2006

An Organizational and Functional Classification of the Stone Tool Assemblage from the Bridge River Archaelogical Site (EeR14) (2003 and 2004 Field Seasons)

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An Organizational and Functional Classification of the Stone Tool Assemblage from the Bridge River Archaeological Site (EeRl4) (2003 and 2004 Field Seasons)

By

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B.A. Mercyhurst College, Erie, Pennsylvania, 2001

Presented in partial fulfillment of the requirements

For the degree of

Masters of Arts

The University of Montana

May 2006

Approved by:

Chairperson:

Dean, Graduate School:

4-6-06

Date:

Clarke, David S., M.A., May 2006 Anthropology

An Organizational and Functional Classification of the Stone Tool Assemblage from the Bridge River Archaeological Site (EeRl4) (2003 and 2004 Field Seasons) (118 pp.)

Chairperson: William C. Prentiss WCP

The Bridge River Archaeological site is a large prehistoric complex hunter-gatherer pithouse village consisting of 80 pithouse depressions, and at least 150 external pit features dating from 1800 – 200 B.P. The Bridge River site is located close to the confluence of the Bridge and Fraser Rivers, near Lillooet, British Columbia, Canada. During the summers of 2003 and 2004 the University of Montana conducted field research programs at the Bridge River site. The laboratory work consisted of analyzing the lithic tools by raw material, thermal alteration, size, percent of cortex, fracture initiation, use wear, and retouch. Subsequently, a Microsoft Access database of the complete lithic tool assemblage was constructed (1,552 tools).

This thesis will seek to address two questions: First, what are the changes throughout time in the organization of lithic tool production, use, and discard at the Bridge River site. Organizational lithic analyses at other archaeological sites, contemporaneous with the Bridge River site, on the Canadian Plateau have been an effective tool when answering socio-economic questions. Second, the research will define a functional classification for the stone tool assemblage from numerous sources such as ethnographic, comparative, and experimental archaeological analysis. This functional classification will be used to help define what subsistence patterns were apparent at the Bridge River site throughout its occupational history.

The research has concluded that the organizational classifications for the Bridge River site do not differ from other contemporaneous sites on the Canadian Plateau such as the Keatley Creek site. The Bridge River and Keatley Creek sites have an expedient block core dominated stone tool organizational strategy throughout their occupational histories. The functional analysis discovered that there are shifts in the stone tool technologies at the Bridge River site that coincide with shifts in the subsistence practices at the site. Specifically, slate / silicified shale scraper tools become more significant in the lithic tool assemblage as time progresses throughout the occupational history of the site associated with a salmon dominated diet.

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ACKNOWLEDGMENTS

There have been many influential persons throughout this research project. I would like to thank Dr. William C. Prentiss for making this thesis possible and all the anthropological wisdom I have gained under your direction. I would also like to acknowledge Dr. John Douglas, and Dr. Wade Davies for being on my thesis committee and providing useful insights about this research. This thesis would not have been possible without the guidance of the Anthropology department at the University of Montana, specifically Dr. Gregory Campbell, and Dr. Thomas Foor. I could not have gotten this far in my academic career had it not been for the faculty and staff at Mercyhurst Archaeological Institute, thanks all. I am forever indebted to my parents Robert and April Clarke for encouraging me to pursue my dream of becoming an archaeologist. Also, I am very grateful to my family, Amy, Katie, Peggy, Hoa, and Tommy for their continual guidance throughout my life. Finally I would like to thank my wife Jennifer, your continual love and support drive me to be a better husband and archaeologist everyday.

CHAPTER 1:

INTRODUCTION

The Bridge River archaeological site is located in the Mid Fraser sub-region of the Canadian Plateau (Figure 1-1). The Bridge River site is one of a few remaining intact prehistoric First Nations villages in the Mid Fraser sub-region (Figures 1-1, 1-2, 1-3, 1-4). Beginning in 2003, Dr. William C. Prentiss, from the University of Montana, began conducting archaeological fieldwork at the Bridge River site. One of the first tasks of this project was to accurately define the site's cultural chronology. To date, he and his students and colleagues have completed two field seasons of mapping, geophysical testing, and excavation at the site. Subsequently, lithic, bone, and perishable artifacts have been analyzed and topographic and geophysical maps have been made of the site (Prentiss et al. 2004, 2005). To define the cultural chronology of the site, extensive radiocarbon dating (90 samples) revealed the site was occupied from 1864 – 167 R.C.Y.B.P. (Radiocarbon Years Before Present). Therefore, the site falls within the Plateau Pithouse Tradition (PPt) (Rousseau 2004) and the inhabitants can be categorized semi-sedentary or "complex hunter gatherers" as defined by Price (1981). The Bridge River site is located in an area of optimal seasonal salmon harvesting. Along with salmon there are other terrestrial faunal and floral species that are important for subsistence. The complex hunter-gatherers at the Bridge River site procured and stored salmon, as well as other foods such as geophytes (roots, tubers), venison, and fleshy berries.

Complex hunter-gatherer societies have been the subject of intense archaeological interest and debate over the last 15 to 20 years (Arnold 1996). One of the research goals of the Bridge River project is to better understand social inequality by studying the emergence of complex hunter-gatherer communities on the interior Canadian Plateau. One method to do this is to determine when social inequality emerged at the Bridge River site and define the social organization of the village during its occupational phases. This research is part of that aim and looks at the lithic tool assemblage from two field seasons of excavation to answer questions about subsistence and lithic technology, which were an integral part of the prehistoric socio economic organization at the Bridge River site.

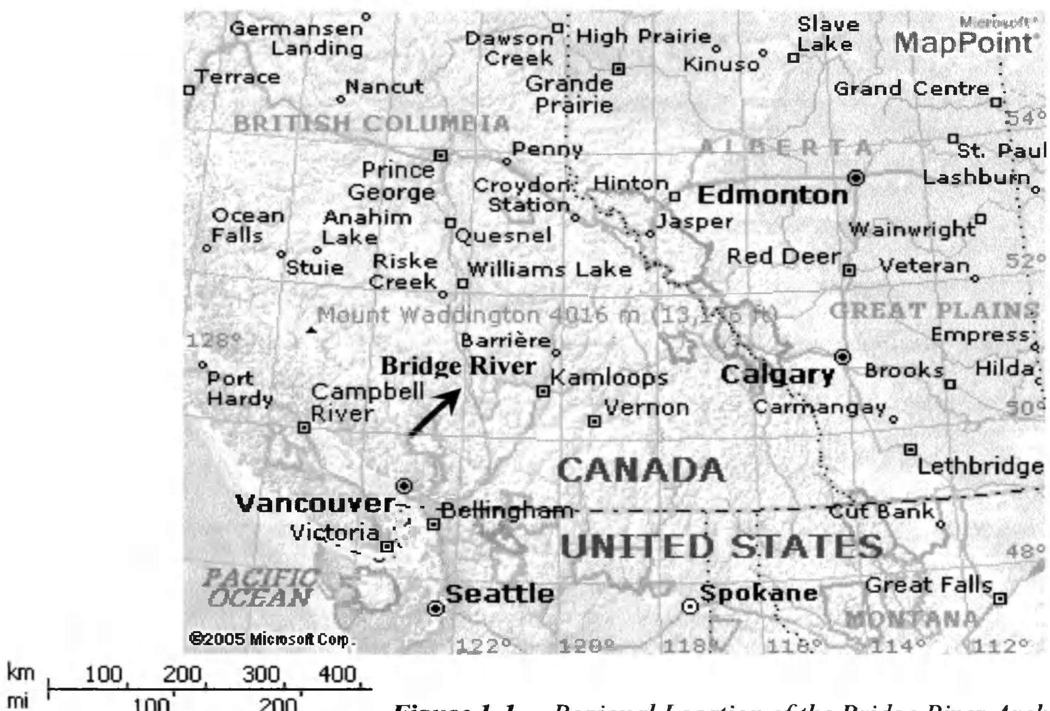


Figure 1-1. *Regional Location of the Bridge River Archaeological Site.*

RESEARCH PROBLEM

The Bridge River archaeological project is looking at social inequality and the emergence of complex hunter-gatherers on the Canadian Plateau. One of the first steps in this process is to define the subsistence and lithic technologies of complex hunter-gatherers in this region. The Bridge River project has the potential to address these problems.

Figure 1-2. *Photograph of the Bridge River site from across the Bridge River facing northeast.*

Figure 1-3. *General view of the Bridge River Site facing northeast.*

Figure 1-4. *Photograph of a Pithouse at the Bridge River site facing southeast.*

This thesis will seek to address two questions: what are the changes through time in the organization of lithic tool production, use, and discard at the Bridge River site, and what relationship exists between the subsistence and technology of lithic strategies practiced at the Bridge River site. Organizational and functional analyses at other archaeological sites on the Canadian Plateau such as Keatley Creek, (Hayden et al. 2000; Godin 2004; Prentiss 2000), have been an effective tool when answering socio-economic questions.

First I will test whether or not the Bridge River site had a winter pithouse village pattern, as reflected in stone tool production and use. A winter pithouse village pattern consisted of inhabitants of the village staying in pithouses during the harsh winter months. During the late spring, summer, and early fall months inhabitants stayed at sites away from the village and returned to the village in the late fall to store foodstuffs and objects, such as raw material for making stone tools necessary to survive during the winter months. To test whether the Bridge River site had a winter pithouse village pattern, the lithic tool assemblage will be compared to the Keatley Creek assemblage to determine if they were organized in the same manner. The Keatley Creek site has been defined as having a winter pithouse village pattern of lithic technological organization (Hayden et al. 2000). The Keatley Creek organizational model for a winter pithouse village pattern is dominated by an expedient block core and tool strategy and to a lesser degree, a bifacial strategy and other lithic strategies (Hayden et al. 2000).

Next I will test whether or not the Bridge River site had a subsistence economy focused on salmon fishing and to a lesser degree hunting and gathering terrestrial resources such as deer, fleshy berries, and tubers (Hayden 1997; Teit 1900, 1906). To assess whether or not the Bridge Rive site had this subsistence pattern, this study will determine whether or not the lithic tools at the Bridge River site were functionally suitable for this kind of subsistence strategy.

SIGNIFICANCE OF RESEARCH

On the Canadian Plateau, evolution of social complexity is a major theme of archaeological research (Hayden 1997; Prentiss and Kuijt 2004). The Bridge River project is looking at social inequality and the emergence of complex hunter-gatherers on the Canadian Plateau. One of the first steps in this process is to more accurately define complex hunter-gatherers via their subsistence and lithic technologies. Answering these questions dealing with lithic technology and subsistence will add to the collective archaeological knowledge of the Bridge River site.

THESIS OUTLINE

This thesis is arranged as follows: Chapter 2, Research Background, discusses the contextual data surrounding the Bridge River site. The contextual data from Chapter 2 builds a frame of reference for the Bridge River site from a paleoenvironmental, cultural historical and ethnographic background. Chapter 2 deals specifically with the post 2500 B.P. time period when the Bridge River site was occupied. Chapter 3, Research Methods, describes the field, laboratory, and analytical, methods utilized during this research. One of this chapter's main goals is to define the organizational and functional classification for the lithic tools excavated from the Bridge River site during the 2003 and 2004 field seasons. Next, Chapter 4, Results, describes the outcomes of the analytical analysis from the previous chapter. This chapter illustrates the data sets and graphs constructed from the information defined in the analytical section of Chapter 3.

Specifically, this chapter provides results for the organizational and functional tool analyses. Chapter 5, Discussion, interprets of the results from the previous chapter. Chapter 5 also compares the results from Chapter 4 to the Keatley Creek organizational and functional classifications. Chapter 6, Conclusions, will summarize the research and its implications for answering questions dealing with lithic technologies, subsistence, and mobility. Chapter 6 will also offer avenues for further research in lithic analysis at the Bridge River site.

CHAPTER 2:

RESEARCH BACKGROUND

The Bridge River archaeological site is a large prehistoric pithouse village consisting of 80 housepit depressions (ranging from 5-18 m in diameter) and at least 150 external pit features (ranging from 1-5 m in diameter) (Prentiss et al. 2004). The site offers a unique opportunity for research into the prehistory of the region because of the number and diverse size of housepits, long occupational sequence, excellent preservation of artifacts and intact cultural stratigraphy. The primary goal of the 2003 and 2004 excavations were to develop a chronology of the village by dating hearth features found within pithouse floors an external pit features. The radiocarbon dating results from the two field seasons at the Bridge River site have revealed 5 occupations of the site: Pre-Bridge River 2470 B.P. (PBR), Bridge River 1 1864-1696 B.P. (BR1), Bridge River 2 1646-1414 B.P. (BR2), Bridge River 3 1375-1139 (BR3), and Bridge River 4 638-167 B.P. (BR4) (Prentiss et al. 2005).

SITE SETTING

The Canadian Plateau geographical area lies within the Canadian province of British Columbia between the great bend in the Fraser River. This is approximately 160 km north of the border with the United States. The Canadian Plateau region borders the Rocky Mountains to the east, and the Coast Mountains to the west (Richards and Rousseau 1987). One of the subdivisions in this region is the Mid-Fraser Canyon where the Bridge River site is located. The Mid-Fraser Canyon lies on the western edge of the Canadian Plateau region and includes the river valley and its surrounding drainages between Big Bar and just south of Lytton, British Columbia (Prentiss et al. 2004). The

Bridge River site is located within a deep valley that divides the Coast Mountains from the Camelsfoot Range (Prentiss et al. 2004; Ryder 1978). The Bridge River site is located on the east side of the Bridge River about 3.1 km (1.92 mi) northwest of the confluence of the Bridge and Fraser Rivers, near the town of Lillooet, British Columbia, Canada (Figure 2-1, 2-4) (Prentiss et al. 2004). The Bridge River site is on the west side of Lillooet-Pioneer Road number 40, in an open field. The site is situated upon the Stl'atl'imx Nation and permission is required before visiting. The roughly two-hectare site is located at an elevation of 335 m (1,099 ft) above mean sea level on a terrace in the steep Bridge River Valley (Prentiss et al. 2004). The site is situated approximately 90 meters above the Bridge River (Styrd 1974). The Bridge River site has exceptional preservation of pithouse stratigraphy including: floors, rims, roofs, features, and artifacts including ~~as~~ tree bark and bone.

PHYSIOGRAPHY

The Bridge River site is underlain by alluvial and colluvial sediments, within the Ponderosa Pine –Bunchgrass biogeoclimatic zone (Matthews 1978; Pokotylo and Mitchell 1989; Prentiss et al. 2004). The site lies in a semi-arid environment, in the rain-shadow of the Coast Range, with an average annual precipitation of 25-30 cm (10-12 in) (Pokotylo and Mitchell 1989). Current site vegetation includes a variety of grasses (e.g., wild rye and various wheat grasses), Saskatoon berry bushes, rabbitbrush, sagebrush, Douglas fir, and Ponderosa pine (Prentiss et al. 2004). The subsistence resources important to the prehistoric peoples of the region included: berries, salmon, geophytes, wild onion, deer, elk, and other floral and fauna species native to the Canadian Plateau.

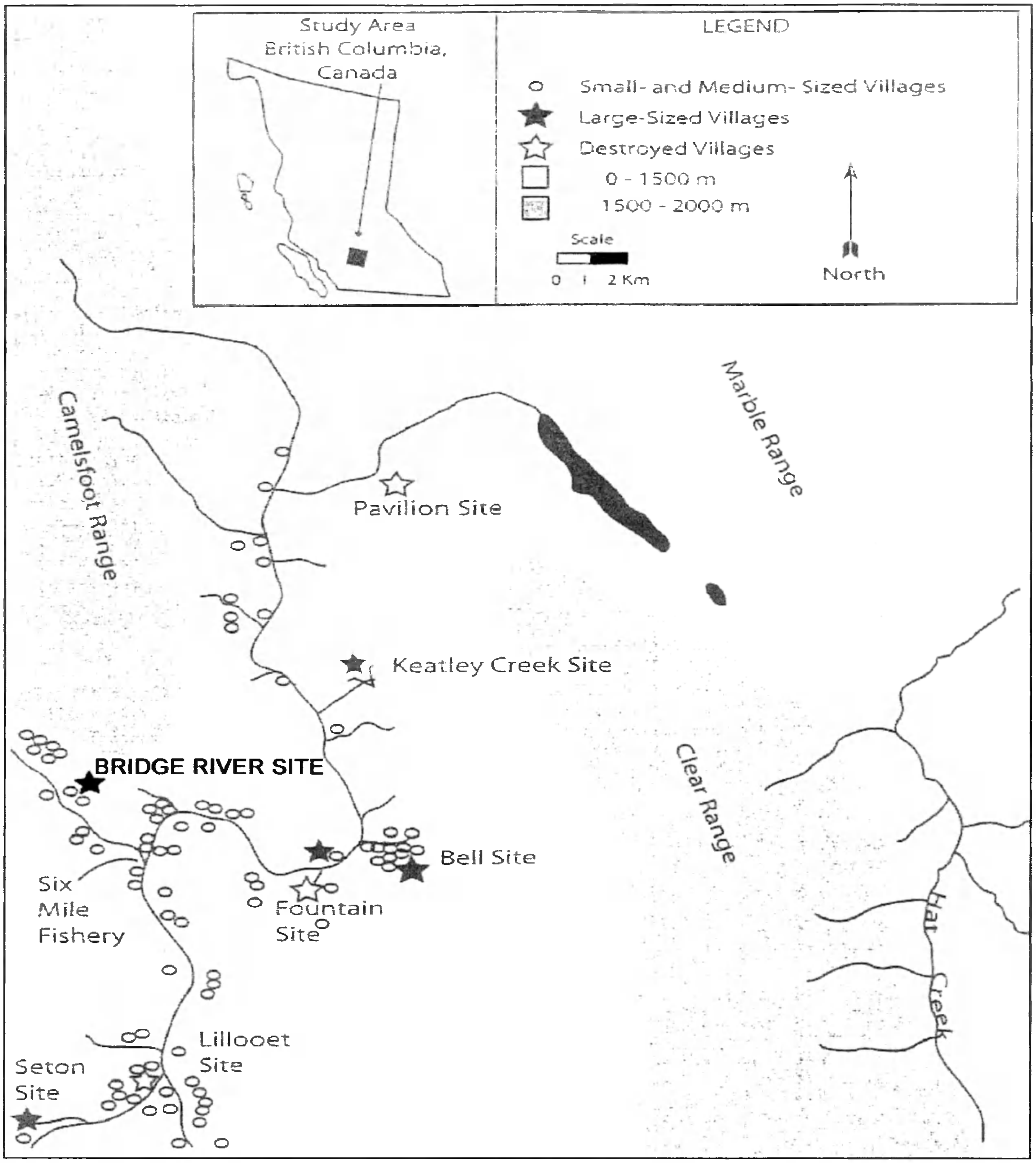


Figure 2-1. *Map of the Lillooet region of British Columbia, Canada, showing the distribution of prehistoric housepit sites and the location of the Bridge Rive site (Adapted from Hayden 1997).*

While the valleys of the Canadian Plateau are semi-arid and have the corresponding collection of plants and animals, the mountain ridges and high altitude meadows receive more precipitation. Ethnographic research has shown that the altitude dependent flora and fauna played an important role in the seasonal movements of the prehistoric denizens of the Canadian Plateau (Alexander 1992).

The single most important subsistence resource on the Canadian Plateau, and in particular the Mid Fraser sub region, is salmon (*Oncorhynchus* sp.) found in the Fraser River and its tributaries. The steep walled canyons of the Mid Fraser sub region concentrate the salmon into narrow runs, making them easy prey to be mass harvested during the annual spawning migrations. The predictable mass harvest and subsequent storage of salmon played an important role in allowing for densely populated villages and possible socio-economic disparities between households and villages (Hayden 1997; Hayden et al. 2000; Prentiss and Kuijt 2004; Prentiss et al. 2004). This was likely a primary moving force behind the packing of people into villages around major fishing sites and the subsequent abandonment and dispersion when the salmon numbers dropped off due to environmental conditions such as climatic shifts (Prentiss and Kuijt 2004).

PALEOENVIRONMENTAL RECORD

The environment around the Bridge River site has not gone through any major environmental changes since the last glacial event, approximately 13,000 years ago, which defined the Pleistocene to Holocene environmental transition. However, there have been minor environmental changes such as climatic shifts that have affected the floral and faunal species in and around the Canadian Plateau. A brief overview of the paleoenvironmental record from deglaciation until 2500 B.P. will be summarized. The paleoenvironmental record will focus on the post 2500 B.P. time period, when the Bridge River site was inhabited (Figure 2-2). Therefore, each Bridge River occupational phase's environmental conditions will be described below in detail. There is no specific paleoenvironmental record for the Bridge River site. Therefore, environmental studies from the Canadian Plateau will be summarized.

The Holocene period began after the deglaciation of the Canadian Plateau around 13000 B.P. During the next 10,200 years, the Canadian Plateau environment went through periods of warming and cooling as well as being moister or drier than present day conditions. After deglaciation, the environment went through a transitional warming period to approximately 8000 B.P. Then temperatures began to gradually warm up until 5000 B.P. Next, Neoglacial conditions caused another transitional period of cooler temperatures between 5000-2800 B.P. Finally, after 2800 B.P. present climatic conditions were observed for the region.

At approximately 2800 B.P. there is another climatic shift (Chatters 1998) that coincides with the initial habitation of the Bridge River site (Pre-Bridge River 2470 B.P.) (PBR) and modern climatic regimes towards the end of the Neoglacial period (4000-2400 B.P.). The first sustained occupation at the Bridge River site is Bridge River 1 (BR1) (1864 – 1696 B.P.), which saw warmer and drier conditions than today. BR1 also coincides with the Fraser Valley Fire Period (FVFP) (2400 – 1200 B.P.), which is believed to have been caused by prolonged summer droughts (Hallett et al. 2003; Lepofsky et al. 2005). The FVFP caused increased forest fires throughout southern Coastal British Columbia (Hallett et al. 2003; Lepofsky et al. 2005). These drought conditions and increased forest fires may have decreased some interior salmon populations as well as conifer forest and other faunal and floral species. On the other hand, these forest fires may have caused increased geophyte (tubers and roots), berry and ungulate (such as deer) production. This increase is due to the expansion of feeding grounds and non-forested land for new floral and faunal species.

Bridge River 2 (BR2) (1646 – 1414 B.P.) is associated with a transition period from warm and dry conditions to cooler and wetter conditions (Hallett et al. 2003; Reyes and Clague 2004). Cooler and wetter conditions are optimal for salmon production in the region. These climatic conditions were likely favorable for salmon intensification at the Bridge River site during BR2.

Climatic conditions during Bridge River 3 (BR3) (1375 – 1139 B.P.) were cooler and wetter than today (Chatters 1998; Chatters and Leavell 1995; Hallett et al. 2003). During this time period climatic conditions were excellent for salmon production in the Fraser River system. During BR3, the cool and wet conditions may have had a negative affect on terrestrial mammals (deer, elk, etc.), geophytes (roots, tubers, etc.), and berry populations (saskatoon, thimbleberry, and other fleshy berries) (Hallett et al. 2003), due to a shorter growing season. Due to theses environmental changes the inhabitants of the Bridge Rive site, during BR3, may have increased their reliance on a salmon based diet (Bochart 2005). The increased salmon production levels during BR3 may be directly related to the site reaching its greatest population levels (Bochart 2005). That is to say, the salmon production levels may have peaked during BR3.

The time period between BR3 and BR4 (1139 – 639 B.P.) is a hiatus of the Bridge River site likely due to poor subsistence resource availability (salmon). The cause of this may be worldwide drought conditions via the Peak Little Climatic Optimum (1200-700 B.P.) and the Medieval Warm Period (1000-600 B.P.) (Chatters and Pokotylo 1998; Lepofsky et al. 2005). The Little Climatic Optimum increased worldwide temperatures between 1400 – 700 B.P. There is evidence of an increased fire period elsewhere on the Canadian Plateau between 900 – 600 B.P. (Chatters and Leavell 1995; Hallett et al. 2003), which coincides with the hiatus of the occupation of the Bridge River site. This time period of increased forest fire activity may have severely decreased the salmon populations and productivity of the Columbia and Fraser River systems by choking them with sediment (Chatters 1998; Chatters et al. 1995; Tunnicliffe et al. 2001). Another effect of the Little Climatic Optimum and warmer conditions is seen on the Columbia River system and possibly the Fraser River system, where flooding between 1000 – 700 B.P. increased during spring thaws due to shorter warmer winters. The consequence of this environmental condition is a decrease in terrestrial vegetation cover (Chatters 1998). Decreased vegetation cover would have severely affected the terrestrial faunal populations, as well as the prehistoric peoples of the region who relied on the vegetation, and the mammals that subsisted on it for survival. All of these environmental factors combined created an environment that was unable to sustain the large semi-sedentary population at the Bridge River site after BR3, probably causing the site to be abandoned.

The trend of cooler and wetter conditions seen during BR3 also defined the climate during Bridge River 4 (BR4) (638 – 167 B.P.) (Chatters et al. 1995). BR4 coincides with the Little Ice Age (600 – 100 B.P.), which caused the advancement of high mountain glaciers worldwide and cooler wetter conditions on the Canadian Plateau (Chatters 1998). These conditions continued the trend of excellent salmon resources and possible reduced terrestrial floral and faunal resources such as geophytes, deer, and berry populations as seen during BR3. Similar to BR3 conditions on the Columbia River system, during BR4 are most likely "good" for salmon populations in the Fraser River system (Chatters et al.1995). The increased salmon populations during BR4 most likely favored the reestablishment of the Bridge River site, though at a reduced population size from its zenith during BR3.

CULTURE CHRONOLOGY

The culture history of the Canadian plateau can be divided into cultural periods, phases, traditions, and horizons based on absolute and relative dating of archaeological sites (Chatters and Pokotylo 1998; Goodale et al. 2004; Pokotylo and Mitchell 1989; Richards and Rousseau 1987; Rousseau 2004; Stryd and Rousseau 1996). A brief overview of the Early Period Nesikep tradition (Early Nesikep, Lehman, and Lochnore phases) will be discussed, but the focus of this section will be on the Plateau Pithouse Tradition (PPt) (3500-200 B.P.) on the Canadian Plateau. Specifically, the Shuswap (3500-2400 B.P.), Plateau (2400-1200 B.P.), and Kamloops horizons (1200-200 B.P.) of the PPt will be defined (Figure 2-2) (Prentiss and Kuijt 2004; Richards and Rousseau 1987; Rousseau 2004). It is during the PPt that the Bridge River site was occupied. The Early Period (11000 – 7000 B.P.), Early Nesikep (6000 – 5500 B.P.), Lochnore (5500 – 3900 B.P.), and Lehman phases (4900 – 4500 B.P.), are all part of the Nesikep tradition. The Neskiep tradition consisted of mobile hunter-gatherer populations (Prentiss and Kuijt 2004). Radiometrically dated pithouse archaeological sites in the vicinity of the Bridge River site exist during the Shuswap horizon of the Nesikep tradition (Chatters and Pokotylo 1998).

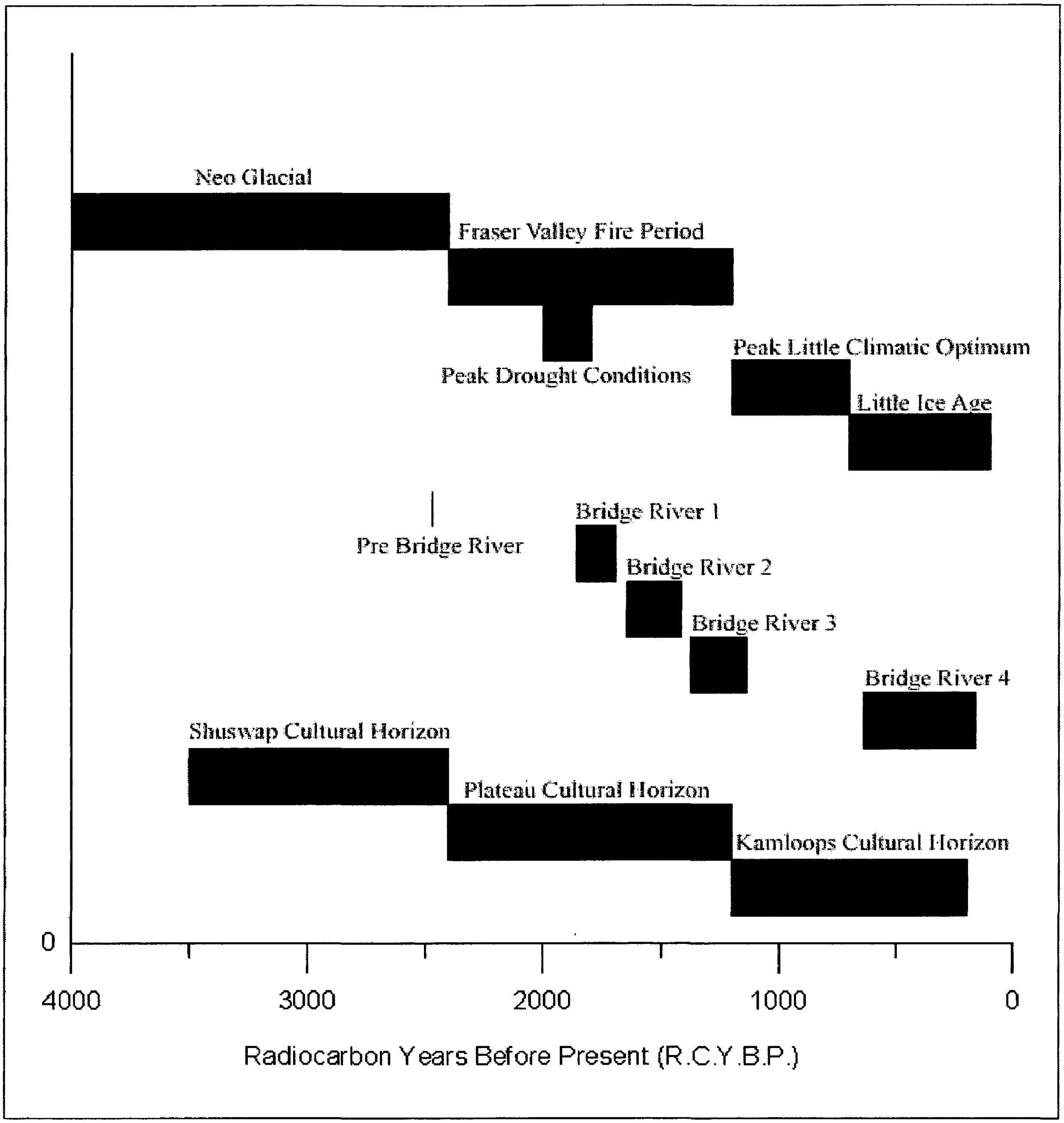


Figure 2-2. *Cultural Chronology and Environmental Time Periods Pertinent to the Bridge River Site.*

The prehistoric peoples from the Nesikep tradition practiced a broad based foraging diet, (Binford 1980), focusing on a variety of animals and plants such as deer, elk, salmon, trout, mollusks, rabbits, small birds, rodents, berries, and geophytes found on the Canadian Plateau (Lenert 2000; Pokotylo and Mitchell 1998; Prentiss et al. 2000; Richards and Rousseau 1987; Rousseau 2004). These individuals were seasonally mobile, not staying in one place for more than a few days or weeks, at most (Pokotylo and Mitchell 1998; Rousseau 2004). They tended to prefer areas protected from the wind situated near water sources such as streams, rivers, and associated environments such as open forest where hunting and gathering was highly successful (Pokotylo and Mitchell 1989; Richards and Rousseau 1987; Rousseau 2004). Their dwellings possibly resembled tepee-like surface structures (Chatters 1986). The artifacts associated with this tradition mainly consisted of stone (basalts and other local raw materials on the Canadian Plateau), and bone having functions associated with hunting and gathering. Some examples of these artifacts include, but are not limited to, stone projectile points, scrapers, knives, bone awls, and bone needles (Chatters and Pokotylo 1998; Richards and Rousseau 1987).

It is not until approximately 4000 B.P. that a change in life ways began to take shape in the Mid Fraser region on the Canadian Plateau with the inhabitants beginning to become more sedentary and occasionally practicing storage of a "collector-like" behavior (Prentiss and Kuijt 2004). Also, during the post-4000 B.P. time period there is an increase in what can be defined as prestige items such as shell beads, animal tooth pendants, and eagle claw pendants found in archaeological sites on the Canadian Plateau (Chatters and Pokotylo 1998; Lenert 2000; Pokotylo and Mitchell 1989; Prentiss et al. 2000; Rousseau 2004; Styrd and Rousseau 1996). Along with prestige items and storage, other cultural behaviors associated with collector-like systems such as logistical mobility, complex settlement patterns (Binford 1978, 1980), and, specific to the Canadian Plateau, ground stone tools (Hayden 1989) are found in the Mid Fraser sub-region during the post

4000 B.P. time period. All of these cultural behaviors and material items are associated with the emergence of the PPt.

The Shuswap Horizon (3500 – 2400 B.P.) (Richards and Rousseau 1987) is the first of three phases of occupation on the Canadian plateau associated with the PPt, which encompasses the occupation of the Bridge River site. The Shuswap horizon represents the first major appearance of pithouse (semi-subterranean winter living structures) communities in the Mid Fraser sub-region (Richards and Rousseau 1987; Rousseau 2004). These pithouses tended to have side entrances, central hearths, and internal storage and cooking pits (Boas 1890; Richards and Rousseau 1987; Teit 1900, 1906). They averaged 11 meters in diameter, with a maximum diameter up to 16 meters and as deep as 2 meters (Richards and Rousseau 1987; Rousseau 2004). Evidence for the construction patterns of these pithouses is seen archaeologically via posthole remains in circular patterns suggesting wooden structures along with other internal features such as hearths and associated artifacts (Hayden 1997, 2000; Richards and Rousseau 1987; Rousseau 2004).

Lithic artifacts during the Shuswap horizon were made from local basalts (dacite), cherts, quartzite, argillite, rhyolite, jaspers, and chalcedonys, and represent both expedient and curated tool strategies (Goodale et al. 2004; Richards and Rousseau 1987; Rousseau 2004). Shuswap projectile points were most likely utilized as atlatl dart or spear tips (Richards and Rousseau 1987). Other lithic tools used during the Shuswap horizon included: key-shaped unifaces, unifacial and bifacial tools, microblades, and cores (Fladmark 1982; Goodale et al. 2004; Richards and Rousseau 1987; Rousseau 2004).

Bone and antler artifacts are also present during the Shuswap horizon. Even though these artifacts are rare and only found at sites with good faunal preservation, they include: beads, projectile points, awls, and needles (Richards and Rousseau 1987; Rousseau 2004).

Subsistence during the Shuswap horizon was organized different than the previous 7,500 years of occupation in the region, due to new food-storage technology and a greater reliance on salmon (Chatters 1995, 2004; Rousseau 2004). Shuswap horizon peoples hunted deer, elk, black bear, mountain sheep, muskrat, beaver, snowshoe hare, red fox, birds, fresh water mussels, trout, salmon, and trumpeter swans (Richards and Rousseau 1987; Rousseau 2004). However, during the Shuswap horizon salmon may have been a main part of the diet according to limited bone chemistry studies (Chisholm 1986; Goodale et al. 2004; Prentiss et al. 2004; Richards and Rousseau 1987; Rousseau 2004).

Evidence of trade during the Shuswap horizon exists in the form of *Dentalium* and *Olivella* shells from the coast making their way into the interior Canadian Plateau region for beads (Chatters and Pokotylo 1998; Richards and Rousseau 1987; Rousseau 2004). On the opposite side of this trading network, and on an inter-regional level, nephrite originating in the Mid Fraser sub-region is present at archaeological sites on the Canadian Plateau as well as on the Southern Northwest Coast during this time period, suggesting a trading network for this precious material (Chatters and Pokotylo 1998; Richards and Rousseau 1987; Rousseau 2004). The nephrite was shaped into different types of artifacts such as adzes used for woodworking.

The main occupation of the Bridge River site begins with BR1 (1646 – 1414 B.P.) during the Plateau horizon. However, one housepit did reveal a date of 2470 +/- 37 R.C.Y.B.P., which falls within the Shuswap horizon. This housepit and its associated artifacts are most similar to those of the Plateau horizon and since the date is at the end of the Shuswap horizon, it will be considered an outlier date and not used for this research. At the end of the Shuswap cultural horizon and the beginning of the Plateau cultural horizon there is a climatic shift from cool and moist conditions to warmer and dryer conditions. These climatic conditions and their effects on the prehistoric inhabitants of the region are what differentiate between the Shuswap and Plateau cultural horizons.

The next phase of occupation in the PPt is the Plateau horizon (2400 – 1200 B.P.) (Richards and Rousseau 1987) where the initial habitation of the Bridge River site occurred during BR1 (1646 – 1414 B.P.). The Plateau horizon has smaller sized housepits with an average diameter of 6 meters and a range from 4 to 8 meters (Richards and Rousseau 1987; Rousseau 2004). However, an exception is the Mid Fraser region where pithouses range from 8 to 20 meters with an average of 10 meters (Rousseau 2004). During the Plateau horizon pithouse village size does increase compared with village size during the Shuswap horizon (Rousseau 2004). Plateau pithouse design is circular to oval with a central hearth and storage and refuses pits similar to Shuswap pithouses (Boas 1890; Carlson 1980; Richards and Rousseau 1987; Teit 1900, 1906; Wilson 1980). Pithouse feature evidence is also similar to Shuswap horizon, revealing postholes, internal pithouse features, and bench linings on the interior edges of pithouses (Eldridge and Styrd 1983; Richards and Rousseau 1987; Rousseau 2004). One change in pithouse design during the Plateau horizon is that both side and roof entrances were being utilized (Hayden 1997; Styrd 1983a).

Lithic artifacts during the Plateau horizon share traits with those from the Northern Plains and Northwest Coast (Goodale et al. 2004; Richards and Rousseau 1987). Plateau projectile points were similar to Shuswap horizon projectiles made for atlatl darts and spears tips (Richards and Rousseau 1987; Rousseau 2004). Around 1500 B.P. the bow and arrow system enters the Mid Fraser sub-region, and arrow points become the dominant projectile point found in archaeological context (Hayden 2000; Richards and Rousseau 1987; Rousseau 2004). Similar to the Shuswap horizon, "stone tools represented in assemblages continue to be unformed unifacial and bifacial flake implements" (Richards and Rousseau 1987:34). Other lithic artifacts associated with the Plateau horizon, but still rare, are incised and groundstone tools such as hand mauls, and nephrite celts (Richards and Rousseau 1987; Rousseau 2004). Chipped stone tools are still the dominant format for lithic technology during the Plateau horizon. These Plateau Horizon lithic tools are comprised from the same raw materials defined during the Shuswap horizon.

Bone, antler, and tooth, artifacts become more prominent in assemblages from the Plateau horizon, consisting of harpoons, projectile points, beads, and gaming pieces (Richards and Rousseau 1987; Rousseau 2004). Lastly, during the Plateau horizon, there is evidence for the use of perishable organic materials. That is not to say they did not previously exist, but archaeological evidence has good dating and preservation of these artifacts from the Plateau horizon. One example of this artifact class is a birch bark basket found at the Bridge River site during the 2004 field season that was radiocarbon dated via associated charcoal to 1864 +/-36 R.C.Y.B.P. (Prentiss et al. 2005).

The Plateau horizon subsistence base focused on marine resources (salmon), and roots as well as terrestrial resources similar to the Shuswap horizon (Burns 2004; Richards and Rousseau 1987). Human burial remains from the Plateau horizon have been analyzed to test this hypothesis. Analysis of stable carbon isotopes from human bone suggests 60% of all dietary protein had a marine origin (Pokotylo and Froese 1983; Richards and Rousseau 1987; Rousseau 2004). During the Plateau horizon the "collector" like behavior (Binford 1980) was the dominant lifestyle as people were packing into larger winter pithouse villages and storage became paramount along with the previous hunting and gathering strategy (Chatters 1995, 2004; Rousseau 2004). Stored foods consisted of dried salmon, fleshy berries (saskatoon, thimbleberry etc.), geophytes, and other floral and faunal species.

Trade during the Plateau horizon took place between the Canadian Plateau and the Northwest Coast, Northern Plains, Eastern Kootenay, and Rocky Mountain Regions (Richards and Rousseau 1987; Rousseau 2004). The archaeological evidence for these trade routes comes from material remains found at sites on the Canadian Plateau, specifically the Mid Fraser sub-region, dating to the Plateau Horizon. Some examples of these artifacts are: nephrite (found in the Canadian Plateau and specifically the Mid Fraser sub-region), argillite (North West Coastal regions), top the world chert (South Eastern British Columbia specifically the Kootenay Mountain Range), and *Dentalium* and *Olivella* shells (North West Coast) (Richards and Rousseau 1987; Rousseau 2004).

Towards the end of the Plateau horizon, the "Big Village Pattern" arises on the Canadian Plateau at approximately 1600 B.P. (Lenert 2001). The "Big Village Pattern" can be defined as having small, medium and large size pithouses organized into communities (Hayden 1997, 2000). This "Big Village Pattern" is an accurate definition of the Bridge River site during the Plateau Horizon. The Plateau horizon (2400 – 1200 B.P.) encompasses most of the occupational phases at the Bridge site during BR1, BR2, and BR3 (1864 – 1139 B.P.). It is during this time that the Bridge River site grows to its highest population levels as well as the largest number of occupied housepits. During BR3 (1375 – 1139 B.P.) the village peaks in all socioeconomic respects as well as physical size (number of occupied housepits). During the height of the Bridge River site, it fits the model outlined for Plateau horizon sites ("The Big Village Pattern").

The last cultural horizon that is part of the PPt on the Canadian Plateau is the Kamloops horizon (1200 – 200 B.P.) (Richards and Rousseau 1987). At approximately 200 B.P. the historic record begins on the Canadian Plateau, thus causing a cultural transition due to European influences. That is not to say that at 200 B.P. the PPt ended, but that from that point in time one we can utilize historic records as well as archaeological records to recreate the past life-ways of the inhabitants on the Canadian Plateau and in particular the Mid Fraser sub-region.

The pithouses during the Kamloops horizon have an average diameter of 8.5 meters, but range from 6 to 20 meters in diameter (Pokotylo and Mitchell 1989; Rousseau 2004). Again, similar to the previous cultural horizons, pithouses are oval to circular in shape, some with raised rims, containing hearths, storage pits, and both roof and side entrances (Richards and Rousseau 1987; Rousseau 2004).

During the Kamloops horizon, lithic technology is similar to both the Plateau and Shuswap horizons in its reduction strategies as well as raw materials utilized. Projectile points are utilized for bow and arrow technology and are usually small in size made from both local (dacite) and non-local raw materials (Top of the World chert). Bifacial lithic reduction is prominent during the Kamloops horizon with an emphasis on fine pressure flaking finishing of lithic tools such as projectile points for the bow and arrow (Richards and Rousseau 1987). Other lithic tools utilized during the Kamloops horizon included gravers, perforators, and key-shaped unifaces (Rousseau 2004).

One distinct change during the Kamloops horizon is an increased emphasis on ground stone tool technology. This is apparent via an increase in the quantity and quality of ground stone artifacts found at archaeological sites on the Canadian Plateau during the Kamloops horizon and more specifically in the Mid Fraser sub-region (Richards and Rousseau 1987). These groundstone artifacts were made from raw materials such as nephrite, slate, and steatite and often worked into anthropomorphic and zoomorphic forms (Hayden and Schulting 1997; Richards and Rousseau 1987; Sanger 1968; Styrd 1983b). Due to the time and effort expended in making such artifacts, they are representative of a high degree of craft specialization and some may have been trade goods.

Other non-lithic artifacts present during the Kamloops horizon include birch bark containers, bone, antler and tooth artifacts, and woven blankets (Richards and Rousseau 1987; Teit 1900, 1906, 1909). Bone and antler artifacts increased significantly in quantity and variety during the Kamloops horizon, although this may be due to preservation factors (Rousseau 1987, 2004). Some of these were often highly decorated using geometric patterns (Rousseau 1987, 2004).

Prestige artifacts are more common during the Kamloops horizon, such as copper beads, nephrite adzes, coastal shell beads, ochre, steatite sculptures, and decorated bone and antler (Richards and Rousseau 1987). This suggests increased trading with other regions as well as inter-regional trade. Also, these prestige items suggest a level of socioeconomic complexity similar to that witnessed in the ethnographic accounts of Teit (1900, 1906, 1909) and others.

During the Kamloops horizon, subsistence strategies were similar to the Plateau horizon, but certain areas may have had greater reliance on marine resources (salmon) versus terrestrial resources (deer) due to their location and dependence on seasonal salmon runs (Goodale et al. 2004). Again, a "collector" strategy (Binford 1980) was practiced via storage (dried salmon, fleshy berries, geophytes etc.) and salmon fishing. Berries, roots, and geophytes were also an integral part of the diet of the prehistoric peoples during the Kamloops horizon. Analyses of stable isotopes from human remains dating to the Kamloops horizon indicate a 40-60% reliance on salmon for their caloric intake (Chisholm 1986; Lepofsky et al. 1996).

The Bridge River site was occupied during the Kamloops horizon during the end of BR3 and throughout BR4. During this time, the Bridge River site does follow the model outlined for the Kamloops cultural horizon, as well as Teit's and other ethnographic accounts of this area. This includes their lithic technology as well as their pithouse design, subsistence strategies, and overall way of life.

HISTORY OF RESEARCH

Three separate linguistic and territorial divisions of the Interior Salish peoples (Lillooet, Shuswap, and Thompson) prehistorically occupied the Interior Canadian Plateau of British Columbia (Magne 1985). The first ethnographic account of theses peoples was by James Teit, under the influence of Franz Boas, during the Jesup North Pacific Expedition (1898 – 1902) (Magne 1985). Teit collected information on the similarities and differences in material culture, beliefs, shelters, and resource gathering traditions of these three groups (Magne 1985). The Bridge River site is situated in the area of the Lillooet cultural group. Their culture is summed up in current work on the Upper Statl'at'imx peoples (who are Teit's Lillooet cultural group):

> The Upper Statimc way of life was inseparably connected to the land. Traditionally, the economy involved planned moves to different sites throughout their territory of rivers, mountains and lakes. The year can be summarized as three main phases. In the spring, families left their winter villages and moved into camps in the low mountain regions to gather roots and berries and hunt for deer, elk and goat. In the late summer and fall, people would return to the Fraser River for the salmon catch and the busy period of drying, trading and socializing that followed. In the winter, after storing up large amounts of dried salmon and other foods, families would settle at their villages to spend the cold months in the shelter of the sistken (pithouse).
>
> The Upper Statimc planned their moves to coincide with the best times to gather medicines, harvest food, and hunt and fish in various sites throughout their traditional territory. As the seasons of each year varied, the people relied upon a rich and complex knowledge of their territory to determine the most appropriate time for their moves. Instead of a heavy burden of tools, the Upper Statimc carried a set of techniques in their mind, which allowed them to construct what they required out of resources available at each place.
>
> The lessons of living on the land were a large part of the inheritance passed on by Upper Statimc elders to the children. First to be learned was the manufacture of essential implements, from fishing weirs to baskets, arrowheads to summer lodges, roasting pits to salmon drying racks. Also required was knowledge of all the various medicine, root and berry-gathering sites, fishing spots and hunting grounds. Children learned

the specialized techniques that made fishing, hunting and root gathering efforts successful by joining adults in the daily activities.

While every Statimc person acquired the knowledge and skill needed to survive, a division of labor characterized day-to-day work. For instance, women, youth and children were generally responsible for harvesting root foods, preparing meats and hides, curing salmon, preparation of roasting pits and cooking foods, maintaining the lodges and caring for the children. Men hunted, fished, and maintained traps, fixed spears, nets, built pithouses, deliberated over matters of politics and defense of the territories. The entire community participated in fishing and in berry gathering. Clan or family chiefs or stewards would manage the sites to ensure, for instance, that berries were harvested at the right time, that fish weirs or platforms were properly maintained and that certain areas were not over-hunted (Smith 1998:7-10).

A necessity to the Interior Salish peoples is their pithouse living structure, which allowed them to survive the harsh winter conditions on the Canadian Plateau (Figure 2-3).

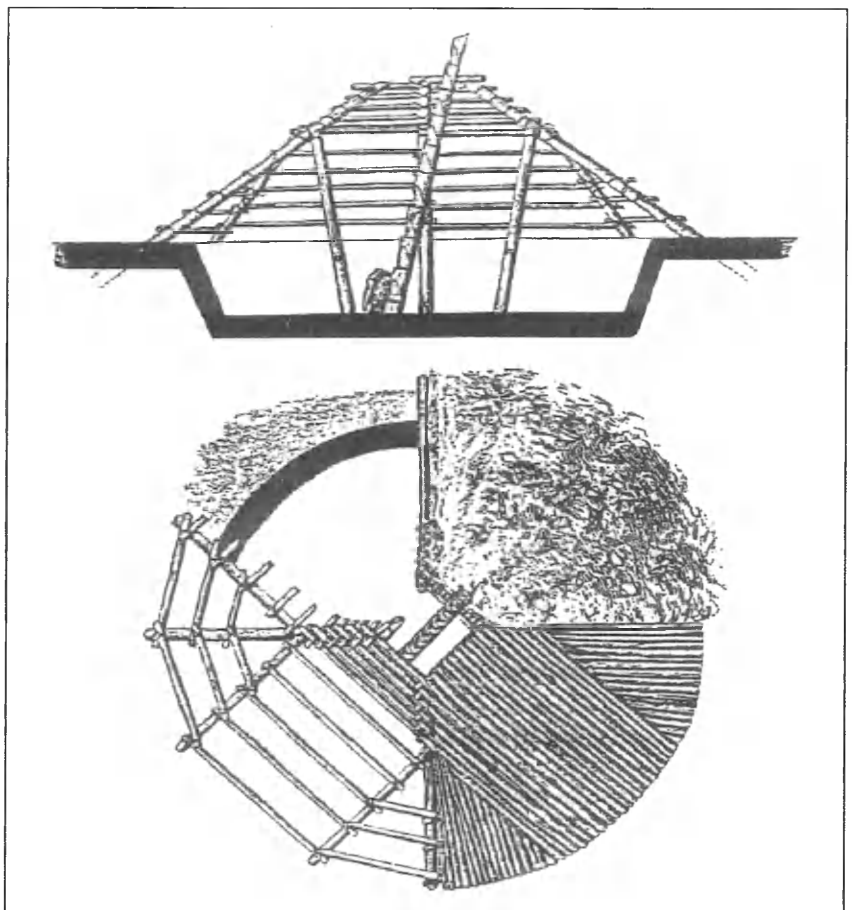


Figure 2-3. *Profile and plan-view of a Canadian Plateau Pithouse (adapted from Teit 1900).*

Initially, construction of the pithouse began with the excavation of a pit into loose soil (Teit 1900). Next, wooden poles were cut with wedges, hammers, and stone adzes and transported to the house location for frame and roof construction (Teit 1900). During construction a smoke hole was left in the center of the roof along with a ladder for entrance into the pithouse (Teit 1900).

Teit's (1900, 1909) and Morice's (1893) ethnographic accounts provide some examples, from the Canadian Plateau, of lithic tools and their functions. The following are some examples of stone tool references from these ethnographic manuscripts and as excerpts from Magne's (1985) work compiling some of these accounts.

> Stones were battered into shape, cut, and flaked. Jade and serpentine bowlders were cut by means of grit-stones or beaver-teeth. Stone skin scrapers and hand-hammers are used up to this day. The Indians are still familiar with this art of making arrowheads. When these were to be made from a bowlder, the following method was employed. The bowlder was split by being laid on a stone and struck with a hand-hammer, generally a pebble of handy size. When a suitable piece had been obtained, its edges were trimmed off with a hard stone. Then it was wrapped in grass or hay, placed on edge on a stone, and large flakes were split off with a hand-hammer. After a suitable piece had been obtained, it was placed on a pad in the left hand and held in position with the fingers. It was given its final shape by means of a flaker made of antler, which was used with forward and downward pressure. The blunt point served for flaking off larger chips, while the smaller one was used for the final stages of the work (Teit 1900:182).

> Adzes and axes of jade and serpentine were in common use...Stone chisels were fastened into handles with sockets, in which the stone was inserted...For cutting or carving, chipped stone knives or beaver-tooth knives were used...Drilling was done by means of stone points (Teit 1900:183).

> The material chosen in preference to fashion arrow or spear heads was loose broken pieces of rock such as were found on the surface. Of course, these were confined to a few localities only wherein were situated sorts of quarries which were very jealously guarded against any person

> even of the same tribe, whose right to share in their contents was not fully established (Morice 1893:65).

This ethnographic literature has described some of the stone tools necessary to survive in a winter pithouse village during the Plateau Pithouse tradition, as well as seasonal tasks and the division of labor prehistoric peoples practiced on the Canadian Plateau. These stone tools needed to solve daily tasks in this environment have been closely examined at other archaeological sites such as Keatley Creek (Hayden et al. 2000). The Keatley Creek site is also a pithouse village during the Plateau Pithouse tradition on the Canadian Plateau (Figure 2-1). The Keatley Creek organizational model utilized for this research takes into account four different strategies: expedient block core, portable long term use, biface, and ground stone and abrading (Hayden et al. 2000). Each one of theses strategies represents different constraints such as raw material, what task they were used for, such as hide scraping, and during what season they may have been used. The main strategy utilized at the Keatley Creek site is the expedient block core strategy. The biface strategy is the second most important organizational strategy at the Keatley Creek site followed by the portable long term use, and ground stone and abrading strategies. These four strategies are defined as,

> In this strategy (Expedient Block Core) cores are kept at the habitation site. Flakes are removed and modified according to immediate needs, and usually discarded after the immediate task is completed. Material is obtained from the most easily available sources, and there is generally no need for especially durable materials (Hayden at al. 2000:189).
>
> The bifacial strategy makes the most sense in the context of high mobility (as tools used in traveling to seasonal camps) and high constraints on the amount of stone material that can be transported on such trips (Hayden et al. 2000:193).
>
> The goal in this strategy (Portable Long Term Use) is to carry specialized tools in high mobility contexts that will last as long as possible and thus

> avoid the need to carry excess stone weight. Thus, the most durable material with high resharpening potential is often reserved for these tools (Hayden et al. 2000:197).
>
> The creation and maintenance of cutting edges by grinding is used under conditions of high processing volumes and / or to display control of wealth and power (Ground Stone and Abrading) (Hayden et al. 2000:203).

This research will seek to determine if the Keatley Creek organizational model also characterizes the lithic technological strategies used throughout the occupational history of the Bridge River site. Arnoud Styrd conducted the first archaeological excavations at the Bridge River site in 1974 to determine, "...as complete an inventory as possible of house pit sites in the Lillooet area...site location, size, composition, and surface cultural material" (Styrd 1974:7). Styrd also tested whether or not pithouses of different sizes and thus the villages they made up were randomly or similarly distributed in space and time (Styrd 1974). At the Bridge River site, Styrd collected 3,220 artifacts and 872 ecofacts from 30 1x1m units distributed throughout 8 pithouses tested (Styrd 1974). He also collected dating samples from all 8 tested pithouses, 4 of them returned dates between 1760 +/-85 – 1260 +/-85 R.C.Y.B.P. (Styrd 1974).

Along with Styrd's work, The University of Montana has completed two field seasons, 2003 and 2004, excavating at the Bridge River site to more accurately define the site's chronology as well as test two opposing models for the evolution of socio-economically complex hunter-gatherer communities on the Canadian Plateau (Prentiss et al. 2004). By extensively testing 58 housepits and 17 external pit features during the two field seasons, the University of Montana better defined the site's occupation dates, 1800 B.P. - 200 B.P. (Prentiss et al. 2005). The two field seasons obtained dates from 55 housepits and 13 external pit features (Prentiss et al. 2005) (Figure 2-4). Along with extensive dating, the two field seasons yielded 22,270 lithic artifacts (7,272 lithic artifacts from dated context), 10,886 faunal remains (some of which were bone artifacts such as beads, awls, etc.), and a birch bark basket (Prentiss et al. 2004, 2005).

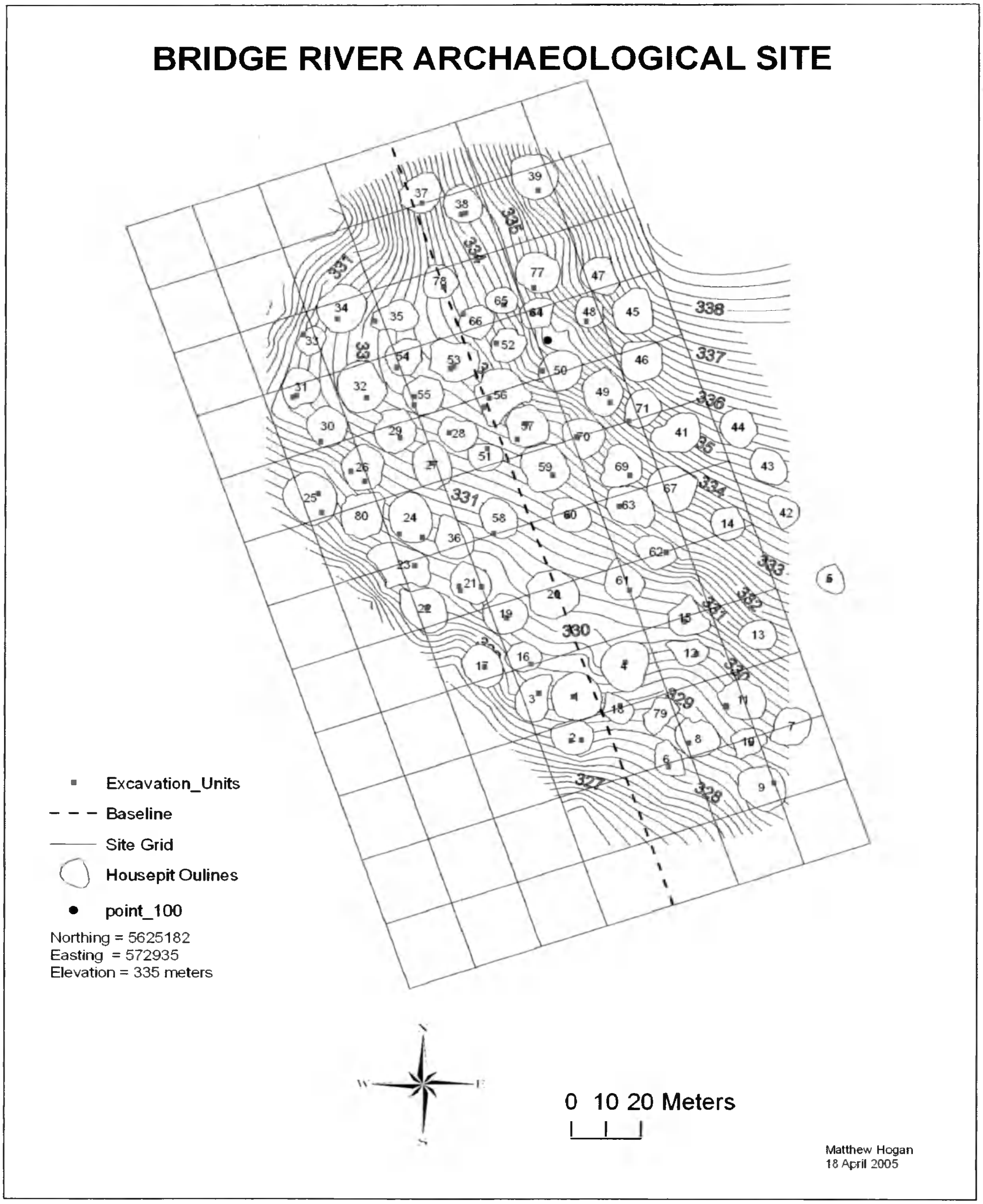


Figure 2-4. *Map of Bridge River site, showing housepit locations, size, topographic relief, grid system, and excavation units (Hogan 2005).*

CHAPTER 3:

RESEARCH METHODS

This chapter discusses the field, laboratory, and analytical methodology utilized during this research. The field and laboratory work occurred over two summers in British Columbia, Canada, while the analysis took place over two years at the University of Montana. This chapter seeks to define the parameters of this research.

This thesis tests two hypotheses, that the Bridge River site had a winter pithouse village pattern of lithic technological organization as seen at the Keatley Creek site, and that the Bridge River site conformed to the Mid Fraser subsistence model of a salmon dominated diet with a lesser reliance on terrestrial resources. To test the first hypothesis, the Bridge River lithic tool assemblage will be compared to the Keatley Creek organizational model to determine if they are similar. The Keatley Creek organizational model is defined as being from a winter pithouse village. Analyzing lithic tools in light of this hypothesis is effective because it relates lithic tools directly to the seasonal organization of a village. Test implications for this hypothesis are, if the Bridge River lithic tool assemblage is dominated by an expedient block core strategy, and secondarily a biface strategy, similar to the Keatley Creek model, then the Bridge River site agrees with the winter pithouse village pattern seen at the Keatley Creek site. Along with these two strategies, the Keatley Creek organization model suggest that the long term use and ground stone and abrading strategies should also be present in the lithic tool assemblage from the Bridge River site.

To test the second hypothesis, the Bridge River lithic tool assemblage will be analyzed from a functional perspective to see if it agrees with the Mid Fraser subsistence model. Analyzing lithic tools to test this hypothesis is valuable because the function of lithic tools links them to the prehistoric problem or task they were used to solve. Along with function, the lithic tool assemblage will be divided up into one of two categories, curated and expedient. Splitting up the tools into these two categories will allow for a more accurate representation of the manner in which the tools were utilized. That is to say the ratio of expedient to curated tools has implications on where the tools may have been used and how long they were used. Combining this with the function of the tools will provide a precise designation of the method in which the tools were used to solve daily problems such as using adzes (heavy duty curated lithic tools) to work wood throughout the entire year at both the village and possibly away from the village.

If the functionality of the lithic tools from the Bridge River site are dominated by fish procurement tools such as, woodworking (adzes), and light duty tools (endscrapers), then the Bridge River site agrees with the Mid-Fraser subsistence model. Scraping tools are needed to process salmon, prior to drying them for later consumption. Woodworking tools such as adzes are needed to make the wooden portions of the dipnets, as well as the drying racks for the fish. Alternatively, if there are higher frequencies of tools such as projectile points and expedient knives, then this infers a greater reliance on hunting and butchering, which does not agree with Mid-Fraser subsistence model. Ethnographic literature from the region states:

> Most skin-scrapers were simply thin pieces flaked off from pebbles of various kinds, and were slightly chipped on one edge only. (Teit 1906:203).
>
> The semi- lunar fish-knife, consisting of a slate blade, its straight side inserted in a handle, is common among all the Lillooet (Teit 1906:203).

> Stone skin-scrapers and hand-hammers are used up to this day (Teit 1900:182).
>
> Adzes and axes of jade and serpentine were in common use (Teit 1900:183).
>
> For cutting and carving chipped stone knives or beaver-tooth knives were used (Teit 1900:183).
>
> Drilling was done be means of stone points (Teit 1900:183).
>
> The skin is first dried, and the flesh side scraped free from fatty substance with a sharp stone scraper (Teit 1900:184).

This is the basis, along with experimental and comparative archaeology, for determining the functionality of tools and tool groups from the Bridge River site.

FIELD METHODS

The 2003 and 2004 University of Montana field schools, under the direction of Dr. William C. Prentiss, were carried out with the purpose of defining the occupational chronology of the Bridge River site. The fieldwork took place during the summer months with the aid of field school students and graduate students from the University of Montana as well as volunteers from the Statimc Nation. This nearly pristine archaeological site has allowed for new and innovative sampling techniques to be used to pinpoint locations where subsurface features are present within housepits and external pit features. This was accomplished by dating features and related stratigraphy within 58 housepits and 17 external pit features (Prentiss et al. 2004, 2005).

A total of 90 dates were obtained from 55 housepits and 13 external features (Prentiss et al. 2004, 2005). The University of Arizona NSF AMS Dating Laboratory was responsible for 80 dates (Prentiss et al. 2004, 2005). The other 10 standard dates were obtained from the Laboratory of Isotopic Chemistry at the University of Arizona

(Prentiss et al. 2004, 2005). The dates were used to define the different occupations of the site (Pre-Bridge River 2470 B.P., Bridge River 1 1864–1696 B.P., Bridge River 2 1646-1414 B.P., Bridge River 3 1375-1139 B.P., Bridge River 4 638-167 B.P.) (Figures 3-1, 3-2) (Markle 2005).

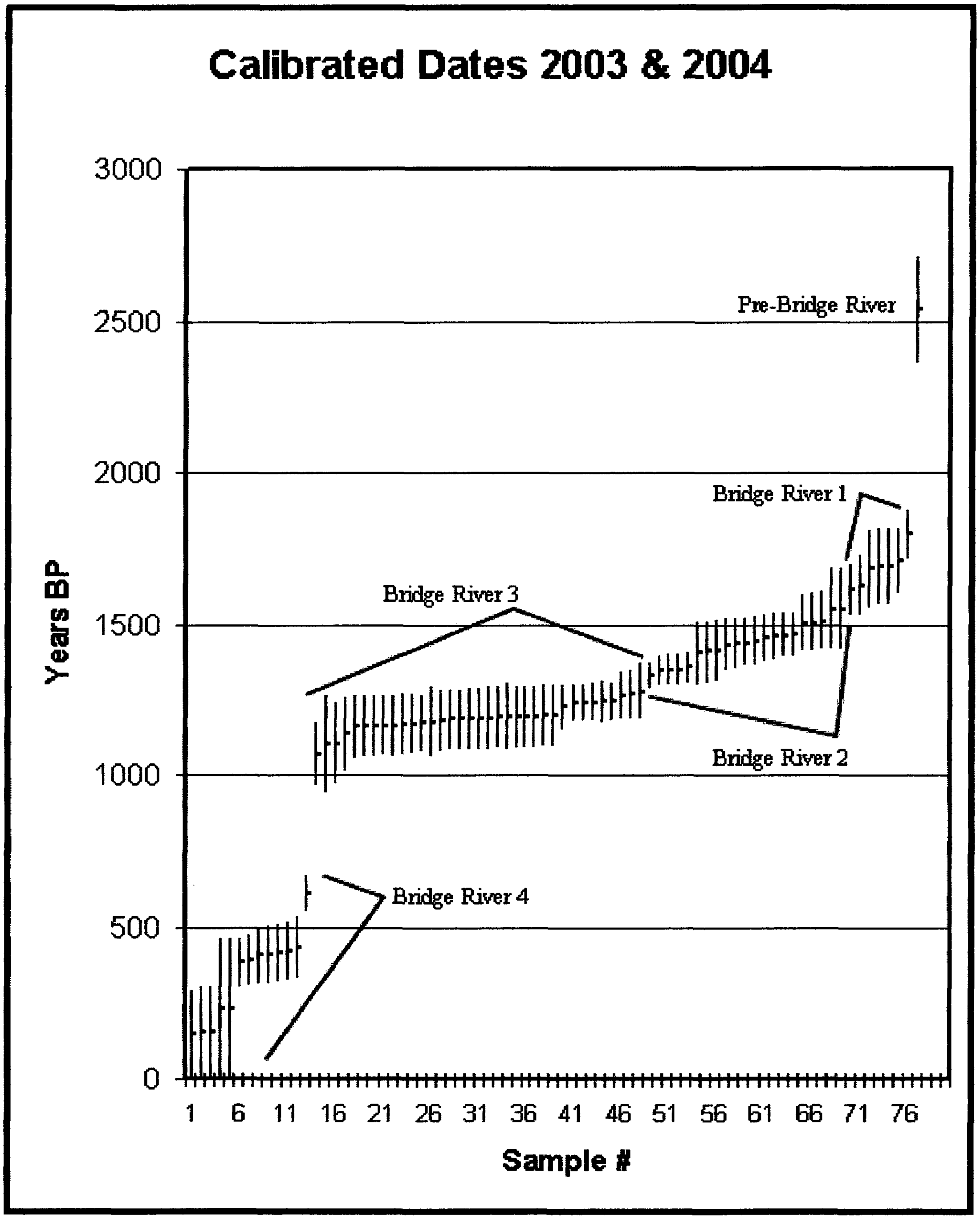


Figure 3-1. *Calibrated Radiocarbon Dates, at the two sigma range, from the Bridge River Site (Adapted from Markle 2005).*

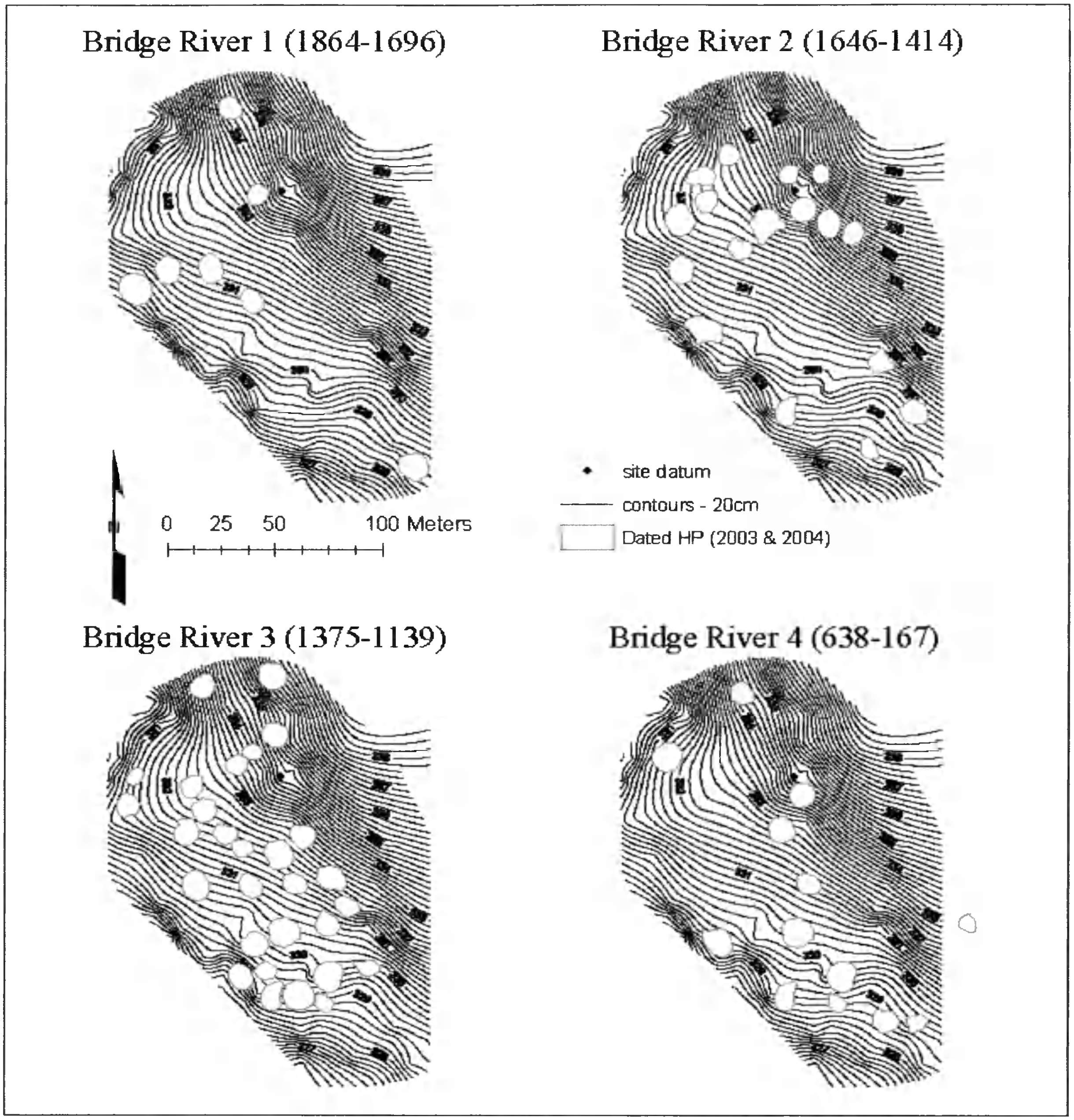


Figure 3-2. *Map of the Bridge River site showing the evolution of the village via radiocarbon dated housepits (Adapted from Hogan 2005).*

After a comprehensive topographic map of the majority of the site was created (Figure 3-3), a ground-based remote sensing survey was taken of the site using three techniques.

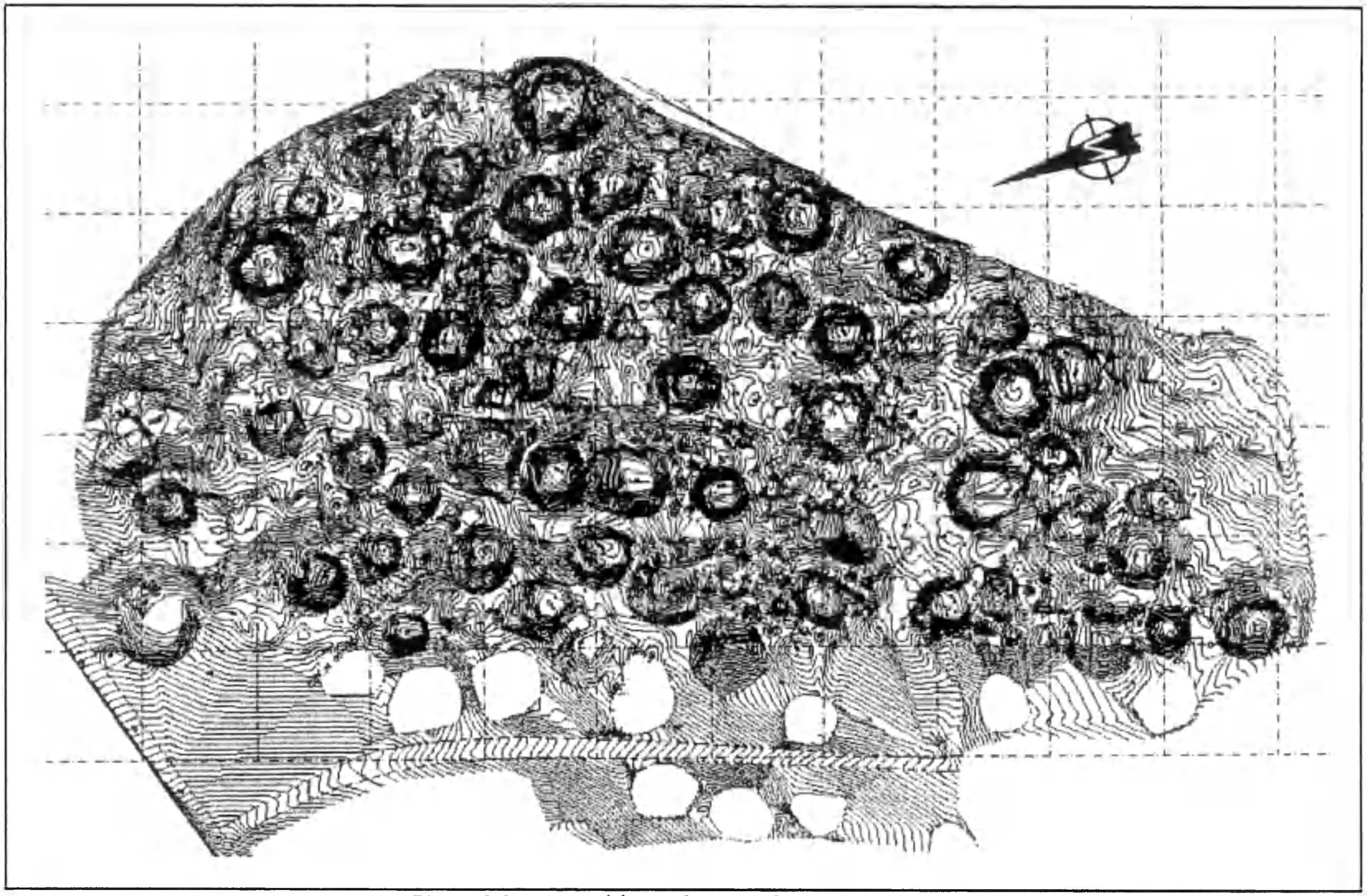


Figure 3-3. *Map of the Bridge River Site (Cross 2004).*

The electromagnetic conductivity, magnetic susceptibility, and ground penetrating radar surveys, undertaken by Dr. Guy Cross (Terrascan Geophysics), revealed areas within the site where hidden housepits (not topographically discernible) were located. More importantly, the survey detected relative differences in the magnetic susceptibility within the pithouses defined as subsurface anomalies (Figures 3-4, 3-5). Intense heating of soils by fire events (i.e. hearths) most likely created these geophysical anomalies. Pinpointing the hearths allowed the excavations to target areas within housepits and external pit features where dateable organic materials (i.e. charcoal from fires) were most likely to be found. After the geophysical anomalies were mapped, the excavation of the site was carried out by placing 77 (50X50 cm, 20X20 in) units over the strongest anomalies in 58 housepits and 17 external pits features. The units were excavated in natural and cultural layers. The artifacts were collected using 1/8-inch (3.1 mm) screen mesh. The units were excavated into culturally sterile alluvial and colluvial deposits, which lie below the remains of the village. All artifacts were collected for laboratory analysis as well as routing sediment samples from strata and features.

LABORATORY METHODS

The laboratory analysis of the Bridge River lithic assemblage from 2003 and 2004 took place at Simon Fraser University in Burnaby, British Columbia, immediately after completing the fieldwork at the Bridge River site. William C. Prentiss directed the lithic analysis with the knowledge that the assemblage would not leave the country for further analysis at the University of Montana for further work. Therefore, the laboratory methodology stressed collecting as much information as possible from each artifact within the short time constraint. The complete lithic assemblage database consists of

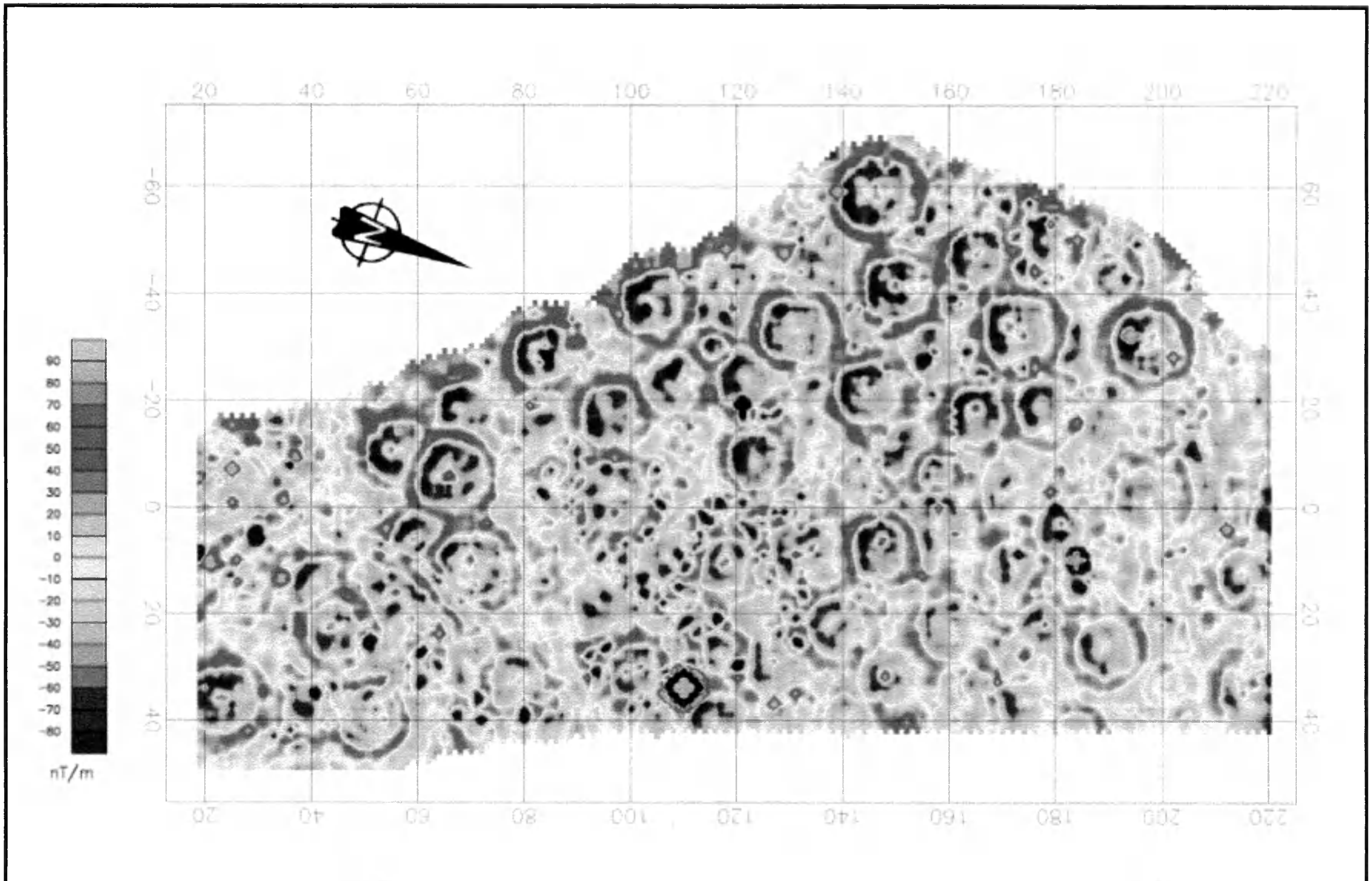


Figure 3-4. *Vertical Magnetic Gradient Map of the Bridge River Site (Cross 2004).*

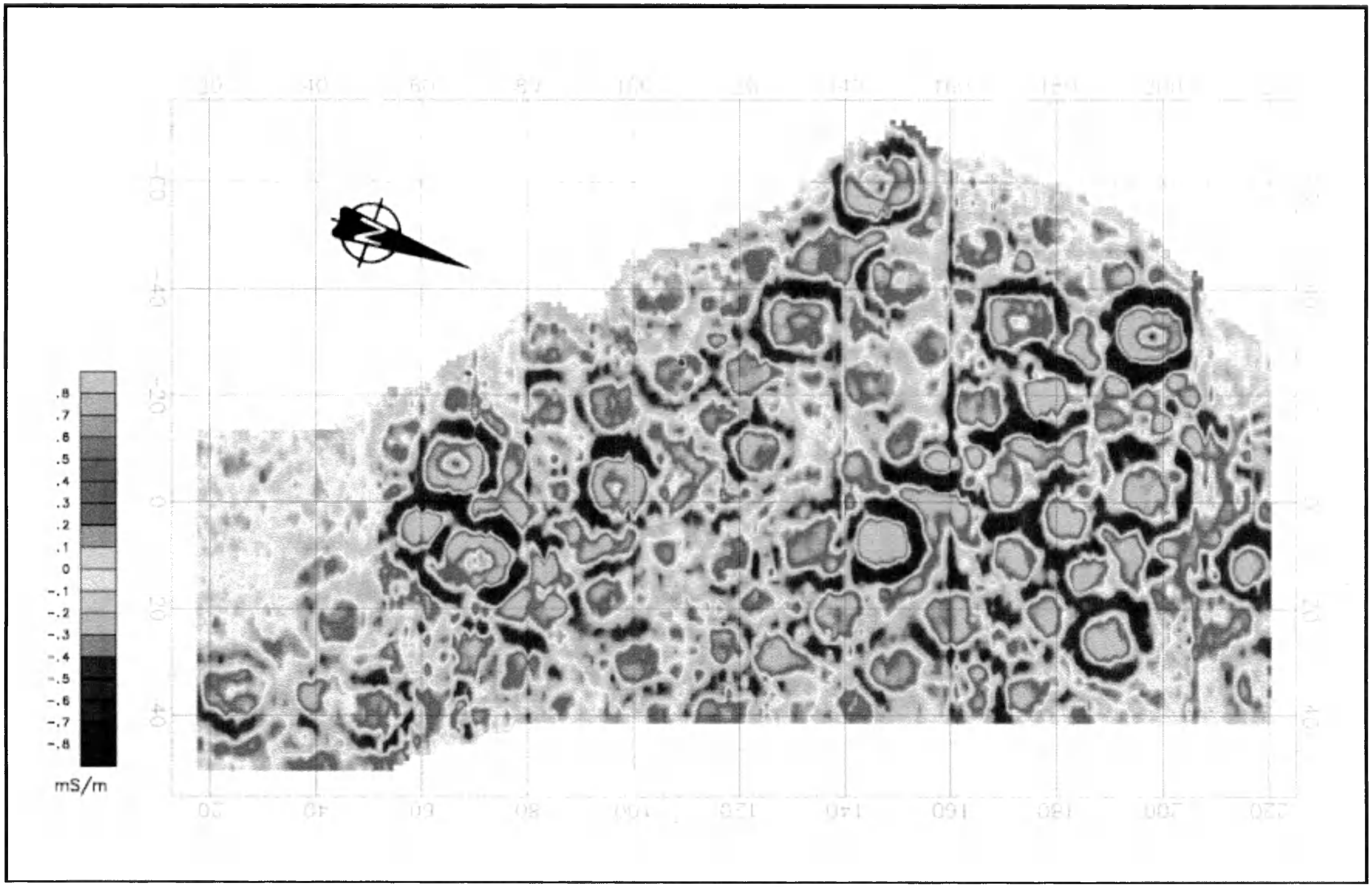


Figure 3-5. *Residual Apparent Conductivity Map of the Bridge River Site (Cross 2004).*

22,433 artifacts. The lithic debitage were sorted by raw material, thermal alteration, size, technological type, cortex, and, when feasible, fracture initiation. The lithic tools were sorted by the same categories as the debitage along with other attributes specific to lithic tools such as use wear, edge angle, and retouch. A total of 40 raw material types were defined during the debitage and tool analysis. Of the 40 raw materials, approximately 80% of the lithic artifacts were dacite, with all other raw materials each representing less than 5% of the artifacts. Thermal alteration was marked as present or absent, and defined by various characteristics. Lithic artifacts that had flake scars with a smooth or soapy texture when compared to older surfaces with a grainier or duller texture were likely heat-treated (Whittaker 1994). Color was another defining characteristic for heat-treated lithics. Lithics that had a greasy luster, crazing, and or a pink to reddish color were likely to have been heat-treated (Crabtree and Butler 1964; Purdy and Brooks 1971).

The stone artifact assemblage from the 2003 and 2004 field seasons included 1,552 lithic tools. The lithic tool analysis began by determining the size of each tool via a five category scale: extra small (<.64 sq cm), small (.64 to 4 sq cm), medium (4 to 16 sq cm), large (16 to 64 sq cm), and extra large (>64 sq cm) (Prentiss 1998, 2000). More precise measurements of certain tools, such as projectile points, were obtained by using calibers. All tools were drawn, and when necessary, some tools such as projectile points were drawn showing multiply faces and margins. Macroscopic as well as microscopic techniques were employed to determine use wear and retouch on the tools. Macroscopic techniques utilized the naked eye as well as hand lenses ranging from 4x to 12x in power. Microscopic techniques utilized Motic SMZ-168-BP; 0.75x – 50x zoom, and American Optical 45 RT Series 40: 7x to 30x zoom microscopes. Use wear analysis defined characteristics such as polish, rounding, striations, and crushing. Measurements were taken on tools to determine edge angles when necessary. Edge angle measurements were determined using Wards Contact Goniometer. When tools had more then one distinctive edge, an employable unit or EU's were defined (Knudson 1983). Knudson (1983) defines EU's as "that implement segment or portion (continuous edge or projection) deemed appropriate for use in performing a specific task, e.g., cutting, scraping, perforating, drilling, chopping." An example of a tool with multiple EU's has a scraping edge and was also burinated on a corner. Therefore, the artifact was counted as both a scraper and a burin. For a complete list of the lithic tool types and frequencies from the Bridge River site, see Appendix B.

Each tool in this analysis has been assigned to a phase (Bridge River 1/2, 3, or 4) due to its contextual, related to a dated context. An example of this is a lithic tool was excavated from stratum x level 1 and a dated piece of charcoal came from a feature that lied within stratum x level 1, therefore the lithic tool was assigned to the same phase as the piece of charcoal. Also, lithic tools were assigned to a phase using stratigraphic laws of superposition and supposition. These lithic tools were assigned to a phase if their contextual position in space had a specific stratigraphic relationship with another strata that was dated. Therefore, the relationship between all the artifacts utilized in this research and the phase they are assigned to is determined only by Radiometrically dated remains and not by arbitrary methods such as projectile point styles.

ANALYTICAL METHODS

There were six analytical methods used during this research to interpret the lithic tool assemblage from the Bridge River site: organizational, functional, expedient versus curated, combined functional and expedient versus curated, specific tool analysis, and chi-square test. All six analytical methods measured tool variation across the four occupational periods at the Bridge River site. For the purposes of this analysis BR1 and BR2 were combined due to low sample sizes during these occupational periods.

To create the datasets for this research, a Microsoft Access database was created from the lithic debitage and tool analysis sheets completed during the laboratory work at Simon Fraser University. The database includes all the lithic artifacts excavated and analyzed during the 2003 and 2004 field seasons at the Bridge River site (22,433 lithic artifacts, 20,881 pieces of lithic debitage, 1,552 lithic tools), as well as their analytical characteristics (use wear, retouch, edge angle, technological type, etc.) and contextual information (unit, stratum, level, associated radiocarbon date, etc.). The analyses utilized during this research only examined lithic tools from dated stratigraphic contexts at the site. The dated lithic debitage consists of 6,660 artifacts, and the dated lithic tools consist of 612 artifacts. Along with the lithic database, the total amount of dated cubic meters of soil excavated from the Bridge River site, divided up by the 4 occupational phases (BR1, BR2, BR3, BR4), was quantified from the scaled profile drawings, and the results from the radiocarbon dating samples. Calculating the total quantity of dated cubic meters from each occupational phase allowed ratios to be determined during each occupational phase. These ratios measure the quantity of artifacts to dated cubic meters excavated from the Bridge River site. An example of this is, during BR1 x number of projectile points were excavated from x cubic meters of dated soil at the Bridge River site.

In addition to the tool density analysis, Chi-square tests were done on the artifact counts from all the analyses performed in this chapter and will be included in the discussion and conclusion sections of Chapter 5. All Chi-square test were calculated using the Georgetown University Chi-square web calculator http://www.georgetown.edu/faculty/ballc/webtools/web_chi.html (Ball and Linton 1996).

The first investigation performed on the lithic tool assemblage was organizational analysis. This analysis began by splitting up the lithic tool assemblage into four organizational categories, expedient block core, portable long term use, biface, and ground stone and abrading strategies (Table 3-1).

Table 3-1. *Organizational Classification of Lithic Tools from the Bridge River Site. The numbers under each tool category represent the specific tool types associated with that category (See appendix B for specific lithic tool definitions).*

Expedient Block Core	Portable Long Term Use	Biface	Ground Stone and Abrading
Expedient Knives 70,74,170,159,130	Endscrapers 161,162	Projectile Points 35,109,110,111,112, 36,114,116,117,119, 19,123,244, 245,251,137	Adzes 228,233,241
Piercers 153	Key-Shaped Scrapers 158	Bifaces 131,192,193,141, 6,135,2,140,225	Cut-Stone Gouges 226
Unifacial Perforators 151	Bifacial Drills 133		Ground Stone Maul 219
Pieces Esquilles 145	Slate / Silicified Shale Knives 230,246		Abraders 201
Notches 154	Slate / Silicified Shale Scrapers 222		Abraded Cobble 207
Unifacial Denticulates 160	Ground Scrapers 250		
Unifacial Borers 152			
Expedient Scrapers 150,156,163,164,165			
Utilized Flakes 143,71,148,72,180			
Burins 223,224			

These four groups were adapted from the Keatley Creek stone tool organizational classification (Godin 2004; Hayden et al. 1996, 2000; Prentiss 2000, Prentiss and Kuijt 2004). The Keatley Creek organizational classification stems from design theory, which views lithic tools as technological answers to problems faced by prehistoric individuals (Hayden et al. 1996, 2000). The organizational categories consist of tool groups that represent a specific tool production and use, which can be interpreted as a strategy. Each organizational category or strategy such as the biface strategy can be viewed as having a specific production (flaking to produce a biface) and use (cutting, scraping, multifunctionality) when solving prehistoric problems such as hunting and butchering.

This analysis utilized 422 out of the 612 dated lithic tools from the 1,552 stone tool assemblage from the 2003 and 2004 excavations. Certain tools were excluded from this analysis such as bipolar cores, which make up the difference between the total amount of dated tools (612) and the amount used for this research (422). Bipolar cores and other dated tools were excluded from this research for a number of reasons. First, bipolar cores do represent an organizational strategy, but were analyzed under the specific tool analysis to more appropriately ascertain their specific significance across time to other specific tools such as slate / silicified shale scrapers. Bipolar cores are not tools, but can be the remnants of tools (exhausted bipolar cores). Bipolar lithic reduction represents a method to extend the use life of raw material under certain conditions. One condition where bipolar lithic reduction is useful is in a winter pithouse village where quantities of raw materials can be depleted during the winter months. Other dated tools, such as hammer stones, were also excluded from the organizational analysis because they did not fit into any of the organizational strategies.

The first organizational classification is associated with the expedient block core strategy. This strategy contains lithic tools such as expedient knives, unifacial denticulates, and other lithic tools used in an expedient manner having limited raw material constraints. The expedient block core strategy consists of lithic tools that are "...small easily maintainable and replaceable expedient tools used and retouched to varying extents under conditions where few time or risk constraints existed" (Hayden et al. 2000:192).

The second organizational classification derives from the portable long term use strategy. This strategy contains lithic tools such as bifacial drills and slate / silicified shale scrapers. These tools were utilized in a more intensive manner than the expedient block core strategy tools, and they exhibit a more formal design than expedient lithic tools. The goal of this strategy is, "to carry specialized tools in high mobility contexts that will last as long as possible and thus avoid the need to carry excess stone weight" (Hayden et al. 2000:197).

The next organizational classification derives from the biface strategy. This strategy contains the lithic tools such as bifaces. The bifaces strengths as a tool can be described as, "...presumed multifunctionality, their economy of raw material use, and the potential utility or resharpening flakes" (Hayden et al. 2000:195). Projectile points are added to this classification because, "their organizational role and function are often equivalent to those of other more generalized bifaces" (Prentiss and Kuijt 2004:53). That is to say, both bifaces and projectile points have similar attributes that allow them to be highly portable and maintainable as a lithic tool strategy when solving problems.

The last organizational classification stems from the ground stone and abrading strategy contains such lithic tool types as adzes and abraders. This lithic tool strategy is based primarily from Hayden's Keatley Creek organizational classification, "ground stone cutting tool strategy" (Hayden et al. 2000:203). The lithic tools in this organizational classification can be defined as "The creation and maintenance of cutting edges by grinding is used under conditions of high processing volumes and / or to display control of wealth and power." (Hayden et al. 2000:203). Abraders are included in this strategy due to their morphological characteristics as a ground stone tool. Abraders were used to shape large quantities of objects such as wooden tools, smooth stone objects, and grind foodstuffs for consumption and storage. Nephrite adzes are an excellent example of a lithic tool in this strategy that represent power and wealth of prehistoric individuals.

The second examination performed on the lithic tool assemblage was functional analysis, which involves sorting each tool into one of three functional groups, hunting and butchering, light duty (hideworking, basketry and fish processing), and heavy duty (woodworking). These three groups were developed from a variety of sources (Table 3-2) (Alexander 2000; Godin 2004; Hayden 2000; Odell 1980; Rousseau 1992; Spafford 1991; Teit 1900, 1906; Tringham et al. 1974), and attempt to classify most of the known activities associated with the lithic tools at the Bridge River site.

The first functional group, hunting and butchering, contains lithic tools associated with hunting and butchering tasks such as hunting terrestrial mammals with projectile points (atlatl, bow and arrow, spear), and the subsequent meat processing with stone knives (Table 3-2). All the tools associated with the hunting and butchering functional classification are placed there due to ethnographic analysis, experimental archaeology, use-wear studies, and residue analysis studies (Hayden et al 2000; Hyland et al. 1990; Loy 1983; Loy and Dixon 1998; Spafford 1991; Teit 1900, 1906). Along with projectile points and knives, bifaces are also part of the hunting and butchering functional group.

Table 3-2. Functional Classification of Lithic Tools from the Bridge River Site. The numbers under each tool category represent the specific tool types associated with that category (See appendix B for specific lithic tool definitions).

Hunting and Butchering	**Light Duty (hideworking, basketry and fish processing)**	**Heavy Duty (woodworking)**
Projectile Points 35,109,110,111,112, 36,114,116,117,119,19, 123,244,245,251,137	Endscrapers 161,162	Pieces Esquilles 145
Expedient Knives 70,74,170,159,130	Slate / Silicified Shale Knives 230,246	Expedient Scrapers 150,156,163,164,165
Bifaces 131,192,193,141, 6,135,2,140,225	Utilized Flakes 143,71,72,180,148	Unifacial Denticulates / Borers 160,152
	Piercers 153	Notches 154
	Unifacial Perforators 151	Burins 223,224
	Slate / Silicified Shale Scrapers 222	Bifacial Drills 133
		Key-Shaped Scrapers 158
		Adzes 228,233,241
		Abraders 207,201
		Cut-Stone Gouges 226
		Ground Scrapers 250
		Groundstone Mauls 219

Bifaces have the ability to perform multiple functions (cutting, scraping, etc.), and are able to be flaked to make more tools. This makes them ideal candidates to be part of the hunting and butchering functional class (Hayden et al. 2000). Also, bifaces suggest a level of "curation" (versus expediency) in that they are more likely to be kept with a tool kit, due to their previously stated qualities, when individuals are hunting and butchering away from the village. Kelly (1988) points out, a biface can be designed to perform one of three different roles: cores, long use-life tools, and byproducts of the shaping process. However, no matter which one of these roles a biface performs, they can still be considered curated tools as Kelly states, "All of these tool types may be curated to some extent" (Kelly 1988:719).

The second functional group, light duty (hideworking, basketry, and fish processing), consists of tools used for activities such as hideworking (slate / silicified shale scrapers), basketry (piercer / perforator), and fish processing (slate / silicified shale scrapers) (Table 3-2). Ethnographic evidence, use-wear studies, and experimental archaeology all support hideworking being done with tools such as end scrapers and piercers (Hayden et al 2000; Spafford 1991; Teit 1900, 1906). Another group of lithic tools in this functional class are utilized flakes. These tools may have been used for shaving wood, basketry, and working hides (Hayden et al 2000). All these tasks are considered light duty, and these tools were relatively multifunctional (scraping, cutting, piercing, etc.).

The last functional classification heavy duty tools, is associated with woodworking, and other heavy duty tasks (Table 3-2). These implements are usually stout implements with high edge angles such as adzes and drills (Godin 2004; Spafford 1991). Again ethnographic accounts, use wear studies, and experimental archaeology support these tools as being utilized for woodworking and other heavy duty tasks (Alexander 2000; Hayden et al. 2000; Teit 1900, 1906; Spafford 1991). Pieces esquilles and adzes are put into this functional classification because they were used for heavy duty tasks such as woodworking and bone. On the other hand, scrapers had many different applications in the prehistoric record such as meat cutting, shaving wood etc. (Hayden et al. 2000). Spafford (1991) defined 5 scraper types with spine-plane angles >45^{o} as being, "better adapted to scraping or shaving hard materials" (Spafford 1991). Therefore, lithic tools, specifically scrapers, with high spine angles were defined as heavy duty tools (Spafford 1991). Notches, denticulates, unifacial borers, gouges, burins, and bifacial drills, have been shown to be effective in working wood, bone, and antler (heavy duty functions) via use-wear studies as well as experimental archaeology (Hayden et al. 2000; Spafford 1991). Their morphological characteristics such as size, raw material, and design or shape, are geared towards working hard objects such as antler and wood. Key-shaped scrapers are classified with the heavy duty woodworking group based on the research of Mike Rousseau (1992) (see Appendix A). His research states the primary function of these lithic tools, "involved working stalks and branches of small woody shrubs and trees" (Rousseau 1992:102).

The last tool category in the heavy duty functional group is abraders and abraded cobbles. These tools main function was to sharpen and smooth bone and antler to produce awls, needles and other tools (Alexander 2000; Godin 2004; Spafford 1991). These needles and awls were then used for light duty functions such as hideworking. This does not mean that the abraders should be put in the light duty functional group, because ethnographic accounts show abraders were also used for smoothing arrow shafts and other woodworking tasks (Teit 1900). Abraders' size, being large to extra large, also allows them to be put with the heavy duty tools, since they would not be carried around much compared with light duty tools. Some abraders were large enough to have even been used as "site furniture" (Binford 1979).

For the quantitative analysis of the functional classification the tools were sorted into the three previously defined classes, (Hunting and Butchering, Light Duty, and Heavy Duty), divided up into each occupational phase (BR1/2, BR3, and BR4), and quantified. Each lithic tool from a dated context received a single count. However, a lithic tool with multiple EU's received as many counts as necessary for each specific functional class they most appropriately fit. That is to say, each EU was counted as one tool. One example is a medium sized biface that was also used as an end scraper, would be counted once under the hunting and butchering functional group for the biface and once under the light duty functional group for the end scraper. Therefore, this tool had two EU's, one for the biface and one for the end scraper. Next, the amount of dated cubic meters excavated from the site during the two field seasons was calculated for each occupational phase (BR1/2, BR3, and BR4). Then, a ratio was calculated between lithic tools from each functional classification and cubic meters excavated from the dated strata.

I examined variation in frequencies of expedient versus curated tools. Two strategies utilized in lithic tool production are expedient and curated tools (Binford 1979). The theoretical debates that surround the terms expedient versus curated is staggering. These terms have been tossed around too loosely and frequently without any specific definitions for the lithic assemblage they are attempting to describe (Kuhn 1994; Odell 1998; Shott 1989). The results are analyses that have too many methodological and theoretical assumptions that are poorly defined and understood. Therefore lithic studies utilizing these terms have often fallen short of their intended goals due to a poor understanding of these vague terms. Similar to the functional analysis, this analysis seeks to shed light on the mobility and subsistence strategies of the inhabitants at the Bridge River site and whether or not they change throughout the evolution of the village.

The prehistoric denizens of this site can be culturally classified as complex hunter-gatherers. It is from this context that the terms expedient and curated will be analyzed to determine if there was change or stasis during the evolution of the Bridge River site between BR 1/2, BR3, and BR4. That is to say, when dealing with the terms expedient and curated, one must define the cultural framework from which they are working. This provides a reference point so there is no ambiguity between the terms curated and expedient in the analysis. This can be illustrated by considering someone analyzing curated versus expedient lithic tools of the Solutrean culture during the Upper Paleolithic in Western Europe. The Solutrean culture, at approximately 20,000 B.P., was a hunter-gatherer population subsisting on large terrestrial mammals such as reindeer, bison, ibex, chamois, woolly rhinoceros, mammoths and local vegetation (Fagan 1995). This culture's lithic tool kit includes large leaf shaped bifaces. These tools are portable and take highly skilled individuals to manufacture. Under this context, these tools symbolize curation. However, curated bifaces from the Solutrean culture are not similar to curated bifaces from the complex hunter-gatherers who inhabited the Bridge River site. This is due to a number of factors, such the inhabitants of the Bridge River site not being as mobile as the those of the Solutrean culture and therefore not needing such laboriously designed tools. Also, the availability and quality of raw material is not similar in these two geographically distinct locations, Western Europe and British Columbia.

This comparison can be even taken to a further archaeological extreme if we try to compare expedient versus curated tools from hunter-gatherer populations in agricultural populations or state level societies where the contextual differences make it almost impossible to discuss these terms without first defining the context in which they are being applied. Therefore, in this defined context of expedient versus curated lithic tools, ethnographic analysis, experimental archaeology, residue analysis, use wear and retouch analysis, and morphological design, were utilized to determine which tools fell into the expedient or curated tool categories (Alexander 2000; Binford 1979; Godin 2004; Hayden et al. 2000; Hyland et al. 1990; Loy 1983; Loy and Dixon 1998; Odell 1980; Parry and Kelly 1987; Prentiss et al. 2004; Rousseau 1992; Spafford 1991; Teit 1900, 1906; Tringham et al. 1974). An example of one of these analyses is residue analysis, which informs us that animal residues such as blood and fat are left on projectile points after being used to hunt and butcher animals (Hyland et al. 1990; Loy 1983; Loy and Dixon 1998). Therefore, we have a direct analytical link between projectile points as a lithic tool group and their implied function, hunting and butchering, via residue analysis.

The term expediency in lithic tools is defined as tools produced, utilized, and reworked, if necessary, and discarded in response to an immediate need at a single location (Binford 1979; Parry and Kelly 1987). These tools are discarded upon completion of the immediate task; have less energy expenditure invested in their production than curated tools, as well as less formal shaping versus curated tools (Binford 1979; Parry and Kelly 1987). In this context, expedient tools are manufactured, utilized, reworked (if necessary) and discarded at the site of use, and not transported for further use, maintenance, or discard at another location (Table 3-3). Some examples of expedient tools as defined from this context are: single scraper, unifacial borer, inverse scraper, and utilized flake. Abraded cobbles are put into this category rather than curated tools because they have minimal use-wear and retouch present, as opposed to formalized abraders, which are curated tools. An example of an abraded cobble is a stone utilized minimally for abrading wood, bone, etc, and discarded. Abraded cobbles are common on the Canadian Plateau due to their ability to quickly an efficiently smooth or straighten a piece of wood or bone so it has no knots or burs on it (Hayden et al. 2000).

Table 3-3. *Expedient Lithic Tools from the Bridge River Site. The numbers under each tool category represent the specific tool types associated with that category (See appendix B for specific lithic tool definitions).*

Unifacial Borers 152	Single Scrapers 150	Alternate Scrapers 156
Inverse Scrapers 163	Double Scrapers 164	Convergent Scrapers 165
Piece Esquilles 145	Unifacial Denticulates 160	Unifacial Perforators 151
Expedient Knives 70,74,170,159,130	Notches 154	Burins 223,224
Utilized Flakes 148,180,71,72,143	Abraded Cobbles 207	Piercers 153

Curated tools can be defined as formally shaped lithic tools that have undergone a significant degree of modification, resharpening, and maintenance over an extended period of use, and may have been transported between archaeological sites prior to discard (Bamforth 1986; Binford 1979; Kooyman 2000; Odell 1996; Parry and Kelly 1987) (Table 3-4). Lithic tools that are formally shaped are different from expedient tools in the time invested in their manufacturing, and the complex mental template that has to be defined prior to manufacturing a formally shaped tool. This means that one must think and spend more time preparing and making a biface versus a flake with a sharp edge to be used for scraping or cutting something. Also, curated lithic tools must have a significant degree of modification, resharpening, and maintenance such as extensive retouch and use wear on the tool and may have multiple functions (scraping, cutting, piercing, etc.). In this context, mobile groups employ curated technologies and more sedentary groups tend to rely on expedient tools (Parry and Kelly 1987). The causal link for this is that attributes of curated tools make them more inclined to be utilized at loci situated away from a base camp in a sedentary population and highly valuable to a mobile population. This correlation has direct implications during the evolution of the Bridge River site where the inhabitants focused on hunting and gathering away from the village and salmon fishing close to the village. Expedient versus curated tool technology can help to tease out whether there were shifts between hunting and gathering and salmon fishing by considering whether there were shifts in their lithic tool technology. Some examples of curated tools are projectile points, bifaces, and ground stone implements.

Table 3-4. *Curated Lithic Tools from the Bridge River Site. The numbers under each tool category represent the specific tool types associated with that category (See appendix B for specific lithic tool definitions).*

Key-Shaped Scrapers 158	Bifacial Drills 133	Adzes 228,233,241	Ground Scrapers 250
Slate / Silicified Shale Knives 230,246	Slate / Silicified Shale Scrapers 222	Projectile Points 35,109,110,111,112, 36,114,116,117,119,19, 123,244,245,251,137	Bifaces 140,141,6,135,2, 225,192,193,131
Endscrapers 162,161	Groundstone Mauls 133	Cut-Stone Gouges 226	Abraders 201

For the quantitative analysis of expedient versus curated tools, the lithic assemblage was split up into the two previously defined groups then divided up by each occupational phase (BR1/2, BR3, and BR4). Each physical lithic tool from a dated context received a single count. However, a lithic tool with multiple EU's received as many counts as necessary for each specific group it most appropriately fit. One example is a medium sized dacite biface that was also used as an end scraper, which would be counted twice under the curated group. Next, the amount of dated cubic meters excavated from the site during the two field seasons was calculated for each occupational phase (BR1/2, BR3, and BR4). Then, a ratio was calculated between lithic tools from each group (expedient versus curated) and cubic meters excavated from dated strata.

The next analysis combines the functional classification analysis and the expedient versus curated analysis to determine any patterns between expedient and curated tools from a functional perspective through the occupation span of the Bridge River site. Additional insight into underlying patterning may be gained by combining the functional and curated versus expedient analyses. This analysis will begin by defining six different groups of lithic tools from dated strata at the Bridge River site (Table 3-5).

Table 3-5. *Combined Functional Classification and Expedient versus Curated Lithic Tools from the Bridge River Site. The numbers under each tool category represent the specific tool types associated with that category (See appendix B for specific lithic tool definitions).*

Hunting and Butchering Expedient	**Hunting and Butchering Curated**	**Light Duty Expedient**	**Light Duty Curated**	**Heavy Duty Expedient**	**Heavy Duty Curated**
Expedient Knives 70,74,170, 130,159	Projectile Points 35,109,110,111,112, 36,114,116,117,119. 19,123,244, 245,251,137	Utilized Flakes 143,71,148, 72,180	Endscrapers 161,162	Pieces Esquilles 145	Bifacial Drills 133
	Bifaces 131,192,193,141, 6,135,2,140,225	Piercers 153	Slate / Silicified Shale Knives 230,246	Burins 223,224	Key-Shaped Scrapers 158
		Unifacial Perforators 151	Slate / Silicified Shale Scrapers 222	Notches 154	Adzes 228,233,241
				Unifacial Denticulates 160	Abraders 201
				Unifacial Borers 152	Cut-Stone Gouges 226
				Abraded Cobble 207	Ground Stone Maul 219
				Expedient Scrapers 150,156,163, 164,165	Ground Scrapers 250

Ratios are then calculated for the six groups against the amount of dated cubic meters excavated at the site during the two field seasons (2003, 2004). To do this, each of the three functional groups, hunting and butchering, light duty, and heavy duty, were cross referenced with the expedient versus curated groups to define the six categories. Next, the six categories were quantified and divided up by each occupational phase. Therefore, each of the six groups was quantified for each phase of occupation (BR1/2, BR3, and BR4).

The same data sets (lithic tool typology, counts of dated lithic tools, expedient versus curated tools, functional classification) were utilized for this analysis. Therefore the same defining characteristics previously stated for each lithic tool apply towards this analysis. For the quantitative analysis of the combined functional and expedient versus curated tool analysis, the lithic assemblage for each of the six categories was split up into the three functional groups, and then into the expedient versus curated groups. Next, the six groups were divided up by each occupational phase (Bridge River 1/2, 3, and 4), and quantified. Next, the amount of dated cubic meters excavated from the site during the two field seasons was calculated for each occupational phase (Bridge River 1/2, 3, and 4). Then, a ratio was calculated between lithic tools from each of the six groups and cubic meters excavated from dated strata.

Finally, the specific tool analysis looks more closely at the specific tool types associated with the six previously defined groups (Table 3-6). Along with these six groups, bipolar cores have been added to the analysis due to their informative nature as a specific artifact class and quantitative importance to the lithic assemblage. This analysis is the most specific look at the lithic tool technological strategies at the Bridge River site. That is to say, the previous analyses resulted in patterns of change seen in the lithic tool assemblage throughout the occupational history of the village. The specific tool analysis will narrow the focus of the research. This will provide insight into which specific tool types changed throughout the occupational history of the village and the effects theses tools had on the subsistence and economy of the inhabitants of the village.

Table 3-6. *Specific Tool Analysis Classification from the Bridge River Site. The numbers under each tool category represent the specific tool types associated with that category (See appendix B for specific lithic tool definitions).*

Light Duty Curated	**Bipolar Lithic Reduction**	**Heavy Duty Expedient**	**Light Duty Expedient**	**Heavy Duty Curated**
Slate / Silicified Shale Scrapers 222	Bipolar Cores 146	Expedient Scrapers 150,156,163, 164,165	Utilized Flakes 143,71,148 72,180	Adzes / Abraders 233,228 241,201

Along with bipolar cores, four other tool groups were analyzed. The light duty and heavy duty tools were analyzed to pick out specific tool types that were most abundant throughout the occupational history of the village. Certain tool types were excluded from this analysis such as hunting and butchering expedient tools because their patterns of change throughout the history of the village has already been defined through the previous analyses. There is no way to more specifically look at the changes in this tool category, since it only consists of one tool type.

Bipolar cores are an independent category not previously defined because they do not fit functionally in one of the three previously defined categories (Hunting and Butchering, Light Duty, Heavy Duty). Bipolar cores are not functional tools. The tools that are byproducts of bipolar cores via bipolar lithic reduction are functional. Also, bipolar cores cannot be defined as expedient or curated tools due to their lack of functionality in this context. At this level of analysis there is no way of discerning whether or not bipolar cores are curated or expedient, thus bipolar cores are an independent category. However, quantitatively and qualitatively (ability to discern lithic assemblage technological changes over time) bipolar cores are significant due to their high artifact counts during all phases of occupation at the Bridge River site.

CHAPTER 4:

RESULTS

This chapter utilizes the methodology and data sets from Chapter three to analyze the lithic tool assemblage from the Bridge River site. The constants throughout all these analyses are time, number of lithic tools, and dated cubic meters excavated during each occupational phase. The time constant throughout these analyses are the occupational phases of the Bridge River site (BR1, BR2, BR3, and BR4) for the reasons previously stated in chapter 3 BR1 and BR2 have been combined as one occupational phase.

The first result section discusses the dated cubic meters excavated from each phase of occupation. To obtain the quantity of dated cubic meters from each occupational phase, the profile maps from the 2003 and 2004 Bridge River technical reports were analyzed (Prentiss et al. 2004, 2005). The profile maps were analyzed to determine the quantity of dated cubic meters that were excavated from dated strata. The dating information was obtained from the extensive radiocarbon dating of the Bridge River site during the 2003 and 2004 field seasons. Each profile was analyzed and the dated strata were identified for each occupational phase (Table 4-1).

Table 4-1. *Total cubic meters excavated from dated strata during each occupational phase.*

Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.
Total Cubic Meters	1.700 m^3	2.788 m^3	1.265 m^3

During the analysis of the lithic tool assemblage, 12 projectile points from a burial context were identified. A decision had to be made as to whether or not these 12 projectile points should be included in the data set for this research. All 12 projectile points have the same contextual data, as they came from an isolated cache of artifacts associated with a human burial excavated in Housepit 11 during the 2004 field season.

They were all assigned to the same occupational phase (BR2). The burial cache lay stratigraphically between two dated features with dates from BR2. Careful reexaminations of these 12 projectile points revealed no use wear on the tools. Thus, the conclusion is made that the 12 projectile points were manufactured and placed into the burial cache without being utilized functionally for hunting or butchering. All projectile points were defined as hunting and butchering tools from a number of avenues of research as defined in Chapter 3. However, these 12 projectile points do not have the same discard context as the other ones from the site, due to their association with a burial. Because these 12 projectile points do not show use wear, and were, in all probability, burial goods, data tables and graphs in the functional analyses of this chapter will be shown with and without the 12 projectile points from BR2.

ORGANIZATIONAL LITHIC TOOL ANALYSIS

Table 4-2 shows the results of quantifying the lithic tools from the organizational analysis per Bridge River occupational phase. The results of this table were utilized to calculate the ratios for Figure 4-1. The 12 projectile points from the burial context were included in this analysis due to their importance as part of an organizational strategy to solve a prehistoric problem. Also, the 12 projectile points from the burial context fit within the confines of the defined biface strategy for this research.

Table 4-2. *Total amount of lithic tools during each occupational phase from each organizational strategy*

Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.
Expedient Block Core	50	118	40
Portable Long Term Use	22	52	29
Biface	24	39	16
Ground Stone and Abrading	10	17	5

Figure 4-1 depicts the ratios of dated tools to dated cubic meters excavated from each occupational phase at the Bridge River site during the 2003 and 2004 field seasons.

Figure 4-1 can be interpreted as showing: expedient block core tools show an abrupt increase between BR1/2 (29.41) and BR3 (42.32), then an abrupt decrease between BR3 and BR4 (31.62). The portable long term use tools show a steady increase between BR1/2 (12.94), BR3 (18.65), and BR4 (22.92). The biface strategy stays somewhat constant between BR1/2 (14.12), BR3 (13.99), and BR4 (12.65). Finally, the ground stone and abrading strategy also stays heavily constant between BR1/2 (5.88), BR3 (6.10), and BR4 (3.95).

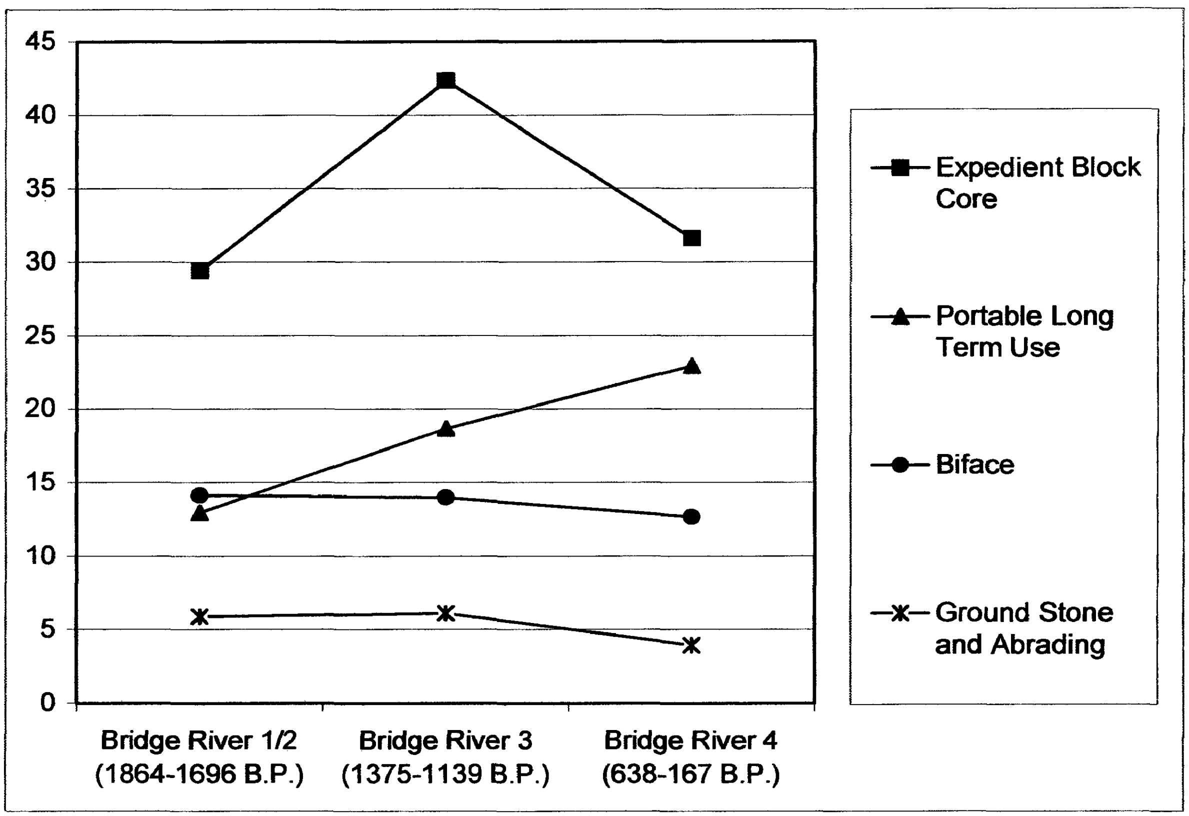


Figure 4-1. *Organizational classification ratios of lithic tools per cubic meters during each occupational phase*

The organizational analysis illustrates a trend of increasing portable long term use tools throughout the occupational history of the village, while the biface and ground stone and abrading strategies stay fairly constant throughout the occupational history of the village. The expedient block core strategy increases between BR1/2 and BR3, similar to the portable long term use strategy, but decreases between BR3 and BR4 while the portable lone term use strategy increases. This inverse relationship between BR3 and BR4 is significant even though the expedient block core strategy still dominates the stone tool assemblage during BR4. What is apparent is that between BR3 and BR4 when the village abandoned and reoccupied approximately 500 years later, the inhabitants continued to increase their reliance on the portable long term use strategy compared with the expedient block core strategy.

FUNCTIONAL LITHIC TOOL ANALYSIS

The functional analysis of the lithic tool assemblage from the Bridge River site utilized numerous avenues of research to formulate the three functional classification groups (Hunting and Butchering, Light Duty, and Heavy Duty), as well as place the dated lithic tools into one of the three groups. Out of the 1,515 lithic tools from the site, 612 lithic tools came from dated context. Not all of the 612 dated tools were analyzed for this research because they could not be classified into one of the three defined categories. An example of a tool that did not fit into one of the three functional categories are hammerstones.

Table 4-3 shows the frequencies of the lithic tools for the functional analysis without the 12 projectile points and Table 4-4 shows the frequencies of lithic tools for the functional analysis with the 12 projectile points. These data were utilized to calculate the ratios for Figures 4-2 and 4-3. Figures 4-2 and 4-3 depict the ratios of dated tools to dated cubic meters excavated from each occupational phase at the Bridge River site during the 2003 and 2004 field seasons. Figures 4-2 and 4-3 can be interpreted in the flowing manner; light duty lithic tools show an abrupt increase between BR1/2 (20.59) and BR3 (32.64), and a more gradual increase in BR4 (33.20). The heavy duty lithic tools steadily increase between BR1/2 (23.53) and BR3 (26.90), and then decrease in BR4 (23.72). The hunting and butchering lithic tools show a similar pattern to the heavy duty lithic tools with a steady increase between BR1/2 (10.00 lithic tools without the 12 projectile points and 18.24 with the 12 projectile points from housepit 11) and BR3 (21.52), with a decrease in BR4 (13.44).

Table 4-3. *Total amount of lithic tools during each occupational phase from each functional category (excluding 12 projectile points from housepit 11)*

Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.
Hunting and Butchering Tools	19	60	17
Light Duty Tools	35	91	42
Heavy Duty Tools	40	75	30

Table 4-4. *Total amount of lithic tools during each occupational phase from each functional category (including 12 projectile points from housepit 11)*

Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.
Hunting and Butchering Tools	31	60	17
Light Duty Tools	35	91	42
Heavy Duty Tools	40	75	30

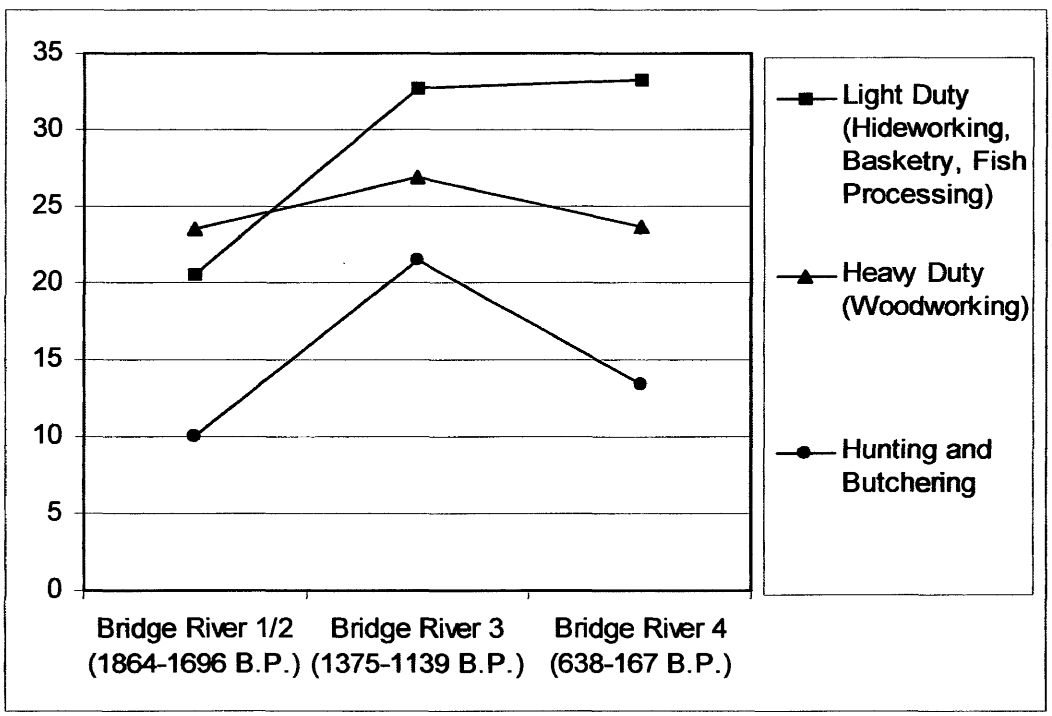


Figure 4-2. *Functional classification ratios of lithic tools per cubic meters during each occupational phase (excluding 12 projectile points from housepit 11)*

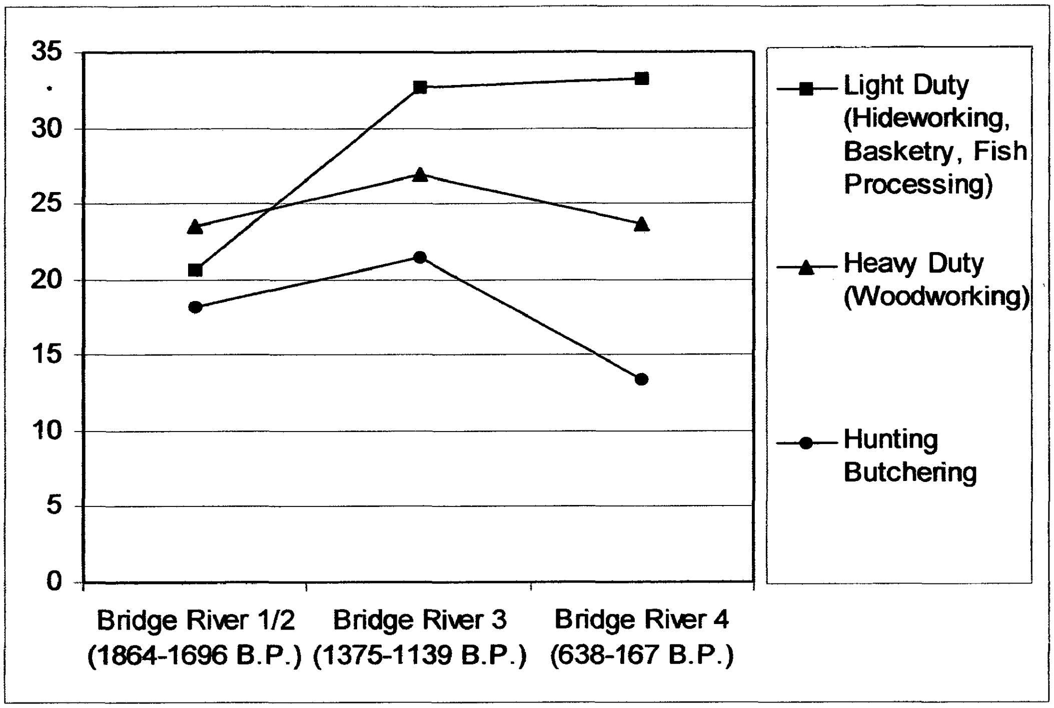


Figure 4-3. *Functional classification ratios of lithic tools per cubic meters during each occupational phase (including 12 projectile points from housepit 11)*

This functional analysis illustrates a trend of light duty tools becoming more common at the Bridge River site as time progresses, versus heavy duty and hunting and butchering lithic tools, which become less common after the peak occupation of the village during BR3. Surprisingly, as the hunting and butchering lithic tools decrease between BR3 and BR4, the light duty lithic tools increase suggesting that the light duty lithic tools were utilized more often for hide and possible salmon processing.

EXPEDIENT VERSUS CURATED TOOL ANALYSIS

The same lithic tool data set used for the functional analysis was used for the expedient versus curated lithic tool analysis. Table 4-5 shows the results of quantifying the lithic tools for the expedient versus curated analysis without the 12 projectile points, and Table 4-6 shows the results of quantifying the lithic tools for the expedient versus curated analysis with the 12 projectile points.

Table 4-5. *Total amount of dated lithic expedient and curated tools during each occupational phase (excluding 12 projectile points from housepit 11)*

Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.
Expedient Tools	50	124	41
Curated Tools	44	102	48

Table 4-6. *Total amount of dated lithic expedient and curated tools during each occupational phase (including 12 projectile points from housepit 11)*

Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.
Expedient Tools	50	124	41
Curated Tools	56	102	48

Figures 4-4 and 4-5 depict the ratios of dated tools to dated cubic meters excavated from each occupational phase at the Bridge River site during the 2003 and 2004 field seasons. Figure 4-4 depicts the ratios without the 12 projectile points, while Figure 4-5 depicts the ratios with the 12 projectile points from the burial cache in housepit 11.

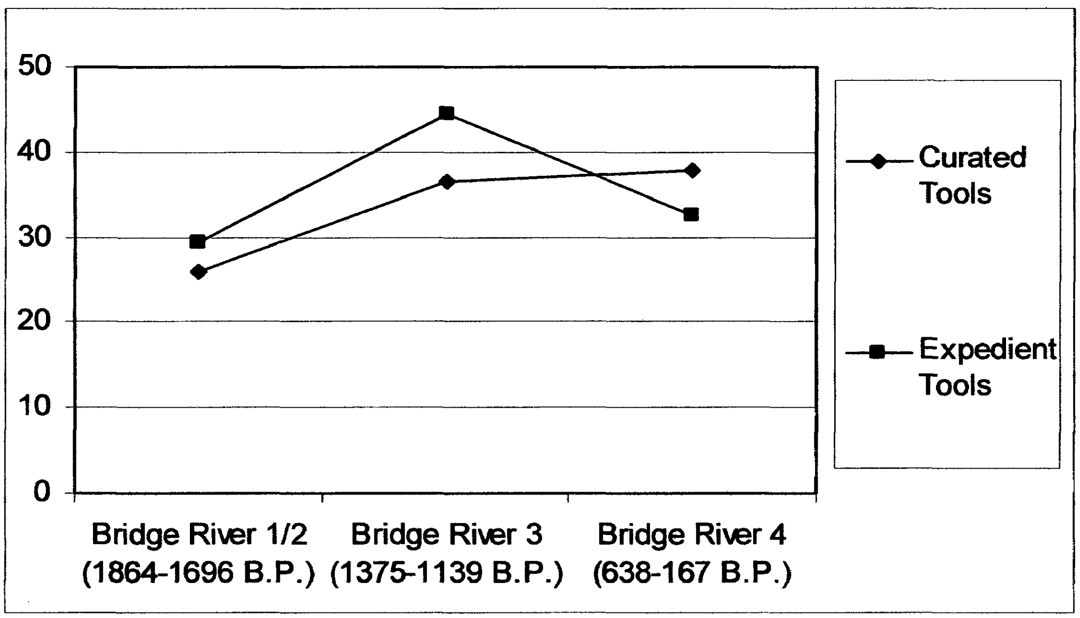


Figure 4-4. *Ratios of expedient versus curated lithic tools per cubic meters during each occupational phase (excluding 12 projectile points from housepit 11)*

Figures 4-4, and 4-5 can be interpreted; curated lithic tools show a steady increase between BR1/2 (25.88) and BR3 (36.59) without the 12 projectile points from housepit 11, and a slight increase between BR1/2 (32.94) and BR3 with the 12 projectile points.

The curated lithic tools do not change significantly between BR3 and BR4 (37.94). The expedient lithic tools show a steady increase between BR1/2 (29.41) and BR3 and a steady decrease between BR3 (44.48) and BR4 (32.41).

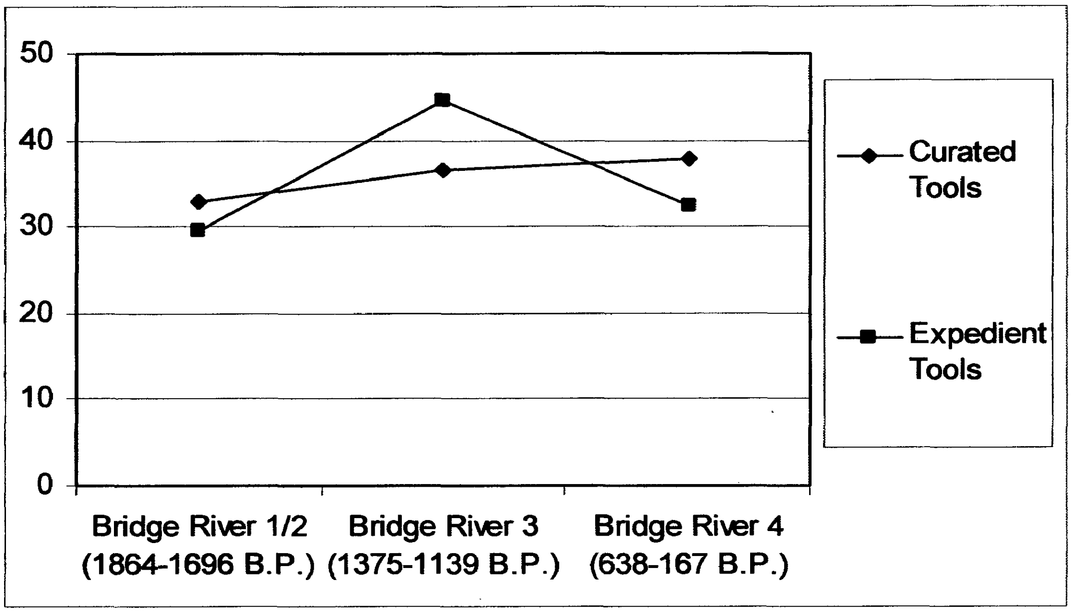


Figure 4-5. *Ratios of expedient versus curated lithic tools per cubic meters during each occupational phase (including 12 projectile points from housepit 11)*

Ratios of expedient versus curated tools illustrate a rise between BR1/2 and BR3. This coincides with BR3 as being the peak occupation of the village. Significant to this research is that between BR3 and BR4 the expedient lithic tools decrease, while the curated lithic tools stay consistent. This technological shift between BR3 and BR4 in the curated versus expedient lithic tools may have implications on the prehistoric peoples of the Bridge River site. Since the lithic technologies shifted to a more curated focus there may have been a greater necessity to hold on to lithic tools for a longer period of time. That is to say, more lithic tools were manufactured to be productive over a sustained period of time and to be reworked and not used minimally and discarded. However, this analysis is not a direct one to one correlation but rather a relationship between two lithic strategies practiced at the site and may no be a direct indicator of tool use. Therefore, the expedient versus curated analysis will be combined with the functional analysis to gain a more precise understanding of tool use at the Bridge River site throughout its occupational history.

COMBINED FUNCTIONAL CURATED AND EXPEDIENT ANALYSIS

The combined functional curated and expedient lithic tool analysis from the Bridge River site combines the previous approaches to formulate six categories (hunting and butchering expedient lithic tools, hunting and butchering curated lithic tools, light duty expedient lithic tools, light duty curated lithic tools, heavy duty expedient lithic tools, and heavy duty curated lithic tools), as well as place the dated lithic tools into one of the 6 categories. For the combined functional curated and expedient analysis, the same number of dated lithic tools (422) was analyzed as was used in the previous analyses.

Table 4-7 shows the frequencies of the lithic tools for the combined curated and expedient analysis without the 12 projectile points. Table 4-8 shows the frequencies of the lithic tools for the combined curated and expedient analysis with the 12 projectile points. These data were utilized to calculate the ratios for Figures 4-6 and 4-7. Figure 4-6 depicts the ratios without the 12 projectile points and Figure 4-7 depicts the ratios with the 12 projectile points from the burial cache in housepit 11.

Table 4-7. *Total amount of combined functional curated and expedient tools during each occupational phase (excluding 12 projectile points from housepit 11)*

Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.
Hunting and Butchering Expedient	7	21	2
Hunting and Butchering Curated	12	39	15
Light Duty Expedient	15	40	13
Light Duty Curated	20	51	29
Heavy Duty Expedient	28	63	26
Heavy Duty Curated	12	12	4

Table 4-8. Total amount of combined functional curated and expedient tools during each occupational phase (including 12 projectile points from housepit 11)

Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.
Hunting and Butchering Expedient	7	21	2
Hunting and Butchering Curated	24	39	15
Light Duty Expedient	15	40	13
Light Duty Curated	20	51	29
Heavy Duty Expedient	28	63	26
Heavy Duty Curated	12	12	4
Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.

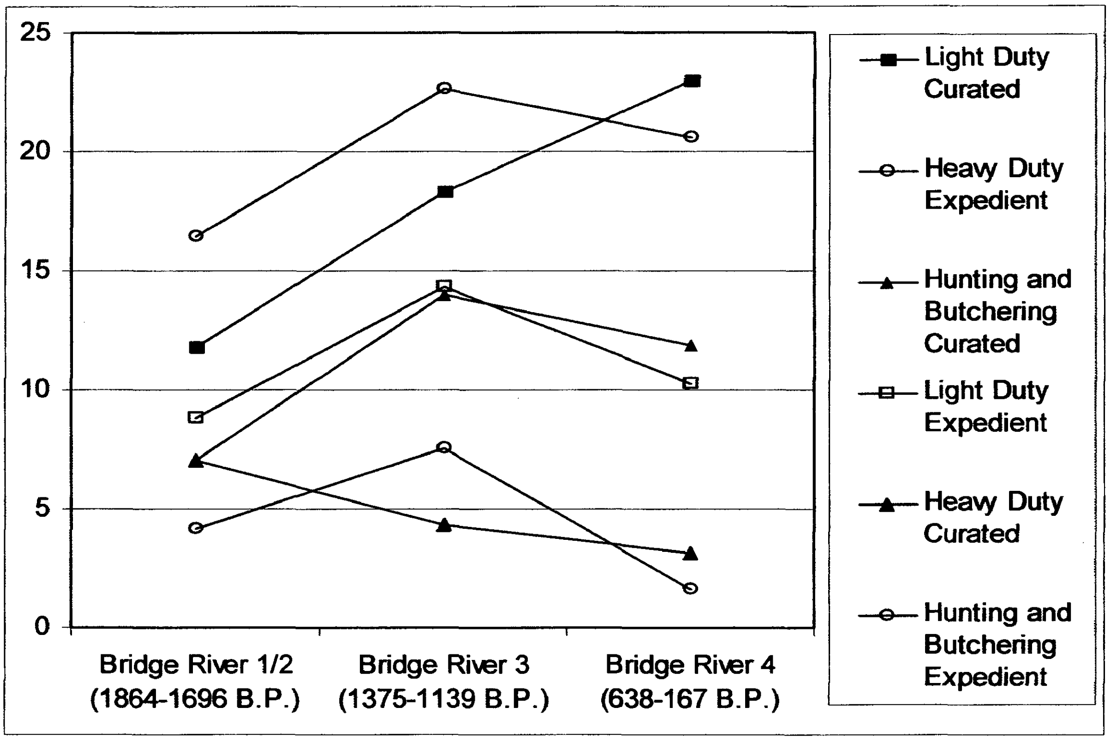


Figure 4-6. *Ratios of combined functional curated and expedient dated lithic tools per dated cubic meters excavated during each occupational phase (excluding 12 projectile points from housepit 11)*

Figures 4-6 and 4-7 can be interpreted as such: light duty curated lithic tools show a steady increase between BR1/2 (11.76), BR3 (18.29), and BR4 (22.92). Heavy duty expedient lithic tools show a steady increase between BR1/2 (16.47) and BR3 (22.60), then a slight decline to BR4 (20.55). Hunting and butchering curated lithic tools show a steady increase between BR1/2 (7.06) and BR3 (13.99) without the 12 projectile points from housepit 11, and a slight increase between BR1/2 (14.12) and BR3 with the 12 projectile points.

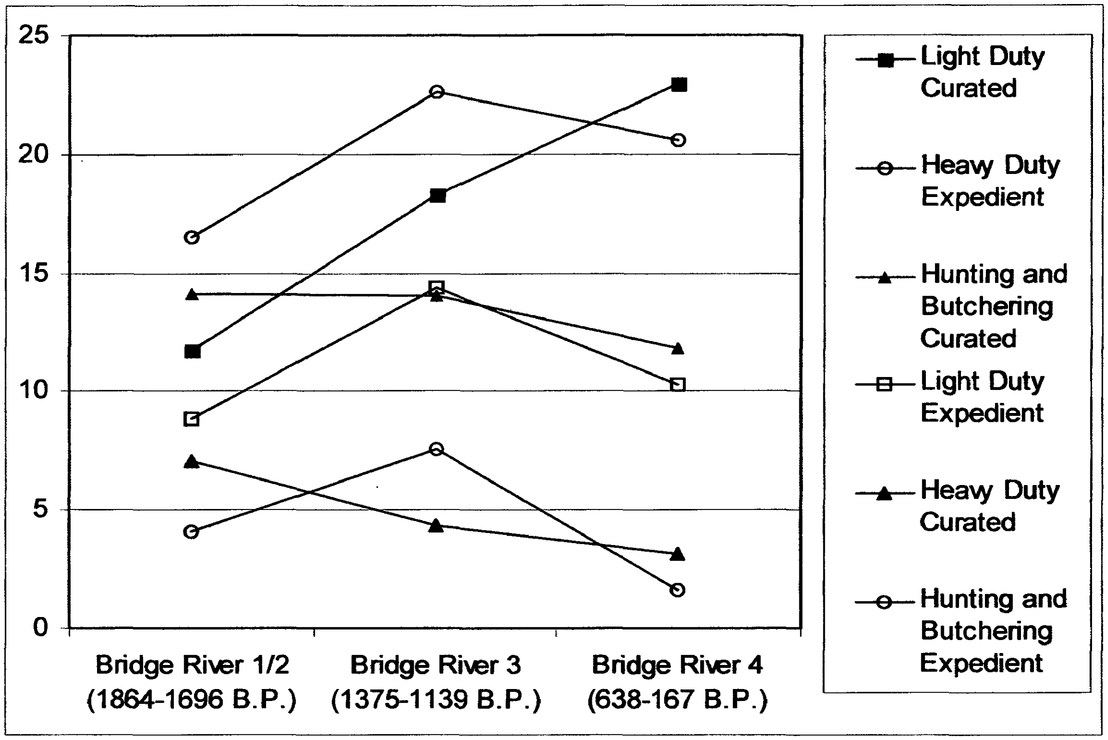


Figure 4-7. *Ratios of combined functional curated and expedient lithic tools per cubic meters excavated during each occupational phase (including 12 projectile points from housepit 11)*

The hunting and butchering lithic tools slightly decrease between BR3 and BR4 (11.86). Light duty expedient lithic tools show a steady increase between BR1/2 (8.82 dated light duty expedient lithic tools per dated cubic meter excavated) and BR3 (14.35), and conversely a steady decline between BR3 and BR4 (10.28). Hunting and butchering expedient lithic tools show a similar trend to the light duty expedient lithic tools. The hunting and butchering expedient lithic tools steadily increased between BR1/2 (4.12) and BR3 (7.53), and conversely decreased between BR3 and BR4 (1.58). The last category, heavy duty curated lithic tools show an inverse relationship to the light duty curated lithic tools, as they peak during BR1/2 (7.06) and steadily decrease during BR3 (4.30), and BR4 (3.16).

The combined functional curated and expedient analysis illustrates three different trends. First the light duty curated tools show a steady increase throughout the occupational phases of the village. Secondly, and conversely, heavy duty curated tools show a steady decline throughout the occupational phases of the village. Lastly the other four groups have similar trends of increasing between BR1/2 and BR3 and decreasing between BR3 and BR4. What is most significant to this research is the steady increase in light duty curated tools between BR1/2, BR3, and BR4. This steady increase of light duty curated tools represents a growing reliance on them due to their increased ratios after BR3 when all other functional curated and expedient categories steadily decrease at BR4. These results help to better understand functional variation in the lithic tool assemblage at the Bridge River site over time.

The results from this combined analysis have shown that broad curated versus expedient and light duty, heavy duty, and hunting and butchering trends can be more specifically defined by examining both trends simultaneously. The results are a more specific look at the categories or groups of tools that change throughout the occupational history of the village. Now that there are known groups of tools that change during the lifespan of the village, these groups of tools can be analyzed to pick out specific tools that may have had an impact on the economies of the Bridge River village and its inhabitants.

SPECIFIC TOOL ANALYSIS

The specific tool analysis from the Bridge River site examined variation in four categories: Slate / Silicified Shale Scrapers, Expedient Scrapers, Utilized Flakes, and Adzes / Abraders. Along with these four groups, bipolar cores were added to this analysis due to their intrinsic value when attempting to define lithic technologies and subsistence patterns at the Bridge River site throughout its occupational history. Bipolar cores reflect a necessity of tools needed to perform tasks by the prehistoric inhabitants of the village. However, bipolar cores also represent a limited raw material source due to bipolar lithic reduction being a possible last resort when making tools due to its destructive and unpredictable nature. With a limited raw material source or limited high quality raw material bipolar lithic reduction can be utilized to create high quantities of tools for every day tasks such as those defined in the light duty, heavy duty, and hunting and butchering functional categories. Therefore, during the winter months at a pithouse village such as Bridge River, bipolar lithic reduction may have been a practical way to make tools and not exhaust the supply of high quality raw material. High quality and possible any raw material may not have been obtained during the winter months due to harsh environmental conditions in the Mid Fraser sub-region. The Bridge River site is located in an area where lithic raw material is dominated by dacite found locally throughout the Mid-Fraser sub region. Along with dacite, chert, jasper, pisolite, basalt, obsidian, nephrite, and other raw materials are located in the region but at a much reduced rate and may be evidence of trade. Specific to the Bridge River site are slate and silicified shale tools, made from materials found directly in and around the Bridge River.

Hayden et al. (2000) have also found bipolar cores to be an influential part of the lithic assemblage from the Keatley Creek site (bipolar cores represent 74% of all cores from the Keatley Creek site, and 97% of all cores from the Bridge River site). Hayden et al. (2000) included bipolar cores as one of the sites organizational strategies due to its value as a single artifact type. For this research bipolar cores are included in the specific tool analysis to determine if there are any relationships to other non bipolar tools such as slate / silicified shale scrapers, and if bipolar core frequencies change over time in relation to other specific tools. For the specific tool analysis, the same amount of dated lithic tools was analyzed from the previous examination along with the bipolar cores.

Table 4-9 shows the frequencies of specific lithic tools. These data were utilized to calculate the ratios for Figure 4-8. Figure 4-8 depicts ratios of specific tool types to dated cubic meters excavated from each occupational phase at the Bridge River site.

Table 4-9. *Total amount of specific tools during each occupational phase*

Slate / Silicified Shale Scrapers	16	43	26
Bipolar Cores	27	64	18
Expedient Scrapers	19	31	17
Utilized Flakes	7	28	8
Adzes / Abraders	10	9	4
Bridge River Occupational Phase	Bridge River 1/2 (1864 – 1414) B.P.	Bridge River 3 (1375 – 1139) B.P.	Bridge River 4 (638 – 167) B.P.

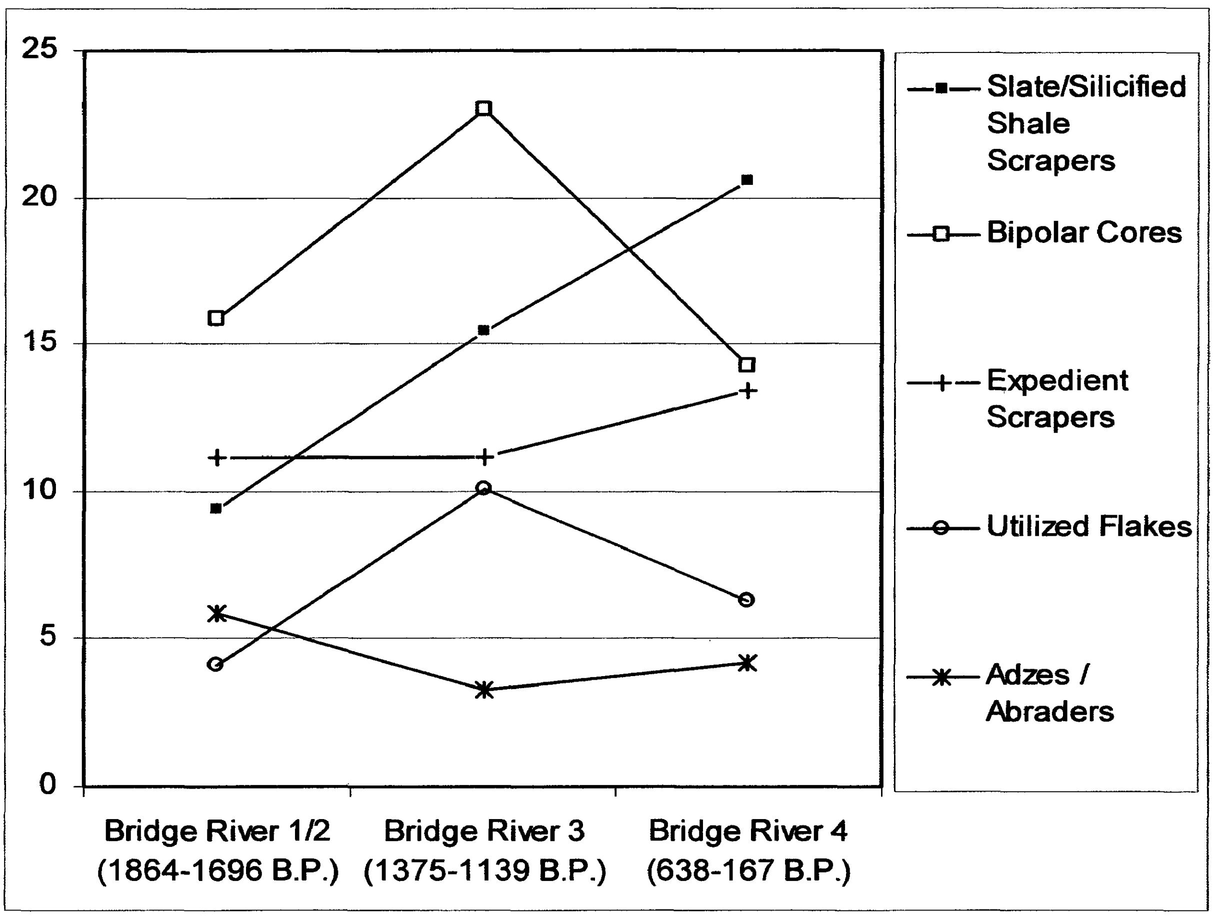


Figure 4-8. *Ratios of specific tools per cubic meter excavated during each occupational phase*

Figure 4-8 can be interpreted as such; slate / silicified shale scrapers (light duty curated lithic tools) show a steady increase between BR1/2 (9.4), BR3 (15.42), and BR4 (20.55). Bipolar cores show a steady increase between BR1/2 (15.88), and BR3 (22.96), then a steady decrease at BR4 (14.23). Expedient scrapers (heavy duty expedient lithic tools) stay fairly static between BR1/2 (11.18), and BR3 (11.12), but slightly increase at BR4 (13.44). Utilized flakes (light duty expedient lithic tools) show a similar trend to bipolar cores because they increase between BR1/2 (4.12) and BR3 (10.04), then decrease at BR4 (6.32). Finally, adzes and abraders (heavy duty curated lithic tools) show a slight decline between BR1/2 (5.88), and BR3 (3.23), and then stay fairly static at BR4 (4.16).

This analysis illustrates three trends. First, the slate / silicified shale scrapers show a steady increase throughout the occupational phases of the village. Next, the bipolar cores, and utilized flakes show an increase during BR1/2 and BR3 (peak village) and then decrease at BR4. The last trend is apparent in the expedient scrapers and adzes / abraders, which show little change between BR1/2 and BR3, then a slight increase at BR4. Significant to this research is the steady increase of slate / silicified shale scrapers (light duty curated lithic tools) throughout all the occupational phases of the Bridge River village site. Even though bipolar cores dominate the lithic tool assemblage during BR3, the technological shift between BR3 and BR4 to a somewhat more curated technology is apparent. Along with the previous analyses, light duty curated slate / silicified shale scrapers become the most important lithic tool class at the site by BR4.

The results from this chapter have revealed distinctive changes in the lithic tool assemblage over time at the Bridge River site. First, in the organizational analysis the expedient block core strategy stayed dominant throughout the occupational history of the Bridge River site. However there were some interesting trends between BR3 and BR4. The organizational analysis illustrated an increasing reliance on the portable long term use strategy to solve problems throughout the occupational history of the village. Specifically, between BR3 and BR4, there was a drastic decrease in expedient block core tools, which suggest an increased reliance on portable long term use tools.

Next, the functional analysis showed a consistent reliance on light duty tools between BR3 and BR4 versus heavy duty and hunting and butchering tools. The expedient versus curated analysis illustrated a constant reliance on curated tools between BR3 and BR4 as expedient tools decreased between these time periods. Then the combined functional curated and expedient analysis demonstrated an inverse relationship between light duty curated tools and heavy duty curated tools throughout the occupational history of the site. Finally, the specific tool analysis represented the trend of combined functional curated and expedient analysis through Slate / Silicified Shale Scrapers, and Adzes / Abraders. Also, this analysis showed the significance of bipolar cores to other tool types during BR1/2 and BR3 where they dominate the tool assemblage. However, during BR4 Slate / Silicified Shale Scrapers replace bipolar cores as the dominant tool type in the assemblage.

All of these analyses have lead to a single tool type that had a significant change throughout the evolution of the village (Slate / Silicified Shale Scrapers), in relation to other specific tools and tool groups from both an organizational and functional perspective. The frequencies of Slate / Silicified Shale Scrapers has directly affected the portable long use organizational strategy and the curated light duty functional category throughout the occupational history of the village. The increased frequency of this tool type throughout the history of the village may also represent an increase in salmon processing.

CHAPTER 5:

DISCUSSION AND CONCLUSIONS

This chapter will discuss the archaeological and anthropological implications of the organizational and functional analyses from Chapter 4 as well as Chi-square test on all the analyses from this research. This discussion will take into account the faunal analysis from the 2003 and 2004 excavations at the Bridge River site (Bochart 2005). Also, a conclusion section will delve into the future implications of this research on the Bridge River project. This research was designed around two different hypotheses. The first hypothesis tested whether or not the Bridge River site had a winter pithouse village pattern. The second hypothesis tested weather or not the Bridge River site had a Mid Fraser subsistence model.

ORGANIZATIONAL ANALYSIS

The first hypothesis's test implications are, if the Bridge River lithic tool assemblage is dominated by an expedient block core strategy, and secondarily a biface strategy, similar to the Keatley Creek model, then the Bridge River site agrees with the winter pithouse village pattern seen at the Keatley Creek site. To test this, an organizational analysis was done on the lithic tool assemblage from the Bridge River site.

The organizational analysis in this study indicates an expedient block core dominated stone tool assemblage throughout the occupational history of the Bridge River site, as well as a less dominant, but continually increasing through time, portable long use strategy. The biface and ground stone and abrading strategies stay fairly constant and insignificant throughout the occupational history of the village site. However, this does not mean these tool strategies are not critical for subsistence at the Bridge River site, but that this research concludes they play a secondary role to the other tool strategies present at the sites. The conclusion of this analysis is that the organizational strategies at the Bridge River site are similar to the Keatley Creek site due to the expedient block core strategy dominating the stone tool assemblage.

One significant conclusion from this analysis is the continual increase in reliance on portable long use tools between BR1/2, BR3, and specifically BR4 when the expedient block core strategy significantly decreases yet is still quantitatively more significant than the portable long use strategy. At the Keatley Creek site, the biface strategy is the second most important strategy while the portable long use strategy at the Bridge River site becomes the second most important strategy. The expedient block core strategy at both sites may be due to a lack of time stress when subsisting off of stored food during the harsh winter months (Torrence 1982), as well as a sedentary existence and availability of raw material during the harsh winter months (Parry and Kelly 1987; Johnson 1987). During the winter months when outside activity is at a minimum, and creating tools for the rest of year is one goal for the prehistoric inhabitants of the village, an expedient block core strategy is one to solve the problem of poor quality and quantity of raw material available to make the tools necessary for the rest of year. Therefore, the expedient block core strategy can be the most efficient use of raw material during tool production and use when there are quantitative and qualitative constraints on the amount and type of raw material being brought to the site during the winter months (Hayden et al. 2000).

To conclude, the Keatley Creek and Bridge River lithic tool assemblages are strategically organized in the same manner except for the difference in the biface strategy being the second most significant strategy at the Keatley Creek site and the portable long use strategy being the second most important strategy at the Bridge River site.

FUNCTIONAL ANALYSES

The second hypothesis's test implications are, that if the functionality of the lithic tools from the Bridge River site are dominated by fish procurement tools such as scraping, woodworking, and light duty tools, then the Bridge River site agrees with the Mid Fraser subsistence model. Scraping lithic tools are needed to process salmon, woodworking tools are needed to make wooden portions of fishing poles, as well as drying racks for fish. If there are higher frequencies of specific tools and tool groups such as projectile points, and expedient knives, then this infers a greater reliance on hunting and butchering. Another test implication is, that if there are higher frequencies of a specific tools and tool groups such as slate and silicified shale scrapers, notches, and endscrapers, then this infers a greater reliance on tools needed to perform light duty and heavy duty tasks associated with fish processing. To test these implications, functional and curated versus expedient analyses were done on the lithic tool assemblage from the Bridge River site. These conclusions will be divided up and described by each occupational period to accurately portray what was happening at the village during each occupational phase (BR1/2, BR3, and BR4).

The functional analyses of BR1/2 concluded that heavy duty expedient lithic tools dominate the assemblage, while light duty curated lithic tools are the next most significant lithic tool group. Along with these two tool groups, bipolar cores are also very significant during BR1/2, but are independent of the other tool groups since they do not fit functionally into one of the three previously defined categories (hunting and butchering, light duty, and heavy duty). Also, bipolar cores can be considered either expedient or curated depending on how and where they were used. Bipolar cores may have been used at the village as an expedient technology to produce tools to solve daily tasks, or curated at or away from the village to be used for a specific purpose. An example of a curated bipolar core may be a high quality raw material such as obsidian curated at the village to be used during the winter months when raw material quantity is very low. Therefore, the lithic technologies during BR1/2 are a bipolar core, heavy duty expedient, and light duty curated industry. This coincides with the winter pithouse village model in the region, as defined through ethnographic (Boas 1890; Morice 1893; Teit 1900, 1906, 1909) and archaeological literature (Chatters and Pokotylo 1998; Fladmark 1982; Hayden 1997, Prentiss and Kuijt 2004).

Bipolar cores are typical of winter pithouse villages on the Canadian Plateau. The winter months were a season of gearing up for spring, summer, and fall subsistence procurement trips. During the winter months, the inhabitants of the village were gearing up for the spring and fall salmon runs, as well as hunting and gathering local floral and faunal species. During the harsh winter conditions, the raw materials collected from the spring, summer, and fall were used to make and fix tools to be used during the rest of the year. Towards the end of the winter, as the lithic resources became depleted in the village, bipolar lithic reduction must have been implemented to create enough tools to survive. The winter pithouse village model also states that the largest group of people most likely inhabited the village during the winter months. During the other seasons away from the village, loci such as hunting and gathering sites were utilized for habitation. Therefore, if the village was mainly inhabited during the winter months, then one would expect to find bipolar core lithic reduction dominating the lithic assemblage since very little to no lithic procurement is being done during the winter months. During the spring, summer, and fall months the majority of the lithic procurement is being done to stock pile raw material for the winter months.

During BR1/2, heavy duty expedient lithic tools were utilized for such functions as woodworking. If the winter pithouse model is correct for BR1/2, then one can conclude that expedient heavy duty tools would be prominent during the winter months at the village due to their necessity to fix and rework bone and wood tools to be used during the other seasons. Some of tools made with these lithic tools would be wooden and used for procurement functions such as hunting and fishing (spear and arrow shafts, fishing net poles), as well as expanding the village by building more pithouses. During BR1/2 the village steadily grew in size and thus the need for more pithouses and more lithic tools to build them is evident.

Additionally, light duty curated lithic tools during BR1/2 are part of the winter pithouse village pattern for the region as seen at the Keatley Creek site. The light duty curated lithic tools utilized for hide and salmon processing, as well as basketry and other light duty tasks are one of the most important tool groups for the inhabitants' existence in such harsh winter environments. That is to say, light duty curated lithic tools are vital to the people practicing winter pithouse village strategies, because they may affect the ability to procure a food source, as opposed to other tools not directly associated with food procurement such as heavy duty lithic tools. These curated light duty lithic tools are evident at other pithouse village sites (Keatley Creek), and the ethnographic research from the region informs us of their importance for subsistence. Lastly, this pattern during

BR1/2 may also be a factor of trade. If the salmon production is profitable during BR1/2 the inhabitants may have been processing enough salmon to trade it away to other groups of people for animal hides such as deer. This may have increased the amount of light duty tools such as scrapers needed to process hides brought into the village through trade. Hides are a necessity of the pithouse village for clothing and other utilitarian items such as storage containers. The Bridge River site is not located in an ideal location for terrestrial hunting due to the steep slopes of the adjacent mountain ranges on either side of the Bridge River (Figure 2-1). This area at the edge of the Camelsfoot range, where the Bridge River site is located, has less available foliage for large terrestrial animals to subsist on compared to forest east of the Camelsfoot range, which are more dense. However, other large pithouse villages is the Mid-Fraser sub region are located in more productive areas for hunting such as the Pavilion, Keatley Creek, and Bell sites. Theses sites are located in between the Camelsfoot and Clear ranges where there are more open and less mountainous areas for large game to reside (Figure 2-1). Therefore, trade would have been an optimal scenario for the prehistoric inhabitants to acquire the needed hides to survive when they had a surplus of salmon during certain times of the year.

It is not until BR3 that we recognize a change in the frequencies of lithic tools at the Bridge River site. During BR3, there is a shift in light duty lithic tools becoming more significant than heavy duty lithic tools during BR1/2. Curated lithic tools increase proportionately between BR1/2 and BR3. Light duty curated and heavy duty expedient lithic tools also increase proportionately between BR1/2 and BR3. Bipolar cores still dominate the lithic assemblage, however there is a change from heavy duty to light duty lithic tools becoming more significant during BR3.

The shift in heavy duty and light duty lithic tools may be evidence of increased food procurement during BR3 since the hunting and butchering lithic tools drastically increase from BR1/2 to BR3. Hunting and butchering lithic tools are functionally self-explanatory, and are associated with curated light duty lithic tools utilized for processing hides as well as procuring and processing salmon. This shift may be the result of a population increase at the site seen in the increased amount of occupied housepits during BR3 versus BR1/2 suggesting a larger population and possible packing of people into the village (Figure 3-2). Furthermore, BR3 may be a time of increased salmon trading due to peak environmental conditions, which may have allowed the village to grow in number of occupied housepits as well as provide enough salmon to sustain a large population and have enough salmon to trade away for unworked hides. To process these unworked hides, light duty scraping tools would have been a necessity. The conclusion of this relationship may represent an increased reliance on salmon as a main subsistence source during BR3, as well as possibly trading salmon for unworked hides with other groups of people that had better access to hunting and gathering loci.

The occupational shift from BR3 to BR4 exposes a drastic reduction in population at the village. Along with this reduction in village size, there is another shift in the lithic tools found at the site. The expedient versus curated, combined functional expedient versus curated, and specific tool analyzes change between BR3 and BR4. The curated lithic tools stay constant between BR3 and BR4 while the frequency of expedient lithic tools decreases. More specifically, the light duty curated lithic tools increase, while the heavy duty lithic tools decrease. Finally the frequencies of bipolar cores drastically decrease between BR3 and BR4, while the slate / silicified shale lithic tools increase.

These trends point to a change in the lithic tactics utilized during BR4 compared with BR3. During BR4, a more curated lithic tool technology, specifically slate / silicified shale scrapers dominates the lithic tool assemblage, and a decreased amount of bipolar cores, and all other combined functional curated and expedient lithic tool categories. This suggests a return to the lithic technological pattern seen during BR1/2.

The implied function of slate / silicified shale tools is for light duty tasks such as hide processing, basketry, and salmon processing. This research has shown the during BR4 the winter pithouse village model does exist, but with slate / silicified shale scrapers taking the place of bipolar cores and all other lithic tool groups as the lithic technology at the site. Even though bipolar cores are not functional tools, they represent the remnants of functional tools. Therefore, a lack of bipolar cores at an archaeological site such as this one, begs the conclusion that less diversity of tools were being made during the winter months. This is most likely due to the increase in slate / silicified shale scraping tools which become the dominant tool type during BR4. Slate / silicified shale scrapers worked so well for this winter pithouse village during BR4 that there was no need to make as many tools as had been previously done to exist. However, slate / silicified shale scraping tools need to examined more specifically as a tool class being quantitatively specific only to the Bridge River site. Other prehistoric pithouse villages in the Mid-Fraser sub region such as the Keatley Creek site have these tools present in their lithic assemblages, but not as frequent as at the Bridge River site, where they are the second most significant tool class behind bipolar cores. The precise function of these tools needs to be more accurately defined via morphological analysis to determine if there are different groups of slate / silicified shale scrappers, such as hafted versus non hafted slate

/ silicified shale scarpers. Moreover, other lithic artifacts such as bipolar cores, a hallmark of the winter pithouse village model, fell into disuse, since slate / silicified shale scrapers worked as well if not better for this lifestyle than a suite of lithic tools produced via bipolar lithic reduction. Therefore, a slate / silicified shale scraper industry along with other tool types, however less significantly, can be described as the lithic technologies during BR4. The increase in frequencies of slate / silicified shale scrapers during BR4 may also be a factor of trading salmon for unworked hides similar to BR3. This may have caused the increase in frequencies of slate / silicified shale scrapers during BR4 to work the hides. This pattern may also represent an increased trade network during BR4 versus BR3 due to higher frequencies of slate / silicified shale scrapers versus bipolar cores between the two occupational time periods.

CHI-SQUARE TESTS

In addition to the analyses in Chapter 3 of this research, Chi-square tests were performed as an independent statistical measure of the research, using the Georgetown University Chi-square web calculator (Ball and Linton 1996). The results of the Chi-square test are shown in Table 5-1.

Table 5-1. *Chi-square Tests from the Analyses in Chapter 3 (without the 12 projectile points from the burial context in Housepit 11).*

	Degrees of Freedom	**Chi-square**	**For significance at a .05 level, the Chi-square should be greater than or equal to**
Functional Classification Analysis	4	4.99	9.49
Expedient versus Curated Analysis	2	2.00	5.99
Combined Functional Curated versus Expedient Analysis	10	15.12	18.31
Specific Tool Analysis	8	14.53	15.51

All of the Chi-square tests were insignificant at the .05 confidence level. This does not contradict the study of artifact density that is the center of this research, although it indicates some of the trends recognized here will require a larger sample of the lithic tool assemblage from the Bridge River site to be verified. It is interesting to note that as my research has examined the lithic tools in a more specific manner, the Chi-square results are closer to significance. The Chi-square results indicate that the narrower the focus of these analyses the closer the results are to being significant. For example, the functional analysis Chi-square result was 4.99 and a significant result needed to be at least 9.49, the combined functional, curated versus expedient analysis Chi-square result was 15.12 and a significant result needed to be at least 18.31, and finally the specific tool analysis Chi-square result was 14.53 and a significant result needed to be at least 15.51. It is likely that the patterns represented in this research are real, but need to be explored more in depth, such as: the role of slate / silicified shale scrapers in the lifestyle of the prehistoric inhabitants of the village, more accurately defining what constitutes a fish processing tool kit via residue analysis to determine if certain lithic tools were used on fish, mammals, or both, and analyzing the lithic debitage, as well as raw material distribution, collected from the two field seasons to determine if they agree with the conclusions of this research. Even thought the Chi-square analyses have shown the patterns of lithic tools examined in this research to be not significant and some differences may be stochastic, this apparent stasis only warrants further examination of the lithic assemblage to tease out what significant patterns are found in the lithic tool assemblage. To illustrate one direction future research might take; I have taken the data from the specific tool analysis (Figure 4-8) and combined BR1/2, and BR3, as a single occupational component since there is a true occupational break in the sequence between BR3 and BR4. When comparing the specific tool analysis in this manner with a Chi-square test, this comparison is significant (Table 5-2).

Table 5-2. *Chi-square Test of Slate / Silicified Shale Scrapers and Bipolar Cores from BR1/2 and BR3 versus BR4.*

	Slate / Silicified Shale Scrapers	**Bipolar Cores**	**Total**
BR1/2 + BR3	59	91	150
BR4	26	18	44
Total	85	109	194
	Degrees of freedom: 1	Chi-square = 5.39	The distribution is significant at a .05 level

This conclusion agrees with the trend of slate / silicified shale scarping tools replacing bipolar cores as the dominant tool type during BR4 at the Bridge River site. This is a first step, however there needs to be more research into the role of slate / silicified shale scraping tools throughout the occupational history of the village as well as their role at other contemporaneous pithouse villages in the Mid Fraser sub-region region.

SUBSISTENCE

The subsistence methods utilized at the Bridge River site throughout its occupational history can be looked at from the combined results of Chapter 4 from this research and the faunal analysis from Bochart (2005). Subsistence at the Bridge River site can be broken up into the three previously defined occupational phases of the village, BR1/2, BR3, and BR4. This does not mean that each occupational phase is mutually exclusive in its subsistence practices, but for the purposes of this research to show patterns of change and or stasis in subsistence practices at the village, each occupational phase will be interpreted independently of the other occupational phases.

The lithic analyses from this research illustrate similarities during BR1/2 to the winter pithouse village pattern for the region when looking at subsistence. Therefore, during BR1/2 the lithic tools functioned for a subsistence base of seasonal salmon harvesting. During BR1/2 the two dominant functional groups are heavy duty lithic tools and light duty lithic tools. More specifically, expedient heavy duty lithic tools represent the winter pithouse village model when dealing with subsistence. During the winter months gearing up phase, lithic and non-lithic tools (wood, bone) needed to procure food during the other seasons must be made and maintained. Prehistoric individual most likely used the heavy duty expedient lithic tool group to perform most of these tasks during the winter months. Thus, they are quantitatively significant during BR1/2, as well as expedient scrapers, which are the part of this group. Also, curated light duty lithic tools represent the winter pithouse village model of gearing up during the winter months. Curated light duty lithic tools, as previously stated, were utilized for subsistence-based tasks such as hideworking and salmon processing. A specific tool that is quantitatively important for these tasks during BR1/2 is slate / silicified shale scrapers.

This subsistence practices seen during BR3, and their change from BR1/2, is seen in the lithic tool assemblage from the site. Throughout BR3, there is a change in the frequencies of lithic tool groups from the site, as light duty lithic tools become more important than heavy duty lithic tools. This functional shift correlates with a slight decrease in adzes and abraders and a drastic increase in slate / silicified shale scrapers between BR1/2 and BR3. Consequently, between BR1/2 and BR3 the necessity for heavy duty curated lithic tools such as adzes and abraders decreased at the same time light duty curated lithic tools represented by slate / silicified shale scrapers increased. This trend points to a subsistence shift from heavy duty woodworking tools employed during the winter months to making and maintaining wood and bone tools to be utilized for the spring, summer, and fall procurement trips to a greater emphasis on light duty lithic tools developed for such tasks as salmon processing and basketry. Thus, the increase of a salmon dominated diet during BR3 is evident via this lithic tool pattern. That is not to say that light duty lithic tools were not used for hideworking, or that no one in the village was hunting and gathering terrestrial species during BR3, but evidence indicates less frequent patterns of this as time progresses between BR1/2 and BR3.

The shift in lithic technology between BR3 and BR4 is also a factor in the subsistence practices of the prehistoric inhabitants of the village. During BR3, the subsistence model is one of a salmon based diet supplemented with hunting and gathering terrestrial resources. However, during BR4 this food procurement is done with a different lithic technology. What is significant about this subsistence pattern during BR4 is how the village changed between BR3 and BR4. When the environmental conditions are not conducive to this subsistence pattern (salmon dominated diet), the village is not able to sustain itself, and thus abandoned after BR3. During BR4, the environmental conditions favor salmon in the region, and thus the Bridge River site is able to sustain a population again. Thus, the Bridge River site is only inhabited when salmon production levels are high enough to sustain a village population. Salmon production levels are directly related to and affected by the environmental conditions of the region.

CONCLUSIONS

To elucidate the subsistence strategies practiced at the Bridge River site throughout its occupational history, lithic analysis will not provide a holistic answer. Therefore, this final section of the thesis will take into account this research along with environmental data from the region (Figure 2-2) and the faunal analyses from the site to look at the lithic technologies, and subsistence at the Bridge River site throughout its occupational history. This final section provides a starting point for further research on the Bridge River site dealing with lithic technologies and subsistence. Further work on the lithic and other data sets from the Bridge River site will expound upon broader anthropological questions about the site and the region dealing with social inequality and the emergence of complex hunter-gatherers on the Canadian Plateau.

BR1/2 is a time period where the Bridge River site is initially occupied and defined as a winter pithouse village. BR1/2 falls within the middle of the Plateau Pithouse tradition (PPt). The end of peak drought conditions during the Fraser Valley Fire period coincides with the beginning of BR1/2. This environmental factor may have been an initial cause for the Bridge River site to be occupied, as this would have caused the environment around the site to be productive enough to sustain a pithouse village. This research has concluded that the lithic tool assemblage represents a winter pithouse village for the region, in that it is dominated by a bipolar industry along with other lithic tools, light duty, heavy duty, hunting and butchering, which are utilized for seasonal salmon fishing, and hunting and gathering local terrestrial faunal and floral resources. The faunal analysis for the period BR1/2 has concluded that Bridge River peoples had a salmon based diet (Bochart 2005).

The next occupational phase, BR3, is a time period where the Bridge River site sees its population peak. During BR3, the Bridge River site is a one of the largest known pithouse villages in the region. BR3 falls within the end of the Plateau Cultural horizon. Towards the end of BR3, the peak Little Climatic Optimum is occurring, which may be the cause of the hiatus of the Bridge River site. This analysis has concluded that during

BR3 there is a change in the lithic tactics at the site. As the village size increased, the inhabitants of the village focused most of their food procurement energy into procuring and processing salmon. This is evident in the lithic tool assemblage from the site, via a shift in frequencies from heavy duty lithic tools to light duty lithic tools. Interestingly, the faunal analyses corroborate this trend suggesting a faunal assemblage dominated by fish (salmon) during BR3 (Bochart 2005). Hence, BR3 is a time period where the Bridge River site sees its peak occupation, and conforms to the winter pithouse village pattern of being dominated by a salmon based diet, supplemented with other terrestrial floral and faunal species as seen at other contemporaneous pithouse village sites in the region such as Keatley Creek. However, the possibility exists that a portion of the salmon procured during BR3 may have been traded for unworked hides. At the end of BR3 the environmental conditions do not favor salmon. This may be the major factor in the abandonment of the village.

BR4 is the last occupational time period of the Bridge River site prior to European contact. This time period falls within the middle to the end of the Kamloops Cultural horizon. This occupational period occurs during the end of the Peak Little Climatic Optimum and the beginning of the Little Ice Age. This environmental shift may have been the cause of the reestablishment of the Bridge River site due to environmental conditions that were conducive to productive salmon runs for the region. However, research is only a preliminary in looking into such questions, which need to be more specifically tested with future data sets from new excavation and paleoenvironmental data. The lithic analysis from this research has concluded that during BR4 the Bridge River site does not resemble a typical winter pithouse village for the region. This is due to the lack of bipolar cores found at the site during BR4. In place of high frequencies of bipolar cores found at the site during BR4, slate / silicified shale scraping tools were found. Therefore the exception to the winter pithouse village model during BR4 is the dominance of a curated light duty lithic tool category represented by slate / silicified shale scrapers versus bipolar cores usually associated with winter pithouse villages in the region. This may be a factor of trading salmon for unworked hides that require scrapers to process. The faunal analysis during BR4 agrees with BR1/2 in the subsistence patterns (Bochart 2005). The faunal analysis along with the lithic analysis from this research shows BR4 as corresponding with the winter pithouse model of subsisting on a salmon based diet similar to BR3, where the subsistence pattern at the site is singularly focused around salmon. However, the Bridge River site may have had different lithic tactics compared with other winter pithouse villages in the region due to the influx of slate / silicified shale tools versus bipolar cores during this occupational phase. Again bipolar cores are not directly functional items, but represent the remnants of tools that were made and do have a functional value. Therefore, bipolar cores are indirectly associated with functional tools, which are necessary to survive in this environment.

In conclusion, this research has taken an initial step in looking at the lithic assemblage from the 2003 and 2004 field seasons at the Bridge River site. More research needs to be done on the artifacts from the site, specifically the lithic debitage, to more holistically answer questions about the Bridge River site dealing with lithic technologies and subsistence. It is not until these questions about the Bridge River site are answered or defined, that broader anthropological questions, such as social complexity and the emergence of complex hunter-gatherers, can be answered about the Bridge River site and the Mid Fraser sub-region on the Canadian plateau.

REFERENCES CITED

Alexander, Diana

1992 A Reconstruction of Prehistoric Land Use in the Mid-Fraser River Area Based on Ethnographic Data. In *A Complex Culture of the British Columbia Plateau,* edited by B. Hayden, pp. 99-176. University of British Columbia Press, Vancouver, British Columbia.

2000 Pithouses on the Interior Plateau of British Columbia Ethnographic Evidence and Interpretation of the Keatley Creek site. In *The Ancient Past of Keatley Creek, Volume II, Socioeconomy*, edited by B. Hayden, pp. 29-66. University of British Columbia Press, Vancouver, British Columbia.

Arnold, Jeanne E.

1996 The Archaeology of complex Hunter-Gatherers. *Journal of Anthropological Archaeology* 12:75-119.

Ball, Catherine N., and Jeffery Connor-Linton

1996 Georgetown University Chi-square Web Calculator. http://www.georgetown.edu/faculty/ballc/webtools/web_chi.html

Bamforth, Douglas B.

1986 Technological Efficiency and Tool Curation. *American Antiquity* 51:38-50.

Binford, Lewis R.

1978 *Nunamiut Ethnoarchaeology*. Academic Press, New York.

1979 Organization and Formation Processes: Looking at Curated Technologies. *Journal of Anthropological Research* 35:255-273.

1980 Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4-20.

Boas, Franz

1890 The Shuswap. *Report of the British Association for the Advancement of Science*, 1886-1889:632-647.

Bochart, Jessica

2005 Interpreting the past through faunal analysis at the Bridge River site, British Columbia Canada. Unpublished Master's Thesis, Department of Anthropology, University of Montana, Missoula, Montana.

Burns, Melisse R.P.

2004 Changing Times, Changing Economics: A Faunal Resource History of Housepit 7 at the Keatley Creek Site. Unpublished Master's Thesis, Department of Anthropology, University of Montana, Missoula, Montana.

Carlson, Catherine
1980 Excavations at the Curr site. In *The Archaeology of Kamloops*, edited by R.L. Wilson and C. Carlson, pp. 87-123. Department of Archaeology, Simon Fraser University Publication 7, Burnaby, British Columbia.

Chatters, James C.
1986 *The Wells Reservoir Archaeological Project, vol. I: Summary of Findings*. Occasional Paper, I; Research Report, 86-6. Central Washington University, Ellensburg, Washington.
1995 Population Growth, Climatic Cooling, and the Development of Collector Strategies on the Southern Plateau, Western North America. *Journal of World Prehistory* 9:341-400.
1998 Environment. In *Handbook of North American Indians*, vol. 12: Plateau, edited by Deward E. Walker Jr., pp. 29-48. Smithsonian Institution Press, Washington, D.C.
2004 Safety in Numbers: Conflict and Village Settlement on the Plateau. In *Complex Hunter-Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America*, edited by William C. Prentiss and Ian Kuijt, pp. 67-83. University of Utah Press, Salt Lake City, Utah.

Chatters, James C., and Daniel Leavell
1995 Harding Lake: A Study of Fire, Succession, and Sedimentation since 350 AD in the Subalpine Fir Forests of the Yaak River, Northwestern Montana. APS Research Report P-4. On file, Kootenai National Forest, Libby, Montana.

Chatters, James C., Virginia L. Butler, Michael J. Scott, David M. Anderson, and Duane A. Neitzel
1995 A Paleoscience Approach to Estimation the Effects of Climatic Warming on Salmonid Fisheries on the Columbia River Basin. In *Climate Change and Northern Fish Populations*, edited by Richard J. Beamish, pp. 489-496. Canadian Special Publication of Fisheries Aquatic Science No. 121. National Research Council of Canada, Ottawa.

Chatters, James C., and David L. Pokotylo
1998 Prehistory: Introduction. In *Handbook of North American Indians, vol. 12: Plateau,* edited by Deward E. Walker Jr., pp 73-80. Smithsonian Institution Press, Washington, D.C.

Chisholm, Brian S.
1986 Reconstruction of prehistoric Diet in British Columbia Using Stable-Carbon Isotopic Analysis. Unpublished Ph.D. dissertation, Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.

Crabtree, Done E., and Robert Butler
1964 Notes on Experiments in Flintknapping: 1, Heat Treatment of Silica Materials. *Tebiwa* 7:1-6.

Cross, Guy
2004 Geophysical Research Report. In *Report of the 2003 University of Montana Investigations at the Bridge River Site (EeRl4)*. Report on file University of Montana, Missoula, Montana.

Eldridge, Morley, and Arnoud H. Styrd
1983 CN Rail Rail-Yard Expansion Project: Heritage Mitigation Study, Kamloops Junction, B.C. Report prepared by ARCAS Associates. On file, Heritage Resource Center; Ministry of Small Business, Tourism, and Culture; Archaeology Branch, Victoria, British Columbia.

Fagan, Brian M.
1995 People of the Earth an Introduction to World Prehistory. Lindinbriar, New York

Fladmark, Knut R.
1982 An Introduction to the Prehistory of British Columbia. *Canadian Journal of Archaeology* 6:95-156.

Godin, Terrance M.
2004 A Timeline in Stone: Lithic Indications of Social and Economic Change at Housepit 7 of the Keatley Creek Site. Master's thesis, Department of Anthropology, University of Montana, Missoula, Montana.

Goodale, Nathan, Michael Lenert, and William C. Prentiss
2004 Environment and Culture Chronology. In *Report of the 2004 University of Montana Investigations at the Bridge River Site (EeRl4)*, pp. 8-11. Report on file University of Montana, Missoula, Montana.

Hallett, Doug J., Dana Lepofsky, Rolf Mathews, and Kenneth Pl. Lertzman
2003 11,000 Years of Fire History an Climate in the Mountain Hemlock Rainforest of Southwest British Columbia Based on Sedimentary Charcoal. *Canadian Journal of Forest Research* 33:292-312.

Hayden, Brian.
1989 From Chopper to Celt: The Evolution of Resharpening Techniques. *In Time, Energy, and Stone Tools*, edited by R. Torrence, pp. 7-16. Cambridge University Press, Cambridge.
1997 *The Pithouses of Keatley Creek*. Harcourt Brace College Publishers, Forth Wroth, Texas.
2000 The Opening of Keatley Creek: Research Problems and Background. In *The Ancient Past of Keatley Creek, Volume I Taphonomy*, edited by B. Hayden, pp. 1-34. Archaeology Press, Burnaby, British Columbia.

Hayden, Brian, Nora Fanco, and Jim Spafford
1996 Evaluating Lithic Strategies and Design Criteria. In *Stone Tools: Theoretical Insights into Human Prehistory*, edited by George H. Odell, pp. 9-45, Plenum Press, New York.
2000 Keatley Creek Lithic Strategies and Design. In *The Ancient Past of Keatley Creek, Volume I, Taphonomy*, edited by B. Hayden, pp. 185-212. Archaeology Press, Burnaby, British Columbia.

Hayden, Brian, and Rick Schulting
1997 The Plateau Interaction Sphere and Late Prehistoric Cultural Complexity. *American Antiquity* 62:51-85.

Hogan, Mathew
2005 Reconstructing Occupation Patterns at the Bridge River Site (EeRl4): Using a GIS to Map the Distribution of Housepits in Both Time and Space. Master's Thesis, Department of Anthropology University of Montana, Missoula, Montana.

Hyland, David C, J. M. Tersak, James M. Adovasio, and M.I. Siegal
1990 Identification of the Species of Origin of Residual Blood on Lithic Material. *American Antiquity* 55:104-111.

Johnson, Jay
1987 Introduction. In *The Organization of Core Technology*, edited by J. Johnson and C. Morrow, pp. 1-12. Westview Boulder.

Kelly, Robert L.
1988 The Three Sides of a Biface. *American Antiquity* 53:717-734.

Kooyman, Brian P.
2000 Understanding Stone Tools and Archaeological Sites. University of Calgary, Calgary, British Columbia.

Knudson, Ruthann
1983 *Organizational Variability in Late Paleo-Indian Assemblages*. Washington State University Laboratory of Anthropology Reports of Investigations No. 60. Pullman, Washington.

Kuhn, Steven L.
1994 A Formal Approach to the Design and Assembly to Mobile Toolkits. *American Antiquity* 59:426-442.

Lenert, Michael
2000 A Chronology of housepit Occupations at the Keatley Creek Site: An Analysis of Stratigraphy and Dating. Master's Thesis, Department of Anthropology University of Montana, Missoula, Montana.

2001 Calibrated Radiocarbon Dates and Culture Change: Implications for Socio-Complexity in the Mid-Fraser Region, British Columbia. *Northwest Anthropological Notes Research Notes* 35:211-228.

Lepofsky, Dana, Stephen Lawhead, Arnoud H. Stryd, and Karla D. Kusmer
1996 Reconstructing Prehistoric Socioeconomies from the Paleoethnobotanical and Zooarchaeological Data: An Example from the British Columbia Plateau. *Journal of Ethnobiology* 16:31-62.

Lepofsky, Dana, Ken Lertzman, Douglas Hallett, and Rolf Mathews
2005 Climate Change and Culture Change on the Southern Coast of British Columbia 2400-1200 cal. B.P.: An Hypothesis. *American Antiquity* 70:267-295.

Loy, Thomas H.
1983 Prehistoric Blood Residues: Detection on Tool Surfaces and Identification of Species of Origin. *Science* 220: 1269-1271.

Loy, Thomas H., and James E. Dixon
1998 Blood Residues on Fluted Points from Eastern Beringia. *American Antiquity* 63:21-46

Magne, Martin M.P.R.
1985 Taseko Lakes Prehistory Project: Report on a Preliminary Survey. Report on file, Archaeology Branch, Victoria, British Columbia.

Markle, Dirk
2005 *Bridge River: A Glimpse of Stratigraphic Complexity of a Housepit Village (1700-200 B.P.)*. Paper presented at the 70th Annual Meeting of the Society for American Archaeology, Salt Lake City, Utah.

Mathews, Rolf W.
1978 The Environment and Biotic Resources of the Lillooet Area. In *Reports of The Lillooet Archaeological Project*, edited by A.H. Stryd and S. Lawhead, pp. 68-99. National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 73. Ottawa.

Morice, Adrian G.
1893 Notes Archaeological, Industrial, and Sociological on the Western Denes. *Transactions of the Canadian Institute, Session 1892-1893* 4:1-222.

Odell, George H
1980 Toward a More Behavioral Approach to Archaeological Lithic Concentrations. *American Antiquity* 45:404-431.
1996 *Stone Tools and Mobility in the Illinois Valley: from Hunter-Gatherer Camps to Agricultural Villages*. International Monographs in Prehistory, Ann Arbor, Michigan.

1998 Investigating Correlates of Sedentism and Domestication in Prehistoric North America. *American Antiquity* 63:553-571.

Parry, William J., and Robert L. Kelly
1987 Expedient Core Technology and Sedentism. In *The Organization of Core Technology*, edited by J. K. Johnson and C. A. Morrow, pp. 285-304. Westview, Boulder Colorado.

Pokotylo, David L., and Patricia D. Froese
1983 Archaeological evidence for prehistoric root gathering on the southern Interior Plateau of British Columbia: A case study from Upper Hat Creek Valley. *Canadian Journal of Archaeology* 7:127-157.

Pokotylo, David L., and Donald Mitchell
1989 Prehistory of the Northern Plateau, In *Handbook of North American Indians, Volume 12, Plateau*, edited by Deward E. Walker, pp. 81-102. Washington: Smithsonian Institution, Washington, D.C.

Prentiss, William C.
1998 The Reliability and Validity of a Lithic Debitage Typology; Implications for Archaeological Interpretation. *American Antiquity* 63:635-650.
2000 The Formation of Lithic Debitage and Flake Tool Assemblages in a Canadian Plateau Winter Housepit Village: Ethnographic and Archaeological Perspectives, In *The Ancient Past of Keatley Creek, Volume I, Taphonomy*, edited by B. Hayden, pp. 213-230. Archaeology Press, Burnaby, British Columbia.

Prentiss, William C., David S. Clarke, Dirk Markle, Jessica Bochart, Jake Foss, and Sierra Mandelko
2005 *Report of the 2004 University of Montana Investigations at The Bridge River Site (EeRl4)*. Report on file University of Montana, Missoula, Montana.

Prentiss, William C., Catherine A. Dietz, Sierra Mandelko, Jackie Orcholl, Emily Wilkerson, Nathan Goodale, Michael Lenert, and Guy Cross
2004 *Report of the 2003 University of Montana Investigations at The Bridge River Site (EeRl4)*. Report on file University of Montana, Missoula, Montana.

Prentiss, William C., and Ian. Kuijt
2004 The Evolution of Collector Systems on the Canadian Plateau. In *Complex Hunter-Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America*, edited by W. C. Prentiss and I. Kuijt, pp. 49-63. University of Utah Press, Slat Lake City, Utah.

Prentiss, William C., Michael Lenert, and Holly Stelton
2000 Report of the 1999 University of Montana Investigations at the Keatley Creek Site (EeRl7). Unpublished manuscript on file at the B.C. Heritage Conservation Branch, Victoria, British Columbia.

Price, Douglas T.
1981 Complexity in "Non-Complex" Societies. In *Archaeological Approaches to the Study of Complexity*, edited by S.E. van der Leeuw, pp. 55-99. Oxbow Monograph 53. Oxbow Books, Oxford, England.

Purdy, Barbara A., and H. K. Brooks
1971 Thermal alteration of silica materials: An Archaeological Approach. *Science* 173:322-325.

Reyes, Alberto V., and John J. Clague
2004 Stratigraphic evidence for multiple Holocene advances of Lillooet Glacier southern Coast Mountains British Columbia. *Canadian Journal of Earth Science*. 41:903-918.

Richards, Thomas H., and Michael K. Rousseau
1987 *Late Prehistoric Cultural Horizons on the Canadian Plateau*. Department of Archaeology Publication, 16. Simon Fraser University, Burnaby, British Columbia.

Rousseau, Michael K.
1992 *Integrated Lithic Analysis: The Significance and Function of Key-Shaped Formed Unifaces on the Interior Plateau of Northwestern North America*. Publication Number 20, Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.
2004 A Culture Historic Synthesis and Changes in Human Mobility, Sedentism, Subsistence, Settlement, and Population on the Canadian Plateau, 7000-200 BP. In *Complex Hunter-Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America,* edited by W. C. Prentiss and I. Kuijt, pp. 3-23. University of Utah Press, Slat Lake City, Utah.

Ryder, June M.
1978 Geomorphology and Late Quaternary History of the Lillooet Area. In *Reports of The Lillooet Archaeological Project*, edited by A.H. Stryd and S. Lawhead, pp. 56-67. National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 73. Ottawa.

Sanger, David
1968 The Chase burial site in British Columbia. *National Museum of Canada Bulletin* 224:86-185. Ottawa.

Shott, Michael J.
1989 On Tool-Class Use Lives and the Formation of Archaeological Assemblages. *American Antiquity* 54:9-30.

Smith, Trevor
1998 *Our Stories Are Written on the Land A Brief History of the Upper Statimc 1800 – 1940*. Upper Statimc Language, Culture and Education Society. Lillooet, British Columbia.

Spafford, James
1991 Artifact Distributions on Housepit Floors and Social Organization in Housepits at Keatley Creek. Master's thesis, Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.

Styrd, Arnoud H.
1974 *Lillooet Archaeological Project: 1974 Field Season*. Cariboo College Papers in Archaeology 1, Kamloops, British Columbia.
1983a *An overview of Lillooet prehistory: the last 4500 years*. Paper presented at the XIth International Congress of Anthropological and Ethnological Sciences, Vancouver, British Columbia.
1983b Prehistoric mobile art from the Mid-Fraser and Thompson River areas. In *Indian Art Traditions of the northwest Coast*, edited by R.L. Carlson, pp. 167-181. Archaeology Press Simon Fraser University, Burnaby, British Columbia.

Styrd, Arnoud H., and Mike K. Rousseau
1996 The Early Prehistory of the Mid-Fraser-Thompson River Area. In *Early Human Occupation in British Columbia*, edited by Roy L. Carlson and Luke Dalla Bona, pp. 177-204. University of British Columbia Press, Vancouver, British Columbia.

Teit, James A.
1900 *The Thompson Indians of British Columbia*. Memoirs of the American Museum of Natural History 2(4). American Museum of Natural History, New York.
1906 *The Lillooet Indians*. Memoirs of the American Museum of Natural History 4(5). American Museum of Natural History, New York.
1909 *The Shuswap*. Memoirs of the American Museum of Natural History 4:7. American Museum of Natural History, New York.

Tringham, Ruth, Glenn Cooper, George Odell, Barbara Yoytek, and Ann Whitman
1974 Experimentation in the Formation of Edge Damage: A New Approach to Lithic Analysis. *Journal of Field Archaeology* 1:171-196.

Torrence, Robin
1982 Time Budgeting and Hunter-gatherer Technology. In *Hunter-gatherer Economy in Prehistory: A European Perspective*, edited by G. Bailey, pp. 11-22. Cambridge University Press, Cambridge.

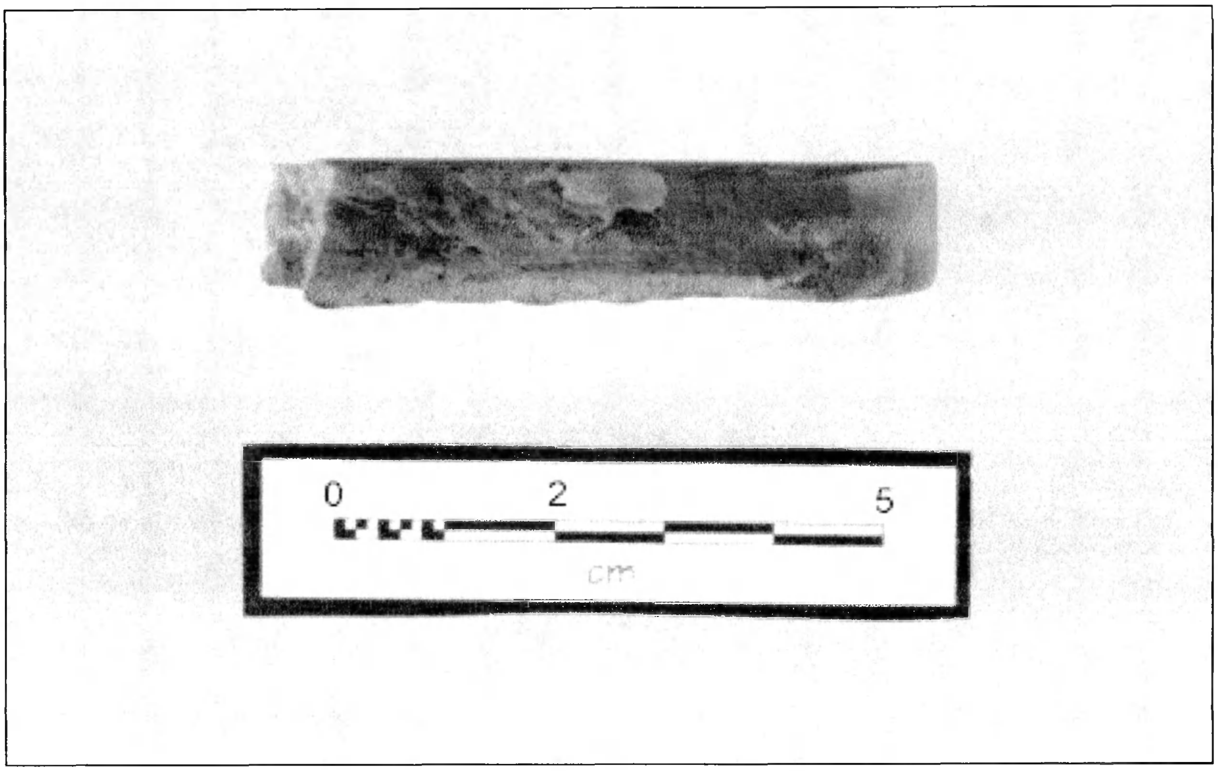
Tunnicliffe, Verena, J. M. O'Connell, Melissa R. McQuoid
2001 A Holocene Record of Marine Fish Remains form the Northeastern Pacific. *Marine Geology*. 174:197-210.

Wilson, Robert L. (editor)
1980 Archaeological Investigations near Kamloops. In *The Archaeology of Kamloops*, edited by Robert L. Wilson and Catherine Carlson, pp. 1-83. Department of Archaeology Publication, 7. Simon Fraser University, Burnaby, British Columbia.

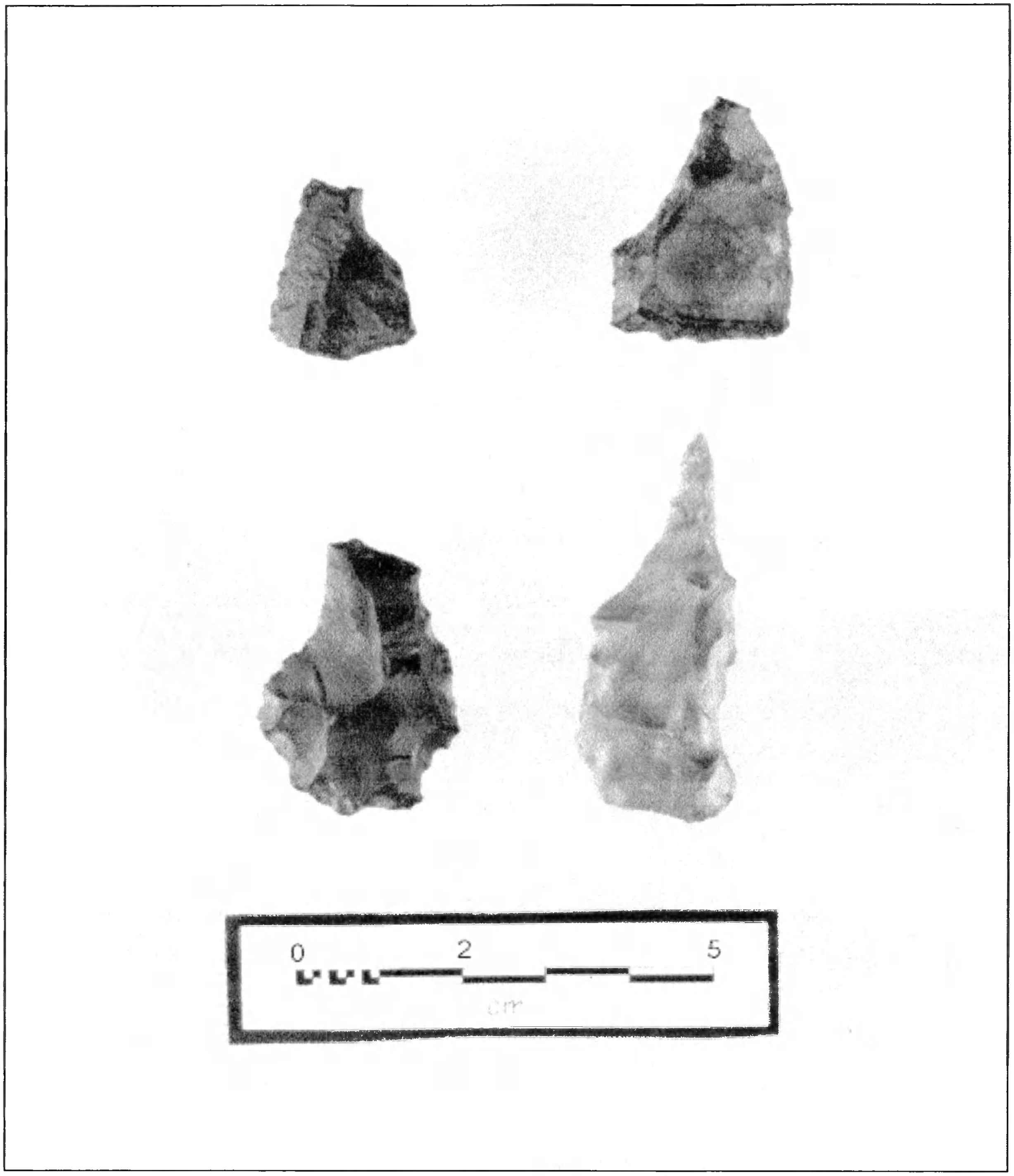
Whittaker, John C.
1994 *Flintknapping Making & Understanding Stone Tools*. University of Texas Press, Austin, Texas.

APPENDIX A

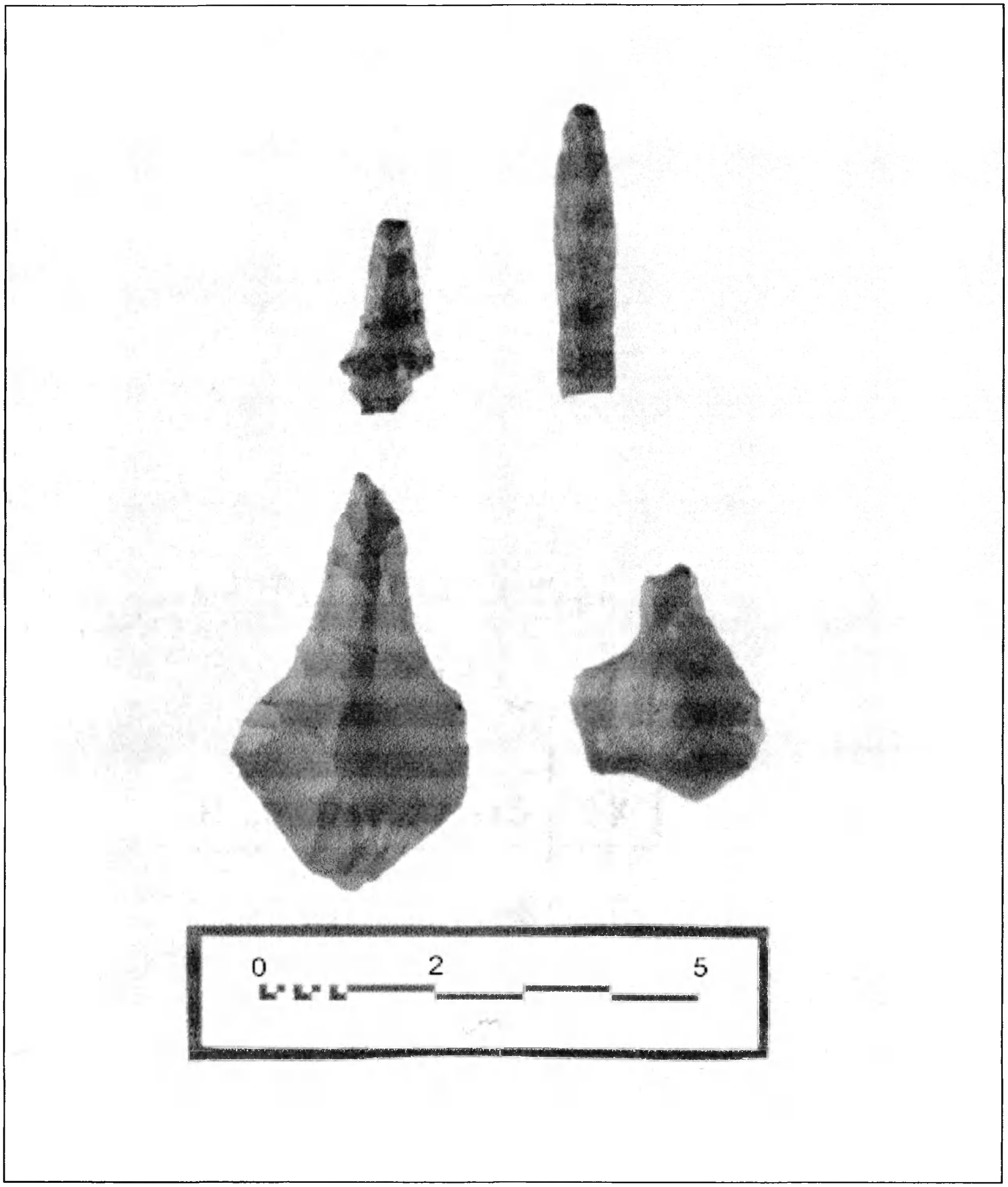
ARTIFACT PHOTOGRAPHS



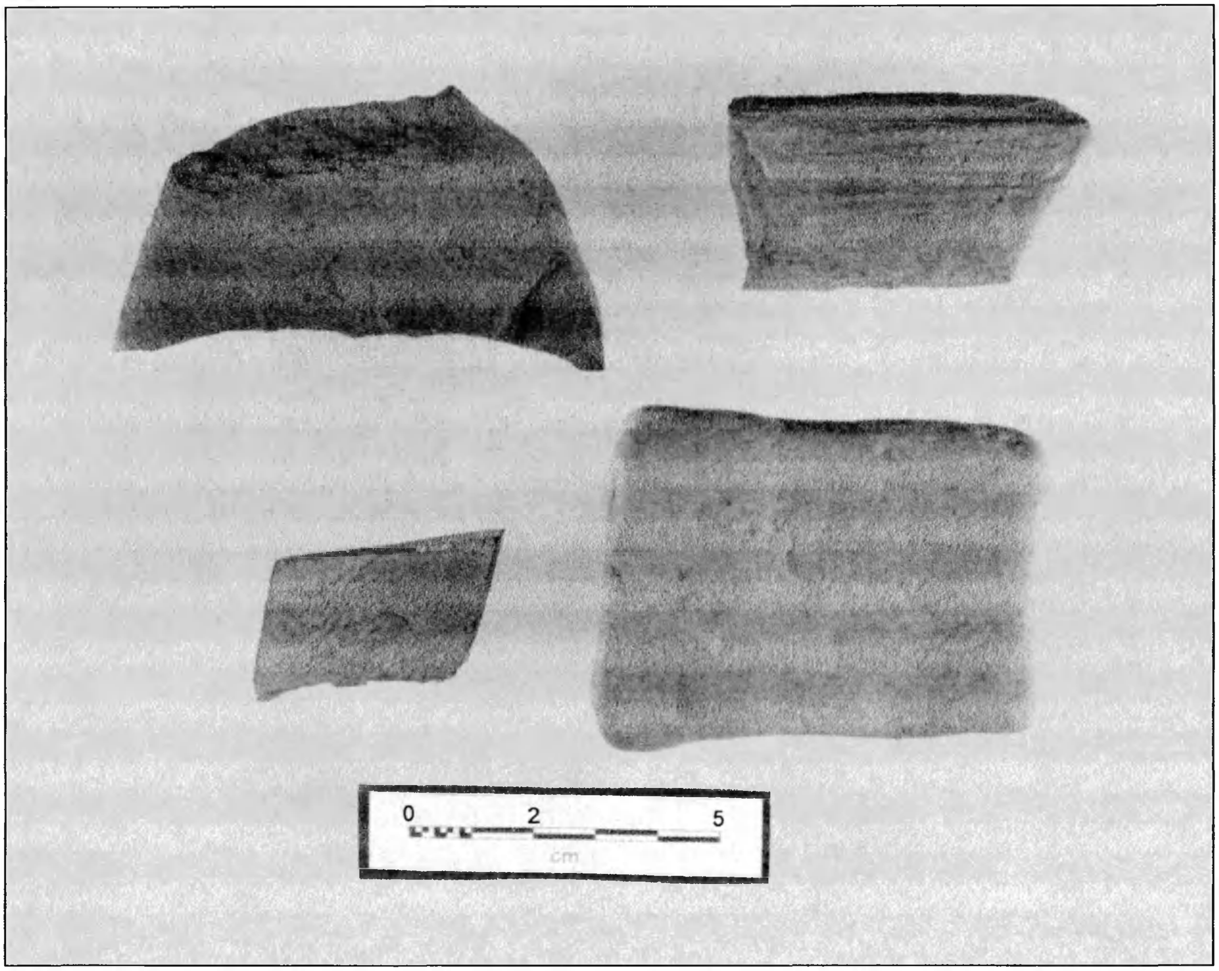
Nephrite Adze (heavy duty curated lithic tool)



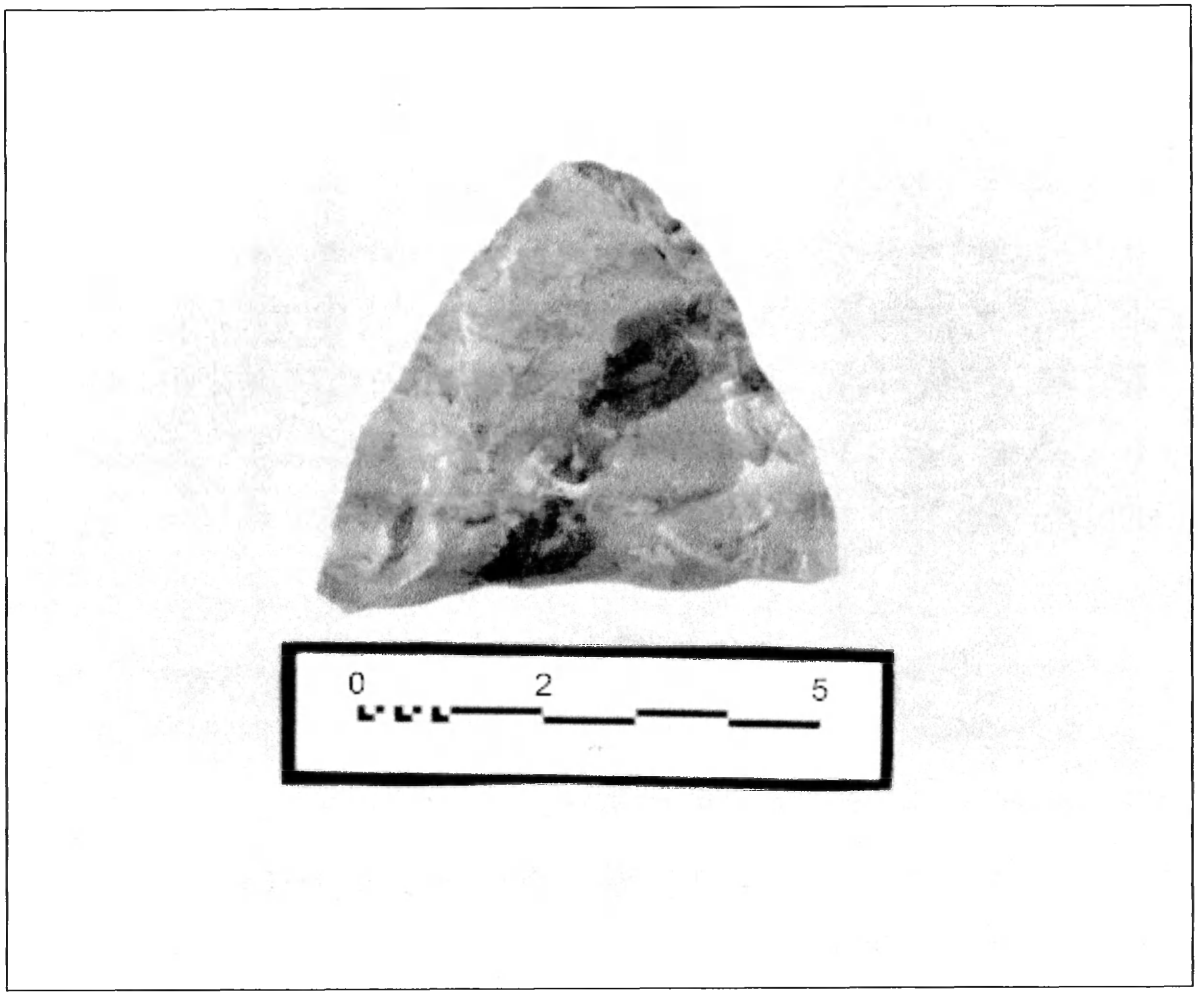
"Key-shaped" unifacial scrapers: one lateral edge straight from base to tip converging with concave edge on opposite lateral edge (heavy duty curated lithic tools)



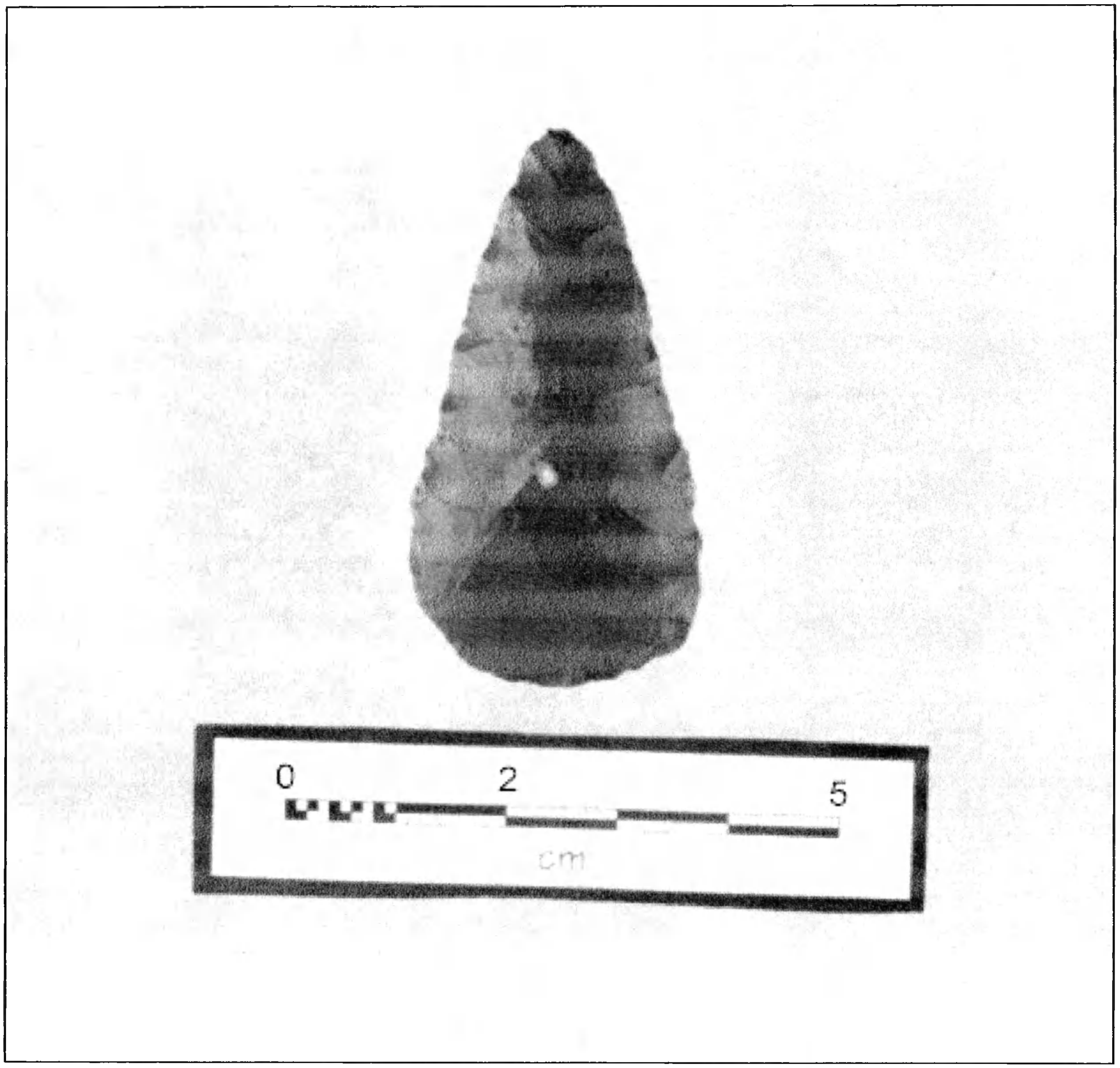
Bifacial Drills (heavy duty curated lithic tools)



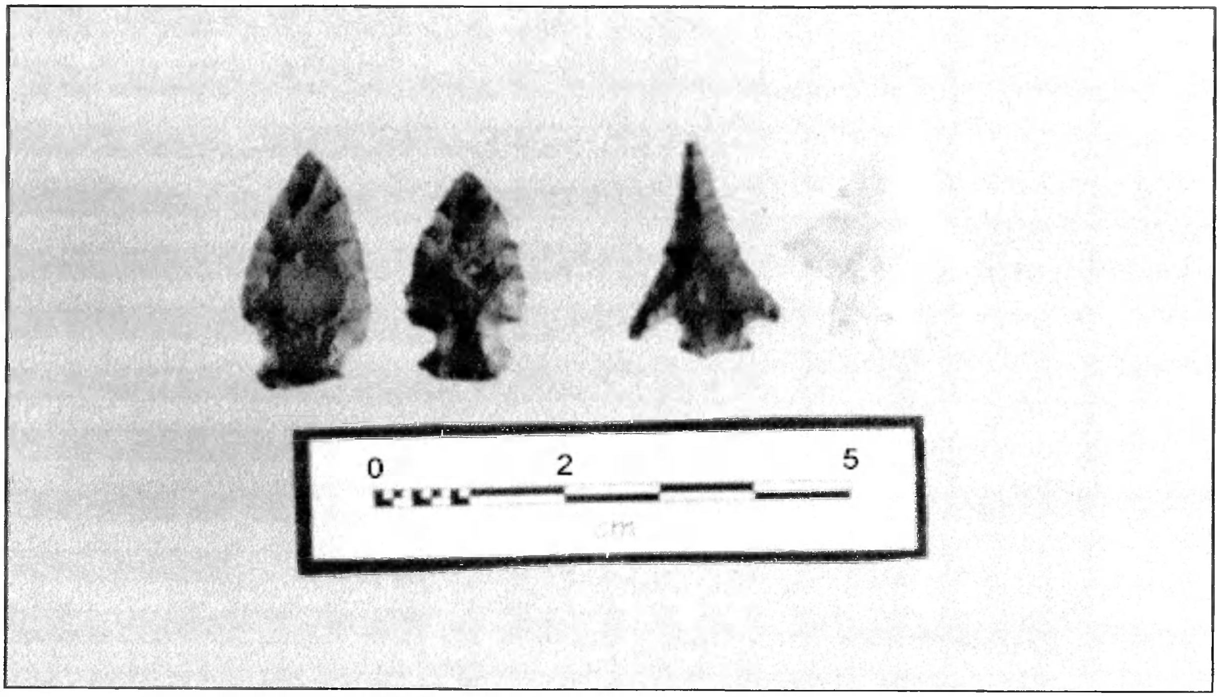
Abraders (heavy duty curate lithic tools)



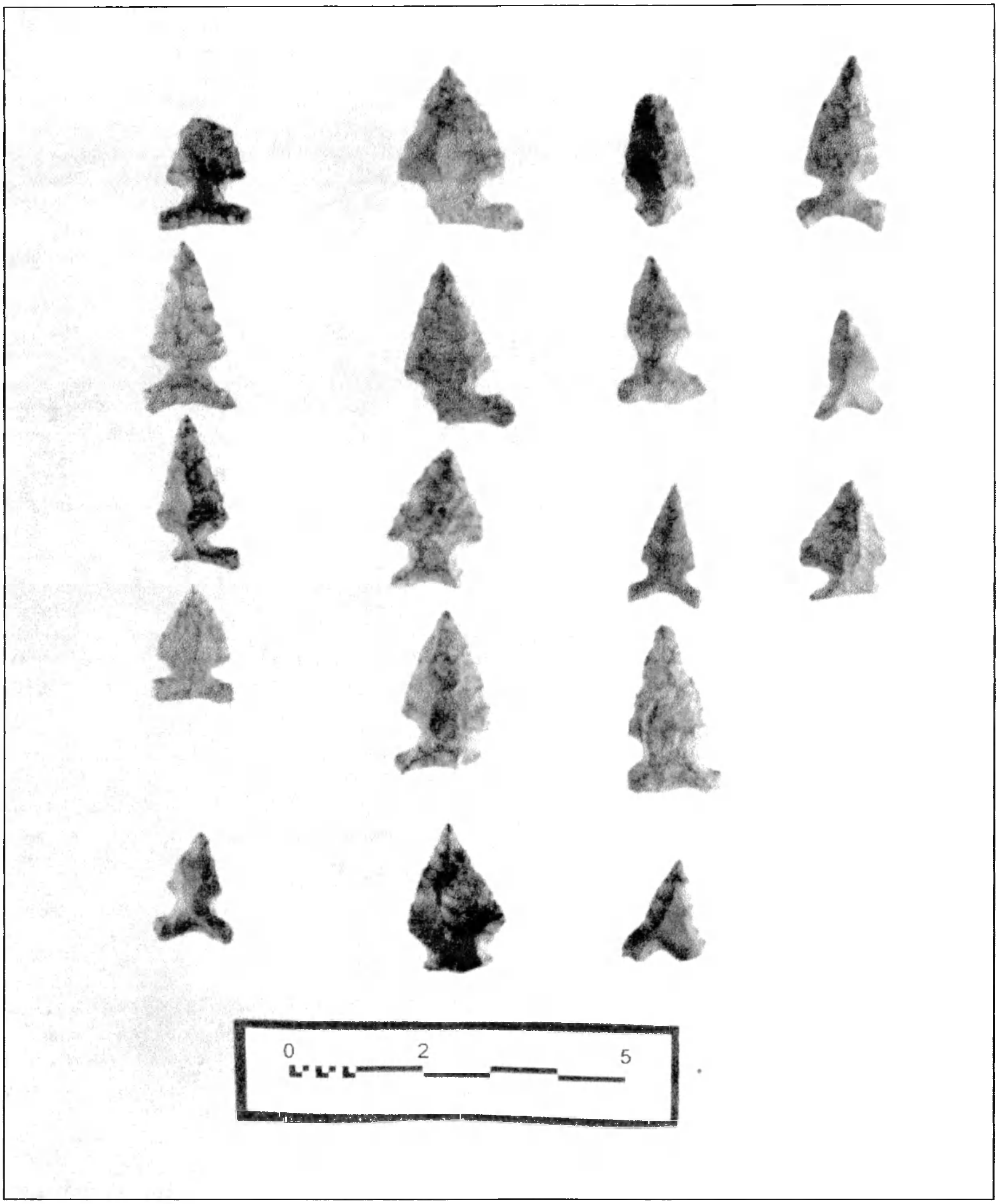
Thermally Altered Pisolite Stage 4 Biface (hunting and butchering curated lithic tool)



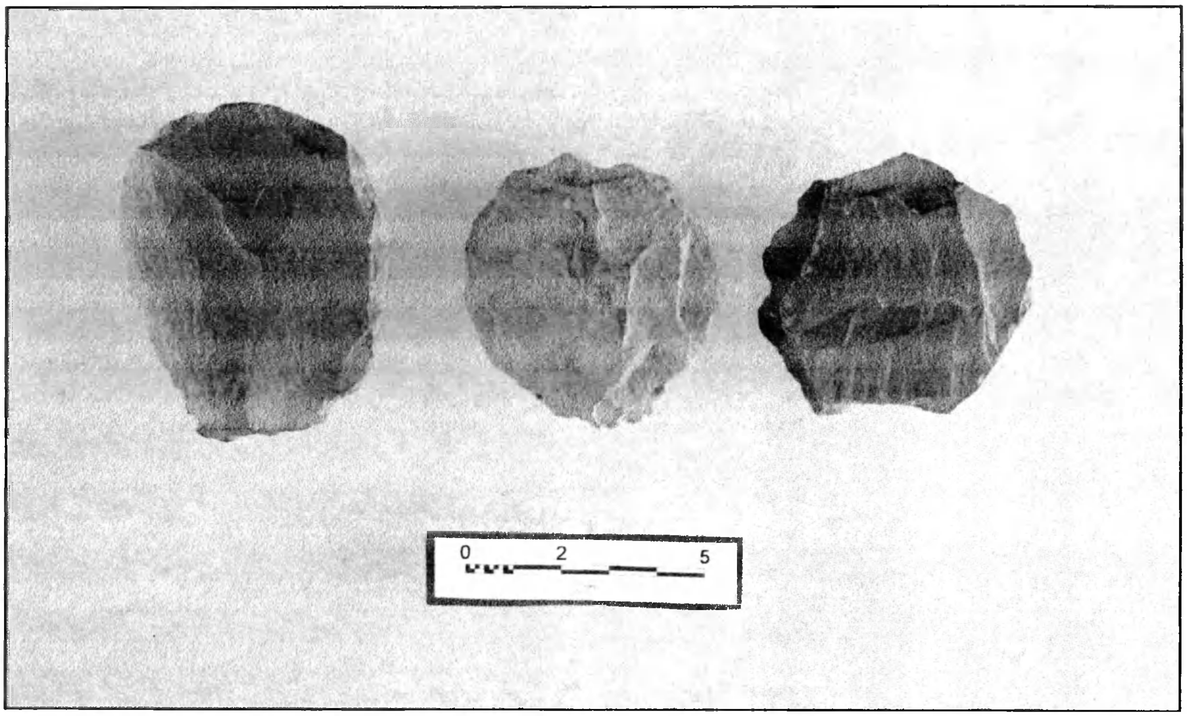
Basalt Stage 3 Biface (hunting and butchering curated lithic tool)



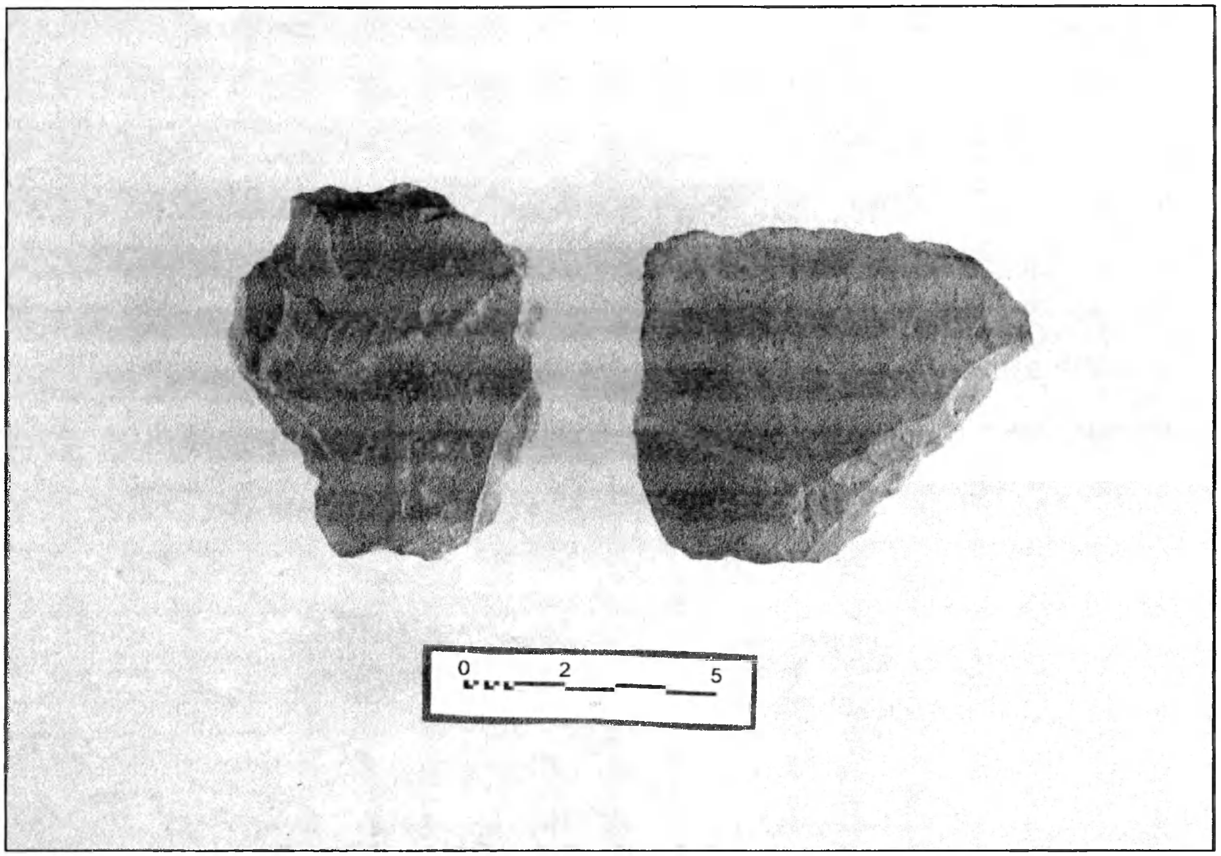
Plateau Projectile Points (hunting and butchering curated lithic tools)



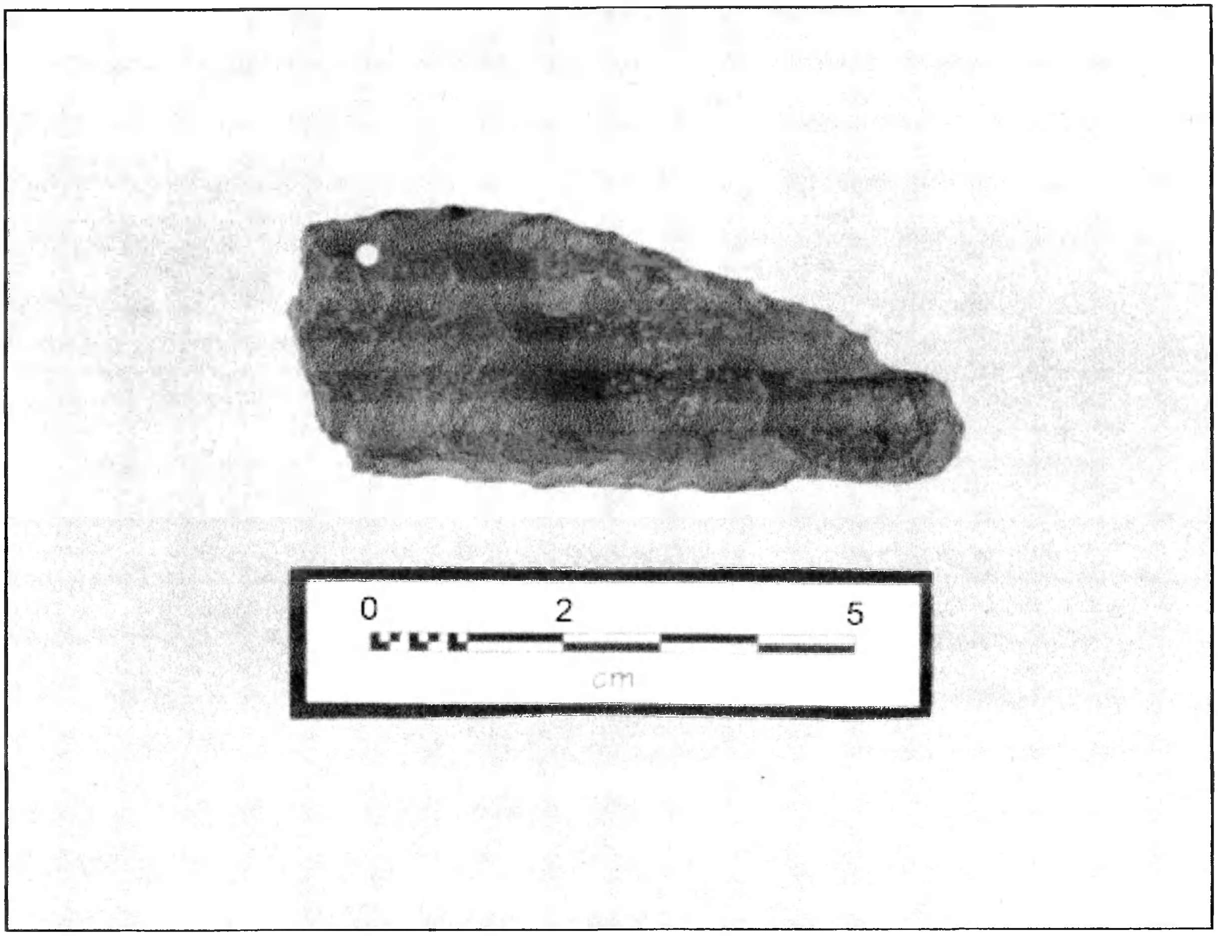
Kamloops Projectile Points (hunting and butchering curated lithic tools)



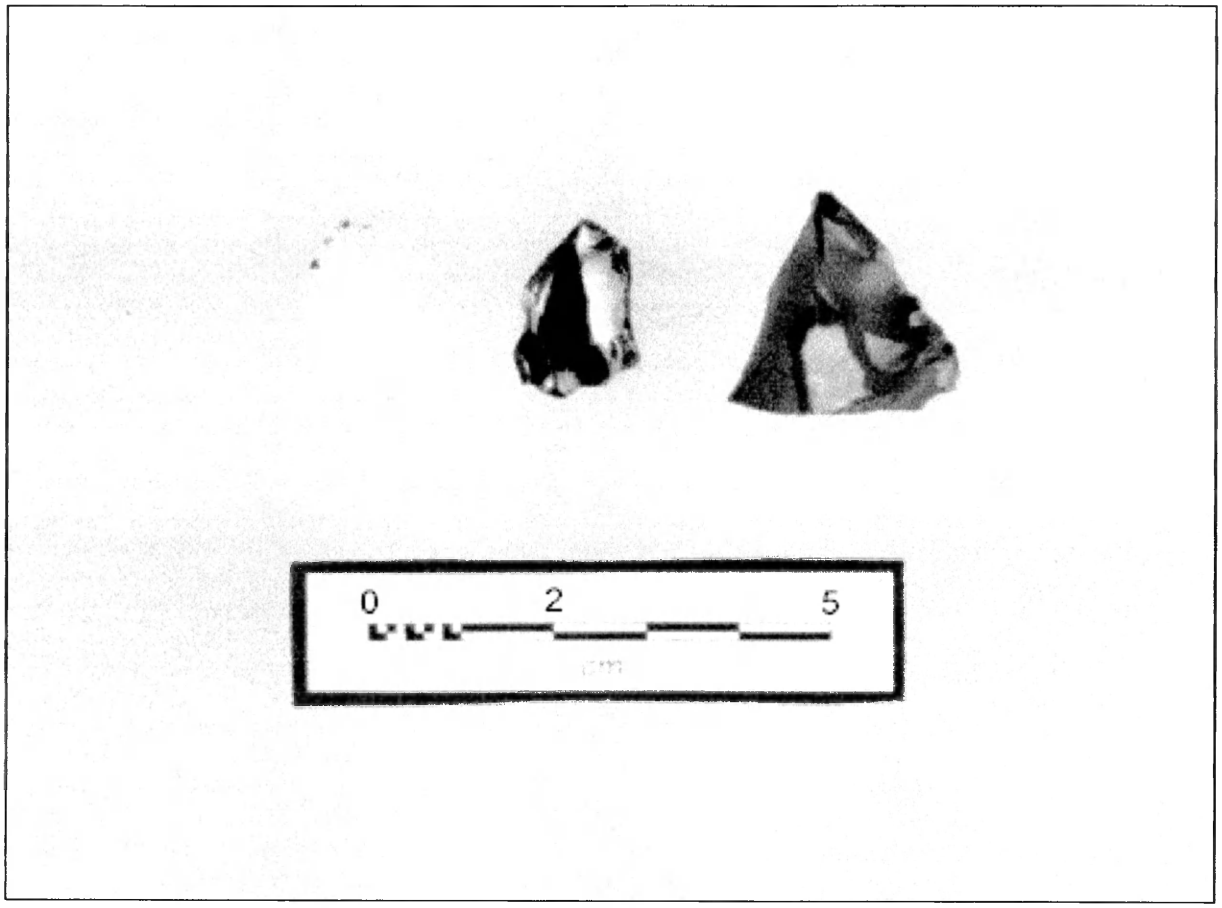
Slate Scrapers (light duty curated tools)



Hafted Slate Scrapers (light duty curated lithic tools)



Slate Knife with bore hole (light duty curated lithic tool)



Bipolar Cores

APPENDIX B

LITHIC TOOL DISTRIBUTION

DATABASE NUMBER	ARTIFACT TYPE	QUANTITY	Quantity Dated
Unifacially Retouched Artifacts			
143	Scraper retouch flake with hide polish	24	14
150	Single scraper; one unifacially retouched lateral or distal edge	108	44
156	Alternate scraper retouched edges on opposing surfaces	20	3
158	"Key-shaped" unifacial scraper: one lateral edge straight from base to tip converging	6	1
	with concave edge on opposite lateral edge		
163	Inverse scraper: single scraper with retouch on ventral face of flake. If retouch is present	18	9
	on both ventral and dorsal surfaces see type 156		
164	Double scraper: two retouched edges on the same surface	11	6
165	Convergent scraper: two scraper edges come together to form a point. Apparently not	11	5
	intended for use as a projectile point or unsuitable for such use		
70	Expedient knife, inversely retouched	20	7
74	Lightly retouched expedient knife, utilized flake	5	3
148	Flake with polish sheen	1	1
170	Expedient knife, normal retouch	28	12
171	Flake with abrupt (trampling) retouch	2	1
180	Utilized flake (general)	71	27
71	Utilized flake on break	3	0
72	Utilized flake on thin flake edge	1	1
157	Miscellaneous uniface	3	0
161	"Thumbnail" scraper: classified as endscrapers in this analysis. See type 162	4	2
162	Endscraper	8	4
153	Small piercer	45	18
152	Unifacial borer	4	1
160	Unifacial denticulate	11	8

159	Unifacial knife	16	4
151	Unifacial perforator	14	7
154	Notch	51	21
54	Small notch	3	0
232	Stemmed scraper	4	0
Bifacial Artifacts			
192	Stage 2 biface	2	1
193	Stage 3 biface	9	7
131	Stage 4 biface	6	2
140	knife-like biface	23	8
141	scraper-like biface	6	5
144	Convergent knife-like biface	1	0
6	Bifacial fragment	10	3
135	Distal tip of biface	11	5
130	Bifacial knife	12	4
132	Bifacial perforator	3	0
133	Bifacial drill	10	1
145	Piece esquillee	29	9
2	Miscellaneous biface	10	4
225	"Tang" knife – biface with notched hafting element on one proximal corner	1	1
240	Wedge on an angular slate or shale (chipped, not ground)	2	0
Porjectile Points			
134	Preform	2	0
36	Point fragment	3	1
35	Point tip	10	1
99	Miscellaneous point	1	0
109	Side-notched point no base	2	0
137	Kamloops preform	1	1
110	Kamloops side-notched point concave base	29	16
111	Kamloops side-notched point straight base	10	4
112	Kamloops side-notched point convex base	7	44
114	Kamloops stemmed	1	1

136	Plateau preform	1	0
115	Plateau corner-notched point concave base	1	0
116	Plateau corner-notched point straight base	6	1
117	Plateau corner-notched point convex base	4	1
119	Plateau basally notched point straight base	2	1
19	Late plateau point	11	5
120	Shuswap base	1	0
123	Shuswap parallel stem slight shoulders	1	1
231	Slate projectile point	1	0
244	Small triangular points straight base, no notches	5	3
245	Large straight to concave base side notch point	1	1
237	Elkiam point	1	0
251	Slate side notched straight point base	1	1
236	Limestone / Marble projectile point	1	0
Cores			
186	Multidirectional core	5	0
189	Unidirectional core	5	0
146	Bipolar core	281	109
182	Core rejuvenation flake	3	2
221	Core on slate tool	6	1
Groundstone Artifacts			
209	Ornamental ground nephrite	5	3
203	Ground slate	88	31
219	Groundstone maul	2	1
190	Hammerstone	13	4
204	Steatite tubular pipe	8	2
202	Sandstone saw: wedge-shaped sandstone slab; narrow edge used for cutting	1	0
	stone by abrasion		
200	Miscellaneous ground stone	32	11
207	Abraded cobble or block: cobble with striations, polish, and battering on edges or other evidence of cultural modification	13	7
201	Abrader	26	14

206	Anvil stone	1	1
220	Ground slate piercer / borer, chipped edges	5	1
228	Groundstone adze on a natural break – snapped thick flake or tabular raw material	7	5
	ground on one face adjacent to snap to form adze blade		
250	Ground nephrite scraper	1	1
235	Metate	1	1
234	Burnishing / polishing stone	1	0
242	Ochre grinding stone	1	0
222	Slate scraper	204	85
226	Cut-stone gouge (convergent cut edges forming robust point)	2	1
230	Slate knife	36	9
233	Nephrite adze	5	3
241	Cut adze	1	1
246	Slate knife with bore hole	1	0
Ornaments			
217	Copper artifact	2	1
216	Ground or sculpted ornament	4	3
214	Stone bead	29	11
215	Stone pendant or eccentric: including bifacial denticulate pendant	2	2
252	Copper bead	2	2
253	Copper pendant	1	0
243	Sliced bead stage 1 (sliced pebble)	2	1
Other			
238	Spike (stone spike)	5	1
239	Small stone bowl	1	0
247	Miscellaneous drilled object	1	0
248	Miscellaneous cut stone	6	0
249	Painted stone tool	2	1
227	Cut stone disk	2	0
223	Burin spall tool	4	2
224	Burin	5	2