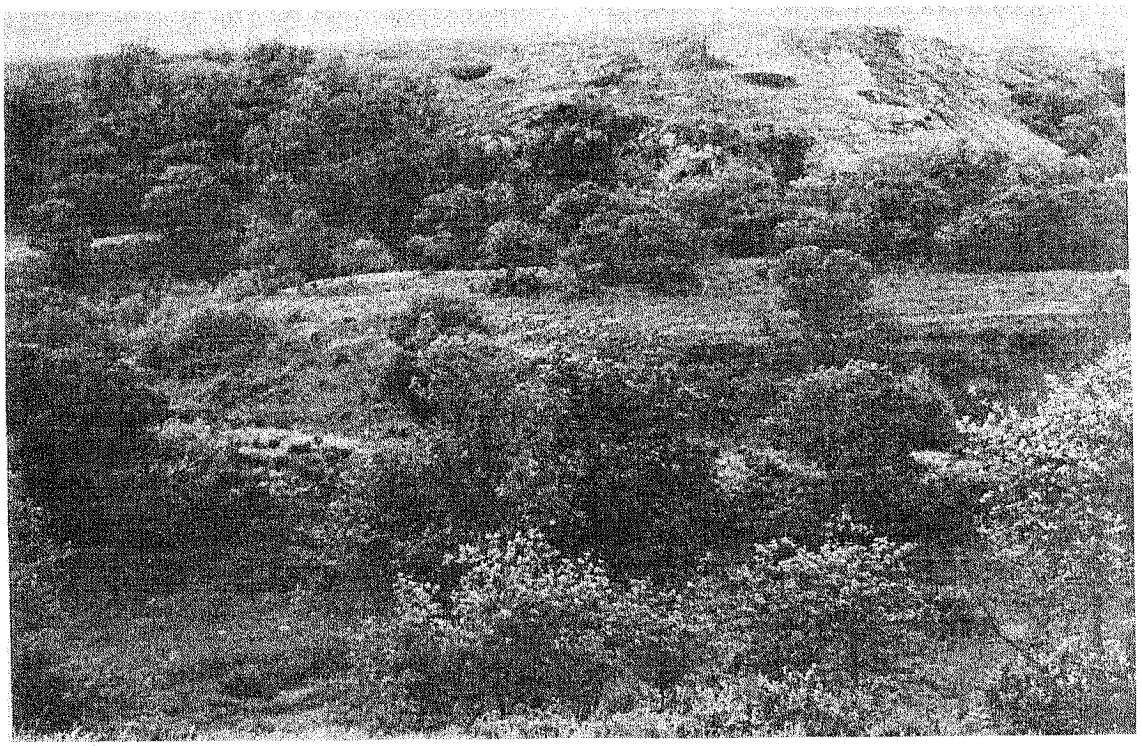

Figure 3.2 Site Photo of FbNp-1 – Note the flat surface of the point bar and vegetation of the slopes

In 1985, working with a three year grant from the Social Sciences and Humanities Research Council of Canada (SSHRC), extensive excavations were begun at FbNp-1 under the direction of Dr. E.G. Walker from the University of Saskatchewan. According to the interim reports presented to SSHRC (Walker et al. 1986), the 1985 excavations confirmed the existence of 15 Late Precontact levels. Excavations continued in 1986 and 1987 and confirmed the presence of rich archaeological components. The work done at the site during these three field seasons confirmed that FbNp-1 was a deeply stratified, multi-component site. Diagnostic artifacts were found in the upper 13 levels; among these were projectile points of the Besant, Avonlea, Prairie and Plains side-notched time periods along with vast amounts of pottery. In addition to these Late Precontact levels, at least one historic occupation was discovered,

identified as such by the presence of glass trade beads and a metal projectile point. There was also a significant amount of faunal remains, which have already been analysed by Dr. E.G. Walker and Dr. Richard Morlan.

3.3 Biophysical Environment

3.3.1 Climate

FbNp-1 is located within the Northern Great Plains, a grassland ecosystem, covering approximately 1,166,000 km^2 (Gilbert 1980: 8). The Great Plains region extends south to north from the Edwards Plateau in Texas to the Aspen Parkland in Saskatchewan, and east to west from Nebraska and Kansas to Colorado. The Northern Plains consists of the area from southeastern Alberta, southern Saskatchewan, southwestern Manitoba, eastern Montana and Wyoming, North and South Dakota and far western Minnesota (Kay 1998).

The environment of Wanuskewin Heritage Park and the FbNp-1 is generally considered to have been somewhat stable over the past 2000 years (Walker 1999), though there have been minor climatic fluctuations throughout this time. At the time of the first occupation of FbNp-1, the Northern Plains well into what has been called the Sub-Atlantic climatic episode. During this time period (2890 BP to 1690 BP), the area was wetter than it is today, with overall rainfall being higher and an increase in humidity (Dyck 1983: 110). A transitional climatic period, known as the Scandic period, followed the Sub-Atlantic. This period is marked by a general drying trend. It is during this time that Besant peoples on the Plains emerged into the great bison hunters that they are most known for being. Following the Scandic period was another episode of wetter times. The Neo-Atlantic is noted for warmer and wetter weather and lasted from 1000

BP to 760BP. The Pacific Episode followed the Neo-Atlantic, once more bringing about dryer conditions. This time was marked in the Middle Missouri region because of the "drastic reduction of occupation" from approximately 760 BP to 410 BP (Dyck 1983: 110). Beginning around 410 BP, the climate became what it is today. The Northern Plains region today is characterized as being a continental climate, with long cold winters and short warm summer (Bergsteinsson and Calvert 1977). Annual precipitation is low, with a mean of approximately 380 mm, with annual snowfall averaging approximately 110cm. The coldest month of the year is January with an average temperature of –17.9° c. July is the warmest month, with an average temperature of 18.8° c (Padbury and Acton 1999: 161).

The Plains cannot be considered to be environmentally homogeneous; there are many different physiographic and biotic provinces to be found throughout the area. This is not to say that there are no common themes, but the idea of a homogenous grassland is not accurate. There are two major types of grassland that occupy the Plains, the short-grass and the tall-grass, which are composed of six dominant grass species. The short-grass prairie is generally found to dominate the Great Plains, and the tall-grass prairie can be found along the western margin of the central lowland. There is an area of mixture creating a mixed-grass prairie along the boundary of the two (Wood 1998).

3.3.2 Physical Environment

The physical surroundings of the FbNp-1 have had many influences. Until construction of Gardiner Dam in 1960, frequent flooding caused by ice jams led to the deposition of alluvial sediments. These alluvial sediments were deposited over organic and cultural materials creating the well sealed cultural levels that were present at the

time of excavation. Construction of the dam, however, has stabilized water levels, and flooding is no longer a frequent occurrence. Stabilization of water levels has also allowed vegetation to grow on the lower terraces. The topography of the area is characteristically glacio-lacustrine with undulating till plains. Permeable sandy soils provide good drainage in the area and prevent the formation of large natural lakes (Martz and de Boer 1999: 94). Dark brown chernozemic soils, characteristic of mixed grasslands are found throughout the area. These soils are a sandy to clayey loam. The area of the site itself consists of organic rich sediments within the upper levels, and organic poor sediments in the lowest levels, which contain sandy mud as well as colluvium (Burt 1987: 111-116).

3.3.3 Flora

The area in and around Wanuskewin Heritage Park is classified as a moist mixed grassland on the Saskatoon Rivers Plain. The moist mixed grassland is the northernmost extension of open grassland and is "closely correlated with semi-arid moisture conditions and dark brown soil" (Padbury and Acton 1999: 162). Occasional stands of aspen groves may be seen in this area around bodies of water, and are present in the area around the South Saskatchewan River and Opimihaw Creek. The appearance of trees in this area coincides with the decline of fescue grass as the dominant type, leaving instead a mixed prairie grass (Thorpe 1999). Mixed grass consists of midgrasses, which can reach heights of 20 to 30 cm, and shortgrasses, which can grow as high as 10 cm. The most common species of midgrasses include western porcupine grass (*Stipa curtiseta*), needle-and-thread (*Stipa comata*), green needle grass (*Stipa viridula*), northern wheat grass (*Agropyron dasystachyum*), and western wheat grass (*Agropyron smithii*). There

are two intermediate species of grasses found in the area, june grass (*Koeleria macrantha*) and plains reed grass (*Calamagrostis montanensis*), their size places them in-between mid- and shortgrasses. The most dominant shortgrass species in this area is blue gramma grass (*Bouteloua gracilis*). A variety of sedges are also found in the area as well as sages, small wildflowers and herbs, these do not, however, make up a significant portion of the biomass of the area (Thorpe 1999: 137). In areas around water sources, there are three dominant tree varieties, the aspen (*Populus tremuloides*), ash (*Fraxinus pennsylvanica*) and willow (*Salix sp.*).

Much of the area around Wanuskewin is utilitized for agricultural purposes and many of the native species of grasses have been displaced by imports. The park, however, has placed a great emphasis on restoring the original habitat. Periodic burnings in the area have aided in this process and the park today boasts a large community of native species.

3.3.4 Fauna

Without question, the animal resources in the Saskatoon area have undergone drastic changes throughout the last 250 years. Prior to European movement and settlement on the Plains, the dominant herbivorous mammal in the region was the bison (*Bison bison bison*). The bison evolved and prospered on the Plains, which in turn was able to maintain a high carrying capacity due to the specialized diet and habits of bison herds. It is estimated that approximately thirty-two million bison were supported on the Plains, with another possible two million living in the margins and borderlands (McHugh 1971). The influence of bison on Plains populations is well known. They provided not only food, but were also a source for clothing, housing and tools as well as

having considerable impact on social organisation and religious beliefs. Other herbivores included elk (*Cervus elaphus*), pronghorn (*Antilocapra americana*), and mule deer (*Odocoileus hemionus*). Currently the only artiodactyls that are still common to the area are the mule deer and white-tailed deer (*Odocoileus virginianus*).

Several large carnivores are known to have once inhabited the area but are rarely, if ever, seen in modern times. These include the wolf (*Canis lupus*), swift fox (*Vulpes velox*), grizzly bear (*Ursus arctos*), and cougar (*Felis concolor*) (Walker 1992; Webster 1999: 13). Carnivores that still inhabit the area include the coyote (*Canis latrans*), skunk (*Mephitis mephitis*), badger (*Taxidea taxus*), river otter (*Lontra canadensis*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), wolverine (*Gulo gulo*) and several species of weasel (*Mustela sp.*). In recent years, there have also been some local cougar sightings.

Three varieties of leporids are found in the area, including the white-tailed jackrabbit (*Lepus townsendii*), snowshoe hare (*Lepus americanus*) and Nuttall's cottontail (*Sylvilagus nuttallii*). In addition to these, there is a wide variety of rodent species found here, most notable being Richardson's ground squirrel (*Spermophilus richardsonii*). Others include the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), Franklin's ground squirrel (*Spermophilus franklinii*), northern pocket gopher (*Thomomys talpoides*), muskrat (*Ondatra zibethicus*), numerous mice and voles and, in areas of plentiful water, beaver (*Castor Canadensis*) (Walker 1992).

Waterfowl and songbirds are abundant in the area, with migratory species being particularly abundant in early spring and late autumn. Raptors suffered a population decline in the area, but appear to be returning, especially the great horned owl (*Bubo*

virginianus). For a more complete list of faunal species found in the area, see Appendix A.

Chapter 4

Mortlach Occupations

4.1 Introduction

Levels 1 and 2 at FbNp-1 reflect a Protohistoric occupation. Protohistoric occupations are identifiable by a mixing of artifacts that shows the first arrival of European trade goods. This means that an occupation can show evidence of European trade, but that the trade goods would have been obtained from a third (or fourth) party and cannot be assumed to have been obtained through direct contact between the two groups. Mortlach occupations are frequently known to contain protohistoric artifacts.

Levels 3 through 5 do not contain any trade items, but they most likely represent the same archaeological phase (Mortlach). This determination can be made based on pottery fragments that were recovered throughout all of the levels. Because of the uncertainty of using projectile points as cultural indicators in the Late Period, the pottery serves as a much more suitable marker especially when combined with the Late Period style point. Radiocarbon dates obtained from the upper five levels all correspond to the Mortlach phase as well as with a contact period. Radiocarbon dates span from 510 ± 137 (S-2809) in level 5 to <100 BP (S-2805) in level 1 (see Appendix D). While the date for level 1 seems too recent to represent a Mortlach occupation, it is possible that modern remains are mixed with older remains in the sod layer. This is supported by the

presence of a shell casing from the early 20th century in the same level as stone tools and aboriginal pottery.

4.2 Lithics

4.2.1 Debitage

Levels 1 through 5 show the same propensity toward the use of local lithic sources as other levels from FbNp-1. Swan River chert accounts for 68% of the total lithic recovery. The second most common lithic material is silicified peat with 10% of the total and other cherts make up the third most common material type with 7%. A total of 2244 flakes were recovered from these levels. See table 4.1 for a detailed breakdown of the material type frequency.

Table 4.1 Lithic count by raw material type

Material	Count	Percent
Swan River chert	1536	68%
Silicified peat	219	10%
Other Cherts	168	7%
Quartz	66	3%
Silicified wood	58	3%
Quartzite	56	2%
Gronlid siltstone	37	2%
Basalt	17	1%
Siltstone	17	1%
Granite	15	1%
Sandstone	12	1%
Unidentified	11	<1%
Athabasca quartzite	10	<1%
Rocky Mtn quartzite	6	<1%
Chalcedony	5	<1%
Fused shale	4	<1%
KRF	3	<1%
Cathead chert	3	<1%
Agate	1	<1%
Total	**2244**	

As is clearly evident from the above table, these occupation levels show a strong preference for locally available lithic types especially Swan River chert. Swan River chert is commonly found in glacial till in southeastern Alberta, southern Saskatchewan, and southern and central Manitoba (Johnson 1998; Grasby et al 2002). It has a bedrock source in the vicinity of Lake Winnipegosis in west central Manitoba (Grasby, et al 2002). There is evidence that the second most common lithic type found in these upper levels is also locally available. Silicified peat, once thought to have been transported from Montana (Johnson 1998), may well have a local source, which can account for the large amount of silicified peat found in sites in central Saskatchewan. Silicified peat is commonly found in the Wood Mountain gravels. Table 4.2 outlines the raw material types by level. As is clearly evident by the table, Swan River chert maintains the preferred material status throughout all of the upper levels. Somewhat misleading is the prevalence of silicified peat in level 5. Due to the very high count, it appears that silicified peat makes up the second most common material throughout these levels, when in reality, it has a low frequency in all other levels, and the main count is skewed by this large count from level 5. When the silicified peat is removed from the picture, miscellaneous cherts and quartz become the second and third most prevalent materials.

Table 4.2 Raw Material by Level

	Level 1	Level 2	Level 2a	Level 3	Level 4	Level 5
SRC	145	270	3	27	134	957
KRF						3
Quartz	22	9	2	4	17	12
RMQ	2	2				2
AQ		2		7		1

Quartzite	26	15	2	2	5	6
SW	2	6			3	47
SP		22		13	1	183
Basalt	5	10			1	1
Granite						15
Sandstone	1	10				1
Siltstone		4		9	1	3
GS				35		2
Agate						1
Chert	3	55	1	39	52	18
ChC						3
Chalcedony		3				2
Fused shale					1	3
Misc	1	5		1		4

Tertiary flakes make up the bulk of the debitage found in these upper levels, indicating a prevalence of final stage reduction as opposed to primary reduction. This suggests that primary raw materials were first collected elsewhere where the initial reduction was generally carried out prior to transportation to this site. There are some cores present at the site, leading to the conclusion that there were some raw materials collected locally, or that some cores did not go through the initial reduction prior to transportation. Secondary decortication flakes outnumber primary decortication flakes, further supporting this argument. Material type can be indicative of the amount of shatter that can reasonably be expected to be found. While some materials such as quartz tend toward shattering when struck, this is not the general trend with the most common materials from these levels such as cherts, silicified peat and silicified wood. See table 4.3 for a breakdown of lithic counts.

Table 4.3 Lithic Count by Flake Type

	Level 1	Level 2	Level 2a	Level 3	Level 4	Level 5
Core	5	14		1		3
1° decort	6	17	1	3	4	10
2° decort	19	53	1	9	27	17
2° flake	40	176	3	26	45	49
3° flake	121	140	3	80	130	1162
Shatter	16	12		2	9	23
Hammerstones		3				3
FCR	100	93	2	34	5	27

Ericson (1984) has suggested the use of a cortex index, defined as the percentage to total of decortication flakes versus total debitage, to aid in the determination of primary versus secondary cores and blanks. The formula for the cortex index is as follows:

$$CI = \frac{\text{Debitage with cortex}}{\text{Total debitage} - \text{retouch/sharpening flakes}} \times 100$$

Application of the cortex index gives the following results per level:

- Level 1 – 12%
- Level 2 – 18%
- Level 2a – 25%
- Level 3 – 10%
- Level 4 – 14%
- Level 5 – 2%

These results show a general tendency toward secondary reduction in the flaking process, with the exception of level 2a. This result is misleading, however, due to the low count of lithic remains recovered from this level. Level 2 is approaching a higher percentage of cortex to debitage, which may be due to the use of Swan River chert as the

favoured material. When materials are available and gathered locally, the index will reflect that in the higher percentage returned.

4.2.2 Tools

4.2.2.1 Hammerstones / Braining Stones

The only non-formed tools found in the upper levels of FbNp-1 are hammerstones. Table 4.3 shows the count per level for FCR and hammerstones. Levels 2a and 4 (n=2 and 5 consecutively) show a very low frequency of FCR. This may be due to the primary concentration of activities being located in unexcavated areas of the level.

Hammerstones were recovered from levels 2 and 5 with a count of three in each level. The three hammerstones from level 2 are all quartzite, while level 5 has one granite, one quartzite and one Athabasca quartzite hammerstone. Cheryl Forner, a University of Saskatchewan graduate student, conducted a use-wear analysis on the hammerstones from this site (Forner 2004). Using low-power magnification, Forner was looking for a general rounding of the grains and striations within the stone on the longitudinal surfaces. She was able to determine that specimen 17-23 was used as either a mano or a graining stone and artifact 17-5 was used as a braining stone.

Mandelbaum (1979) describes the tanning process used by the Plains Cree as involving use of a hand-held stone.

> "The hide was then rubbed with fat and slightly heated so that the grease might penetrate. A mixture of liver and brains, taken from deer or buffalo, was applied. The skin was left to dry overnight. The next morning it was soaked in water and vigorously wrong. A smooth stone was briskly rubbed over it to insure a thorough drying" (Mandelbaum 1979:60).

The stone described in this process would show roundedness on the grains of the side used in the abraiding as well as striations along the same side. Mulloy recovered tanning stones from Pictograph Cave I (Mulloy 1958:41; Forner 2004). He based this designation on ethnographic analogy and the slightly polished look present on all sides of the stone and the flat smooth surface that would have been used in the tanning process. These are the same criteria used by Forner.

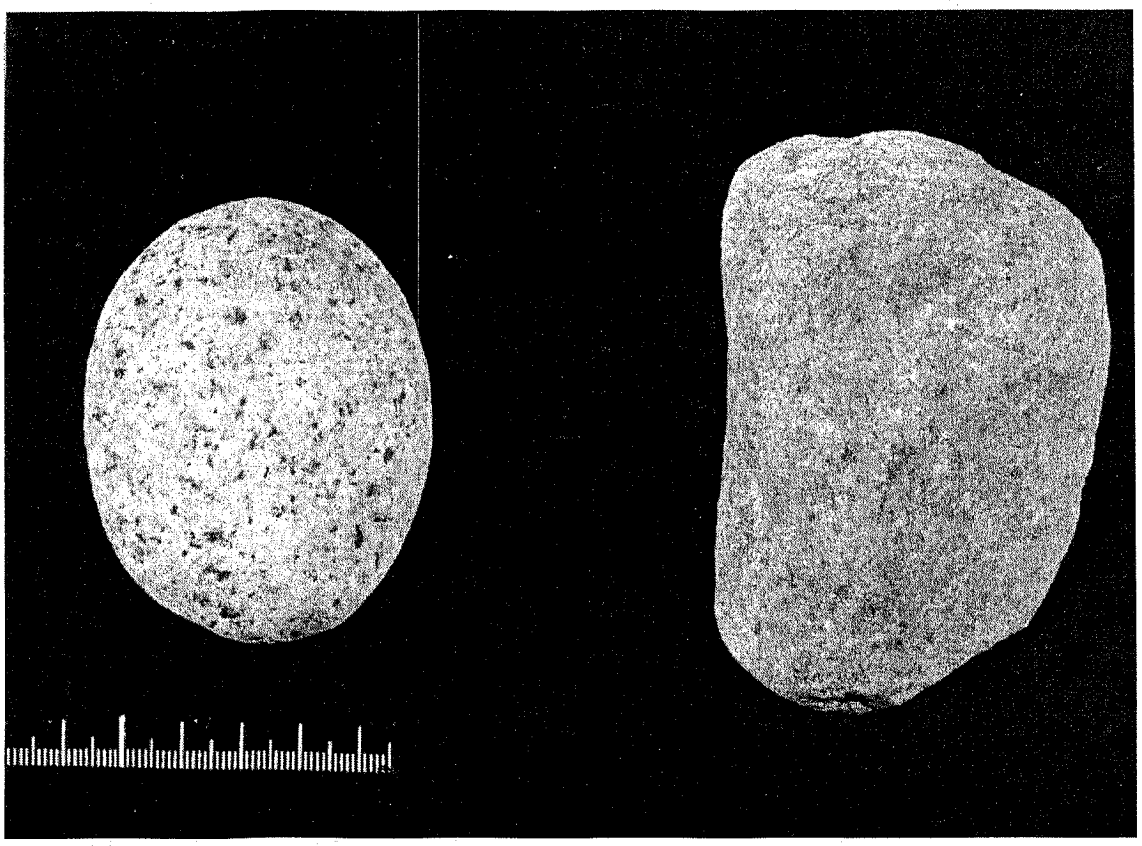

Figure 4.1 Two Hide Processing Stones

4.2.2.2 Formed Tools

There were a total of 15 lithic formed tools, excluding projectile points, recovered from levels 1 though 5. Table 4.4 outlines the metrics as well as non-metric properties of these tools. One incomplete biface was recovered from level 1. This rose quartz biface was snapped distally and is missing the tip. Side-notches are evident on the proximal end. Basally, both ends are snapped off at the very tip below the notches. The dorsal side has a convex surface that is nearly domed, while the ventral surface is primarily flat, but is lacking the generalized flaking patterns that are evident on the dorsal side. Flaws in the material have created a somewhat hollowed out appearance on the ventral side, though retouching is clearly evident along both left and right lateral magins.

There are six formed tools that were recovered from level 2. Of these six tools, one specimen (artifact number 10-1, Figure 4.2 D) is a unifacially worked endscraper, and one (artifact 42-68, Figure 4.2 C) appears to be a small bifacial knife. The small knife is retouched bifacially though some cortex is still evident on the ventral side. The left and right lateral edges are asymmetric, with the right edge being more rounded in shape. There is minor sinuosity evident on the right margin as well. The left lateral margin is straight with no evident sinuosity. The distal end is snapped off, which accounts for the discarding of this artifact. Specimen 19-102 (Figure 4.2 B) appears to be the stem from a bifacially worked knife. It is thinned basally and broken distally, leaving only the basal portion. Two specimens, 23-6 and 23-7 (Figure 4.2 E, F) are similar in form and look, though 23-7 appears to be a finished product. Both are bifacially flaked, though 23-6 lacks the finished, though sinuous, lateral margins that are evident in specimen 23-7. Both are manufactured of Swan River chert and have very

large vugs throughout, which can account for lack of further reduction. One endscraper (artifact number 10-1) was recovered from level 2. This scraper is made of fine-grained chert, and though lacking the high-domed appearance of other scrapers, it does have a high angled, unifacially worked scraping edge. Specimen 6-18 (Figure 4.2 A) is a triangular bifacially flaked preform. It appears to have been manufactured for a projectile point, but flaws in the material may have prevented the completion of the notching as well as the final thinning of the body of the tool. Basal thinning is evident, and both left and right lateral margins have been bifacially worked.

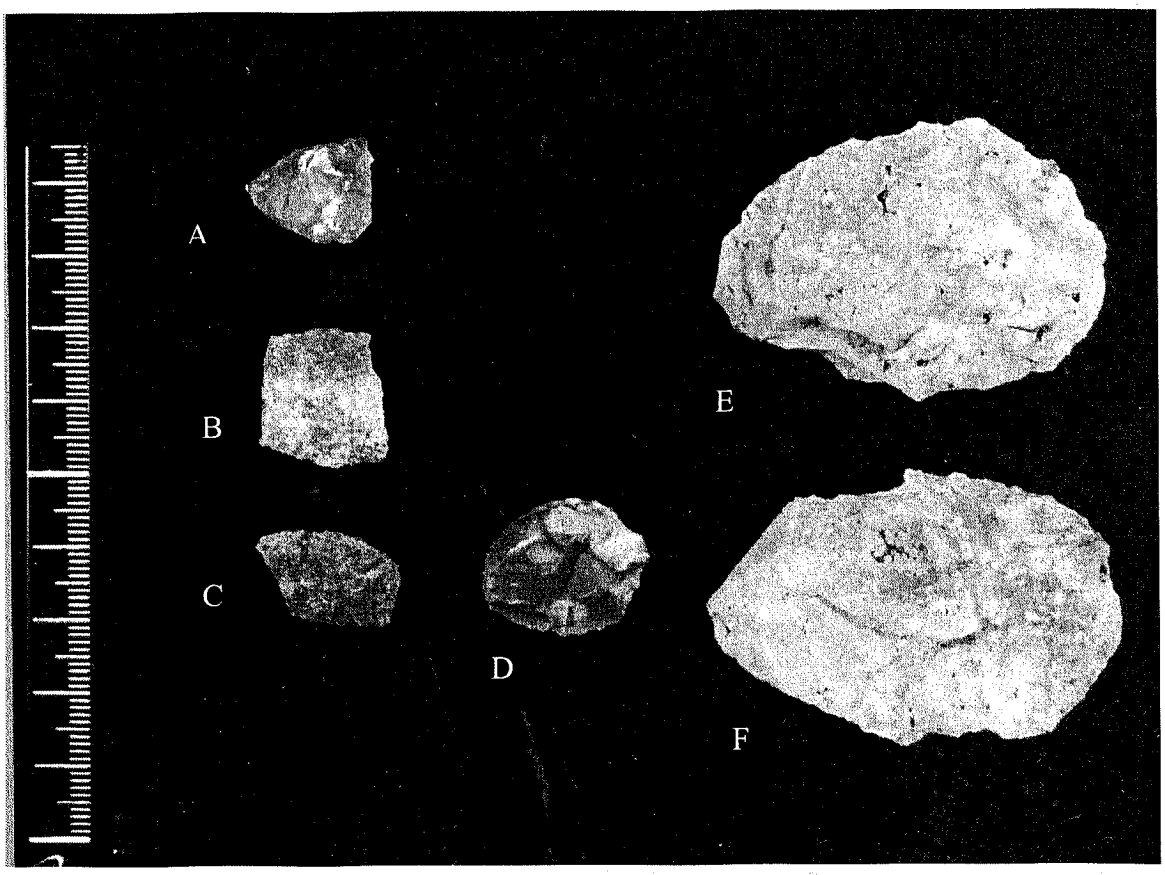

Figure 4.2 Tools from level 2

Table 4.4 Formed Tools

Lvl	Unit	Cat#	Shp	X-sect	Rtch	Comp	Mat	L	W	T	Wt
1	3	3-39	Rect	Plano/vex	Bi	Inc	Qtz	26.93	10.62	4.96	1.6
2	19	19-102	Rect	Biplanar	Bi	Inc	SRC	18.84	19.84	5.18	2.1
2	23	23-7	Ovate	Irreg	Bi	Comp	Src	55.37	40.82	13.76	26.3
2	23	23-6	Ovate	Biconvex	Bi	Inc	Src	58.14	37.75	14.44	31
2	42	42-68	Rect	Biplanar	Bi	Inc	Qtzt	21.19	13.16	3.69	1.2
2	10	10-1	Ovate	Plano/vex	Uni	Comp	Chert	21.22	19.28	10.75	4.1
2	6	6-18	Tri	Plano/vex	Bi	Pref	Chal	18.03	14.88	5.38	1.4
3	4	4-55	Rect	Plano/vex	Bi	Inc	Sp	16.60	16.02	3.88	1.2
3	52	52-24	Rect	Plano/vex	Bi	Inc	Sp	25.25	15.52	5.08	2.3
3	11	11-6	Ovate	Plano/vex	Bi	Comp	Src	49.19	56.93	10.52	30.9
4	1	1-129	squar	Plano/vex	Uni	Comp	Sp	19.54	22.75	11.37	6.5
4	2	2-100	Tri	Plano/vex	Uni	Inc	Chert	35.46	23.26	6.63	5.4
4	51	51-30	Irreg	Biplanar	Bi	Inc	Sp	17.17	14.02	3.99	.9
4	52	52-32	Tri	Biplanar	Uni	Inc	Src	23.71	21.48	4.99	2.6
5	6	6-89	Rect	Biplanar	Bi	Inc	Src	16.53	14.51	3.85	1.0

Two formed tools were recovered from level 3. Specimen 52-24 and 4-55 are two parts of a silicified peat biface that can be refitted to form a single biface (Figure 4.3 A). The dorsal surface is slightly convex, and this seems to be due to the material type rather than by design, as final thinning is not complete. The left lateral margin shows some retouch, while the right margin has a slightly sinuous appearance and retouch all along the edge. The distal end is snapped off and the break between these two pieces is at the proximal end. Specimen 11-6 (Figure 4.3 B) is ovate and bifacially retouched. Indentures on the left and right margins suggest that it may have been intended to be hafted, however, because of a lack of complete reduction of the dorsal surface, hafting may not have been possible.

A total of five formed tools were recovered from level 4, with three of them being unifacially worked and two of them being bifacially worked. Specimen 51-30 (Figure 4.4 A) is a silicified peat biface fragment. It appears to have been asymmetric in shape, with a slight notched appearance on the left basal margin and none on the right.

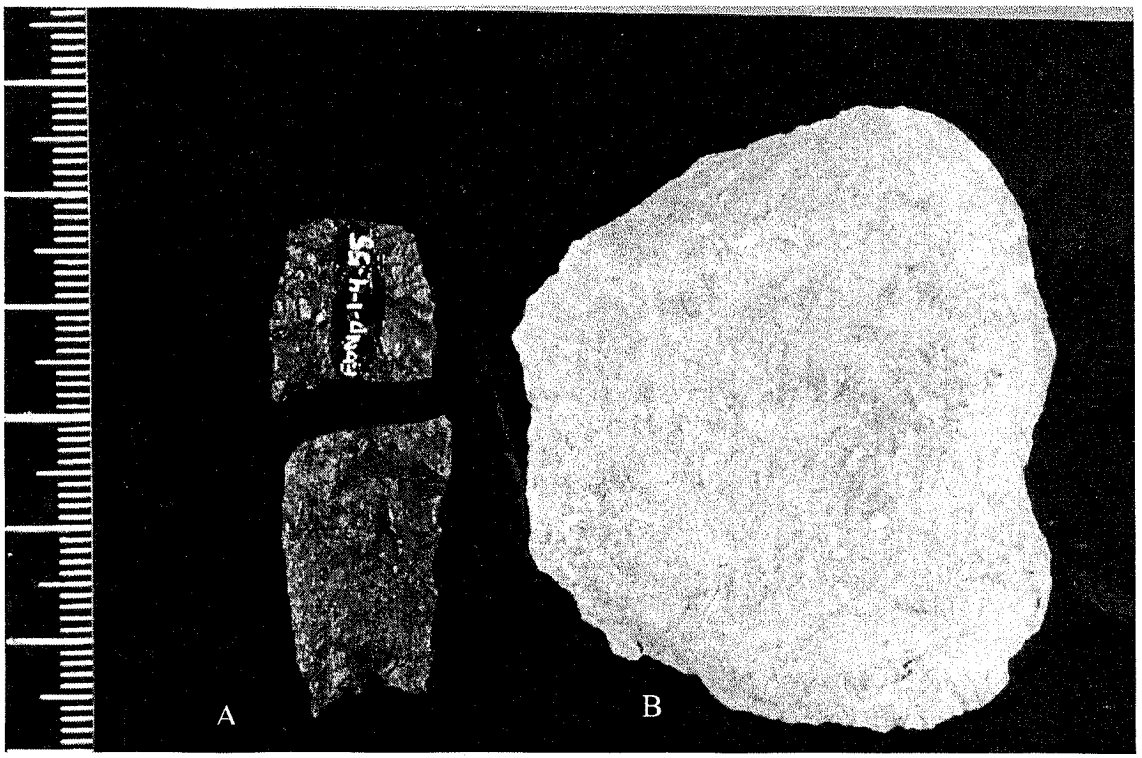

Figure 4.3 Level 3 Tools

There is a possible basal notch that may be actual notching, or may be due to the nature of the material. The distal end is snapped leaving primarily just the base of this piece. The second biface from level 4 (38-49) is made of Knife River flint (Figure 4.4 B). This small biface is basally thinned and both left and right lateral margins show the sinuous edging characteristic of bifacial retouching. The right basal corner is snapped off, which may account for the disposal of this artifact. Three unifacially worked tools were recovered from level 4. One specimen (1-129) is a high domed end-scraper with retouch along the distal edge as well as both left and right margins (Figure 4.4 D). Specimen 52-32 (Figure 4.4 E) is a Swan River chert unifacially worked tool that was snapped off at the proximal end. It is asymmetric and may have been used as an etching tool due to the

concavity on the distal right margin and use wear along the edge of the tip. Specimen 2-100 (Figure 4.4 C) is a tear-drop shaped uniface. The left margin appears to be snapped. While this tool is lacking the high domed feature of most scrapers, the right margin has a higher angled edge that may have been used for scraping. The distal end also bears unifacial retouching.

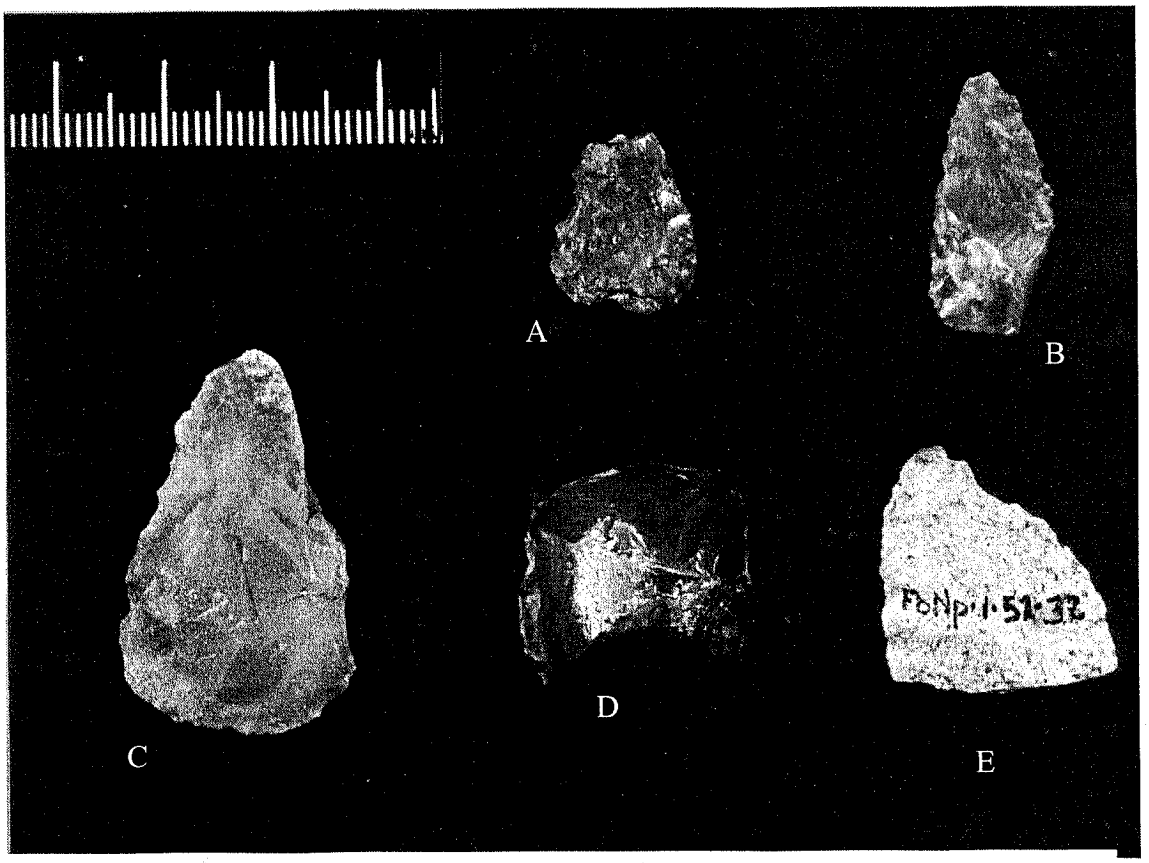

Figure 4.4 Level 4 Tools

4.2.2.3 Projectile Points

There were a total of 14 projectile points recovered from the upper levels of FbNp-1. The majority of these points appear to flake points manufactured quickly from a simple flake and using the contour of the flake to aid in the creation of the tool. This type of point production leads to a nearly unifacial appearance of many of the projectile

points. Table 4.5 shows the metric attributes taken for these points, and Table 4.6 shows the non-metric attributes. Non-metric attributes were only recorded for points that were more than half complete and showed all of the attributes needed to complete the chart. This was in order to maintain the same comparative numbers for analytical purposes.

Table 4.5 Metric Attributes of Projectile Points

Lvl	Unit	Cat#	Mat	com	Body lngth	St lgth	Ttl Lgth	Max Body Wdth	Min Stm Wth	Base Wth	R Ntch Wth	L Ntch Wth	R Ntch Dth	L Ntch Dth	R Bsl Edg hght	L Bsl Edg hght	Max Bdy thck	Max Stm thck
1	2	2-39	mt	Inc	20.56			18.05									2.44	
1	2	2-41	Src	Inc													1.69	
2	42	42-32	Src	Com	14.04	7.8	24.71	8.85	7.38	11.97	4.60	4.60	.9	2.74	2.57	3.30	2.22	2.78
2	1	1-31	Krf	Inc														
2	6	6-16	Sp	Com	14.86	5.33	19.95	11.86	9.91	13.93	4.42	6.21	1.57	1.53	2.74	3.45	3.48	3.48
2	6	6-13	Sp	Com	9.14	6.55	15.57	11.41	9.10	13.18	2.49	3.03	1.44	1.84	5.33	4.86	3.32	3.00
2	37	37-16	Src	Inc	9.51	6.16	16.21	15.00	11.53	15.79	3.32	3.91	2.18	2.15	5.42	4.53	3.65	3.45
2a	47	47-9	Src	Com	16.00	6.56	23.96	14.55	12.43	15.9	2.73	3.15	1.12	1.79	6.38	3.83	3.99	3.29
3	5	5-60	Gss	Inc														
3	15	15-77	Src	Com	18.43	8.24	26.16	14.61	9.59	11.65	4.64	3.65	2.36	2.23	4.48	4.25	4.86	3.70
3	15	15-76	Cht	Com	17.67	4.64	24.92	15.93	9.88	15.14	3.25	4.09	3.46	3.86	3.96	3.27	2.22	1.95
3	15	15-70	Src	Com	10.98	5.14	16.21	12.74	8.87	12.81	2.82	2.66	2.19	2.59	3.66	2.65	3.21	2.36
4	1	1-135	Sw	Inc	6.54	5.93	12.01	14.01	8.12	8.12	4.56		1.97		5.40		3.45	2.83
5	54	54-32	Src	inc	17.37	4.77	23.06	11.12	10.46	11.33	2.58		1.25		3.43		4.02	3.42
5	6	6-89	Src	Inc													3.85	

Mat= material type, com= completeness, src= Swan River chert, Krf= Knife River silicified sediment, sp= silicified peat, sw= silicified wood, Gss= Gronlid siltstone, mt= metal

Two projectile points were recovered from level 1. One of these points is a proximally snapped metal point (Figure 4.5 A). The beveled edges clearly shows that this piece was used as a projectile point and it was most likely discarded after snapping at the proximal end, which could have been the result of impact during use. The second projectile point recovered from level 1 is just the very tip of a Swan River chert point. It is obviously bifacially worked, and the angle suggests that it was used as a point rather than a cutting tool.

(Figure 4.5 E) is a small side notched point. The base is straight, with high edges, and small u-shaped notches. The ventral side of this point is largely unworked, suggesting that it was manufactured from a pre-existing flake. The distal end is asymmetric, with a slightly right oblique angle. Item 1-31 is the right basal edge of a projectile point. Only the straight base and a portion of the right notch are evident on this point. The flat, unworked areas of this point fragment suggest that, like the previous two points, it too is a flake point. As with the previously described projectile points from level 2, specimen 42-32 (Figure 4.5 B) is a flake point. There is a distinct lack of a fully worked area on the ventral surface, with only edge modification evident. It also appears that this point was initially manufactured and used, then attempts were unsuccessful in refurbishing the right lateral margin. The notches are asymmetrical, with the right notch being barely present. The final projectile point from level 2 is specimen 37-16 (Figure 4.5 C). This point, like the others from this level, is a flake point, with only edge modification evident on the ventral side. The dorsal side is fully worked with an irregular flake pattern. This artifact is snapped distally, most likely the result of an impact fracture with use. The asymmetrical outline of the base may be in part due to the presence of a vug located along the bottom margin of the base. This surely made maintaining a symmetric outline difficult if not impossible.

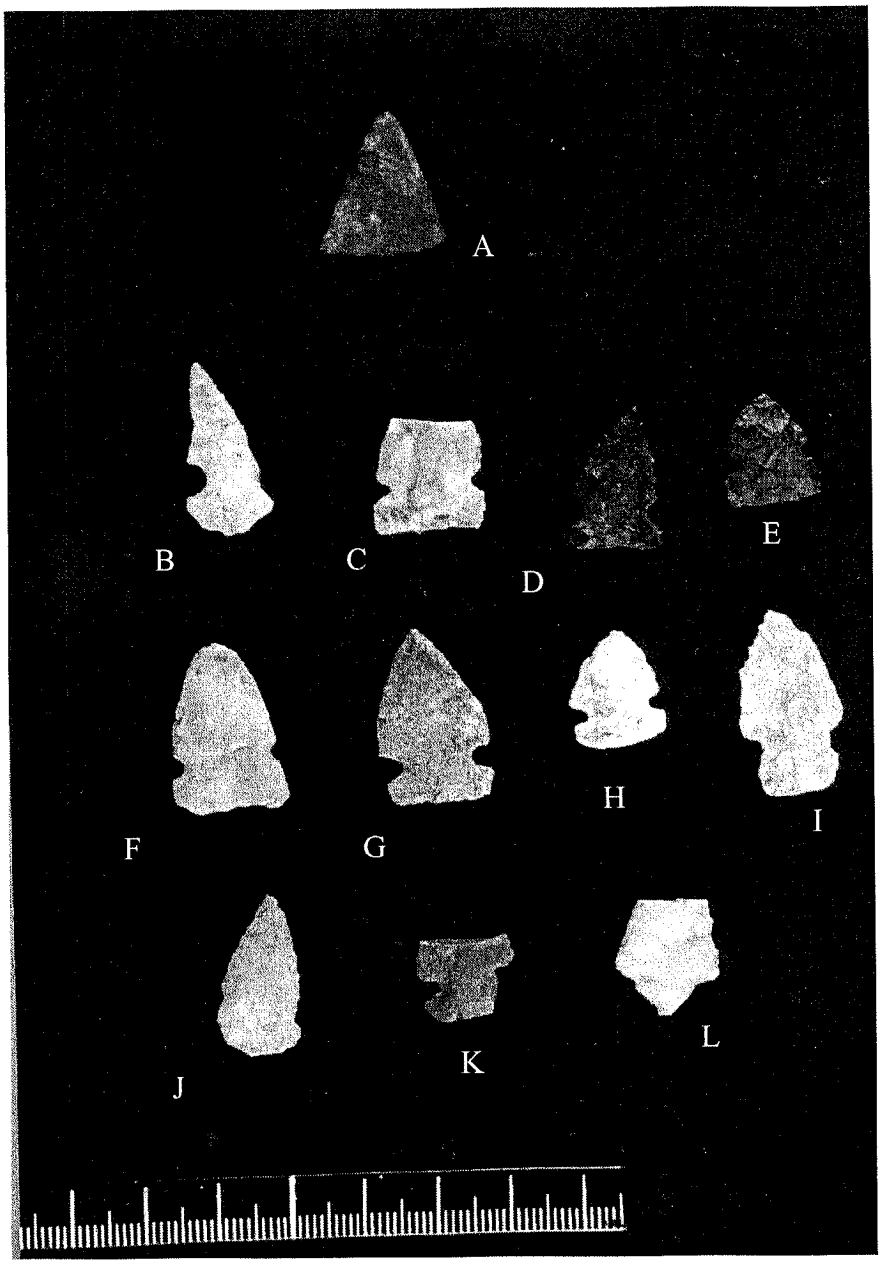

Figure 4.5 Mortlach Group Projectile Points

There is one projectile point from level 2a. Specimen 47-9 (Figure 4.5 F) is a Swan River chert point with a high base and rounded tip. The rounded tip may be due to previous use and an attempt to refurbish. The proximal margin of this point is asymmetric with evident basal thinning. The thinning process may have led to the asymmetric nature of the edge. Unlike the points from level 2, this artifact appears to be bifacially reduced, as opposed to an edge modified point.

Table 4.6 Recorded Non-Metric Attributes

Cat #	Basal edge shape	Notch type	Notch form	Flaking pattern	Outline form	Cross-section	Base form
6-16	Concave	Side	Shallow round	Irreg	Asym	Convex concave	Asym
6-13	Straight	Side	U narrow	Irreg	Asym	Plano convex	Sym
42-32	Convex	Side	U broad	Irreg	Asym	Plano convex	Asym
37-16	Concave	Side	U narrow	Irreg	Asym	Plano convex	Asym
47-9	Concave	Side	Round shallow	Irreg	Asym	Plano convex	Asym
15-70	Convex	Side	Rect narrow	Irreg	Asym	Concave convex	Sym
15-77	Straight	Side	Rect broad	Irreg	Sym	Biconvex	Sym
15-76	Straight	Side	U narrow	Edge modified	Sym	Biplanar	Asym
54-32	Convex	Side	Round shallow	Patterned	Sym	Convex triangular	Asym

Four projectile points were recovered from level 3. Of these four, two are Swan River chert, one is a generic grey chert, and one is Gronlid siltstone. Specimen 15-70 (Figure 4.5 H) is a small, patinated Swan River chert point. The base is squared and largely symmetrical in form. Due to being manufactured from a flake, the ventral surface is only marginally worked and there is a distinct arch toward the ventral side of

the point. The tip is asymmetric, leaning to the right. The second Swan River chert point from level 3 is artifact number 15-77 (Figure 4.5 I). In contrast to 15-70, this point is larger and is fully worked on both dorsal and ventral surfaces. The base is narrower than the body of the point and the notches are squared and shallow with thinning evident along the basal margin. A slight bulk is evident on the dorsal surface, and it may not have been possible for further thinning of the body at this point. Specimen 15-76 (Figure 4.5 G) is a large grey chert point. This point is curved in longitudinal cross-section, reflecting the fact that it was made by a minimum of marginal retouch of an arched flake. The only working evident on this point is along the basal, left and right margins. A very slight bulk on the ventral surface of the distal edge may be the remnants of a bulb of percussion. Specimen 5-60 is the distal portion of a Gronlid siltstone point. It is unlikely this point was ever used, as it appears to have been snapped during the manufacturing process. Working is only evident on the dorsal side, with the ventral surface being largely unfinished. The unfinished nature of the ventral surface suggests that it was that surface being worked on when this artifact snapped proximally.

One projectile point was recovered from level 4. Specimen 1-135 (Figure 4.5 K) is a broken point made of silicified wood. It is snapped distally as well as along the right basal margin. The base appears to have been thinned, which may have led to the breakage that occurred along the right basal edge. The distal snap may have occurred as the result of impact during use.

Two projectile points were found in level 5, both of which are Swan River chert. Specimen 54-32 (Figure 4.5 J) is a complete point that is asymmetric in form, with a rounded base and very small notches. The body of this point is diagonally flaked, and the base was thinned, which may have contributed to the jagged appearance of the basal

margin. The second projectile point from level 5, catalogue number 6-89 (Figure 4.5 L), is also manufactured of Swan River chert. This point is snapped at the distal end, possibly caused by the presence of a vug that penetrates the entire depth of the artifact. Both left and right margins of the base are snapped. The quality of the material, aside from the vug, is higher than that of other Swan River chert points in the collection and appears to have been heat treated, which may be the reason for the increase in quality.

4.2.2.2 Utilized Flakes

A total of 24 utilized flakes were recovered from FbNp-1. The most prolific level for utilized flakes appears to be Level 2, with a total of 10. Two utilized flakes were recovered from Level 1, 2 from from level 2a, 2 from level 3, 1 from level 4 and 7 from level 5. See table 4.7 for a breakdown of retouched flakes by level and material type.

Table 4.7 Retouched and Utilized Flakes by Level

Level	Material	Count
1	SRC	2
2	SRC	8
2	RM Quartzite	1
2	Silicified Wood	1
2a	Quartz	1
2a	Chert	1
3	Quartz	1
3	Chert	1
4	SRC	1
5	SRC	2
5	Chert	5

4.3 Pottery

The pottery from levels 1 though 5 has been identified as a northern variant of Mortlach pottery. This is based largely on the work of Malainey (1991, 1995) as well as

that of Walde (2003). Malainey has proposed the name Wascana ware, following Kehoe's (1959) initial description of the thin-walled, compact pottery found in association with Plains side-notched projectile points. Walde (2003) suggests that Wascana ware is an overused term that is no longer applicable due to the frequent reworking of the features of materials commonly associated with the term. He has proposed instead the term Lozinsky sub-phase of the Mortlach complex. This northern variant, as described by both Malainey and Walde, is generally found north of the Qu'Appelle Valley, extending into the Saskatchewan Parklands and is associated with Plains side-notched projectile points (Malainey 1998). Dates for this terminal late-period occupation generally extend from 650BP to the time of contact. Uncalibrated radiocarbon dates from FbNp-1 fit into this time period, with level 5 returning a date of 510 ± 70 years BP (S-2809), and level 1 returning a date of < 100 years BP (S-2805). For further discussion of pottery of this time period, see Chapter 7.

A total of 271 sherds were recovered from the Mortlach levels of FbNp-1, for a total of 331gm. Due to the highly fragmented nature of this pottery, reconstruction was not possible to any large extent, though some rimsherds were able to be refitted, contributing to a better understanding of the rim profile of these vessels. Level 4 was the most prolific level, with 136 sherds recovered. The remaining sherds were distributed through the remaining levels. For a breakdown of sherd count by finish, see table 4.8.

Table 4.8 Pottery by Level and Exterior Finish

Level	Indet Smoothed	Smooth	CWT	CWT smoothed	Fabric impress	Indet	Exfol	**Total**
1	25			12		5	1	**43**
2	2	2					1	**5**
3	3			32				**35**

4	15	5		106	4		6	**136**
5	10	3	1	17	17		4	**52**
Total	**55**	**10**	**1**	**167**	**21**	**5**	**12**	**271**

As is evident from the above chart, 62% of the pottery collected from the upper levels were cord-roughened and then smoothed. Nearly all sherds recovered show some evidence of smoothing, and the second most common finish is an indeterminate smoothed finish. Most likely the initial finish was also cord-roughening, as there is very little (8%) fabric finishing on the sherds from these levels.

Based on rimsherds, two vessels were identified from level 1. While it is possible that the rimsherds represent only one vessel, I have here defined them as two separate vessels based on the presence of tool incising at the lip base of specimen 51-2, and its absence from the other four rimsherds recovered from this level, 1-64 (n=2) and 1-14 (n=2). All of these rimsherds have oblique cord wrapped tool impressions on the brim and a maximum lip thickness of 13mm. Vessel 3 (catalogue number 51-2) appears to have an L-shaped lip and a fine grit temper (Figure 4.6, A; also see Appendix B, p. 148). Vessel 5 (catalogue numbers 1-14 and 1-64) appears to have a wedge shaped lip and a fine grit or sand temper (Figure 4.6, E; also see Appendix B, p.149). The small size of the specimens makes further identification of rim shape and profile impossible.

Vessel 2 is represented by one rimsherd, specimen 51-2a (Figure 4.6, D; also see Appendix B, p. 148). This rimsherd has a very unusual paste in that the sand temper is extremely prolific to the point of giving the appearance of being mostly sand with littleclay present. The rim profile appears to be an S profile and the lip is rounded. The maximum lip thickness is 10mm and the minimum is 9mm. Vessel 10 (Figure 4.7, C and D; also see Appendix B, p. 152) also appears to be an unusual vessel in that it

appears to be a mini-vessel. The maximum lip thickness is 5mm, with a minimum 3mm. A line of punctates is evident just below the brim, which consists of a rounded lip with uneven and unparallel tool impressions along the brim The rim profile is straight and the temper is fine to medium grained grit.

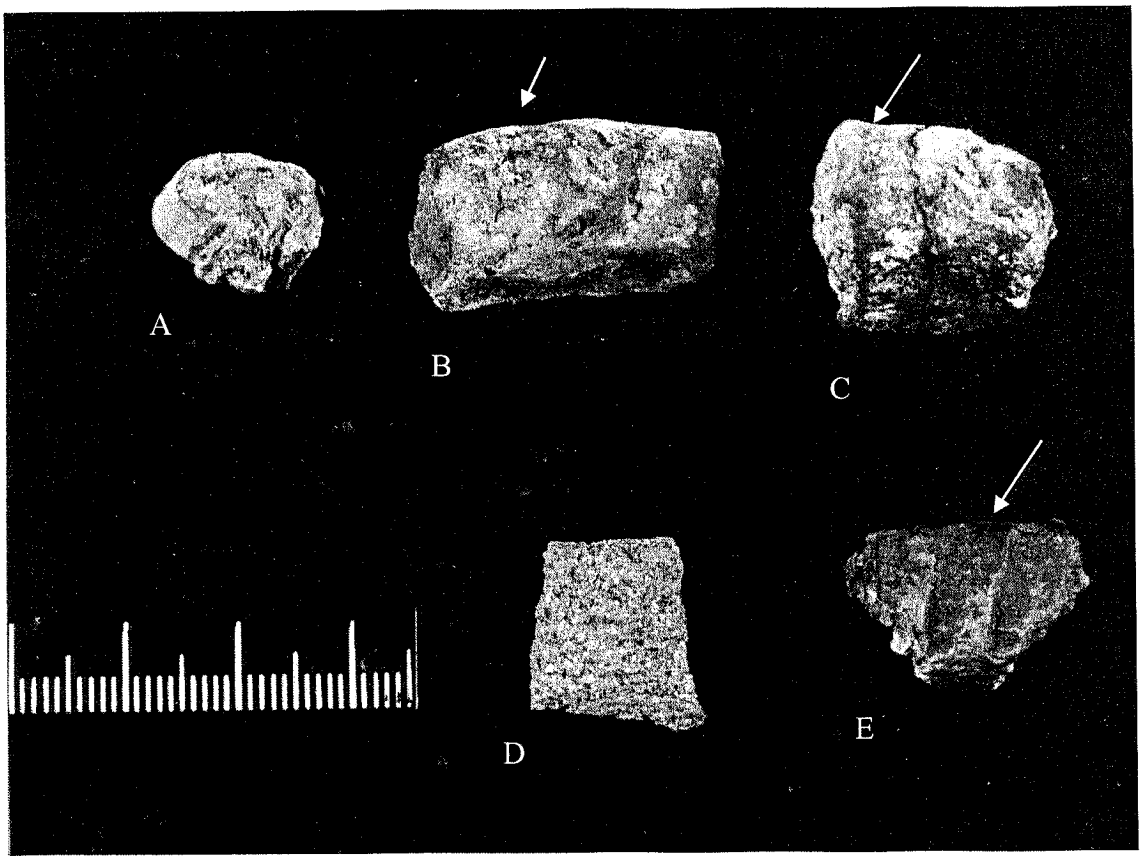

Figure 4.6 Rimsherds from Vessels 1 (B, C), 2 (D), 3 (A), 5 (E) : Arrows show location of cord wrapped tool impressions

A total of 21 rimsherds were recovered from levels 3 and 4 combined. From these, two vessels are likely represented. Vessel 4 (Figure 4.7 A; also see Appendix B, p. 149) is represented by 20 of these sherds, all of which are highly fragmented, though cross-matching suggests that this is indeed one vessel that is found in levels 3 and 4. Vessel 4 has a smoothed cord-roughened exterior and brushed interior. The grit is fine

grained, with a compact paste and no evidence of exfoliation. The straight rim of this vessel contains a row of pinching along the outer squared lip surface, and a maximum lip thickness of 8mm, with a minimum of 4mm. A third measurement was taking 2.5cm below the brim, with a return of three different results depending on which sherd was used (3mm, 4mm, 5mm). A second vessel (vessel 9) was present in level 4 (Figure 4.8; also see Appendix B, p. 151). This vessel is lacking the brim, but consists of a series of five refitted sherds that make up a lower part of the rim. A row of punctates is evident along the middle of the refitted pieces. The finish is smoothed, probably originally cord-roughened, and the temper is sand. Due to the small size of this piece, vessel and rim profile as well as lip shape and decoration is not possible to determine. The maximum thickness of this piece is 5mm, with a minimum of 4mm.

Level 5 has a total of three vessels, represented by five rim sherds. Vessel 1 (Figure 4.6, B and C; also see Appendix B, p. 147) appears to be fabric impressed with oblique cord-wrapped tool impressions along the brim. The paste is compact with a fine grit temper. The lip is rounded and the rim profile appears to be a wedge, though this determination is difficult due to the small nature of the specimens recovered. The maximum lip thickness is 11mm, and the minimum is 9mm. Vessel number 6 is represented by one highly fragmented sherd (see Appendix B, p. 150). It appears to be a T-shaped lip from a fabric impressed vessel. There appears to be fabric impressions on the brim that may be the result of the fabric folding over onto the brim. The paste is compact with a fine grit temper and a maximum thickness of 17mm at the brim. The final vessel from the upper levels is vessel number 7, represented by two rimsherds (Figure 4.7 B; also see Appendix B, p. 150). This vessel has a fabric finish and fine grit/sand temper. The rim profile is straight and it appears as though the fabric

impressions extent to the lip and brim of this vessel. The lip shape is rounded and has a maximum thickness of 5mm, with a minimum thickness of 3mm.

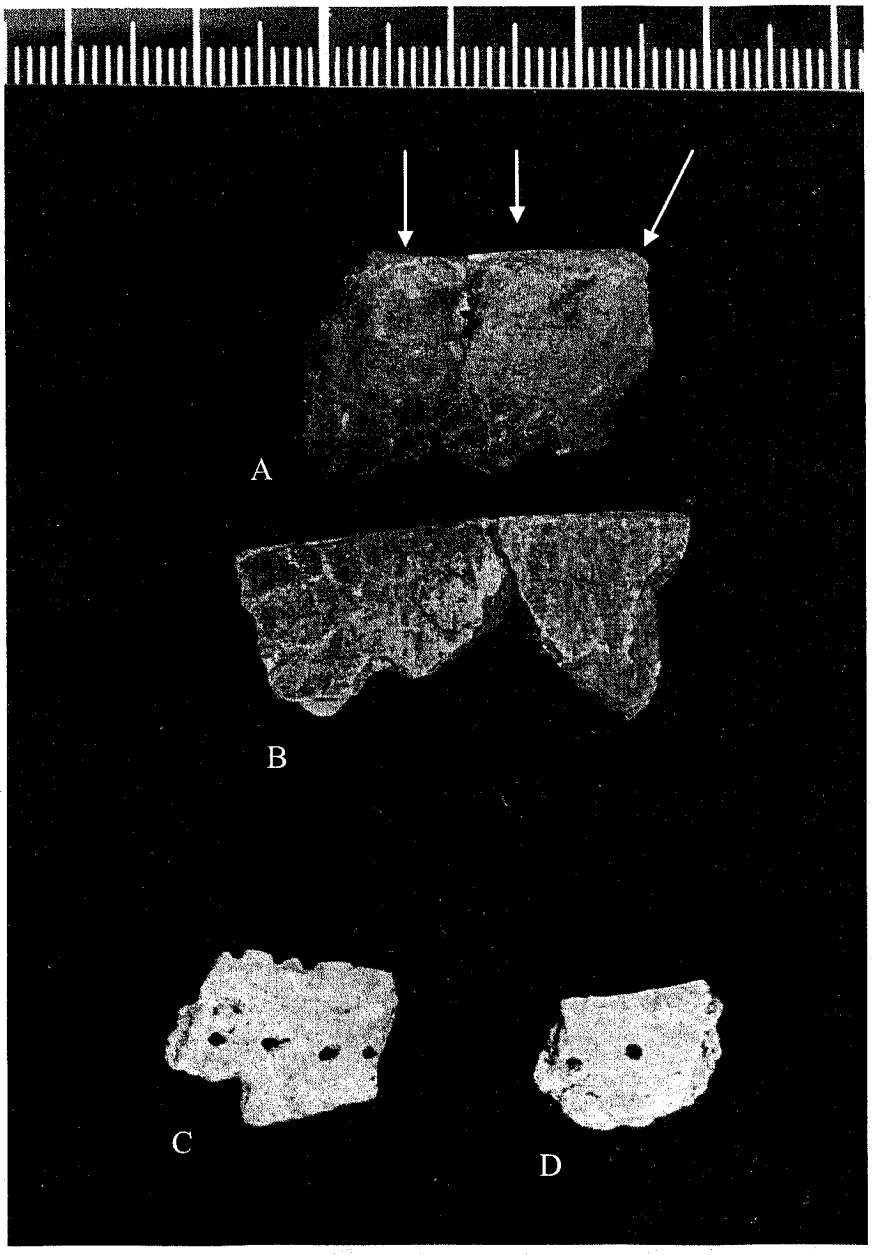

Figure 4.7 Rimsherds from Vessels 4 (A), 7 (B), 10 (C, D) : Arrows show location of pinches. Also note miniature punctates on vessel 10.

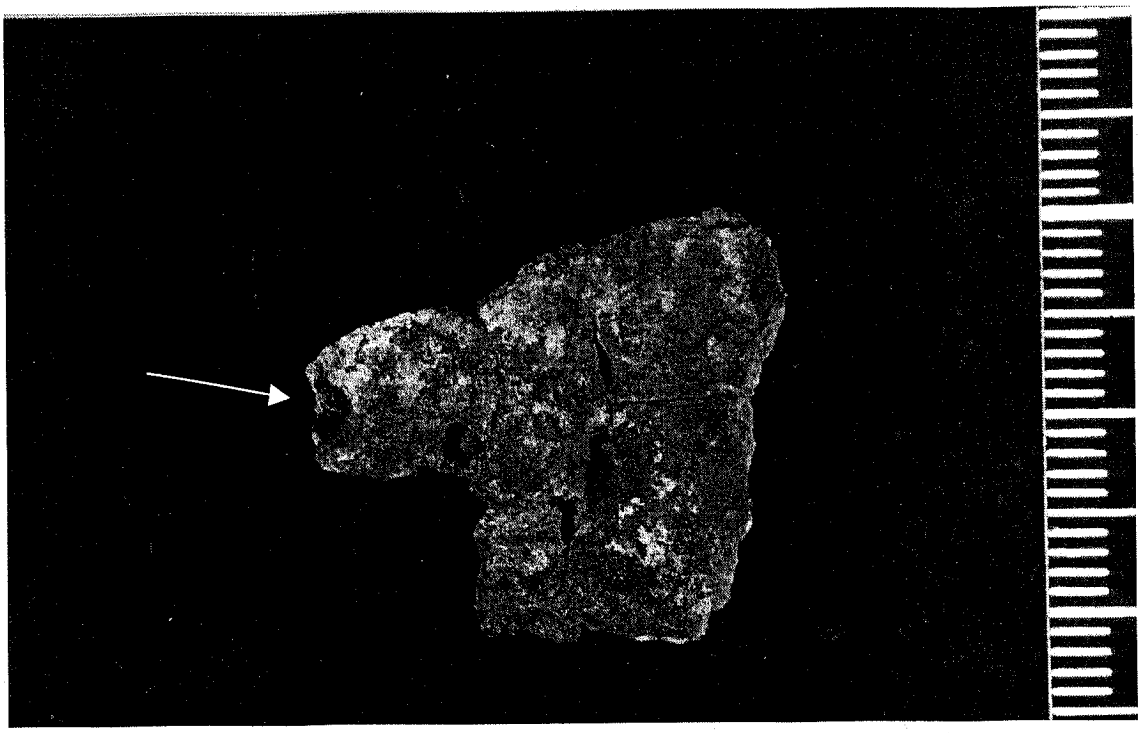

Figure 4.8 Vessel 9 – Note the row of punctates, indicated by the arrow

4.4 Historic Trade Goods

4.4.1 Beads (n=3)

A total of three trade beads were recovered from FbNp-1. Of these, two are glass and one appears to be ceramic. Specimen 10-113 was recovered from level 1 and is a small, light blue, cylindrical seed bead. Its length is 2.64mm and the width is 2.56mm. The second seed bead, specimen 3-46, was recovered from level 2. This is the only trade artifact that was excavated from a level below level 1 and is a bright navy cylindrical bead with a length of 2.86mm and a width of 3.13mm. Both of these have a flattened surface along the width of the bead, which is indicative of the manufacturing process wherein a length of glass was drawn out while viscid until the glass was no longer able to be pulled. At this point, the length of glass was laid out to cool (Kidd and

Kidd 1970). This flattened area may correspond with the area that came in contact with the surface after being laid out to cool, producing the flattened area. The third bead, specimen 46-11 is a round, white opaque bead with a matte finish. This bead appears to be ceramic and has a winding or wiped appearance in the finish. This bead is asymmetric in shape, and has a length of 10.06mm and a width of 10.09mm.

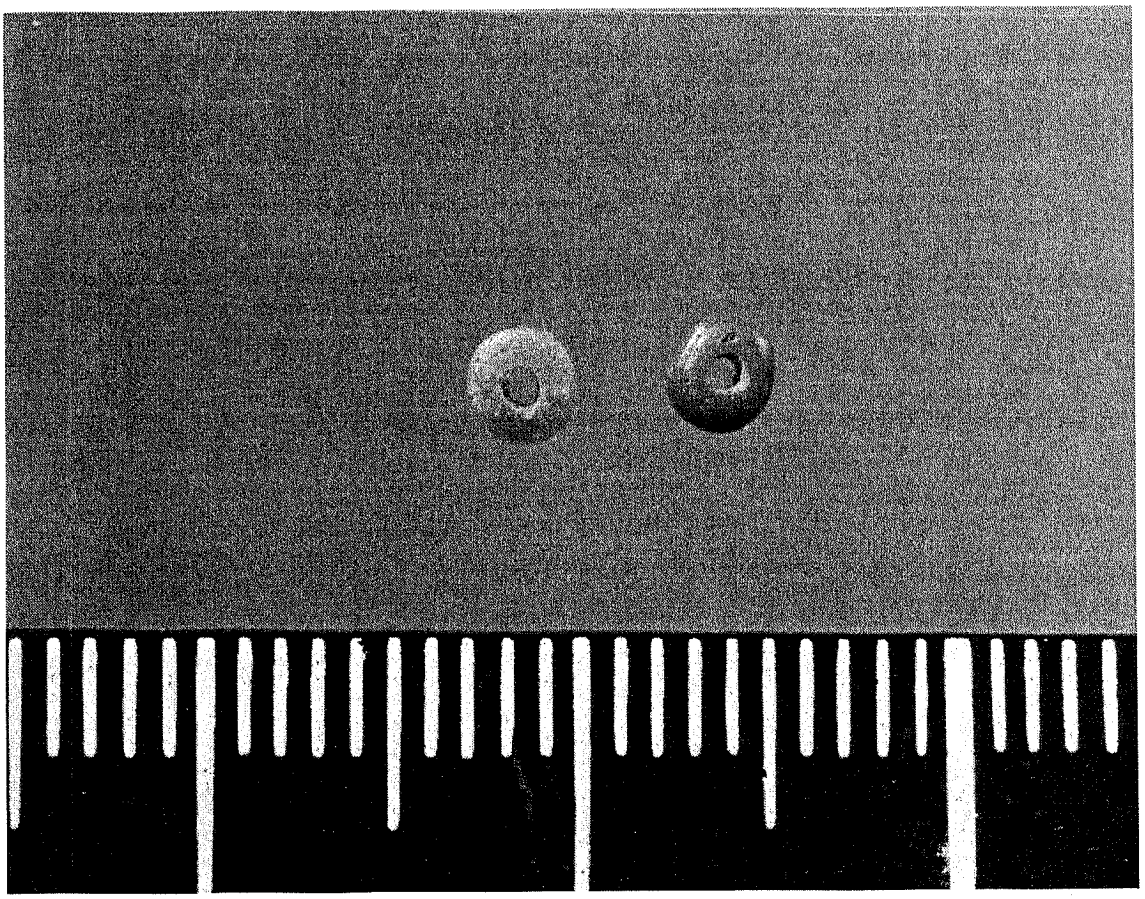

Figure 4.9 Seed Beads (note that scale is to millimeter)

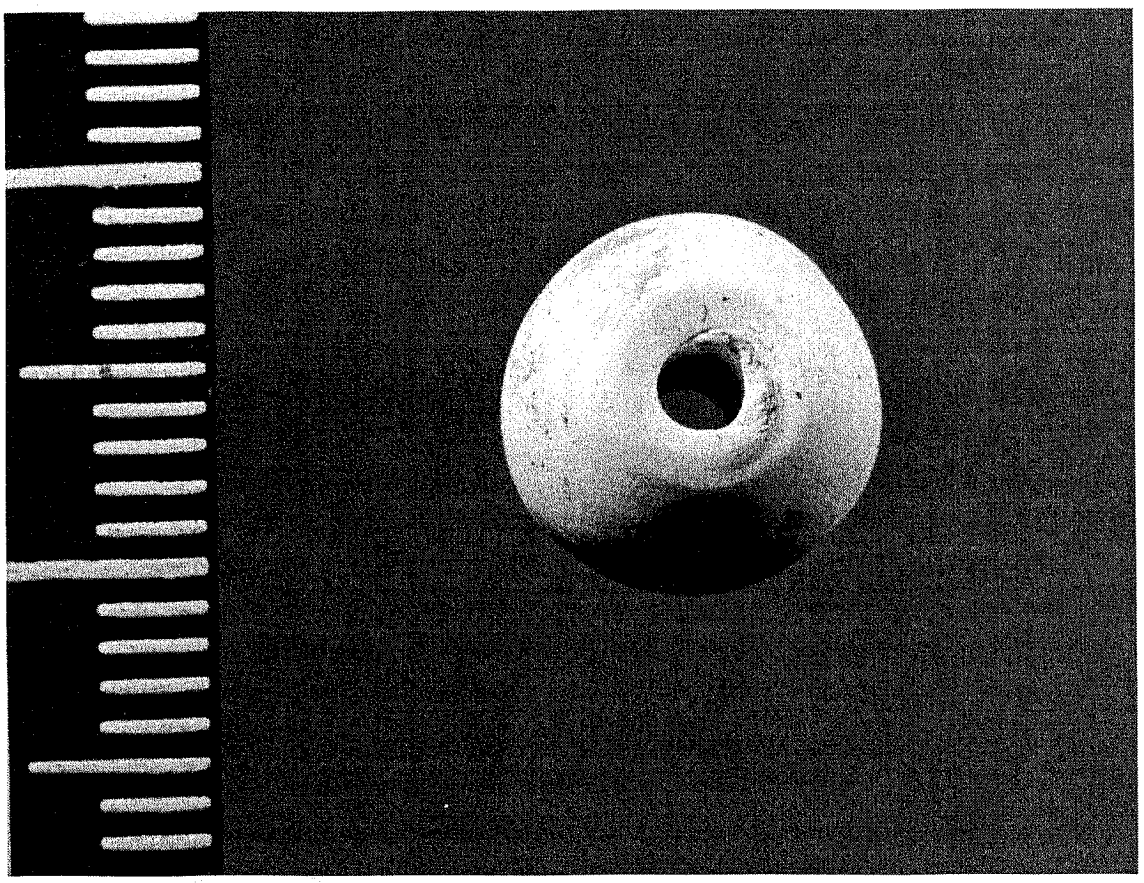

Figure 4.10 Ceramic Bead

4.4.2 Metal Tools (n =3)

There were three pieces of metal that appear to have been utilized as tools. Specimen 2-12 is two long (100.88mm and 25.12mm) pieces of oxidized metal, most likely iron. This item appears to have been cut lengthwise into a thin (5.61mm) strip. Specimen 1-27 is a small triangular piece of oxidized metal. This piece may have been the point of a cutting tool or projectile point. It is 18.68mm in length and 9.12mm at its widest point. Specimen 1-29 appears to be of pounded out metal that has become oxidized. There appears to be a working edge distally where beveling is evident as well as parallel striations along the dorsal surface where the working edge may have been filed down for use either as a scraping or cutting tool. The left margin appears to end

abruptly, where it may have been cut, and proximally the metal appears to be folded over onto itself, which may indicate this was pounded to form the shape. The length of this artifact is 26.55mm and the width is 23.79mm.

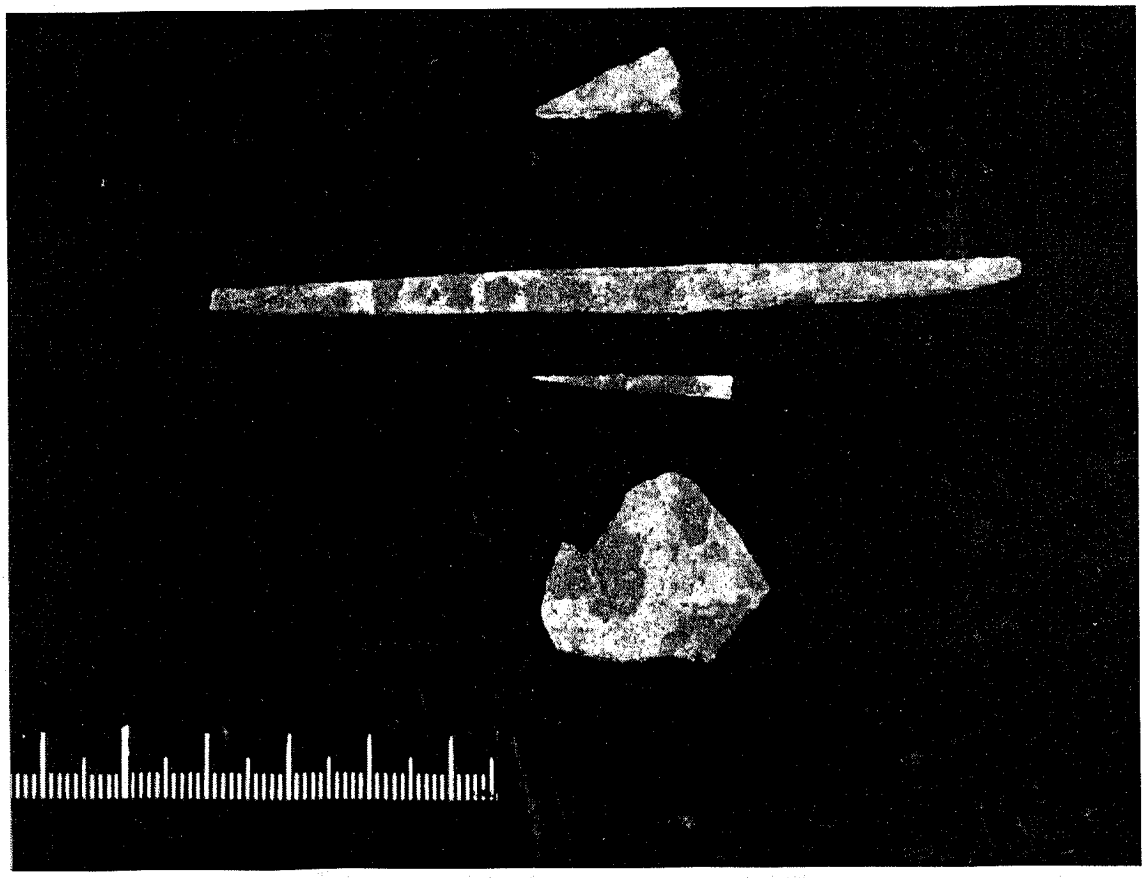

Figure 4.11 Metal Tools

4.4.3 Other Historic Artifacts

In addition to obvious tools other bits of metal were recovered in the uppermost level of FbNp-1. There were a total of 8 pieces of scrap metal, one of which (catalogue number 2-52) appears to be the tab from a can. Specimen 3-26 is also somewhat

unusual in that it appears to be a round, thick wire from which the ends could be cut to form tools as needed. Heavy oxidation is evident on all 8 pieces of scrap metal present.

In addition to the metal scraps, one glass shard was recovered from level 1. This specimen (3-10) is flat and has the characteristic mottled look of old glass. At first glance, this piece appears to simply be a broken glass shard, but upon closer examination, a possible striking platform exists on the proximal end. In addition to the striking platform, there are signs of use-wear on the distal margin of the dorsal side. This item may have been used for scraping or cutting, though due to the nature of glass and its easy fracture properties it is difficult to make a concrete assertion.

The final historic artifact from FbNp-1 appears to be intrusive from later years. Catalogue number 5-17 is a catridge casing that appears to have been manufactured in 1949 for a .303 Enfield. This was a center-fire cartridge, manufactured in the United States. Table 3.8 shows the metric attributes for this casing. As mentioned in Chapter 1, the area of Wanuskewin Heritage Park was previously privately owned land. This casing is likely representative of activities related to the private ownership of the surrounding area prior to it being sold to the Meewasin Valley Authority.

Headstamp	Description	Length	Head	Taper	Fire
WRA49 303		56.46	13.47	8.02	cent

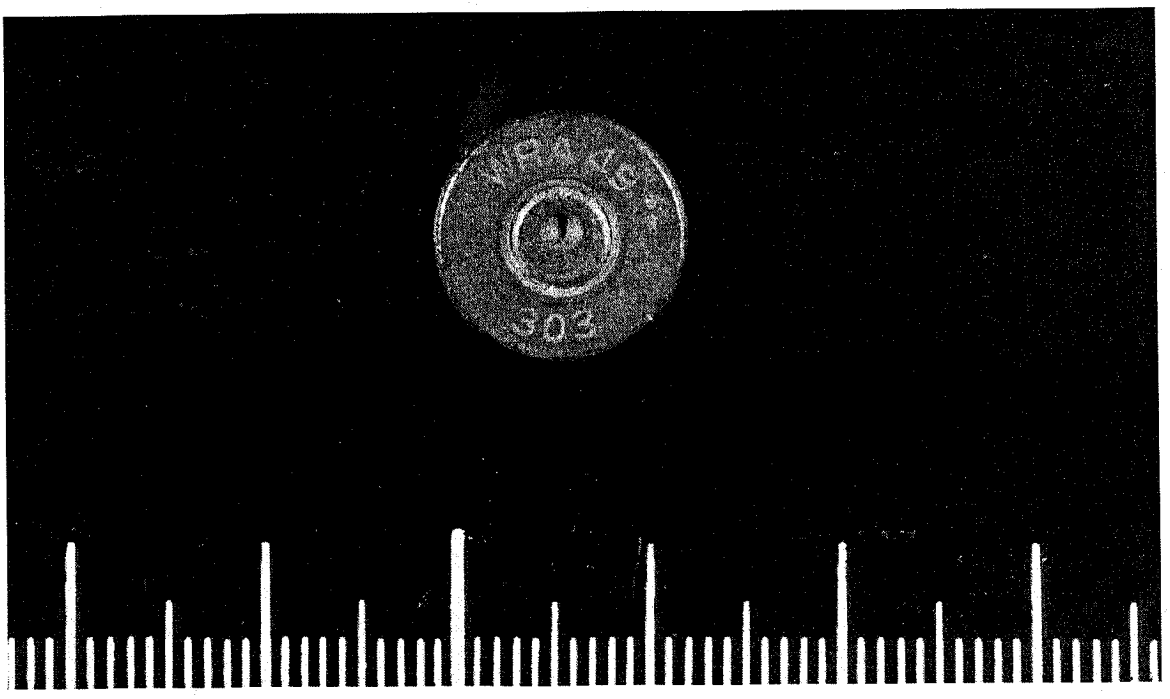

Figure 4.12 Cartridge Casing Head

4.5 **Spatial Distribution**

The distribution of artifacts throughout the Mortlach levels of FbNp-1 show a clear and repeated use of the Northeast and Southwest areas of the site. While there is occasional evidence of heavy use of Areas C and B, the vast majority of site usage appears to have occurred in Areas A and D. Level 1, a protohistoric assemblage consisting of metal and glass trade goods as well as a terminal Plains Period projectile point and Mortlach pottery, represents the most recent occupation. The lithic debitage is largely concentrated in area A with a second, less dense concentration in Areas D and C. Area B was largely sterile, producing only one pot sherd and one flake. All of the pottery save the isolated sherd from Area B was found in Area A. It is worthy to note here, that the majority of the glass and metal was also recovered from Area A, as were

both of the projectile points. Area D, the second most prolific area of this level, consists mainly of flakes (though still to a much lesser degree than Area A), some metal scraps and two glass trade beads. Area C does have some abundance of flakes, and it appears that if additional units were to be excavated in the vicinity of 455n70w that Area C may prove to be much more productive than the current numbers indicate.

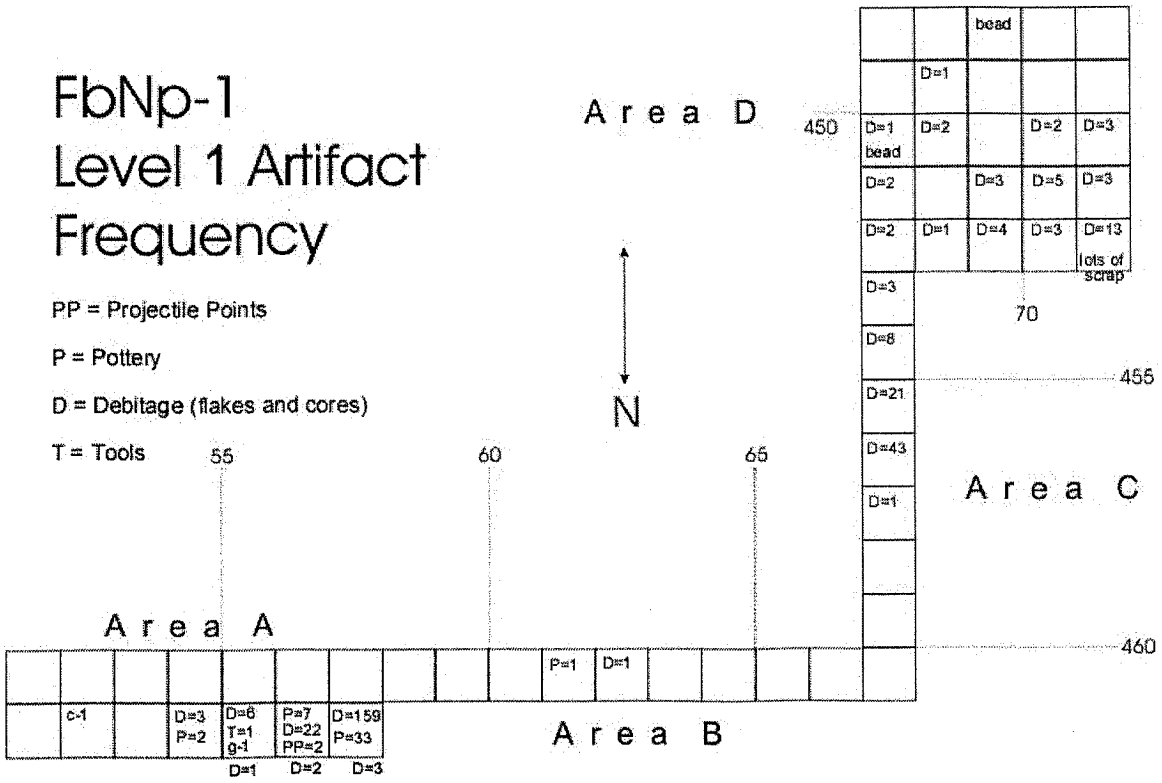

Figure 4.13 Artifact Distribution - Level 1

Level 2 shows similar spatial patterning as level 1, though Area D appears to have been more extensively utilized than Area A. A large amount of lithic debitage was recovered from Area D as well as one projectile point and four potsherds. Area A, while seeming to have less intense usage, produced three projectile points as well as a glass

trade bead. The north half of Area C produced a fair amount of lithic debitage as well as one pot sherd and one projectile point. Again it is worth noting that Area B appears to be largely ignored in terms of usage. It is possible that this may be the result of spatial patterning of dwellings and hearths. At this point however, that is only conjecture as there were no stone circles or post holes discovered during exactions.

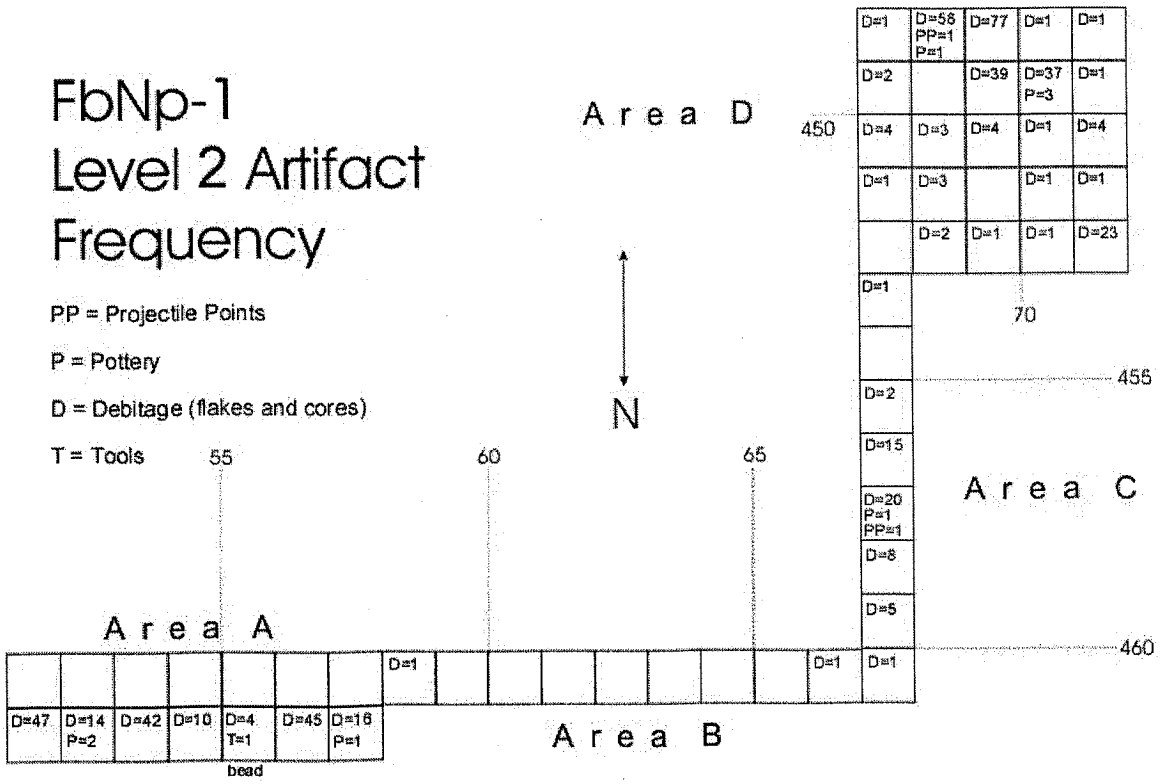

Figure 4.14 Artifact Distribution: Level 2

Level 2a appears to be a largely sterile level (figure 4.15). There were a mere 10 artifacts recovered from this level, all of which were debitage from Area C. The absence of other evidence, coupled with the abundance of artifacts recovered from levels directly

above and below this level, indicate that level 2a is most likely the result of environmental factors or the bottom deposits from level 2.

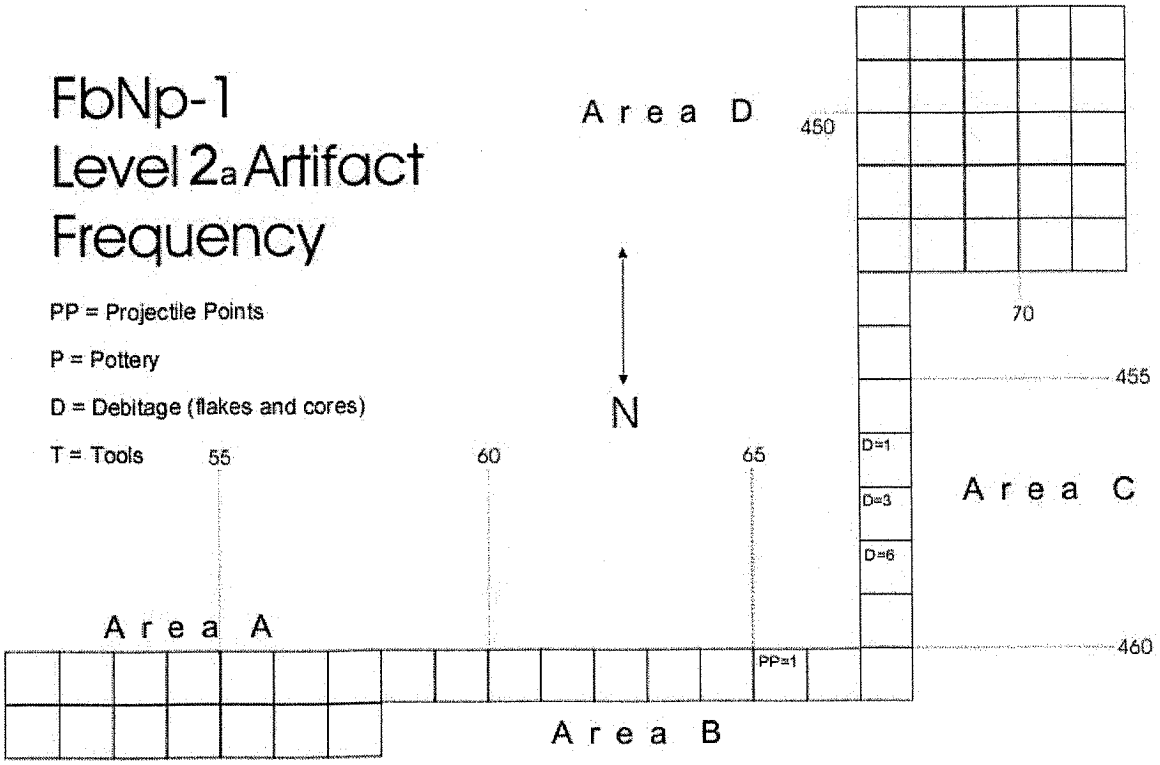

Figure 4.15 Artifact Distribution: Level 2a

Level 3 (Figure 4.16) once again shows a return to high utilization of Area A. A concentration of lithic debris as well as one projectile point and several pot sherds were recovered from this area. Area B consists of a light lithic scatter, as does Area D though Area D also produced three projectile points. Area C was sterile.

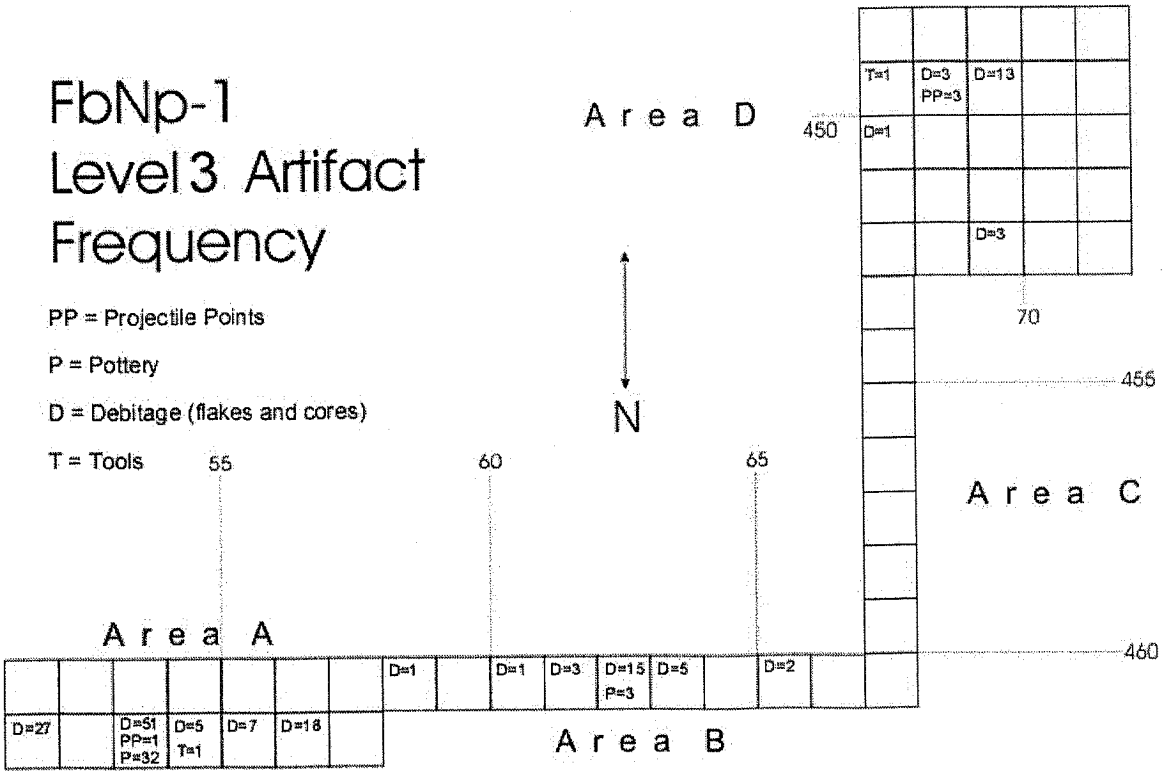

Figure 4.16 Artifact Distribution: Level 3

Level 4 is almost entirely focused on Area A (Figure 4.17). There was a scattering of lithic debitage from Area B, but the largest concentration of artifacts appears to be from Area A. In addition to the debitage scatter, a large amount of pottery was recovered from this level, all of which came from Area A. The pottery recovered from level four represents the largest collection from the Terminal Plains period from this site, and serves as an indicator of the cultural tradition that can be associated with these levels.

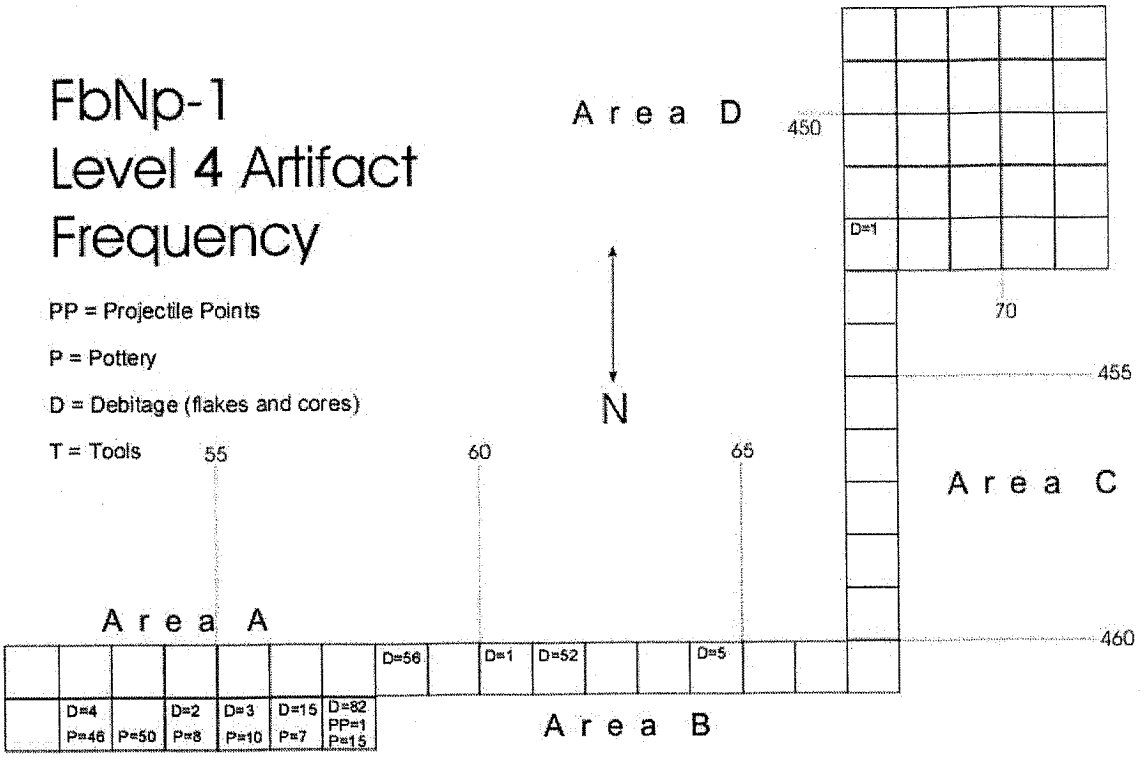

Figure 4.17 Artifact Distribution: Level 4

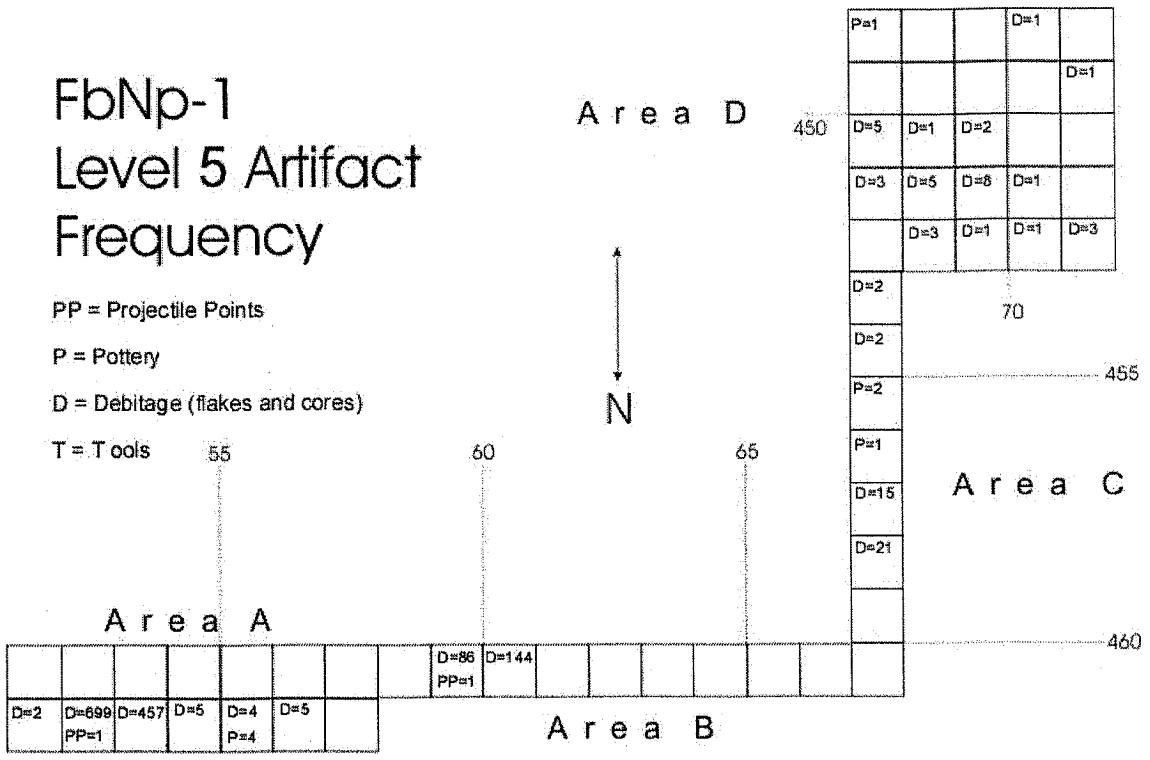

Figure 4.18 Artifact Distribution: Level 5

Level 5 (Figure 4.18), in contrast to level 4, produced very little pottery, and a very large amount of debitage. A very large concentration of lithic debris was recovered from Area A, along with four pot sherds and one projectile point. In other parts of the site, Area D produced a moderate lithic scatter as did Area C. Area B had two productive units that together produced over 200 flakes as well as one projectile point.

4.6 Conclusions

The upper two levels of FbNp-1 clearly show trade between existing populations and in-coming Europeans. The lower levels of these represent a terminal Plains occupation, the nature of which has been debated in the literature (Malainey 1991, 1995; Peck and Ives 2001; Walde 2003), but is ostensibly known as the Mortlach phase. This determination can be made based on projectile point style as well as pottery type. For a greater discussion of the Mortlach phase, see Chapter 7.

Level 5 contains more than one pottery style recovered from the single level. When keeping in mind that exchange of good as well as peoples between various cultural groups that are allies, it is not unusual to believe that the various pot styles can be accounted for by intermarriage and exchange. The issue of level 5 notwithstanding, it is apparent that the terminal Late Plains Period occupation of FbNp-1 is represented by a single cultural entity (Mortlach) between the time of the occupation of level 5 through level 1. That is not to say that a single group occupied during this time, but rather that a continuous cultural tradition was present for the entire time, with levels 1 and 2 showing the appearance of European trade goods.

Chapter 5
Old Women's Occupations

5.1 Introduction

Cultural levels 6 through 10 represent an Old Women's Phase occupation at FbNp-1. The pottery in these levels tends to be poorly consolidated, thick and chunky, with large grit temper. Because of the highly fragmented nature of the pottery from these levels, it has not been possible to reconstruct the vessels in any large extent, however, several rim/brim sherds as well as shoulder and base sherds have been refitted to the greatest extent possible, thus aiding in identification of type. Along with this very distinctive pottery, late side-notched projectile points have also been recovered in these levels. Radiocarbon dates from these levels range from the oldest (level 10) at 1155 ± 75 (S-2815) to the youngest level (level 6) at 510 ± 70 (S-2809) (see Appendix D). These dates, along with the pottery and projectile points, place the levels 6 through 10 occupations solidly within the Old Women's phase.

5.2 Lithics

5.2.1 Debitage

The lithic debitage recovered from the Old Women's Phase levels consisted of 3235 flakes, including retouched and those showing evidence of use-wear (Table 5.1). The most common raw material recovered from these levels is Swan River chert,

numbering 1878 flakes or 58% of the total debitage count. The second most common material type is quartz, which consists of 13% of the total. Other raw materials found in these levels include silicified peat, quartzite and chalcedony. Table 5.1 outlines the overall view of raw materials recovered from levels six through ten.

Table 5.1 Flake Count by Raw Material

Material	Count	Weight	% of Total (by count)
Swan River chert	1878	1667.3	58%
Quartz	410	419.3	13%
Silicified peat	253	156.8	8%
Chert	113	193.1	3%
Quartzite	99	301.8	3%
Silicified wood	95	104	3%
Chalcedony	73	42.1	2%
Knife River flint	72	19	2%
Gronlid siltstone	57	39.7	2%
Siltstone	55	130.5	2%
Basalt	47	270.7	1%
Sandstone	22	144	1%
Athabaska quartzite	16	93.6	<1%
Granite	15	54.5	<1%
Unidentified/Misc	14	93.4	<1%
Cathead chert	7	6.2	<1%
Fused shale	5	9.1	<1%
Rocky Mtn. Quartzite	2	4.2	<1%
Agate	2	7.5	<1%

From Table 5.1, it can clearly be seen that Old Women's phase peoples inhabiting the Opimihaw Creek valley had a solid preference for locally available raw materials. Swan River chert is obtainable from local riverbanks, as is quartz. This is not to the complete exclusion of exotics such as silicified sediment from the Knife River area of North Dakota. When examined on a level by level basis, the clear preference for Swan River chert is maintained throughout cultural levels 6 through 10 (see table 5.2). The exception to this is in level 7, where quartz is the predominant material followed by

Swan River chert. However, when shatter is taken into account, it becomes clear that the propensity of quartz towards shattering during flaking is the logical explanation for the large difference between the occurrence of quartz and Swan River chert in this level. An increased amount of quartz flaking has resulted in a vast amount of shatter in level 7 (see table 5.3). This may also account for the higher standing of quartz overall, when a more accurate picture of material type usage may be gained by excluding shatter from the picture. When shatter is not included, the reduction of flakes from level 7 normalizes the overall picture and shows an increase in the reliance on silicified peat, silicified wood, and non-identified cherts.

Table 5.2 Raw Material Percentages by Level

	Level 6	Level 7	Level 8	Level 9	Level 10
SRC	47%	19%	77%	49%	30%
KRF	3%	5%	2%		3%
Quartz	10%	47%	6%	2%	1%
RMQ					1%
AQ	2%	1%			1%
Quartzite	9%	5%	2%	4	9%
SW	2%	1%	2%	11%	7%
SP	6%	2%	4%	6%	1%
Basalt	<1%	2%	1%		12%
Granite					
Sandstone	2%	2%	<1%		
Siltstone	5%	2%	2%		4%
GS	2%	7%	<1%		
Agate			<1%		
Chert	8%	5%	1%	23%	8%
ChC	<1%	1%			1%
Chalcedony	3%	<1%	2%	4%	22%
Fused shale	1%	<1%			
Misc	1%	1%	<1%		1%

SRC = Swan River chert, KRF = Knife River flint, RMQ = Rocky Mountain quartzite, AQ = Athabaska quartzite, SW = Silicified wood, SP = Silicified peat, GS = Gronlid siltstone, ChC = Cathead chert

While the majority of flakes by material were Swan River chert, the majority of flakes by type were tertiary flakes, which represent the end stages of tool manufacturing as well as resharpening and revitalizing used tools. Of the 2057 flakes recovered in levels 6 through 10, 995 of them, or 48% were tertiary flakes. The second most common flake type was secondary flakes. Secondary flakes accounted for 680 or 33% of the total recovered debitage. Seven percent of the debitage was shatter while decortication flakes (primary and secondary) accounted for another 9%. Table 5.3 shows a breakdown by level of the total counts of debitage from levels 6 through 10.

Table 5.3 Flake and Type Count by Level

	Level 6	Level 7	Level 8	Level 9	Level 10
Core	7	11	6		4
1° decort	19	22	13	2	9
2° decort	22	34	60	4	10
2° flake	153	224	234	19	50
3° flake	119	295	450	22	109
Shatter	23	120	11		5
Total	343	706	774	47	187

Application of Ericson's (1984) cortex index formula introduced in Chapter 4, gives the following results per level:

- Level 6 – 11.95%
- Level 7 – 7.93%
- Level 8 – 9.43%
- Level 9 – 12.77%
- Level 10 – 10.16%

The very low relative amounts of cortex indicate that initial reduction of cores was not done at FbNp-1. This, along with the tendency of decortication flakes to be secondary rather than primary, suggests that the cores being worked at FbNp-1 were secondary cores and blanks that were brought to the site.

5.2.2 Tools

5.2.2.1 Hammerstones

There are two major tool categories, formed or chipped stone tools and non-formed tools and cores. Non-formed tools from FbNp-1 are outlined in table 5.4, and include FCR, hammerstones, and unworked cobbles.

Table 5.4 Non-formed Tools by Level

	Level 6	Level 7	Level 8	Level 9	Level 10
Hammerstone	2	2			
Cobble	25	3	1		2
FCR	102	245	48		37

There were 31 cores found in the Old Women's levels of FbNp-1. Level 7 has the highest number of cores, with 11 in total, making up 35% of the overall cores for these levels. Six of the cores from level 7 are quartz, consistent with the large amount of shatter in this level. Two of the cores in level 7 are Swan River chert while the remaining three are unidentified chert. The three cores in level 5 consist of Swan River chert (n=2) and fused shale (n=1). Level 6 produced seven cores consisting of Swan River chert (n=2), quartz (n=2), Rocky Mountain quartzite (n=1), siltstone (n=1), and unidentified chert (n=1). Level 8 has six cores, five of which are Swan River chert. The remaining core from level 8 is Athabasca quartzite. Three of the four cores found in level 10 are Swan River chert; the fourth is siltstone.

5.2.2.2 Formed Tools

Formed tools from levels 6 through 10 are divided into two distinct categories, projectile points and non-projectile points. The latter are further divided into unifacial and bifacial tools. Table 5.5 outlines the traits recorded for formed tools excluding projectile points.

Table 5.5 Formed Tools Excluding Projectile Points

level	unit	Artifact#	shape	cross section	type of retouch	comp	mat	length	width	thick	wt
5-6	47	47-33	round	concave/convex	uni	comp	chal	15.18	13.85	4.07	.9
5-6	49	49-53	rect	biplanar	bi	inc	gss	21.43	15.54	3.95	1.2
6	11	11-64a	irreg	biplanar	uni	comp	krf	16.33	10.67	2.60	.4
6	20	20-21	rect	plano/convex	bi	inc	quartz	31.59	26.07	7.60	7.2
6	28	28-57	rect	biplanar	bi	comp	sw	41.15	20.26	4.67	5.8
6	2	2-125	tri	biplanar	bi	inc	src	31.96	27.15	4.32	3.3
6	3	3-129	rect	biplanar	bi	inc	sp	24.31	13.45	4.14	1.5
6	3	3-156	tri	biplanar	bi	comp	src	15.72	10.59	3.25	.5
6	5	5-122	rect	biplanar	bi	inc	sp	15.05	16.94	3.75	1.1
6	10	10-37	rect	biplanar	bi	inc	sw	19.78	15.31	3.69	1.1
6a	3	3-214	Rect	Plano/convex	Uni	comp	Krf	14.59	22.70	6.58	2.7
6a	1	1-247	Rect	Plano/convex	Uni	Comp	Sw	27.47	17.95	10.27	6.0
6a	5	5-167	Rect	Plano/convex	Bi	Com	Sw	24.36	25.71	8.55	5.4
6a	2	2-228	tri	Plano/convex	bi	Inc	src	22.13	19.51	6.71	3.2
7	10	10-73	square	plano/convex	bi	inc	Sp	15.22	16.13	5.77	1.5
7	4	4-192	tri	Plano/convex	bi	Comp	sp	39.34	15.33	6.54	3.2
7	1	1-270	Irreg	Plano/convex	Uni	inc	chert	18.80	13.61	7.0	2.6
7	4	4-203	rect	wedge	uni	comp	krf	21.76	13.35	3.84	1.1
7	3	3-255	tri	biplanar	uni	inc	krf	26.49	10.29	4.91	1.0
7	2	2-260	oval	plano/convex	uni	comp	chert	37.92	24.51	8.74	6.5
7	10	10-83	ovate	biplanar	bi	inc	src	12.38	8.67	4.05	.6
7	38	38-182	rect	wedge	bi	comp	quartz	18.93	21.94	6.49	2.9
7	35	35-130	tri	biplanar	bi	inc	sp	31.53	19.47	4.21	3.2
7	29	29-131	tri	biplanar	bi	inc	src	15.65	13.40	3.75	.7
7	28	28-121	tri	convex/concave	bi	comp	krf	22.81	15.45	3.47	1.3
8	54	54-90									
8	1	1-316									
8	1	1-308									

Uni=unifacially retouched, bi = bifacially retouched, comp= completeness, sp= silicified peat, src= Swan River chert, krf= Knife River silicified sediment, gss= Gronlid siltstone, chal= chalcedony, sw= silicified wood

The Level 5-6 designation denotes artifacts recovered in the screen with uncertain depth measurements that may have been from level 5 or 6. The two tools recovered from this level are placed with level 6. One tool is bifacially worked; the other unifacially worked. The bifacial tool (49-53) appears to be a thin, finely made projectile point pre-form, of Gronlid siltstone. The tip is broken off which can account for its disposal. Along the base is evidence of thinning. Parallel-oblique pressure flake scars are evident on the dorsal surface of the pre-form, while the ventral demonstrates a more generalized pressure flake removal with no visible pattern. Also visible on the ventral side is the speckled grey patination that is characteristic of Gronlid siltstone. Artifact number 47-33 is a small, round endscraper made of brown chalcedony. The bulb of percussion is evident on the ventral surface and it is patinated along the dorsal surface.

Level 6 contains eight tools and all but one are bifacially worked. Artifact number 11-64a appears to be a small etching tool made of Knife River silicified sediment. This tool was manufactured from a flake and flaking scars are evident along the bulb of percussion. As well, a single flake scar along the right lateral margin extending down the length of the tool and creating a working edge. Use wear is also evident along the distal end, especially at the right distal point.

There are seven bifacially worked tools from level 6. Artifact number 3-156 is a small, thin Swan River chert biface. Because of the smoothed texture and pinkish colour, it appears that this material was heat treated prior to working. This biface is asymmetrical, with the left margin being straight and the right being rounded toward the

proximal edge then curving toward the left distal margin. Edge retouch is evident along both left and right margins. Item 5-122 is a bifacially worked silicified peat fragment. The distal end is snapped and the proximal end bears evidence of notching on the right margin, with thinning along the left, possibly for a future notch. The base is thinned and concave, with pressure flaking evident along the dorsal surface. The ventral side is largely unworked, but does have retouching along both left and right margins. Artifact 3-129 is also made of silicified peat. This bifacially worked preform tool is thinned along the base and retouched along both margins. It appears to have been made from the bulb of percussion of a previous flake. Attempts to thin out the thicker section of the pre-existing bulb of percussion may have caused the snap at the distal end. Specimen 20-21 is a quartz biface that may also have been used as a spoke-shave as evidenced by the concave nature of the left lateral margin. Because of the nature of the quartz, flaking patterns are not discernable, but retouch is evident along the right margin. The proximal margin is thinned and the distal end appears to hold another bifacial edge. While the distal edge may have been used for cutting, the cutting edge length is short (8.82mm), and similar in nature to the etching edge found on item11-64a. Artifact 28-57 is made from silicified wood and bifacially worked along the right margin. The proximal, distal and left margins are all flat edged although the left margin bears evidence of attempts to create another working edge. Because of the nature of the material, flaking patterns are not visible, but the right edge is clearly bifacially worked. Specimen 2-125 is a very thin (4.32mm at the thickest point) Swan River chert biface. The left and right edges both show retouch and the distal end is snapped off. The right edge appears to have been the working surface as the left edge is jagged and irregular. There is no discernable pattern to the flaking. This tool may have been manufactured from a previous pressure flake as

the small striking platform appears to be lipped and there is no discernable bulb of percussion. Item 10-37 is made of silicified wood and bifacially worked on one end. The other three edges are snapped making orientation of this tool difficult. It appears that manufacturing was never completed although the one working edge is nicely retouched on both sides. There is evidence of what may represent an attempt at notching along the right margin, however, because of the unpredictable nature of some types of silicified wood, this may simply be an example of accidental indentation. There is evidence of further attempts at working or thinning this artifact, but they all appear to have been abandoned.

Level 6a produced four formed tool, two are unifacially worked and two are bifacially worked. Artifact number 3-214 is a Knife River silicified sediment end scraper. The proximal end terminates in an abrupt snap that may or may not have affected its use. The distal end is retouched along the dorsal side creating a high-domed scraping surface. The finely crafted end-scraper also shows retouch along the distal right and left margins. Artifact 1-247 is a silicified wood end scraper. Because silicified wood will not fracture concoidally (Kooyman 2000:30), it gives the impression of being poorly manufactured. The proximal and left lateral edges end abruptly with snapped, flat surfaces and the working edge, because of the material type, had to be retouched on both the dorsal and ventral surfaces to produce an adequate scraping edge. Artifact 5-167 is also made of silicified wood. This artifact lacks the high-domed dorsal surface that is characteristic of scrapers although the thickness is still noteworthy (8.55mm). The sheeted appearance of the material most certainly contributes to the sinuous appearance of the distal edge of this tool. The right lateral margin is also bifacially retouched, as is part of the left margin. The left side also contains a remnant striking

platform that the maker was apparently unable to completely remove. Catalogue number 2-228 is the remnant tip of a biface made from heat treated Swan River chert. This tool is asymmetrical and triangular in shape. Both left and right cutting edges are moderately sinuous in shape and the flake scars show a generalized or random flaking pattern. The proximal end is snapped off leaving on the distal half of the tool.

There are 11 formed tools found in level 7. Of these 11 tools, three are made of silicified peat, three are made from Knife River silicified sediment, two from Swan River chert, one from quartz, and two from an unidentified chert. One of the four artifacts (10-73) made from silicified peat is an end scraper (Figure 5.1 F). This item shows retouch along the distal margin at the base of the high dome that is characteristic of end scrapers. There is minor pecking evident along the ventral side of the working edge, presumably to resharpen the tool after retouching along the dorsal side failed to produce the desired result. Item 35-130 (Figure 5.1 E) is a right distal biface fragment also manufactured from silicified peat. This artifact was snapped down the middle as well as at the proximal edge. There is bifacial retouch all along the right margin and the dorsal as well as ventral sides give the impression of 'pitting' that is common in silicified peat. Several of the flake scars on both sides show signs of attempts at parallel flaking attempts, but due to the nature of the material, the patterns do not continue down the length of the tool. The third silicified peat tool from this level is a biface that consists of two pieces that have been refitted. The proximal half was found in level 6a (cat. # 4-124), while the distal half was recovered from level 7 (Figure 5.1 D). The dorsal side tends to be somewhat rounded and convex although the flaking shows obvious attempts to thin, which may have caused it to snap in two. The distal tip is missing, but the overall shape is still observable. There is one side-notch evident at the

right proximal end and a general thinning along the left proximal edge where there may have been a notching attempt. Both left and right margins are bifacially retoutched.

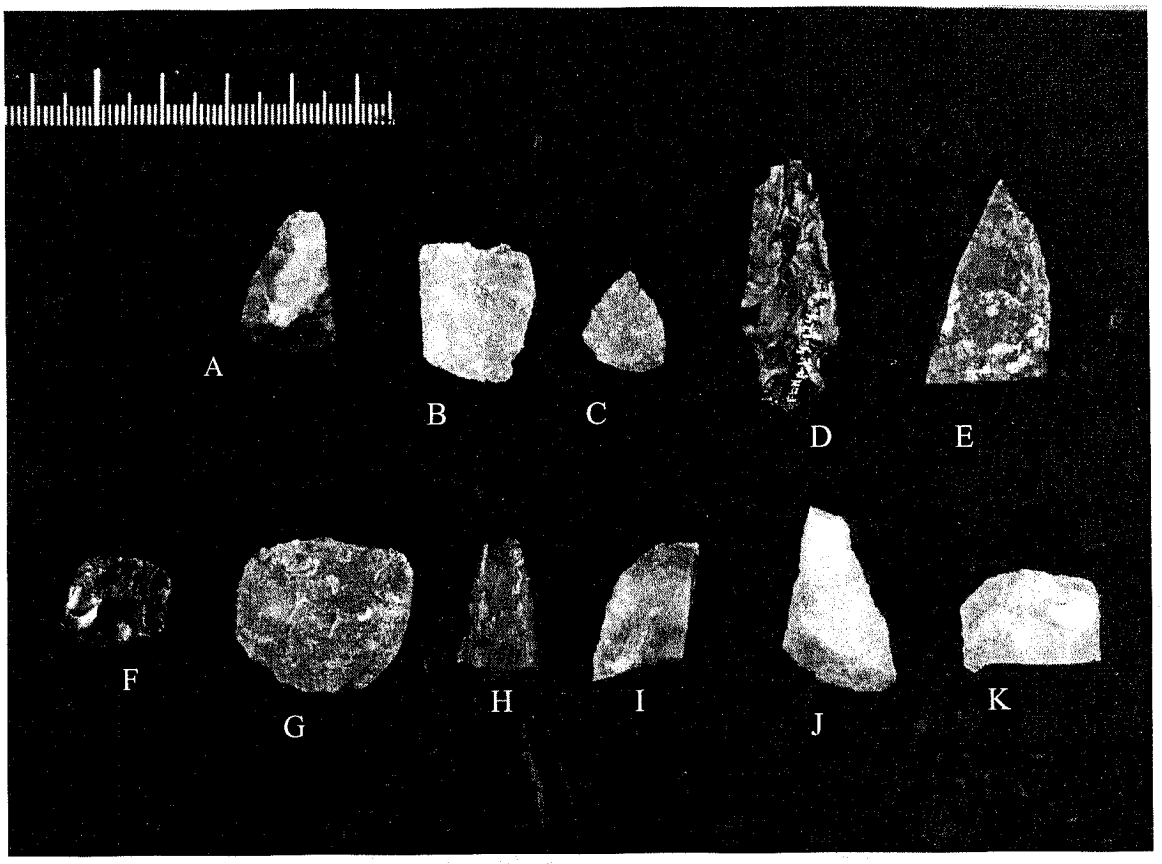

Figure 5.1 Old Women's Phase Tools

There appears to be a spall removed from the center of the ventral side that may have been due to being heated after discarding. Artifact 28-121 (Figure 5.1 A) is a bifacially retouched Knife River silicified sediment flake tool. It shows evidence of use-wear along the left margin and bifacial retouching along the distal and right edges. Specimen 4-203 (Figure 5.1 H) is also manufactured of Knife River silicified sediment. This end scraper is elongated triangular in shape, and while it lacks the high domed feature of most scrapers, the distal angle at the area of retouch is sufficient to allow for an adequate

scraping surface. Artifact 3-255 is a bifacially retouched, triangular shaped, Knife River silicified sediment tool that may have been used as an incising or puncturing tool. Along the right margin, it is bifacially retouched and the base is thinned. Item 29-131 (Figure 5.1 C) is an asymmetric, heat-treated Swan River chert biface fragment. The base is snapped off, but evidence of notching is present. This artifact may have been a projectile point, but because of the asymmetrical nature, it more likely was a small hafted biface. Both margins are bifacially retouched and there is a generalized flaking pattern on both surfaces. Also manufactured of Swan River chert is artifact number 10-83. This artifact is a broken biface fragment consisting of just the proximal left side. The distal and right sides are broken off leaving only the left half of the proximal end. The left margin is bifacially retouched and notched. The attempt at creating the notch may account for the breaking off of the base. Artifact 1-270 (Figure 5.1 I) is a chert endscraper fragment. This artifact has been snapped on two sides and has retouching on the distal as well as the left side creating a scraping edge. Artifact 2-260 (Figure 5.1 G) is an oval end scraper that was manufactured on a large remnant bulb of percussion from a flake. The original striking platform is evident on the proximal end and the distal end has been retouched. This scraper has the domed appearance that is typical of artifacts of this type and has a generalized flaking pattern across the dorsal surface. Made from quartz, artifact number 38-182 (Figure 5.1 B) is a wedge shaped biface. The bifacial cutting surface appears to have been made by removing one flake on either side parallel to the edge. There is no sign of small retouch flakes being removed from the cutting edge, which may be due to the nature of and difficulty working with quartz.

Level 8 contains three form tools, one Swan River chert endscraper, a Swan River chert biface, and a silicified siltstone biface. The Swan River chert endscraper (1-

308) is somewhat concave on the ventral side, but still has a domed dorsal surface (Figure 5.1 K). The proximal end is snapped off and the distal end is retouched, creating the scraping edge. Item 1-316 (Figure 5.1 J) is a heat-treated Swan River chert biface. The left margin and very tip have been snapped off, and the right edge has bifacial retouching. 54-90 is made of brown silicified siltstone. Some of the cortex is still present on both dorsal and ventral side. The tool has been snapped off following the right margin and the left side is retouched.

5.2.2.3 Projectile Points

Projectile points were analyzed following the classificatory scheme proposed by Peck and Ives (2001). There were a total of nine projectile points recovered from the Old Women's levels of FbNp-1, two from level 6, two from level 6a, three from level 7, and two from level 10. The following table (table 5.6) shows the metrics recorded for the projectile points.

In order to place projectile points within the model proposed by Peck and Ives, there are several non-metric traits that must also be considered. These traits include basal edge shape, notch type, notch form, flaking pattern, outline form, cross-section and base forms. These attributes are recorded in table 5.7 and the classification system is discussed in chapter 6 of this thesis.

Table 5.6 Projectile Point Metrics

Lvl	Unit	Cat#	Mat	com	Body lngth	St lgth	Ttl Lgth	Max Body Wdth	Min Stm Wth	Base Wth	R Ntch Wth	L Ntch Wth	R Ntch Dth	L Ntch Dth	R Bsl Edg hght	L Bsl Edg hght	Max Bdy thck	Max Stm thck
6	6	6-109	Src	com	10.92	4.31	16.65	10.41	7.75	8.95	4.43	3.15	1.04	1.34	2.04	3.12	2.93	3.49
6	18	18-40	Ss	com	13.34	4.97	18.48	12.22	6.01	9.28	3.38	3.30	2.46	2.74	2.0	2.20	3.10	1.68

6a	4	4-153	Sp	com	13.37	4.84	19.4	13.18	8.25	13.31	4.3	3.62	2.63	2.65	1.59	3.09	3.02	2.35
6a	1	1-246	Ss	inc	8.03	4.54	12.35	13.12	7.03	10.53	2.87	3.51	1.93	2.65	2.45	2.42	3.46	2.79
7	6	6-151	Ss	inc														
7	8	8-159	chal	com	17.89	4.53	23.08	13.46	8.81	13.09	3.89	3.17	2.79	1.89	2.84	4.33	3.82	2.78
7	29	29-87	Sw	com	16.06	5.43	21.73	12.03	8.43	12.35	5.39	6.07	2.16	2.37	2.84	3.07	4.02	3.33
10	5	5-315	sp	com	9.24	5.39	5.30	9.15	7.15	11.39	4.84	5.21	1.94	1.88	3.94	3.72	4.21	3.18
10	6	6-197	sw	inc													3.68	

Mat= material type, com= completeness, src= Swan River chert, ss= siltstone, sp= silicified peat, sw= silicified wood, chal= chalcedony

Table 5.7 Non-metric Projectile Point Attributes

Cat #	Basal edge shape	Notch type	Notch form	Flaking pattern	Outline form	Cross-section	Base form
6-109	Convex	Side	Broad round	Irreg	Sym	Convex sym	assym
18-40	Concave	Corner	Deep round	Dbl diag	Sym	Convex sym	Assym
1-246	Concave	Corner	Deep round	Dbl diag/irreg		Convex sym	Assym
4-153	Concave	Side	Deep round	Irreg	Assym	Plano-convex	Assym
6-151				Dbl diag	Assym	Plano-convex	
8-159	Concave	Side	Deep round	Irreg	Sym	Plano-convex	Assym
29-87	Straight	Side	Broad V	Irreg	Assym	Assym-convex	Assym
6-197				Irreg	Sym	Convex sym	
5-315	Straight	Side	Shallow round	Irreg	Assym	Convex assym	assym

There are two projectile points that were recovered from level 6. Artifact 6-109 (Figure 5.2 B) is a small Swan River chert side-notched projectile point that appears to have been reworked after initial usage. The right basal edge has been reworked to the

point of an almost total reduction and the base shows evidence of thinning. The reworking of the base of this point has resulted in a now asymmetrical outline for the base, but the blade of the point remains symmetric. .The second projectile point from level 6 is a siltstone corner-notched point (catalogue # 18-40, Figure 5.2 A). This point is complete and finely crafted. There is evidence of some basal thinning and the flaking pattern is double diagonal with a clear midline down the center of the point. Of special note is the serration of both left and right margins. This is clearly intentional as is the serration following the diagonal flake scars down the length of the blade.

Level 6a contains three projectile points. One (1-246) is very similar in nature to artifact 18-40 from level 6 (Figure 5.2 C). This point is also manufactured of siltstone and is corner notched. In addition to that, 1-246 also appears to have initially been serrated, or the attempt was made to make it serrated, which led to the snapping off of the tip. Thinning of the base is evident on both dorsal and ventral sides and the ventral side appears to have been either reworked or never fully finished, due to the apparent attempt to serrate the blade. The second projectile point from level 6a is an asymmetrical point, manufactured from silicified peat. This point also has basal thinning and the right basal margin appears to have been snapped during the thinning process.

Three projectile points were recovered from level 7. Of these three, one item (6-151) is merely the broken tip of a point. The overall morphology of this point appears to have been asymmetric, with the left margin being more rounded than the straight right margin. The flaking pattern is double diagonal, with a clear though asymmetric mid-line. Artifact number 8-159 (Figure 5.2 D) is a chalcedony side-notched point that appears to have been manufactured from a flake. The ventral side is largely unworked

and relies on the general plano shape of the flake for its form. Edge retouch is evident along the margins of both sides and the dorsal side has an irregular flaking pattern. The base was thinned, which created a convex appearance. The flake that was removed to thin the base is quite long and the flake scar extends up to the midpoint of the blade. The third projectile point from level 7 (29-87) is a side-notched point made of silicified wood (Figure 5.2 E). Because of the nature of the material, the flaking is irregular and the overall form is asymmetric. It appears that there were attempts at basal thinning, but once again due to the nature of the material, the thinning was largely unsuccessful other than at the very bottom margin.

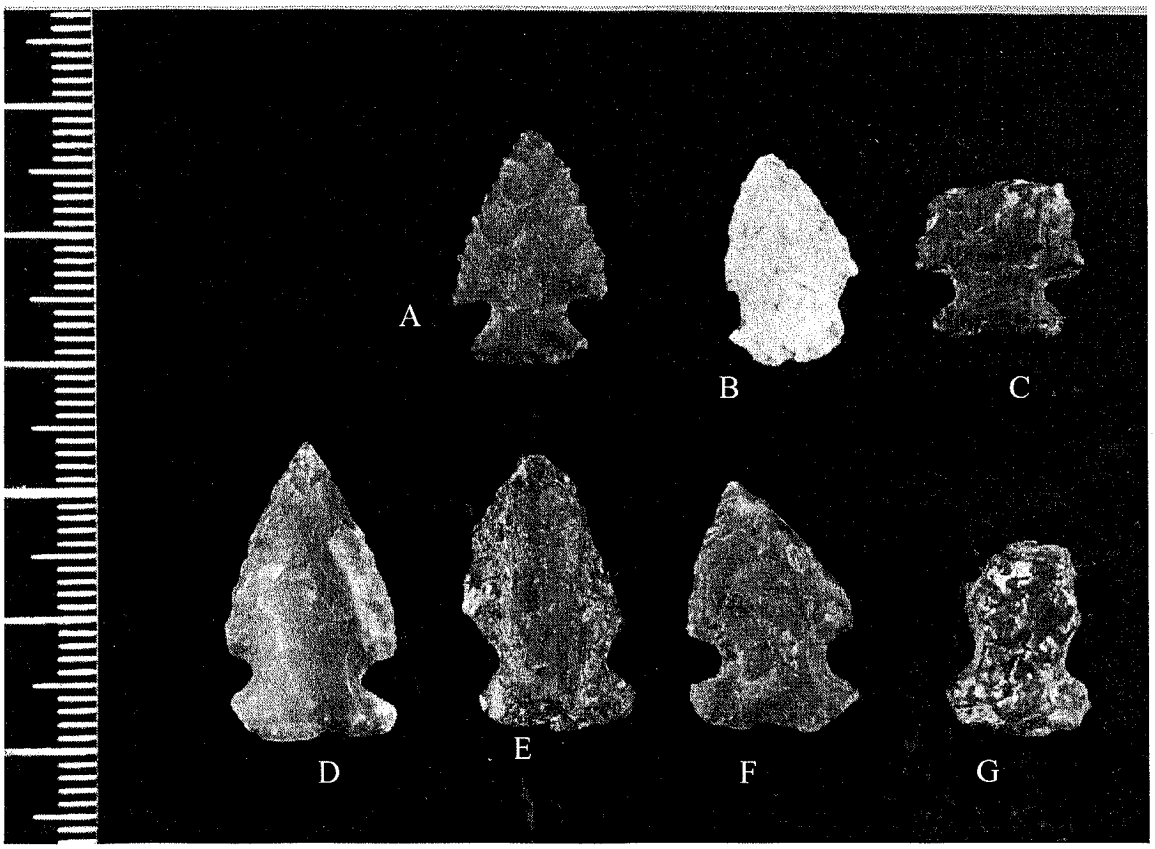

Figure 5.2 Cayley Series Projectile Points

The final two projectile points from the Old Women's occupations at FbNp-1 were both recovered from level 10. Interestingly, there were no points in levels 8 or 9. Of the two points excavated in level 10, one is complete and one is incomplete. The incomplete point is just the tip of a silicified wood point that appears to have been symmetric, despite the irregular flaking pattern. The quality of the silicified wood from which the point was manufactured appears to have been very good, as the flakes that were removed all appear intentional. The final point from level 10 is manufactured of silicified peat and represents the crudest of the projectile points (Figure 5.2 G). This point is small, with a rounded tip that may possibly be the result of breaking and attempting to rework. The material type surely accounts for the difficulty in manufacturing that the maker of this point would have had. The roundedness and overall crude morphology lends itself to the question of whether this point could have been used in its existing state. Most likely it could not and was discarded as a result.

5.2.2.4 Retouched Flakes

There were a total of 21 utilized flakes from the Old Women's levels. Three utilized flakes were recovered from level 6, 5 from level 6a, 4 from level 7, 6 from level 8, 2 from level 9, and 1 from level 10. For a breakdown of utilized flakes per level, see Table 5.8.

Table 5.8 Utilized Flakes by Material Type and Level

Level	Material	Count
6	Quartzite	1
6	Silicified Peat	1
6	Chert	1
6a	SRC	2
6a	Quartz	1
6a	Quartzite	1
6a	Siltstone	1
7	SRC	2
7	Quartz	1
7	Silicified Wood	1
8	SRC	3
8	Siltstone	3
9	Chert	1
9	Chalcedony	1
10	Siltstone	1

5.3 Pottery

Cronk's pot (figure 5.3), which was recovered from FbNp-1 by a local collector and later described by Green (1993), shares many characteristics that appear to be present in at least one of the vessels recovered during excavations. The shouldered globular shape that is evident on Cronk's pot was also present on at least one vessel from the excavated units as is supported by the presence of the shoulder sherds which were discussed previously. The flattened basal sherds are also similar to those found on Cronk's pot. This indicates the presence of at least two similarly shaped vessels that also correspond to the Old Women's Phase pottery.

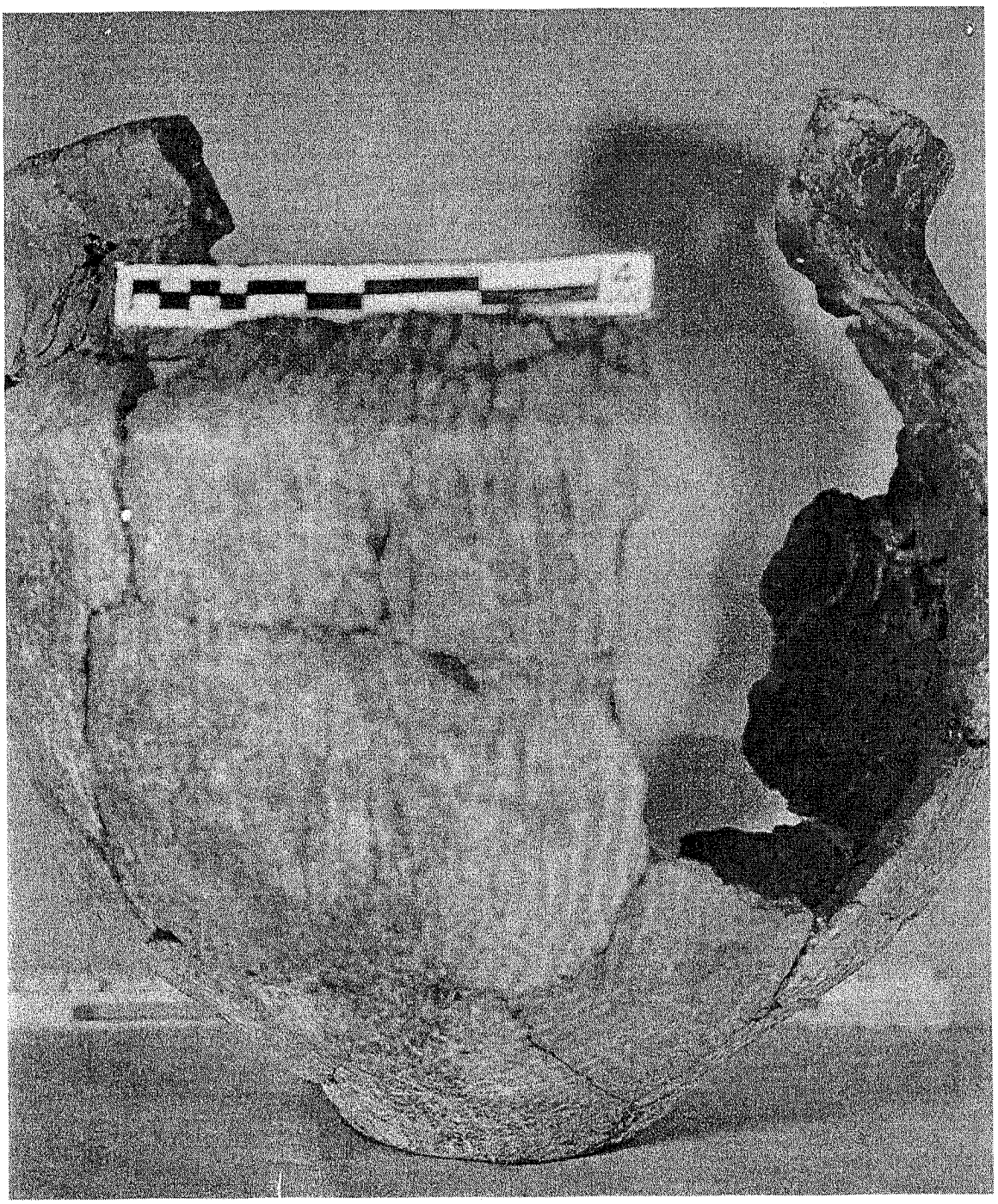

Figure 5.3 Cronk's Pot

5.3.1 Body sherds

The pottery from the Old Women's phase levels of FbNp-1 were separated into rim, neck and body sherds. Those sherds too small to be identified as a separate vessel area were placed into the general body sherd category. A total of 922 body sherds were recovered for levels five through ten with a combined weight of 2173 grams. Of these 922 sherds, 773 or 84% were recovered from level 7. Level 8 was the second most prolific level, with 8% of the sherds, followed by level 10 with 5%, level 6 with 3%, and finally level and 6a with < 1%.

Table 5.9 Pottery Count by Finish Per Level (does not include rim sherds)

Level	Smoothed	CWT	CWT smoothed	Fabric smoothed	Indet	Exfoliated	**Total**
6	15		2	1	2	7	**27**
6a			3				**3**
7	706		18	1		48	**773**
8	18	3	44		2	8	**75**
10	3					41	**44**
Total	**742**	**3**	**67**	**2**	**4**	**104**	**922**

The vast majority (74%) of the sherds recovered from levels 5-10 have a smooth finish. This figure is using a purely raw count, which may be misleading, as the count can be skewed by the collection being extremely fragmented. However, when table 5.9 is constructed using weight, the overall picture does not change drastically. The percentage by volume for sherds with a smoothed finished rises slightly to 77%. Some changes, however, do occur. The cord-roughened percentage by count is less than 1%. When this is figured by weight, the number rises to 3%. The percentage for sherds that were cord-roughened and then smoothed also increases from 9% to 15%. A drastic

decrease is seen only in those sherds that were too exfoliated to determine a finish. Using a raw count, the percent to total is 11%, but when figuring percent to total by weight, the number drops to 3%. A higher percent total by count rather than by weight occurs when examining a highly fragmented collection, where the count is skewed by the number of very tiny sherds that by themselves will not make up a large percentage of the volume by weight. In order to overcome this problem, both count and weight need to be considered when looking at any given pottery collection that consists of fragmented sherds.

Table 5.10 Pottery by Weight (gm) and Finish Per Level (does not include rim sherds)

Level	Smoothed	CWT	CWT smoothed	Fabric smoothed	Indet	Exfoliated	**Total**
5	1		2		1	1	**5**
5-6	8	1	59			1	**69**
6	114		5	3	2	16	**140**
6a			3				**3**
7	1506		66	5		37	**1614**
8	51	78	194		1	7	**330**
10	1					12	**13**
Total	**1681**	**79**	**329**	**8**	**4**	**74**	**2175**

In addition to the standard body sherds, several neck and shoulder sherds as well as base sherds were recovered from these levels. They are included in the above count. The shoulder pieces (n=3) were refitted and show an angled shoulder on a cord-roughened vessel. Cooking residue is abundant on the shoulder, and it is likely that it can be attributed to vessel 11. The base sherds were refitted creating a built-up base that is in contrast to many of the Old Women's vessels that merely have a flattened bottom as the base.

5.3.2 Rimsherds

There are a total of 6 rim sherds in levels five through ten, representing two separate vessels. Vessel determination can be made on the basis of several criteria, including rim shape and surface finish as well as the level from which it was obtained. The distinctiveness of the vessels recovered in levels 5 through 10 at FbNp-1 simplified vessel determination of rim sherds. Four of the recovered rim sherds, with a total weight of 85 grams represent vessel 11 from level 7. Two sherds, with a total weight of 9.5 grams represent vessel 12 from level 8. Vessel 11 appears to have been manufactured by paddle as is evidenced by the cord-roughened exterior, which was later smoothed (also see Appendix B, p.152). The smoothing has lessened the depth of the cord impressions on the exterior of the vessel, but has not completely obliterated them. Evidence of wipe lines can be seen on the interior of the vessel and in places lacking the carbon residue that is common around the rim of this vessel. Inner and outer lip decoration is absent from this vessel as is brim decoration. Of special note is the extremely flat and wide brim on vessel 11 (Figure 5.4). The inner lip extends into the interior of the vessel, creating a flange that at its maximum is 20mm thick. When measured directly below the brim beneath the flange, the maximum thickness is 10mm. An additional rim measurement taken 2.5cm below the brim is 8mm thick. The very flat, wide brim on this vessel is somewhat anomalous with Old Women's phase pottery, though thickened flat brims are not unknown. Other attributes of the vessel are clearly consistent with Old Women's phase pottery, such as the thick walls, large grit temper, loosely consolidated paste and cord-wrapped tool manufacturing process.

Vessel 12 is also assignable to Old Women's phase pottery based on the thick walls, large grit temper and loosely consolidated paste (also see Appendix B, p. 153). Unfortunately, the exterior of vessel 12 is exfoliated. The interior, however, is smoothed with no evidence of brushing or wipe lines. The brim is flat, but lacking the extreme thickening seen on vessel 11 and what appear to be single-line incisions down the center. At its maximum, the brim on vessel 12 is 13.76mm wide and 12.23 at its minimum point. The rim area is lacking 2.5cm to allow for an additional measurement at that point. Despite the exfoliation of the exterior wall, the rim appears to be slightly excurvate with a thickening at the lip.

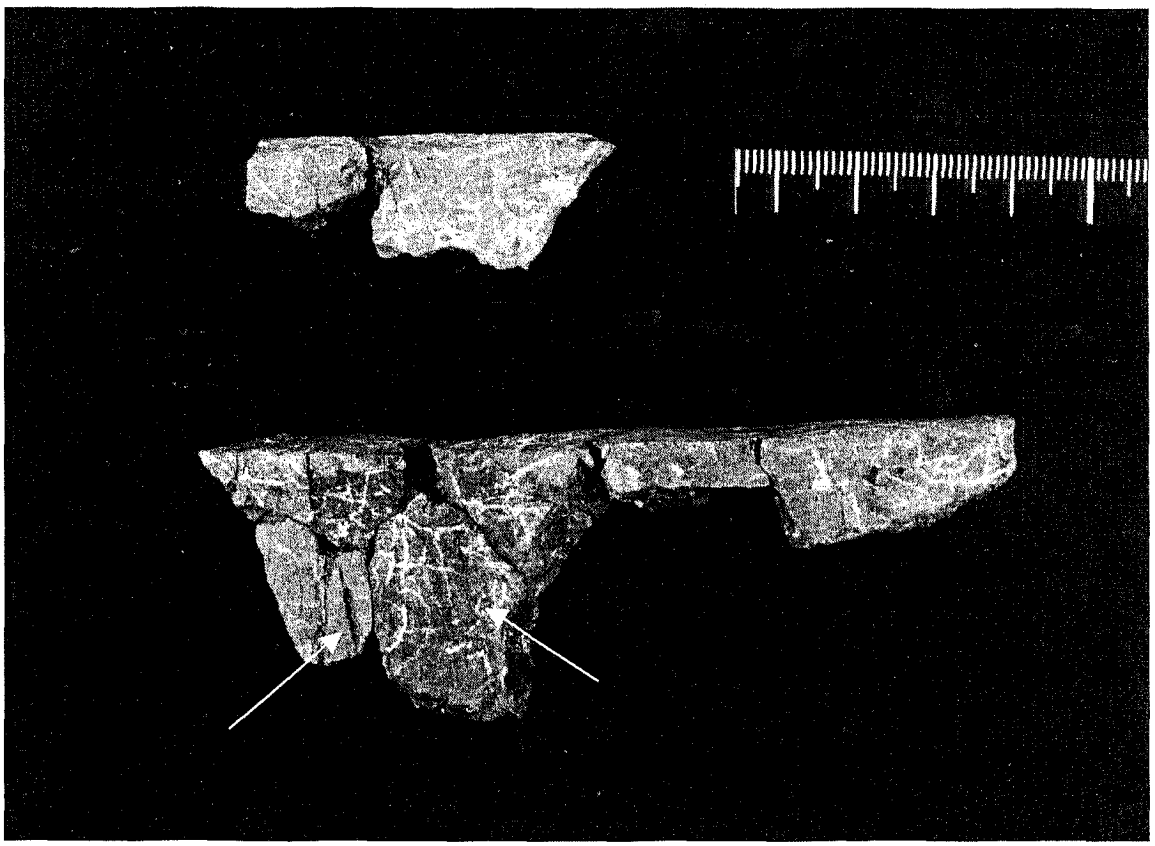

Figure 5.4 Vessel 11 Arrows indicate evidence of cord-roughening

One other rim sherd likely represents an Old Women's phase vessel. This rim sherd was recovered from a level that is somewhat indeterminable. Level 5-6 has some artifacts that may come from level 5 and some that may stem from level 6. One of the three recovered rim sherds from this level is more likely an Old Women's vessel (vessel 8 – Figure 5.5, also see Appendix B, p. 151). The exterior is fabric impressed with the fabric carrying over onto the exterior lip and the interior is smoothed. The temper is fine grit or sand and the paste is compact. The brim is flat and the lip is L-shaped, with the flange of the L carrying over to the interior of the vessel. Decoration is present on the brim in the form of incising parallel to the mouth of the vessel.

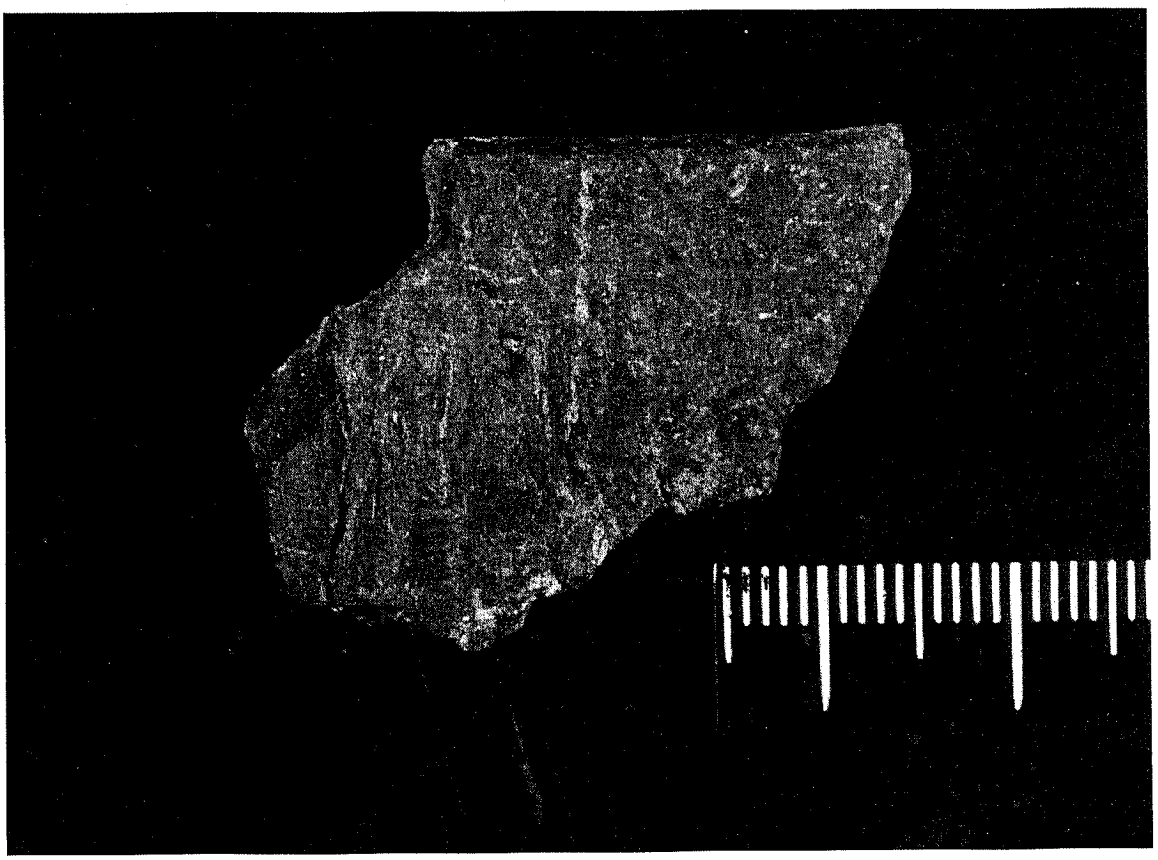

Figure 5.5 Vessel 8 – the white lines that are visible are root etchings

5.4 Spatial Distribution

Old Women's levels from FbNp-1 represent at least four separate occupations. The combination of Cayley projectile points with Old Women's phase pottery thoughout levels 6 through 10 indicates repeated use during a single phase. Despite the overall picture of a widespread artifact scatter, when the individual levels are examined spatially, there is a clear preference for different areas of the site depending on the level (see appendix B). Level 6 showed a scattering of lithics in areas C and D as well as a pottery concentration in area C. An additional lithic scatter was recovered from area A. In contrast to this, level 6a was devoid of pottery and lithics from all areas but A and the extreme eastern two units of area B. The largest concentration of lithic scatter in level 6 was from area A, which corresponds with level 6a.

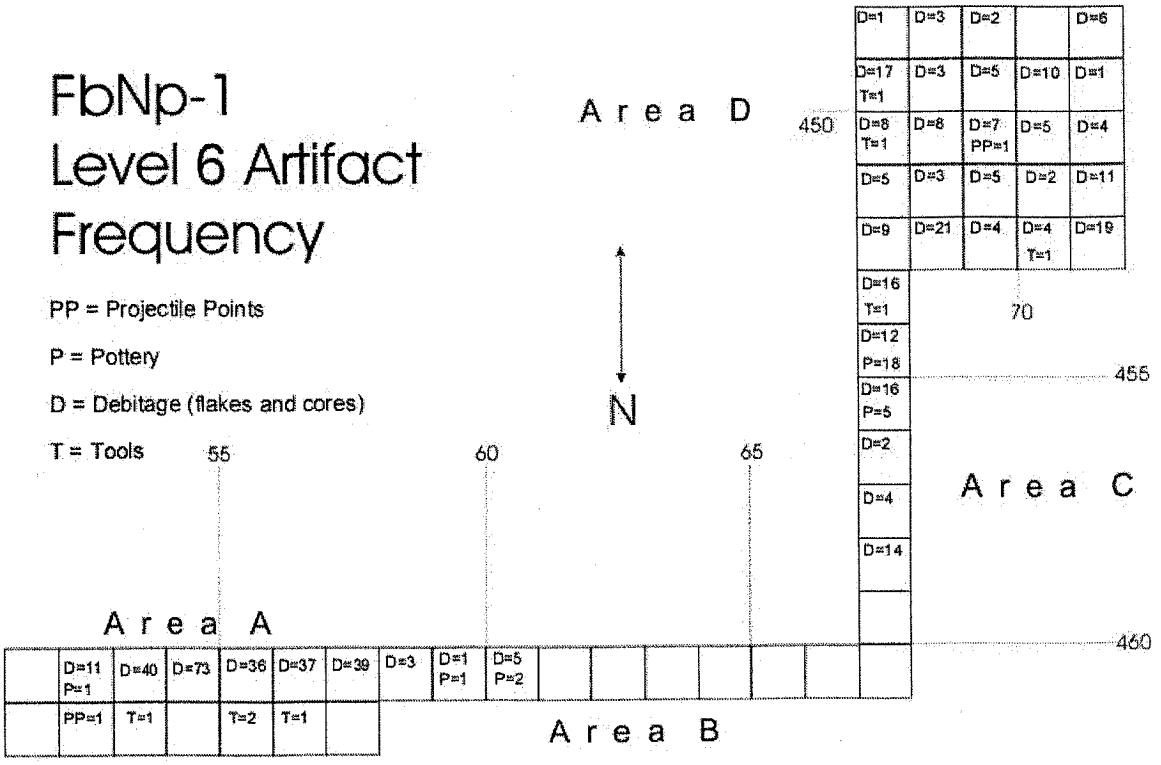

Figure 5.6 Artifact Distribution: Level 6

Level 7 consists of a lithic and pottery scatter in areas B and C, with a concentration of debitage and pottery in area A that also contained a projectile point. All of the other areas added together do not equal the large concentration of not only debitage, but also pottery that was recovered from area C, with over 300 flakes and 600 pottery sherds, as well as tools and one projectile point in the neighboring unit of area D. Level 8 is in direct contrast to level 7, with a large lithic concentration in area B that drops off drastically at the edge of area C. There is a smaller concentration of lithic debris in area A as well as a small pottery concentration. Level 9 is virtually nonexistent in terms of recovered artifacts with the exception of a slight scatter recovered from area B that corresponds to the units in level 8 with the highest concentration of debitage.

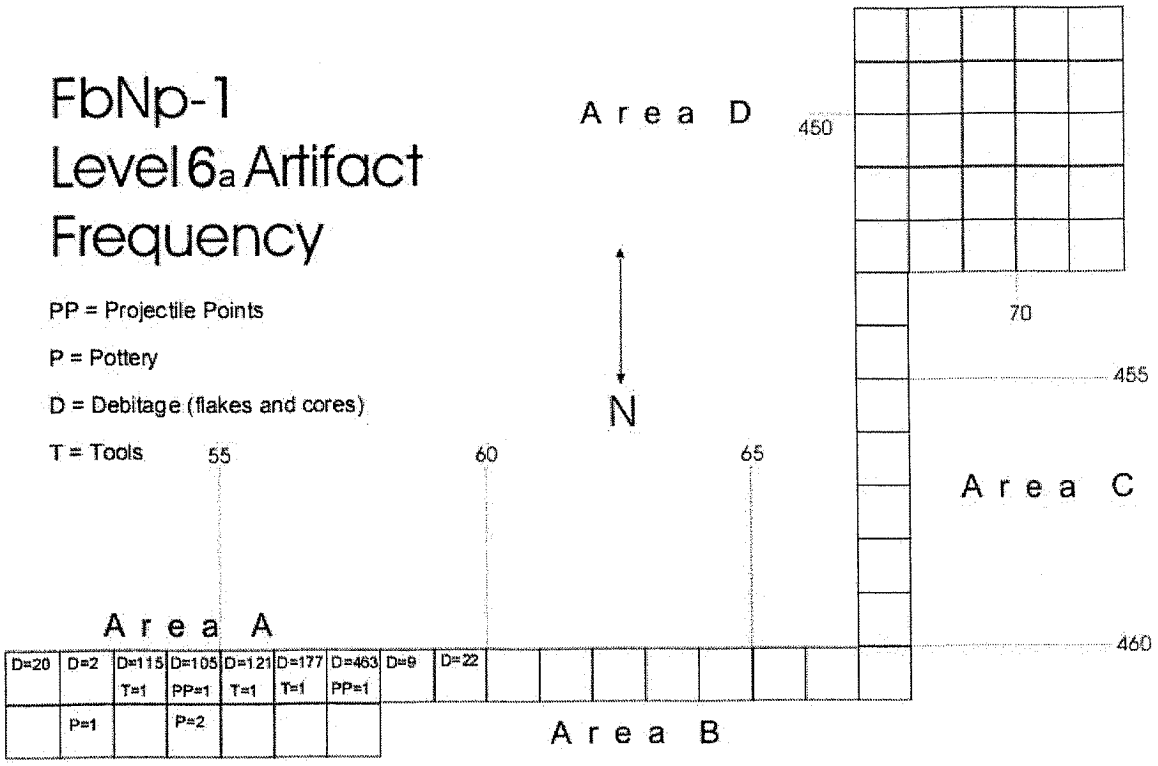

Figure 5.7 Artifact Distribution: Level 6a

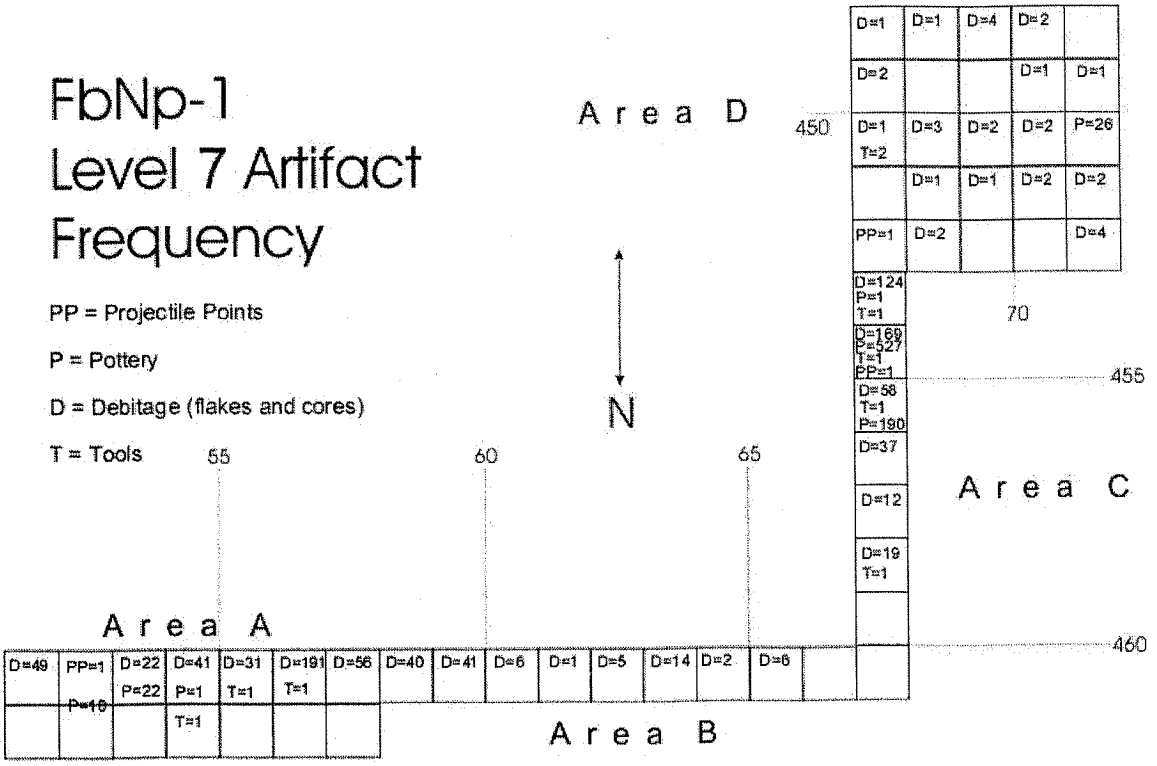

Figure 5.8 Artifact Distribution: Level 7

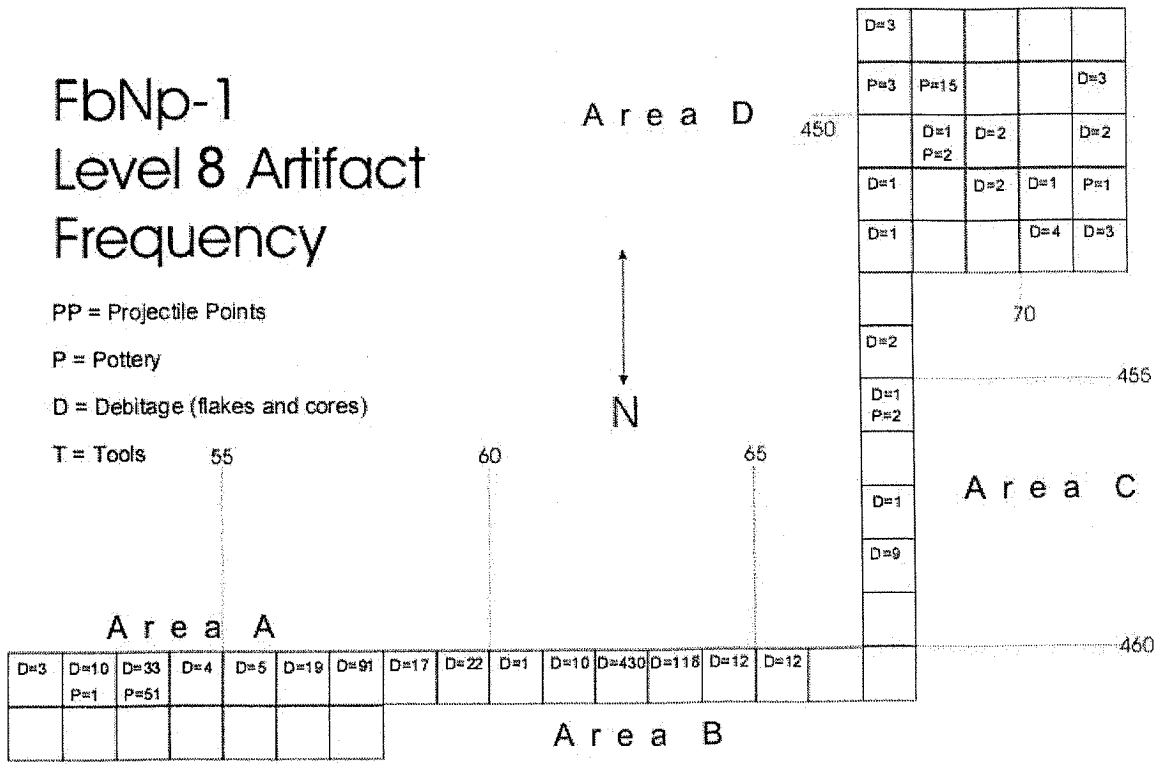

Figure 5.9 Artifact Distribution: Level 8

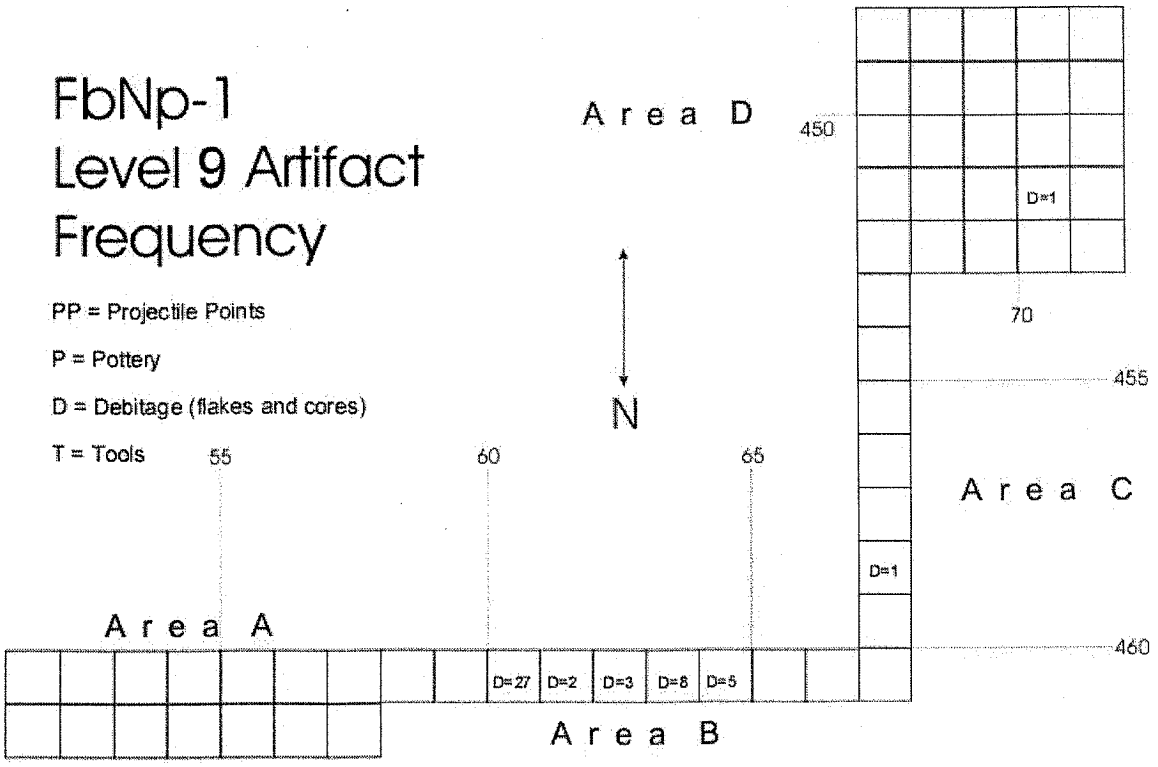

Figure 5.10 Artifact Distribution: Level 9

Level 10 shows another direct contrast to the immediately preceeding level, with a small scattering of lithics in areas D and B. There does exist a concentration of pottery sherds in the very northern unit of area C, but it appears to be largely stand alone and without a concentration of lithics or tools to correspond with it. The greatest concentration of artifacts in level 10 occurs in area A. There is a moderate concentration of lithics, but largely to the exclusion of other artifact types, as only one pot sherd was recovered from this area, as well as one projectile point and one tool.

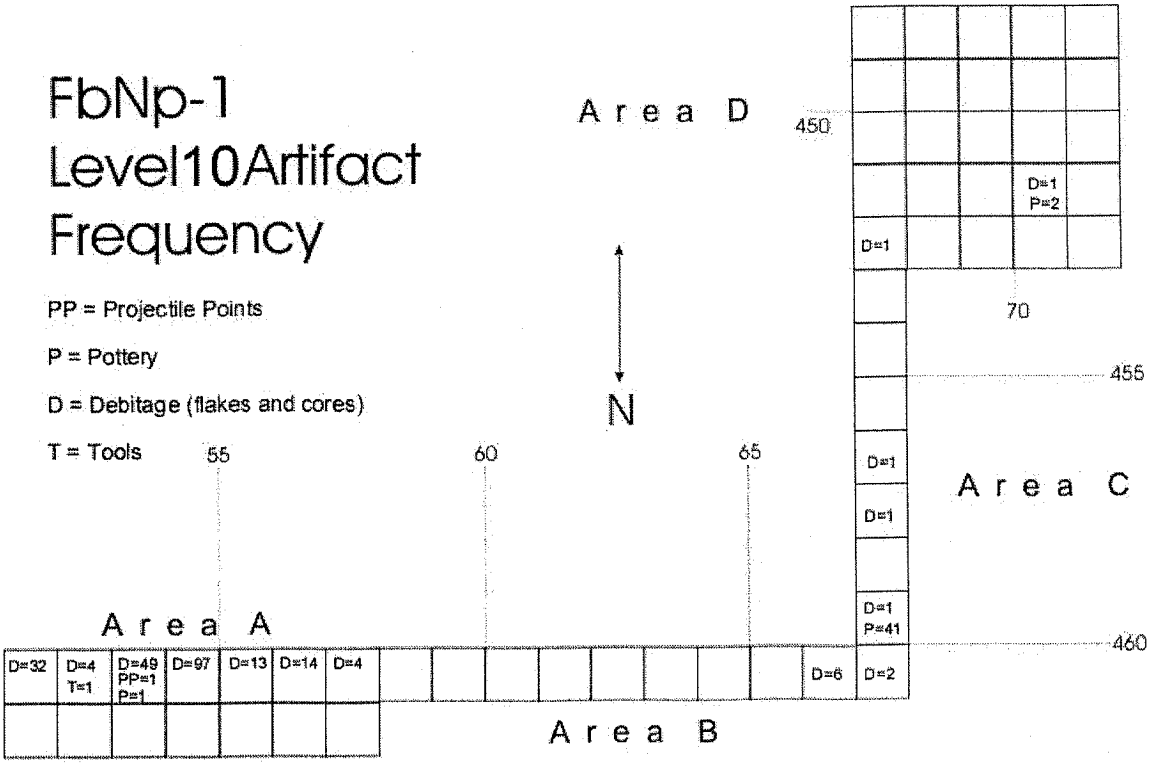

Figure 5.11 Artifact Distribution: Level 10

5.5 Conclusions

Based on the above discussion, it appears that levels 6 and 6a may represent a single occupation based on site utilization, though due to the large amount of artifacts from both levels, it is likely that they do represent two completely separate occupations. This assumption is based on the appearance of a thin veneer of sediment that is observable between the two levels. Given the propensity for yearly flooding prior to construction of the dam, it is likely that the occupations are merely closely spaced, but still separate. Level 7 is clearly a separate occupation from 6a, and level 8 is also clearly a separate occupation. Level 9, because of the spattering of lithics, may represent the termination of the level 8 occupation. Level 10, while somewhat sparse, appears to be a separate occupation.

The presence of pottery as well as secondary and tertiary flakes indicate a habitation site. This is reinforced by the large amount of cooking residue on the recovered vessels. Scrapers and knives indicate hide processing was also being performed here.

Chapter 6

Avonlea/Besant Occupations

6.1 Introduction

Cultural levels 11 through 13 represent an early Late Period occupation at FbNp-1. Projectile points and pottery found in these levels clearly indicate an Avonlea occupation in level 12. Level mixing has occurred in the lower levels, as level 13 contains both Avonlea and Besant projectile points. Formed tools were only recovered in levels 11 through 13 of the lower levels. All artifacts that were recovered below level 13 were either flakes or fire-cracked rock, with a complete absence of pottery and diagnostics. Because of this, cultural affiliation is difficult at best for the lowest levels, but they are being included here with the oldest assignable archaeological complex of the early Late Period.

6.2 Lithics

6.2.1 Debitage and Cores

There were a total of 822 flakes and cores recovered from the early Late Period levels with a total weight of 3268.8. As in the upper levels, Swan River chert is the most common material type being used during this time period. Over half (58%) of the flakes recovered from the Avonlea/Besant levels are of this locally available material. Quartzite and other cherts make up the bulk of the remaining materials from these levels

followed by chalcedony. Interestingly, Knife River silicified sediment, which is frequently associated with Besant occupations, makes up only about 1% of the recovered flakes. Table 6.1 shows the overall frequency of material types for these levels. The clear preference is for local cherts and quartzites, though not to the complete exclusion of imported exotics.

Table 6.1 Raw Material Frequencies for early Late Period levels

Material	Count	Count %	Weight	Weight %
SRC	477	58%	1869.5	57%
KRF	5	1%	2.1	<1%
Quartz	28	3%	58.4	2%
RMQ	6	1%	18.4	1%
AQ	24	3%	178	5%
Quartzite	78	9%	447.9	14%
SW	11	1%	16.8	1%
SP	18	2%	16.3	1%
Basalt	14	2%	179.4	5%
SndStn	1	<1%	91.4	3%
SS	15	2%	139	4%
GSS	10	1%	28.5	1%
Chert	76	9%	164	5%
ChC	3	<1%	6.1	<1%
Chal	52	6%	48.6	1%
FS	1	<1%	.8	<1%
Unident	3	<1%	13.4	<1%

SRC=Swan River chert, KRF= Knife River silicified sediment, RMQ= Rocky Mountain quartzite, AQ= Athabaska quartzite, SW= silicified wood, SP= silicified peat, SndStn= sandstone, SS= siltstone, GSS= Gronlid siltstone, ChC= cathead chert, Chal= chalcedony, FS= fused shale

When examined level by level (table 6.2), the preference for Swan River chert holds. Quartzites and other cherts are also strong favourites. There is a noticeable change in secondary lithic material preferences between these levels and the Old Women's levels immediately preceding. While Swan River chert is still the most

favoured material type, the use of quartz drops off dramatically. A full 13% of material from the Old Women's levels was quartz, while only 4% from the Besant/Avonlea levels are quartz. Another noticeable change is in the use of silicified peat. Only 2% of the material recovered from levels 11 and up were of silicified peat, compared to 8% in levels 6 through 10. Because silicified peat and quartz are locally available, the change in material usage appears to represent a change in preference. Quartz tends to be very difficult to shape, and while some silicified peat can be of high quality, the general tendency is for these two materials to be of low quality. It appears then, that people occupying the Opimihaw valley during the Besant and Avonlea periods were concerned with overall quality of the raw material that would be used in tool manufacturing.

Table 6.2 Material Type Percentages by Level

Material	L-11 %	L-12 %	L-13 %	L-13a	L-14 %	L-15 %	L-16 %	L-17 %	Ls-18-24 %	L-25+ %
SRC	72%	63%	41%	17%	91%	50%		48%		
KRF		1%							12%	
Quartz		4%	3%					12%		
RMQ	4%	1%								
AQ		1%	15%						12%	
Quartzite	1%	6%	24%		2%		100 %	20%	25%	100%
SW	3%	1%	1%					8%		
SP		3%	1%	2%						
Basalt		2%				50%			50%	
SndStn		<1%								
SS	1%	2%	5%					4%		
GSS		2%								
Chert	15%	10%	10%		2%			4%		
ChC	1%	<1%								
Chal		2%		79%	5%			4%		
FS		<1%								
Unident	1%	<1%		2%						

The vast majority of debitage recovered in the Avonlea/Besant levels come from level 12. Level 13 is the second most abundant debitage level followed by level 11, level 13a and level 14. Of note is the extremely low amount of artifacts recovered from other levels. Levels 15 and 16 each only produced two flakes. Levels 18-24 produced a total of 8 and levels 25 and higher produced a total of seven flakes. This may indicate that the units excavated in these levels were not directly on the occupation or that the levels do not represent an actual occupation, but rather are the result of movement of artifacts in the matrix. The latter is further supported by the mixing that is evident in level 13 which contains both Avonlea and Besant projectile points.

Table 6.3 Flake Type by Level

	L 11	L 12	L 13	L 13a	L 14	L 15	L 16	L 17	L 18-24	L 25+
Core	2	17	2					1	1	
1° decort	2	38	4					1	1	
2° decort	5	89	8		1			3		
2° flake	39	121	31	7	6	1	2	8	4	7
3° flake	16	231	60	40	37	1		7	2	
Shatter	4	17			1			5		
Total	**68**	**513**	**105**	**47**	**45**	**2**	**2**	**25**	**8**	**7**

When the cortex index is applied, the overall results are low. The exception to this is in level 12, in which 25% of the flakes are cortex-bearing. In general it would still appear that initial core reduction is not being performed at FbNp-1, however, that is not to say that it is not occurring at all, only that the tendency in these levels is for the initial reduction to have taken place elsewhere. Level 12, at 25% cortex to flake ratio has the highest amount of primary core reduction, which may be due to the high amount

of Swan River chert being flaked in this level. The following results were obtained for the cortex index for these levels:

- Level 11 – 12 %
- Level 12 – 25%
- Level 13 – 11%
- Level 13a – 0%
- Level 14 – 2%
- Level 15 – 0%
- Level 16 – 0%
- Level 17 – 16%
- Level 18-24 – 13%
- Levels 25+ - 0%

6.2.2 Other Lithics

As seen in table 6.4, level 12 appears to be the most prolific level in terms of other lithic items. There are 17 cores, and 78 pieces of FCR in level 12, as compared to other levels with, at most, 2 cores and 39 pieces of FCR. Unused cobbles, primarily in the form of silicified siltstone pebbles are also most abundant in level 12, though there are also 7 in level 13.

Table 6.4 Other Lithics by Level

Level	Cores	Hammerstones	FCR	Cobbles	Anvils
11	2		4		
12	17	1	78	7	
13	2		5	7	1

13a					
14			11		
15			4		
16			23	4	
17	1		39		
18-24	1	1	4	3	
25+			2	2	

6.2.3 Tools

6.2.3.1 Non-Projectile Point Formed Tools

A total of 13 formed tools were recovered from levels 11 through 15. Three of these tools are of uncertain provenience and were ascribed to level 10-11. These are included with level 11. The following table (6.5) gives a general description of the tools that were recovered from these levels. For a description of projectile points, see chapter 6.2.3.2.

Table 6.5 Formed Tools

Lvl	Unit	Cat	Shp	CS	Rt	Com	Mat	Lng	Wdth	Thk	Wgt
11	54	54-96	rect	biplanar	bi	inc	src	20.66	16.35	5.11	1.9
11	50	50-	rect	p/c	bi	indeter	sp	26.89	18.12	7.22	3.4
11	47	47-85	tri	P/c	bi	comp	chert	27.20	20.35	6.92	4.4
11	41	41-85	rect	P/c	bi	inc	src	43.69	56.86	15.41	36.0
12	3	3-325	ovate	P/p	bi	inc	src	18.48	16.34	5.25	1.6
12	25	25-	rect	P/c	bi	comp	ss	20.62	19.94	8.75	3.7
12	52	52-	Tri	biconvex	Uni	Comp	Quartz	35.20	25.22	13.24	10.3
13	38	38-	tri	P/p	bi	comp	src	63.99	29.31	7.01	14.1
13	21	21-70	ovate	wedge	uni	comp	src	33.72	23.67	11.67	8.1
13	10	10-99	ovate	P/c	uni	comp	aq	51.98	46.69	15.27	37.2
13	43	43-81	irreg	biplanar	bi	comp	src	35.13	24.61	5.95	3.0
13	42	42-	tri	biplanar	bi	comp	src	74.82	53.40	11.08	47.7
13	37	37-	tri	biplanar	bi	inc	gss	12.23	8.31	1.94	.1
15	2	2-377	Rect	P/c	Uni	Comp	Krf	29.06	15.43	3.59	2.4

Level 10-11 contained a total of three tools, and all three are bifacially worked. One bifacially worked tool was recovered from level 11 proper. Catalogue number 54-

96 (Figure 6.1 B) appears to be a biface stem made of Swan River chert. The material was heat-treated, and the stem appears to have broken during shaping, and was then utilized along both left and right margins. Artifact 50-119 (Figure 6.1 C) is a silicified peat preform that is bifacially worked. Due to the nature of the material and the many inclusions in this piece, the final stage of manufacturing appears to have been abandoned. Artifact number 47-85 (Figure 6.1 A) is a piece of chert that has been bifacially flaked. It appears to have been an attempt at manufacturing a wedge, but after trying both standard and bipolar flaking techniques that seems to have been abandoned in favour of bifacially working the right margin to produce a cutting tool. In level 11, 41-85 (Figure 6.1 G) is a large Swan River chert broken biface. Both left and right margins have been bifacially flaked and the left margin appears to have been utilized. A large amount of vugs in the material seems to have prevented further flaking of this tool and both the proximal and distal ends are broken off. Whether this was intentional or accidental is not immediately evident.

There are a total of three formed tools in level 12. Artifact number 3-325 (Figure 6.1 D) is a small expediency tool manufactured of Swan River chert. It has been unifacially worked on the right lateral margin. The left margin gives the appearance of being bifacially retouched, but this is due to the presence of vugs as well as cortex. The proximal end has been broken off. Also recovered from level 12 is a spurred endscraper manufactured from silicified siltstone (Figure 6.1 E). This scraper has the domed appearance that is common for tools of this type and there are long pressure flake scars evident along the dorsal surface creating the scraping edge. This scraper is spurred along the right proximal margin. A second scraper was recovered from level 12 (catalogue number 52-124), and is made of Swan River chert that appears to have been

heat altered (Figure 6.1 F). It is triangular in shape, and also has the high-domed shape that is indicative of end-scrapers. In addition to the one working surface at the distal end, there appears to be a second working surface on the left margin, with the retouch being on the ventral side as opposed to the dorsal side.

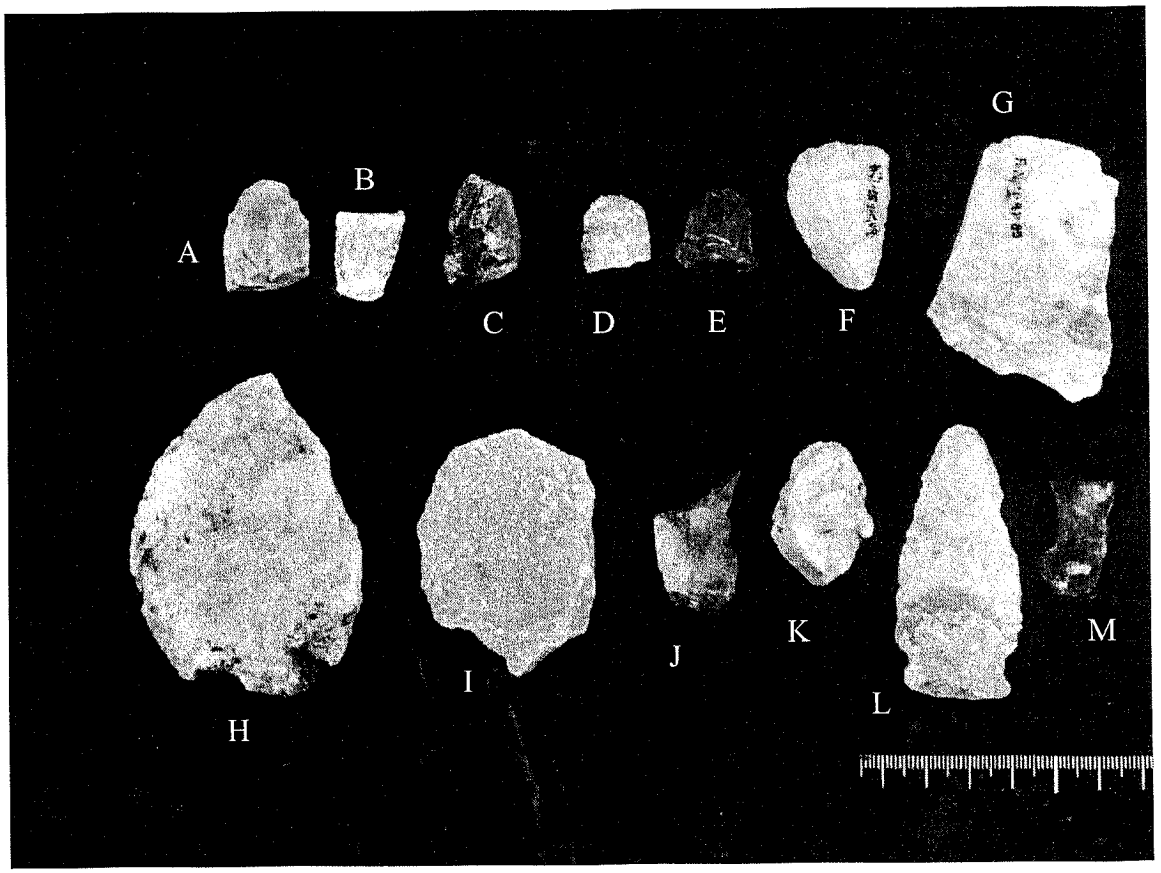

Figure 6.1 Formed Tools: Levels 11 - 13

Six formed tools were recovered in level 13, including two complete bifaces and a perforator as well as two unifaces and a biface tip fragment. One of the complete bifaces (catalogue number 38-259) is a large, notched biface that is common in Besant occupations (Figure 6.1 L). This biface is manufactured of Swan River chert and both left and right margins are bifacially retouched creating a cutting surface. The right lateral margin appears to have been damaged creating an area of flatness. This is most

likely the reason the biface was discarded as it appears the area is no longer able to be sharpened along the right margin. There are two large notches along the base and there is some evidence of basal thinning. Item 21-70 (Figure 6.1 K) is a Swan River chert, wedge shaped scraping tool that was manufactured on a spent bipolar core. Unifacial retouch is evident along the high edge of the margin, but attempts at creating a working scraping edge do not seem to have been wholly successful and as a result was most likely never used. Artifact number 10-99 (Figure 6.1 I) is a unifacial cutting tool that was manufactured from Athabasca quartzite flake. The striking platform and bulb of percussion are evident on this expediency tool and retouch appears along the distal left margin. Some remnant cortex is still present along the dorsal surface. Item 43-81 (Figure 6.1 J) is a perforator made from a Swan River chert flake. The spike used for perforation is triangular in cross-section and extends off the right distal edge. The left margin appears to have been purposefully snapped, allowing for backing. No other margins show signs of either retouch or use. Artifact number 42-162 (Figure 6.1 H) is a large bifacially worked backed knife. The right margin is intentionally dulled to allow for holding in the hand, while the left margin is bifacially retouched. The proximal end of this knife contains a series of very large drusy vugs and smaller drusy vugs are evident on both dorsal and ventral sides. The knife is asymmetric, with the working edge being convex and moderately sinuous as is typical of bifacial knives. Specimen 37-335 is the tip of a biface and was manufactured from Gronlid siltstone. Bifacial flaking is evident on both dorsal and ventral sides and this may represent a projectile point tip, but determination of that is tenuous based on the amount of the tool that is present.

One tool was recovered from level 15. This is a flake tool made of Knife River flint that was made into a scraper (Figure 6.1 M). The distal edge shows evidence of unifacial retouch along the high margin. The striking platform and bulb of percussion are both evident on the proximal end. No other signs of retouch or use-wear are evident on this tool.

6.2.3.2 Projectile Points

A total of six projectile points were recovered from levels 12 and 13, which are the only two projectile point bearing levels in the deeper deposits of FbNp-1. Of the two projectile points recovered from level 12, one is clearly Avonlea (1-366) while the second (4-326) is of an indeterminate type. Artifact 1-366 was made of white chalcedony and is primarily one side-notch and ½ of the body of the point in total. Due to the thinness of the point and the location of the notch on the base it is easily assignable to the Avonlea horizon. Artifact number 4-326 is made of heat-treated Swan River chert and consists of part of the base of a point, including one notch. There is not enough of the point present for cultural determination. See table 6.6 for the projectile point metrics from these levels.

Table 6.6 Projectile Point Metrics

Lvl	Unit	Cat#	Mat	com	Body lngth	St lgth	Ttl Lgth	Max Body Wdth	Min Stm Wth	Base Wth	R Ntch Wth	L Ntch Wth	R Ntch Dth	L Ntch Dth	R Bsl Edg hght	L Bsl Edg hght	Max Bdy thck	Max Stm thck
12	1	1-366	Ch	Inc														
12	4	4-326	Src	Inc														
13	24	24-149	Sp	Com	14.75	5.03	17.99	13.41	12.46	14.2	1.71	2.01	.95	.89	3.56	3.55	3.33	2.81
13	24	24-	Cht	Inc	13.15	3.76	16.37	12.23	8.97		2.71		1.71		2.37		2.91	2.24

		148																
13	18	18-67	Sp	Com	16.42	2.72	18.39	12.4	8.9	9.96	2.25	2.26	.92	1.26	2.27	1.48	2.69	2.67
13	38	38-258	Gss	Com	24.57	5.70	30.60	17.51	10.86	13.68	6.74	5.63	2.63	2.08	3.65	3.61	7.15	4.64

Of the four projectile points recovered from level 13, three are of the Avonlea type and one appears to be a Samantha point, indicating a Besant occupation. The three Avonlea points from this level are 24-148 (Figure 6.2 C), 24-149 (Figure 6.2 D) and 18-67 (Figure 6.2 E). Both 24-149 and 18-67 are made of silicified peat while 24-148 is

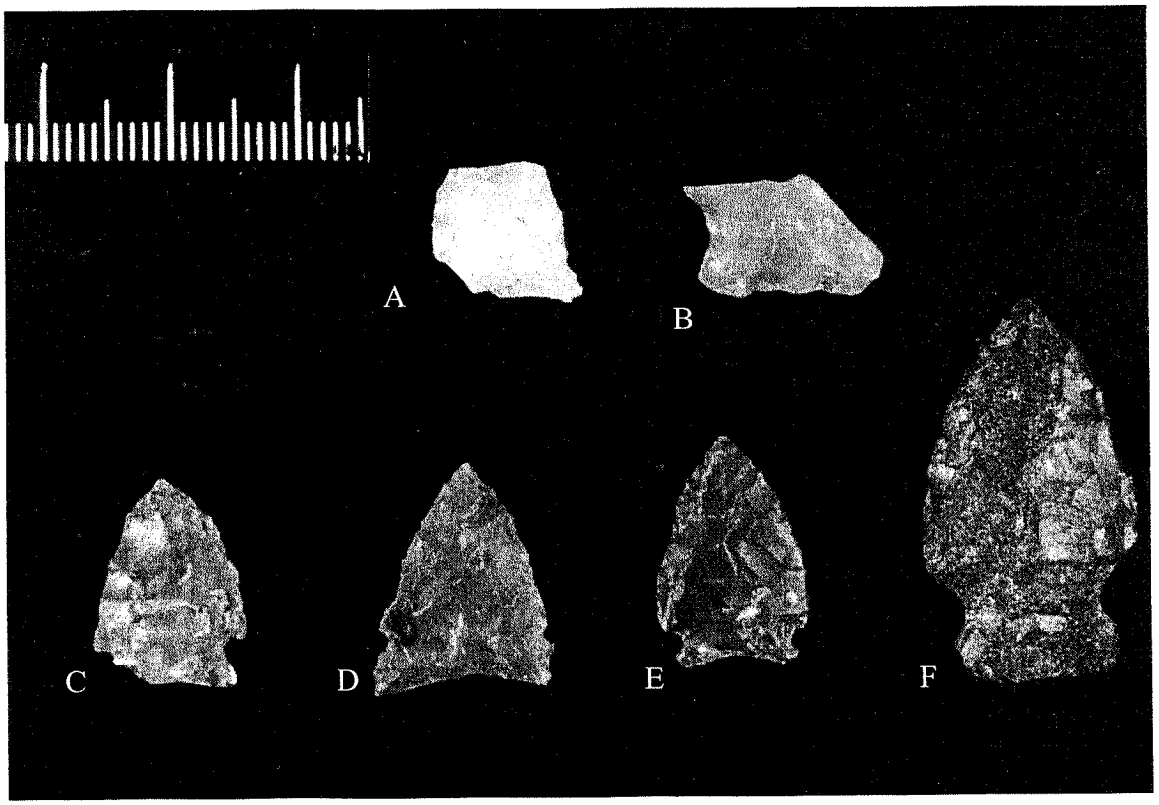

Figure 6.2 Besant and Avonlea Projectile Points

made of chert. All three of these points are thin and finely flaked with notches low on the base. The left notch is broken off of 24-148, which may be the reason it was discarded. Artifact 38-258 (Figure 6.2 F) is a large side-notched point, made of Gronlid

siltstone. There is some remnant cortex on the ventral side of the point, and both sides show evidence of the grey specked patination that occurs with Gronlid siltstone. This point is generally well made and complete. The notches are u-shaped and wide extending deep onto the base of the point.

In addition to the points from level 13, there are two partial points from level 12. Artifact number 1-366 appears to be an Avonlea point made from Swan River Chert (Figure 6.2 A). A second partial projectile point is artifact 4-326 is also Swan River chert and is just the basal portion. This artifact may represent the base of a Besant point (Figure 6.2 B).

6.2.3.3 Utilized Flakes

A total of 10 utilized or retouched flakes were recovered from levels 11 through 13. Of these, three were from level 11, five from level 12 and two from level 13. In contrast to the other levels, only a small number (2) of these utilized flakes were Swan River Chert. For a breakdown of utilized flakes per level by material, see Table 6.7.

Table 6.7 Utilized Flakes by Level and Material

Level	Material	Count
11	SRC	1
11	Chert	2
12	SRC	1
12	Quartzite	1
12	Chert	1
12	Chalcedony	1
12	Unidentifiable	1
13	Quartzite	2

6.3 Pottery

The pottery from the Avonlea/Besant levels of FbNp-1 lack any rim sherds. However, the uniqueness of the attributes allows for assigning of a separate vessel number to the pottery from this level. A full 95% (n= 481) of the pottery recovered from these levels is net-impressed, which is frequently found in conjunction with Avonlea projectile points. The net-impressed pottery was found in level 12 immediately preceding the mixed Avonlea/Besant level (13) somewhat clarifying the confusion that can be caused by the mixed lower levels. In addition to net-impressed pottery, however, there is one possible cord roughened sherd from level 12, as well as four sherds of indeterminate exterior finish. These body sherds demonstrate that level 12 can also be considered a mixed level, as cord roughened pottery tends to be more indicative of a Besant occupation. All of the pottery from this level has a compact paste and fine grit or sand temper and all are body sherds. The maximum thickness of the body sherds is 10.41mm with a mean of 7.54mm and a median of 7.35mm. The minimum thickness is 4.12, with a mean of 6.61mm and a median of 7.08mm.

Level 12 is not the only pottery bearing level of the lower levels. Levels 11 and 13 also contained pottery though not to the extent of the level 12. Level 11 had one small sherd with a smooth exterior finish that was exfoliated on the interior and of an indeterminate temper. The paste, like that of the sherds in level 12, is compact. Due to the exfoliation, minimum and maximum thickness measurements were not taken. Also containing a small amount of pottery is level 13, with five body sherds. The exterior finish on all five sherds is indeterminate due to the highly fragmented nature of these sherds. The paste appears to be compact with a fine to medium grit temper.

6.4 Spatial Distribution

Artifact distribution in levels 11 through 13 show no continuity from level to level. Occupation of level 11 is largely concentrated in Area C, to the near complete exclusion of the other areas of the site. The only exception is the small amount of debitage recovered in Area A (Figure 6.3). Level 12 displays an increased utilization of all areas of the site, though the most intense concentration of artifacts appears in Area A, consisting primarly of debitage and tools. Pottery is more largely concentrated in Area C, and is accompanied by a light scatter of debitage in the same area (Figure 6.4). The largest concentration of artifacts from level 13 can be found in Area B. It is worth noting, however, that a light scatter of debitage is also present in Areas C and D, and all of the projectile points recovered from this level were also in these two areas.

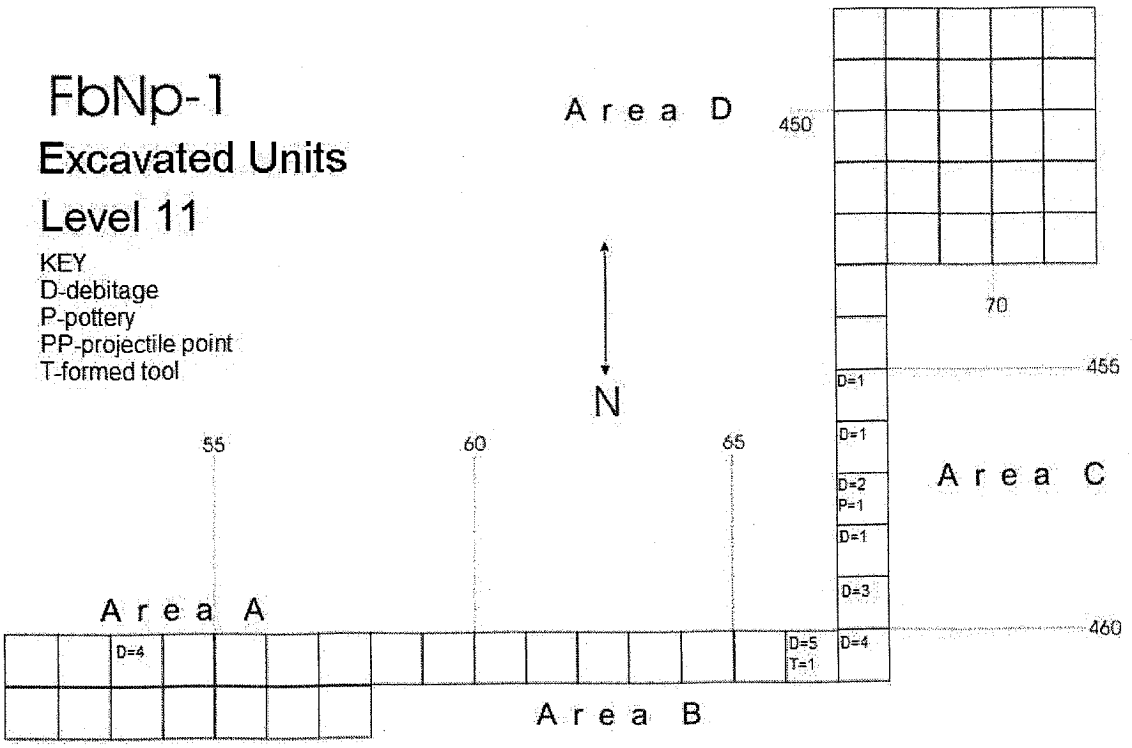

Figure 6.3 Spatial distribution of Level 11

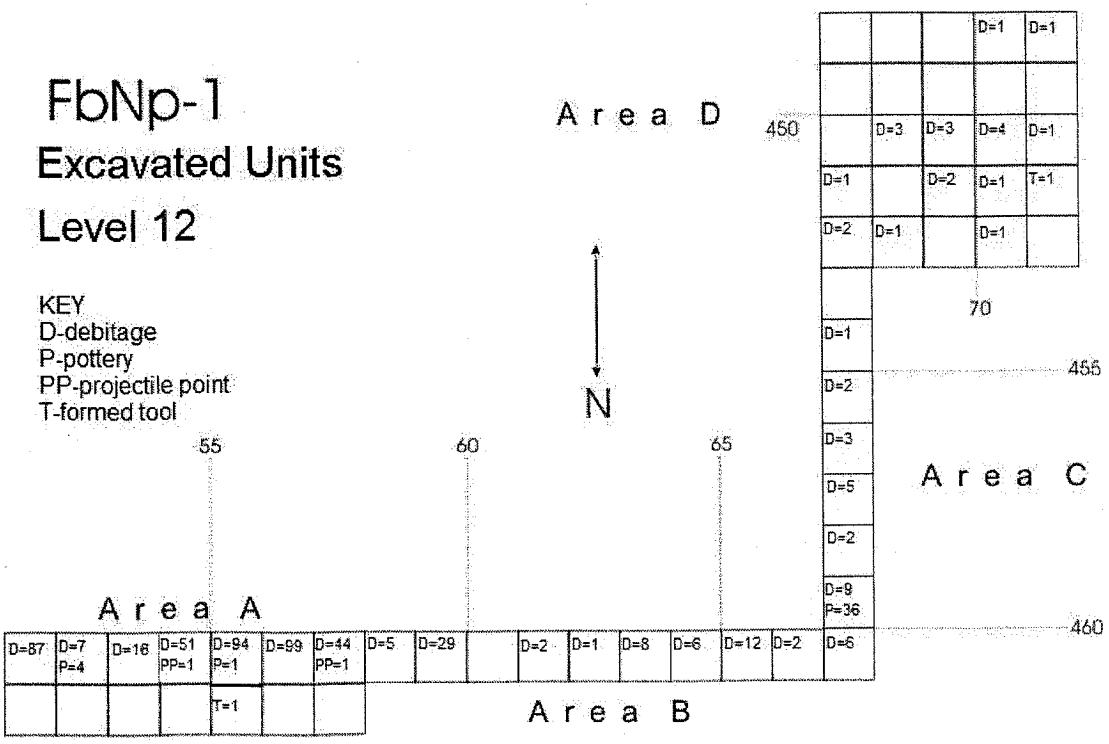

Figure 6.4 Spatial distribution of Level 12

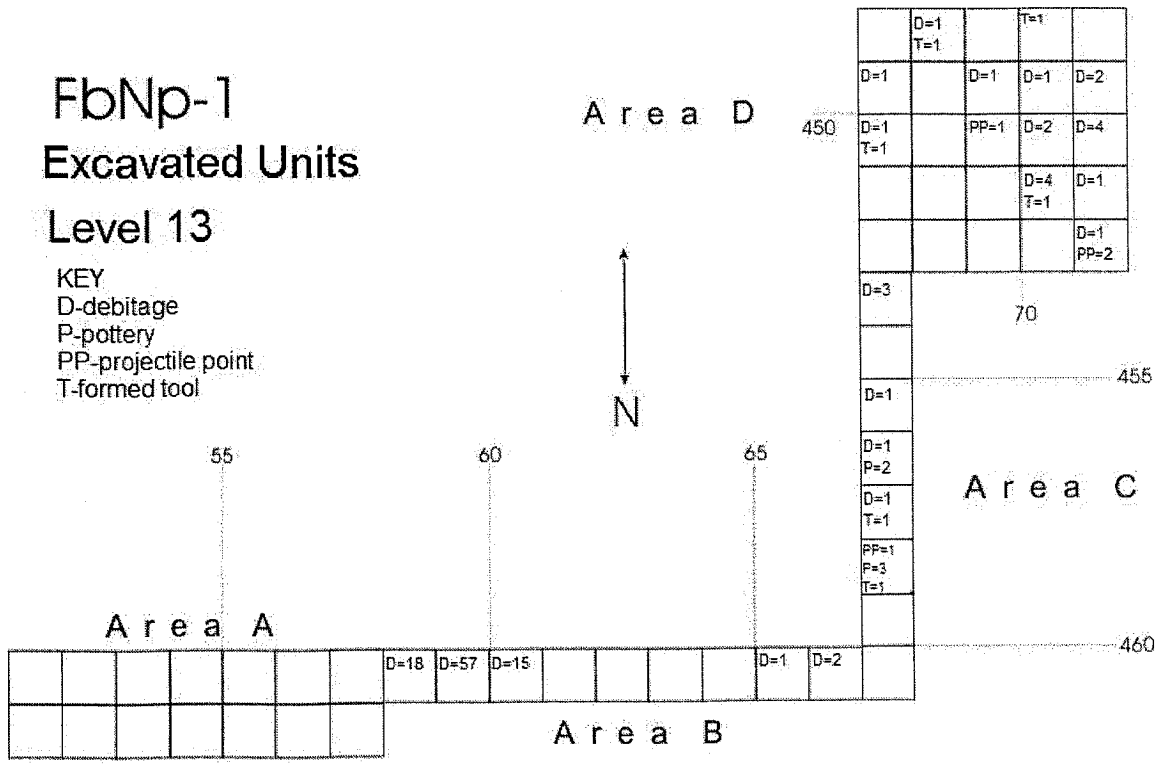

Figure 6.5 Level 13 spatial distribution

6.5 Conclusions

The pottery as well as projectile points from these levels make affiliation with the Avonlea horizon as well as the Besant complex apparent. Level 11 may represent a solid Avonlea occupation, while levels 12 and 13 are mixed Avonlea/Besant. The presence of both Avonlea and Besant pottery and projectile points in the same levels suggests that these two cultural entities existed in this area during the same time period. Geological evidence uncovered during excavations may indicate that the lowest levels are the result of hydrologic transportation rather than *in situ* occupations (Walker et al. 1986: 14-29).

Discussion and Intersite Comparison

7.1 Introduction

As previously discussed in Chapter 2 of this thesis, it is generally agreed that the Old Women's Phase appears on the Northern Plains at approximately 1200 BP, and is directly followed by the Mortlach Phase in Saskatchewan beginning around 650 BP. Both of these phases are represented by occupation levels recovered during excavations at FbNp-1. While pottery styles associated with both of these phases tend to be easily discernable one from the other, the projectile points are described as being morphologically similar. Projectile points associated with both phases tend to be small side-notched points, and are frequently interpreted as being hastily manufactured. This is due to the high volume of points manufactured by the pressure thinning of flakes as opposed to the early style of manufacture that included bifacial percussion thinning of a blank, followed by pressure flaking and retouching (Bradley 1991:394-395). There is an on-going discussion in attempts to classify these points, and many researchers have used either metric, non-metric, or both sets of attributes in their classification schemes. This chapter will explore the pottery styles common to each of these Late Plains Period phases and examine the projectile point classification systems associated with each of them, as well as compare the assemblage from FbNp-1 with other Late Plains Period assemblages.

7.2 Old Women's Phase

7.2.1 Pottery

Old Women's Phase pottery is generally characterized as Byrne's Saskatchewan Basin Complex Ware Late Variant (Byrne 1973), and more recently Walde and Meyer (2003:142) have suggested that Byrne's definition should be incorporated into the already existing and defined Ethridge Ware. Bryne described his Late Variant pottery based on paste, form, finish and decoration. He noted that the paste can be compact or blocky with grit temper (crushed granite) that varies from small to large, sometimes within a single vessel. The paddle and anvil style of production was used in manufacturing these vessels which is responsible for the frequent occurrence of anvil depressions on the interior of the vessel (Green 1993:17). There is evidence as well of smoothing, sometimes to such an extent as to nearly completely obliterate the finish which may be either cord-roughened or fabric impressed, though some vessels appear to have been manufactured with a smooth finish (Kehoe 1959, Byrne 1973, Green 1993). The following is a more complete list of Old Women's pottery characteristics found on the Northern Plains:

- Vessel shape – generally globular, but can also be conoidal with bases usually rounded though not to the complete exclusion of flattened bases
- Temper – Generally grit from crushed granite or quartzite with ranges from fine to large to very large, up to 15mm
- Paste – Generally course, poorly consolidated
- Lip – Generally flat with exterior beveling, but can also be rounded or ridged and is often thickened

- Rim – Generally excurvate or straight with others such as S-profiles also possible
- Neck – Generally shallow and short with some concave exaggeration
- Shoulder – Absent, indistinct or pronounced. When present, thickening of the ridge often occurs either internally or externally
- Body – Generally thick walled with a variety of finishes including cord-roughening and fabric impressing that was obtained by the use of cord or fabric wrapped paddles used in conjunction with an interior anvil. Smoothing of the finished exterior is common, and can result in the complete obliteration of exterior finish, while the interior is generally smooth. Wall thickness generally ranges from 6 to 15mm thick.
- Decoration – Vessels are frequently undecorated, but when decoration is present, it may take the form of tool impressions, especially cord-wrapped tool impressions along the lip and rim. Finger pinching may also be present and, less common, are punctates.

These characteristics, combined with radiocarbon dates ranging from 1155 ± 75 (S-2814) years BP in cultural level 10 to 790 ± 135 (S-2810) years BP in cultural level 6, place levels 6 through 10 well within the accepted range for Old Women's Phase occupations.

While the majority of vessels recovered from Old Women's phase sites tend to be globular, conoidal vessels do occasionally occur. The Tschetter site just west of Saskatoon contained at least one conoidal vessel (Linnamae 1988:112) with other features that are more common to Old Women's pottery such as a fabric-impressed exterior and thick, loosely consolidated paste. The Old Women's phase vessels

recovered from FbNp-1 were to a large extent too fragmented to allow a clear idea of vessel shape, with the notable exception being the basal fragments that were reconstructed to reveal a flattened. In addition to the basal sherds, two large shoulder sherds were also conjoinable. No vessel designation could be assigned to the shoulder sherds, but it is noteworthy that the shoulder is pronounced and was constructed in the same manner as the basal sherds, by the use of additional clay to thicken this part of the vessel.

7.2.2 Projectile Points

Projectile points traditionally associated with the Old Women's Phase on the Northern Plains are generally referred to as Prairie Side-notched. The existing classification scheme used for projectile points associated with the Old Women's Phase is based primarily on research by MacNeish (1958), Forbis (1960) and Kehoe (1966). Though there have been other attempts to revise and define these typologies (Whelan 1976, Nicholson 1976), the dominant system utilized in Saskatchewan today is based on Kehoe's work and most publications simply refer to the points as either Plains or Prairie Side-notched. The initial study of Late Period projectile points to make an attempt at spatial and temporal patterning was MacNeish's work with points recovered from the Lockport site (EaLf-1) in southeastern Manitoba (MacNeish 1958). In his final report, MacNeish described two major types of points, the Prairie Side-notched and the Plains Side-notched. He described Prairie Side-notched points as being generally assymetrical with side-notching located above an irregular convex base (MacNeish 1958:104). These types were designed to reflect both temporal and spatial patterning as well as obvious morphological differences in style. The two types were settled upon only after taking

his initial findings from the Lockport site and applying them to other excavated sites in Manitoba. Because the sample was purely from Manitoba and relied upon a small sample, the study may have been somewhat short-sighted, but it still served as the basis upon which future research could be built.

In 1960, Forbis provided the next step in Late Plains projectile point classification with his work at the Old Women's Buffalo Jump. Using a more statistical approach, Forbis utilized techniques that would become popular with processual archaeologists and applied them to the concerns of the culture historical paradigm. In this way, he took detailed measurements of various features of each point, applied a variety of statistical tests and then arranged them chronologically to examine technological change over time. Discarding MacNeish's earlier system, Forbis established seven point styles that he believed could be reliably chronologically arranged to provide a relative dating system (Forbis 1960:94). In this work Forbis relied on clustering and averages of a set of points rather than individual measurements and noticeable morphological variation.

Tom Kehoe in 1966 published results of the next major study of late side-notched projectile points. This was based on points from the Gull Lake site, a deeply stratified site in southwestern Saskatchewan (Kehoe 1966:827). Kehoe's research showed a variety of points that could be found in different levels and he attempted to use these as temporal and spatial markers. He built upon the earlier work conducted by both MacNeish and Forbis to futher divide the broad categories of Prairie and Plains Side-notched projectile point types into several different varieties and refined his concepts through comparison with points from the Boarding School, Walter Felt, Old Women's Buffalo Jump, Hagen and Pictograph Cave sites. Citing work conducted in classical

archaeology, Kehoe (1966:827) established these expanded point typologies by looking not only at the artifact as a whole, but by examining each separate attribute, a methodology similar to that earlier employed by Forbis. Kehoe believed that by examining the parts that compiled the whole, he would be able to better identify distinguishing characteristics and that in doing so better relative dating can be achieved by measuring the change that occurs in each feature.

Under this system, Kehoe maintained the general type names of Prairie and Plains Side-notched point established by MacNeish and then applied the variants used by Forbis under each. Kehoe identified six varieties of Prairie Side-notched type points. As a general type, Prairie Side-notched points were found to be of irregular flaking with "poorly defined angles" (Kehoe 1966:830) and notches that were generally large and wide located above basal corners that are rounded. Kehoe also stated that there is a purposeful asymmetry that is evident, and the bases tended to be straight with rounded corners (Kehoe 1973:58). Some Prairie points showed some serration, but Kehoe determined this to not be purposeful and to be more the direct result of the irregular flaking pattern.

Until 2001, these were the main typologies used on the Northern Plains for identification of Prairie Side-notched points. Trevor Peck from the University of Calgary and John Ives from the Heritage Resource Management Branch in Edmonton published a reworking of the older classification systems in 2001 that produced results suggesting the earlier typologies did not adequately address the issues of spatial and temporal variation. In defining their typology, Peck and Ives (2001) performed a series of one-way ANOVA tests on sets of points recovered from both Alberta and Saskatchewan, and used a Scheffe test as the post-hoc analysis.

Peck named the projectile points found in sites dating from 1250BP to 650BP in Saskatchewan the Cayley series, after Cayley, Alberta near the Women's Buffalo Jump. The main metric identifying features of the Cayley series are basal height, notch depth, notch height, shoulder height, basal angles (both distal and proximal) and shoulder angle (Peck and Ives 2001: 177), while the main discrete (non-metric) attributes used in identifying Cayley series points are basal edge shape, notch form (shape) and base form (shape) (Peck and Ives 2001: 176).

Basal edge shapes found in the Cayley series are generally straight with a second tendency to be concave. There is a preference for V-shaped broad notch forms as well as round shallow notched, and basal shapes are generally fish-tailed but can also be oblong or barn-shaped (Peck and Ives 2001: 176). Continuous attributes used to identify Cayley series points are expressed in terms of a mean with a standard deviation and can be found in table 7.1.

Table 7.1 Cayley Series Continuous Attributes (from Peck and Ives 2001)

Attribute	Mean	Std Dev.
Base Height	1.98	1.1
Notch Depth	1.8	.66
Notch Height	3.21	1.06
Shoulder Height	6.45	1.39
Distal Base Angle	112.44°	17.3°
Prox Base Angle	105.2°	17.5°
Shoulder Angle	106.7°	16.7°

7.2.3 Intersite Comparison

Old Women's Phase sites are common in Saskatchewan, and what can be considered a typical assemblage is found at the Tschetter site. The Tschetter site is located approximately 18km west of Wanuskewin Heritage Park and FbNp-1 in the Dumfernline

Sandhills, and was excavated by field schools from the University of Saskatchewan as well as by the Saskatchewan Archaeological Society (Prentice 1983:1-5, Linnamae 1988:91, 101-103). Because of its proximity to FbNp-1, this site was chosen as a comparative model for both pottery and projectile points. Artifacts recovered from the Tschetter site formed the basis for a Master of Arts Thesis within the Department of Archaeology by Jean Prentice in 1983.

While the Tschetter site lacked a great abundance of pottery (Prentice 1983:128, Linnamae 1988), there was one vessel that was able to be reconstructed to the extent that vessel and lip shape could be determined. With its thick vertical walls, grit temper, elongated fabric-impressed body and rounded base, the Tschetter pot clearly fits into the definition of Old Women's pottery. Of note is the flattened lip. While it lacks the extended internal flange that is evident on some of the rim sherds recovered from FbNp-1, this vessel's lip is noticeably flattened and shows thickening on the inner corner. Three other vessels were identified from the Tschetter site based on rim sherds. While one vessel was exfoliated to the extent that lip form was not easily identifiable, the remaining two displayed the same flattened surface as vessel 1 as well as the vessels from FbNp-1 (Prentice 1983:128-134). This flattening of the lip surface, in contrast to a more rounded lip, may be indicative of a North/South or East/West variant or subphase within the Old Women's Phase (Dale Walde, personal communication 2004), but more research is needed before any conclusive statement can be made. It is worth mentioning, however, that if such a variant is evident in the pottery, it may well tie into some of the more recent work on projectile point variation, which would lend credence to the recognition of variation within the pottery and possibly show the existence of a subphase. Two of the vessels from the Tschetter site have fabric impressed exteriors and

two have smoothed exteriors. Smooth or obliterated exterior finish is common among vessels from FbNp-1, and this appears to be a consistent feature when examining vessels from the Tschetter site.

There were a total of 270 projectile points recovered from the Tschetter site, all of which were identified as Prairie Side-nothced, following MacNeish's typology (Prentice 1983:99). Some difficulties arise when attempting to apply Peck and Ives typology to the Tschetter points due mainly to differential recording of attributes. Base form, for instance, is considered a defining characteristic for the Cayley series, but the terms utilized by Peck and Ives (2001) are largely absent from Prentice's descriptions. This problem can be overcome to a certain extent by utilizing metric values for the various attributes considered to be indicative of the Cayley series. When using averages for basic measurements, the Tschetter projectile points tend toward the Cayley series. That is, for the four major identifying features of a Cayley series projectile point (base angles were not recorded for projectile points recovered from the Tschetter site), the averages of base heights, notch depths, notch heights and shoulder heights all fall within the acceptable range for this series.

When the projectile points from the Tschetter site are compared to those from the Old Women's levels of FbNp-1, the similarities are obvious. Both sets of points have the same general characteristics in that they are frequently reworked and have low rounded basal edges and wide shallow notches. As is common with any discussion wherein a combining of a group of artifacts occurs, it is important not to allow the general characteristics of the group to overshadow the attributes of the individual. That is, the assumption is frequently made that a group of points, because they are found in context with one another, all belong to the same type. To test whether all projectile

points in this collection are truly from the Cayley series, measurements were made of the primary identifying attributes of a selection of points. It came as no surprise that at least one projectile point (specimen 27-230) from the Tschetter collection showed a greater affiliation for the Mortlach series than the Cayley series.

Another example of an Old Women's site is the Sherwin Campbell site (EgOa-5). The Sherwin Campbell site is a habitation and processing site found on the Missouri Coteau in the mixed grassland region near Elrose, Saskatchewan (Whatley 2004:6). The Sherwin Campbell site was surface collected in 1989 after the land owner began finding cultural remains while breaking up the land for cultivation. Further work at the site was completed in 2001 when Kevin Whatley, a graduate student at the University of Saskatchewan, conducted testing followed by the excavation of one square metre at the site (Whatley 2004:3). As a result of the survey and the later excavation, projectile points and pottery belonging to the Old Women's Phase were recovered from the site.

A total of 303 pottery sherds were recovered from the Sherwin Campbell site, and from those 303 sherds 20 vessels were identified (Whatley 2004:116-142). All of the vessels were identified as belonging to the Old Women's phase. Because most of the vessels are represented by a single rim sherd, it is impossible to discuss general vessel shape other than to note that one basal sherd was recovered that showed a rounded base and one of four shoulder sherds showed a prominent thickening of the ridge (Whatley 2004:136-137). The rounded base contrasts with basal sherds recovered from FbNp-1, which showed a flattened base, but the presence of angular shoulder sherds, if only of one vessel, is consistent. The main feature of note from the Sherwin Campbell pottery collection that are important to this discussion is the lip shape. All of the rim sherds from FbNp-1 have a distinct flattening of the lip, some to the extreme (see

Appendix B for vessel by vessel descriptions). Vessels recovered from the Sherwin Campbell site have a mixture of both flattened and rounded lip shapes, a notable feature given its location to the southwest of both the Tschetter site and FbNp-1. Other characteristics of the Sherwin Campbell pottery are consistent with that recovered from FbNp-1 in that it tends to be thick, loosely consolidated and primarily grit tempered.

A total of 34 projectile points where recovered from the Sherwin Campbell site, and of these 30 were indentified as Prairie Side-notched and one as Plains Side-notched. The typology of the remaining three was indeterminate (Whatley 2004:58-81). Typological determination of the Sherwin Campbell projectile points was based on Nicholson's (1976) work at the Stott site, adding basal juncture shape as an additional attribute (Whatley 2004:58). Despite the one projectile point that was identified as being a Plains Side-notched, when the projectile point metrics are compiled and averaged, the resultant data suggest that this particular set of points fall well within the parameters of the Cayley series as described by Peck and Ives (2001). As with the collection from Tschetter, however, there are several individual points that bear a closer resemblance not only morphologically but also metrically to the Plains Side-notched (or Mortlach) series.

When one takes into account the changes that are noted as occurring to the Cayley series for the late Old Women's Phase, it becomes evident that the attributes most accountable for resemblance to the Mortlach series are also traits that are noted in later Cayley series points from Alberta. These same traits are identifiable in the upper-most Old Women's levels from FbNp-1, and suggest that changes occurring in projectile point manufacturing were already underway prior to the Mortach phase replacing the

Old Women's phase on the Plains. It should be noted, however, that a similar evolution of style does not occur in regards to the pottery of each respective phase.

7.3 Mortlach Phase

7.3.1 Pottery

There are currently some differences in the interpretation of pottery of the Mortlach phase. Malainey (1991; 1995) conducted a study of terminal Late Period pottery in Saskatchewan which produced a much more restricted view than was previously taken by Byrne (1973) as well as others (Meyer 1988, Meyer and Epp 1990) in defining what could and could not be considered Mortlach. Malainey proposed that the pottery assemblages south of the Qu'appelle Valley should be considered Mortlach and belonging to the Mortlach Aggregate, while those north of the Qu'appelle Valley should be considered Wascana ware belonging to the Moose Jaw culture. Walde (2003) has more closely followed Byrne's definition of Mortlach and considers much of the Terminal Late-Period pottery on the Plains of Saskatchewan to be part of the Mortlach Phase, with the variation in styles to be indicative more of a subphase than a completely separate cultural entity. He therefore ascribes northern Mortlach pottery found in the Parklands to the Lozinsky subphase, and the southern variant as the Lake Midden subphase.

Both Malainey and Walde's approaches have their origins in earlier work. Malainey's use of Wascana Ware is based on Alice Kehoe's work (1959). Kehoe described Wascana ware as consisting of a variety of forms and finishes, which makes its precise definition difficult (Kehoe 1959:240-243), but the primary identifying features include a strong tendency for either straight, angled or S-rim profiles, globular

vessels formed using the paddle and anvil technique, thin lightly tempered compact paste, and exterior surfaces that are either smoothed or bear cord- or fabric-wrapped impressions (Kehoe 1959:241, Malainey 1998:872). Kehoe also notes a strong tendency for decoration including punctates and cord-wrapped tool impressions to appear on Wascana ware vessels.

Walde (2003) rejects Malainey and Kehoe's ideas of two separate cultural entities, opting instead to more closely follow Byrne's (1973) idea of recognizing Mortlach as one entity. Walde does expand on this work, however, in that he sees a north – south division that represents two separate subphases as already mentioned. The Lozinsky subphase of Mortlach is the more northerly and can be found north of the Qu'appelle Valley. Pottery of the Lozinsky subphase is most noted for its affinity to both Mortlach and Selkirk vessels (Walde 2003:64). Walde goes on to suggest that based on this affinity as well as raw lithic materials such as Gronlid Siltstone, the people of the Lozinsky subphase were more closely associating with their neighbours to the north than with those of the Lake Midden subphase, despite the similarity of pottery with the Lake Midden subphase (Walde 2003:64). Equally, sites containing an assemblage that includes pottery of the Lake Midden subphase show a great deal of intermingling with the Middle Missouri region to the south (Walde 2003:52). Despite syncretic and exotic vessels present in the collections of both the northern and southern regions, Walde's data suggest that there are enough similarities to allow for these cultural expressions to be considered subphases rather than separate entities.

Walde (2003:60) defines Mortlach pottery as having four main vessel profiles, vertical, angled, S-rim and wedge rim. Additional characteristics of Mortlach phase pottery include cord or fabric roughened surfaces, check-stamped surfaces or smoothed

surfaces. Decorations include dentates, cord wrapped tool impressions, notching, pinching and quartering. The paste is generally compact with light temper and the exterior surface may be burnished.

Mortlach pottery is thought to have been manufactured by Assiniboine, and the geographical distribution of the two coincide. The northern boundary for the Mortlach phase is the boreal forest (Walde 2003, Walde et al. 1995) where, as mentioned previously, the pottery frequently exhibits some Selkirk features. The southern boundary extends to the Middle Missouri region, and the eastern boundary appears to be delineated by the presence of Black Duck as well as Sandy Lake ware in southwestern Manitoba (Bryant 2002).

7.3.2 Projectile Points

Projectile points associated with Mortlach phase sites are commonly referred to as Plains Side-notched. Development of the typology of these terminal Late Period projectile points has followed along similar lines as that of the Cayley series, with MacNeish (1958), Forbis (1960) and Kehoe (1966) playing the major roles in establishing the initial identifying attributes for recognizing Plains Side-notched points.

The temporal range for Plains Side-notched projectile points was determined to be from approximately A.D. 1000 to A.D. 1300, with some continuing on to historic times (MacNeish 1958). The points were described as generally being small in size and "roughly equilateral in outline with small side-notched (MacNeish 1958:104). The lateral margins were described as being generally straight with some being slightly convex, and having straight to slightly concave bases. Kehoe (1966:830) noted that the bases on Plains Side-notched points tended to be angled or squared off, and were

frequently wider than the shoulders. Notches also appear to occur higher on the body, creating a taller base than with Prairie Side-notched points.

When Peck and Ives (2001) completed their study of the latter of the Late Plains period projectile points, they renamed the Plains Side-notched point to Mortlach and called it a group to reflect the "tighter clustering of attributes seen later in the eastern group of sites (Peck and Ives 2001:175). Because of the obvious differences in pottery of the Mortlach and Old Women's phases, it would not be unreasonable to look for variation in projectile point styles as well. Coinciding with pottery phases, the Cayley series points were found in assemblages across the Northern Plains from 1250 B.P. to 650 B.P., after which, in Saskatchewan, the Mortach series point replaces the Cayley series. In Alberta, Cayley series points are thought to continue on into protohistoric times, echoing the presence of Old Women's pottery as well.

The main identifying characteristics of the Mortlach group projectile point include a generally straight basal edge, though it can be concave, U-shaped narrow or round shallow notch forms and a rectangular or fish-tailed base. The characteristic metric attributes are outlined in Table 7.2.

Table 7.2 Mortlach Group Continuous Attributes (From Peck and Ives 2001)

Attribute	Mean	Std Dev.
Base Height	4.11	1.21
Notch Depth	2.29	.65
Notch Height	2.52	.81
Shoulder Height	6.82	1.16
Distal Base Angle	99.06°	10.06°
Prox Base Angle	95.07°	10.34°
Shoulder Angle	91.77°	15.21°

7.3.3 Intersite Comparison

Mortlach phase sites are commonly found across the central and eastern Saskatchewan plains. One such site is the Sjovold site. The Sjovold site is located southwest of the town of Outlook, Saskatchewan, just north of the northern most extent of the Missouri Coteau (Dyck and Morlan 1995). This large habitation site is multi-component and contains multiple levels of Late Plains Period occupations.

Layer II was identified as belonging to the Moose Jaw culture. As discussed earlier in this chapter, the Moose Jaw culture and its pottery, referred to as Wascana ware, correspond to the Lozinsky subphase of the Mortlach phase. Both pottery and lithics were recovered from this site that are characteristic of this phase (Dyck and Morlan 1995). There were two vessel recovered from Layer II, both with a complex profile (Dyck and Morlan 1995:189-193) and both with affinities to the Lozinsky subphase pottery recovered from FbNp-1. The presence of punctates (including interior bossing) on vessel C as well as the pinching and cord-roughening that is present on vessel B suggest an affinity with the pottery remains from the upper levels of FbNp-1. A high occurrence of smoothing is present on pottery remains from FbNp-1, and smoothing is also present at the Sjovold site on the exterior of vessel C. While not all of vessel B could be recovered, it does appear that the pinching on this vessel represents quartering, an attribute that is largely absent from the pottery at FbNp-1. There is a general lack of Mortlach projectile points from the Sjovold site, making a comparison impossible. The pottery was included here to show a similarity in exterior finish (smoothing) as well as decorative similarities (punctates).

A second pottery bearing Mortlach site is the Lozinsky site. The Lozinsky site (FdNm-51) was surface collected in 1977 and 1978 by Dr. Ian Dyck of the Royal

Saskatchewan Museum. The Lozinsky site is located in the Parklands approximately 50km north of Saskatoon and just off the South Saskatchewan River (Malainey 1995).

There were a total of 17 projectile points recovered from excavations at the Lozinsky site that were identified as Plains side-notched. Morphologically, this collection of projectile points seems to exemplify the ideal of what constitutes a Plains Side-notched point. The bases are generally straight, though some show a small degree of concavity, and the basal angles tend toward 90° (Malainey 1995:112). Local lithic materials were heavily relied upon, with 14 of the 17 projectile points being manufactured of Swan River chert. Even within this collection of seemingly ideal Plains side-notched points, the degree of variance is such that at leave one point identified as Plains has a basal height that falls outside the mean of the Mortlach group (2.0cm), and a wider notched width than would be expected for a projectile point of this group (4.4cm).

Pottery recovered from the Lozinsky site was attributed to Wascana Ware by Malainey, and to Mortlach by Meyer and Epp (1990) and Walde (2003). The main area of disagreement is with the presence of Selkirk attributes that are frequently identified on Mortlach vessels north of the Qu'Appelle Valley as already discussed. This argument notwithstanding, there are several attributes shared by pottery recovered from FbNp-1 and the Lozinsky site. Cord-wrapped tool impressions are the most common brim decoration (Malainey 1995:128-133), as with those vessels from FbNp-1. A single row of punctuates directly below the brim is also common among the vessels from both sites. Another noticeable similarity between the two collections is the exterior surface finish. The majority of sherds recovered from FbNp-1 show either an obliterated finish or a smooth finish, not unlike the plain finish that makes up nearly 30% of the collection at the Lozinsky site (Malainey 1995:126).

Absent from Lozinsky, but noticeably present at FbNp-1 are the mini-vessels. While they are unusual in their appearance, the decorative motifs are still similar to those found at the Lozinsky site as there is a single row of punctuates present as well as tool impressions along the brim of the vessels.

7.4 Conclusions

Attempting to bridge the arguments between pottery variation and projectile point variation is a daunting process. Peck and Ives' (2001) proposed system of projectile point typology fits in with accepted pottery phases recognized on the Northern Plains, with the Cayley series being normally found in sites containing Old Women's vessels and the Mortlach group found in sites containing Mortlach pottery. One notable exception to this is that following Malainey (1995), Mortlach pottery north of the Qu'Appelle valley should be considered to be Wascana ware and corresponding to the Moose Jaw culture. While there are a number of problems with the proposed projectile point typology, there was no discernable difference between projectile points south of the Qu'Appelle valley and those north of the Qu'Appelle valley. While this in and of itself is not enough to reject the existence of a separate ware on the Northern Plains, it can help to further clarify the issue when one considers that a variance should be present when proposing different phases.

Chapter 8

Conclusions

The Old Women's phase on the Northern Plains is recognizable in the archaeological record by the thick walled pottery, use of local lithics, and the presence of Cayley series projectile points. These are believed to represent proto-Blackfoot populations. Mortlach occupations tend to also have a high reliance on local lithics, but the pottery possesses significantly thinner walls, and the projectile points are classified as Mortlach group points, which tend to be also be thinner than their Cayley counterparts as well as more regular in shape. Mortlach occupations are believed to represent a proto-Nakota population.

Material remains from FbNp-1 have shown the presence of a series of Late Plains Period occupations. The oldest identifiable levels show evidence of a Besant/Avonlea occupation. While it has been considered that Besant and Avonlea co-existed for a long time period, it now appears that this was unlikely. Rather than Avonlea followed Besant (Cloutier 2004). While this discussion is outside the scope of this thesis, it evidence of both of these phases can be found in the lower levels, including levels with both styles of projectile points. The upper level of this time period (10) is solidly Avonlea, with the lowest two (12 and 13) being a mixed Besant/Avonlea component.

Also identified at FbNp-1 are levels that are clearly Old Women's occupations. Levels 6 through 10 have pottery identified as Old Women's phase pottery as well as projectile points that are assigned to the Cayley series following Peck and Ives (2001). The heavy reliance on local lithic sources is consistent with Old Women's phase occupations found across the Northern Plains. The three vessels ascribed to the Old Women's phase show some affinities to other Old Women's collections from the Northern Plains. Of special note is the flat brim that appears to be consistent in more northerly and easterly sites, with one in particular (vessel 11) having an exaggerated inward facing L-shaped lip with a maximum thickness of 20mm. Old Women's occupations are thought to represent a proto-Blackfoot population. This is supported by geographic continuity between Old Women's occupations in Alberta and known Blackfoot territory. This includes the Old Women's Buffalo Jump wherein existing Blackfoot populations have in their oral histories memories of the area and its use as a communal hunting site. It follows, then, that Blackfoot populations were present in the Saskatoon area prior to the arrival of Nakota and Cree populations.

The uppermost levels of FbNp-1 have not only evidence of European contact, but also show evidence of a Mortlach occupation. Mortlach protohistoric occupations are not uncommon (Walde 2003:76, Joyes 1973:78-83) and are commonly thought to represent proto-Nakota people. Following Walde (2003), the pottery remains appear to be of the Lozinsky sub-phase. Choosing Walde's scheme over Malainey's makes several statements. Assigning the pottery to two completely different complexes as proposed by Malainey suggests that the populations responsible for those occupations represent two separate cultures. Additionally, if such a cultural division were evident, it would be apparent in more than just one outward expression of that culture. For

instance, not only would the pottery display very different traits, but the projectile points would as well. Despite some misgivings with the latest projectile point typology, it is still evident that a stylistic continuity exists between the northern and southern Mortlach groups. If they represented two completely different ethnic groups, one would logically expect the points to display greater variation as well as the pottery, as is evident at the time of the arrival of Mortlach in Saskatchewan.

Following the same logic that was used in assigning the Old Women's phase to Blackfoot people, geographic continuity suggests that the Mortlach phase can be assigned to Nakota populations (Walde 2003). In addition to geographic continuity, other evidence can be looked at as well. As stated by Ewers (1974:81-82), there were several independent Nakota bands known to be on the Plains at the time of Lewis and Clark (Walde 2003:77-78). These bands operated largely independent of each other, but still recognized in each other a commonality and were never known to be at war with one another. A certain level of independence would provide for other evidence of cultural difference as well such as stylistic differences in pottery as well as other outward expressions of culture. If this information is taken further, it can easily represent the presence of the known northern and southern groups of Nakota, which may coincide with the Lozinsky and Lake Midden sub-phases of Mortlach occupations. Ethnographically, during the early historic period Cree peoples to the north were allied with the Nakota (Russel 1991; Wright 1995). This association presumably included intermarrying. It is also ethnographically known that women were responsible for pottery manufacturing (Schneider 1983). It would also stand to reason that stylistic difference was an intentional act from the potter based on an attempt to gain renown for their craft (Walde 2003:82). It is naïve to attempt to view pre-contact cultures as

existing within their individual boundaries with the only mixing to occur during trade. There was almost certainly an exchange of ideas and creative influences that arose due to intermarriage as well as the trade contact. Because of this fluidity of population, it is logical to assume that some stylistic approaches of one group would transfer to the neighboring group. This transfer of ideas, when applied to pottery remains from northern Mortlach occupations, readily and easily explains the Selkirk influence when one follows with the idea that Selkirk pottery was produced by Cree populations in the forest. Because of this population and stylistic fluidity as well as the relative abundance of syncritic Mortlach/Selkirk vessels, these should be considered diagnostic of the Lozinsky sub-phase of Mortlach. The northern and southern styles of Mortlach pottery are also united by common features, with the outside influences being imposed upon an already existing style. Because of this, recognition of two sub-phases as opposed to separate wares appears to be the more logical option.

While the general basis for the Cayley series and Mortlach group of projectile points appears to be accurate in terms of discrete attributes, the continuous attributes do not hold up to scrutiny. There are several reasons for this. One of the identifying attributes of the Cayley series is asymmetry. When dealing with asymmetrical artifacts, measurements from both sides must be considered separately. Peck and Ives, in their proposed scheme, chose to follow Forbis and take a mean of the left and right sides instead of considering each on its own. This leads to a smoothing of the supposed intentional asymmetry and a skewing of the real nature of the points. While statistical measurements may be useful in determining variability, there needs to be some caution used when viewing the results. When measurements were taken on the points from FbNp-1, each side was considered separately, and the results of the ANOVA and

Scheffe tests (see Appendix C for detailed results) showed a significant difference only in right basal edge height. This shows that the perceived variation in other attributes simply does not exist to any large extent for the projectile points of FbNp-1. These results stand to reason, when one considers the unlikelihood of a person sitting down to produce a projectile point and consciously deciding that they are going to make a notch that is wider than it is deep or create a measurable percentage to basal height. It is also interesting to note that when the same routines were performed on the projectile points recovered from Avonlea levels, the ANOVA failed to return any statistical difference between these points and the later Cayley and Mortlach points.

Another possible problem with the use of statistical measures to determine ethnicity lies in the measurements themselves. Even when using an easily delineated attribute such as notch height, the result is determined by the person taking the measurement. Errors or variance in measurement is very high. Appendix D shows a table of metric attributes measured by a group of graduate students from the Department of Archaeology at the University of Saskatchewan. All of the metric attributes were taken using a single set of calipers and on a single set of points. As is obvious from the results, metric attributes though static do change depending on the person who is doing the measuring. That is not to say that it is not possible to have one 'correct' measurement, but rather that the high variability can skew the intended results of statistical testing. Theoretically, the variability would wash itself when the various tests are applied, however when the attempt is made to assign ethnicity to such a minute variability as a fraction of a millimeter, it is less likely that differences in measurements will produce the same test results. I must question, therefore, whether complex testing accurately shows the variability we are seeking when applying such tests. In some

cases, perhaps, but when attempting to establish a projectile point typology system it seems unlikely. When the standard deviation is applied to the mean measurements of the main identifying attributes defined by Peck and Ives (2001), there is such a large area of overlap that it is possible to have a great number of points that fit into both the Cayley series and Mortlach group. Because of this great variability, the more reasonable approach would be to use primarily discrete attributes. Here again, however, there is a great deal of overlap in what defines each respective projectile point. If a site produces only a limited amount of projectile points by which to assign a cultural entity, the great possibility of overlap can be a hindrance to the task. It is because of this fact that pottery should be used as a primary cultural indicator for the Late Plains Period. Because of the availability of artifacts other than projectile points in the Late Period, it is a unique opportunity on the Plains to make use of artifacts for which we have ethnographic data that suggest affiliation with modern ethnic groups.

Where is the solution to this complex problem then, when there are problems with identifying attributes by both quantitative as well as qualitative means? As proposed by Peck and Ives, a combination of the two sets of identifying factors must be used. However, each projectile point should be considered individually as opposed to as a group. Only when the points are considered individually can changes in style be seen accurately. If the goal is to determine typology, assignment of the typology cannot be done solely as a group and without regard for some individual differences, because variations within the group can be indicative of a beginning of change. At the risk of taking one step forward and two steps back, it appears that the more traditional method of identification should be used. That is, that the projectile points with straighter, higher bases with basal angles approaching 90° and a classic triangular shape are classic

Mortlach group, while those that tend to be highly asymmetric with lower basal angles and wider notches are of the Cayley series.

When examining the collection from FbNp-1, some differences between the projectile points recovered from this site and the 'classic' Mortlach group points are evident. In general, the flaking on the Mortlach group points from FbNp-1 lacks the higher quality that was described by both Kehoe (1966) and Forbis (1960) as well as Peck and Ives (2001). The flaking is irregular and frequently tends to constitute edge retouch of a flake as opposed to bifacial reduction of a blank. While it is possible that this can be attributed to local lithic material and the best use thereof, it is more likely a further example of forest influence on stylistic properties of a Plains collection. It stands to reason that if forest influences are evident and able to be seen on other cultural expressions, then they will also be evident in projectile points. Additional research is required on not only Boreal Forest collections that correspond with the Mortlach time period (ca. 650BP – contact), but also projectile points of the Lozinsky sub-phase.

Projectile points belonging to the Cayley series from FbNp-1 are in general typical of the series. It is worthy to note, however, that those projectile points from the upper levels of Old Women's Phase occupations already show a tendency toward a change to either Mortlach group projectile points or later Cayley series points as found in Alberta after 650BP. While the two sets never fully converge, there is a distinct difference between early and late Cayley series points in Alberta, and the upper levels of FbNp-1 show a change occurring as well. The notch height tends to be smaller in the upper levels, something that is very noticeable in Mortlach group points, and they tend to be thinner, which is a characteristic of Mortlach as well. These trends that are evident in the upper Old Women's levels, however, do not indicate that the projectile points

were undergoing a change that would eventually lead them the Mortlach group style, but rather that there was a change that was beginning to occur at this time. Because of a lack of any true transitional Cayley/Mortlach projectile points (or rather the lack of recognition of such transitional points), it is more likely that the stylistic changes we see in the Cayley series at FbNp-1 were leading into the late Cayley series as seen in Alberta in the absence of Mortlach.

While some argue that cultural evolution does not actually occur on the Plains (Michlovic 1983) due to a continuity of basic subsistence practices throughout the ages, it is the subtle changes in technology and style that can act as preliminary indicators that change is beginning to occur. When viewing an assemblage, however, subtle differences in style and manufacturing cannot be seen when the entire assemblage is considered as a whole. Each individual artifact must be examined on its own merit without the bias of the other artifacts in the collection in order to see not only technological but also stylistic changes that occur through time. Only when we are able to more clearly pinpoint when and where these changes begin occurring can we truly view the evolution of populations on the Northern Plains into those that were present at the time of European contact.

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Appendix A

Fauna of Wanuskewin Heritage Park (Appended from Webster 1999)

Latin Name	Common Name
Mammals	
Bovidae	**Antelopes, Cattle, Sheep and Goats**
Bison bison	American Bison
Antilocapridae	**Pronghorns**
Antilocapra americana	Pronghorn
Cervidae	**Deer**
Cenus elaphus	Elk
Odocoileus virginianus	White- Tailed Deer
Odocoileus hemionus	Mule Deer
Felidae	**Cats**
Lynx lynx	Lynx
Felis concolor	Mountain Lion
Ursidae	**Bears**
Ursus americanus	American Black Bear
Ursus arctos	Grizzly Bear
Canidae	**Dogs**
Canis lupus nubilis	Buffalo Wolf
Canis latrans	Coyote
Canis familiaris	Domestic Dog
Vulpes vulpes	Red Fox
Vulpes velox	Swift Fox
Mustelidae	**Weasels and their Allies**
Gulo gulo	Wolverine
Taxidea taxus	American Badger
Mephitis mephitis	Striped Skunk
Lontra canadensis	River Otter
Mustela ermina	Ermine

Mustela frenata	Long- Tailed Weasel
Mustela vison	American Mink
Mustela nivalis	Least Weasel
Procyonidae	**Raccoons and their Allies**
Procyon lotor	Raccoon
Leporidae	**Rabbits and Hares**
Lepus americanus	Snowshoe Hare
Lepus townsendii	White- Tailed Jack Rabbit
Erethizontidae	**New World Porcupines**
Erethizon dorsatum	Porcupine
Castoridae	**Beavers**
Castor canadensis	American Beaver
Dipodidae	**Jumping Mice and Jerboas**
Zapus princeps	Western Jumping Mouse
Heteromyidae	**Pocket Mice and Kangaroo Rats**
Perognathus fasciatus	Olive-Backed Pocket Mouse
Geomyidae	**Pocket Gophers**
Thomomys talpoides	Northern Pocket Gopher
Muridae	**Rats, Mice and Voles**
Ondatra zibethicus	Muskrat
Microtus pennsylvanicus	Meadow Vole
Microtus ochrogaster	Prairie Vole
Cleithrionomys gapperi	Gapper's Red-Backed Vole
Onchomys leucogaster	Northern Grasshopper Mouse
Peromyscus maniculatus	Deer Mouse
Peromyscus leucopus	White-Footed Mouse
Sciuridae	**Ground Squirrels**
Spermophilus franklinii	Franklin's Ground Squirrel
Spermophilus richardsonii	Richardson's Ground Squirrel
Spermophilus tridecemlineatus	Thirteen-Lined Ground Squirrel
Marmota monax	Woodchuck
Eutamius minimus	Least Chipmunk
Soricidae	**Shrews**
Sorex cinereus	Masked Shrew
Microsorex hoyi	Pygmy Shrew

Vespertillionidae	**Bats**
Lasiurus cinereus	Hoary Bat
Lasiurus borealis	Red Bat
Eptesicus fuscus	Big Brown Bat
Lasionycteris noctivagans	Silver Haired Bat
Myotis lucifugus	Little Brown Bat

Birds

Podicipedidae	**Grebes**
Podiceps nigricollis	Eared Grebe
Podiceps auritis	Horned Grebe
Podylimbus podiceps	Pied-Billed Grebe
Aechmophorus occidentalis	Western Grebe
Pelecanidae	**Pelicans**
Pelecanus erythrorhynchos	White Pelican
Phalacrocoracidae	**Cormorants**
Pha/acrocorax auritis	Double-Crested Cormorant
Anatidae	**Swans, Geese and Ducks *Cygnus***
buccinator	Trumpeter Swan
Branta canadensis	Canada Goose
Chen caerulescens	Snow Goose
Anser albifrons	White-Fronted Goose
Anas strepera	Gadwall
Anas platyrhynchos	Mallard
Anas clypeata	Northern Shoveler
Anas acuta	Pintail
Anas crecca	Green-Winged Teal
Anas americana	American Wigeon
Anas discors	Blue-Winged Teal
Bucephala albeola	Bufflehead
Bucephala clangula	Common Goldeneye
Mergus merganser	Common Merganser
Mergus serrator	Red-Breasted Merganser
Aythya valisineria	Canvasback
Aythya affinis	Lesser Scaup
Aythya americana	Redhead
Aythya collaris	Ring-Necked Duck
Oxyura jamaicensis	Ruddy Duck
Cathartidae	**American Vultures**

Cathartes aura	Turkey Vulture
Accipitridae	**Ospreys, Eagles, Hawks and Allies**
Haliaeetus leucocephalus	Bald Eagle
Aquila chrysaetos	Golden Eagle
Accipiter cooperii	Cooper's Hawk
Accipiter gentilis	Goshawk
Accipiter striatus	Sharp-Shinned Hawk
Buteo platypterus	Broad-Winged Hawk
Buteo jamaicensis	Red- Tailed Hawk
Buteo lagopus	Rough-Legged Hawk
Buteo swainsoni	Swainson's Hawk
Circus cyaneus	Northern Harrier
Pandion haliaetus	Osprey
Falco sparverius	American Kestrel
Falco columbarius	Merlin
Falco peregrinus	Peregrine Falcon
Strigidae	**Typical Owls**
Athene cunicularia	Burrowing Owl
Bubo virginianus	Great Horned Owl
Asio otus	Long-Eared Owl
Asio flammeus	Short-Eared Owl
Aegolius acadicus	Northern Saw-Whet Owl
Nyctea scandiaca	Snowy Owl
Phasianidae	**Partridges, Pheasants and Grouse**
Bonasa umbellus	Ruffed Grouse
Tympanuchus phasianellus	Sharp- Tailed Grouse
Gruidae	**Cranes**
Grus americana	Whooping Crane
Grus canadensis	Sandhill Crane
Rallidae	**Rails and Coots**
Fulica americana	American Coot
Porzana carolina	Sora
Rallus limicola	Virginia Rail
Coturnicops noveboracensis	Yellow Rail
Charadriidae	**Plovers**
Pluvialis dominica	Lesser Golden Plover
Charadrius vociferus	Killdeer
Scolopacidae	**Sandpipers, Phalaropes and Allies**

Recurvirostra americana	American Avocet
Gallinago gallinago	Common Snipe
Tringa melanoleuca	Greater Yellowlegs
Tringa flavipes	Lesser Yellowlegs
Tringa solitaria	Solitary Sandpiper
Umosa haemastica	Hudsonian Godwit
Limosa fedoa	Marbled Godwit
Calidris melanotos	Pectoral Sandpiper
Calidris alba	Sanderling
Actitis macularia	Spotted Sandpiper
Catoptrophorus semipalmatus	Willet
Phalaropus tricolor	Wilson's Phalarope
Laridae	**Gulls, Terns and Skimmers**
Chlidonias niger	Black Tern
Sterna hirundo	Common Tern
Sterna forsteri	Forster's Tern
Larus californicus	California Gull
Larus pipixcan	Franklin's Gull
Larus delawarensis	Ring-Billed Gull
Columbidae	**Doves and Pigeons**
Zenaida macroura	Mourning Dove
Cuculidae	**Cuckoos**
Coccyzus erythropthalmus	Black-Billed Cuckoo
Caprimulgidae	**Goatsuckers**
Chordeiles minor	Common Nighthawk
Trochilidae	**Hummingbirds**
Archilochus colubris	Ruby- Throated Hummingbird
Alcedinidae	**Kingfishers**
Ceryle alcyon	Belted Kingfisher
Picidae	**Woodpeckers**
Colaptes auratus	Northern Flicker
Picoides pubescens	Downy Woodpecker
Picoides villosus	Hairy Woodpecker
Sphyrapicus varius	Yellow-Bellied Sapsucker
Tyrannidae	**Tyrant Flycatchers**
Tyrannus tryannus	Eastern Kingbird
Tyrannus verticalis	Western Kingbird

Sayornis phoebe	Eastern Phoebe
Myiarchus crinitus	Great Crested Flycatcher
Empidonax alnorum	Alder Flycatcher
Empidonax minimus	Least Flycatcher
Contopus borealis	Olive-Sided Flycatcher
Alaudidae	**Larks**
Eremophila alpestris	Horned Lark
Hirundinidae	**Swallows**
Riparia riparia	Bank Swallow
Hirundo rustica	Barn Swallow
Tachycineta bicolor	Tree Swallow
Corvidae	**Jays, Magpies and Crows**
Pica pica	Black-Billed Magpie
Cyanocitta cristata	Blue Jay
Corvus brachyrhynchos	Common Crow
Corvus corax	Common Raven
Paridae	**Titmice**
Parus atricapi!lus	Black-Capped Chickadee
Sittidae	**Nuthatches**
Sitta canadensis	Red-Breasted Nuthatch
Sitta carolinensis	White-Breasted Nuthatch
Certhiidae	**Creepers**
Certhia americana	Brown Creeper
Troglodytidae	**Wrens**
aedon Troglodytes	House Wren
Cistothorus palustris	Marsh Wren
Cistothorus platensis	Sedge Wren
Mimidae	**Mockingbirds and Thrashers**
Toxostoma rufum	Brown Thrasher
Dumete!la carolinensis	Gray Catbird
Musciapidae	**Thrushes and Allies**
Turdus migratorius	American Robin
Sialia sialis	Eastern Bluebird
Sialia currucoides	Mountain Bluebird
Catharus minimus	Gray-Cheeked Thrush
Catharus guttatus	Hermit Thrush

Catharus ustulatus	Swainson's Thrush
Catharus fuscescens	Veery
Regulus calendula	Ruby-Crowned Kinglet
Motacillidae	**Pipits and Wagtails**
Anthus spragueii	Sprague's Pipit
Bombycillidae	**Waxwings**
Bombycilla garrulus	Bohemian Waxwing
Bombycilla cedrorum	Cedar Waxwing
Laniidae	**Shrikes**
Lanius ludovicianus	Loggerhead Shrike
Lanius excubitor	Northern Shrike
Verionidae	**Vireos**
Vireo olivaceus	Red-Eyed Vireo
Vireo gilvus	Warbling Vireo
Emberizidae	**Warblers, Sparrows and Allies**
Setophaga ruticilla	American Redstart
Oendroica castanea	Bay-Breasted Warbler
Oendroica striata	Blackpoll Warbler
Oendroica virens	Black- Throated Green Warbler
Dendroica pennsylvanica	Chestnut-Sided Warbler
Oendroica palmarum	Palm Warbler
Oendroica magnolia	Magnolia Warbler
Oendroica coronata	Yellow-Rumped Warbler
Oendroica petechia	Yellow Warbler
Geothlypis trichas	Common Yellowthroat
Vermivora celata	Orange-Crowned Warbler
Vermivora peregrina	Tennessee Warbler
Wilsonia canadensis	Canada Warbler
Wilsonia pusilla	Wilson's Warbler
Seiurus aurocapillus	Ovenbird
Mniotilta varia	Black-and-White Warbler
Icteria virens	Yellow-Breasted Chat
Oolichonyx oryzivorus	Bobolink
Molothrus ater	Brown-Headed Cowbird
Quiscalus quiscula	Common Grackle
Icterus galbula	Northern Oriole
Euphagus cyanocephalus	Brewer's Blackbird
Euphagus carolinus	Rusty Blackbird
Agelaius phoeniceus	Red-Winged Blackbird
Sturnella neglecta	Western Meadowlark

Xanthocephalus xanthcephalus	Yellow-Headed Blackbird
Carduelis tristis	American Goldfinch
Calcarius ornatus	Chestnut-Collared Longspur
Junco hyemalis	Dark-Eyed Junco
Coccothraustes vespertinus	Evening Grosbeak
Carduelis flammea	Common Redpoll
Carduelis hornemanni	Hoary Redpoll
Carduelis pinus	Pine Sisken
Pinicola enucleator	Pine Grosbeak
Carpodacus purpureus	Purple Finch
Pheucticus ludovicianus	Rose-Breasted Grosbeak
Pipilo erythrophthalmus	Rufous-Sided Towhee
Spizella arborea	Tree Sparrow
Spizella passerina	Chipping Sparrow
Spizella pallida	Clay-Coloured Sparrow
Ammodramus bairdii	Baird's Sparrow
Ammodramus leconteii	LaConte's Sparrow
Melospiza lincolnii	Lincoln's Sparrow
Melospiza melodia	Song Sparrow
Passerella iliaca	Fox Sparrow
Pooecetes gramineus	Vesper Sparrow
Zonotrichia querula	Harris' Sparrow
Zonotrichia leucophrys	White-Crowned Sparrow
Zonotrichia albicollis	White- Throated Sparrow
Passerculus sandwichensis	Savannah Sparrow
Plectrophenax nivalis	Snow Bunting
Loxia curvirostra	Red Crossbill
Loxia leucoptera	White-Winged Crossbill

Amphibians and Reptiles

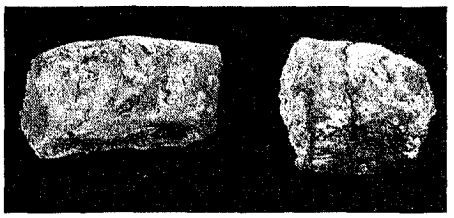
Ambystomidae	**Mole Salamanders**
Ambystoma tigrinum	Tiger Salamander
Bufonidae	**True Toads**
Bufo hemiophrys	Canadian Toad
Hylidae	**Treefrogs and Relatives**
Pseudacris triseriata	Boreal Chorus Frog
Ranidae	**Typical Frogs**
Rana pipiens	Leopard Frog
Rana sylvatica	Wood Frog

Colubridae	**Typical Snakes**
Thamnophis sirtalis	Red-Sided Garter Snake
Thamnophis radix	Plains Garter Snake

Appendix B
Vessel Descriptions with Rim Profiles

Rim profiles are to scale

Vessel 1



Mortlach vessel represented by three rim sherds. See also Chapter 4.

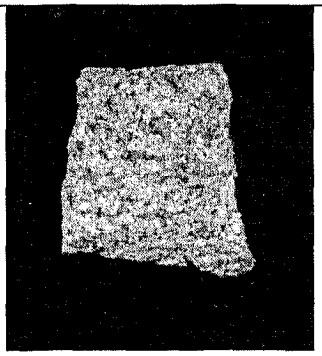
Form: This rim is rounded and possibly wedge shaped, but because of such small pieces it is difficult to discern

Finish: This vessel appears to be fabric impressed with some smoothing present

Paste: Compact, with fine grit temper dispersed throughout

Decoration: There is a row of oblique CWO impressions along the lip surface

Vessel 2



Mortlach vessel represented by one rim sherd. See also Chapter 4.

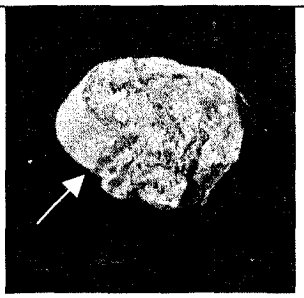
Form: This rim sherd has a flat lip surface with moderately rounded corners in what appears to be an S-profile

Finish: There is no discernable additional finish on this sherd.

Paste: Compact, with very heavy sand temper

Decoration: There are no additional decorations on this vessel

Vessel 3



Mortlach vessel represented by one rim sherd. See also Chapter 4.

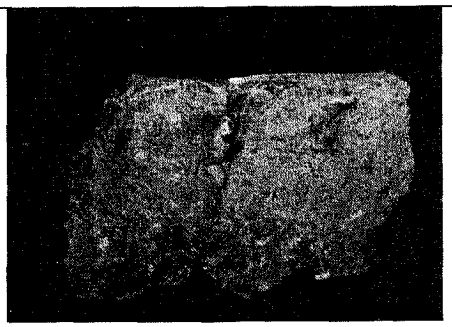
Form: This rim sherd has a rounded, L-shaped rim with a flat lip surface

Finish: Due to the small size of this sample, the finish is indeterminate

Paste: Appears to be compact with fine grit temper

Decoration: The lip surface is decorated with oblique CWO impressions. The interior of the vessel at the base of the lip has a single row of incising, as shown by the arrow in the photo.

Vessel 4



Mortlach vessel represented by 20 highly fragmented rim sherds. See Chapter 4.

Form: This vessel appears to be a mini-vessel with a straight rim

Finish: Smoothed, cord-roughened exterior with a brushed interior

Paste: Compact paste with fine grit temper dispersed throughout

Decoration: A row of pinching is evident along the outer lip corner. No other decoration is present

Vessel 5

Mortlach vessel represented by two rim sherds. See Chapter 4.

Form: Wedge shaped lip, though rim profile is indeterminate due to the small nature of the sample

Finish: There is no finish discernable

Paste: Compact paste with fine grit or sand temper

Decoration: There is a row of oblique CWO impressions along the brim

Vessel 6

Mortlach vessel represented by one rim sherd. See Chapter 5.

Form: This vessel appears to have a T-shaped lip, but due to the small, fragmented nature of the sample a rim profile is indeterminate

Finish: This vessel appears to be fabric impressed, with the fabric being folded over onto the brim surface

Paste: The paste of this piece is compact with a fine grit temper

Decoration: The lip surface has been destroyed and no decoration is discernable

Vessel 7

Mortlach vessel represented by two rim sherds. See Chapter 4.

Form: This vessel has a straight rim profile, with a rounded lip

Finish: This vessel has a fabric finish and the fabric impressions carry over onto the brim

Paste: The paste is compact with grit/sand temper

Decoration: There is evidence of a punctate below the lip on this vessel (shown by the dotted line) that extends through the interior vessel wall.

Vessel 8

Old Women's vessel represented by one rim sherd. See Chapter 5.

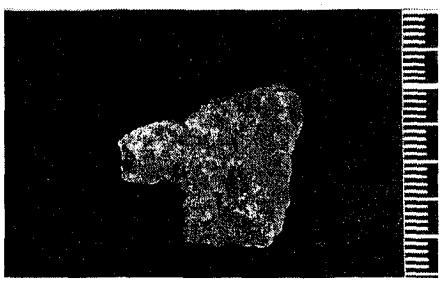
Form: This vessel has a straight rim profile with an L-shaped lip and flat brim.

Finish: There are fabric impressions on the exterior surface of this vessel that carry over onto the lip. The interior of the vessel is smoothed.

Paste: The paste is compact with fine grit/sand temper

Decoration: The only decoration present on this vessel is incising on the brim that runs parallel to the mouth of the vessel.

Vessel 9



Mortlach vessel represented by a series of five reconstructed sherds. See Chapter 4.

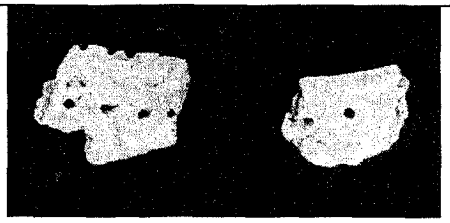
Form: The shape and profile are unable to be determined by the pieces of this vessel that are present. This appears to be part of a rim, but there is no lip or brim to make that determination possible.

Finish: Smoothed cord-roughened

Paste: This vessel is sand tempered

Decoration: A row of punctates is evident along the mid-line of the refitted pieces.

Vessel 10



Mortlach vessel represented by two rim sherds. See Chapter 4.

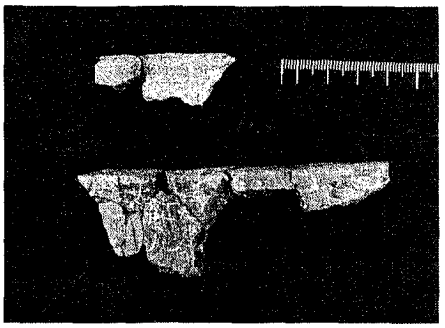
Form: This mini-vessel appears to be a straight rimmed vessel with rounded lip and brim surface

Finish: Part of the exterior surface is exfoliated, but it appears to be a smooth finish vessel

Paste: This vessel is exfoliating and has fine to medium grained grit temper

Decoration: Along the brim surface is a series of tool impressions that appear to be converging. In addition, there is a row of very small punctates just below the lip.

Vessel 11



Old Women's vessel represented by ten reconstructed rim sherds. See Chapter 5.

Form: This vessel appears to be a straight-rimmed vessel with a large L flange at the brim. The brim is very flat and the flange extends to the interior of the vessel.

Finish: There is evidence of cord-roughening as well as smoothing on the exterior surface of this vessel, while the interior shows wipe lines.

Paste: The paste of this vessel is

loosely consolidated with large grit temper.

Decoration: Vessel 11 has no evidence of any discernable decoration.

Vessel 12

Old Women's vessel represented by one rimsherd. See Chapter 5.

Form: While there is not enough of the rim to be able to state for certain, it appears to be slightly excurvate with a flattened brim and thickening at the lip.

Finish: The exterior of this sherd is exfoliated, making finish determination impossible. The interior, however, appears to be smoothed though lacking in wipe lines.

Paste: The paste of this rim sherd is loosely consolidated, with large grit temper.

Decoration: There is no decoration evident on this sherd.

Appendix C
Additional Projectile Point Measurements

Catalog #	Body Length	Stem Length	Total Length	Body Width	Min Stem Width	Base Width	Width of Left Notch	Depth of Left Notch	Width of Right Notch	Depth of Right Notch	Height of Left Basal Edge	Height of Right Basal Edge	Max Body Thickness	Max Stem Thickness
FbNp-1-1-135		6.3		14.1	8.2		2.8	2.4		3.0		3.6	3.4	2.9
FbNp-1-1-246		5.0		13.1	6.9	10.5	2.6	2.2	3.2	2.3		2.3	3.4	3.0
FbNp-1-15-70	8.5	6.5	16.4	12.7	8.7	12.9	2.4	2.2	2.5	1.8		3.3	3.2	2.3
FbNp-1-15-76	17.2	7.6	24.9	15.9	9.9	15.1	3.1	2.7	3.7	2.6		4.0	2.1	2.0
FbNp-1-15-77	16.7	9.2	26.1	4.8	9.4	11.6	4.2	1.4	3.7	1.8		4.4	4.9	4.0
FbNp-1-18-40	13.1	5.0	18.3	12.4	6.1	9.3	2.8	2.5	3.0	2.3			3.2	3.0
FbNp-1-29-87	14.4	7.3	21.8	12.2	8.5	12.3	5.7	2.4	4.2	1.8		2.8	4.0	3.8
FbNp-1-37-16		7.6		14.8	11.4	15.6	2.8	1.5	2.5	1.7		5.3	3.7	3.4
FbNp-1-38-258	20.8	9.6	30.5	17.8	10.7	13.6	5.3	1.6	5.7	1.8		3.8	7.2	4.4
FbNp-1-4-153	13.0	8.3	20.5	13.2	8.3	13.4	3.4	2.7	4.3	2.4		3.0	3.3	2.5
FbNp-1-47-9	15.8	8.6	23.8	14.5	12.4	16.0	2.9	1.6	2.7	.7		5.9	4.1	3.6
FbNp-1-5-315		9.7			7.1	11.4	3.8	1.5	3.9	1.4		4.0	4.1	3.8
FbNp-1-54-32	14.8	8.3	22.9	11.1	10.2	11.8	2.1	.6	2.0	.7		4.6	4.0	3.6
FbNp-1-6-109	10.6	6.5	16.5	10.4	7.6	9.0	3.5	1.2	3.0	1.2		2.0	3.2	3.5
FbNp-1-6-13	8.7	8.4	15.6	11.4	9.1	13.1	2.1	1.4	2.8	1.4		5.2	3.4	3.1
FbNp-1-6-16	12.2	8.6	20.2	11.9	9.5	13.9	4.0	1.2	5.7	1.4		3.2	3.5	3.6
FbNp-1-8-159	17.3	5.9	23.1	13.5	8.7	13.1	2.7	1.7	3.6	2.3		4.2	3.9	3.0

Catalog #	Body Length	Stem Length	Total Length	Body Width	Min Stem Width	Base Width	Width of Left Notch	Depth of Left Notch	Width of Right Notch	Depth of Right Notch	Height of Left Basal Edge	Height of Right Basal Edge	Max Body Thickness	Max Stem Thickness
FbNp-1-1-135	5.1	7.08	11.64	14.15	8.21								3.48	3.21
FbNp-1-1-246	7.36	5.11	12.35	13.08	6.93	10.56			3.02	2.68			3.59	2.85
FbNp-1-15-70	10.29	6.21	16.4	12.77	8.89	12.93			2.62	1.70		3.26	3.2	2.77
FbNp-1-15-76	18.03	7.83	24.89	15.87	9.81	13.68			3.06	2.62		4.18	2.24	2.22
FbNp-1-15-77	18.16	8.82	26.15	14.62	9.53				4.72	1.7		4.91	4.85	3.93
FbNp-1-18-40	13.43	5.81	18.41	12.26	6.00	9.3			3.57	2.41			3.10	3.04
FbNp-1-29-87	15.33	6.54	21.73	12.92	8.43	12.30			5.01	1.83			4.01	3.7
FbNp-1-37-16	9.22	6.45	16.22	14.91	11.57	14.6			3.29	1.82		5.46	3.68	3.59
FbNp-1-38-258	21.7	9.63	30.55	17.68	10.70	13.23			6.28	2.83			7.18	6.37
FbNp-1-4-153	12.69	8.18	19.4	13.19	8.25				4.84	2.54			3.28	2.79
FbNp-1-47-9	15.89	8.88	23.98	14.53	12.42	16.02			2.90	1.16		6.63	4.09	3.6
FbNp-1-5-315	7.88	9.14	15.35	9.39	7.13	10.04			5.22	1.88		4.13	4.13	3.92
FbNp-1-54-32	14.58	8.98	23.07	11.12	10.39	10.48			2.69	.83			3.87	3.86
FbNp-1-6-109	10.42	6.49	16.59	10.41	7.61				4.35	1.17			3.39	3.48
FbNp-1-6-13	8.42	7.98	15.56	11.40	9.06	13.25			2.46	1.35		5.34	3.34	3.33
FbNp-1-6-16	12.48	7.76	19.89	11.86	9.82	12.42			4.64	1.57		3.19	3.51	3.7
FbNp-1-8-159	17.18	6.81	23.09	13.53	8.73	11.9			3.81	2.68			3.92	3.35

Catalog #	Body Length	Stem Length	Total Length	Body Width	Min Stem Width	Base Width	Width of Left Notch	Depth of Left Notch	Width of Right Notch	Depth of Right Notch	Height of Left Basal Edge	Height of Right Basal Edge	Max Body Thickness	Max Stem Thickness
FbNp-1-1-135		6.36	11.81	14.06	8.14		3.19	3.47			2.83			2.85
FbNp-1-1-246		5.19	12.52	13.15	6.85	10.5	3.63	2.81	3.29	2.62	1.16	1.84	3.54	2.84
FbNp-1-15-70	9.17	7.06	16.23	12.71	8.88	12.87	2.94	2.55	2.75	2.21	2.62	2.94	3.21	2.61
FbNp-1-15-76	16.74	8.16	24.9	15.84	9.83	15.07	3.81	2.89	4.16	3.06	3.9	2.74	2.47	2.22
FbNp-1-15-77	16.98	9.11	26.09	14.62	9.53	11.59	3.71	2.33	4.30	2.14	2.75	3.83	4.87	3.67
FbNp-1-18-40	12.56	5.9	18.46	12.18	6.02	9.17	3.38	2.84	3.60	2.86			3.09	2.44
FbNp-1-29-87		9.12	21.75	12.46	8.45	12.31			5.17	2.04		1.9	3.98	3.72
FbNp-1-37-16		8.12	16.21	14.4	11.47	15.31	3.58	2.05	3.42	2.38	5.41	4.0	3.7	3.62
FbNp-1-38-258	19.82	10.71	30.53	17.76	10.99	13.13	5.49	2.04	5.91	2.95	3.6	3.35	6.96	5.23
FbNp-1-4-153	10.37	9.01	19.38	13.18	8.25	13.33	3.81	2.9	4.88	2.66	2.77		3.26	2.79
FbNp-1-47-9	13.89	10.07	23.96	14.48	12.40	15.97	3.29	1.85	2.80	1.27	4.07	5.7	4.12	3.43
FbNp-1-5-315		9.47	15.31	9.14	7.13	11.37	4.39	1.86	3.66	1.96	2.88	3.2	4.12	3.91
FbNp-1-54-32	14.52	8.49	23.01	11.09	10.45	11.53	2.56	.93	2.62	1.29			3.95	3.62
FbNp-1-6-109	10.24	6.4	16.64	10.41	7.72	9.04	3.79	1.19	4.05	1.37			3.16	3.48
FbNp-1-6-13	7.17	8.39	15.54	11.34	9.14	13.11	3.04	1.89	2.43	1.65	4.57	5.26	3.39	3.32
FbNp-1-6-16	11.7	8.23	19.93	11.9	9.74	13.84	4.18	1.59	4.02	2.04	3.03	2.24	3.4	3.7
FbNp-1-8-159	16.15	6.95	23.1	13.41	8.84	13.05	3.08	2.32	3.92	3.04	3.12	1.65	3.93	3.46

Appendix D

Radiocarbon Dates

Site Name	Borden Number	Level/Component	Lab No.	Uncorrected Age	Normalized Age
Tipperary Creek	FbNp-1	Level #1	S-2805	<100	<100
Tipperary Creek	FbNp-1	Level# 2	S-2806	380+/-70	460+/-75
Tipperary Creek	FbNp-1	Level #3	S-2807	200+/-70	200+/-70
Tipperary Creek	FbNp-1	Level #4	S-2808	290+/-70	290+/-70
Tipperary Creek	FbNp-1	Level #5	S-2809	510+/-70	590+/-75
Tipperary Creek	FbNp-1	Level #6	S-2810	790+/-135	870+/-135
Tipperary Creek	FbNp-1	Level #6a	S-2811	855+/-70	855+/-70
Tipperary Creek	FbNp-1	Level #7	S-2812	880+/-70	960+/-75
Tipperary Creek	FbNp-1	Level #8	S-2813	945+/-135	1025+/-135
Tipperary Creek	FbNp-1	Level #10	S-2814	1155+/-75	1235+/-80
Tipperary Creek	FbNp-1	Level #12	Beta-70705	1190+/-60	1260+/-60
Tipperary Creek	FbNp-1	Level #12	S-2815	1235+/-75	1315+/-80
Tipperary Creek	FbNp-1	Level #13	S-2885	1535+/-75	1615+/-80
Tipperary Creek	FbNp-1	Level #14	S-2816	1790+/-75	1870+/-80
Meewasin Creek	FbNp-9	Level #1	S-2367	<100	<100
Sjovold	EiNs-4	Level #1	S-1757	580+/-190	660+/-190
Sjovold	EiNs-4	Level #2	S-1758	730+/-190	810+/-190
Sjovold	EiNs-4	Level #3	S-1759	950+/-190	1030+/-190
Sjovold	EiNs-4	Level #4-5	S-1760	1320+/-190	1400+/-190
Sjovold	EiNs-4	Level #4-5	S-1761	1340+/-190	1420+/-190
Sjovold	EiNs-4	Level #6	S-1762	1380+/-200	1460+/-200
Sjovold	EiNs-4	Level #6	S-1763	1380+/-190	1460+/-190
Sjovold	EiNs-4	Level #6	CAMS-2274	N/A	1840+/-55
Sjovold	EiNs-4	Level #7-8	S-1764	1630+/-200	1710+/-200
Sjovold	EiNs-4	Level #7-9	S-1765	1860+/-200	1940+/-200
Tschetter	FbNr-1	N/A	S-1631	920+/-45	1000+/-50
Tschetter	FbNr-1	N/A	S-669	1005+/-75	1085+/-80
Tschetter	FbNr-1	N/A	S-2225	1020+/-100	1100+/-100

Appendix E

Oneway

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Min Stem Width	**Between Groups**	19.272	4	4.818	2.417	.073
	Within Groups	53.817	27	1.993		
	Total	73.089	31			
R Basal Edge Height	**Between Groups**	16.471	4	4.118	4.552	.007
	Within Groups	22.615	25	.905		
	Total	39.086	29			
Body Length	**Between Groups**	41.987	4	10.497	.654	.629
	Within Groups	433.082	27	16.040		
	Total	475.070	31			
Stem Length	**Between Groups**	20.289	4	5.072	2.985	.037
	Within Groups	45.882	27	1.699		
	Total	66.171	31			
Total Length	**Between Groups**	39.023	4	9.756	.372	.827
	Within Groups	708.995	27	26.259		

	Total	748.018	31			
Max Body Width	**Between Groups**	2.959	4	.740	.191	.941
	Within Groups	104.733	27	3.879		
	Total	107.692	31			
Base Width	**Between Groups**	13.796	4	3.449	.852	.506
	Within Groups	97.114	24	4.046		
	Total	110.910	28			
R Notch Width	**Between Groups**	1.847	4	.462	.333	.853
	Within Groups	37.440	27	1.387		
	Total	39.287	31			
L Notch Width	**Between Groups**	3.078	4	.770	.589	.674
	Within Groups	31.344	24	1.306		
	Total	34.422	28			
R Notch Depth	**Between Groups**	2.408	4	.602	1.394	.263
	Within Groups	11.665	27	.432		
	Total	14.073	31			
L Notch Depth	**Between Groups**	2.003	4	.501	1.123	.369
	Within Groups	10.699	24	.446		
	Total	12.702	28			
L Basal Edge Height	**Between Groups**	2.596	4	.649	.816	.528
	Within Groups	19.094	24	.796		
	Total	21.690	28			
Max Body Thickness	**Between Groups**	1.968	4	.492	.594	.670
	Within Groups	22.377	27	.829		
	Total	24.346	31			
Max Stem Thickness	**Between Groups**	1.591	4	.398	.936	.458
	Within Groups	11.900	28	.425		
	Total	13.491	32			

Post Hoc Tests

Multiple Comparisons
Scheffe

Dependent Variable	(I) PeriodGroup	(J) PeriodGroup	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Min Stem Width	1	2	2.01367	.72906	.138	-.3945	4.4219
		3	.05900	.77328	1.000	-2.4953	2.6133
		4	.79129	.69575	.860	-1.5069	3.0895
		5	1.39700	.83524	.599	-1.3619	4.1559
	2	1	-2.01367	.72906	.138	-4.4219	.3945
		3	-1.95467	.85489	.292	-4.7785	.8692
		4	-1.22238	.78546	.662	-3.8169	1.3721
		5	-.61667	.91132	.976	-3.6269	2.3936
	3	1	-.05900	.77328	1.000	-2.6133	2.4953
		2	1.95467	.85489	.292	-.8692	4.7785
		4	.73229	.82667	.938	-1.9984	3.4629
		5	1.33800	.94707	.737	-1.7904	4.4664
	4	1	-.79129	.69575	.860	-3.0895	1.5069
		2	1.22238	.78546	.662	-1.3721	3.8169
		3	-.73229	.82667	.938	-3.4629	1.9984
		5	.60571	.88490	.975	-2.3173	3.5287
	5	1	-1.39700	.83524	.599	-4.1559	1.3619
		2	.61667	.91132	.976	-2.3936	3.6269
		3	-1.33800	.94707	.737	-4.4664	1.7904
		4	-.60571	.88490	.975	-3.5287	2.3173
R Basal	1	2	2.04367(*)	.49115	.009	.4121	3.6752

Edge Height		**3**	1.17900	.52094	.304	-.5515	2.9095
		4	1.04867	.49115	.361	-.5829	2.6802
		5	.87700	.62609	.743	-1.2028	2.9568
	2	**1**	-2.04367(*)	.49115	.009	-3.6752	-.4121
		3	-.86467	.57592	.691	-2.7778	1.0485
		4	-.99500	.54912	.524	-2.8191	.8291
		5	-1.16667	.67253	.566	-3.4007	1.0674
	3	**1**	-1.17900	.52094	.304	-2.9095	.5515
		2	.86467	.57592	.691	-1.0485	2.7778
		4	-.13033	.57592	1.000	-2.0435	1.7828
		5	-.30200	.69459	.996	-2.6093	2.0053
	4	**1**	-1.04867	.49115	.361	-2.6802	.5829
		2	.99500	.54912	.524	-.8291	2.8191
		3	.13033	.57592	1.000	-1.7828	2.0435
		5	-.17167	.67253	.999	-2.4057	2.0624
	5	**1**	-.87700	.62609	.743	-2.9568	1.2028
		2	1.16667	.67253	.566	-1.0674	3.4007
		3	.30200	.69459	.996	-2.0053	2.6093
		4	.17167	.67253	.999	-2.0624	2.4057
Body Length	**1**	**2**	.17467	2.06818	1.000	-6.6569	7.0062
		3	-2.18300	2.19363	.909	-9.4290	5.0630
		4	-1.14414	1.97369	.987	-7.6636	5.3753
		5	1.76550	2.36939	.966	-6.0611	9.5921
	2	**1**	-.17467	2.06818	1.000	-7.0062	6.6569
		3	-2.35767	2.42515	.915	-10.3684	5.6531
		4	-1.31881	2.22818	.986	-8.6789	6.0413
		5	1.59083	2.58522	.983	-6.9486	10.1303
	3	**1**	2.18300	2.19363	.909	-5.0630	9.4290
		2	2.35767	2.42515	.915	-5.6531	10.3684
		4	1.03886	2.34509	.995	-6.7074	8.7851
		5	3.94850	2.68664	.708	-4.9260	12.8230

	4	1	1.14414	1.97369	.987	-5.3753	7.6636
		2	1.31881	2.22818	.986	-6.0413	8.6789
		3	-1.03886	2.34509	.995	-8.7851	6.7074
		5	2.90964	2.51027	.851	-5.3823	11.2015
	5	1	-1.76550	2.36939	.966	-9.5921	6.0611
		2	-1.59083	2.58522	.983	-10.1303	6.9486
		3	-3.94850	2.68664	.708	-12.8230	4.9260
		4	-2.90964	2.51027	.851	-11.2015	5.3823
Stem Length	1	2	1.62400	.67317	.243	-.5996	3.8476
		3	1.87400	.71400	.174	-.4845	4.2325
		4	.62543	.64241	.915	-1.4966	2.7474
		5	-.21350	.77121	.999	-2.7610	2.3340
	2	1	-1.62400	.67317	.243	-3.8476	.5996
		3	.25000	.78936	.999	-2.3574	2.8574
		4	-.99857	.72525	.754	-3.3942	1.3971
		5	-1.83750	.84146	.337	-4.6170	.9420
	3	1	-1.87400	.71400	.174	-4.2325	.4845
		2	-.25000	.78936	.999	-2.8574	2.3574
		4	-1.24857	.76330	.619	-3.7699	1.2728
		5	-2.08750	.87447	.253	-4.9760	.8010
	4	1	-.62543	.64241	.915	-2.7474	1.4966
		2	.99857	.72525	.754	-1.3971	3.3942
		3	1.24857	.76330	.619	-1.2728	3.7699
		5	-.83893	.81707	.899	-3.5378	1.8600
	5	1	.21350	.77121	.999	-2.3340	2.7610
		2	1.83750	.84146	.337	-.9420	4.6170
		3	2.08750	.87447	.253	-.8010	4.9760
		4	.83893	.81707	.899	-1.8600	3.5378
Total Length	1	2	1.66100	2.64621	.982	-7.0799	10.4019
		3	2.54600	2.80673	.933	-6.7252	11.8172
		4	.86457	2.52531	.998	-7.4770	9.2062

		5	3.05100	3.03161	.905	-6.9630	13.0650
	2	1	-1.66100	2.64621	.982	-10.4019	7.0799
		3	.88500	3.10296	.999	-9.3646	11.1346
		4	-.79643	2.85093	.999	-10.2136	8.6207
		5	1.39000	3.30776	.996	-9.5362	12.3162
	3	1	-2.54600	2.80673	.933	-11.8172	6.7252
		2	-.88500	3.10296	.999	-11.1346	9.3646
		4	-1.68143	3.00052	.988	-11.5927	8.2299
		5	.50500	3.43753	1.000	-10.8498	11.8598
	4	1	-.86457	2.52531	.998	-9.2062	7.4770
		2	.79643	2.85093	.999	-8.6207	10.2136
		3	1.68143	3.00052	.988	-8.2299	11.5927
		5	2.18643	3.21186	.976	-8.4230	12.7958
	5	1	-3.05100	3.03161	.905	-13.0650	6.9630
		2	-1.39000	3.30776	.996	-12.3162	9.5362
		3	-.50500	3.43753	1.000	-11.8598	10.8498
		4	-2.18643	3.21186	.976	-12.7958	8.4230
Max Body Width	1	2	.60467	1.01705	.985	-2.7549	3.9642
		3	.06800	1.07875	1.000	-3.4953	3.6313
		4	-.32914	.97059	.998	-3.5352	2.8769
		5	-.09450	1.16518	1.000	-3.9433	3.7543
	2	1	-.60467	1.01705	.985	-3.9642	2.7549
		3	-.53667	1.19260	.995	-4.4761	3.4027
		4	-.93381	1.09574	.946	-4.5532	2.6856
		5	-.69917	1.27132	.989	-4.8986	3.5002
	3	1	-.06800	1.07875	1.000	-3.6313	3.4953
		2	.53667	1.19260	.995	-3.4027	4.4761
		4	-.39714	1.15323	.998	-4.2065	3.4122
		5	-.16250	1.32119	1.000	-4.5266	4.2016
	4	1	.32914	.97059	.998	-2.8769	3.5352
		2	.93381	1.09574	.946	-2.6856	4.5532

		3	.39714	1.15323	.998	-3.4122	4.2065
		5	.23464	1.23446	1.000	-3.8430	4.3123
	5	1	.09450	1.16518	1.000	-3.7543	3.9433
		2	.69917	1.27132	.989	-3.5002	4.8986
		3	.16250	1.32119	1.000	-4.2016	4.5266
		4	-.23464	1.23446	1.000	-4.3123	3.8430
Base Width	1	2	1.73033	1.03877	.604	-1.7313	5.1920
		3	.67450	1.19006	.988	-3.2913	4.6403
		4	1.39367	1.03877	.771	-2.0680	4.8553
		5	.94867	1.32418	.971	-3.4641	5.3614
	2	1	-1.73033	1.03877	.604	-5.1920	1.7313
		3	-1.05583	1.29846	.954	-5.3829	3.2712
		4	-.33667	1.16138	.999	-4.2069	3.5336
		5	-.78167	1.42239	.989	-5.5217	3.9584
	3	1	-.67450	1.19006	.988	-4.6403	3.2913
		2	1.05583	1.29846	.954	-3.2712	5.3829
		4	.71917	1.29846	.989	-3.6079	5.0462
		5	.27417	1.53636	1.000	-4.8457	5.3940
	4	1	-1.39367	1.03877	.771	-4.8553	2.0680
		2	.33667	1.16138	.999	-3.5336	4.2069
		3	-.71917	1.29846	.989	-5.0462	3.6079
		5	-.44500	1.42239	.999	-5.1850	4.2950
	5	1	-.94867	1.32418	.971	-5.3614	3.4641
		2	.78167	1.42239	.989	-3.9584	5.5217
		3	-.27417	1.53636	1.000	-5.3940	4.8457
		4	.44500	1.42239	.999	-4.2950	5.1850
R Notch Width	1	2	-.50233	.60809	.952	-2.5110	1.5063
		3	-.10900	.64498	1.000	-2.2395	2.0215
		4	.22814	.58031	.997	-1.6887	2.1450
		5	.04600	.69666	1.000	-2.2552	2.3472
	2	1	.50233	.60809	.952	-1.5063	2.5110

		3	.39333	.71305	.989	-1.9620	2.7487
		4	.73048	.65514	.868	-1.4336	2.8945
		5	.54833	.76011	.970	-1.9625	3.0591
	3	1	.10900	.64498	1.000	-2.0215	2.2395
		2	-.39333	.71305	.989	-2.7487	1.9620
		4	.33714	.68951	.993	-1.9404	2.6147
		5	.15500	.78993	1.000	-2.4543	2.7643
	4	1	-.22814	.58031	.997	-2.1450	1.6887
		2	-.73048	.65514	.868	-2.8945	1.4336
		3	-.33714	.68951	.993	-2.6147	1.9404
		5	-.18214	.73808	1.000	-2.6201	2.2559
	5	1	-.04600	.69666	1.000	-2.3472	2.2552
		2	-.54833	.76011	.970	-3.0591	1.9625
		3	-.15500	.78993	1.000	-2.7643	2.4543
		4	.18214	.73808	1.000	-2.2559	2.6201
L Notch Width	1	2	.10917	.61719	1.000	-1.9476	2.1659
		3	.13500	.69982	1.000	-2.1971	2.4671
		4	.76393	.59146	.795	-1.2071	2.7349
		5	.66500	.69982	.921	-1.6671	2.9971
	2	1	-.10917	.61719	1.000	-2.1659	1.9476
		3	.02583	.73768	1.000	-2.4324	2.4841
		4	.65476	.63580	.897	-1.4640	2.7735
		5	.55583	.73768	.965	-1.9024	3.0141
	3	1	-.13500	.69982	1.000	-2.4671	2.1971
		2	-.02583	.73768	1.000	-2.4841	2.4324
		4	.62893	.71629	.940	-1.7581	3.0159
		5	.53000	.80809	.979	-2.1629	3.2229
	4	1	-.76393	.59146	.795	-2.7349	1.2071
		2	-.65476	.63580	.897	-2.7735	1.4640
		3	-.62893	.71629	.940	-3.0159	1.7581
		5	-.09893	.71629	1.000	-2.4859	2.2881

	5	1	-.66500	.69982	.921	-2.9971	1.6671
		2	-.55583	.73768	.965	-3.0141	1.9024
		3	-.53000	.80809	.979	-3.2229	2.1629
		4	.09893	.71629	1.000	-2.2881	2.4859
R Notch Depth	1	2	-.32433	.33942	.920	-1.4455	.7968
		3	.21400	.36001	.985	-.9752	1.4032
		4	-.36600	.32391	.863	-1.4360	.7040
		5	-.66600	.38886	.577	-1.9505	.6185
	2	1	.32433	.33942	.920	-.7968	1.4455
		3	.53833	.39801	.766	-.7764	1.8530
		4	-.04167	.36568	1.000	-1.2496	1.1662
		5	-.34167	.42428	.956	-1.7431	1.0598
	3	1	-.21400	.36001	.985	-1.4032	.9752
		2	-.53833	.39801	.766	-1.8530	.7764
		4	-.58000	.38487	.688	-1.8513	.6913
		5	-.88000	.44092	.427	-2.3364	.5764
	4	1	.36600	.32391	.863	-.7040	1.4360
		2	.04167	.36568	1.000	-1.1662	1.2496
		3	.58000	.38487	.688	-.6913	1.8513
		5	-.30000	.41198	.969	-1.6608	1.0608
	5	1	.66600	.38886	.577	-.6185	1.9505
		2	.34167	.42428	.956	-1.0598	1.7431
		3	.88000	.44092	.427	-.5764	2.3364
		4	.30000	.41198	.969	-1.0608	1.6608
L Notch Depth	1	2	.06792	.36059	1.000	-1.1337	1.2696
		3	.81375	.40888	.432	-.5488	2.1763
		4	.25268	.34556	.968	-.8989	1.4042
		5	.08625	.40888	1.000	-1.2763	1.4488
	2	1	-.06792	.36059	1.000	-1.2696	1.1337
		3	.74583	.43099	.569	-.6904	2.1821
		4	.18476	.37147	.992	-1.0531	1.4227

		5	.01833	.43099	1.000	-1.4179	1.4546
	3	1	-.81375	.40888	.432	-2.1763	.5488
		2	-.74583	.43099	.569	-2.1821	.6904
		4	-.56107	.41850	.772	-1.9557	.8335
		5	-.72750	.47213	.671	-2.3008	.8458
	4	1	-.25268	.34556	.968	-1.4042	.8989
		2	-.18476	.37147	.992	-1.4227	1.0531
		3	.56107	.41850	.772	-.8335	1.9557
		5	-.16643	.41850	.997	-1.5610	1.2282
	5	1	-.08625	.40888	1.000	-1.4488	1.2763
		2	-.01833	.43099	1.000	-1.4546	1.4179
		3	.72750	.47213	.671	-.8458	2.3008
		4	.16643	.41850	.997	-1.2282	1.5610
L Basal Edge Height	1	2	.72917	.48171	.685	-.8761	2.3344
		3	.67750	.54621	.817	-1.1427	2.4977
		4	.50893	.46163	.872	-1.0294	2.0473
		5	.13500	.54621	1.000	-1.6852	1.9552
	2	1	-.72917	.48171	.685	-2.3344	.8761
		3	-.05167	.57575	1.000	-1.9703	1.8670
		4	-.22024	.49624	.995	-1.8739	1.4334
		5	-.59417	.57575	.897	-2.5128	1.3245
	3	1	-.67750	.54621	.817	-2.4977	1.1427
		2	.05167	.57575	1.000	-1.8670	1.9703
		4	-.16857	.55906	.999	-2.0316	1.6945
		5	-.54250	.63071	.944	-2.6443	1.5593
	4	1	-.50893	.46163	.872	-2.0473	1.0294
		2	.22024	.49624	.995	-1.4334	1.8739
		3	.16857	.55906	.999	-1.6945	2.0316
		5	-.37393	.55906	.977	-2.2370	1.4891
	5	1	-.13500	.54621	1.000	-1.9552	1.6852
		2	.59417	.57575	.897	-1.3245	2.5128

		3	.54250	.63071	.944	-1.5593	2.6443
		4	.37393	.55906	.977	-1.4891	2.2370
Max Body Thickness	1	2	.05033	.47012	1.000	-1.5026	1.6032
		3	-.61600	.49863	.820	-2.2631	1.0311
		4	-.40943	.44864	.932	-1.8914	1.0725
		5	-.12550	.53859	1.000	-1.9046	1.6536
	2	1	-.05033	.47012	1.000	-1.6032	1.5026
		3	-.66633	.55126	.831	-2.4873	1.1546
		4	-.45976	.50649	.933	-2.1328	1.2133
		5	-.17583	.58765	.999	-2.1169	1.7653
	3	1	.61600	.49863	.820	-1.0311	2.2631
		2	.66633	.55126	.831	-1.1546	2.4873
		4	.20657	.53306	.997	-1.5542	1.9674
		5	.49050	.61070	.956	-1.5268	2.5078
	4	1	.40943	.44864	.932	-1.0725	1.8914
		2	.45976	.50649	.933	-1.2133	2.1328
		3	-.20657	.53306	.997	-1.9674	1.5542
		5	.28393	.57061	.993	-1.6009	2.1688
	5	1	.12550	.53859	1.000	-1.6536	1.9046
		2	.17583	.58765	.999	-1.7653	2.1169
		3	-.49050	.61070	.956	-2.5078	1.5268
		4	-.28393	.57061	.993	-2.1688	1.6009
Max Stem Thickness	1	2	.28933	.33665	.944	-.8199	1.3986
		3	-.24067	.33665	.971	-1.3499	.8686
		4	.36314	.32127	.863	-.6954	1.4217
		5	-.06650	.38568	1.000	-1.3373	1.2043
	2	1	-.28933	.33665	.944	-1.3986	.8199
		3	-.53000	.37639	.739	-1.7702	.7102
		4	.07381	.36270	1.000	-1.1212	1.2689
		5	-.35583	.42081	.947	-1.7424	1.0307
	3	1	.24067	.33665	.971	-.8686	1.3499

		2	.53000	.37639	.739	-.7102	1.7702
		4	.60381	.36270	.603	-.5912	1.7989
		5	.17417	.42081	.996	-1.2124	1.5607
	4	**1**	-.36314	.32127	.863	-1.4217	.6954
		2	-.07381	.36270	1.000	-1.2689	1.1212
		3	-.60381	.36270	.603	-1.7989	.5912
		5	-.42964	.40861	.891	-1.7760	.9167
	5	**1**	.06650	.38568	1.000	-1.2043	1.3373
		2	.35583	.42081	.947	-1.0307	1.7424
		3	-.17417	.42081	.996	-1.5607	1.2124
		4	.42964	.40861	.891	-.9167	1.7760

* The mean difference is significant at the .05 level.