

University of Montana

## ScholarWorks at University of Montana

---

Graduate Student Theses, Dissertations, &  
Professional Papers

Graduate School

---

2004

### Timeline in stone| Lithic indications of social and economic change at Housepit 7 of the Keatley Creek Site

Terrence M. Godin

*The University of Montana*

Follow this and additional works at: <https://scholarworks.umt.edu/etd>

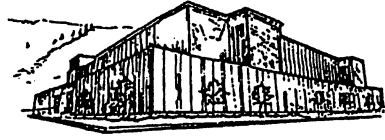
**Let us know how access to this document benefits you.**

---

#### Recommended Citation

Godin, Terrence M., "Timeline in stone| Lithic indications of social and economic change at Housepit 7 of the Keatley Creek Site" (2004). *Graduate Student Theses, Dissertations, & Professional Papers*. 3912.  
<https://scholarworks.umt.edu/etd/3912>

This Thesis is brought to you for free and open access by the Graduate School at ScholarWorks at University of Montana. It has been accepted for inclusion in Graduate Student Theses, Dissertations, & Professional Papers by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact [scholarworks@mso.umt.edu](mailto:scholarworks@mso.umt.edu).



Maureen and Mike  
**MANSFIELD LIBRARY**

The University of  
**Montana**

---

Permission is granted by the author to reproduce this material in its entirety, provided that this material is used for scholarly purposes and is properly cited in published works and reports.

**\*\*Please check "Yes" or "No" and provide signature\*\***

Yes, I grant permission

    X    

No, I do not grant permission

Author's Signature: Terrence M. Godin

Date: 05/17/04

Any copying for commercial purposes or financial gain may be undertaken only with the author's explicit consent.

---



**A TIMELINE IN STONE:  
LITHIC INDICATIONS OF SOCIAL AND ECONOMIC CHANGE  
AT HOUSEPIT 7 OF THE KEATLEY CREEK SITE**

by

Terrence M. Godin

B.A. The University of Montana, Missoula, 1999

presented in partial fulfillment of the requirements

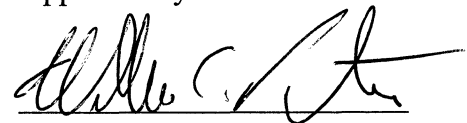
for the degree of

Master of Arts

The University of Montana

May 2004

Approved by:



Chairperson



Dean, Graduate School

5-17-04

Date



UMI Number: EP36367

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI EP36367

Published by ProQuest LLC (2012). Copyright in the Dissertation held by the Author.

Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against unauthorized copying under Title 17, United States Code



ProQuest LLC.  
789 East Eisenhower Parkway  
P.O. Box 1346  
Ann Arbor, MI 48106 - 1346

A Timeline in Stone: Lithic Indications of Social and Economic Change at Housepit 7 of the Keatley Creek Site (124 pp.)

Director: William C. Prentiss



The Keatley Creek site is a large, winter housepit village located on the Canadian Plateau in British Columbia, Canada. Past research and more recent excavations conducted by the University of Montana in 1999, 2001, and 2002 have focused on Housepit 7, one of the largest housepit features within the village core. Two models have been developed that attempt to explain the emergence of large, aggregated villages like Keatley Creek.

The more established aggrandizer model suggests that such villages, with their attendant socioeconomic complexity, emerged as a result of a strong, sustained focus on plentiful and highly predictable salmon runs in the Mid-Fraser River. Individuals desiring elevated status and power manipulated surplus salmon for their benefit, which resulted in the early rise of inequality and ranking on the individual and household levels, as well as differential access to resources. These hallmarks of complexity arose during the late Shuswap Horizon (ca.3500-2400 B.P.) and remained stable until the abandonment of the village.

A second, alternative model asserts that the changing environment played a more active role in the evolution of cultural structures and subsequent emergence of socioeconomic complexity at Keatley Creek. Building upon an earlier established foundation, socioeconomic complexity did not fully develop until the early Kamloops Horizon (ca. 1200-200 B.P.), and under drought conditions. Local resource shortages, intense competition, and the use of new technologies resulted in pronounced inequality, ranking, and differential access to resources late at the Keatley Creek site. This model is dynamic, and suggests people responded directly to changing environmental conditions.

In order to test these two propositions, this research analyzes lithic artifacts and raw materials excavated from Housepit 7 of the Keatley Creek site by the University of Montana. Lithic technology is placed within organizational and functional frameworks, and plotted along a new Housepit 7 timeline that spans the period of approximately 1815 B.P. to village abandonment at 800 B.P. These organizational and functional lithic data demonstrate that logistical mobility increased over time as subsistence shifted to a stronger focus on terrestrial resources, patterns of which peaked during the latest occupation phases of Housepit 7. Prestige-associated lithic raw material and prestige item frequencies and diversity are also greatest late in the life of the house. These implications of lithic use and discard meet those predicted under the alternative, evolutionary model of emergent socioeconomic complexity.

## ***TABLE OF CONTENTS***

Abstract	ii
List of Figures	v
List of Tables	v
Acknowledgments	vi
Chapter One: Introduction	1
Research Problem	2
Research Goals	4
Significance of Research	4
Thesis Outline	5
Chapter Two: Research Background	6
Site Setting	6
Plateau Paleoenvironmental Record	9
Cultural Chronology	12
Canadian Plateau Culture Area	13
Mid-Fraser Cultural Chronology	13
Housepit Formation Processes	27
Description of Housepit 7	34
Chapter Three: Research Methods	37
Introduction	37
Models of Socioeconomic Complexity	37
Excavation and Radiocarbon Dating of Housepit 7	46
Laboratory Methods	55
Analytical Methods	56
Organizational Analysis	56
Functional Analysis	61
Lithic Raw Material Analyses	70
Analysis of General Lithic Raw Materials	70
Analysis of Prestige-Associated Lithic Raw Materials	72
Analysis of Lithic Prestige Items	74
Predictions of Models for the Lithic Analyses	76
Chapter Four: Results	84
Introduction	84
Results of Organizational Analysis	84
Results of Functional Analysis	87
Results of General Lithic Raw Material Analysis	90
Results of Prestige-Associated Lithic Raw Material Analysis	92
Results of Lithic Prestige Item Analysis	95
Results Summary	97

Chapter Five: Discussion	98
A Return to the Models' Predictions	98
Discussion of Implications under the Supported Model	107
Discussion Summary	113
Chapter Six: Conclusions	114
References Cited	118
Appendix: Raw Data	124

## ***LIST OF FIGURES***

Figure 2-1.	Map showing location of Keatley Creek site and other large housepit villages in the Mid-Fraser area of British Columbia.	7
Figure 2-2.	Map of Keatley Creek site village core area and local topography.	8
Figure 2-3.	Profile and plan-view of pithouse.	30
Figure 2-4.	Graphic of housepit formation processes.	32
Figure 2-5.	Map of the Keatley Creek site showing the location of Housepit 7.	35
Figure 3-1.	Map of University of Montana Housepit 7 excavation units.	47
Figure 3-2.	Plan-view showing locations of SHPs 1, 3 and 4 in the northwest quarter of Housepit 7.	48
Figure 3-3.	Profile of west wall, north trench, Housepit 7 illustrating SHP 3, Early HP 7, and Rims 1-4.	49
Figure 3-4.	Profile of northwest side of Housepit 7. Illustrates the north walls of excavation units BBB, FFF, HHH, GGG, and NN, which show Housepit 7 Rims 2-4 and SHPs 1, 3, and 4.	50
Figure 4-1.	Percentages of Housepit 7 lithic tools under the organizational classification.	86
Figure 4-2.	Percentages of Housepit 7 lithic tools under the functional classification.	88
Figure 4-3.	Percentages of general lithic raw materials from Housepit 7 debitage and tools.	91
Figure 4-4.	Percentages of prestige-associated lithic raw materials from Housepit 7 debitage, tools, and prestige items.	94
Figure 4-5.	Percentages of total prestige-associated lithic raw materials from Housepit 7 debitage, tools, and prestige items.	94
Figure 4-6.	Percentages of Housepit 7 lithic prestige items.	96
Figure 4-7.	Percentages of total Housepit 7 lithic prestige items.	96

## ***LIST OF TABLES***

Table 3-1.	Housepit 7 calibrated radiocarbon dates.	54
Table 3-2.	Housepit 7 organizational classification of lithic tools	59
Table 3-3.	Housepit 7 functional classification of lithic tools	63
Table 3-4.	Model predictions for organizational, functional, lithic raw material, and lithic prestige item analyses.	83

## *ACKNOWLEDGMENTS*

First, I would like to thank my thesis committee, Dr. William C. Prentiss, Dr. Thomas A. Foor, and Dr. Sarah J. Halvorson. Bill, your considerable input and guidance during the entire thesis research and writing process were of an enormous help and I truly appreciate it. Over the years, you have contributed greatly to my success as a student and as an archaeologist, and I will always be grateful. Tom, you have also added to my graduate school experience in significant and positive ways. Thank you for your efforts and for getting me focused when I had lost my way. Thanks to Sarah for her participation and for graciously agreeing to sit on my committee at the last minute.

Very special thanks to Carl M. Davis, Helena National Forest Archaeologist, who read an incredibly rough draft of this thesis, provided many insightful comments, and some much needed advice. Carl, it is difficult to state how grateful I am for the guidance, support, infinite patience, and friendship you have shown me over the last five years. Without you I would not be where I am today, nor would my future be nearly so bright—thank you so much! I would also like to thank everyone at the Helena National Forest and the USDA Forest Service for their kind words and support as I prepared this report, and for the opportunity to take part in the Student Career Experience Program (SCEP).

Several others also had a hand in the completion of this research in one way or another. A great deal of gratitude goes to Rebecca Thompson for providing valuable comments on an early draft of this work. Thanks Becky, for your endless understanding, encouragement, and love as I struggled to finish this project. With your help it was completed; I will never forget this and always love you for it! Thanks also to my good friend Tom Flanigan, who offered support and thoughtful insight as I wrote and developed ideas. Although I have cursed your name on numerous occasions for persuading me to enroll in graduate school, having now finished I can look back fondly on a challenging but highly rewarding experience. A thousand thanks buddy, to you and The C.C.! Thank you also to Michael Haury for having an open ear and encouraging words during trying times.

To my dad, Roger Godin, and my brother, Chris Godin—thanks for your advice over the last three years, and for putting up with my complaints. You both helped me to stay focused and remember what is important, whether you know it or not.

This thesis is dedicated to my mother, Ursula J. Godin. Mom, without your encouragement and support I would have never started school all those years ago, much less held on to see the entire process through and produce the document you now hold in your hands. With a future full of possibilities, I would be remiss not to give the utmost thanks to the person who convinced me to pursue an education in the first place. Doing so has unlocked doors of opportunity that would have otherwise remained tightly sealed. Thanks for everything mom—this is for you, with much love!

## ***CHAPTER ONE: INTRODUCTION***

The Keatley Creek site (EeR1 7) is one of the largest known winter housepit villages in the Mid-Fraser area of British Columbia, Canada (Figures 2-1 and 2-2). Not only is the village itself extensive, but many of the houses that comprise it are also unusually large. The anomalous size of this site and its component housepit features made it very appealing to archaeologist Brian Hayden (2000c). At the outset, Hayden had the simple goal of trying to understand why the housepits of Keatley Creek were so abnormally large. However, subsequent research revealed that this issue was not as simple to address as originally thought, and a whole host of additional questions and study were spurred from this first inquiry.

Based on many years of work at the Keatley Creek site, and at the large Housepit 7 in particular, Hayden (1997, 2000a, 2000b) has come to believe that the aggregated village emerged during the Shuswap Horizon (3500-2400 B.P.) and exhibited significant socioeconomic complexity from this time onward, until the village was abandoned at approximately 800 B.P. However, more recent work conducted by William C. Prentiss and colleagues (Lenert 2001; Prentiss et al. 2000, 2002, 2003a, 2004) at Keatley Creek, has resulted in a new chronology for Housepit 7 and the entire site. He argues that the densest aggregation of the village did not occur until after 1800 B.P., and socioeconomic complexity described by Hayden did not take hold until after 1100 B.P. (Prentiss et al. 2004).

Years of excavation and research conducted by both Hayden and Prentiss have thus resulted in two contrasting models of prehistoric village occupation and the rise of

socioeconomic complexity at Keatley Creek. The intent of this research is to test these models through varied analytical examinations of lithic data from Housepit 7.

### **RESEARCH PROBLEM**

Issues surrounding the rise of complex hunter-gatherer societies, while at one time largely ignored, have been the subject of intense archaeological interest and debate over the last 15 to 20 years (Arnold 1996). A number of models, dependant upon a variety of “causes, consequences, correlates and conditions”, have been developed in an effort to explain the emergence of complex hunter-gatherers in various parts of the world (Arnold 1996:95). For the Mid-Fraser area and the Keatley Creek site, two models have been proposed to help explain the timing and manner in which socioeconomic complexity arose (Hayden 1997, 2000a; Prentiss et al. 2002, 2003a, 2004). The models differ in their explanations for when and how this occurred, as briefly discussed below. They are outlined in much more detail in Chapter 3 of this work.

Hayden’s (1997:112) more established “aggrandizer model” holds that complexity emerged as a result of aspiring elites that operated when inexhaustible supplies of salmon were available and technologies capable of taking advantage of the plentiful resource were in place and ready for use. Hallmarks of the complexity and inequality that eventually resulted from aggrandizing behavior at Keatley Creek include dense settlement, ranking, intensification of salmon, and considerable exchange, all of which characterize the “Classic Lillooet” period described by Hayden (1997, 2000b). This pattern emerged between 3000 and 2300 B.P., a time of ideal environmental conditions of the Neoglacial climatic episode, when resources like salmon and roots were plentiful (Chatters 1998). Central to this model are the early rise of complexity at



Keatley Creek and the stability of the pattern throughout the life of the village.

Continual, strong reliance on salmon was the rule as aggrandizers used surpluses of the abundant resource to build-up their power-base and status.

In the second, alternative model, socioeconomic complexity developed over three phases at Keatley Creek. Under this “evolutionary” model, groups with a reliance on aquatic resources packed into the Mid-Fraser area in order to access substantial salmon runs that remained plentiful there, but were reduced in numbers elsewhere on the Plateau due to drought conditions (Prentiss et al. 2004). This process occurred twice at 1800-1500 B.P. and 1100-700 B.P., which coincides with two periods of drought separated by a brief interval of cooler and wetter climate conditions (Prentiss et al. 2004). When drought conditions took hold for the second time, the initial aggregation provided the adaptive structure for a new cultural mechanism to develop. Within the context of substantial local resource shortages, increased territoriality, and new technologies, significant individual and household competition occurred (Prentiss et al. 2004). The end result was characterized by all the elements of Hayden’s (1997, 2000b) Classic Lillooet period at Keatley Creek. The key element of the evolutionary model is the late rise of socioeconomic complexity at Keatley Creek, which peaked between 1100-700 B.P. just prior to abandonment of the village. It is also more dynamic, and does not involve the stability of adaptation described by Hayden’s (1997) model.

This research tests both the aggrandizer and evolutionary models with recently excavated lithic data from Housepit 7. These data are considered within the framework of the housepit’s timeline, as derived from recently published radiocarbon dates (Prentiss et al. 2003b). In so doing, patterns of lithic production, use, and discard are observable

over time. Implications of these patterns are then extended to the models' arguments for the emergence of socioeconomic complexity.

### **RESEARCH GOALS**

Both the aggrandizer and evolutionary propositions present convincing arguments, and the goal is to evaluate which one is best supported by the organization and function of Housepit 7 lithic tools, as well as household rates of lithic raw material and prestige item use. In this work, I conduct five individual analyses using data obtained during the University of Montana's 1999, 2001, and 2002 excavations at Housepit 7. The models' predictions for lithic use and discard are addressed, and depending on the results of the analyses, aid in determining which of the two is best supported by the Housepit 7 lithic data. The implications of these analyses are extended to, and discussed within, the larger context of the supported model. Thus, a lithic line of evidence is developed that helps to substantiate arguments for the emergence of socioeconomic complexity at the Keatley Creek site.

### **SIGNIFICANCE OF RESEARCH**

The manner in which lithic technology was organized and functioned gives insight into prehistoric mobility regimes and subsistence strategies (Hayden et al. 1996b, 2000). Rates at which both common and prestige-associated lithic raw materials were used help infer important facets of social organization, including ownership and control of lithic sources, status inequality, and exchange (Hayden 1996a, 2000c). The same holds true for formed lithic prestige items (Hayden 2000c). These more direct implications of lithic use and discard can be considered within larger models of initial village aggregation and the emergence of a highly complex society at the Keatley Creek

site. In this way, a better understanding of village social organization and economics during prehistory becomes possible.

Central to this research is the Housepit 7 timeline, developed from new radiocarbon dates and a complete profile of the house (Prentiss et al. 2003b). Each lithic analysis of this study is based upon, and benefits significantly from, this new record of Housepit 7. Indeed, without this level of temporal resolution it would be very difficult to adequately test ideas about Keatley Creek origins and whether cultural adaptations were static or dynamic through time. With the new Housepit 7 timeline, however, models that seek to address these issues can now be more rigorously tested with a variety of archaeological data, including lithics.

### **THESIS OUTLINE**

This thesis is arranged in the following manner. Chapter 2, Research Background, provides a setting by which the research problem may be considered. Chapter 3, Research Methods, outlines in detail the theoretical models to be tested by the lithic analyses of this study. A discussion of radiocarbon dating at Housepit 7 follows, along with the analytical and quantification methods utilized in this research. Chapter 4, Results, presents the outcome of each analysis, and Chapter 5, Discussion, describes the determination of the supported model and addresses analysis implications within that model. Chapter 6, Conclusions, summarizes and discusses the significance of the study.

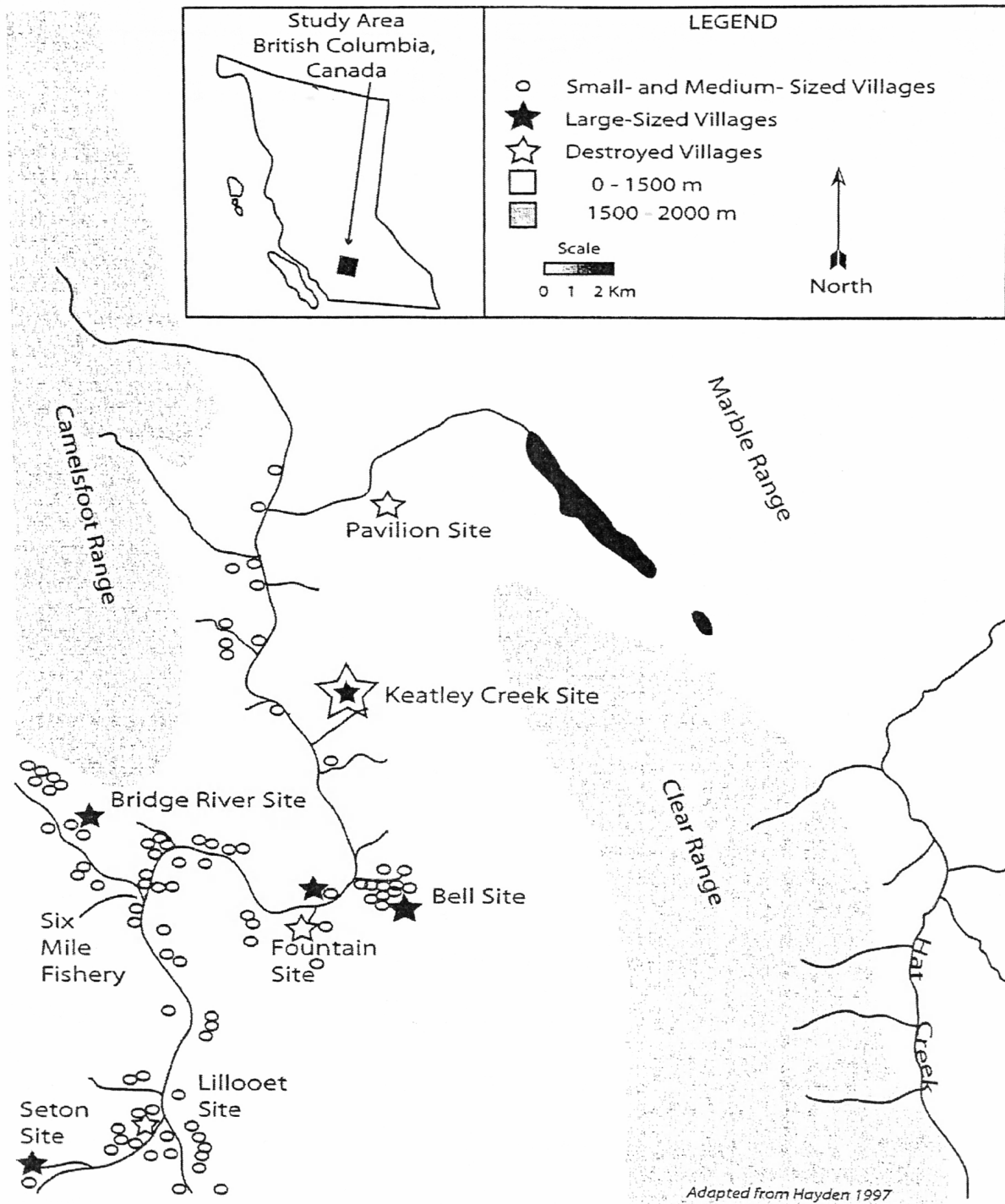
## ***CHAPTER TWO: RESEARCH BACKGROUND***

This chapter provides a backdrop for the analyses conducted and conclusions arrived at during the course of this thesis research. It includes overviews of the Keatley Creek site setting; a brief review of the Plateau paleoenvironmental record; a discussion of Mid-Fraser cultural chronology; and a description of housepit formation processes with a particular focus on Housepit 7.

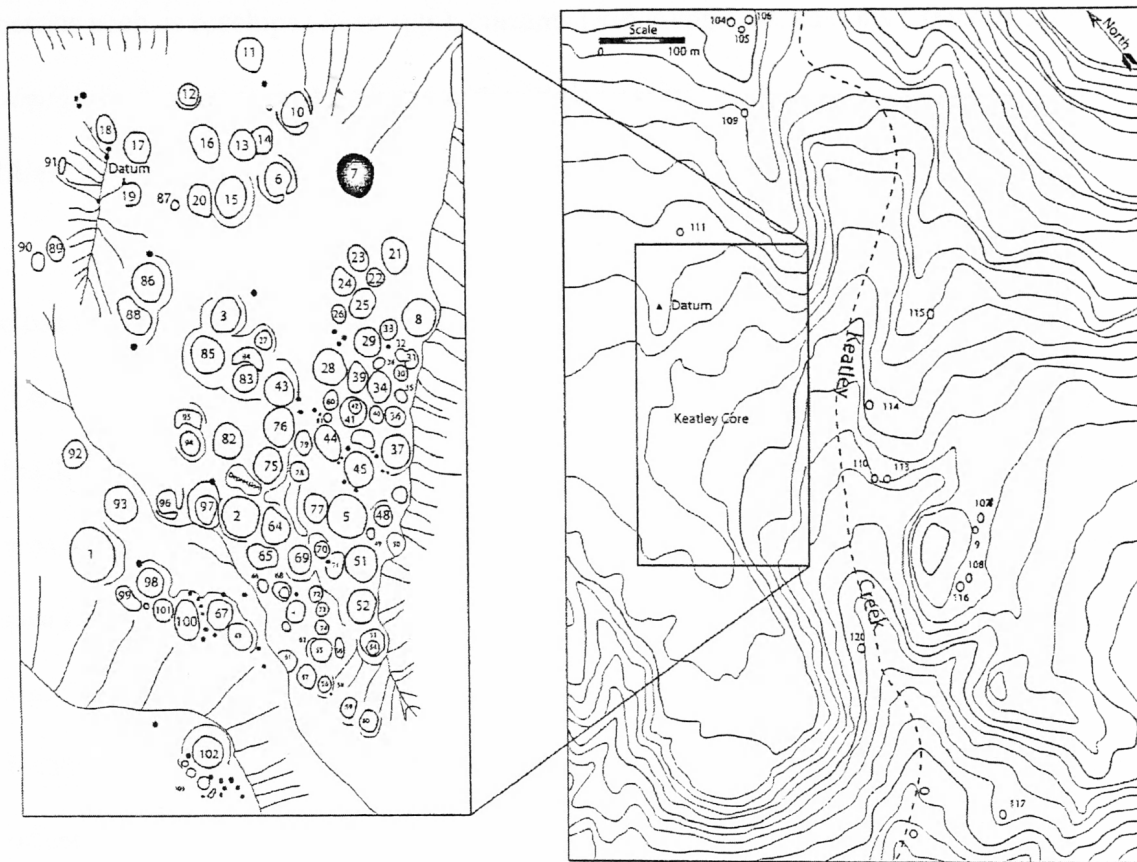
### **SITE SETTING**

The Keatley Creek site is located in the Mid-Fraser area of the Canadian Plateau. Kroeber (1939:55) describes the Fraser area, which occurs within what he termed the “Columbia-Fraser Plateau”, as being dry when compared to the Columbia Plateau to the south and having patchy forests mixed with steppe. This description only hints at the climatic, environmental, and topographic diversity of the Canadian Plateau, all of which had profound influence on the human populations that lived there (Nelson 1973; Chatters 1998). This section describes the setting of the Keatley Creek site, and also reviews the paleoenvironmental record of the Plateau area.

The Keatley Creek site is located approximately 25 kilometers upstream from the modern town of Lillooet in the British Columbia interior, and consists of a total of 119 housepit depressions (Figures 2-1 and 2-2) (Lepofsky et al. 1996). The site sits at the upper end of a gently sloping terrace roughly 370 meters above, and 1.5 kilometers from, the Fraser River. The site is bounded by the steep Clear Range to the east and the Camelsfoot Range to the west (Lepofsky et al. 1996; Ryder 1978). River terraces, such as the one on which the Keatley Creek site sits, are common topographical features in the area, and are typically dissected by ravines or broken by scarp slopes (Ryder 1978).



**Figure 2-1. Map showing location of Keatley Creek site and other large housepit villages in the Mid-Fraser area of British Columbia (from Prentiss et al. 2003b, adapted from Hayden 1997).**



**Figure 2-2. Map of Keatley Creek site village core area and local topography (from Prentiss et al. 2003b, adapted from Hayden 1997).**

These landforms were produced through glacial and post-glacial processes such as slope-wash and debris flow, and the glacier-shaped landscape at the Keatley Creek site has remained largely unchanged since its initial occupation (Friele 2000).

Site vegetation consists of various grasses and big sagebrush (*Artemisia menziesii*). Overstory on adjacent slopes is composed chiefly of Ponderosa pine (*Pinus Ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) (Lepofsky et al. 1996). Vegetation in and around the Keatley Creek site reflects the typical gradation of biogeoclimatic zones in the area, which begins with the Ponderosa Pine and Douglas fir Zones at lower elevations and terminates at the sub-alpine and alpine vegetation zones (Lepofsky et al. 1996). Available plant food resources are as diverse as the ecological zones, and include

berries such as rosehips (*Rosa* spp.), currants (*Ribes* spp.), saskatoons (*Amelanchier alnifolia*), root crops such as balsamroot (*Balsamorhiza sagittata*), and several types of lilies (Lepofsky et al. 1996).

Besides plant foods, a number of riverine and terrestrial species could be procured close to the site. These include, but are not limited to, salmon (*Oncorhynchus* spp.), deer (*Odocoileus* spp.), bighorn sheep (*Ovis Canadensis*), moose (*Alces alces*), rabbit (*Lepus*), black bear (*Ursus americanus*), and several species of game birds. Elk once roamed the area but disappeared by 1850, and caribou may have also been present in the more distant past (Alexander 1992). Overall, the Keatley Creek site setting was ideal for accessing a variety of riverine, faunal, and plant subsistence resources. The topography of the location was also ideal, as it likely provided protection against brutal winter weather and offered a reliable source of water in Keatley Creek itself (Friele 2000).

### **PLATEAU PALEOENVIRONMENTAL RECORD**

Just as the landscape, flora, and fauna are dynamic around the Keatley Creek site, so is the paleoenvironmental record of the Plateau region. While climates went through constant change, Chatters (1998) has noted that pronounced shifts in environmental conditions occurred at approximately 9500-9000 B.P.; 6500-6300 B.P.; 4500 B.P.; and 2800-2000 B.P. It should be noted that Chatters' (1998) and Chatters and Pokotylo's (1998) environmental records of the greater Plateau area are utilized in this summary, since none have been compiled to date that are specific to the Keatley Creek site locale.

#### **11000 to 9500 B.P.**

This early Holocene period was marked by a dry, warm climate, as suggested by fossil wood and pollen counts that indicate higher timberlines and summertime

temperatures (Chatters 1998). Forests largely comprised of Douglas fir were restricted to higher elevations, while grasses and other plants common to steppe-like environments populated lower elevations. The faunal record is indicative of the dominant steppe environment, and comprised elk, bison, deer, mountain sheep and pronghorn (Chatters 1998). Limited evidence suggests that at least some anadromous fish runs may have occurred in the Fraser River at this time. Geologically, the mid to latter portion of this period witnessed the Fraser River continually cutting through a massive amount of sediment and gravel previously deposited by glaciers, which had filled the Fraser Valley to a depth of 300 meters or more (Chatters 1998; Hayden 1997).

#### **9500 to 6400 B.P.**

During the period of 9500 to 6400 B.P., the northern reaches of the Plateau experienced the expansion downward of lower elevation forests (Chatters 1998). Evidence from the northern and southern Plateau indicates a shift from continental to maritime climate patterns during this period (Chatters 1998). After 8000 B.P. conditions generally became drier, although there are indications for a few short, wet periods. This interval saw an increase in the frequency of cedar and a decrease in Douglas fir in the forests of the Fraser Canyon (Chatters 1998). The climate was beneficial for the growth of root crops such as balsam root, biscuitroot, and camas (Chatters and Pokotylo 1998). In terms of fauna, ungulate populations appear to have increased, particularly deer (Chatters 1998).

#### **6400 to 4500 B.P.**

A general cooling characterized this middle Holocene period, as forests moved lower in elevation and their grass understory all but vanished (Chatters 1998). In



conjunction with this cooler climate, moisture increased once again between 5400 and 5000 B.P., which spelled an end to more open forests and grasslands on the northern Plateau (Chatters 1998). While conditions at the beginning of the period were less than ideal for anadromous fish productivity, there are indications that the situation improved near its end on the Fraser, as slightly cooler water and a later freshet allowed salmon runs to develop. Nevertheless, evidence for the intensive use of salmon and their storage is lacking (Chatters and Pokotylo 1998).

#### **4500 to 2800 B.P.**

During the initial portion of this period, a rapid shift to cooler temperatures occurred in tandem with higher levels of moisture. The Douglas fir forests responded by expanding to their greatest extent on the northern Plateau (Chatters 1998). Cold summer and winter temperatures resulted in low environmental productivity, which caused a decline in deer and elk populations. However, mountain sheep, mountain goats, and caribou populations may have prospered under the conditions and counteracted diminished deer and elk numbers (Chatters 1998). Also, the northern Plateau climate of this period appeared to have resulted in water conditions conducive to highly productive but succinct salmon runs (Chatters 1998).

#### **After 2800 B.P.**

The early part of this period was distinguished by a general warming trend and a decrease in moisture. Contemporary vegetation patterns emerged and grasses made their way onto dry slopes (Chatters 1998). Forests began to open up again, and subalpine biotic zones climbed in elevation (Chatters and Pokotylo 1998). Open forests and their attendant larger edge areas, coupled with a warmer, more productive climate, benefited a

variety of animal species and increased their populations (Chatters 1998). In addition, warm, dry conditions resulted in elevated fire frequencies on the Plateau between 2400 and 1300 B.P., which also created favorable conditions for game (Hallett et al. 2003; Chatters 1998). According to Hayden (2000a), the initial aggregation of the Keatley Creek site likely occurred at the beginning of this time period.

For the last 2,000 years on the Plateau, there are relatively few indications of a major climate change (Chatters 1998; Chatters and Pokotylo 1998). However, subtle changes occurred, and their effects on the environment of the Plateau region can be discerned. The Little Climatic Optimum increased worldwide temperatures between 1400 and 700 B.P., and drought conditions prevailed, as attested by the increase in fire frequencies across the Plateau between 900 and 700 B.P. (Hallett et al. 2003). Increased flooding events on the Columbia River between 1000 and 700 B.P. also document a decrease in vegetation cover and warmer winters (Chatters 1998). Another climatic shift, known as the Little Ice Age, took place between 600 and 100 B.P., and caused the advancement of high mountain glaciers world-wide (Chatters 1998). However, due to insufficient research there is little direct evidence of this climate shift on the Canadian Plateau.

### **CULTURAL CHRONOLOGY**

The cultural chronology of the Canadian Plateau is pertinent to this research. While a complete chronology is presented from 12000 to 200 B.P., the greatest emphasis is given to the Late Period (3500 to 200 B.P.) and its various horizons since these are the periods that are directly germane to this study. In addition, the focus of the chronology is on the Mid-Fraser division of the Canadian Plateau culture area because this is where the

Keatley Creek site is located. The lithic technological characteristics of each period, horizon, and phase are emphasized since lithics are the subject of this thesis research.

### **CANADIAN PLATEAU CULTURE AREA**

The Canadian Plateau culture area is located almost wholly within the confines of British Columbia, Canada. It is bounded on the west by the Coast Range and on the east by the Cariboo and Columbia Mountains. Its northern termination lies at approximately 53° 30' North latitude, and the bulk of the area occurs within the Fraser River drainage (Pokotylo and Mitchell 1998; Richards and Rousseau 1987). The region has an approximate area of 232,500 square kilometers (Richards and Rousseau 1987). The Canadian Plateau culture area is divided into numerous smaller regions and includes the Mid-Fraser River area, the primary interest of this study.

Specific environmental, topographical, and paleoenvironmental characteristics of the Mid-Fraser region have been addressed in the preceding sections of this chapter. Suffice it to say that the Mid-Fraser area can be defined as being located between the Camelsfoot Range on the west and the Clear Range to the east. It covers Fraser Valley lands between Big Bar and Lytton, British Columbia (Prentiss et al. 2000).

### **MID-FRASER CULTURAL CHRONOLOGY**

The Mid-Fraser cultural chronology relies heavily on syntheses provided by Pokotylo and Mitchell (1998), Stryd and Rousseau (1996), and Richards and Rousseau (1987). The major defining characteristics of each period, phase, and horizon are briefly discussed, followed by their manifestations at the Keatley Creek site.

## **EARLY PERIOD: 11000 TO 7000 B.P.**

Few Early Period archaeological sites have been identified on the Plateau, despite the fact that the area was ice-free and presumably able to support human populations after 11000 B.P. (Pokotylo and Mitchell 1998). While isolated projectile points appearing to be from the Plano, Western Fluted Point, Early Stemmed Point, and other traditions have been identified on the Plateau, none have been found within dated deposits (Rousseau 1993; Pokotylo and Mitchell 1998). As such, considerable debate surrounds the interpretation of what their presence on the Plateau may actually represent.

Despite the limited Early Period archaeological record, some data from this period are available from the Gore Creek “burial” site (Fladmark 1982; Pokotylo and Mitchell 1998). Identified near the town of Kamloops in the South Thompson River Valley beneath layers of silt and volcanic tephra, the burial consists of the postcranial remains of a young adult male that are thought to come to rest as a result of accidental burial by a flash flood or mudflow (Fladmark 1982; Pokotylo and Mitchell 1998). No artifacts were identified with the remains, but radiocarbon dating of the tephra layers above the remains gave a date of roughly 8500 B.P. Stable carbon isotope analysis of the skeletal remains is suggestive of a diet low in salmon and fairly rich in terrestrial resources (Fladmark 1982; Pokotylo and Mitchell 1998). If such a diet is representative of Early Period populations in general, locations of Early Period sites may well be in highland areas where access to game such as deer and sheep would have been readily available (Prentiss et al. 1999). The intense focus of archaeologists on housepits within the river valleys and drainage bottoms of the Mid-Fraser may partially explain the limited information about the Early

Period (Pokotylo and Mitchell 1998). As for the Keatley Creek site, evidence from the Early Period has yet to be identified.

### **MIDDLE PERIOD: 7000 TO 3500 B.P.**

The Middle Period begins at approximately 7000 B.P. and ends at 3500 B.P. After 4500 B.P., the interval was characterized by cooler, wetter conditions in the Mid-Fraser area (Pokotylo and Mitchell 1998; Stryd and Rousseau 1996). This period is divided into the Nesikep Tradition, which in turn is broken down into the Early Nesikep and Lehman Phases. The closing portion of the period is comprised of the Lochnore Phase (Pokotylo and Mitchell 1998).

#### **Nesikep Tradition: 7000 to 4500 B.P.**

The Nesikep Tradition acquired its name from the Nesikep Creek site where it was first recognized (Sanger 1969:197). The Nesikep Tradition is regarded as a hunting oriented culture that may have been made up of a mix of earlier traditions from the region as climatic conditions began to cool and become wetter (Stryd and Rousseau 1996). In addition to the extensive use of larger ungulates such as deer and elk, Nesikep peoples subsisted on rodents, vegetable foods, salmon, steelhead trout, and mollusks (Pokotylo and Mitchell 1998; Sanger 1969). The Nesikep Tradition is divided into two cultural phases, the Early Nesikep and Lehman (Pokotylo and Mitchell 1998).

#### **Early Nesikep Phase: 7000 to 6000 B.P.**

A total of four sites in the Mid-Fraser and Thompson River valleys contain Early Nesikep Phase components, including the Nesikep Creek site (EdRk 4), Lehman site (EdRk 8), Rattlesnake Hill site (EeRh 61), and Fountain site (EdRl 19) (Pokotylo and Mitchell 1998). The tradition is represented by thin lanceolate, corner-notched, and

barbed projectile points (Stryd and Rousseau 1996). Early Nesikep points are distinct, and distinguished by their V-shaped corner notches, straight or convex basal margins, basal thinning, and basal edge grinding (Pokotylo and Mitchell 1998). Other artifacts commonly identified in Early Nesikep components include formed unifaces, small oval formed unifaces, microblades and wedge-shaped microblade cores, antler wedges, ground rodent incisors, and bone points and needles (Pokotylo and Mitchell 1998; Stryd and Rousseau 1996). In terms of subsistence, Early Nesikep peoples focused largely on deer and elk, although salmon, steelhead trout, birds, and freshwater mollusks were also utilized (Pokotylo and Mitchell 1998). There is no evidence to suggest the intensive use of salmon during Early Nesikep Phase times.

**Lehman Phase: 6000 to 4500 B.P.**

As with the Early Nesikep Phase, four sites in the Fraser, Thompson and Highland valleys have major Lehman Phase components, which include the Lehman site, Rattlesnake Hill site, Oregon Jack Creek site (EdRi 6), and EdQx 42 (Pokotylo and Mitchell 1998). Key artifacts exclusive to this phase are the pentagon-shaped, obliquely V-shaped corner and side-notched Lehman projectile points and lanceolate knives that exhibit straight bases with some cortex (Pokotylo and Mitchell 1998; Stryd and Rousseau 1996). Lehman Phase deposits differ markedly from Early Nesikep components by the absence of microblade technology. The Lehman Phase lithic assemblage also contains leaf-shaped knives, thin circular scrapers, and horseshoe-shaped convex end scrapers. There is also a high incidence of fine to medium grained basalt raw materials in Lehman Phase components (Pokotylo and Mitchell 1998). Although a few Lehman artifacts are

unique, many are similar to the Early Nesikep Phase suggesting to some researchers that the former grew out of the latter (Pokotylo and Mitchell 1998; Stryd and Rousseau 1996).

For subsistence, Lehman peoples hunted deer and elk but also intensively utilized freshwater mollusks (Pokotylo and Mitchell 1998). Salmon, bird, rabbit, and small rodents were also consumed. While reliance on anadromous fish may indeed have been greater during Lehman times when compared to the Early Nesikep Phase, there continues to be little evidence of intensified use of salmon (Pokotylo and Mitchell 1998).

At the Keatley Creek site, two examples of Lehman Phase artifacts have been identified, which include two Lehman point fragments. One was recovered from under the rim of Housepit 5 and the other from under the southwest living floor of Housepit 7 (Hayden 2000a).

#### **Lochnore Phase: 5500 to 3500 B.P.**

The early portion of the Lochnore Phase overlaps with the Lehman Phase by approximately 1,000 years, indicating that two different types of adaptive patterns were at work on the Plateau at the same time and place (Pokotylo and Mitchell 1998). Suggestions as to what this overlap indicates vary, and range from the idea that Lehman groups were absorbed into Lochnore (eventually resulting in the initiation of the Plateau Pithouse Tradition), to a relationship between Lochnore and the Northwest Coast Old Cordilleran Phase (Richards and Rousseau 1987; Sanger 1969). Others maintain that Lochnore represents the final phase of the Nesikep Tradition, and see no ancestral relationship to the later Shuswap Horizon (Prentiss and Chatters 2003; Prentiss and Kuijt 2004). As in the case of the Lehman-Lochnore overlap, debate also surrounds the interpretation of the lifeways and subsistence strategies of the Lochnore Phase itself.

Stryd and Rousseau (1996) maintained that Lochnore is indicative of a river and forest adaptation which resulted from the movement of Salishan speaking peoples up the Fraser River corridor to the Northern Plateau from the coast. It has further been suggested that this migration was in response to cooler, wetter conditions and greater abundance of salmon spurred by the Neoglacial climate shift (Pokotylo and Mitchell 1998). Whatever prompted the migration, Stryd and Rousseau (1996) and Pokotylo and Mitchell (1998) believed Lochnore Phase people were foragers employing immediate-return consumption tactics. Lochnore foragers accessed resources via frequent residential moves and many did not utilize pithouses as residences. At the same time, there are indications at the Baker site that pithouses and some level of storage were utilized (Pokotylo and Mitchell 1998). As might be expected, resources exploited by these Lochnore foragers were broad, and included deer, elk, beaver, snowshoe hare, turtle, duck, goose, salmon, and freshwater mussel (Pokotylo and Mitchell 1998).

In contrast to the Lochnore forager idea, Hayden (2000a) has argued that this phase represents the first successful mass harvesting of salmon coupled with the use of storage technology. This initial pattern, once further developed, would provide the foundation for the Late Period Plateau Pithouse Tradition. Hayden saw supporting evidence in the Lochnore housepits at the Baker site and two burials identified near Clinton, located upstream from the Keatley Creek site. While admitting that it is currently impossible to say for certain whether the burials are Lochnore or Lehman in origin, Hayden (2000a) thought they were indeed Lochnore. Carbon isotope analysis of the remains revealed a diet in which 40% of the individuals' protein came from salmon.



Lithic technologies characteristic of the Lochnore Phase include Lochnore side-notched points, microblades, macroblades, concave-edged endscrapers, leaf-shaped points, oval bifaces, oval scrapers, end and side scrapers, flake scrapers, edge-battered pebbles, unifacial pebble choppers, notched pebbles, and leaf-shaped elliptical knives. The use of nonvitreous basalts and denticulate edge retouch was common (Pokotylo and Mitchell 1998). At the Keatley Creek site, evidence for this phase is represented by the recovery of Lochnore point fragments in redeposited contexts of Housepit 5 and under the southwest portion of the floor of Housepit 7 (Hayden 2000a). More recent excavations by the University of Montana have identified Lochnore points under the northwest rim of Housepit 7 (Prentiss et al. 2000).

#### **LATE PERIOD: 3500 TO 200 B.P.**

The Late Period is divided into three cultural horizons: the Shuswap, Plateau, and Kamloops (Richards and Rousseau 1987). According to Richards and Rousseau (1987), these three horizons compose the Plateau Pithouse Tradition, which is characterized by semi-sedentary, hunter-gatherer, logistically organized populations who were focused to a great extent on salmon and also utilized pithouses. Hayden (1997, 2000a) believes that the strong reliance on salmon and storage exhibited during Late Period horizons likely built upon the pattern initiated during Lochnore times, which eventually resulted in the construction of large pithouses, the formation of residential corporate groups during late Shuswap times, and the significant socioeconomic complexity observed at Keatley Creek.

As with many issues in Plateau archaeology, opinions vary about the impetus behind changes in the patterns observed during the Plateau Pithouse Tradition. One view argues that the Plateau Pithouse Tradition developed as a response to the cooler, wetter

conditions of the Neoglacial maximum (Pokotylo and Mitchell 1998). This shift in climate resulted in a reduction in ungulate populations but at the same time fostered an increase in the availability of salmon. This, in turn, triggered an adaptive response in Late Period cultures that focused their energy on more readily-available marine resources like salmon (Kuijt 1989). Alternatively, Prentiss and Chatters (2003) argue that the Plateau Pithouse Tradition adaptive response was not unique to the Mid-Fraser area but occurred throughout the Pacific Northwest. This “collector” system (see Binford 1980) may have been one of many adaptive patterns present at a given time, but it proved to be the most successful under the climate conditions of the Neoglacial maximum (Prentiss and Chatters 2003).

#### **Shuswap Horizon: 3500 to 2400 B.P.**

The first cultural horizon of the Late Period and the Plateau Pithouse Tradition is the Shuswap Horizon, beginning at 3500 B.P. and lasting until 2400 B.P. (Richards and Rousseau 1987). As previously described, the Shuswap Horizon represents a collector type adaptation that came about under cooler, moister conditions. It signifies the first regular, widespread use of semi-subterranean winter pithouses on the Canadian Plateau (Richards and Rousseau 1987). Shuswap houses are described as being relatively large, averaging 10.7 meters in diameter with a maximum diameter up to 16 meters (Richards and Rousseau 1987). Houses are circular to oval in plan, and usually have no rim deposits. They are typically flat-bottomed with rectangular-shaped floors, and commonly have hearths, some internal storage, and cooking pits associated with them (Richards and Rousseau 1987). The lack of rim accumulations suggests short-term occupations or the lack of reoccupation (Prentiss et al. 2004). Postholes suggest the presence of internal

support superstructures, although just how substantial these were depended on the mass of the roof, which appears to have varied during Shuswap times (Richards and Rousseau 1987).

Shuswap peoples utilized elk, deer, mountain sheep, black bear, numerous species of small mammals, fresh water mussels, salmon, trout, and various species of birds, but did not rely on plant resources to any great extent (Richards and Rousseau 1987). It is difficult to say how important specific species were to the diet, but studies of human bone have indicated a fairly strong focus on anadromous fish (Prentiss et al. 2004). Richards and Rousseau (1987) proposed that, based on the lack of Shuswap components identified in highland areas, subsistence probably centered on the utilization of resources in lowland areas close to base camps. These base camps were likely moved on a frequent basis in order to access a broad spectrum of resources, as is indicated by the limited evidence for storage and the lack of rim deposits at Shuswap housepits (Prentiss et al. 2004).

When compared to later horizons, Shuswap technology is somewhat simplified in terms of “composition, workmanship, and technological sophistication” (Richards and Rousseau 1987:27). This, however, may have more to do with the tendency to procure and utilize local, poor-quality lithic raw materials than any lack of ability to produce more refined tools. Shuswap projectile points exhibit considerable morphological variation, but in general are lanceolate and/or triangular in shape. Their length and width may be indicative of their use on thrusting spears or atlatl darts (Richards and Rousseau 1987). Other artifact types identified in Shuswap deposits include key-shaped unifaces and bifaces, small endscrapers, split cobble tools, and numerous unifacial and bifacial flakes (Richards and Rousseau 1987). With the exception of projectile points, Shuswap

chipped-stone tools occur in low frequencies. Microblades and ground stone artifacts are present but relatively uncommon (Richards and Rousseau 1987).

At Keatley Creek, Hayden (2000a) saw the Shuswap Horizon as marking the beginning of socioeconomic complexity, complete with: 1) the full occupation of the Keatley core area, 2) the founding of residential corporate groups that would eventually own and control prime fishing and other resource acquisition locales, 3) long-distance trade, and 4) a strong emphasis on the use and storage of salmon. The possible Lochnore housepits of the Baker site and the Clinton burials were the foundation for the emergence of large aggregated villages during Shuswap times (Hayden 2000a). Shuswap points identified at the base of undisturbed rim deposits from large houses are cited as supporting evidence (Hayden 2000a). Also, because these rim deposits show no indication of disturbance or redeposition, house size during Shuswap times is the same as that observed during later horizons (Hayden 2000a). Unchanging lithic procurement patterns and prestige items that may indicate inequality and long-distance trade with the southern Northwest Coast also represent the beginning of Hayden's big-village pattern, which is characterized by unusually large residential housepit structures and dense, aggregated villages (Hayden 1997; Richards and Rousseau 1987). However, there are some problems with the Shuswap evidence. For example, the housepits of the Baker site are somewhat anomalous compared to other Lochnore sites, and research of Shuswap households and burials offer little evidence for status inequality (Prentiss et al. 2004).

#### **Plateau Horizon: 2400 to 1200 B.P.**

The Plateau Horizon represents the second period of the Plateau Pithouse Tradition, and spans the period from approximately 2400 to 1200 B.P. (Richards and

Rousseau 1987). The beginning of the Plateau Horizon saw a shift from the cool and wet conditions of the Neoglacial (during Lochnore and Shuswap times) to warmer, drier conditions quite similar to those of the modern Plateau climate (Richards and Rousseau 1987; Chatters 1998). In physical form, Plateau housepits are circular to oval in plan, similar to those of the Shuswap Horizon, and tend to lack rim deposits. Central hearths, cooking and storage pits, steep walls, and flat floors all define the Plateau housepit (Richards and Rousseau 1987). Differing slightly from Shuswap times, postholes indicate the use of heavier timbers and a more robust superstructure for the dwelling, indicating heavy earthen roofs and an overall structure similar to historical descriptions (Teit 1900, 1906). While Plateau housepit clusters increased in size, the houses themselves seem to have decreased in size when compared to those of the Shuswap period (Richards and Rousseau 1987). Exceptions to this general rule of thumb are housepits at Keatley Creek, where, according to Hayden (2000a), large houses were occupied during the Plateau Horizon and some increased in size during this time period.

When it comes to Plateau subsistence, information is sparse. However, it is known that deer, elk, several species of small mammals, salmon, non-anadromous fish, fresh water mussels, birds, and an array of plant resources were consumed (Richards and Rousseau 1987). The importance of these resources varied temporally and spatially, but the overall approach to subsistence and settlement during the Plateau mesh well with Binford's (1980) collector strategy. A recent study of Housepit 7 faunal remains suggests the household had a salmon-focused diet during the Plateau Horizon (Burns 2004).

When compared to Shuswap chipped-stone artifacts, Plateau lithic technology shows a marked increase in craftsmanship, which may signify the extensive use of high

quality raw materials obtained from distant sources, likely through trade and exchange (Richards and Rousseau 1987). Projectile points are less variable in form, and are typically bilaterally-barbed with corner or basal notching (Richards and Rousseau 1987). Two size groups of points are representative of the Plateau Horizon, and presumably functioned in different ways. The larger ones are indicative of use on atlatl darts, and the smaller points, which appeared between 1700 and 1500 B.P., signify the use of bow and arrow technology (Richards and Rousseau 1987). The frequency of endscrapers and key-shaped unifaces and bifaces increases during the Plateau Horizon, although similar to Shuswap times, unformed unifacial and bifacial flake tools remain prominent (Richards and Rousseau 1987). Ground stone sculpture and tools are rare in most places during the Plateau, with the possible exception of the Mid-Fraser area by roughly 1900 B.P.

Hayden (2000a) noted that early evidence for socioeconomic complexity on the Plateau may be apparent during the Lochnore phase, but he maintained that it was certainly represented by late Shuswap times at Keatley Creek, and the pattern only became stronger during the Plateau Horizon. As previously discussed, the general decrease in housepit size observed during the Plateau at many locales is not apparent at Keatley, as the large dwellings were continuously occupied throughout the horizon. Hayden (2000a) also observed that the Keatley Creek village expanded to its greatest physical size and population during the Plateau, and smaller houses were added along the site's periphery suggesting a milieu of socioeconomically diverse households. A postulated increase in the frequency of prestige items indicates greater status inequality as well as increased trade with the coast. The analysis of human burials near Lillooet indicates a 60% protein contribution from salmon to the diet (Hayden 2000a). According

to Hayden (2000a), these various lines of evidence suggest the highest level of socioeconomic complexity yet observed during the prehistoric occupation of Keatley Creek.

Differing from Hayden's views are those of Richards and Rousseau (1987) and Fladmark (1982), who see social complexity and the big village pattern as emerging during the late Plateau Horizon. This view is based partly on Fladmark's (1982:131) plotting of Plateau radiocarbon dates, which indicated a "marked peak of cultural deposition about 1,000—1,500 B.P. in the interior, perhaps indicating some kind of climax in the number and size of pit-house settlements at this time." In testing Fladmark's ideas, Richards and Rousseau (1987) took it a step further by separating out Mid-Fraser dates from the rest of the Plateau interior, and found that they were indeed concentrated between 1000 and 1500 B.P.

#### **Kamloops Horizon: 1200 to 200 B.P.**

The Kamloops Horizon represents the final cultural horizon on the Canadian Plateau. During this time period, there was a continuation of the collector system, and a reliance on storage (noted for the Plateau Horizon), and an increase in salmon consumption. In these and other respects, the Kamloops Horizon gives a strong representation of Hayden's (2000a) Classic Lillooet period at Keatley Creek. Before addressing its manifestations at Keatley, some of the defining Kamloops characteristics should be discussed.

Large housepits continued to be used during Kamloops times, but they also tend to show significant variation in size (Pokotylo and Mitchell 1998; Richards and Rousseau 1987). Excavated Kamloops housepits range between 5 and 12 meters in diameter, and

may vary in shape from oval or circular to rectangular or square. They typically exhibit substantial rim deposits (Pokotylo and Mitchell 1998; Richards and Rousseau 1987). Posthole evidence and roof deposits indicate many Kamloops dwellings, particularly the rectangular and square-shaped ones, may have had lighter roofs and by extension more gracile superstructures (Richards and Rousseau 1987). However, the same is not indicated for round or circular housepits of the horizon. Cooking and storage pits are commonly found within Kamloops houses. Larger storage pits are also located outside houses and, when exclusively present, tend to occur in sites adjacent to water courses or standing bodies of water (Richards and Rousseau 1987).

As noted, a collector system was utilized for subsistence during Kamloops times, and salmon became increasingly important, contributing as much as 60% of protein to the diet (Richards and Rousseau 1987). Root crops were also gathered and hunting of small and big game was undertaken (Richards and Rousseau 1987). The latter endeavor was achieved primarily through a strong reliance on the bow and arrow, as indicated by the remains of such technology in Kamloops deposits.

The hallmark of the horizon's lithic technology is the small Kamloops side-notched projectile point. In addition to narrow side-notching, the points are triangular in shape, and have basal margins that ranged from convex to concave (Richards and Rousseau 1987). Points of similar morphology, but larger, indicate continued use of atlatl and/or thrusting spears (Hayden 2000a; Richards and Rousseau 1987). Other common lithic tools include pentagon-shaped bifaces and knives. Most formed tools exhibit good craftsmanship but are smaller in size when compared to their Plateau counterparts. Microblade technology is absent from Kamloops deposits. Ground stone



artifacts were produced from slate, nephrite, and steatite, and seem to become more common during this horizon (Richards and Rousseau 1987).

Hayden (2000a) has estimated that the Keatley Creek site was abandoned at approximately 1100 B.P., leaving only 100 years of occupation during the Kamloops Horizon. Others believe the site was abandoned later, at approximately 800 B.P. (Prentiss et al. 2003b). Lithic indicators of Keatley Kamloops occupation amount to only a few small multi-notch projectile points identified at the site's periphery and in a cache pit. Hayden (2000a) maintained that large houses retained their size as well as their social and economic status within the community during the Kamloops horizon while at the same time the frequency of smaller houses declined. Potential explanations range from decreased populations to socioeconomic factors to climatic influence, but Hayden (2000a) has also noted that the low frequency of small houses could simply be a result of the short duration of the Kamloops occupation at Keatley Creek. Once the site was abandoned, there is little to suggest pithouses at the core were reoccupied. However, use of houses at the site's margins did occur during historic times (200-50 B.P.), and evidence indicates minimal short-term camping within some of the housepit depressions (Hayden 2000a).

### **HOUSEPIT FORMATION PROCESSES**

This section discusses the formation processes involved in the construction of subterranean winter pithouses used at Keatley Creek. This consideration is essential in order to understand and interpret housepit deposits. In his ethnography of the Thompson and Lillooet Indians, Teit (1900, 1906) described in detail how pithouses were erected and maintained. These and other ethnographic accounts provide researchers with

valuable insights into the formation and character of housepits, and their component floor, roof, and rim deposits.

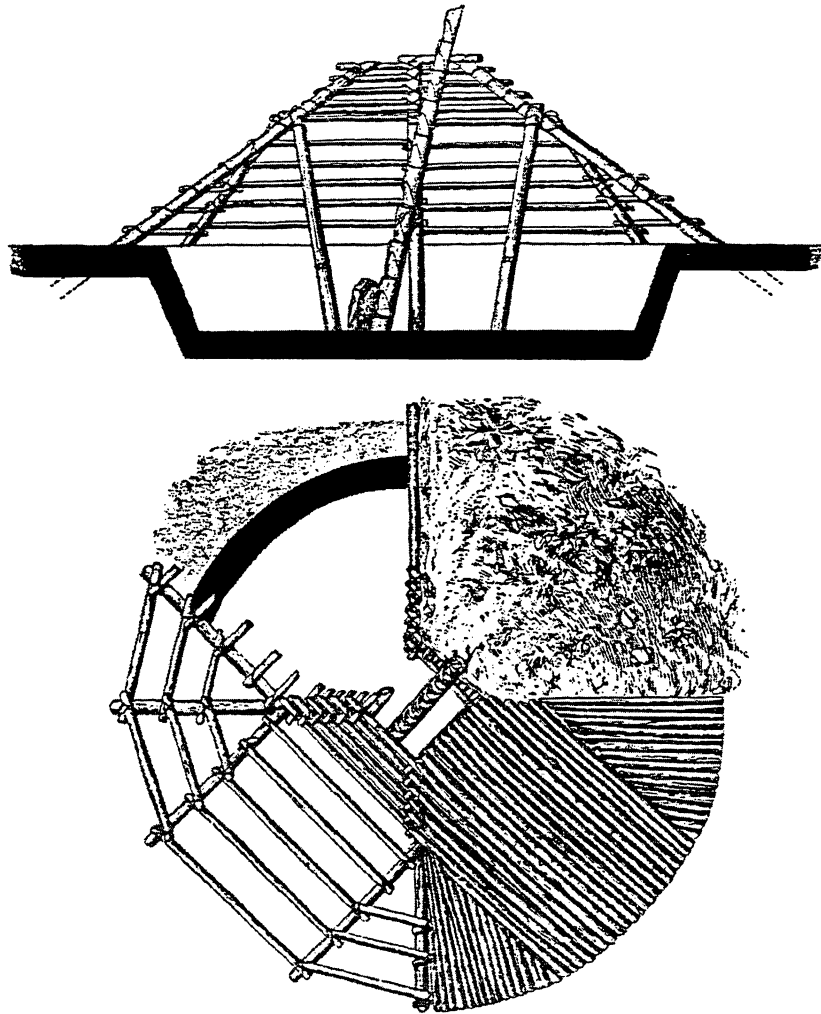
Construction of winter pithouses typically began with the excavation of a pit into loose soil. House size usually depended on the number of people that would be living within the structure once it was built (Teit 1900). The initial footprint of the pithouse was established through the use of two segments of bark rope knotted twenty to forty feet from one end. These would be laid across one another at right angles, the center point being determined by eye, and the center and end points of each rope were then marked with stakes (Teit 1900). A circle connecting the outer four stakes was sketched in the soil to form the outer boundary of the new pithouse, and actual excavation of the pit could then begin. Digging sticks and wooden scrapers were used for digging, and this work was typically the women's responsibility (Teit 1900). Soil was deposited into baskets, which was then dumped at close proximity to the pit for later use in covering the roof of the dwelling.

Once the pit had been excavated, the wood materials to be used in the frame and roof of the house were cut, usually with "wedges, hammers, and stone adzes" (Teit 1900:192), and transported to the house location. The length of heavy green timbers, used for the upright supports of the house, were dependent on the size of dwelling to be constructed, and was usually first determined by eye and then measured via bark ropes (Teit 1900). Smaller poles were employed to construct the roof. With the frame and roof materials at the house location, construction began by placing four large support timbers vertically (but at slight angles) within the excavated pit to a depth of roughly 15 inches (Teit 1900). These supports were notched at their tops so they could hold four main

rafters while the bottom ends were buried in the ground just outside of the excavated pit. These main rafters ran at an angle from the ground to the vertical supports, where they were attached to the latter with willow bark, and then continued beyond the supports for a short distance. The main rafters did not meet at the center so that a hole was left, which, after being framed by heavier timbers, provided light, access to the house, and a smokehole (Teit 1900). Additional side rafters were installed, which were buried in the ground at the outside edge of the pit and run at angles to meet the main rafters where the latter met the primary supports (Figure 2-3). With this superstructure in place, construction of the roof itself could begin.

Small poles were first tied horizontally to the main and side rafters, from the ground up to the entrance of the house (Teit 1900). A second layer of tightly spaced poles were added on top of and roughly perpendicular to the first supporting layer of poles, and ran from the ground to the entrance, main rafters, and side rafters (Teit 1900). To complete formal construction the entire roof was covered with pine needles, dry grasses, and soil, and a large notched log was placed through the opening in the roof in order to provide access to the house. Such houses were occupied during the winter months, from December until early March (Teit 1900), and lasted for roughly twenty years until wood rot or infestation by various pests necessitated abandonment or reconstruction (Alexander 2000).

If it was decided that a house was to be rebuilt in the same location, the old one was usually burned to the ground. Prior to burning, any materials that could be salvaged from the old house were removed (Alexander 2000). The dismantling and burning work was typically conducted in the spring, and upon return to the winter village in the fall, the



**Figure 2-3. Profile and plan-view of pithouse (adapted from Teit 1900).**

remains of the old pithouse were excavated from the original depression and deposited around its rim. The remains deposited around the edge of the pit consisted not only of the unsalvageable structural remains, but of floor sediments and detritus deposited onto the floor, as well as refuse dumped onto the roof during the previous occupation of the dwelling (Hayden 1997). A new frame and roof were then constructed, and the jumble of material deposited on the rim during clearing operations was either re-deposited on the new roof or remained in place on the rim (Hayden 1997). If a house was to be

permanently abandoned it was often left to decay, leaving behind a layer of collapsed roof material on top of the final floor. This pattern of occupation, deconstruction, reconstruction, and final abandonment of pithouses resulted in the formation of the numerous housepit rims that compose the Keatley Creek site today (Figure 2-4). While the record within these rims is exceedingly complex, it is one from which details about the past can be teased. By understanding housepit formation processes, the identification of floor, roof, and rim deposits of housepits becomes possible. This, in turn, has allowed researchers to address a host of issues surrounding prehistoric society and economy in the Mid-Fraser area of British Columbia.

Hayden (1997) was able to identify several relatively reliable markers of floor deposits in the housepits of Keatley Creek. In terms of sediments, floor strata are typically dark due to the presence of organics and trampled charcoal. They are usually composed of the same glacial till that underlies them. Silt present in floor deposits betrays their origin as it is similar to that found in the sterile till below. At the same time, when compared to roof deposits, floors have lesser amounts of gravel, suggesting the latter were being swept clear or that silt was entering the pithouse via wind or through the roof (Hayden 1997). Few charred remains have been identified within the postholes of floor deposits, indicating that the large support timbers were typically salvaged prior to burning the roof (Hayden 1997). At Keatley, the bulk of excavated housepits show a thin layer of charcoal over floor deposits, indicating that most of them had been burned rather than being left to decay and collapse upon abandonment (Hayden 1997). As for artifacts, relatively few prestige items and complete tools are identified in floor deposits. Of those that do remain, little weathering is evident due to their location within the house. The

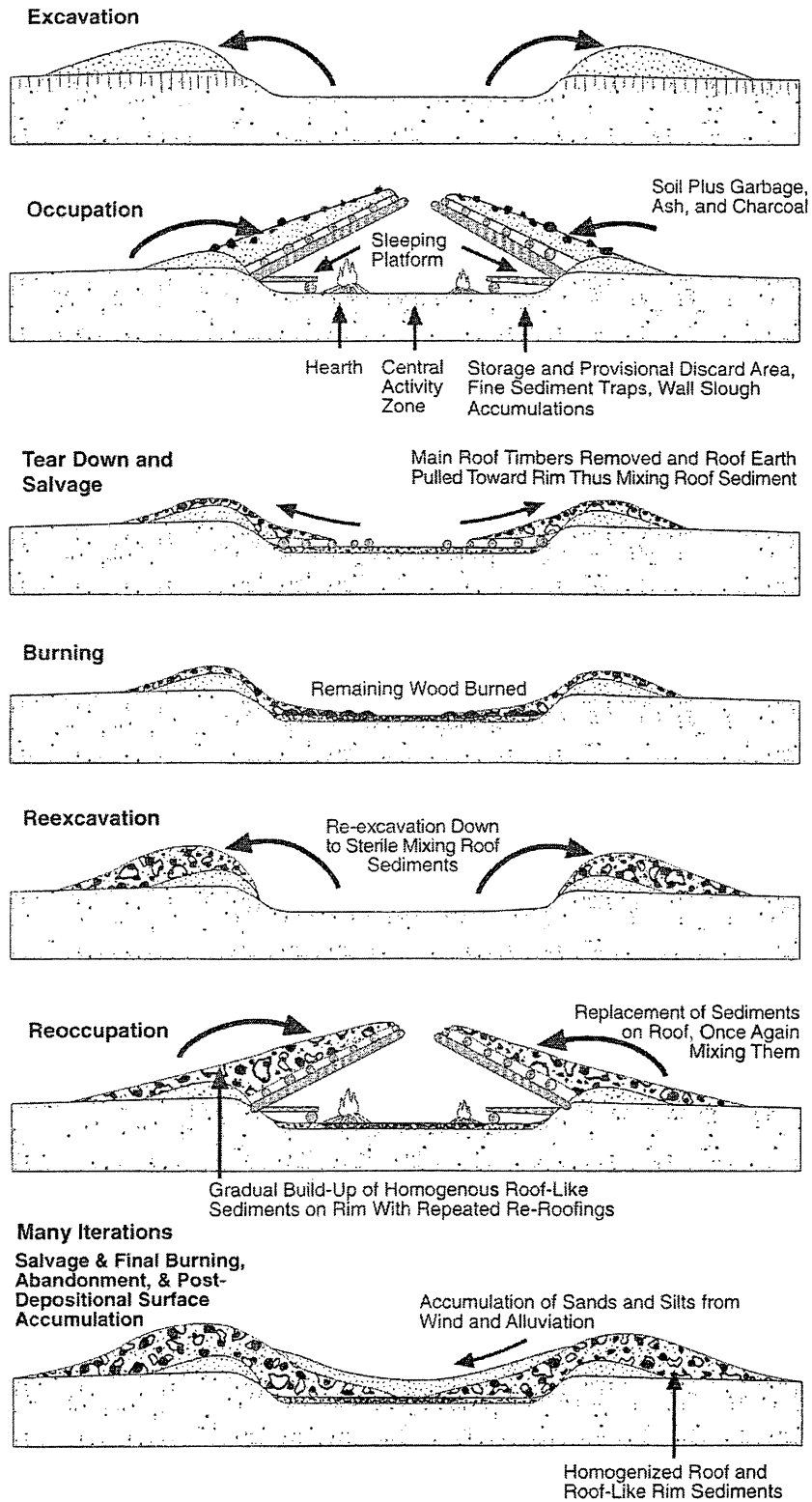


Figure 2-4. Housepit formation processes (from Hayden 1997).

scarcity of prestige items is thought to be due in part to their burial with high status individuals. However, the low frequency of complete artifacts in general, coupled with the pattern of burning that seems to have taken place, suggested to Hayden (1997) a systematic, unhurried abandonment of houses where important or valuable items and tools were retained by their occupants. Floor deposits at Keatley typically retain projectile points from the final occupation, indicating that floors from previous occupations were cleaned quite well and material was dumped on the pithouse rim (Hayden 1997).

In contrast to the low amount of gravel in floors, roof deposits are marked by high gravel content suggesting they are composed largely of the underlying glacial till (Hayden 1997). Sediments range in color from black to brown, which is attributed to the deposition of organic waste on the roof. Bone refuse and lithic debitage are also commonly present in roof deposits. The manner in which these materials came to rest on the roof was initially an open question. However a number of analyses of stone tools revealed that lithic materials were likely dumped directly onto the roof after a house cleaning or during pithouse reconstruction (Hayden 1997). Re-roofing activities also help to explain the uniform character of roof-like sediments. In addition to dumping and reconstruction events, analysis of lithic tools in roof deposits indicate that some specialized activities were carried out on the roof during the active life of the house (Hayden 1997). When considering organic and bone material, it is assumed that direct dumping and pithouse reconstruction processes resulted in their placement within roof deposits as well, although decay, bioturbation, reconstruction, and trampling have combined to reduce their overall frequency.

The rim deposits of small houses seem identical to roof deposits while those of large houses like Housepit 7 are somewhat different. Rim sediments contained specific, finite deposits of organic materials, till, charcoal, and gravel, suggesting dump events onto the rim during use and maintenance of the active pithouse (Hayden 1997). Lithic analyses have also identified specialized activity areas on some large housepit rims (Hayden 1997).

### **DESCRIPTION OF HOUSEPIT 7**

Housepit 7 at the Keatley Creek site is the data source for the lithic analyses conducted in this study. It is therefore worthwhile to first review the house's physical characteristics and briefly describe the previous excavations there. Of all the housepits excavated at Keatley Creek, Housepit 7 is the largest, and is located at the base of a low hill near the north-northeastern edge of the site (Figure 2-5). While its floor measures 12 meters in diameter the housepit as a whole measures 19 meters in diameter (MacDonald 2000; Hayden and Spafford 1993). Along with 23 other probable housepit structures, Housepit 7 was first tested via standardized trench in 1986 by Hayden (2000a). The results of this investigation indicated that Housepit 7 was a good candidate for further excavation, which was conducted during the following field seasons and resulted in the complete excavation of its final floor.

Testing and excavation of Housepit 7 suggested that it was first occupied during Shuswap times and continued to be used into the early Kamloops Horizon (Hayden and Spafford 1993). Based on the number of hearths and amount of fire cracked rock, lithic debitage, and artifacts associated with them, 30 to 45 people are estimated to have occupied the house. They were separated into approximately eight distinct domestic



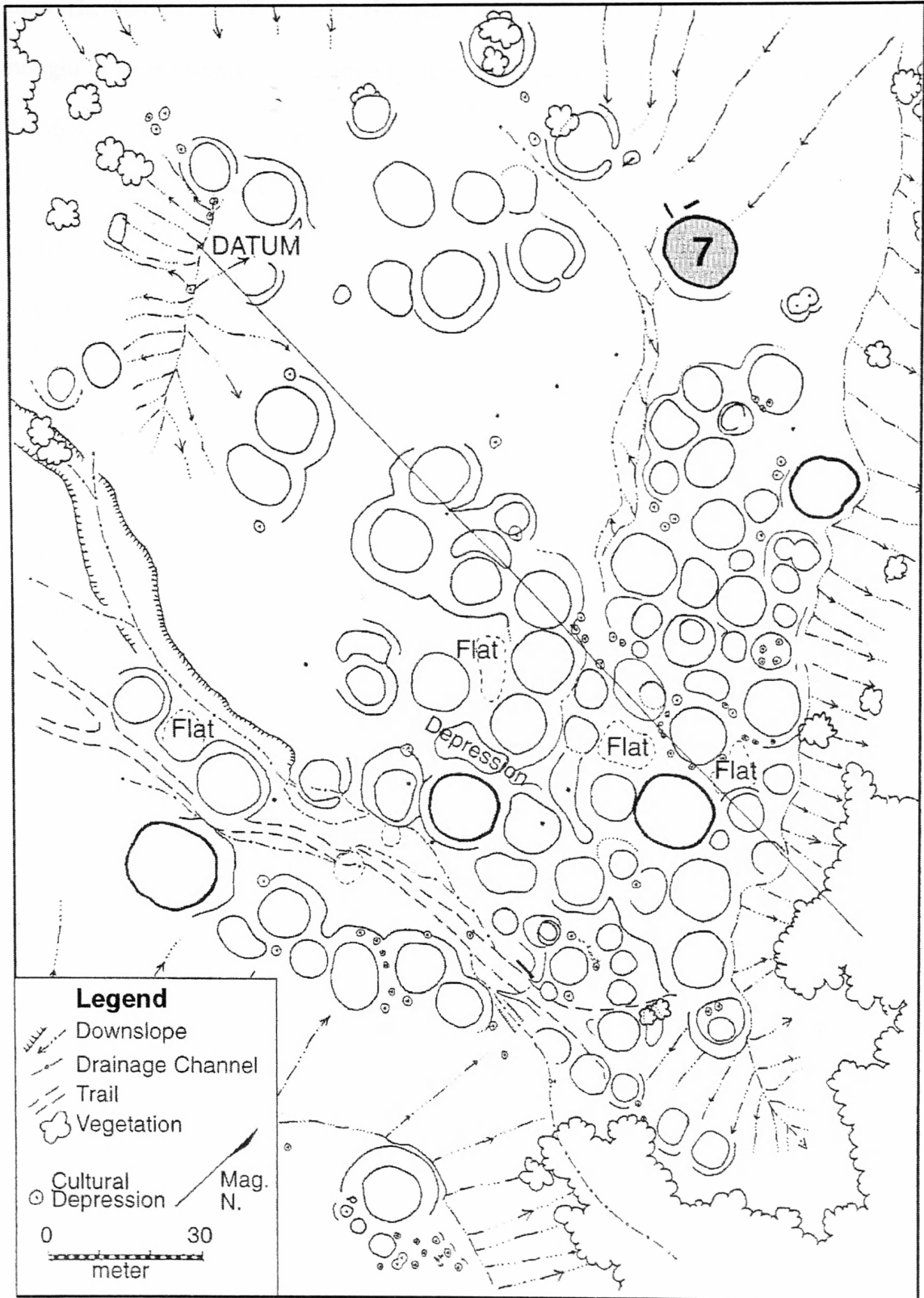


Figure 2-5. Map of the Keatley Creek site showing the location of Housepit 7 (adapted from Hayden 1997).

units (Hayden and Spafford 1993; Hayden et al. 1996c; Spafford 1991). The house is thought to have reached its maximum size at some point during the Plateau Horizon (Hayden and Spafford 1993).

The density and diversity of artifacts, botanical, and faunal remains recovered from Housepit 7 are significant, and far greater than what was observed in the smaller houses excavated at Keatley (Hayden and Spafford 1993). A wide array of prestige-associated artifacts were identified. The faunal remains indicated a stronger reliance on deer and sheep when compared to small housepits, and exotic species such as fox and lynx were also taken (Hayden and Spafford 1993). These characteristics suggest that the house had a high level of social and economic influence on the Keatley Creek village. In addition, studies of artifact distributions across the floor of Housepit 7 (Spafford 1991) indicate the presence of discrete domestic units that were likely hierarchically organized (Hayden and Spafford 1993).

Excavations of Housepit 7 by the University of Montana in 1999, 2001, and 2002 have led to a significantly different interpretation of the timing and manner in which socioeconomic complexity emerged along the Mid-Fraser and at the Keatley Creek site. These investigations focused on exploring smaller housepit (“sub-housepit”) floors in the northwestern portion of Housepit 7, the relationships between these and overlying strata, and dating issues (Prentiss et al. 2000, 2002, 2003a, 2003b). A detailed account of these excavations is provided in the following chapter since they provided the lithics data used in this thesis. As will be seen, the earlier work of Hayden and the more recent research carried out by the University of Montana provide the foundation for the lithic analyses and discussions conducted in this study.

## ***CHAPTER THREE: RESEARCH METHODS***

### **INTRODUCTION**

This chapter presents the methods used to analyze the lithic data from Housepit 7 of the Keatley Creek site. As stated in chapter 1, the primary goal of this work is to determine which of two models for the rise of socioeconomic complexity at Keatley Creek is best supported by rates of lithic use and discard at Housepit 7. A review of both models and their general implications opens this chapter, which is then followed by a brief description of the University of Montana's Housepit 7 excavations and radiocarbon data. Next, the methods used in the specific analyses of Housepit 7 lithic tools, raw materials, and prestige items are presented. Finally, a discussion of specific expectations for the results of each analysis under the two models brings the chapter to a close.

### **MODELS OF SOCIOECONOMIC COMPLEXITY**

Two models that attempt to account for the rise of socioeconomic complexity in the Lillooet area of British Columbia are to be tested in this thesis. The first model was developed by Brian Hayden (1997), and appeals to the proclivities of ambitious individuals in a context of abundant resources to explain the socioeconomic complexity of large housepit villages along the Mid-Fraser. Overall, it is a model of stability in the sense that complexity emerged, it remained fairly stable through time until village abandonment. A second, alternative model has been put forth by Prentiss and colleagues (Prentiss et al. 2002, 2003a, 2004). It relies on a new cultural chronology for the Keatley Creek site to build an evolutionary argument for the late and gradual arrival of socioeconomic complexity. Each model is reviewed below.

## **The Aggrandizer Model**

Hayden's research into Lillooet area of British Columbia initially began with the idea of answering a rather straightforward question: why were the villages of this region, along with some of their houses, so abnormally large (Hayden 1997; Hayden 2000a)? After years of investigation at the Keatley Creek site, finding a definitive answer to this inquiry proved more involved and difficult than originally anticipated. However, as ideas were developed to describe how a complex hunter-gatherer society arose at Keatley Creek, they eventually coalesced into a general model that describes large village development, socioeconomic complexity, and abandonment.

Hayden (1995, 1997) cites several characteristics of the complex hunter-gatherers that occupied Keatley Creek, which define the Classic Lillooet period. It consists of: 1) dense settlement, 2) a ranked society involving the use of prestige items and the display of status through grave goods, 3) involvement in extensive exchange networks, and 4) intensification of key resources, particularly salmon (Hayden 1995, 1997). He postulates that the predictable and abundant nature of salmon runs in the Fraser River around the Lillooet area provided conditions ideal for the development of the other elements of the Classic Lillooet period, and led to the rise of large villages and affiliated socioeconomic complexity (Hayden 1997).

Hayden and Ryder (1991) note that the precipitous, enclosed character of the Fraser River canyon just north of the Lillooet area translated to a prime setting for salmon procurement, drying, and preservation. Conditions were so perfect, salmon supplied as much as 70% of prehistoric dietary protein to groups living in the Lillooet area (Hayden and Ryder 1991). Because ideal conditions fostered such reliable and abundant runs of

protein-rich salmon, and technologies were in place to take advantage of them, surpluses began to accrue annually and some individuals saw opportunity among all the excess (Hayden 1997). Hayden refers to such people as “aggrandizers” and defines them as “ambitious, aggressive, accumulative, ‘triple-A’ personality types” (Hayden 1997:112). Inherently self-serving, aggrandizers desired prestige and power, and would have added to both by using surplus salmon derived from their control of the best fishing spots along the Mid-Fraser for their personal gain. These surpluses were employed to create contractual obligations or debt relations among those who did not have similar access to the resource, or to entice others to work, for them through promises of sharing in the spoils. This resulted in the procurement of even more excess salmon (Hayden 1997). Those aspiring individuals who were the most successful at building debt relations and a labor pool would see their wealth and prestige increase in-kind. As more and more people were lured into debt and work individual houses and villages as a whole would grow. Thus, success of individual households would vary, and result in a ranking system within the community (Hayden 1997).

Differences in house size, prestige item frequencies, and in the access to certain types of resources are a few of the key indicators that denote ranking and the status of households within a large pithouse village (Hayden 1997). Control was not limited to good fishing locations, but encompassed all manner of resources including lithic acquisition locales or quarries. When access to these controlled resources, particularly salmon, was threatened or completely extinguished the stability of the village as a whole was jeopardized (Hayden 1997). For Hayden and Ryder (1991), a major landslide that

blocked the Fraser River and its salmon runs was the cause of the abandonment of Keatley Creek and all large villages in the Lillooet area.

This account of Hayden's model describes the "how" and "why" of emerging complexity at Keatley, but not the "when". Based on excavations conducted at Housepit 7, Hayden (2000a, 2000b) posits that it was initially constructed around 2600 B.P. in late Shuswap times. The house reached its full size by 2160 B.P., and remained in use with little apparent change until a massive landslide in the Fraser River canyon at 1100 to 1000 B.P. forced the abandonment of most of the entire Keatley Creek village. The temporal dimension of Hayden's model is based on several radiocarbon dates obtained from the north rim of Housepit 7 and the identification of a series of Shuswap projectile points from the bases of rim deposits in large houses (Hayden 2000a, 2000b). The net result is the early establishment of a complex residential corporate group which remained intact and stable for some 1500 to 1600 years.

At its core, Hayden's model sees intensification of salmon and the use of surplus fish in inter-individual and inter-household status competition as the primary driver behind the emergence of the aggregated Keatley Creek village. Two broad implications for the archaeological record of Housepit 7 come to light under such a scenario. First, no matter what relevant lines of evidence are used, socioeconomic complexity should be indicated as emerging early in the housepit sequence. Second, once complexity was established, evidence should indicate stability in the system through time until abandonment of the house and village.

## **The Evolutionary Model**

Prentiss et al. (2002, 2003a, 2004) offer an alternative to Hayden's more established model. Their view sees the rise of aggregated villages and their attendant socioeconomic complexity as developing late in the Mid-Fraser area and at Keatley Creek. It depends upon evolutionary processes rather than the aggrandizing behavior of individuals as being the motivating energy behind the emergence of socioeconomic complexity (Prentiss et al. 2003b, 2004). The model is based on the assumption that change in one area of a cultural system results in change somewhere else. It also places changing environmental conditions front and center as being a major influence on the cultural evolutionary process.

From 3500 to 2400 B.P., human groups utilized a collector strategy that involved a high degree of logistical mobility, a small amount of storage, and short-term occupations of pithouses under cool and moist climatic conditions (Richards and Rousseau 1987; Chatters 1998). These conditions contrast with the warmer and drier environment that followed. Between approximately 2400 and 1400 B.P., increased fire frequency, accelerated rates of sedimentation, and changing vegetation patterns indicate a warmer and drier climate (Chatters 1998; Chatters and Pokotylo 1998; Hallett et al. 2003). Gradual warming and drying eventually produced drought conditions between 1800 and 1500 B.P. This drought increased production of terrestrial resources, but reduced access to salmon across the greater Plateau region. At the same time, the optimal conditions of the Fraser in the Lillooet area continued to support substantial populations of fish despite these adverse climate conditions (Prentiss et al. 2004). With growing populations and increasingly limited access to salmon, people were provided with

incentives to pack into locales like the Lillooet area where significant amounts of fish could still be easily obtained (Binford 2001; Prentiss et al. 2004). Once drought conditions hit at 1800 B.P., people became even more attached to these prime fishing locations and began to defend them against others. At the same time, logistical groups were sent out to collect additional resources (Prentiss et al. 2002, 2004).

While large groups living in distinct houses probably received the greatest benefit under these circumstances, considerable variation in group size was likely involved and dependent on prior social standing, family size, and other factors (Prentiss et al. 2004). During this time at Keatley, the egalitarianism that defined mobile hunter-gatherer cultural systems prior to populations packing into the Mid-Fraser likely held fast despite the advantages large households may have had in this new, more sedentary context. This model holds that there is little evidence to suggest socioeconomic complexity and inequality beyond differences in house size and lengths of occupations (Prentiss et al. 2004). By the end of this period, however, packing and resource intensification resulted in dense villages that may have exhibited subtle status differences among households. Nonetheless, these modest differences would have been accepted under previously established egalitarian regimes (Prentiss et al. 2004).

The period between 1400 to 1100 B.P. brackets a change to cooler, wetter climate conditions. A downturn in temperatures and an increase in moisture during this time resulted in conditions similar to what they were prior to the warm-up and drought of 2400 to 1400 B.P. (Prentiss et al. 2004). Terrestrial resources became less available but fish populations increased across the Plateau. Under these conditions motives for staying tied to prime fishing locations were eliminated, and people responded by dispersing from the



Mid-Fraser area. This is indicated by an increased frequency of housepits in other areas of the Plateau (Prentiss et al. 2004). Keatley Creek was not abandoned at this time, but reductions in housepit frequencies indicate that a smaller number of people appear to have lived there (Prentiss et al. 2003b). This model expects that patterns established prior to 1400 B.P. were maintained at the village through the cooler and wetter conditions of this period (Prentiss et al. 2004). The only hint of change is in the faunal remains that indicate a greater focus on mammalian resources (Burns 2004).

At the end of the cold and wet interval, drought conditions returned to the Plateau from 1100 to 700 B.P. With this second warming period and drought, conditions were set for a repeat of the patterns seen in the first dry period. People again packed into the Mid-Fraser as access to fish remained high but became restricted elsewhere on the Plateau (Prentiss et al. 2004). Access to terrestrial resources that profited from the drought, such as deer and various species of berries, improved again. Housepit frequencies drop throughout the Plateau until 700 B.P., and increase in the Mid-Fraser after 1000 B.P. until they too decline after 700 to 800 B.P. (Prentiss et al. 2004).

According to this model, socioeconomic complexity and inequality during this period reached the levels that Hayden (1997) argues were established between 2600 and 2160 B.P. This is supported by evidence for the intensive use of large and medium sized houses at Keatley Creek and the abandonment of smaller ones. Analyses of faunal remains indicate a shift from a focus on salmon to a stronger reliance on mammalian resources. Differences in the types of food remains and artifacts also appear during this drought period (Prentiss et al. 2004). As people packed into the Mid-Fraser for a second time, control for resources became very competitive due to territoriality and shortages of

local resources, including salmon. The events that led to scarce resources in the surrounding area were enhanced by technological innovations such as the bow and arrow, which allowed for more effective hunting (Prentiss et al. 2002).

With limited resources, the largest households would have had the greatest advantage and been the most successful just as they were during the first period of drought. However, unlike during the first packing event, status differentiation became prominent and large households were indeed ranked higher than others (Prentiss et al. 2004). What is critical under this model is that the patterns of complexity and inequality which arose during the second drought could not have been possible without the structure that was first established during the earlier drought (Prentiss et al. 2004). That is, the differences between households noted during the first dry spell allowed for the formation of a new pattern of social behavior under similar yet slightly different conditions, which was eventually characterized by a high level of competition and socioeconomic complexity (Prentiss et al. 2004).

As for reasons behind the final abandonment of Keatley Creek and the Mid-Fraser River in general at 800 B.P., the evolutionary model again appeals to ecological lines of evidence. The Little Climatic Optimum and start of the Little Ice Age initiated a return to wetter conditions. This resulted in improved access to salmon in other areas of the Plateau, while terrestrial resources became scarce (Prentiss et al. 2004). At Keatley Creek, 100 years of abandonment was followed by a low degree of pithouse use and some limited camping within the village core area (Hayden 2000a; Prentiss et al. 2004). Climatic conditions at abandonment were similar to those during the 1400 to 1100 B.P. period. These conditions, combined with the resource scarcity during the height of the

prior drought, resulted in a significant loosening of the ties that bound people to the Mid-Fraser area (Prentiss et al. 2004). This was not a complete collapse, but rather a return to the mobility and subsistence patterns present prior to 2000 B.P. It is important to note that there is considerable debate regarding the causes of the Mid-Fraser abandonment, and this model does not rule out Hayden and Ryder's (1991) landslide having a hand in the event (Prentiss et al 2004).

When contrasted with Hayden's aggrandizer model, the implications of the evolutionary model for the archaeological record of Housepit 7 are significantly different. Sustained intensification on salmon and manipulation of surpluses by aggrandizers through time is not a requirement of this model, and the record Housepit 7 should indicate shifting subsistence strategies rather than fixed ones. Environmental factors that guided the establishment of cultural structures earlier in time also had a hand in the emergence of a new structure later, which involved significant inequality and competition as side-effects, not driving mechanisms (Prentiss et al. 2004). As such, relevant indicators of socioeconomic complexity should appear late in the Keatley Creek archaeological record according to the evolutionary model. In addition, the rise of complexity and inequality should occur gradually, and be dynamic rather than stable once they do appear.

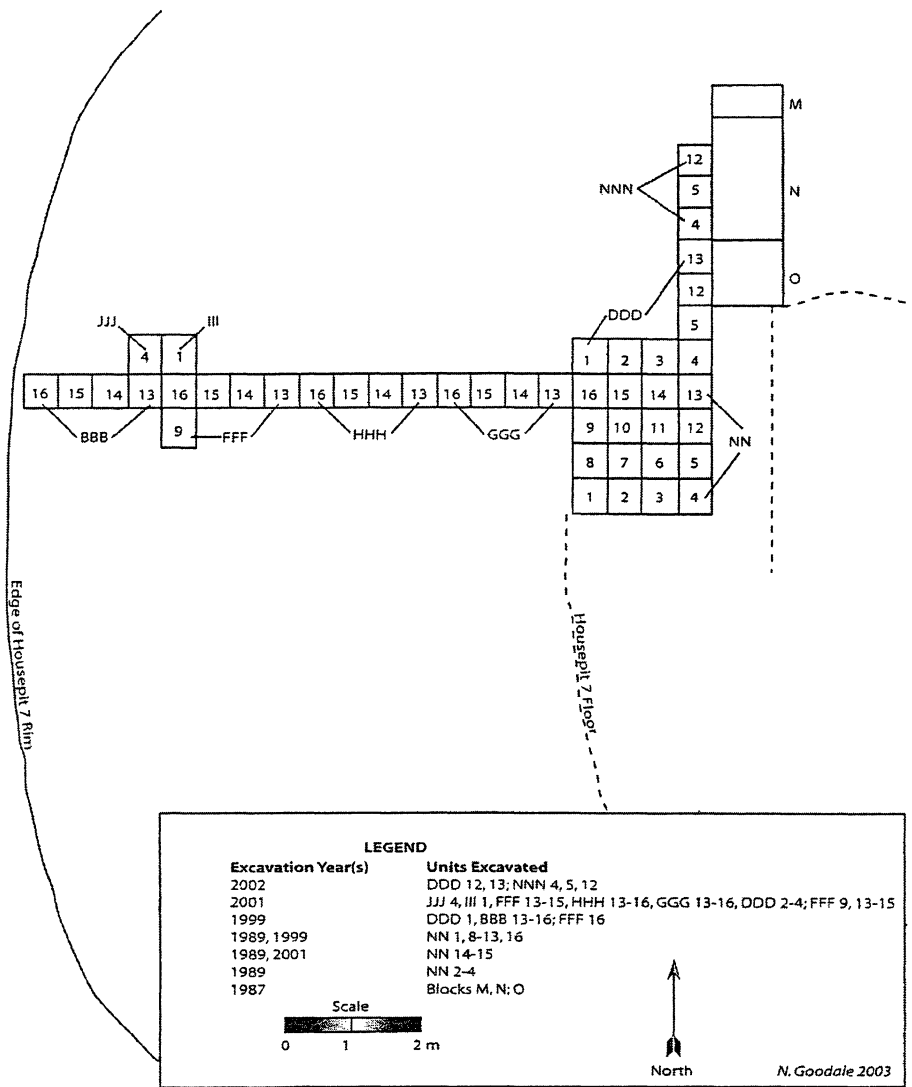
## **EXCAVATION AND RADIOCARBON DATING OF HOUSEPIT 7**

This research uses lithic data derived from the University of Montana's excavations at Housepit 7 of the Keatley Creek site in 1999, 2001, and 2002. These excavations were designed to provide data for specific analyses that could address hypotheses in the more general areas of subsistence, technology, and dating. Regarding the latter, recent analysis by Prentiss et al. (2003b) led to the development of a well-dated chronology for Housepit 7.

### **Excavation**

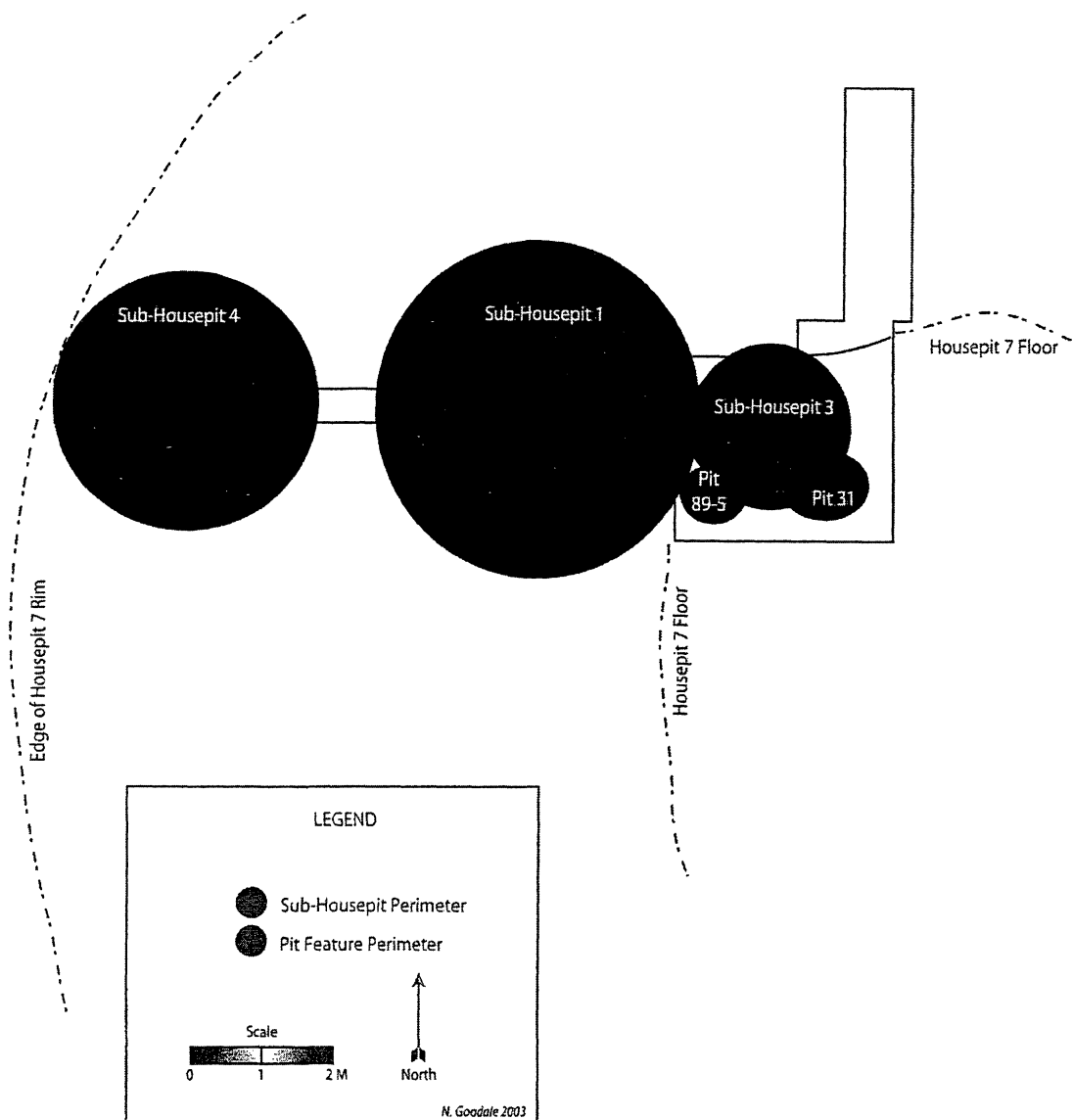
Hayden's (2000a) testing and excavations at Keatley Creek were limited to a relatively small number of housepits that spanned a range of sizes from small to large. Of the large houses at the site, only Housepit 7 was fully excavated. It is the best example of an early, large housepit at the site, and as such provides firm footing from which to consider the rise of socioeconomic complexity at Keatley Creek and in the Mid-Fraser area as a whole (Hayden 1997, 2000a; Prentiss et al. 2002). Excavations at Keatley Creek by University of Montana archaeologists begun in 1999 had the goals of identifying stratigraphic associations and determining the horizontal extent of the house (Prentiss et al. 2000).

Initially, a trench cross-cutting Housepit 7's floor was tied in with the northwest corner of Hayden's 1989 excavations (Figure 3-1) (Prentiss et al. 2000). Another trench was then excavated and oriented north to south, and additional test units were dug outside of the house in order to identify extra-house stratigraphy, activity areas, and to determine if an additional housepit was present (Prentiss et al. 2000). It became apparent early on that a small housepit (sub-housepit or SHP) floor was located beneath the floor, rim, and



**Figure 3-1. Map of University of Montana Housepit 7 excavation units (from Prentiss et al. 2003b:Figure 3).**

roof deposits of Housepit 7 (Prentiss et al. 2000; Prentiss et al 2003b). Excavations attempted to expose this early floor and occupation, which was subsequently named SHP 1 (Figure 3-2). While digging, evidence of a second small housepit, later labeled SHP 3, was identified in strata beneath SHP 1, and efforts were also expended on its excavation (Prentiss et al. 2000). On the western, outer rim of Housepit 7 five more test units were excavated in order to identify Lochnore deposits and determine their stratigraphic

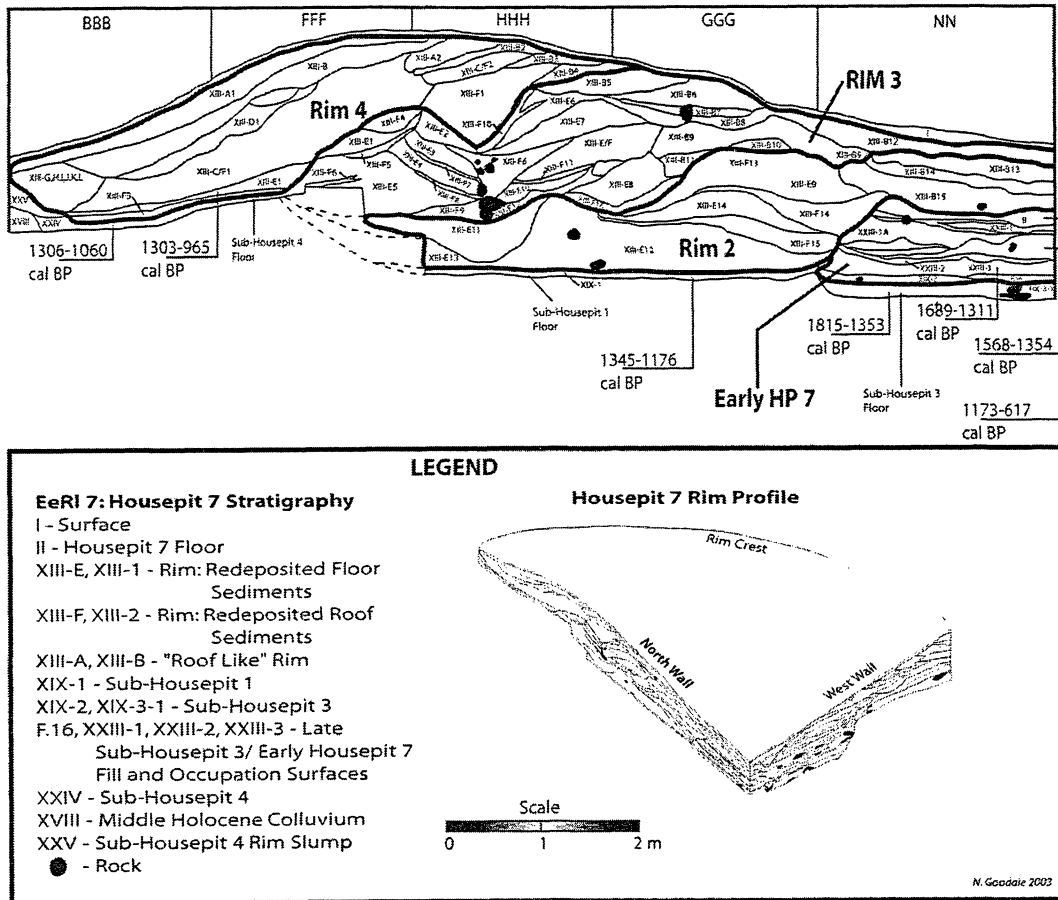


**Figure 3-2. Plan-view showing locations of SHPs 1, 3, and 4 in the northwest quarter of Housepit 7 (from Prentiss et al. 2003b:Figure 4).**

associations with early housepits (Prentiss et al. 2000). As these subsquares were being excavated evidence of yet another floor from a small housepit, SHP 4, was unearthed (Prentiss et al. 2000, 2002).

In 2001, excavations at Housepit 7 resulted in a complete profile of deposits in the northern and northwestern portions of Housepit 7, and of earlier sub-housepits (Figures 3-3 and 3-4) (Prentiss et al. 2002). The horizontal excavation dug in 1999 was extended





**Figure 3-4. Profile of northwest side of Housepit 7. Illustrates the north walls of excavation units BBB, FFF, HHH, GGG, and NN, which show Housepit 7 Rims 2-4 and SHPs 1, 3, and 4 (from Prentiss et al. 2003b:Figure 6).**

SHP 4 (Prentiss et al. 2000, 2002). In sum, the 2001 excavations resulted in total exposure of SHP 3, greater exposure of SHPs 1 and 4, and revealed the full northwestern profile of Housepit 7 roof, rim, and floor deposits (Prentiss et al. 2002).

In 2002, excavations began by reopening Hayden's 1987 north to south oriented trench, designated MNO (Figure 3-1). While this had also been done in 1999 in order to reprofile the unit's walls and gain more stratigraphic detail, five new excavation units were dug along the old units' west wall (Prentiss et al. 2000, 2003a). Additional units



were excavated to the west and outside of the house to get more detailed information on activity areas there (Prentiss et al. 2003a).

All University of Montana excavations at Keatley Creek were conducted according to accepted archaeological methods and principles, and also adhered to conventions unique to the site which had been established during earlier excavations (Prentiss et al. 2000, 2002, 2003a). Excavation units were placed according to a previously established grid system. Units consisted first of 2 X 2 meter squares that were then subdivided into smaller 50 X 50 centimeter units and numbered 1 through 16 (Prentiss et al. 2000, 2002, 2003a). Each sub-unit was excavated in natural strata by hand using trowels, dustpans, and smaller tools where necessary, and sediments were screened through 1/8 inch mesh. Profiles from a minimum of two walls were drawn for each unit. Floor deposits were excavated in 5 centimeter levels and artifacts and bone above 1 centimeter in diameter were point plotted and individually bagged (Prentiss et al. 2001, 2002, 2003a). Homogenous strata larger than 10 centimeters were dug in arbitrary 10 centimeter levels until the next stratum was reached (Prentiss et al. 2000, 2002, 2003a). Specific strata designations were consistent with criteria established during earlier excavations for surface, roof, rim spoil, rim slump, dump, floor, and sub-floor pit features (Prentiss et al. 2002). Lastly, soil samples were taken for flotation and sedimentary analyses from every level of floor and other strata according to a predetermined, systematic plan (Prentiss et al. 2000, 2002, 2003a).

### **Radiocarbon Dating**

Distinct occupations and rim construction phases were identified within Housepit 7 as a result of the University of Montana's excavations. Charcoal samples from these

occupations produced a variety of radiocarbon dates (Prentiss et al. 2003b). These dates allowed for the development of a robust chronology of Housepit 7 occupation. This chronology, in turn, is central to the lithic analyses of this research and to testing models of emergent socioeconomic complexity at Keatley Creek.

Radiocarbon dates were obtained primarily from in situ charcoal identified within hearth and posthole features, although house floors occasionally provided large fragments (Prentiss et al. 2003b). Samples that produced the earliest dates were obtained from the floor, hearth features, two occupation surfaces, and fill of the SHP 3 depression. Early dates were also derived from a hearth located beneath the northern rim of Housepit 7 and from preserved wood found in a posthole that had been placed within an earlier cache pit (Prentiss et al. 2003b). Middle period dates are from the charcoal of hearth features in SHP 1 (interpreted as a room and not a separate housepit since it cuts through earlier Housepit 7 deposits) and SHP 4 (Prentiss et al. 2003b). Late dates for Housepit 7 occupation were derived from a hearth within the rim material deposited over SHP 4 (Prentiss et al. 2003b), while abandonment dates come from the work of Hayden (2000b), which were derived from roof beams, hearth features, and tree branches on the final floor of Housepit 7.

In all, a total of seventeen radiocarbon dates were obtained by the University of Montana, and an initial chronology based on uncalibrated dates was built from these and the work of Hayden (2000b). Calibrated dates were also calculated so as to better understand and compare the timing of events suggested in the radiocarbon time scale against the calendar (Prentiss et al. 2003b). Although every deposit within Housepit 7 was not dated, each sub-housepit and Housepit 7 rim construction phase was, and when

combined with established area cultural chronologies, a reliable chronology of Housepit 7 occupation could be developed.

For the purposes of this research, sub-housepit and rim phases are grouped in a manner that reflects their stratigraphic relationships so that a continuous timeline is formed by which patterns of lithic use and discard may be assessed throughout the life of Housepit 7. SHP 3 begins the sequence and dates to 1815-1347 cal. B.P. (Table 3-1) (Prentiss et al. 2003b:Figure 8). Next in line are Early Housepit 7 deposits, which date to 1710-1299 cal. B.P. (Prentiss et al 2003b:Figure 8). Rim construction phases 1 and 2, along with SHP 1, represent the early middle period of Housepit 7 and date to 1345-1176 cal B.P. (Prentiss et al. 2003b:Figure 8). Rim 3 and SHP 4 are grouped together and represent the late middle period of Housepit 7, although their date of 1306-1060 cal. B.P. closely resemble those of the early middle period. Rounding out the sequence is Rim 4, dating to 1303-965 cal. B.P., which is followed by Housepit 7 abandonment between 877 and 795 cal. B.P. (Prentiss et al. 2003b:Figure 8).

**Table 3-1. Housepit 7 calibrated radiocarbon dates (adapted from Prentiss et al. 2003b:Table 1).**

Lab #	Standard Age B.P.	Calibrated Mean B.P.	2 $\sigma$ Range B.P.	Housepit Assoc.	Strata Group Assoc.	Provenience
T-15205A	1236 $\pm$ 71	1134	1303-965	7	Rim 4	Feature 34 hearth in Rim 4
Beta 139441	1270 $\pm$ 60	1176	1292-1060	SHP 4	Rim 3 & SHP 4	Feature 14 hearth on floor
A11796	1305 $\pm$ 50	1197	1306-1088	SHP 4	Rim 3 & SHP 4	Feature 14 hearth on floor
T-15208A	1332 $\pm$ 41	1241	1306-1176	SHP 1	Rim 1, Rim 2, & SHP 1	Feature 41 hearth on floor
T-15202A	1360 $\pm$ 44	1263	1345-1181	SHP 1	Rim 1, Rim 2, & SHP 1	Feature 38 hearth on floor
T-15207A	1361 $\pm$ 41	1263	1345-1181	SHP 1	Rim 1, Rim 2, & SHP 1	Charcoal on floor
T-15204A	1489 $\pm$ 41	1405	1511-1299	7	Early HP 7	Feature 36A wood in posthole
A-12475	1695 $\pm$ 45	1614	1710-1518	7	Early HP 7	Feature 53, hearth in rim base
A-11792	1545 $\pm$ 40	1436	1525-1347	SHP 3	SHP 3	Feature 33 wood in posthole
A-11793	1590 $\pm$ 45	1461	1568-1354	SHP 3	SHP 3	Feature 24 hearth on upper floor
Beta 139440	1580 $\pm$ 60	1470	1607-1333	SHP 3	SHP 3	Feature 16 hearth
A-11794	1580 $\pm$ 80	1500	1689-1311	SHP 3	SHP 3	Feature 16 hearth
T-15203A	1636 $\pm$ 67	1528	1703-1353	SHP 3	SHP 3	Feature 25 hearth on floor
T-15206A	1710 $\pm$ 71	1628	1818-1438	SHP 3	SHP 3	Feature 17, hearth on floor
A-11795	1745 $\pm$ 50	1677	1815-1539	SHP 3	SHP 3	Charcoal, floor.

## **LABORATORY METHODS**

During the University of Montana's excavations, lithic artifacts were removed from excavation units and bagged after the recordation of detailed provenience data, or were taken from screens if they had not been initially identified within a given sub-square. Upon completion of fieldwork each year, all lithic artifacts were transported to Simon Fraser University (SFU) in Burnaby, British Columbia, for preliminary sorting and analysis.

Debitage was sorted by material type, flake size, degree of dorsal cortex, and flake types as defined by the SFU Keatley Creek flake typology (Prentiss et al. 2000, 2002, 2003a). The groups of primary, secondary, and tertiary reflect the percentage of dorsal cortex cover, and debitage were sorted accordingly. SFU flake types include primary, secondary, billet, shatter, and bipolar, with the first designation representing a flake that had a high likelihood of being a tool and secondary flakes having little potential as tools (Prentiss et al. 2000, 2001, 2003a). Billet, shatter, and bipolar flakes were defined by technological attributes different from criteria utilized to sort primary and secondary flakes (Prentiss et al. 2000, 2001, 2003a). Like debitage, formal tools were identified by criteria previously established in Hayden's SFU Keatley Creek tool typology. Once lithic debitage and tools had been sorted, basic descriptive data were presented in field reports describing each year's excavations, and displayed in separate tables organized by sub-square, material type, and provenience. Several analyses were also conducted, which focused on the technological and functional variation of debitage and tool characteristics between strata, and how lithic technological organization is related to mobility and subsistence strategies (Prentiss et al. 2000, 2002).

## **ANALYTICAL METHODS**

This section describes the lithic analyses conducted in this thesis study. They are based on lithics data derived from the University of Montana's 1999, 2001, and 2002 excavations of Housepit 7. The analyses center on the frequencies of lithic tool production, use, and discard from both organizational and functional perspectives. Investigations also concern lithic raw materials from debitage and tools, raw materials thought to be prestige-associated, and formed lithic prestige items. The methods used in the five lithic analyses conducted are reviewed, along with the quantification methods employed. The stage will then be set for a discussion of specific expectations of each analysis under the previously outlined aggrandizer and evolutionary models for emergent socioeconomic complexity. Results of all analyses are presented in Chapter 4, and all raw data are listed in the Appendix.

## **ORGANIZATIONAL ANALYSIS**

The organizational analysis in large part follows the design theory work of Hayden et al. (1996b, 2000), and involves the sorting of Housepit 7 tools into a classification comprised of strategies for lithic utilization. Under design theory, the tools of Housepit 7 can be thought of as technological answers to potential problems that people faced during prehistory (Hayden et al. 1996b, 2000). The lithic tool answer for each problem was affected by certain limitations or constraints that have implications for the ultimate solution (Hayden et al. 1996b, 2000).

When potential activities and constraints on solutions are defined, they can be compared to the archaeological record. It then becomes possible to view lithic tools in terms of "needs and constraints" (Hayden et al. 2000:185). If patterns of production and

use are clear enough, solutions can then be regarded as “strategies” (Hayden et al. 2000:185). Based on considerations of a number of constraints, “design criteria”, and information gleaned from the ethnographic record of the Interior Plateau, patterns observed in the lithic tools of the Keatley Creek site led Hayden et al. (1996b, 2000) to develop six strategies of stone tool production and use: 1) expedient block core, 2) biface, 3) portable flake tool, 4) quarried bipolar, 5) scavenged bipolar, and 6) ground stone cutting. By examining the timing and frequencies of each strategy, potential insights into mobility regimes and subsistence strategies become possible.

Recent studies have established a strong level of control over the stratigraphic divisions and dating of Housepit 7 deposits (Prentiss et al. 2003b). By placing lithic tools into an organizational classification, and then sorting them according to dated sub-housepit and rim construction phases (Prentiss et al. 2003b), quantification will reveal frequencies of lithic production and use strategies throughout the life of Housepit 7. More specifically, the organizational study will measure variation in lithic technological behavior associated with changing mobility regimes and subsistence strategies.

### **Organizational Classification**

For the organizational classification, I used a modified form of Hayden et al’s (1996b, 2000) design and strategy approach. The expedient block core, biface, portable flake tool, and ground stone cutting strategies were retained from the original strategy groups. Unlike Hayden et al. (1996b, 2000), my biface group included all projectile points and <sup>pointed flakes</sup> performs, because their “organizational role and function are often equivalent to other more generalized bifaces” (Prentiss and Kuijt 2004). The bipolar strategies were eliminated and replaced with abrader and blade strategies, the expectations being that the

abraders should be more prevalent under sedentary contexts while blades, given their association with portable technologies, should occur in greater frequencies under conditions of higher mobility (Prentiss and Kuijt 2004). I used the Prentiss and Kuijt (2004) strategies because they speak well to the levels of mobility and types of subsistence strategies that may have been present at various times throughout the life of Housepit 7, and have meaning in terms of adaptations. Specifically, under a more sedentary regime greater frequencies of expedient block core, ground stone cutting, and abrader tools would have been employed; more mobile groups would have used larger numbers of bifaces, portable flake tools, and blades (Prentiss and Kuijt 2004).

An organizational classification of the Housepit 7 lithic tool assemblage was developed by sorting each SFU flake tool type into one of the six strategy groups (Table 3-2). In general, placement of specific tool types within a given group closely followed the work of Hayden et al. (2000) (the exceptions were the abrader and blade strategies and the inclusion of projectile points in the biface group). However, some tool types were not included under any strategy by Hayden et al. (2000), and a number of tools could have been sorted into more than one group because they appeared to have multiple functions. In these cases, decisions on classifying such artifacts were based on tool design and overall morphology.

### **Quantification of Organizational Analysis**

Once Housepit 7 lithic tools were organizationally classified, data quantification could begin. Counts of tools were arranged according to the strata groups listed in Table 3-1, or SHP 3; Early HP 7; Rim 1, Rim 2, & SHP 1; Rim 3 & SHP 4; and Rim 4. For actual quantification, each tool received a count of one under its corresponding strategy



**Table 3-2. Housepit 7 Organizational Classification of Lithic Tools.**

Strategy/Tool Name	SFU-Keatley Creek Typology Type Numbers
<b><i>Expedient Block Core Strategy</i></b>	
Scrapers	150, 156, 163, 164, 165
Expedient Knives	70, 74, 170
Utilized Flakes	71, 72, 73, 180
Miscellaneous Uniface	157
Piercer	153
Unifacial Borer	152
Denticulate	160
Unifacial Knife	159
Unifacial Perforator	151
Notches	54, 154
Pieces Esquillees	145
Multidirectional Core	186
Small Flake Core	187
Bipolar Core	146
Single Scraper/Small Piercer	150/153
Convergent Scraper/Small Piercer/Notch	165/153/154
Convergent Scraper/Alternate Scraper/Scraper-Like Biface	165/156/141
Utilized Flake/Single Scraper	180/150
Utilized Flake/Small Piercer/Inverse Scraper	180/153/163
Small Piercer/Notch	153/154
Piercer/Utilized Flake	153/180
Notch/Utilized Flake on a Break	154/71
Knife-Like Biface/Single Scraper/Utilized Flake on a Break	140/150/71
Bipolar Core/Utilized Flake	146/180
<b><i>Biface Strategy</i></b>	
Bifaces	131, 192, 193
Knife-Like Biface	140
Scraper-Like Biface	141
Bifacial Fragment	6
Bifacial Knife	130
Miscellaneous Biface	2
All Projectile Points and Preforms	19, 35, 36, 99, 100, 101, 110, 111, 112, 118, 119, 126, 127, 134, 136, 137

**Table 3-2. (continued)**

Strategy/Tool Name	SFU-Keatley Creek Typology Type Numbers
<b><i>Portable Flake Tool Strategy</i></b>	
Scraper Retouch Flake with Hide Polish	143
Hide Scraper Retouch Flake or Flake with Polish Sheen	148
Key-Shaped Scraper	158
End Scraper	162
Spall Tools	183, 184
Crescent Scraper, Miscellaneous Artifact	1
Bifacial Perforator	132
Bifacial Drill	133
Single Scraper/Bifacial Drill	150/133
<b><i>Ground Stone Strategy</i></b>	
Ground Stone Maul	219
Adze	185
Miscellaneous Ground Stone	200
<b><i>Blade Strategy</i></b>	
Microblade Core	149
Microblade	147
Core Rejuvenation Flake	182
<b><i>Abrader Strategy</i></b>	
Abrader	201
Abraded Cobble	207

and stratigraphic group. Combination tools or tools with multiple functions that crossed strategy groups were also given a count of one since they had been assigned to a single, specific strategy group. Note that while a blade strategy was included in this analysis it is possible that many of them were mixed in from earlier, Middle Holocene deposits. This must be kept in mind when considering any blade strategy data from Housepit 7. Once quantification was complete, totals were converted to percentage frequencies.

## **FUNCTIONAL ANALYSIS**

The purpose of the functional analysis is similar to the organizational analysis. By classifying Housepit 7 lithic tools from a functional perspective, the goal is to provide additional insight into lithic technological behavior associated with changing mobility regimes and subsistence strategies. With the tools functionally classified and arranged according to the same stratigraphic groups used in the organizational analysis, evidence for shifting mobility and subsistence strategies can then be extended to models for the timing and manner in which socio-economic complexity arose at the Keatley Creek site. As has been discussed, the organizational classification of Housepit 7 tools resulted from a combination of Hayden et al.'s (1996b, 2000) and Prentiss and Kuijt's (2004) research. The same cannot be said, however, for the functional classification of Housepit 7 tools. While the basis behind the three functional groups comes partly from design strategy ideas, it relies more heavily on a variety of sources. As a result, a detailed discussion of functional groups and the logic used to construct them is warranted.

### **Functional Groups**

The lithic tools of Housepit 7 are placed into one of three functional groups: 1) hunting and butchering tools, 2) hideworking and basketry or light duty tools, and 3) woodworking or heavy duty tools (Table 3-3). These functional tool groups were developed in part from the design strategy work of Hayden et al. (1996b, 2000), but also from summaries of ethnographic tool use (Alexander 2000) as well as direct ethnographic accounts (Teit 1900, 1906). Research conducted by Spafford (1991) on the distributions of lithic tools on Keatley Creek housepit floors and by Rousseau (1988) on the function of specific tool types were also consulted to develop the functional groups.

While every attempt was made to construct the classification based on these sources, some Housepit 7 tools proved difficult to classify in terms of function. Combination tools or those that clearly had multiple functions were classified during the quantification process (see below). In other cases, support for placing a given tool within its functional group could not be directly gleaned from the literature. This problem was dealt with in two ways. First, many tools likely had multiple functions, and were grouped based on their similarity in design to other tool types whose functions could be more clearly discerned from the literature. When this approach was not appropriate or helpful, the usefulness of a tool for light or heavy-duty work was considered in order to functionally classify it. In discussions of the specific tool groups to follow, the methods employed to classify all tools, including “problem” ones, are addressed. Whatever the methods used to group the lithic tools of Housepit 7, it is important to note the power of a functional group lies not with the individual tools that compose them but in the group as a whole. In this way these collections or groups of tools represent broad functional characteristics that may shed light on gradations of mobility and subsistence strategies.

### **Hunting and Butchering Group**

This functional group consists of Housepit 7 lithic tools that represent tasks associated with the hunting and butchering of game (Table 3-3). Inclusion of projectile points and preforms within this group is obvious, as their use in the procurement of big game has been long accepted by researchers and well documented ethnographically (Alexander 2000; Teit 1900, 1906). Expedient, unifacial, and knife-like bifaces from Housepit 7 were also classified as hunting and butchering tools because they were “probably used in some part of the butchering activities thought to be represented at the

**Table 3-3. Housepit 7 Functional Classification of Lithic Tools.**

Functional Class/Tool Name	SFU-Keatley Creek Typology Type Numbers
<b><i>Hunting and Butchering</i></b>	
All Projectile Points and Preforms	19, 35, 36, 99, 100, 101, 110, 111, 112, 118, 119, 126, 127, 134, 136, 137
Expedient Knives	70, 74, 170
Unifacial Knife	159
Knife-Like Biface	140
Microblade	147
Bifaces	131, 192, 193
Scraper-Like Biface	141
Bifacial Fragment	6
Biface Tip	135
Bifacial Knife	130
Miscellaneous Biface	2
<b><i>Hideworking and Basketry (light duty)</i></b>	
Spall Tools	183, 184
End Scrapers	162
Scraper Retouch Flake with Hide Polish	143
Hide Scraper Retouch Flake or Flake with Polish Sheen	148
Utilized Flakes	71, 72, 73, 180
Piercer	153
Unifacial Perforator	151
Bifacial Perforator	132
<b><i>Woodworking (heavy duty)</i></b>	
Pieces Esquillees	145
Adze	185
Scrapers	150, 156, 163, 164, 165
Crescent Scraper, Miscellaneous Artifact	1
Notches	54, 154
Denticulates	160
Unifacial Borer	152
Bifacial Drill	133
Key-Shaped Scraper	158
Abraded Cobble	207
Abrader	201

site (cutting meat, hide, tendons, or filleting)” (Hayden et al. 2000:189). While a hunting and butchering function for the remaining tools of this group (Table 3-3) seems clear, prudence dictates additional explanation.

Design theory suggests that constraints on using microblades for hunting and butchering activities are considerable in a context of low mobility (Hayden et al. 2000). Given the amount of raw material wasted in their production, coupled with the level of skill required to produce them and the high costs of raw material procurement, the use of microblades in a sedentary context would be a poor design solution (Hayden et al. 2000). Because they are considered to be indicative of highly portable technologies (Prentiss and Kuijt 2004), and thus a better solution under more mobile regimes, they are included within the inherently mobile hunting and butchering class of tools in this analysis.

The last tools classified in the hunting and butchering group include bifaces, scraper-like bifaces, bifacial fragments, biface tips, bifacial knives, and miscellaneous bifaces. Design theory suggests that bifaces are most beneficial under circumstances of high mobility due to the multiple functions they perform, their portability and lengthy cutting edge, and because additional flakes can be easily and quickly derived from the biface itself (Hayden et al. 2000). If the design of bifaces make most sense under conditions of higher mobility, then it is most logical to place them within the functional group that is inherently more mobile—hunting and butchering.

#### **Hideworking and Basketry (light duty) Group**

This group consists of lithic tools associated with the working of animal hides, basket construction, or similar light-duty tasks often involving perishable materials (Table 3-3). Placement of some tools within this group was relatively straightforward

while in other cases consideration of the design of the tool or the nature of the task (i.e. light-duty) being performed was necessary.

Tools that are clearly associated with the working and manipulation of animal hide include end scrapers and scraper retouch flakes with hide polish or polish sheen. Ethnographic evidence supports the use of such tools to scrape and thin hides, as do archaeological use-wear studies and experimental research (Hayden et al. 2000; Spafford 1991; Teit 1900, 1906). The hide polish or sheen present on scraper retouch flakes is evidence for their use in hideworking.

Spall tools are included in the hideworking and basketry group based on ethnographic evidence that they were used to “stretch hides in the tanning process” (Hayden et al. 2000:201; Teit 1900, 1906). They were typically made of coarse-grained quartzite cobbles and usually hafted (Hayden et al. 2000; Spafford 1991).

Utilized flakes are included in the hideworking and basketry class but they are somewhat problematic. Utilized flakes may have been used for shaving wood, in basket making, for working hides, as well as in some butchering tasks (Hayden et al. 2000). The shaving of wood and basket making are considered “light-duty” tasks that involved the use of utilized flakes in this analysis. It is acknowledged that these tools were highly multifunctional, and thus the functional analysis was conducted both with and without utilized flakes. However, their inclusion did not appear to significantly affect frequencies, and as a result they were retained in the analysis.

The last tools in the hideworking and basketry group are piercers and both unifacial and bifacial perforators. Both tools were used to puncture materials such as hide or possibly bark, which are considered light-duty tasks. They are less robust than

borers and drills (included under the woodworking functional group) due to the less demanding loads applied to the tools when working softer or more forgiving materials (Hayden et al. 2000).

### **Woodworking (heavy duty) Group**

The woodworking or heavy duty functional group is composed of lithic tools presumably associated with the working of wood (Table 3-3). They are typically tough, stout implements. In most cases, tools classed under this group were clearly used in the manipulation of wood at Keatley Creek, but they also probably served multiple functions.

Pieces esquilles, also known as wedges, were used for splitting wood or other hard materials such as bone (Teit 1900, 1906; Spafford 1991). Adzes are hafted tools used in heavy duty wood working tasks such as in the manufacture of canoes or in many facets of pithouse construction (see Teit 1900, 1906). Adzes were also used for cutting wood for sculptures and firewood, and for peeling bark (Alexander 2000). Given the amount of time and effort it takes to produce a ground stone nephrite adze, they are also considered a prestige item (Hayden et al. 2000).

Unlike pieces esquillees and adzes, generalized scraping tools are less clearly associated with woodworking. Like utilized flakes, scrapers probably had many different applications (i.e. shaving wood, hide working, meat cutting, etc.) (Hayden et al. 2000). For the purposes of this analysis, the spline-plane angle was used in order to classify these tools into the heavy duty class (Spafford 1991). Specifically, five scraper types with spline-plane angles  $> 45^\circ$  were deemed to be “better adapted to scraping or shaving hard materials”, and as such are included in this class (see Spafford 1991:41).

Notches and denticulates are generally regarded as being well-suited to shaving



and scraping wood, bone, and antler (Hayden et al. 2000; Spafford 1991). Some distinctions between large and small notches have been made. Larger examples, with their higher spline-plane angles, were best suited to working hard woods. Smaller notches and denticulates, with their lower spline-plane angles, were used in the production of more delicate basketry elements (Hayden et al. 2000; Spafford 1991). While interesting, these distinctions were not needed to classify these tools in this analysis. Their clear association with woodworking or at least with the working of relatively hard materials (i.e. heavy-duty tasks), and their relative lack of multifunctionality, allowed for their placement within the woodworking or heavy-duty functional group.

For the classification of unifacial borers and bifacial drills, design and tool morphology were considered. Borers are stout and robust with “projections capable of sustaining” high “loads as well as rotary movements without fracturing” (Hayden et al. 2000:193), presumably to deal with the harder materials being worked by such tools. While drills may not be especially tough, the task constraints of boring holes leaves little morphological flexibility resulting in a highly specialized tool stout enough to work moderate to hard materials (Hayden et al. 2000). Ethnographic evidence is sparse regarding the use of drills, but at least one use was for manufacturing pipes (Teit 1900). Tool morphology and ethnographic evidence indicate that borers and drills were used in heavy-duty tasks such as the working of hard materials like wood, bone, and antler.

Key-shaped scrapers are classified with the woodworking group based on the research of Mike Rousseau (1992). His analysis suggested that the primary functions of key-shaped scrapers “involved working stalks and branches of small woody shrubs and

trees” (Rousseau 1992: 102), More specific tasks include “bark stripping, removal of secondary branch nodes, and smoothing and significantly altering the primary stalk/branch shafts by scraping, shaving, planing, whittling, carving, and/or engraving actions” (Rousseau 1992:102). Although these activities seem more consistent with “light-duty” oriented tasks, they are also tasks exclusively associated with woodworking, and are therefore included within the woodworking functional group.

The woodworking group also comprises abraded cobbles and abraders, the latter of which consist primarily of sandstone slabs. These tools were used to sharpen and smooth bone and antler to produce awls, needles and other tools (see Spafford 1991; Alexander 2000) that were in turn useful in the working of hide or other soft materials. This would imply that abraded cobbles and abraders would be more appropriate classified under the hideworking or light-duty functional group. However, ethnographies indicate that abraders were used for smoothing arrow shafts and in other woodworking (Teit 1900). Abraders were also used to cut nephrite and other types of stone (Alexander 2000; Teit 1900). Since nephrite adzes are considered to be heavy-duty woodworking tools, abraders are indirectly connected to woodworking because they were used to manufacture a highly specialized woodworking tool. It is clear that abraders had a variety of functions, but the large size of abrader slabs also implies low mobility which is a key characteristic of the woodworking functional group, hence their inclusion here.

### **Quantification of Functional Analysis**

Quantification of the functional classification was essentially the same as that of the organizational analysis. Specifically, tools of the functional groups were quantified according to the same sub-housepit and rim construction strata groups of Housepit 7

utilized in the organizational analysis. Despite these similarities, there was one important difference in actual quantification of functional tools that requires discussion here.

As discussed, each tool in the organizational classification received a count of one under the appropriate strategy class and strata group even if it was a combination tool or appeared to have multiple functions. In this regard, quantification of the functional classification differed in that “employable units”, or “EU’s” (Knudson 1982) of combination or multiple function tools were quantified. Briefly, Knudson (1982:10) states that an EU is “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.” If a given tool was typed as a combination tool or had multiple functions, each potential function of that tool was regarded as an EU. Each EU of that tool was then counted as one and that value assigned to the appropriate functional and strata group during quantification. For example, if one tool was typed as both a miscellaneous biface and an end scraper, it would be counted once under the hunting and butchering group and once under the hideworking and basketry group so that both uses would be accounted for in the data. For the organizational analysis, such a tool was counted only once during quantification. Fortunately, in most cases it was not necessary to use this approach as the majority of the Housepit 7 lithic tools could be easily tallied once placed within a given functional group. For those multiple-function tools that could not clearly be placed into a single class, EU’s proved to be a good way to ensure that all functions of the tools were represented in the data and analysis. Once quantification was complete totals were converted to percentage frequencies.

## **LITHIC RAW MATERIAL ANALYSES**

The lithic raw material analysis is composed of two separate efforts: the first focuses on general types of jasperoid, pisolite, vitric tuff, chalcedony, and quartzite material types, and the second on the more rare prestige-associated raw materials of nephrite, steatite, and obsidian (Hayden 2000c). Both analyses center on lithic raw materials of debitage and tools identified in the sub-housepit and rim construction phases of Housepit 7. Note that the term “general” is applied only to distinguish between the raw materials considered in the first analysis from those prestige-associated types addressed in the second. It should not be taken to have any meaning beyond this distinction.

## **ANALYSIS OF GENERAL LITHIC RAW MATERIALS**

The general raw material analysis loosely follows the procedures used in research previously conducted by Hayden et al. (1996a). Hayden et al.’s analysis examined the frequency of jasperoid, pisolite, vitric tuff, chalcedony, and quartzite debitage from three large housepits at Keatley Creek (1, 5, and 7). Their analysis suggested preference for, perhaps even control of, certain lithic raw materials among the different housepits (Hayden et al. 1996a). This indicated to the researchers that large households regularly used, and controlled or perhaps owned different areas of the landscape. These “residential corporate groups” varied in their ability to access certain lithic raw materials, and persisted “in the same house location as identifiable socioeconomic units over many centuries, and apparently well over a millennium” (Hayden et al. 1996a:353-355).

By following the portion of Hayden et al.’s (1996a) research procedures related to Housepit 7, this analysis also measured the amount of use and discard of the same types

of raw materials within the household. However, this investigation does not compare patterns between different houses, as was done by Hayden et al. (1996a). To reiterate: these data should allow for an assessment of the preference for certain lithic raw materials through time at Housepit 7. If a preference is suggested it may indicate ownership and control of a lithic raw material locale. Since this type of ownership and control are not common among more egalitarian societies, patterning of common lithic raw materials can give indications as to when and how socioeconomic complexity emerged at Keatley Creek.

### **Quantification of General Lithic Raw Materials**

Quantification of lithic raw material data was straightforward. Each piece of jasperoid, pisolite, vitric tuff, chalcedony, and quartzite debitage, as well as every tool, received a count of one under its respective raw material type and strata group. Hayden et al. (1996a:344) only quantified debitage, which was done “because it was assumed to more accurately reflect the procurement and use of lithic raw materials in bulk, whereas modified tools might be more biased in terms of individual trade items and exchange patterns.” At the same time, Hayden et al. (1996a:353) maintain “sources for some of the lithic material types are within 15 km of the Keatley Creek village”, and that “it is highly probable that the lithic materials at Keatley Creek were procured directly by site inhabitants rather than by trade.” Based on these factors, I felt that that any bias via trade and exchange would be minor or almost non-existent. However, to be certain this was the case I tabulated raw materials of debitage and tool types both separately and together. It quickly became evident that including raw material counts from tools would have little

effect on overall frequencies, since debitage counts greatly exceed those of tools. Raw counts and percentage frequencies of this analysis are provided in the Appendix.

### **ANALYSIS OF PRESTIGE-ASSOCIATED LITHIC RAW MATERIALS**

The second aspect of the lithic raw material analysis is focused on prestige-associated lithic raw materials nephrite, steatite, and obsidian. The prestige association of these materials comes from their use in the production of prestige items and tools, including stone beads, ornaments, pipes, ground stone mauls, adzes, and ornamental ground nephrite identified at the Keatley Creek site (Hayden 2000c). While most lithic material could have been obtained locally (Rousseau 2000), at least one prestige raw material—obsidian—may have been derived from a source located approximately 300 kilometers from the Mid-Fraser (Hayden 2000c). Tools produced from local lithic raw materials performed most village tasks adequately. But the fact that obsidian was obtained from distant sources suggests it had served a purpose beyond merely producing functional tools. The local rarity of obsidian, coupled with the significant investment in effort required to obtain it, indicates that there was a payoff for the person who possessed the material or items produced from it—namely, increased prestige.

Along these lines, the working of nephrite required considerable amounts of time and effort to produce items such as adzes (Hayden 2000c). Given the large investments required in adze production, it also follows that dividends of increased prestige derived from their production and possession would be high, and relatively few would have been produced. Indeed, a paucity of nephrite adzes or adze fragments have been identified in housepit deposits (Hayden 2000c).

The association of steatite with prestige linked activities stems from its use in the manufacture of pipes and paint or ocher bowls, as documented ethnographically (Teit 1900, 1906). Steatite was used to make zoomorphic sculptures elsewhere on the Plateau (Hayden 2000c). Given the expenses involved in the procurement and working of steatite and all prestige-associated lithic raw materials, powerful individuals and households used them in the production of items that reflected their high status. As such, a relatively straightforward link between these materials and status inequality is evident. However, Hayden (2000c) points out issues that should be kept in mind when considering prestige items at sites like Keatley Creek that in turn appear to hold for the lithic raw materials used to produce them.

A primary problem with analyzing the distribution of prestige artifacts is that they are scarce in housepit or domestic deposits. This may be due to the rarity of such items to begin with, comparatively minor status differences between domestic groups, or their burial with high status individuals (Hayden 1997; 2000c). Prestige items that are left behind are usually fragmentary, and were likely lost or hidden within the house (Hayden 1997; 2000c). All of these factors present limitations for determining the socioeconomic standing of a “specific domestic group” across a given housepit floor. However, their analysis can still give insight into the *general* level of socioeconomic complexity present at Housepit 7 at any given time (Hayden 2000c:190). As stated by Hayden (2000c:200): “the mere existence of prestige items is a strong demonstration that private (or corporate) ownership had largely superseded the sharing ethics of generalized hunter/gatherers since it makes no sense to invest large amounts of labor in the production of flashy, non-utilitarian objects only to have them borrowed and never returned, as usually happens in

generalized hunter/gatherer societies.” Despite the low frequencies, tallying rates of prestige-associated lithic raw material use at Housepit 7 should give a general but relatively direct measure of status inequality through time.

### **Quantification of Prestige Associated Lithic Raw Materials**

Quantification of prestige associated raw materials involved giving a count of one to any nephrite, steatite, and obsidian piece of debitage, tool, or prestige item. Because frequencies of these raw materials are so low, debitage and formed artifacts were considered together as was done for the general raw material analysis. Total raw counts were converted to percentage frequencies once counts were completed.

### **ANALYSIS OF LITHIC PRESTIGE ITEMS**

The final analysis of this research is similar to the prestige associated lithic raw material analysis. The core difference is its focus on the formed or worked lithic prestige items identified in the sub-housepit and rim deposits of Housepit 7. Items included in this analysis consist of stone beads, stone pendants, ornaments, pipe fragments or bowls, ground stone mauls, celts or adzes, ornamental ground nephrite, paint cups, and a single piece of miscellaneous ground stone. With the exception of the miscellaneous ground stone types, the lithic prestige items selected for this analysis come directly from the Keatley Creek prestige item descriptive work completed by Hayden (2000c). The miscellaneous ground stone included in this analysis is represented by a single, special case based on descriptions from field notes. Its presence should not be taken to mean that any piece of miscellaneous ground stone was quantified.

Issues surrounding the analysis of worked lithic prestige items are identical to those involved in the consideration of prestige-associated lithic raw materials, and have



already been addressed. Suffice it to say here that, again, determining the differences between domestic groups and other spatial distribution patterns across the floor of Housepit 7 is not the intended goal of this examination. As a result many of the pitfalls inherent in the analysis of prestige items can be avoided. However, the very low frequency of such items in housepit deposits remains a problem, and this issue will have to be kept in mind when considering implications of the results. Low frequencies aside, I believe this examination to be valid for the same reason the prestige-associated lithic raw material analysis is compelling. That is, the mere presence of prestige artifacts should be strong indicators of ranking and inequality (Hayden 2000c).

With this in mind the purpose of this analysis is to measure rates of lithic prestige item use through the entire Housepit 7 sequence. Like prestige-associated lithic raw materials, formed stone prestige items should provide suggestions as to when inequality and ranking, with its associated displays of wealth via such items, first became evident and what happened once it did.

### **Quantification of Lithic Prestige Items**

Actual quantification of prestige items in Housepit 7 sub-housepit and rim deposits was basic. Each artifact received a count of one and the value was entered under the appropriate prestige item type and strata group. Once totals were obtained percentage frequencies were calculated.

## **PREDICTIONS OF MODELS FOR THE LITHIC ANALYSES**

This section discusses what the models outlined at the beginning of this chapter predict regarding the various lithic analyses conducted in this research. Specific model predictions are addressed for the organizational and functional classifications of Housepit 7's lithic tools, along with its raw materials and prestige items.

### **Predictions of Aggrandizer Model**

Hayden's (1997) model relies heavily on the importance of salmon and the role manipulation of its surpluses by aggrandizers played in the rise of individual and household competition, inequality, and ranking. Based on radiocarbon dating, identification of Shuswap projectile points, unchanging housepit size, and lithic studies, Hayden maintains that these elements of complexity arose early along the Mid-Fraser and at the Keatley Creek site (Hayden 1997, 2000a, 2000b; Hayden et al. 1996a). Once these patterns developed, the system was stable and remained relatively unchanged until the village was abruptly abandoned at approximately 800 B.P. due to a catastrophic landslide along the Fraser River that cut off its salmon runs (Hayden 1997; Hayden et al. 1996a; Hayden and Ryder 1991).

Organizationally, the focus on salmon for subsistence should be reflected by high frequencies of tools, such as those of the expedient block core strategy, associated with processing large volumes of resources (Parry and Kelly 1986). Given this strong reliance on salmon, Hayden's (1997) model also implies low levels of mobility as people stayed tied to villages and focused on fishing. This greater level of sedentism would also suggest that the expedient block core tool strategy would be the most prevalent, along with ground stone and abrader tools. With the latter two groups, frequencies will be

lower relative to expedient tools but should still remain more visible in the data than other low-count tool strategies indicative of greater mobility (i.e. portable flake tool and blades). Aggrandizing subsistence strategies and mobility regimes at Keatley Creek would also be indicated by low frequencies of tools indicative of hunting and higher levels of mobility. So, while the model predicts the prominence of expedient block core, ground stone, and abrader strategy tools at Housepit 7, low frequencies of biface, portable flake tool, and blade strategy tools would also be present. All patterns would have been established early and remain relatively unchanged throughout the Housepit 7 sequence.

Functional tool groups should evince similar patterns to those predicted for the organizational analysis under Hayden's (1997) model. Like expedient block core tools, many tools in the heavy-duty woodworking functional group would be most adaptive in sedentary contexts among people who process large amounts of specialized resources, particularly salmon (Parry and Kelly 1986). Many of these would have also worked well in the production of fishing technologies. Thus, the aggrandizer model predicts that woodworking tools would be the dominant functional group and remain so through time, thereby reflecting a low degree of mobility. Frequencies of hunting and butchering, as well as hideworking and basketry tools, would remain relatively low and pattern fairly closely with one another given their similarity in function, again indicating low levels of mobility and a strong focus on salmon. If these two groups do exhibit any differences, the model would predict hideworking and basketry tools to be more prevalent early and to retain a stronger presence than hunting and butchering tools. According to Hayden (2000c), buckskin can be considered a prestige item because it was used by high status individuals and households in wealth displays. If this is the case, it follows that tools

used in the production of buckskin (or any prestige item for that matter) should appear early given the early emergence of inequality proffered by Hayden's model. Whatever the frequencies of the specific functional groups, patterns predicted by the aggrandizer model should appear early and remain strong through time at Housepit 7.

Aside from subsistence strategies and mobility regimes, several predictions regarding differential access to resources, and the degree of ranking and inequality, at Housepit 7 can be proposed based on Hayden's (1997) model. Frequencies of one or perhaps even two general lithic raw material types should be clearly dominant early and remain steady through all Housepit 7 occupations. Such a pattern would indicate the early and sustained ownership and control of a lithic source, as allowed for under the model. This would also lend additional support to the implications of Hayden et al.'s (1996a) lithic research, the procedures of which were utilized in my general raw materials analysis. Ranking and inequality would be reflected in frequencies of prestige-associated raw materials, and the model would predict higher frequencies of all types early followed by stability in those high numbers through time. The diversity of prestige lithic raw materials utilized would also be an indication of the degree of inequality, and under this model diversity of raw materials should be large early and remain prominent through time. Formed lithic prestige items should show the same patterns as prestige-associated raw materials for the same reasons, with frequency and diversity of items represented starting high and remaining at such levels through to late Housepit 7 deposits.

### **Predictions of the Evolutionary Model**

The aggrandizer model can be contrasted with the evolutionary model (Prentiss et al. 2004), which argues for a late development of socioeconomic complexity in the Mid-

Fraser area and at Keatley Creek. Populations first packed into the Mid-Fraser under drought conditions, withdrew as the climate cooled and moistened, and then packed once again into the area upon a return to drought conditions. It was only during the second drought and packing event that the high degree of ranking, inequality, and general complexity (thought to appear early under Hayden's model) finally materialized (Prentiss et al. 2004). Salmon also has importance under this model, and it does not dispute that surpluses may have been used by aggrandizers to elevate their status and that of their households. However, according to Prentiss et al. (2004), indications of these behaviors do not become apparent until 200 to 600 years after the village formed. Therefore, status competitions between individuals and households cannot be viewed as the driving force behind the emergence of villages like Keatley Creek. Under this model, inequality and complexity developed from status competition as side-effects to an evolutionary process that acted upon previously established cultural structures. It argues for flexibility as people continually adapted to changing climates and adjusted their subsistence strategies to address those changes. As might be expected, the dynamic evolutionary model invokes a number of distinct predictions for the lithic assemblage of Housepit 7.

Under the Prentiss et al. (2004) proposition, drought conditions at 1100-700 B.P. led to increased territoriality and competition due to local resource shortages of all kinds. The primary focus on riverine resources slowly shifted to an increase in the reliance on mammalian resources, particularly as large households exercised their power and controlled key resource acquisition locales. The change may also have been aided by technological innovations like the bow and arrow, which allowed for greater efficiency and effectiveness in hunting (Prentiss et al. 2004). The evolutionary scenario therefore

predicts the early domination of organizational tool strategies by expedient block core, ground stone, and abrader tool groups as a result of the initial focus on salmon and low mobility. These frequencies, however, would slowly diminish through the Housepit 7 occupations as people became more mobile in their attempts to control, protect, and procure scarce terrestrial resources. This change in mobility and subsistence would likewise be indicated by steady increases in the frequencies of biface, portable flake tool, and blade strategy lithic tools.

Functional tool group frequencies would support patterns of the organizational analysis under the evolutionary model. In this case, an early dominance of woodworking or heavy duty tools in the Housepit 7 would be predicted as people packed into the Mid-Fraser area and became sedentary during the first period of drought. The change to a greater emphasis on mammalian resources predicted by the model would be reflected by increased frequencies of hunting and butchering and hideworking and basketry tools through time. Woodworking tools would steadily decline in frequency to reach their lowest levels late at Housepit 7, further supporting a later shift in subsistence strategies and mobility regimes. It is expected that hunting and butchering and hideworking and basketry functional groups would be closely associated and demonstrate similar patterns. If frequencies of hideworking and basketry tools do increase through time, the evolutionary model's position for the late formation of inequality might predict this due to the prestige association of buckskin, as previously discussed (Hayden 2000c). Lastly, greater amounts of hideworking and basketry tools late suggests the increased use of plant resources that may have been harvested through the use of basketry elements.

In regard to the general lithic raw material analysis, the evolutionary model predicts that evidence for the control of highly desirable resource acquisition locales such as lithic quarries would only appear late in the Housepit 7 sequence. Therefore, one or possibly two general lithic raw material types would become dominant gradually and reach their peaks late. Said another way, early deposits would show a greater diversity in raw material types, but as time passed this diversity would decrease as one or two types rise to clearly dominate over all other lithic raw material types. The late rise of ranking and inequality posited by the evolutionary model predicts that prestige-associated lithic raw materials would show low frequencies and diversity early. In both cases, this would be followed by a gradual increase through time with peaks during the latest phases of Housepit 7. The model predicts the same patterns for formed prestige items.

### **Model Prediction Summary**

Predictions for the results of the lithic analyses can be summarized in broad terms. A heavy focus on salmon coupled with low mobility, and an early rise of ownership and control of resources, ranking, and inequality are key characteristics of the aggrandizer (Hayden 1997) model. All trends or patterns in the lithics under this model of stability should appear early in the Housepit 7 record and change little through time. The evolutionary model (Prentiss et al. 2004) holds that subsistence strategies will shift to the greater utilization of a variety of terrestrial resources, and as a result mobility would also increase. Ownership and control of resources, ranking, and inequality appear late along the Mid-Fraser. Lithics under this model would show trends of gradual change through time with peaks during the later occupations of Housepit 7.

Table 3-4 summarizes the predictions of both models for the lithic analyses of this research. It should be noted that it presents an idealized vision of both models, and does not necessarily take into account ecological or technological changes in Hayden's (1997) proposition. For example, while Hayden has argued for stability during the Classic Lillooet period, he has also considered the impact technological advancements like the bow and arrow may have had on the economies of Housepit 7 and Keatley Creek. However, in order to adequately test the two models with the lithic analyses used in this research, broad lines of distinction had to be drawn between them.



**Table 3-4. Model predictions for organizational, functional, lithic raw material, and lithic prestige item analyses.**

	AGGRANDIZER MODEL	AGGRANDIZER MODEL	EVOLUTIONARY MODEL	EVOLUTIONARY MODEL
ANALYSES	LITHIC FREQUENCIES EARLY TO MID HOUSEPIT 7	LITHIC FREQUENCIES MID TO LATE HOUSEPIT 7	LITHIC FREQUENCIES EARLY TO MID HOUSEPIT 7	LITHIC FREQUENCIES MID TO LATE HOUSEPIT 7
<b>Organizational Analysis</b>				
Expedient Block Core Strategy	High <sup>1</sup>	High <sup>1</sup>	High <sup>2</sup>	Low <sup>3</sup>
Biface Strategy	Low <sup>4</sup>	Low <sup>4</sup>	Low <sup>5</sup>	High <sup>3</sup>
Portable Flake Tool Strategy	Low <sup>4</sup>	Low <sup>4</sup>	Low <sup>4,5</sup>	High <sup>3,4</sup>
Ground Stone Strategy	High <sup>6</sup>	High <sup>6</sup>	High <sup>2,6</sup>	Low <sup>3,6</sup>
Blade Strategy	Low <sup>4</sup>	Low <sup>4</sup>	Low <sup>4,5</sup>	High <sup>3,4</sup>
Abrader Strategy	High <sup>6</sup>	High <sup>6</sup>	High <sup>2,6</sup>	Low <sup>6,6</sup>
<b>Functional Analysis</b>				
Hunting and Butchering Tools	Low	Low	Low <sup>5</sup>	High <sup>3</sup>
Hideworking and Basketry (light duty) Tools	Low <sup>7</sup>	Low <sup>7</sup>	Low <sup>5,7</sup>	High <sup>3,7</sup>
Woodworking (heavy duty) Tools	High <sup>1</sup>	High <sup>1</sup>	High <sup>2</sup>	Low <sup>3</sup>
<b>General Lithic Raw Materials</b>				
Frequency of one or two raw materials	High	High	Low <sup>5</sup>	High <sup>3</sup>
Diversity of raw materials	Low	Low	High <sup>2</sup>	Low <sup>3</sup>
<b>Prestige- Associated Lithic Raw Materials</b>				
Frequency of all raw materials	High	High	Low <sup>5</sup>	High <sup>3</sup>
Diversity of raw materials	High	High	Low <sup>5</sup>	High <sup>3</sup>
<b>Lithic Prestige Items</b>				
Frequency of prestige items	High	High	Low <sup>5</sup>	High <sup>3</sup>
Diversity of prestige items	High	High	Low <sup>5</sup>	High <sup>3</sup>

- 1) Relative to frequencies of all other strategies and functional groups
- 2) Starting high but decreasing in frequency and/or levels of diversity to late Housepit 7
- 3) Relative to earlier frequencies and/or levels of diversity
- 4) Relative to ground stone and abrader strategies
- 5) Starting low but increasing in frequency and/or levels of diversity to late Housepit 7
- 6) Relative to portable flake tool and blade strategies
- 7) Buckskin prestige link may result in high frequencies relative to hunting and butchering functional group

## ***CHAPTER FOUR: RESULTS***

### **INTRODUCTION**

This chapter presents the results of the analyses described in Chapter 3. With the recent radiocarbon dating of sub-housepit and rim construction phases, lithics from all analyses could be quantified according to five distinct stratigraphic groups that constitute the entire lifespan of Housepit 7 (see Table 3-1). These stratigraphic groups give temporal control and allow the analyses to speak to rates of lithic production, use, and discard over time. Changes in these rates have relatively direct implications for changes in mobility regimes, subsistence strategies, ownership or control of resources, and ranking or status inequality, as touched upon in the preceding chapter. Once trends reflecting these issues have been observed in the data, they can then be considered in light of those predicted by the more established aggrandizer (Hayden 1997), or the newer evolutionary (Prentiss et al. 2004), models for emerging socioeconomic complexity in order to determine which is best supported by these particular data. It must be stressed at the outset that patterns and trends observed in the lithics data are not mutually exclusive of one another. For example, if increased mobility is suggested it does not mean that people were no longer sedentary, only that they may have become more logistically itinerant relative to earlier time periods.

### **RESULTS OF ORGANIZATIONAL ANALYSIS**

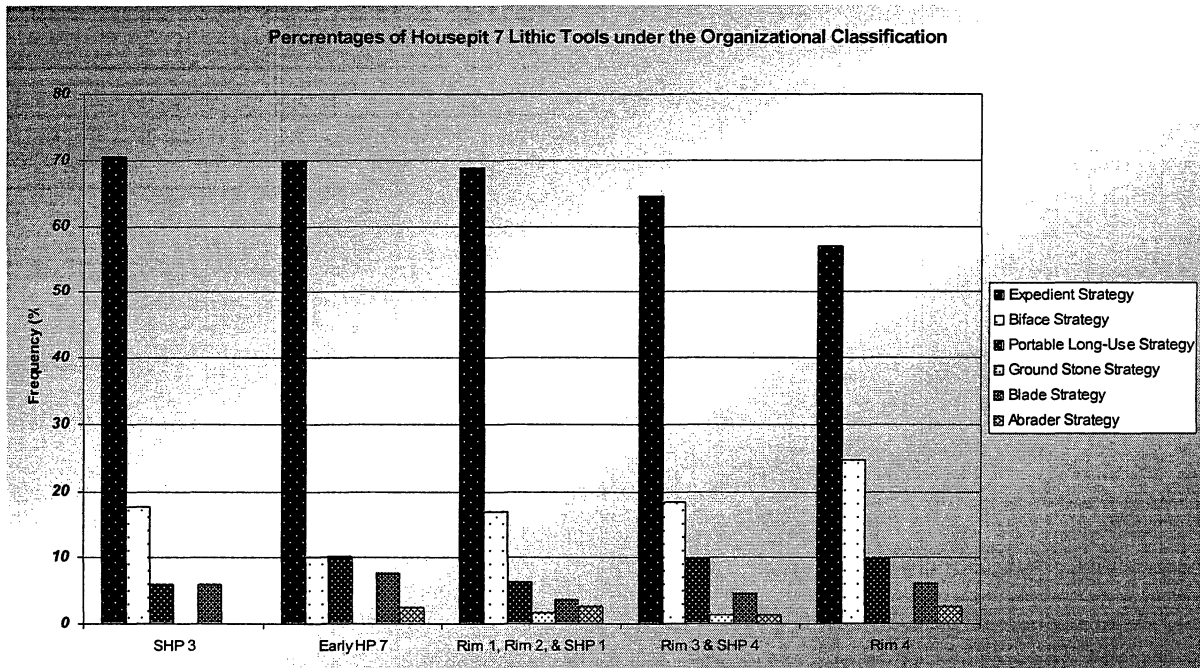
The goal of this analysis is to get an idea of variation in the organization of lithic technology through the sub-housepit and rim deposits of Housepit 7, and therefore, through time. By looking at the comparative significance of lithic use and discard strategies, insights into the level of mobility and types of subsistence practices employed

become possible. A total of 553 lithic tools were organizationally classified and quantified from the early SHP 3 deposits to the late Rim 4.

Expedient block core strategy tools dominate the assemblage through each occupation zone of Housepit 7 (Figure 4-1). This was expected as such tools are common among more sedentary groups (Parry and Kelly 1986). Expedient block core tools also steadily dropped in frequency through time, from a high in SHP 3 at 70.59% to their lowest level of 56.9% of the assemblage in Rim 4. Although tools of the expedient strategy still predominate in the last occupations of Housepit 7, their diminished presence suggests a shift in mobility and subsistence strategies, particularly when considered in conjunction with frequencies of biface and portable flake tool strategies.

Biface strategy tools drop to their lowest frequency (10%) in Early HP 7 deposits but then consistently climb to a peak of 24.56% in Rim 4, which coincides with the steady drop in expedient tools, as previously mentioned. The frequencies of portable flake tools fluctuate early and are few in number. However, it is notable that they remain at higher levels in the last two occupation phases of Housepit 7. The small sample sizes of ground stone, blade, and abrader tool strategies render them meaningless for the purposes of this analysis.

Despite the very small sample size of half of the lithic strategy groups in the organizational classification, the data still show several important trends. The data for the organizational classification suggest changing levels of mobility and modification of subsistence strategies through time. Specifically, biface and portable flake tools are multifunctional, lightweight, highly maintainable, and may even provide a raw material source (e.g. bifaces) for the production of additional tools where no other sources occur



**Figure 4-1.**

(Kelly 1988; Parry and Kelly 1986). Thus, their flexibility and dependability offered a significant advantage to mobile people over expedient tools, which are often produced with an immediate task in mind and then tossed aside (Parry and Kelly 1986).

Conversely, bifaces and portable flake tools would not function as well in more sedentary contexts. In general, these tools require large time and effort investments due to the level of skill and quality of raw material required to produce them, and are also more difficult to maintain (Parry and Kelly 1986). Tools of the expedient block core strategy, on the other hand, are more useful in sedentary contexts—in other words, factors that made bifaces and portable flake tools beneficial are not cost-effective for people remaining in one place. The organizational classification suggests expedient tools produced at Housepit 7 were necessary early on, but as time passed, biface and portable flake tools became increasingly important as people became more logistically mobile.

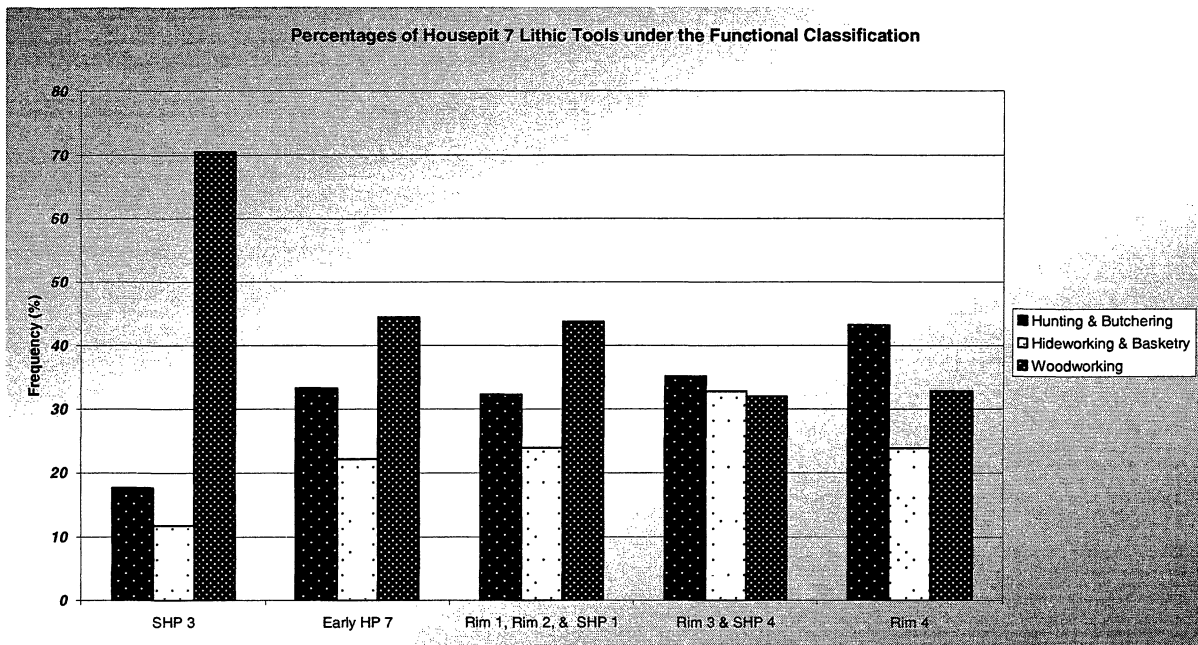
The same data trends are suggestive as to why logistical mobility may have increased at Housepit 7. The bulk of the tools classified under the biface and portable

flake tool strategies (Table 3-2, Chapter 3) are technologies that were used for the procurement, butchering, and general processing of game. It therefore follows that the greater levels of logistical mobility reflected by tool frequencies over time resulted from changing subsistence strategies and a shift to an increasing focus on mammalian resources.

### **RESULTS OF FUNCTIONAL ANALYSIS**

By consulting ethnographic (Teit 1900, 1906; Alexander 2000), distributional (Spafford 1991), and functional studies (Rousseau 1992) of lithic tool use, Housepit 7 tools were classified into three broad groups, and the collective whole of each reflect general hunting and butchering, hideworking and basketry or light-duty, and woodworking or heavy-duty tasks (Table 3-3). When the classification was quantified for each of the five Housepit 7 occupation phases, some interesting trends are discernable that parallel those observed in the organizational classification data.

A total of 490 lithic tools from Housepit 7 deposits were grouped and quantified under the functional classification. Frequencies of tools classified under the hunting and butchering functional group show a steady increase through time, from a low of 17.65% in SHP 3 to a maximum of 43.2% in Rim 4 (Figure 4-2). Hideworking and basketry tools show roughly the same pattern of increasing frequency through time, which was expected given that many of the functional tasks for the tools are related between it and the hunting and butchering class. Frequencies of hideworking and basketry or light duty tools are at their lowest (11.76%) in SHP 3, rise to a peak of 32.81% in the second to last occupation phase of Rim 3 & SHP 4, and drop again to 23.94% in Rim 4. The frequencies of woodworking or heavy-duty tools steadily decrease through time. From a high of



**Figure 4-2.**

70.59% in SHP 3, they steadily drop to reach their lowest levels (32.86%) in the last two occupations phases of Housepit 7.

If the functional groups accurately represent the general tasks after which they are named, the data suggest a gradual change first and foremost in subsistence strategies but also in the level of mobility. Increasing frequencies of hunting and butchering tools, coupled with those of hideworking and basketry tools, indicate an increased focus on the procurement of terrestrial resources through time. These would include not only mammalian resources, but plant resources as well, which may have been harvested through the use of basket elements (Prentiss et al. 2004). Basketry would, in turn, require the production of light-duty tool types included in the hideworking and basketry group. The decrease in frequency of these tools in Rim 4 is surprising. The reason for this pattern is unclear given that hunting and butchering tools continue to rise to their greatest frequency in the Rim 4. However, note that the frequency of hideworking and basketry tools in the last rim construction phase is over double what it was in SHP 3, the earliest

deposits in Housepit 7. The increasing rates of both the hunting and butchering and the hideworking and basketry tool groups suggest greater levels of logistical mobility because they were used to procure and process terrestrial resources, which, by necessity, require greater levels of mobility to obtain.

Changes in logistical mobility and (somewhat less) in subsistence are also implied by progressively diminishing frequencies of woodworking or heavy-duty functional tools. As discussed in Chapter 3, it is assumed that the bulk of these tools would be more prevalent among sedentary peoples. In particular, the large investments in time and effort required to produce some of these tools (i.e. adzes) would not be as affordable under more mobile regimes. Further, many of these tools are quite specialized and are conducive to working the hard materials used in the production of fishing technologies. The expedient nature and lack of portability of other tools within the woodworking group also fits best with more sedentary contexts (Parry and Kelly 1986). By extension, if the woodworking tools of Housepit 7 suggest the people of Keatley Creek were less mobile early on, it can be cautiously assumed they were more focused on salmon at that time given the area's excellent fishery. This focus appears to lessen over time as terrestrial resources gain in prominence.

The functional analysis data also provide an indication of increasing levels of inequality through time. If the possession of buckskin was indeed the realm of the prestigious and wealthy at Keatley Creek, as suggested by Hayden (2000c), then frequencies of hideworking and basketry tools would suggest that the greatest extent of inequality occurred during the last two phases of Housepit 7.

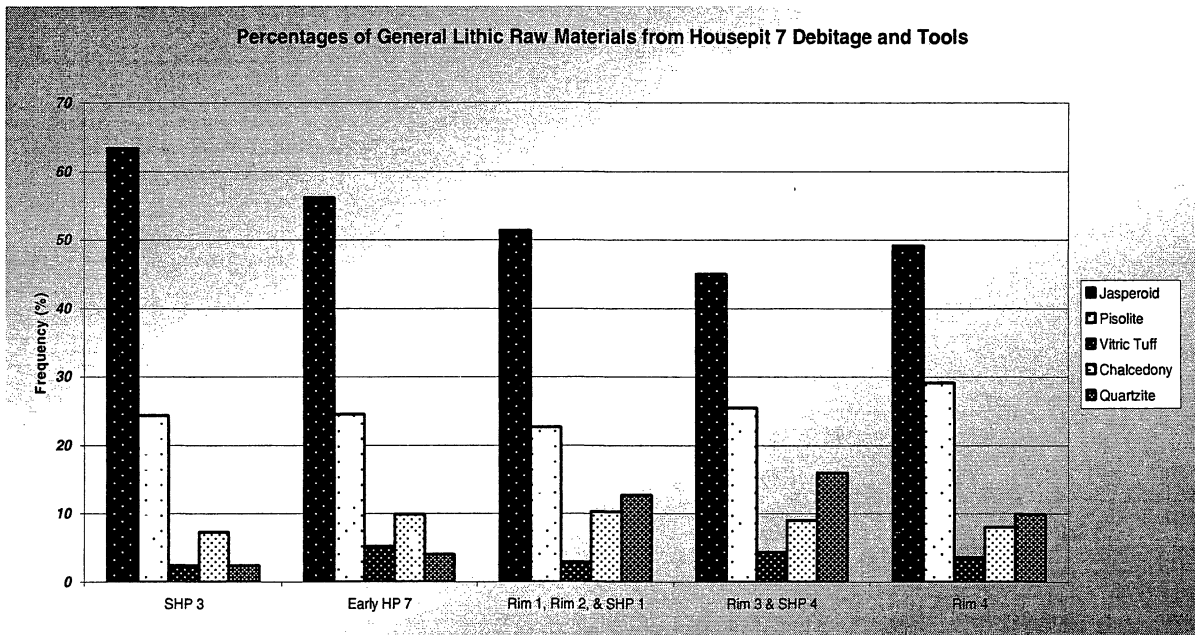
## **RESULTS OF GENERAL LITHIC RAW MATERIAL ANALYSIS**

Based on the lithic raw material analyses of three Keatley Creek housepits (1, 5, and 7), Hayden et al. (1996a) concluded that large households formed residential corporate groups that persisted for a number of centuries and had differential access to the landscape, by which they owned or controlled certain lithic raw material sources. My analysis sought to replicate the procedures of Hayden et al.'s study by measuring the frequencies of five different lithic raw material types in Housepit 7 using both the debitage and tools identified within the newly dated occupation phases (Prentiss et al. 2003b). Hayden et al. (1996a) saw evidence for clear raw material preferences in Housepit 7, and therefore assumed that this reflected the ownership or control of a lithic raw material source. My results are not quite as definitive.

A total of 1,575 pieces of lithic debitage and tools were tabulated by raw material, which include jasperoid, pisolite, vitric tuff, chalcedony, and quartzite from the occupation phases of Housepit 7. Jasperoid clearly dominates the lithic assemblage of each house phase, which replicates the results of Hayden et al. (1996a). However, a steady drop in frequency is also indicated along the housepit's timeline. Jasperoid peaks early in SHP 3 (63.41%), then drops to 45.01% in Rim 3 and SHP 4, before rebounding slightly again to 49.14% in Rim 4 (Figure 4-3). As Jasperoid decreases, frequencies of other lithic raw materials generally tend to increase through time.

Pisolite is the next most heavily utilized lithic raw material. It increases slightly from 24.39% in SHP 3 to its greatest level at 29.17% in Rim 4. Like pisolite, the frequency of quartzite also increases through time. The swell in numbers is substantial considering the initial frequency of 2.44% in SHP 3, which then jumps over six times to a





**Figure 4-3.**

peak of 16.01% in Rim 3 & SHP 4. Quartzite does drop again to 9.98% in Rim 4, but this is still over four times the amount observed in SHP 3. Vitric tuff frequency fluctuates through time, and climaxes at 5.27% during the Early HP 7 phase. The frequency of chalcedony also reaches its zenith at 10.27% in Rim 1, Rim 2, and SHP 1, before falling off again to 8.06% in Rim 3 and SHP 4 and Rim 4. Both vitric tuff and chalcedony display frequencies in Rim 4 that are greater than what was observed in the earliest deposits of Housepit 7, although these increases are minimal.

These lithic raw material data are interesting in light of Hayden et al.'s (1996a) lithic study. Jasperoid may dominate the raw material types at Housepit 7 through time, but its prevalence becomes less marked between the earliest and the latest deposits of the house. As jasperoid decreases, pisolite and quartzite reach their greatest levels in the last two Housepit 7 occupation phases. The low frequencies of vitric tuff and chalcedony vary slightly through time, which precludes drawing inferences from these data.

However, it may be noteworthy that their Rim 4 frequencies are higher than in the earliest occupation phase of SHP 3.

If Hayden et al. (1996a) are correct, the dominance of a raw material, as recovered from housepit deposits, may indicate ownership and control of key lithic acquisition locales. The results here show strongest evidence for this early in the Housepit 7 sequence, but then the picture slowly changed as time went on. These data imply ownership and control of jasperoid occurred early, but then slowly eroded through time as the procurement and use of all other raw materials rose in frequency, and reached their apex in mid to late Housepit 7 deposits. In short, this lack of sustained control coupled with the increase in the diversity of lithic raw materials would not be expected if a residential corporate group maintained their presence for centuries at Housepit 7 (Hayden et al. 1996a). This, of course, is assuming the conclusions of Hayden et al.'s (1996a) study are correct. If they are not, another possibility may be that Housepit 7 corporate groups simply expanded their ranges over time, thereby accessing a greater variety of lithic raw materials.

### **RESULTS OF PRESTIGE-ASSOCIATED LITHIC RAW MATERIAL ANALYSIS**

Prestige- associated lithic raw materials include nephrite, steatite, and obsidian. All were used to manufacture tools and artifacts that are associated with the activities and wealth displays of high-ranking individuals and households at Keatley Creek (Hayden 2000c). In addition to the prestige items they were used to manufacture, nephrite and steatite were unique and “prestigious” because of the large time and labor investments required to work them (Darwent 1980). In the case of obsidian, its local rarity contributed to its increased value. As described in Chapter 3, frequencies of these types

of raw materials tend to be low in domestic deposits for a variety of reasons (Hayden 2000c). These low numbers need to be kept in mind as trends in the data are discussed.

A total of 26 pieces of debitage, tools, and/or prestige items were manufactured from nephrite, steatite, or obsidian throughout the Housepit 7 sequence. The earliest deposits of the house, as well as the early middle period of Rim 1, Rim 2, and SHP 1, show nephrite as the only prestige raw material represented (Figure 4-4). This 100% use of nephrite changes abruptly in Rim 3 and SHP 4, and all three prestige raw material types are represented evenly. In the final occupation phase of Rim 4, obsidian dominates and constitutes 70% of the prestige-associated lithic raw materials. Nephrite drops out entirely and steatite decreases slightly to 30%. When all prestige-associated raw materials (nephrite, steatite, and obsidian) are collapsed into a single group, the trend toward larger frequencies late in the Housepit 7 occupational sequence becomes much clearer than when they are viewed individually (Figure 4-5). Taken together, prestige-associated lithic raw materials rise to 11.54% in Rim 3 and SHP 4, and then jump to 76.92% in Rim 4. Thus, 88.5% of all prestige stone is associated with the house's final two occupation phases. In sum, the results of this analysis indicate their use became much more common late in the life of Housepit 7.

If the simple presence of lithic prestige items, and by extension the raw materials used in their manufacture, are considered as indicators of ranking and inequality (Hayden 2000c), then these data suggest that differential social and economic standing was most substantial late, in the Rim 4 occupation phase of Housepit 7. Hayden (2000c:190) cites increased diversity of prestige items in spatial distribution studies as being an "especially reliable indicator of high status". If this idea is extended to the relative frequencies of

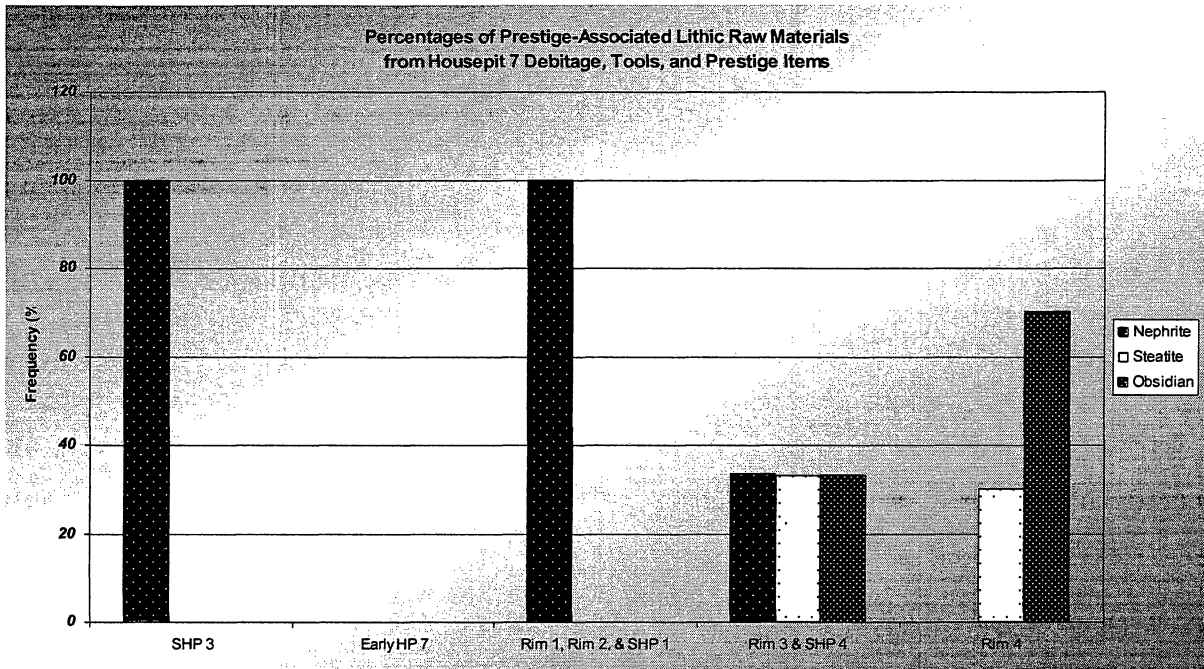


Figure 4-4.

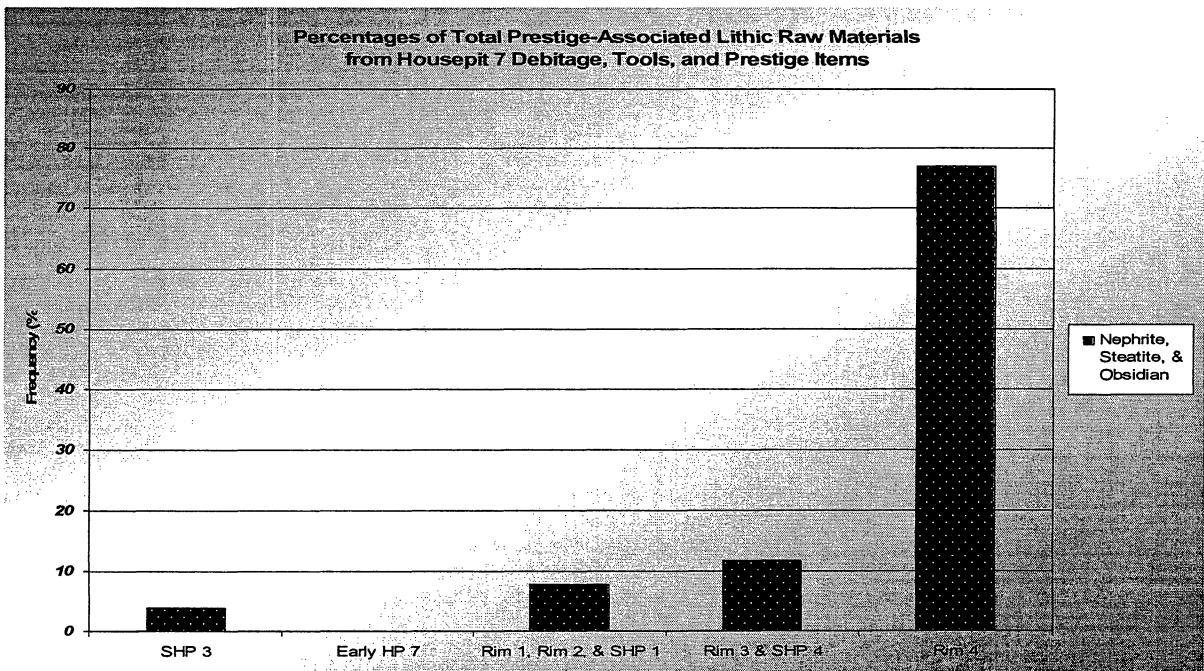


Figure 4-5.

prestige-associated lithic raw materials, then the greater diversity of these materials in the last two occupation phases provides further evidence that a high degree of status inequality came late to Housepit 7 and Keatley Creek. In addition to ranking and inequality, greater levels of exchange and mobility may be indicated by the pronounced

increase in obsidian frequency between Rim 3 and SHP 4 and Rim 4. Although evidence for a local obsidian lithic source is lacking (Rousseau 2000), studies show that numerous pieces of the material came from Anaheim Lake, located roughly 300 kilometers northwest of the Keatley Creek site (Hayden 2000c). These data, would suggest that exchange became much more prominent late, during the last rim phase of Housepit 7.

### **RESULTS OF THE LITHIC PRESTIGE ITEM ANALYSIS**

The analysis and tabulation of Housepit 7 lithic prestige items in domestic deposits are beset with the same problems that results in low frequencies of prestige-associated raw materials, as previously discussed and detailed in greater depth in Chapter 3. However, relative frequencies can still be constructive for determining rates of lithic prestige item utilization through time. While their low sample size must always be kept in mind when considering trends in the data, the mere existence of these items can give indications of ranking and inequality (Hayden 2000c) when plotted along the Housepit 7 timeline.

Only 11 individual prestige items were identified in Housepit 7 deposits. SHP 3 contained a single piece of ornamental ground nephrite, and Early HP 7 was entirely devoid of prestige items (Figure 4-6). Rim 1, Rim 2, and SHP 1 contained one piece of miscellaneous ground stone. In Rim 3 and SHP 4 diversity of items increases substantially, with pipe or bowl fragments, ground stone mauls, and adzes all represented by single examples. The diversity of prestige items is not only maintained in Rim 4, but their overall frequency rises with the addition of three stone beads, a single ornament, and two pipe fragments. When all prestige item types are collapsed into a single group, these patterns become even more pronounced (Figure 4-7). The increase in both diversity and

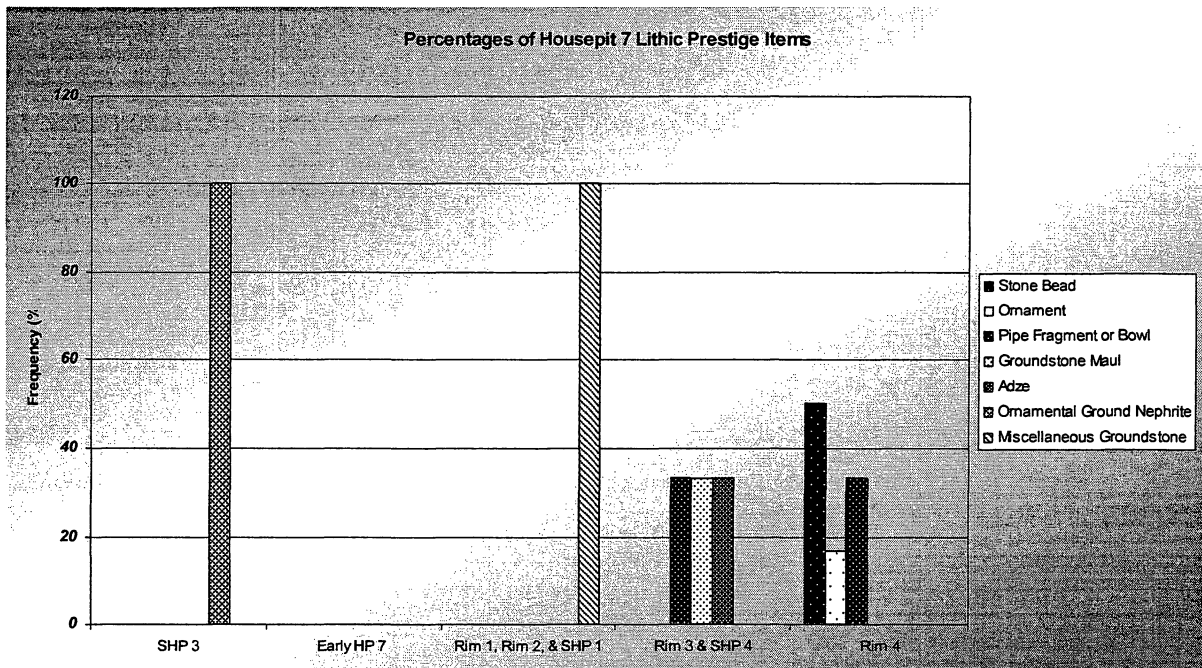


Figure 4-6.

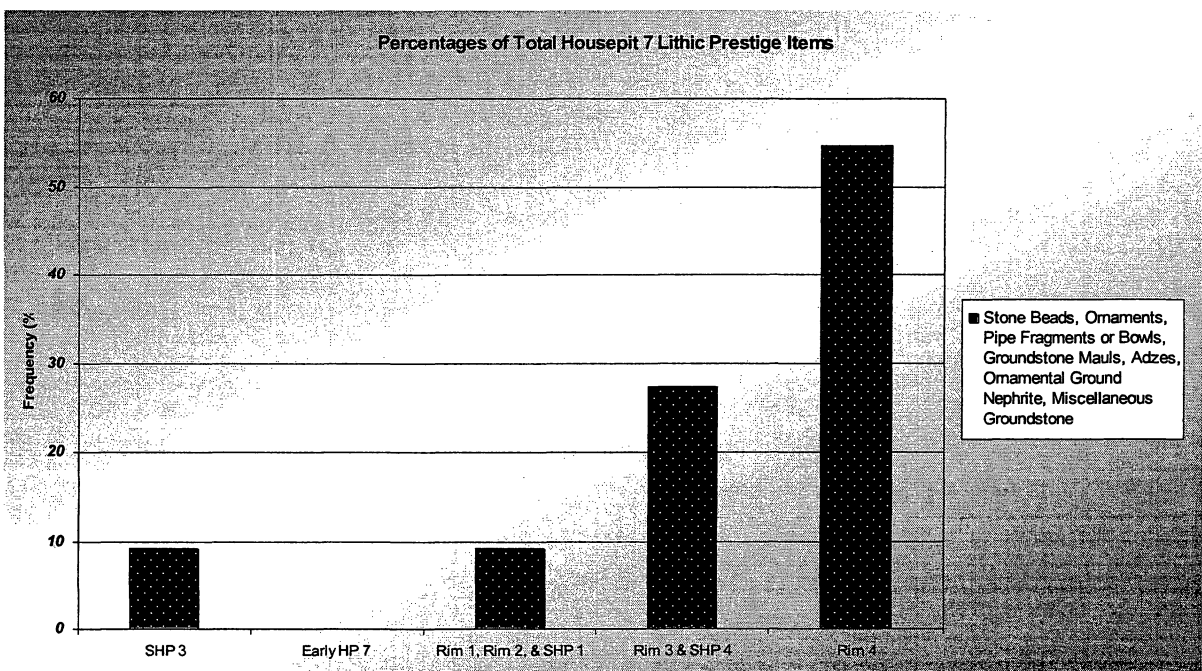


Figure 4-7.

number of prestige items over time is clear, and terminates with a large peak in Rim 4. In fact, 27.27% of the all lithic prestige items are found in Rim 3 and SHP 4, which then doubles to 54.55% in Rim 4. Thus, 9 of the 11 lithic prestige items tabulated (81.8%), are from the two most recent Housepit 7 rim occupations.

Lithic prestige items show the same pattern as prestige-associated raw materials. The steady increases in relative frequencies and diversity through time indicates that the wealth displays, ranking, and overall inequality in which prestige items played a part reached their maximum extent during the last two occupation phases of Housepit 7.

### **RESULTS SUMMARY**

The analyses of lithics data collected during the University of Montana's 1999, 2001, and 2002 excavations at Housepit 7 of the Keatley Creek site revealed some rather remarkable trends in the rates of lithic production, use, and discard, which in turn have a number of interesting implications. Gradual, steady rises in the level of logistical mobility and in the focus on terrestrial resources are indicated through time at Housepit 7, and both reached their greatest extent in the two most recent rim phases of the house. Evidence for the ownership and control of lithic sources also appears to be present, although data trajectories suggest this control gradually faded and weakened through time. Increases in the relative frequency and diversity of both prestige-associated lithic raw materials and of formed lithic prestige items imply differential economic standing came about fairly gradually and did not reach its greatest extent until the latest Housepit 7 deposits. Greater levels of exchange and mobility late in the life of Housepit 7 are also suggested by the prestige-associated lithic raw material data.

## ***CHAPTER FIVE: DISCUSSION***

The results presented in Chapter 4 show that the analyses conducted in this study, which measure rates of lithic production, use, and discard at Housepit 7, have implications for prehistoric mobility, subsistence strategies, ownership and control of lithic sources, and status inequality. This chapter first discusses these implications in terms of those predicted by the two models for emergent socioeconomic complexity tested in this research (see Chapter 3 for predictions and model discussions). In so doing, it will be possible to determine which of these two models is best supported by the implications of the lithics data. With this determination made, implications can then be extended to, and considered within the context of, the supported model.

### **A RETURN TO THE MODELS' PREDICTIONS**

In order to determine which model, the aggrandizer (Hayden 1997) or the evolutionary (Prentiss et al. 2004), is best supported by the lithic analyses of this research, implications will be reviewed against those predicted by the models in Chapter 3. This section is broken into sub-sections for the individual lithic analyses.

#### **Predictions for the Organizational Analysis**

Based on the organizational classification, frequencies of lithic use and discard strategies imply changes in the level of mobility and in subsistence regimes employed at Housepit 7 (Hayden et al. 1996b, 2000). The expedient block core and biface strategies proved to be the most meaningful due to their large sample size. The decreasing rates of the expedient block core tools, coupled with increasing frequencies of bifaces, documents a gradual increase in both the level of logistical mobility and reliance on mammalian resources over time. Although sample size was small, a larger and fairly stable frequency



of portable flake tools occur late in Housepit 7, and generally support the trends observed in the expedient block core and biface tool data. Frequencies of the ground stone, abrader, and blade tool strategies are quite low, and as a result are not considered to have any significant implications in this study. Despite this fact, those that are retained are quite meaningful relative to models of emergent socioeconomic complexity.

Hayden's (1997) aggrandizer model predicted frequencies of expedient block core strategy tools would remain high and stable while bifaces and portable flake tools would remain consistently low. Taken together, these tool groups indicate a low level of logistical mobility and a continuous, strong focus on salmon. While this analysis demonstrates that the intensive reliance on expedient tools was high throughout the Housepit 7 sequence, it also shows that they continuously dropped in number through time to reach their lowest frequencies in Rim 4. In contrast, biface frequencies steadily increase from Early HP 7 times and peak in Rim 4. Portable flake tool frequencies reach higher, sustained levels in the final two occupation phases of Housepit 7, when compared to its earlier deposits. As such, the specific predictions of Hayden's (1997) aggrandizer model for the expedient block core, biface, and portable flake tool strategies were not met, and therefore it is not supported by the data of the organizational analysis.

Under the Prentiss et al. (2004) evolutionary scenario, it was predicted that expedient block core tools would dominate early but then diminish through time to reflect the gradual increase in the level of logistical mobility and shift to a heavier reliance on mammalian resources. These changes in mobility and subsistence would likewise be reflected in a gradual and continual increase in the frequencies of bifaces and portable flake tools. The results of the organizational analysis show that reliance on expedient

block core tools, while prevalent throughout the rim, did in fact decline over time. Biface and portable flake tool strategy frequencies rose to peak in Rim 4 or remain at stable highs in the last two occupation rims of Housepit 7, respectively. Therefore, predictions of the evolutionary model for these three tool strategies were indeed met, and as a result it is best supported by the relevant and meaningful data of the organizational classification. It could be argued that this analysis simply measures variation in hunting frequency, which in turn would be expected to increase under either model given the adoption of the bow and arrow. While this may be true, this research tests idealized visions of both the aggrandizer and evolutionary models, as discussed in Chapter 3. Since the former model does not explicitly take into account several additional lines of evidence that further support greater access to mammalian resources later in time that the latter proposition does, it is still the evolutionary model that *best fits* with the results of the organizational analysis data.

### **Predictions for the Functional Analysis**

The functional analysis of Housepit 7 lithic tools also reveals trends of change through time in both mobility regimes and subsistence strategies. These data suggest a strong, initial sedentism at Housepit 7, followed by an increasingly greater degree of logistical mobility as people slowly shifted subsistence strategies from a pronounced focus on salmon to a greater emphasis on the procurement of terrestrial resources (mammalian and plant). The analysis also indicates that, overall, shifts in mobility and subsistence reached their greatest extent late in the life of Housepit 7. An increase in hideworking and basketry tools also suggests this, as well as a gradual and late development of status inequality.

For the functional analysis, Hayden's (1997) aggrandizer model predicted that the frequencies of hunting and butchering tools, along with hideworking and basketry tools, would remain relatively low throughout the entire rim sequence of Housepit 7. If there was to be a difference in frequencies between the hunting and butchering and the hideworking and basketry tool classes, it was predicted that the latter would be somewhat more prevalent than the former due to the prestige association of buckskin (Hayden 2000c). In any case, the low tool frequencies of both groups contrasts with the prediction of consistently high numbers of woodworking tools, which would indicate the sustained, low degree of logistical mobility and heavy emphasis on salmon that are central to the model.

Conversely, the Prentiss et al. (2004) evolutionary model predicted an initial dominance of woodworking tools to be followed by a drop-off in frequency as the hunting and butchering and hideworking and basketry functional groups gained in numbers through time. This trend would thus indicate a slow increase in logistical mobility as people expanded their diet to include greater amounts of mammalian resources under increasingly ranked and competitive contexts. These trends would reach their greatest extent in the later two occupation phases of Housepit 7, or Rim 3 and SHP 4 and Rim 4. If there was any marked difference between the two groups, the model also predicted that the prestige- association of buckskin would function to elevate frequencies of hideworking and basketry tools over those of the hunting and butchering class late in the rim sequence of the house (Hayden 2000c; Prentiss et al. 2004)

This analysis has shown that the most recent occupation phase of Housepit 7 exhibited the greatest frequency of hunting and butchering tools coupled with a low

frequency of woodworking tools. From the earliest to the latest housepit phases, both functional groups gradually but consistently rose and fell to their maximum highs and lows, respectively. Meanwhile, hideworking and basketry tools climbed in frequency with each passing phase, following the hunting and butchering tool trend, although their frequencies do drop somewhat in Rim 4. At no time are tools of the former class more prevalent than those of the latter. Overall, implications of the functional analysis do not meet those predicted by Hayden's (1997) aggrandizer model, and as such it is not supported by these data. Rather, implications of the analysis align more closely with those predicted by the evolutionary (Prentiss et al. 2004) model, and therefore it is supported by these data. The one exception to this is the drop in hideworking and basketry frequencies in Rim 4, which was not predicted.

#### **Predictions for the General Lithic Raw Material Analysis**

The lithic raw material analysis revealed some unexpected data trends. Jasperoid dominated all five raw material types from the earliest to the latest Housepit 7 deposits. In this regard, the results duplicate those of Hayden et al.'s (1996a:351) research. However, this analysis shows that the frequency of jasperoid declined over time while pisolite and quartzite reached their highest quantities in the last two housepit occupation phases. Vitric tuff and chalcedony occur in small amounts, but their Rim 4 numbers are higher than in the early SHP 3 occupation, which has some minor significance.

Hayden et al. (1996a) maintain that the preference of jasperoid in Housepit 7 lithics indicates ownership and control of a key resource by residential corporate groups that persevered for hundreds of years. If the same corporate group occupied the dwelling for this span of time (or even a millennium) as suggested by Hayden et al. (1996a), there

should be early indications of ownership or control and these would be expected to remain fairly stable. In short, the pattern of general raw material frequencies observed in SHP 3 (Figure 4-3) should be repeated in a relatively stable manner in all subsequent Housepit 7 strata groups. The aggrandizer model (Hayden 1997) predicted these same patterns, which would support the contention that socioeconomic complexity, of which ownership or control of key resources is a part, arrived early at Keatley Creek and remained relatively unchanged until site abandonment.

The evolutionary model, on the other hand, maintains that complexity should not arise until late at Keatley Creek. As a result, the model predicted that indications of ownership or control would not reach their greatest extent until late in the Housepit 7 rim. Patterns in the lithic raw material data supporting this model would show a gradual increase in the dominance of one or maybe two lithic raw material types, which would become most prevalent in the mid to late Housepit 7 occupation phases.

If ownership or control of parts of the landscape is indeed indicated by the dominance of a particular raw material, the data of this analysis suggest strong initial control that fell off through time: jasperoid became less prevalent and other raw material types rose in frequency to reach their zenith in the middle and late periods of Housepit 7. This suggests less, not sustained and certainly not increased, control through time. Thus, predictions under Hayden's (1997) aggrandizer model were not met, and these data also do not support the conclusions of Hayden et al. (1996a). Further, predictions under the evolutionary (Prentiss et al. 2004) model were also not met because again, the data suggest a gradual decline in the level of control rather than increased levels late. Therefore the results of the general lithic raw material analysis have to be considered

neutral in terms of offering support for either model tested in this research. As alluded to in Chapter 4, these results may suggest that Housepit 7 corporate groups expanded their range over time and as a result accessed a greater variety of lithic raw materials.

### **Predictions for the Prestige-Associated Lithic Raw Material Analysis**

The prestige-association of nephrite, steatite, and obsidian has been discussed in previous chapters. If these materials indeed reflect high status and inequality, then their relative numbers within Housepit 7 strata groups can function as a barometer for the social and economic standing of the household over time. The early and early-middle house deposits show limited frequency and breadth of prestige-associated stone. The latest two rim phases, however, are characterized by greater frequency and diversity of prestige-linked lithic materials, particularly obsidian in Rim 4. When nephrite, steatite, and obsidian are considered together, Rim 4 dominates all previous occupations in its total content of prestige-associated stone. This implies that differential social and economic status did not become pronounced until late in the life of Housepit 7. The marked increase in the level of obsidian in Rim 4 supports this idea, but also suggests greater levels of prehistoric exchange and perhaps mobility due to its local scarcity.

If socioeconomic complexity (inequality, ranking) arose early at Keatley Creek and was sustained through time, as proposed by Hayden (1997), then prestige-associated lithic raw materials should give an indication of this. Indeed, the aggrandizer model predicted high frequencies of all prestige-associated stone early, and then to be stable throughout the life of Housepit 7. Diversity of material types was also predicted to be high early and fluctuate little over time.

In contrast, the evolutionary model posits that Hayden's level of complexity, with its inequality and ranking, only became prominent late at Keatley Creek. Therefore, the model predicted that frequencies of prestige lithic raw materials would be low and show a limited breadth early. This would then be followed by a gradual and steady increase in frequency and diversity of prestige-associated lithics until they peaked in the latest phases of Housepit 7.

The implications of this analysis do not support those predicted under the aggrandizer model (Hayden 1997), since the numbers and breadth of prestige-linked stone suggest inequality and ranking became most prominent late, rather than early. Frequencies and diversity of prestige raw materials between the early and late Housepit 7 occupation phases show abrupt increases, which are patterns that meet the predictions for analysis results under the evolutionary model (Prentiss et al. 2004).

### **Predictions for the Lithic Prestige Item Analysis**

The analysis of Housepit 7 lithic prestige items parallels that of prestige-associated materials in its methods, problems, and implications. Formed lithic prestige tools and artifacts are linked to inequality and ranking, as detailed in Chapter 3. At Keatley, prestige items are characterized by low frequencies to an even greater degree than prestige-associated lithic raw materials. However, even low numbers of prestige items can be helpful for discerning the social and economic standing of a household (Hayden 2000c). This analysis shows that low frequencies and diversity of lithic prestige items characterize the early and early-middle occupation phases of Housepit 7. However, the number and diversity then increase in the last two rim phases (Rim 3 and SHP 4; Rim 4) of the housepit. When grouped into a single prestige item class, the steady increase in

their frequency really becomes clear. In fact, Rim 4 contains twice the number of items identified in the preceding rim phase.

Predictions for this analysis under both the aggrandizer (Hayden 1997) and the evolutionary (Prentiss et al. 2004) models mirrored those of the prestige-associated lithic raw material analysis. The aggrandizer scheme predicted that the relative diversity and frequencies of prestige items would be high early and remain elevated through Rim 4, thus reflecting the model's position on the early emergence of inequality and ranking and their retention once established. The evolutionary model predicted low frequencies and diversity of lithic prestige items early, followed by gradual increases through time to peak during the later occupations of Housepit 7. Such a trend would support the gradual and late emergence inequality and ranking proffered by the model.

It is clear from this analysis that the data do not meet the predictions of the aggrandizer model (Hayden 1997). They do, however, show a steady increase in both prestige item frequency and diversity over time with peaks in Rim 4, which were trends predicted by the evolutionary model (Prentiss et al. 2004).

In summary, the preceding discussions have shown that all but one of the lithic analyses conducted in this research met the predictions of the Prentiss et al. (2004) evolutionary model for emerging socioeconomic complexity at Keatley Creek. While the evolutionary scheme was not supported by the general lithic raw material analysis, the results did not meet the predictions of the aggrandizer model (Hayden 1997) either. Organizational and functional lithic data suggest increased levels of mobility and reduced reliance on riverine resources coupled with a greater focus on mammalian resources. These data trends generally reach their greatest extent late in the life of Housepit 7.



Lithic prestige data also suggest pronounced levels of inequality and ranking appeared late.

### **DISCUSSION OF IMPLICATIONS UNDER THE SUPPORTED MODEL**

The lithic analyses conducted in this thesis sought to test two models of emergent socioeconomic complexity in the Mid-Fraser area of British Columbia and at the Keatley Creek site in particular. Most of the analyses' implications have been shown to best fit those predicted by the evolutionary (Prentiss et al. 2004) model. This section attempts to take these implications and place them within the larger context of the supported model.

The evolutionary model posits that socioeconomic complexity developed in the Mid-Fraser area in three phases (Prentiss et al. 2004). Warm and dry climatic conditions during the early Plateau Horizon at 2400-1400 B.P. led to drought conditions between 1800 and 1500 B.P. In response to the increasingly dry conditions, people packed into the Mid-Fraser area and Keatley Creek in order to access the plentiful salmon runs that were still present despite the poor environmental conditions. This packing resulted in the emergence of aggregated villages with a diet strongly focused on salmon that was supplemented with additional resources through logistical collecting (Prentiss et al. 2004). When the warm and dry climate finally turned to drought after 1800 B.P., people became more tied to, and may even have defended, key fishing locales. Nonetheless, the egalitarian ideals that defined the mobile hunter-gatherer lifeway prior to packing into the Mid-Fraser appears to have held fast, since there is no clear evidence of ranking and inequality at this time other than differences in house size.

The Housepit 7 occupations that cover the first drought phase of the evolutionary model (SHP 3 and Early HP 7), have a combined radiocarbon span of 1815-1299 B.P.

(Table 3-1) (Prentiss et al. 2003b). The organization of lithic technology during these occupations reflects the strong reliance on salmon and a low degree of logistical mobility suggested to have been present during this period. Expedient block core tools dominated while bifaces and portable flake tools were relatively scarce. Functional lithic tool groups parallel what is seen organizationally at this time, particularly in SHP 3. Significant drops observed in woodworking tools and increases in hunting and hideworking tools between SHP 3 and Early HP 7 strata are notable. This may be reflective of increased defensive concerns and logistical collecting activity during the height of the drought. Prestige-associated lithic raw materials and artifacts are poorly represented in SHP 3 and are non-existent in Early HP 7, suggesting that ranking and status inequality did not gain prominence during the first drought and packing event.

Cooler, wetter climatic conditions prevailed between 1400 and 1100 B.P., near the end of the Plateau and the very beginning of the Kamloops Horizons. The evolutionary model posits that salmon runs improved across the Canadian Plateau, and as such payoffs to staying packed in the Mid-Fraser area were no longer what they were during the preceding drought (Prentiss et al. 2004). In fact, costs for the collection of terrestrial resources may have become too large for most people to bear, as the investments required increased substantially under the cool, wet climate. An increased number of housepits at sites elsewhere on the Plateau suggest population movement out of the Mid-Fraser during this period. However, the Keatley Creek site was not abandoned and data do suggest the possibility that fewer people lived there (Prentiss et al. 2003b). The evolutionary model holds that patterns initiated during the prior drought

were generally maintained during the cool, moist interval, but some minor increases in ranking and inequality may have occurred (Prentiss et al. 2004).

At Housepit 7, the cool, wet phase of the model begins at the tail end of the Early HP 7 occupation (1710-1299 cal. B.P.), includes all of Rim 1, Rim 2, and SHP 1 (1345-1176 cal. B.P.), and the bulk of Rim 3 and SHP 4 (1306-1060 cal. B.P.) (Table 3-1) (Prentiss et al. 2003b). Organizationally, Housepit 7 lithic technology from these occupations shows the domination of expedient block core tools, but at the same time they steadily decrease as biface tools progressively gain prominence. Portable flake tools dip in frequency but do return to elevated numbers in Rim 3 and SHP 4. Functionally, the woodworking tool group consistently drops during this period, while hunting and butchering tools rise slightly and hideworking and basketry tools also increase, but in a more pronounced fashion. The organization and function of Housepit 7 lithic technology implies a greater reliance on mammalian resources through the cool and wet period of 1400 to 1100 B.P., as suggested by the evolutionary model and supported by recent analyses of the house's faunal remains (Prentiss et al. 2004; Burns 2004). Greater mobility is also suggested, which may have been a natural byproduct of the increased focus on mammalian resources. The low degree of ranking and status inequality observed in the first phase, as indicated by prestige-associated lithic raw materials and items, appears to have been maintained in this phase until Rim 3 & SHP 4. Increased frequencies and diversity of prestige-linked raw materials and formed items suggest some degree of inequality had arrived toward the end of the cool and moist climate conditions, which may hint at the minor status differentiation.

The cold, damp climate of 1400 to 1100 B.P. gave way to a second period of drought during the first half of the Kamloops Horizon, between 1100 and 700 B.P. Patterns initiated during the first drought were repeated, only to a more extensive degree which entailed very different results (Prentiss et al. 2004). People once again packed into the Mid-Fraser area to access the ample salmon runs that had diminished elsewhere. Drought conditions opened up forests, which benefited ungulate populations and some types of edible plant resources and as a result search times and the effort required to access them was reduced. According to the evolutionary model, it was at this time that elements of the Classic Lillooet period described by Hayden (1997) finally came to complete fruition. A significant elaboration of the cultural structure laid down during the first drought ensued, and the second drought saw an entirely new type of mechanism that did not involve the retention of egalitarian ideals but rather pronounced socioeconomic complexity (Prentiss et al. 2004). Competitive behavior and territoriality may have led to local resource shortages, which could have been intensified by new technological innovations like the bow and arrow. Indeed, Housepit 7 faunal studies suggest mammals became the main focus of the diet during this second drought (Burns 2004). In such a situation, the largest households and their members would have had the greatest advantage and benefited via elevated prestige on both the corporate and individual levels. Ranking and status differentiation soon followed (Prentiss et al. 2004).

Housepit 7 occupations during this second period of drought include the very end of Rim 3 and SHP 4 (1306-1060 cal. B.P.) and all of Rim 4 (1303-965 cal. B.P.). During this period, patterns observed in the lithics of Rim 3 and SHP 4 became much more pronounced in Rim 4. The increased reliance and focus on mammalian resources

suggested by the faunal data is reflected by the organization of lithic technology. Expedient block core tools continually dropped in their dominance and reached their lowest frequency in Rim 4. Biface numbers increased and peaked in Rim 4, and portable flake tool frequencies also increased and remained stable in both rims. Functional tool classes echo these trends, as woodworking tools reached their lowest frequencies during the second drought. Hunting and butchering gear, along with hideworking and basketry tools, reached their greatest levels in Rim 3 and SHP 4 and Rim 4, respectively. Together, the Housepit 7 organizational and functional lithics data indicate a reduced emphasis on salmon and increased reliance on mammalian resources, which would have occurred under highly competitive circumstances and involved the use of new technologies (i.e. the bow and arrow), a situation where large households had all the advantage (Prentiss et al. 2004).

Status differentiation and inequality were most pronounced during this time period, as indicated by the Housepit 7 prestige lithics data. Although diversity of prestige-associated lithic raw materials observed in Rim 3 and SHP 4 was reduced in Rim 4 by one material type, there was a marked increase in obsidian frequency. This greater use of obsidian in the last occupation phase suggests exchange may have become significant late in the Housepit 7 sequence. The diversity of formed lithic prestige items was stable during the last two housepit occupations; the combined frequency of all items doubles in Rim 4. The peak of hideworking and basketry tools in Rim 3 and SHP 4 may also indicate elevated inequality during this period due to the high status afforded by buckskin (Hayden 2000c). Overall, these data indicate that ranking and inequality, and by extension socioeconomic complexity, reached their fullest extent late at Housepit 7

and the Keatley Creek site, just prior to their abandonment during the brief period of 1100-700 B.P., as proposed by Prentiss et al. (2004).

The catastrophic landslides in the Fraser canyon, which had detrimental effects on the highly predictable and abundant salmon runs, may not have been the primary cause behind the abandonment of the Keatley Creek site, as maintained by Hayden and Ryder (1991). Environmental data indicate climatic conditions changed between 800 and 700 B.P.—around the time of village abandonment—and returned to the cool and moist conditions that were present prior to the second drought. Cooler temperatures and increased moisture resulted in a severing of the ties that bound people to the Mid-Fraser and Keatley Creek, since salmon runs had improved across the Plateau and search and pursuit times for mammalian resources had increased locally (Prentiss et al. 2004). At village abandonment, shifts in mobility regimes and subsistence strategies occurred as payoffs for remaining semi-sedentary became less. Although salmon were still utilized, faunal remains from terminal rim phases of Housepit 7 indicated a broad diet rich in large and small game, and possibly increased reliance on plant resources (Burns 2004). With a diet largely focused on terrestrial resources, the costs of hunting and pursuing game and plant resources that were increasingly dispersed and scarce would have become too great. Many people may have determined that remaining tied to the village was no longer feasible or beneficial, and as such left to pursue a more mobile hunter-gatherer lifeway. When enough people made this decision, the village was abandoned. Although this scenario does not rule out the possibility that a catastrophic landslide may have contributed to the demise of Keatley Creek, changing resource use patterns are viewed as the primary cause (Prentiss et al. 2004; Burns 2004; Hayden and Ryder 1991). The

Housepit 7 lithic data support this viewpoint. A diminished focus on salmon coupled with increased mobility and reliance on mammalian and other terrestrial resources reached their peak expressions in Housepit 7 just prior to village abandonment.

### **DISCUSSION SUMMARY**

The lithic data generated by this research indicate increasing levels of logistical mobility and reliance on terrestrial resources over time at Housepit 7. This pattern reached its maximum in the last rim construction phase of the house. The general lithic raw material analysis did not indicate patterns of ownership and control predicted under either model tested, and as such was determined to be neutral in terms of this research. However, the prestige lithic data show that ranking and status inequality reached their greatest expressions during the last two Housepit 7 rim phases, and was particularly strong in the final rim. All retained, combined data best fit with predictions posed by the evolutionary model (Prentiss et al. 2004) and run counter to those of the aggrandizer (Hayden 1997) proposition. In essence, it was people responding to changing environmental conditions that led to the arrival of marked socioeconomic complexity as a side effect at Keatley Creek that, in fact, peaked near the end of the village's life.

## ***CHAPTER SIX: CONCLUSIONS***

This study was conducted in order to test two models for emergent socioeconomic complexity in the Mid-Fraser area of British Columbia, Canada, and specifically at the Keatley Creek site. Lithics data used to test these models were derived from the University of Montana's 1999, 2001, and 2002 excavations at Housepit 7 at Keatley Creek. The lithic analyses relied on new radiocarbon dates derived from charcoal samples in hearths, postholes, and floors within Housepit 7 (Prentiss et al. 2003b). This level of stratigraphic and temporal control was not available to previous researchers. These new dates from Housepit 7 range from the latter half of the Plateau Horizon (1815 cal. B.P.) to the first half of the Kamloops Horizon (965 cal. B.P.). This timeline has been critical to this research.

Many of Brian Hayden's (1997; Hayden et al. 1996a) propositions regarding the length and persistence of residential corporate groups at Keatley Creek and its overall level of socioeconomic complexity are primarily based on studies of housepit floor and upper rim deposits. More importantly, his timeframe was developed in part from a series of radiocarbon dates from the northern rim of Housepit 7 and a dog bone identified within a storage pit (Hayden 2000b). In Prentiss et al.'s (2003b:729) recently published review of new radiocarbon data, they note that Hayden's dates came from "materials excavated in unconsolidated rim or pit fill that by definition are in secondary contexts." Although Hayden's research is critical to understanding prehistoric occupation at Keatley Creek, the discrepancies between the old and new radiocarbon data make it difficult to substantiate his arguments regarding village origins, stability, and socioeconomic complexity over time. This study has the benefit of new excavation and radiocarbon data



(a complete profile of Housepit 7), and therefore direct implications for lithic production, use, and discard can be more rigorously extended to address these larger issues.

The lithic analyses conducted in this study indicate that patterns of mobility, subsistence strategies, and inequality predicted by Hayden's (1997) model may hold in upper rim and final floor "temporal snapshots", but are not maintained when plotted along the new Housepit 7 timeline. Organizationally, expedient block core tools dominate all other lithic tool strategies in each phase of the house, as expected under semi-sedentary conditions where large amounts of salmon were being processed. However, the aggrandizer model does not predict the changing frequencies of these and other tool strategies through time. Expedient block core tools, in fact, diminish in frequency through time while those of a hunter's toolkit, such as bifaces and portable flake tools, increase. Functional tool groups also elicit the same patterns at Housepit 7, and suggest greater mobility and reliance on terrestrial resources over time as the focus on riverine resources dwindled. Lithic raw material procurement and use suggests ownership and control of a stone source may have ebbed over time, and did not increase or remain at high, sustained levels. Prestige-associated lithic raw materials and formed artifacts also substantially increase in frequency late in the Housepit 7 sequence, signifying that the greatest amount of inequality came late to the household. To reiterate, none of these inferences would be possible without an entire, dated profile of Housepit 7. Indeed, if only lithics data from the late occupation phases (Rim 3 and SHP 4; Rim 4) of the house were considered, Hayden's (1997) aggrandizer model would be supported. But, when a full occupation history of Housepit 7 is examined, the early development of socioeconomic complexity and its stability over time are not suggested.

This research demonstrates that the history of Housepit 7 and the Keatley Creek site is more complicated than originally thought. This is supported by other analyses, such as the recent examination of Housepit 7 faunal remains by Burns (2004). Her study revealed that while the initial house occupations (Early HP 7) were dominated by a narrow diet focused largely on pink salmon, the pattern gave way to the greater use of big game over time so that mammals became the primary dietary focus in the last rim occupation phase (Rim 4) of Housepit 7. Besides the faunal data, there is also evidence for a marked increase in the use of plant resources late in Housepit 7 that may have coincided with drought conditions, as suggested by increased fire frequencies across the Plateau (Hallett et al. 2003; Prentiss et al. 2004). In sum, this thesis research and other data sets lend support to the alternative evolutionary model of aggregated village development proposed by Prentiss et al. (2004).

Note that this study has been based on data derived from a single housepit at Keatley Creek, and therefore, additional investigations at other housepit and village sites in the area would contribute greatly to our understanding of regional socioeconomics. With additional inquiry, further scrutiny of both models assessed in this research could be achieved, and only benefit our understanding of Mid-Fraser and Canadian Plateau prehistory. Indeed, while this research has supported the contention that socioeconomic complexity arose late at the Keatley Creek site the nuances of the evolutionary model (Prentiss et al. 2004) could be better demonstrated. Perhaps additional data sets and high resolution tests can some day speak to the finer points of the evolutionary model or at least provide additional lines of supporting evidence. For example, extending the lithic analyses employed in this research to several different sized housepits at Keatley Creek

or those of other large housepit sites could potentially substantiate or refute the patterns of social and economic change suggested by the Housepit 7 lithic data.

Despite the inability of this study to address the intricacies of the evolutionary model, it does lend support to a new depiction of prehistoric life and the rise of complex hunter-gatherers at the Keatley Creek site. Housepit 7 lithic data suggest social and economic lifeways best described from an evolutionary perspective. That is, complexity did not appear early in the occupational sequence of the house and remain fixed. Rather, it appeared slowly as cultural adaptations responded to changing environmental conditions across the Canadian Plateau, particularly drought. Adaptations that initially arose under drought provided the basis upon which new cultural mechanisms could be built once climatic conditions cycled back to those earlier patterns.

In the final analysis, the picture presented by Housepit 7 and the Keatley Creek site was not carved into stone early in time, shaped by and for the benefit of powerful individuals and households, with little or no subsequent alteration. Instead, it is a painting of life where colors ran and bled to form shapes similar, yet altogether different from those of the original image. While conditions at Keatley Creek may have eventually provided individuals and households ample opportunities to benefit themselves, display their high status, and ultimately form the complex society described by Hayden (1997), the evolutionary model (Prentiss et al. 2004) holds that the “Keatley canvas” only accepted the strokes of their brush during the second site aggregation after the “primer” of the first had been applied. With this foundation in place a picture was created that may have retained its familiar base coat, but was otherwise flooded with all manner of color and complexity.

## REFERENCES CITED

- Alexander, D.  
1992 Environmental Units. In *A Complex Culture of the British Columbia Plateau*. Edited by Brian Hayden, pp. 47-98. UBC Press, Vancouver.
- 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. Archaeology Press, Burnaby, B.C.
- Arnold, J. E.  
1996 The Archaeology of Complex Hunter-Gatherers. *Journal of Anthropological Archaeology* 12:75-119.
- Binford, L. R.  
1980 Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 31: 203-210.
- 2001 *Constructing Frames of Reference: An Analytical Method for Archaeological Theory Building using Ethnographic and Environmental Data Sets*. University of California Press, Berkeley.
- Burns, M.R.P.  
2004 *Changing Times, Changing Economics: A Faunal Resource History of Housepit 7 at the Keatley Creek Site*. Unpublished M.A. Thesis, Department of Anthropology, University of Montana, Missoula.
- Chatters, J.C.  
1998 Environment. In *Plateau*, edited by D.E. Walker Jr., pp. 29-48. Handbook of North American Indians, Volume 12, William C. Sturtevant, general editor. Smithsonian Institution Press, Washington D.C.
- Chatters, J.C. and D. L. Pokotylo  
1998 Prehistory: Introduction. In *Plateau*, edited by D.E. Walker Jr., pp. 73-80. Handbook of North American Indians, Volume 12, William C. Sturtevant, general editor. Smithsonian Institution Press, Washington D.C.
- Darwent, J.  
1980 *The Prehistoric Use of Nephrite on the British Columbia Plateau*. Archaeology Press, Burnaby, B.C.
- Friele, P.  
2000 The Evolution of Landforms at Keatley Creek, near Lillooet, British Columbia. In *The Ancient Past of Keatley Creek, Volume I, Taphonomy*, edited by B. Hayden, pp. 65-68. Archaeology Press, Burnaby, B.C.

- Fladmark, K.R.  
 1982 An Introduction to the Prehistory of British Columbia. *Canadian Journal of Archaeology* 6: 95-156.
- Gould, S.J. and R.C. Lewontin  
 1979 The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Panglossian Programme. *Proceedings of the Royal Society of London B* 205:581-598.
- Hallett, D.J, D.S. Lepofsky, R.W. Mathewes and K.P. Lertzman  
 2003 11,000 Years of Fire History and Climate in the Mountain Hemlock Rainforests of Southwestern British Columbia based on Sedimentary Charcoal. *Canadian Journal of Forest Research*, in press.
- Hayden, B.  
 1995 Pathways to Power: Principles for Creating Socioeconomic Inequalities. In *Foundations of Social Inequality*, edited by T.D. Price and G.M. Feinman, pp. 15-86. Plenum Press, New York.  
 1997 *The Pithouses of Keatley Creek*. Harcourt Brace College Publishers, Fort Worth.  
 2000a 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, B.C.  
 2000b Dating Deposits at Keatley Creek. In *The Ancient Past of Keatley Creek, Volume I, Taphonomy*, edited by B. Hayden, pp. 35-40. Archaeology Press, Burnaby, B.C.  
 2000c Prestige Artifacts at Keatley Creek. In *The Ancient Past of Keatley Creek, Volume II, Socioeconomy*, edited by B. Hayden, pp. 189-202. Archaeology Press, Burnaby, B.C.
- Hayden, B., E. Bakewell, and R. Gargett  
 1996a The World's Longest-Lived Corporate Group: Lithic Analysis Reveals Prehistoric Social Organization Near Lillooet, British Columbia. *American Antiquity* 61:341-356.
- Hayden, B., N. Franco, and J. Spafford  
 1996b 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, B.C.
- Hayden, B., G.A. Reinhardt, R. MacDonald, D. Holmberg, and D. Crellin  
 1996c Space per Capita and the Optimal Size of Housepits. In *People Who Lived in Big Houses: Archaeological Perspectives on Large Domestic Structures*, edited by G. Coupland and E. Banning, pp. 151-164. Prehistory Press, Madison.
- Hayden, B. and J. Ryder  
 1991 Prehistoric Cultural Collapse in the Lillooet Area. *American Antiquity* 56(1): 50-65.
- Hayden, B. and J. Spafford  
 1993 The Keatley Creek site and Corporate Group Archaeology. *BC Studies* 99:106-139
- Kelly, R.L.  
 1988 The Three Sides of a Biface. *American Antiquity* 53(4):717-731.
- Kuijt, I.  
 1989 Subsistence Resource Variability and Culture Change during the Middle-Late Prehistoric Transition on the Canadian Plateau. *Canadian Journal of Archaeology* 13: 97-118.
- Knudson, R.  
 1982 Organizational Variability in Late Paleoindian Assemblages. *Reports of Investigations*, No. 60. Laboratory of Anthropology Washington State University, Pullman.
- Kroeber, A.L.  
 1939 Cultural and Natural Areas of Native North America. University of California Publications in American Archaeology and Ethnology, No. 38.
- Lenert, M.  
 2000 *A Chronology of Housepit Occupations at the Keatley Creek Site: An Analysis of Stratigraphy and Dating*. Unpublished M.A. thesis, Department of Anthropology, University of Montana, Missoula.
- Lepofsky, D., K. Kusmer, B. Hayden, and K. Lertzman  
 1996 Reconstructing Prehistoric Socioeconomies from Paleoethnobotanical and Zooarchaeological Data: An Example from the British Columbia Plateau. *Journal of Ethnobiology* 16: 31-62.

- MacDonald, R.  
 2000 Structural Strategies for Pithouses on the Keatley Creek Site. In *The Ancient Past of Keatley Creek, Volume II, Socioeconomy*, edited by B. Hayden, pp. 221-238. Archaeology Press, Burnaby, B.C.
- Nelson, C. M.  
 1973 Prehistoric Culture Change in the Intermontane Plateau of Western North America. In *The Explanation of Culture Change: Models in Prehistory*, edited by C. Renfrew, pp. 371-390. University of Pittsburgh Press, Pittsburgh.
- Parry, W.J. and R.L. Kelly  
 1986 Expedient Core Technology and Sedentism. In *The Organization of Core Technology*, edited by J.K. Johnson and C.A. Morrow, pp. 285-304. Westview Press, Boulder.
- Pokotylo, D.L. and D. Mitchell  
 1998 Prehistory of the Northern Plateau. In *Plateau*, edited by D.E. Walker Jr., pp. 81-102. Handbook of North American Indians, Volume 12, William C. Sturtevant, general editor. Smithsonian Institution Press, Washington D.C.
- Prentiss, W.C., M. Burns, T. Schlegel, L. Harris, N. Goodale, and M. Lenert  
 2002 Report of the 2001 University of Montana Investigations at the Keatley Creek Site (EeR17). Report on file, Archaeology Branch, Department of Small Business, Tourism, and Culture, Province of British Columbia, Victoria.
- Prentiss, W.C., and J.C. Chatters  
 2003 Evolution of Collector Systems on the Pacific Coast of Northwest North America. *SENRI Ethnological Studies* 63:49-80.
- Prentiss, W.C., J.C. Chatters, M. Burns  
 2004 Exaptation in the Emergence of Status Inequality. In *Social and Economic Dynamics among Intermediate Scale Societies*, edited by W.C. Prentiss and I. Kuijt, in review, University of Arizona Press, Tucson.
- Prentiss, W.C., L. Harris, S. Mandelko, J. Adams, C. A. Dietz, M.R.P. Burns, N. Goodale, and M. Lenert  
 2003a Report of the 2002 University of Montana Investigations at the Keatley Creek Site (EeR17). Report on file, Archaeology Branch, Department of Small Business, Tourism, and Culture, Province of British Columbia, Victoria.

- Prentiss, W.C., and I. 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. In press, University of Utah Press, Salt Lake City.
- Prentiss, W.C., M. Lenert, T.A. Foor, N.B. Goodale, and T. Schlegel  
 2003b Radiocarbon Dating at Keatley Creek: The Chronology of Occupation at a Complex Hunter-Gatherer Village. *American Antiquity* 68:719-736.
- Prentiss, W.C., M. Lenert, and H. Stelton  
 2000 Report of the 1999 University of Montana Investigations at the Keatley Creek Site (EeR17). Report on file, Archaeology Branch, Department of Small Business, Tourism, and Culture, Province of British Columbia, Victoria.
- Richards, T.H. and M.K. Rousseau  
 1987 *Late Prehistoric Cultural Horizons on the Canadian Plateau*. Publication Number 16. Department of Archaeology, Simon Fraser University, Burnaby.
- Rousseau, M.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.
- 1993 Early Prehistoric Occupation of South Central British Columbia: A Review of Evidence and Recommendations. *BC Studies* 99: 140-183.
- 2000 Results of the Keatley Creek Archaeological Project Lithic Source Study. In *The Ancient Past of Keatley Creek, Volume I, Taphonomy*, edited by B. Hayden, pp. 185-212. Archaeology Press, Burnaby, B.C.
- Ryder, J.  
 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 No. 73. National Museum of Canada, Ottawa.
- Sanger, D.  
 1969 Cultural Traditions in the Interior of British Columbia. *Syesis* 2: 189-200.



- Spafford, J.  
1991 *Artifact Distributions on Housepit Floors and Social Organization in Housepits at Keatley Creek*. Unpublished M.A. thesis, Archaeology Department, Simon Fraser University, Burnaby, B.C.
- Stryd, A.H. and M. Rousseau  
1996 The Early Prehistory of the Mid Fraser-Thompson River Area. In *Early Human Occupation in British Columbia*. Edited by R. Carlson and L. Della Bona, pp. 177-204. University of British Columbia Press, Vancouver.
- Teit, J.  
1900 The Thompson Indians of British Columbia. *Memoirs of the American Museum of Natural History, Jesup North Pacific Expedition* 1(4):163-392.  
1906 The Lillooet Indians. *Memoirs of the American Museum of Natural History, Jesup North Pacific Expedition* 2(5):193-300.

## **APPENDIX: RAW DATA**

**Raw counts of Housepit 7 lithic tools, organizational classification.**

	<b>SHP 3</b>	<b>Early HP 7</b>	<b>Rim 1, Rim2, &amp; SHP 1</b>	<b>Rim 3 &amp; SHP 4</b>	<b>Rim 4</b>	<b>Total</b>
<b>Expedient Strategy</b>	12	28	77	98	132	347
<b>Biface Strategy</b>	3	4	19	28	57	111
<b>Portable Long-Use Strategy</b>	1	4	7	15	23	50
<b>Ground Stone Strategy</b>	0	0	2	2	0	4
<b>Blade Strategy</b>	1	3	4	7	14	29
<b>Abrader Strategy</b>	0	1	3	2	6	12
<b>Total</b>	17	40	112	152	232	553

**Percentage frequencies of Housepit 7 lithic tools, organizational classification.**

	<b>SHP 3</b>	<b>Early HP 7</b>	<b>Rim 1, Rim2, &amp; SHP 1</b>	<b>Rim 3 &amp; SHP 4</b>	<b>Rim 4</b>
<b>Expedient Strategy</b>	70.59	70	68.75	64.47	56.9
<b>Biface Strategy</b>	17.65	10	16.96	18.42	24.56
<b>Portable Long-Use Strategy</b>	5.88	10	6.25	9.87	9.91
<b>Ground Stone Strategy</b>	0	0	1.79	1.32	0
<b>Blade Strategy</b>	5.88	7.5	3.57	4.6	6.03
<b>Abrader Strategy</b>	0	2.5	2.68	1.32	2.6
<b>Total</b>	100	100	100	100	100

**Raw counts of Housepit 7 lithic tools, functional classification.**

	SHP 3	Early HP 7	Rim 1, Rim2, & SHP 1	Rim 3 & SHP 4	Rim 4	Total
<b>Hunting and Butchering</b>	3	12	31	45	92	183
<b>Hideworking and Basketry (light duty)</b>	2	8	23	42	51	126
<b>Woodworking (heavy duty)</b>	12	16	42	41	70	181
<b>Total</b>	17	36	96	128	213	490

**Percentage frequencies of Housepit 7 lithic tools, functional classification.**

	SHP 3	Early HP 7	Rim 1, Rim2, & SHP 1	Rim 3 & SHP 4	Rim 4
<b>Hunting and Butchering</b>	17.65	33.33	32.29	35.16	43.2
<b>Hideworking and Basketry (light duty)</b>	11.76	22.22	23.96	32.81	23.94
<b>Woodworking (heavy duty)</b>	70.59	44.45	43.75	32.03	32.86
<b>Total</b>	100	100	100	100	100

**Raw counts of Housepit 7 general lithic raw materials from debitage and tools.**

	SHP 3	Early HP 7	Rim 1, Rim2, & SHP 1	Rim 3 & SHP 4	Rim 4	Total
<b>Jasperoid</b>	52	96	190	194	256	788
<b>Pisolite</b>	20	42	84	110	152	408
<b>Vitric Tuff</b>	2	9	11	19	19	60
<b>Chalcedony</b>	6	17	38	39	42	142
<b>Quartzite</b>	2	7	47	69	52	177
<b>Total</b>	82	171	370	431	521	1575

**Percentage frequencies of Housepit 7 general lithic raw materials from debitage and tools.**

	SHP 3	Early HP 7	Rim 1, Rim2, & SHP 1	Rim 3 & SHP 4	Rim 4	Total
<b>Jasperoid</b>	63.41	56.14	51.36	45.01	49.14	50.03
<b>Pisolate</b>	24.39	24.56	22.7	25.52	29.17	25.9
<b>Vitric Tuff</b>	2.44	5.27	2.97	4.41	3.65	3.81
<b>Chalcedony</b>	7.32	9.94	10.27	9.05	8.06	9.02
<b>Quartzite</b>	2.44	4.09	12.7	16.01	9.98	11.24
<b>Total</b>	100	100	100	100	100	100

**Raw counts of Housepit 7 prestige-associated lithic raw materials from debitage and tools.**

	SHP 3	Early HP 7	Rim 1, Rim2, & SHP 1	Rim 3 & SHP 4	Rim 4	Total
<b>Nephrite</b>	1	0	2	1	0	4
<b>Steatite</b>	0	0	0	1	6	7
<b>Obsidian</b>	0	0	0	1	14	15
<b>Total</b>	1	0	2	3	20	26

**Percentage frequencies of Housepit 7 prestige-associated lithic raw materials from debitage and tools.**

	SHP 3	Early HP 7	Rim 1, Rim2, & SHP 1	Rim 3 & SHP 4	Rim 4	Total
<b>Nephrite</b>	100	0	100	33.34	0	15.39
<b>Steatite</b>	0	0	0	33.33	30	26.92
<b>Obsidian</b>	0	0	0	33.33	70	57.69
<b>Total</b>	100	0	100	100	100	100

**Percentage frequencies of total Housepit 7 prestige-associated lithic raw materials from debitage and tools.**

	SHP 3	Early HP 7	Rim 1, Rim2, & SHP 1	Rim 3 & SHP 4	Rim 4	Total
<b>Nephrite, Steatite, &amp; Obsidian</b>	3.85	0	7.69	11.54	76.92	100

**Raw counts of Housepit 7 lithic prestige items.**

	<b>SHP 3</b>	<b>Early HP 7</b>	<b>Rim 1, Rim2, &amp; SHP 1</b>	<b>Rim 3 &amp; SHP 4</b>	<b>Rim 4</b>	<b>Total</b>
<b>Stone Bead</b>	0	0	0	0	3	3
<b>Ornament</b>	0	0	0	0	1	1
<b>Pipe Fragment or Bowl</b>	0	0	0	1	2	3
<b>Groundstone Maul</b>	0	0	0	1	0	1
<b>Adze</b>	0	0	0	1	0	1
<b>Ornamental Ground Nephrite</b>	1	0	0	0	0	1
<b>Miscellaneous Groundstone</b>	0	0	1	0	0	1
<b>Total</b>	1	0	1	3	6	11

**Percentage frequencies of Housepit 7 lithic prestige items.**

	<b>SHP 3</b>	<b>Early HP 7</b>	<b>Rim 1, Rim2, &amp; SHP 1</b>	<b>Rim 3 &amp; SHP 4</b>	<b>Rim 4</b>	<b>Total</b>
<b>Stone Bead</b>	0	0	0	0	50	27.28
<b>Ornament</b>	0	0	0	0	16.67	9.09
<b>Pipe Fragment or Bowl</b>	0	0	0	33.33	33.33	27.27
<b>Groundstone Maul</b>	0	0	0	33.33	0	9.09
<b>Adze</b>	0	0	0	33.34	0	9.09
<b>Ornamental Ground Nephrite</b>	100	0	0	0	0	9.09
<b>Miscellaneous Groundstone</b>	0	0	100	0	0	9.09
<b>Total</b>	100	0	100	100	100	100