REPORT OF THE 2008 UNIVERSITY OF MONTANA INVESTIGATIONS AT THE BRIDGE RIVER SITE (EeRl4)

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Excavated materials will be curated at the Royal British Columbia Museum (RBCM) but remain property of the Bridge River Band. We thank Grant Keddie and Martina Steffen for their efforts at the RBCM.

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CHAPTER ONE

INTRODUCTION

(Anna Marie Prentiss, Guy Cross, and Paul Goldberg)

Introduction

This is the report for archaeological field research conducted at the Bridge River site (EeRl4), located in the Middle Fraser Canyon of south-central British Columbia during summer of 2008. The overarching goal of the project is to develop a better understanding of the processes by which dense aggregate villages and socio-economic inequality evolved in the Interior Pacific Northwest Plateau region (Hayden 1997a; Prentiss et al. 2003, 2005a; 2005b, 2007, 2008). The Bridge River site is a large housepit village consisting of approximately 80 house depressions, located on a terrace of the Bridge River several kilometers upstream from its confluence with the Fraser River. As noted by Hayden (1997a), it is one of only a few remaining intact large villages from the Mid-Fraser Canyon. Recent research at the Bridge River site suggests that the village emerged by ca. 1800 cal. B.P., was abandoned by ca. 1100 cal. B.P. and briefly reoccupied at ca. 400-200 cal. B.P. (Prentiss et al. 2008). These dates indicate that the village was occupied at approximately the same time as the other large villages (Keatley Creek and Bell) located about 10 km to the east (Hayden 2000a, 2005; Prentiss et al. 2003; Stryd 1973, 1974). The site is located within several kilometers of the Fraser River Six Mile rapids, the most famous aboriginal salmon fishery in interior British Columbia (Kennedy and Bouchard 1992; Kew 1992; Romanoff 1992). Not surprisingly, subsistence data indicate that the village was highly dependent upon salmon (Bochart 2005). A relatively high degree of regional affluence is indicated by the frequent presence of groundstone prestige items (Hayden 1998) such as beads, pendants, and adzes, in addition to non-local trade goods such as obsidians and dentalium shell in many of the housepits (Prentiss et al. 2005c).

This research provides the second stage of a test of two different models of Mid-Fraser housepit village evolution and organization initially developed during research at the Keatley Creek site (Hayden 2000b; Prentiss et al. 2003). Building upon the work of Stryd (1972, 1973, 1974, 1980; Stryd and Baker 1968; Stryd and Lawhead 1978), Hayden (1997a, 1997b, 1998, 2000b, 2005; Hayden and Ryder 1991) has argued that the archaeological record at Keatley Creek village reflects the emergence of socio-economic and political complexity, termed the “Classic Lillooet” period, throughout the Mid-Fraser area. The Classic Lillooet period dates to approximately 1000-2000 B.P. and is characterized at Keatley Creek by dense settlement, a ranked society (Hayden 2000c, 1998; Schulting 1995), intensification of select resources such as salmon (Kusmer 2000), and participation in wide-ranging exchange networks (Hayden and Schulting 1997). In his “aggrandizer model” Hayden explains the emergence of the Mid-Fraser villages (Keatley Creek in particular) as the consequence of the behavior of self-interested, aspiring elites (Hayden 1995, 1997a, 1998). He suggests that once inexhaustible resources such as salmon became available and technologies were in place for production and storage of surplus, certain individuals with psychological predispositions for competitive behavior developed and implement schemes for increasing their own prestige. This striving for individual success resulted in the rapid and early emergence of aggregated housepit villages featuring status inequality. This resulted in the rapid development of the Mid-Fraser villages during the peak Neoglacial climatic episode between ca. 3000 and 2300 B.P. during which conditions were optimal for procurement of surplus salmon and root resources (Chatters 1998) and collector economic systems were in place (Richards and Rousseau 1987; see also Prentiss and Kuijt 2004). Hayden (1997a, Hayden et al. 1996; Hayden and Ryder 1991) argues that once in place the Mid-Fraser villages were economically successful and residentially stable persisting to at least 1000 B.P.

Prentiss and her colleagues (Lenert 2001; Prentiss et al. 2003, 2005a, 2005b, 2007; 2008) offer an alternative model for the evolution of the cultural pattern reflected in particular by the late Classic Lillooet period records of Keatley Creek and Bridge River. Current data suggest that this process occurred in several phases. During Period I, ca. 1900-1500 cal. B.P., the aggregated villages rapidly emerged featuring all house sizes, salmon and root intensification, but no obvious indicators of ranking other than house size. Period II is relatively brief, spanning approximately 1500 to 1200 cal. B.P. and is marked by village expansion, salmon intensification, and decline in root roasting (Lepofsky and Peacock 2004; Prentiss et al. 2003, 2008). At Keatley Creek, artifactual indicators of status variation between housepits are extremely rare, while at Bridge River, the more obvious prestige items appear most consistently in higher numbers within the smaller houses. Further, Bridge River housepits appear to be organized in semi-circular clusters at the northern and southern ends of the site suggesting the possibility that the village featured two or more large-scale co-habiting social groups (Prentiss et al. 2008). Period III persists from 1200 B.P. to the abandonment of the last Mid-Fraser villages at ca. 800 B.P. (Prentiss et al. 2003, 2006a). Housepits at Keatley Creek reflect the Classic Lillooet ranked corporate group pattern described by Hayden (1997a, 1997b, 2000b, Hayden and Ryder 1991). Subsistence data from Keatley Creek reflect declines in access to salmon and expanded use of terrestrial resources, possibly resulting in local resource depression (e.g. Broughton 1994), especially associated with ungulates (Prentiss et al. 2007). If salmon numbers did undergo a significant reduction, then it is no surprise that the Bridge River village was abandoned at the beginning of this period since this village was fewer subsistence options than nearby Keatley Creek and Bell.

From this standpoint, the Classic Lillooet pattern emerged in three phases: First, an initial aggregation process associated with control of the Mid-Fraser resources (fishery) may have offered substantial reward after 1900 cal. B.P. due to rising populations, expanding patchiness of terrestrial resources associated with increasingly warm and dry climatic conditions (Bennett et al. 2001; Hallett et al. 2003a; Hallet and Walker 2000), increasing access to salmon, and expanding exchange opportunities on both the coast and interior (Chatters 1998; Rousseau 2004). Second, population growth and apparent economic success led to rapid growth of the Mid-Fraser villages that may have resulted in increasing numbers of social groups or units, peaking by ca. 1200-1300 cal. B.P. (e.g. Hayden 1997a). It is likely that social complexity became more pronounced during this period. However, there are few archaeological indicators of any formal hereditary ranking or stratification prior to this time (Prentiss et al. 2007;

Schulting 1995). Current data suggest that, shortly after the beginning of Period III, a sudden decline in salmon may have led to collapse of some villages (e.g. Bridge River) and the emergence of stratification at Keatley Creek (Prentiss et al. 2007). It is likely that the people of Bridge River had taken some steps towards social complexity featuring status inequality prior to its abandonment. Under this perspective, stratification comes as an unintended by-product of competition for control of patchy dwindling resources at select villages (Prentiss et al. 2005b, 2007) as local groups took advantage of environmental and demographic changes to develop ways of insuring more secure living conditions for themselves (e.g., Arnold 1993; Kirch 1988, 1997, 2000; Wiessner 2002).

The 2008 Bridge River research is a component of a larger program with the primary goal of improving our understanding of the evolution of the complex hunter-gatherer societies of the late prehistoric Pacific Northwest, and more broadly, to examine the general principles behind cultural evolution. Three focus areas define this program.

First, Northwest Coast and Interior societies of the Late Prehistoric period are defined economically by the use of collector mobility and subsistence strategies (e.g. Binford 1980). Prentiss and Chatters (2003a, 2003b; Chatters and Prentiss 2005; Prentiss and Kuijt 2004) suggest that collector strategies evolved in one or more isolated contexts of the northern Northwest Coast and spread into other areas such as the Interior during the early Neoglacial climatic period shortly after 4000 cal. B.P. Second, when and why did the aggregated winter village pattern (Chatters and Pokotylo 1998) emerge on the Plateau? Once collector strategies came to exist on the Plateau, it was still some time before the larger group aggregates emerged in the form of large villages or even towns (Hayden 1997a). Despite some opinions to the contrary (Hayden 2000b, 2005), it is clear that the large villages, featuring 20-50 simultaneously occupied houses of widely varying sizes, did not begin to evolve in the Mid-Fraser area until after 2000 cal. B.P. (Chatters and Pokotylo 1998; Prentiss et al. 2003, 2005b, 2006a). Complete explanation of this phenomenon requires further research, but recent studies suggest that simple arguments such as population pressure (e.g. Croes and Hackenberger 1988; Lohse and Sammons-Lohse 1986; Matson 1983, 1985) are not adequate. It is also clear that there was no simple link to maximum numbers of salmon since salmon numbers may have been at their highest over 1000 years prior to the development of the Mid-Fraser villages (Chatters 1995; Chatters et al. 1995).

Recent research suggests two possible models for explaining initial emergence of the Mid-Fraser villages. First, it is possible that small groups of indigenous collectors moving in and out of the Mid-Fraser clustered to take advantage of newly invigorated salmon runs after 1900 cal. B.P. using a residential strategy that included co-residential corporate groups operating from large housepits (e.g. Hayden et al. 1985). This model asserts that while this “complex collector” strategy (Prentiss et al. 2005b) had already developed to some degree near the coast, it did not play a role in the emergence of similar tactics on the interior. Second, the complex collector strategy developed in the Fraser Valley closer to the Coast, perhaps as reflected in the large and early dating house at the Scowlitz site (Lepofsky et al. 2000; see also Lepofsky et al. 2005). Then, either the fundamentals were transmitted via human communications (e.g. Cavalli-Sforza and Feldman 1981) to the interior or movement of actual populations possessing the strategy, up from the Fraser Valley (west of Hope, B.C.), perhaps originating from the vicinity of the lower Harrison and Lillooet Rivers. Some data from the 2003 and 2004 investigations at Bridge River hint at the latter alternative particularly including the appearance of a ground slate technology previously unknown to the Plateau, but typical of the Fraser Valley, in the earliest dating housepits (Prentiss et al. 2005b). If this is the case, it suggests that basic structure of the winter-village/corporate group strategy, typical of the Mid-Fraser Canyon, evolved elsewhere and was transported into the region, possibly by groups seeking to take advantage of those same resources recognized under the first model.

Finally, when and why did social inequality emerge in the Pacific Northwest region and how did it vary in structure? The historic period central and northern Northwest Coast, Lower Columbia, and Mid-Fraser societies were characterized by large aggregate villages with hereditarily stratified social organizations (Matson and Coupland 1995; Teit 1906). Defining the evolutionary history of this form of institutionalized inequality (e.g. Wiessner 2002) is an important priority in Pacific Northwest archaeology (Ames and Maschner 1999). To most archaeologists who work in this region, it is clear that some form of incipient status differentiation was present shortly after the emergence and expansion of collector strategies (Matson and Coupland 1995). However, it appears very unlikely that any form of institutionalized hereditary differentiation occurred earlier than approximately 1800 cal. B.P. when burials of the later Marpole phase on the Central Coast begin to contain indicators of inherited status differences (Burley and Knusel 1989). This form of social organization appears to have occurred very rarely and relatively late on the Plateau; post 1200 cal. B.P. in the Mid-Fraser and post 500 cal. B.P. on the Lower Columbia (Prentiss et al. 2005b).

Two approaches to explanation have been prominent in the literature. Ecologists look for unequal relationships between demographics and resource productivity, generally asserting that resource patchiness and packing will trigger patterns of social behavior consistent with emergent inequality (Binford 2001; Fitzhugh 2003). Agency theorists link emergent inequality to the complex interactions between individual agency and social structure. Hayden (1992) links the emergence of inequality to optimal resource conditions, arguing that opportunity for acquisition of surplus resources would favor competitive behavior from "aggrandizers." Maschner (1991, 1995) adds an additional step to Hayden's process, suggesting that resources do not directly equate to power. Rather, community members must use resource surplus to attract a large kin-based following. Power is thus achieved and maintained via corporate group size. Arnold (1993) and Wiessner (2002) agree in part with these assertions, but suggest that institutionalized inequality could only come about during a short lived period of adverse resource conditions or some other historical calamity, that might allow aspiring elites to manipulate others, less well off. Keatley Creek data now indicate that a similar process associated with localized resource shortages and group movements may have played a critical role in the emergence of inequality in the Mid-Fraser (Prentiss et al. 2007).

The current research seeks to ultimately understand the evolution and organization of the Bridge River housepit village. The project is expected to require at least three major phases of research. The first phase focused on site wide mapping, geophysical investigations, test excavations, and extensive radiocarbon dating. Results of that research indicate rapid village growth between ca. 1900 and 1100 cal. B.P., followed by abandonment and late reoccupation. The radiocarbon dating program provided 78 radiocarbon dates on 55 housepits (12 additional dates were on external roasting pit features [Dietz 2004]), providing insight into changes in demographics and social organization from the standpoint of inter-household spatial arrangements (Prentiss et al. 2008). The second and current phase emphasizes excavation of select housepit floors across all periods in the history of the village in order to better define changes in demography and socio-economic organization. A third phase will likely explore the histories of select housepits in substantially further detail.

The Bridge River research program has been designed to answer a number of broad questions. First, what is the occupational and cultural chronology at the Bridge River site? This question has been substantially answered during Phase I of the Bridge River project. It is clear now that the Bridge River village emerged earlier than nearby Keatley Creek, but was also abandoned earlier. Given its early dates, it is possible that groups from Bridge River may have even been responsible for the establishment of some other villages like Keatley Creek. It is also possible that the abandonment of Bridge River may have played a role in the development of institutionalized inequality at Keatley Creek. Second, what was the nature of socio-economic and political organization and how did it change during the history of the Bridge River community? Selected tests in housepits and extensive geophysical investigations hint that even the earliest Bridge River households were multi-family and perhaps "corporate group" (Hayden and Cannon 1982) in nature. It is also clear that significant differences in house sizes characterized the village throughout its history. There also appear to be two major clusters of housepits that simultaneously grew in size from the earliest period until the abandonment. However, based upon investigations in 2003 and 2004 there is no clear association between larger houses and highest numbers or quality of prestige items prior to the late reoccupation, as might be expected from ethnographies (Teit 1906) or previous investigations at Keatley Creek (Hayden 1997a) or Bell (Stryd 1973). It is clear that while Bridge River social organization was undoubtedly complex from the start, the nature of that complexity has not been clear. Two avenues of investigation of social organization are being explored: The first focuses on identification of status differentiation as marked by consistent variation in household location, construction, subsistence patterns, wealth items, and possibly even religious icons (e.g. Lesure and Blake 2002); and the second emphasizes "horizontal" (e.g. Johnson 1982) social complexity emphasizing differences and similarities between the north and south clusters in the realms of subsistence economy, wealth, and stylistic markers (e.g. "clan" [Teit 1906] or lineage group symbolism).

Status inequality within complex hunter-gatherer societies has been subject of a growing literature that has sought to define variation and evolutionary origins of this phenomenon around the world (Arnold 1993, 1995, 1996a, 1996b; Earle 1997; Feinman 1995; Fitzhugh 2003; Hayden 1995; Wiessner 2002). As noted by Wiessner (2002), arguments seeking to explain emergent inequality in intermediate scale societies generally fall into two groups: managerial and agency. Managerial models vary widely and include population pressure (Cohen 1981; Croes and Hackenberger 1988), scalar stress (Ames 1985; Johnson 1982), warfare (Carneiro 1970), and ecological patchiness and population packing (Binford 2001; Fitzhugh 2003). As a group, they argue that cultural practices, sometimes described in aggregate as systems of behavior, adjust to new conditions in adaptive ways sometimes leading to the need for more complex social relations in order to efficiently harvest, process, protect, and distribute resources. Many of these models (pressure, packing, scalar stress, resource stress) assume adverse conditions revolving around imbalances between available food resources and human populations that require change in order to restore balance.

In contrast, agency approaches look to the generation of new social phenomena via the dialectic that forms between agency and social structure. While environmental and economic conditions provide an important backdrop, it is this complex social process that generates changes that eventually become institutionalized. Several versions of this approach have been offered by Hayden (1994, 1995), Clark and Blake (1994), Maschner and Patton (1996), Arnold (1993, 1996a), and Lepofsky et al. (2005). Major differences, measurable in the archaeological record, within this group revolve around ecological conditions that favor the ability of individuals to successfully pull off wealth building schemes within their surrounding communities. Researchers have not generally explored the interesting issue of resistance to such schemes. Hayden (1994, 1995; see also Clark and Blake 1994; Maschner and Patton 1996) argues that optimal resource conditions are necessary for people to tolerate new forms of resource ownership and control. In contrast, Arnold (1993, 1996) argues that aspiring elites will not gain opportunity to exert control over new groups until those groups become stressed enough to be willing to submit to these actions. She looks to altered resource conditions or population-resource imbalances as the background to successful machinations of elites.

Darwinian archaeologists have not often explored issues of social change (but see Braun 1990). However, current research suggests that inequality and other hallmarks of so-called complex societies may have often emerged through exaptive processes associated with attempts by groups to solve problems associated with labor, households, and economies, unintentionally creating new social problems. Prentiss (2010) proposes that inequality in the Pacific Northwest may have come about in several stages associated with the development of house groups and competition to maintain such houses.

Previous University of Montana Investigations in the Mid-Fraser Canyon

Teams from the University of Montana have been conducting field research in the Mid-Fraser Canyon since 1999. The following discussion reviews results from the Keatley Creek and Bridge River Projects.

Keatley Creek

This research was designed to test three alternate models seeking to explain the emergence of social inequality at Keatley Creek. In brief, these included Brian Hayden’s (1995, 1997a, 1998) aggrandizer model and two other models. The first of the latter two derives from Rosenberg (1998) and others who view population pressure as leading to competition for control of optimal spaces resulting in gradually more intense levels of social competition and eventual collapse due to abuse of local resources (e.g. Broughton 1994). The other asserts that technological enhancement was the primary driving force, suggesting that complexity was derived from technological innovations increasing effectiveness of hunting, fishing and warfare. This resulted in competition for control of optimal spaces such as the Mid-Fraser canyon, eventually producing complex villages.

In order to adequately test the hypotheses, data collection procedures were designed to answer a series of specific questions concerning chronology and processes of cultural change. When did the transition to socio-economic inequality occur and was this transition abrupt or gradual? The 1999, 2001 and 2002 field seasons at Keatley Creek resulted in a new dating sequence for the rim midden deposits of Housepit 7 and the Keatley Creek village. New dating of early features suggests that Housepit 7 and likely the entire aggregated village existed between ca 1600 and 750 cal. B.P. Within this time frame there appear to have been four phases to the history of Housepit 7. The core village formed during Period 1 ca. 1600-1400 cal. B.P., expanding substantially during Periods 2 and 3 ca. 1400-1200 cal. B.P. Small houses were abandoned and signs of hereditary inequality came about in the final period of ca. 1200-750 cal. B.P.

Studies of artifacts, faunal remains and plant materials led to a revised view of cultural processes leading to emergence of inequality and later to site abandonment (Prentiss et al. 2007). Faunal remains suggest that while salmon was probably the critical subsistence item early in village history, this was to eventually change. By Rim 4 times (post 1200 cal. B.P.) predation was increasingly emphasizing mammals over salmon, whose numbers had significantly declined. The deer bone assemblage also suggests that early village groups tended to hunt locally (indicated by more complete element representation) while in Rim 4 times, deer hunting probably required longer trips (as marked by faunal assemblages nearly completely dominated by limbs only). Plant data also suggest an increasingly extensive approach to resources. Rim 4 contains major increases in pine nuts and prickly pear cactus seeds, generally low ranked species, compared to local geophytes (Lepofsky and Peacock 2004). Evidence for geophyte processing nearly disappears from the archaeological record during Rim 4 times. Berry seeds also parallel results of the deer bone analysis with the early village dominated by species more adapted to dry conditions (e.g. the arid terraces associated with the Keatley Creek village), while the later occupation seems to focus to a higher degree on species requiring consistently wetter soil, as are most commonly found away from the village at higher elevations (Prentiss et al. 2007). These results are supported by analysis of lithic artifacts which indicate a steadily increasing role for hunting related gear (e.g. projectile points and bifacial knives) peaking during the Rim 4 period. Critically, prestige artifacts also jump dramatically during the final phase forming the inter-house disparities discussed so frequently by Hayden (e.g. 1997a), suggesting major social changes manifested at this time.

Prentiss et al. (2007) argue that the Keatley Creek village emerged at the beginning of an uptrend in salmon productivity. They suggest that the village grew in tandem with a rise in salmon numbers that may have peaked and rapidly declined at about 1200 cal. B.P. This decline in salmon may have occurred relatively quickly, radically affecting the value of key fishing spots and likely places for hunting and gathering terrestrial food resources and triggering a new wave of competition for control of those places. It is even possible that human-driven resource depression may have played a role in the famous Keatley Creek abandonment. The Keatley Creek research explicated a new view of village evolution, one in which inequality came about as a by-product of drastically rearranged subsistence resource access, labor scheduling, and social arrangements. However, excavations at one village are not enough to fully understand such a process, one that was probably acted out on a much larger scale. This led to the next round of research at the nearby Bridge River village.

Bridge River

The Bridge River project was proposed as a logical test of the competing hypotheses regarding the evolution of Keatley Creek. Previous research (Stryd (1974) suggested that the Bridge River village was occupied at the same time as Keatley Creek and it seemed reasonable to conclude that similar processes must have played a role in the history of that village. Thus, the Bridge River project was initially viewed as a place where archaeologists could "replicate the experiment."

The primary goal of Phase I (2003 and 2004 field seasons) at Bridge River was to overcome some of the data inadequacies that had always hampered research at Keatley Creek, namely determining changes in village size as indicated by similarly dated housepit floors. To accomplish this, a program of extensive surface and subsurface mapping using geophysical techniques was instituted resulting in maps of nearly the entire village derived from magnetic and conductivity surveys (Prentiss et al. 2008). Strong negative-valued anomalies on the magnetic gradient map were used to project locations of datable features such as hearths and clusters of burned roof beams lying on house floors. Subsequently, test units were excavated to explore stratigraphy, collect artifact and ecofact samples, and most critically, dating samples. Success in recognizing datable contexts using the geophysical methods was approximately 80% and resulted in collection of 90 radiocarbon samples and dating of 55 housepit floors and 13 external pit features. It was very clear from this research that the village offers outstanding opportunities for very fine grained analysis of socio-economic change within this complex hunter-gatherer context.

Radiocarbon dates suggested that the village evolved during four major periods. Earliest dating housepits are associated with Bridge River 1 and 2 between ca. 1800 and 1300 cal. B.P. The village peaked in size during Bridge River 3 at ca. 1300-1100 cal. B.P. with at least 29 occupied houses (Prentiss et al. 2008). The village was subsequently abandoned until approximately 400-500 cal. B.P. at which point it was occupied into the beginnings of the historical period. Spatial arrangements of occupied housepits suggest that by Bridge River 3 times (possibly BR 2) two social groups (perhaps something like Teit's [1906] "clans") may have existed. Also, distinctions between larger and smaller houses appear to have existed throughout the life of the village (as expected by Hayden 1997a for Keatley Creek) suggesting some variability in household size and perhaps wealth. Faunal remains indicate an intensely salmon oriented economy throughout all periods in the life of the village (Bochart 2004). Lithic artifacts support this contention but also suggest that other forms of hunting and gathering were also critical (Clarke 2006). An entirely new lithic industry (to the Plateau) was discovered at the village focused on production of slate tools using combinations of cutting, grinding, and chipping to create a variety of scrapers, knives and even one projectile point. A general correlation was recognized between frequency of ground slate tools and intensity of salmon fishing (Mandelko 2006).

The 2003 and 2004 Bridge River data suggest that the village emerged earlier than Keatley Creek but was also abandoned earlier. Reasons for the early emergence are not yet clear, but may be associated with better access to the 6-Mile rapids fishing site in the nearby Fraser Canyon and the quality salmon fishing within the Bridge River valley as well. This critical economic tie to salmon may help us to better understand the early abandonment. While the Bridge River valley is a better place for salmon fishing than the Keatley Creek area, it does not offer the same degree of access to productive foraging patches (say for deer and geophytes). Consequently, Bridge River peoples may have been substantially more dependent on salmon as a food resource, but also trade goods, than those of Keatley Creek. It can be hypothesized that when salmon productivity declined after ca. 1200 cal. B.P., the first major casualty was the Bridge River village. Prentiss et al. (2007) suggest that it was that specific event and probably others like it that provided the context for emergent hereditary inequality at Keatley Creek, since original families could provide shelter to the newly poor and use of their labor, but may have maintained their original property rights by passing them along to only their own children. The question remains, however, had this form of inequality already developed at Bridge River? In contrast, did a different but equally complex form of social organization evolve at this village, possibly in the form of opposing clan or lineage groups, each with their own forms of social ranking and individual rights to resources?

The current research is emphasizing clarification of the transition point between the pre-aggregated village pattern and the emergent complex villages. The *in situ* emergence of corporate group households may have been a rapid and complex cultural evolutionary event (Prentiss et al. 2005b). It is not clear if this process actually occurred in the Mid-Fraser or if it had occurred earlier on the Central Northwest Coast, eventually leading to expansion of those groups into the Mid-Fraser area. Additional research focuses on the processes leading the development of social inequality. The Mid-Fraser research is of critical importance since inequality undoubtedly emerged *in situ* in this context in the centuries prior to ca. 1000 cal. B.P. A final area concerns the crucial relationships between technology and subsistence economy. Of special significance at Bridge River are studies into the organization of groundstone technology since at Bridge River groundstone is far more common and diverse in form that at either Keatley Creek or the other large excavated village, Bell.

Field and Laboratory Methods

The current Bridge River research is the second phase of a comprehensive test of the models outlined above. Overall, the project is designed to test for archaeological signatures reflecting the expectations of these models. Specific elements of Hayden's aggrandizer model have been rejected (e.g. the early date of ca. 2600 B.P., for village emergence and stable persistence of that entrepreneur society for 1500 years). However, many of the basic tenets could still be feasible. If the aggrandizer model is correct then the village will feature from its inception evidence for inter-household inequality in the form of correlations between house size and accumulation of prestige-associated foods and artifacts. Thus, the earliest strata from larger housepits should feature evidence indicative of ability of that household to accumulate surplus foods and other goods. In particular, they should reflect control of prestige-linked foods such as Chinook salmon and deer, lithic raw materials such as nephrite, high labor investment artifacts such as stone beads, pipes, and adzes, and finally, non-local trade items such as shell ornaments (Hayden 1997a). If the alternative model is correct it should be indicated by two or more phases of change within the Bridge River Village. Once present, the early aggregated village should contain evidence for occupation of houses in multiple size ranges, but evidence for status differentiation or ranking should be lacking (other than in differences in house size and relative storage capacity). Persistent socio-economic egalitarianism should be indicated by high degrees of similarity between houses (and between hearth groups within houses) in subsistence items consistently emphasizing fish over mammals, shared lithic raw material types or quarry sources for chipped stone items, low numbers of prestige items (Hayden 1998) and extramural food caches and roasting pits indicative of food sharing (Flannery 2002). Given the apparent complexity in settlement patterns within the village it may be that manifestations of wealth and power may vary in other ways. For example, if the village was ranked only at the clan or social group level (e.g. Feinman's "corporate" form of organization), then variation in wealth could exist only on a broader spatial scale, perhaps within aggregates of households, as is suggested by household positioning (Prentiss et al. 2008). If institutionalized inequality did emerge at Bridge River and is a byproduct of similar processes seen at Keatley Creek, only the final house floors from Bridge River 3 should manifest this pattern. Subsistence data should indicate a shift towards significantly increasing quantities of medium to large game in the diet, particularly in the largest houses (and likely with specific hearth groups). Lithic data from largest houses should reflect control of quarry locations and production of steatite and nephrite trade goods. Largest houses should, late in their life spans also begin to intensify harvest of a wider range of salmon species to be used as surplus in exchange relationships and in competitive feasting (Hayden 1997a). The frequency of feasting events should increase during Bridge River 3 as manifested by rising numbers of unusually large intra- and extra-mural roasting pits. Current data on external pit features strongly support this prediction (Dietz 2004).

Testing these hypotheses requires extensive sampling of house floors associated with occupation periods BR1-3 at the Bridge River site followed by interdisciplinary laboratory studies. Project goals require examination of variation in a variety of archaeological data within and between different sized households at Bridge River. Based upon ethnographies (Teit 1906), Hayden's extensive excavations at Keatley Creek and the first phase of investigations at Bridge River, it is clear that hearth-associated activity areas most likely reflect the locations and activities of individual family units on housepit floors (Hayden 1997a). Therefore, to understand variability in the socio-economic status of these domestic units and to extrapolate that understanding to the level of household socio-economy, it is paramount that excavations focus on gaining a substantial sample of materials from the activity area contexts. Hayden (1997a) accomplished this task by excavating entire house floors in order to expose activity areas of domestic units. While Hayden's data are superb the lengthy time required to excavate entire houses was costly and it limited the number of houses that could be explored. Further, it effectively prevented future field investigations associated with these housepit floors. These problems can be avoided by using geophysical methods to identify activity zones associated with major hearth and cache pit features and subsequent excavation sampling.

Choice of housepits to study is dictated by several factors. First, housepits must be excavated from the earlier (Bridge River 1 and 2) and later (Bridge River 3) time frames in order to evaluate socio-economic changes in the village prior to the ca. 1100 cal. B.P. abandonment. Second, data from larger and smaller houses are necessary to explore status variation as conditioned by house size during the early and late periods. Third, in order to explore variation in households by spatial location, houses need to be chosen from the north and south clusters. Finally, in order to assure quality data that can be used for socioeconomic analysis, only those housepits with clearly delineated floors can be excavated (e.g. Hayden 1997a). As outlined in Table 1, several houses were chosen from each time period based upon their size, spatial location, and floor. The 2008 field season focused on housepits with known BR 3 occupations (Housepits 20, 24, and 54). However, BR 2 and 4 components in Housepits 20 and 54 were also excavated.

Table 1. Housepit excavation program (large is ≥15 m diameter; small is 9-14.9 m in diameter).

Project Year	Calendar Year	Time Period	Housepits	Cluster Area
2	2008	Late	1 large, 1 small	North
			1 large, 1 small	South
3	2009	Early	1 large, 1 small	North
			1 large, 1 small	South

Under the direction of Dr. Guy Cross, geophysical investigations in 2007-2008 focused on high-resolution mapping of selected housepits, utilizing a combination of magnetic, electromagnetic (EM), resistivity and ground penetrating radar (GPR) technologies (Scollar et al., 1990; Cross 2004; 2005; Prentiss et al., 2008). As previously proposed, initial site-wide reconnaissance conducted in 2003 to guide preliminary archaeological sampling was followed by focused higher resolution mapping of selected housepits during the 2004 field season (e.g. see Figure 1. coincident magnetic and EM conductivity plans for HP24/HP36 below).

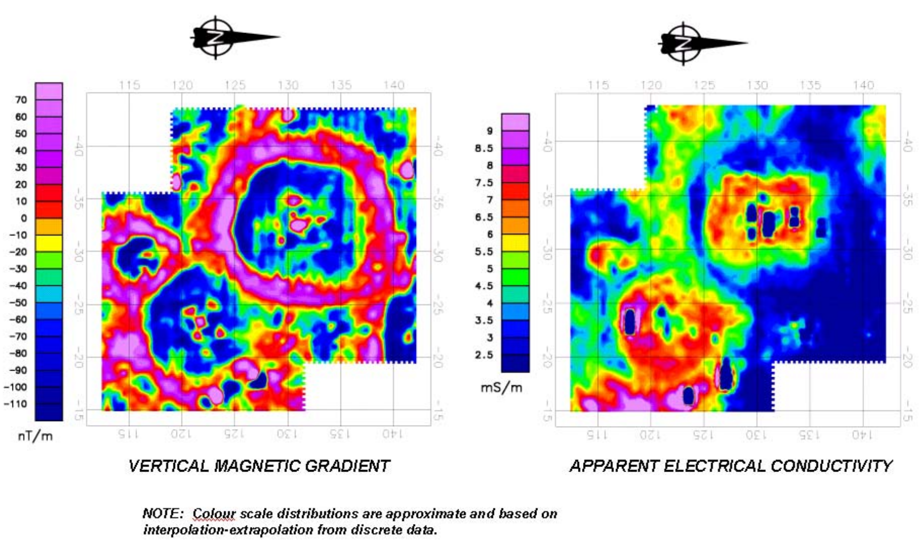

Figure 1. Coincident magnetic and EM conductivity plans for HP 24/36.

Beginning in 2007 priority was given to further analysis and assessment of resulting data to establish an optimum data acquisition strategy for identification and delineation of primary household activity areas. Selected anomalous feature areas were resurveyed with further increased spatial sampling density and utilizing extended measurement bandwidth to establish practical limits on resolution. Investigations focused on the potential of small-scale galvanic resistivity mapping and localized three-dimensional radar imaging at center frequencies to 1 GHz. Geophysical mapping of selected house floors were carried out to guide the focus of ensuing archaeological excavations during the 2008 and 2009 field seasons. Magnetic and electrical methods were employed for initial mapping with cross-sectional stratigraphic constraints supplied by localized GPR imaging. Targeted archaeological excavations are expected to establish consistent and repeatable associations between observed geophysical signatures and related cultural features.

Excavations within each housepit focused on exposing the hearth associated activity areas defined by the geophysical investigations. Hayden's (1997a) excavations at Keatley Creek defined variation in activity areas based upon their location within the housepit floors. Housepit 7 (a very large house) offered the highest number of activity areas (about 10) with also the highest diversity of activities including food preparation concentrated on the south and west sides of the floor. Those on the east side of the floor tended to indicate special activities such as wood working or hide preparation. Smaller housepits had fewer activity areas (3-5), but similar arrangements around the floors. The 2003 and 2004 investigations at Bridge River confirm similar spatial patterns, though details of variation in activities are still unknown.

The 2008 excavations at Bridge River sampled three activity areas from each investigated housepit. The original goal was to obtain an approximately 50% random sample of each. Since activity areas average about 4 m^2 or 16 50x50 cm subsquares, this meant that approximately 8 subsquares would be excavated from each. However, once excavations began it became evident that strata in most areas were deeper and more complex than anticipated thereby precluding adequate sampling from scattered test units. In addition it also became obvious that longer stratigraphic profiles would be necessary to fully interpret housepit strata. Therefore, the excavation strategy was modified from randomly placed 50 cm test units within geophysical anomalies to one or more linear trenches through these areas. Trenches were still excavated in 50x50 cm units for maximum control. This provided large samples of artifacts, faunal remains and feature materials (including macrobotanicals) from each to permit examination of intra-household socio-economic variation similar to the analyses conducted of the Keatley Creek housepits (Hayden 1997a, 2000a, 2000b, 2000c; Hayden and Spafford 1993; Lepofsky et al. 1996; Prentiss 2000).

Housepit stratigraphy is complex (e.g. Prentiss et al. 2003, 2005a, 2007, 2008) including complex deposits interpreted as floor, roof, and rim. Floors have generally fine bedded sediments transported to the site from elsewhere. Roof and rim sediments tend to have more unconsolidated mixtures of redeposited smaller and larger sized sedimentary particles, charcoal, plant and animal remains, and artifacts. While Keatley Creek floors were generally thin, Bridge River floors vary widely. Some floors are similar to those of the Keatley Creek context, while others are substantially thicker. In addition, the Bridge River village often has multiple stratified floors, whereas Keatley Creek housepits generally contain only the final occupation floors. Bridge River floors are often separated by what appear to be roof layers, some containing burned support beams. The very thick floors appear to have accreted over long periods by simply adding new floor material over the old.

Stratigraphy at Bridge River was studied using two strategies. Field observations of deposits (e.g., color, texture, structure, and consistence) are commonly used to describe archaeological sediments and to make tentative inferences about relevant depositional and post-depositional processes, including geogenic, pedogenic and anthropogenic processes. However, the use of simple field data alone limits our ability to fully interpret the stratigraphic and archaeological record. Analysis of bulk samples (e.g., grain-size and chemical analyses are commonly used in geoarchaeological situations but they are ineffective in unraveling the complex sequence of geogenic and anthropogenic events that characterize the accumulation of archaeological sediments (Courty, Goldberg, & Macphail, 1989; Goldberg & Macphail, 2006). On the other hand, soil micromorphology – the study of undisturbed soils, sediments and other archaeological materials (e.g., ceramics, bricks, mortars) at a microscope scale – has shown to be a very significant and effective means to reveal site formation processes in sites where cultural additions play an important role in sedimentation and modifications (Macphail, 1991, 2000; Macphail & Cruise, 2001; Matthews, 1995, 1996; Matthews, French, Lawrence, Cutler, & Jones, 1996, 1997). Such research has clearly demonstrated that archaeological sediments – like lithic and ceramic remains – constitute integral parts of the archaeological record, and they can reveal details about human activities and processes that are scarcely or not visible by other means. In the context of this project, this includes an understanding of pre-occupation of the landscape, maintenance and re-use of floors and roofs, rebuilding phases and destruction phases, identification and localization of activity areas (e.g., cooking, storage, and cleaning) integrated over space and time (Courty, 2001; Goldberg & Whitbread, 1993). Micromorphological research at Bridge River will consisted of sampling complete stratigraphic sections from one or more locations within each housepit in order to understand changes in microfacies and associated activities.

The project maintained the basic 50x50 cm excavation units used during the 2003 and 2004 field seasons. Each square was individually hand excavated using trowels and dustpans and where necessary, smaller tools including bamboo sticks. All sediments were be sieved through 1/8 inch mesh screens. Sediments were excavated in natural strata. Some zones (e.g. roofs and rims) are complex containing multiple natural levels. Where larger zones or levels are thicker than 10 cm, but otherwise homogeneous, excavation preceded in arbitrary 10 cm levels. Excavation of floor sediments will included point proveniencing and individual bagging of artifacts and bone above 1 cm in maximum diameter whenever possible. Articulated fish were collected in aggregate. Excavation of floors preceeded in arbitrary 5 cm levels. One-liter soil samples for flotation and additional sedimentary analyses will be taken systematically in each square of housepit floors. A detailed profile was drawn from at least one major wall for each trench. Sediments larger than 1 cm maximum diameter were be individually drawn and general sedimentary zones demarcated. Digital photographs were be taken of each profiled wall and exposed floors. All mapping and unit placement was accomplished using a survey instrument (EDM) and prism.

A limited number of radiocarbon samples were collected from excavated features to be submitted for AMS dating from the NSF AMS Laboratory at the University of

Arizona. These data are essential for further defining the village chronology. Radiocarbon dating of charcoal recovered only from *in situ* features and roof beams will avoid the problems of ambiguous associations between strata and dated material encountered by Hayden (2000d) in his attempts at dating some rim and pit strata at Keatley Creek. Details regarding analysis of artifacts and zooarchaeological and paleoethnobotanical remains are described in later chapters and appendices of this report.

Report Outline

Results of the 2008 investigations are presented in chapters covering dating and stratigraphy (Chapter 3), lithic artifacts (Chapter 4), and faunal remains (Chapter 5). Appendices include the maps (Appendix A), photographs and other illustrations (Appendix B), lithic artifact typology (Appendix C), Paleoethnobotanical report (Appendix D), dog remains report (Appendix E), and background on micromorphology methods (Appendix F). Artifact and faunal remains data are provided in the enclosed CDs.

CHAPTER TWO

ENVIRONMENT AND CULTURE CHRONOLOGY

Nathan Goodale, Michael Lenert, and Anna Marie Prentiss

This chapter provides a brief review of the Canadian Plateau cultural chronology and places the Bridge River site in its local and regional environmental context. We do not provide a review of Plateau paleoenvironments (see Chatters 1998).

The Canadian Plateau Culture Area

The Canadian Plateau geographic culture area lies within British Columbia between the great bend in the Fraser River to the north, the Rocky Mountains to the east, the Coast Mountains to the west, and 50 miles above the border with the United States to the south (Richards and Rousseau 1987). There are a number of geographic subdivisions within this greater area, This review is concerned with the Mid-Fraser Canyon subdivision because it contains the Keatley Creek site (EeRl7). The Mid-Fraser Canyon includes the river valley itself and its surrounding drainages stretching from Big Bar to just south of Lytton.

The Mid-Fraser Canyon area is semi-arid and located in the rain-shadow of the Coast Range. The average annual amount of precipitation is only 25-30 cm (Pokotylo and Mitchell 1998). This region supports the Interior Douglas Fir Bioclimatic Zone which is dominated by the presence of Douglas Fir, sagebrush, and various bunch grasses.

Linguistically speaking, the Plateau culture area includes Sahaptian, Interior Salish, Kutenai, Chinook, and Athapaskan speaking peoples. The inhabitants of the Mid-Fraser included Interior Salish groups. Ethnographically identified and also contemporary groups include the Upper or Fraser River Lillooet (*Stl'atl'imx*) and the Shuswap (*Secwepemc*). The Thompson or *Nlaka7pamux* also used the Middle Fraser area at its southern portion. Hayden (1992; see also Alexander 1992, 2000; Teit 1900, 1906, 1909) provides an ethnographic overview of contemporary and recent land use by the *Stl'atl'imx* people in the Mid-Fraser area, who are the indigenous people of the Bridge River area.

Cultural Chronology

This section reviews the culture history of the Canadian Plateau in southern British Columbia between the time of 3,500-250 BP. It relies heavily on the culture historical concepts outlined by Richards and Rousseau (1987) and Stryd and Rousseau (1996).

Shuswap Horizon (3,500-2,400 BP)

The earliest cultural horizon fully belonging to the Plateau Pithouse tradition is the Shuswap horizon. However, with the enigmatic presence of the Baker pithouse site that dates to the Lochnore Phase (5,500-3,500 BP), Stryd and Rousseau (1996) were forced to reevaluate the initial use of pithouses in the Plateau Region. Nevertheless, the Shuswap horizon represents the first major distribution of pithouse communities in this region. The architectural characteristics of the pithouses in the Shuswap horizon include an average size of 10.7 meters in diameter, a circular and oval plan, steep walled, and flat bottomed (Richards and Rousseau 1987). The houses have side entrances, central hearths, and internal storage and cooking pits. The presence of large postholes indicates that there was a substantial wooden superstructure that was most likely covered with earth (Hayden 1997, 2000; Richards and Rousseau 1987).

Lithic assemblages associated with the Shuswap horizon are less complex in workmanship, composition, and technological sophistication as compared to the later horizons of the Plateau Pithouse tradition (Richards and Rousseau 1987). Low to medium quality materials were used to make many of the tools and this resulted in their crude appearance. More finely made tools out of dacite (a form of fine-grained basalt), jasper, and chalcedony appear in the Shuswap horizon. Shuswap horizon projectile points have a mean length of 4cm, width of 1.8cm, and an average neck of 1.10cm. These points were most likely used as atlatl or spear tips (Richards and Rousseau 1987). Shuswap point variations resemble Hanna, Duncan, McKean, and Oxbow points of the Northern Plains and may indicate some form of contact between the two regions (Richards and Rousseau 1987).

Other lithic items associated with the Shuswap horizon include: key-shaped unifaces and bifaces, unformed unifacial and bifacial tools, microblades, and cores. Lithic technology that requires more hours to produce such as groundstone, formal scrapers, and artwork is very rare in the Shuswap horizon. The lithic technology during this horizon represents a more expedient organization.

Subsistence was logistically organized (per Binford 1980) in the Shuswap horizon and was focused on deer, elk, black bear, sheep, muskrat, beaver, snowshoe hare, red fox birds, fresh water mussels, trout and salmon, and trumpeter swans (Richards and Rousseau 1987). There is evidence that salmon procurement was becoming more important during the Shuswap than in earlier horizons. However, salmon was not considered to be a main dietary source until later traditions in the Plateau Pithouse tradition.

Trade with the coastal regions becomes evident in the Shuswap horizon with the presence of dentalium shells. Several Shuswap projectile points also resemble Locarno Beach phase points, indicating that some form of contact existed between the two regions.

Plateau Horizon (2,400-1,200 BP)

The Plateau horizon is the next cultural component of the Plateau Pithouse tradition and relates to a time period that reflects a climatic shift from cool and moist conditions to warmer and dryer conditions that are still present today (Hebda 1982). The housepits of the Plateau horizon are characteristically smaller than those of the previous Shuswap horizon with an average diameter of 6.14 meters (though generally larger in the Mid-Fraser area). Housepits are circular to oval in plan often containing a central hearth feature, and a few small cooking, storage, and refuse pits (Richards and Rousseau 1987; Carlson 1980; and Wilson 1980). The walls tend to be steep and the floors are flat with a basin shaped profile. There is evidence for large postholes, earth roofing insulation, and benches lining the edges. Eldridge and Stryd (1983) and Hayden (1997) give evidence for both side entrances and roof entrances being employed at this time.

The lithic technology employed during the Plateau horizon shares characteristics with the Northern Plains and North West Coast. The Plateau horizon projectile points were most likely used as dart and arrow points. The dart points have an average of 4.10cm in length and an average width of 2.60cm. Arrow points have an average length of 2.48cm and an average width of 1.73cm (Richards and Rousseau 1987). The larger dart points were used continually throughout the Plateau horizon. However, the smaller arrow points were only used after ca. 1,500 BP (Richards and Rousseau 1987). Plateau points have convex bases, small barbs, and corner notches and are similar to Pelican Lake corner notched points suggesting continuing contact between the Plateau and Northern Plains (Dyck 1983).

Incised and groundstone tools are uncommon during this time with chipped stone tools making up the significant percentage of lithic assemblages. Chipped unifacial and bifacial implements are the most common during this time and an increase in the use of key-shaped scrapers is also evident.

Bone tools are more common in the Plateau horizon than the earlier cultural traditions. These tools include: harpoons, bone points, beads, and gaming pieces. This may be due to a greater degree of bone preservation or to a higher degree of logistically collecting marine resources.

The subsistence focus of the people of the Plateau horizon was on marine resources (salmonids), and roots. Stable carbon isotope analysis of human bone suggests that 60% of all dietary protein had a marine origin (Pokotylo and Froese 1983; and Richards and Rousseau 1987).

The evidence for a trans-Rocky Mountain exchange network involving the Plateau, the Northern Plains, the Eastern Kootenay, and Rocky Mountain Regions is represented by the presence of nephrite, argillite, top of the world chert, Dentalium and Olivella shells. These artifacts represent prestige or trade goods coming into the Plateau from their respective places of origin.

During the later stages of the Plateau horizon the "Big Village Pattern" (Lenert 2001) or Lillooet Phenomenon arises in the western Canadian Plateau Region at ca. 1800-1600 cal. BP (Lenert 2001). The Lillooet Phenomenon employs the existence of small, medium, and large pithouses organized into communities. This time period also reflects a probable height of social complexity (as defined by Arnold 1996) and population aggregation.

Kamloops Horizon (1,200-200 BP)

The Kamloops horizon is the last prehistoric cultural phase in the Canadian Plateau Region. Architecturally, the housepits in this phase have an average diameter of

8.66 meters, but range in size from 5 meters to 22 meters in diameter. The housepits are oval, round, rectangular, and square in plan and usually have raised earth rims. Central hearths, storage pits, and both side and roof entrances are associated with Kamloops Housepits (Richards and Rousseau 1987).

Kamloops side-notched points are the most common projectile points employed during this time period. These points are small and triangular and have small, narrow, opposing side notches with straight to slightly convex or concave basal margins. The points have an average length of 2.04 cm, and an average width of 1.32 cm (Sanger 1970). In the later stages of the Kamloops horizon (ca. 400-100 BP) multi-notched points are found, but rare. These points have up to four additional notches along one lateral blade margin and are slightly larger than Kamloops side-notched varieties (Richards and Rousseau 1987).

Lithic technology employing bifacial reduction is quite similar in the Kamloops horizon when compared to earlier cultural traditions. It is dominated by fine, pressure-finishing of both points and knives. There is an increase in the quantity, quality, and variety of ground stone artifacts made of nephrite, slate, and steatite and these raw materials were often carved into anthropomorphic and zoomorphic forms. These items are representative of a high degree of workmanship and craft specialization. There is evidence that these items were trade goods and may have been one of their main functions.

Non-lithic artifacts that are associated with the Kamloops horizon include: birch bark containers and woven blankets (Teit 1909). There is an increase in the variety and frequency of antler, bone, and tooth artifacts. These items were often highly decorated using a series of geometric patterns.

Subsistence strategies during the Kamloops horizon were logistically organized with a focus on aquatic resources in addition to terrestrial resources including deer, roots and berries. Stable isotope analysis, from a limited number of human remains, indicates that 40-60% of the dietary caloric intake was from salmon (Lepofsky et al. 1996).

The Bridge River Site

The Bridge River site lies on the western edge of the British Columbia Plateau region within a deep valley (Bridge River) that divides the Coast Mountains from the Camelsfoot Range (Ryder 1978). The site lies on a broad terrace on the north side of the Bridge River and is underlain by alluvial and colluvial sediments. From a vegetative standpoint, the site is located within the Ponderosa Pine-Bunchgrass biogeoclimatic zone (Mathewes 1978). Current site vegetation includes a variety of grasses (e.g. wild rye and various wheat grasses), Saskatoon berry bushes, rabbitbrush, big sagebrush, and Ponderosa pine.

CHAPTER THREE

STRATIGRAPHY, FEATURES, AND DATING

(Anna Marie Prentiss)

This chapter describes the stratigraphic contexts excavated during the 2008 field season at the Bridge River site. The chapter also describes all excavated features and reviews the results of all new dating research conducted since the 2008 field season. The goal of the chapter is to provide the reader with an overview of variation in- and dating of the major strata excavated in each of Housepits 20, 24, and 54. The chapter closes with an examination of patterning in fire-cracked rock counts and feature volume.

Stratigraphy and Dating

Tables 3.1 through 3.12 provide a review of stratigraphic designations and results of radiocarbon dating for all excavated areas in Housepits 20, 24 and 54. In a number of cases it was necessary to adjust field designations resulting in re-numbering of some sequences. Comparison of strata between excavation blocks within specific housepits permitted cross-referencing of strata and establishment of summary sequences (Tables 3.4, 3.8, and 3.12).

Table 3.1. Radiocarbon dating from 2008 at the Bridge River site.

Lab Number	Sample ID	Context[*1]	Material	$d^{13}C$	Date (yrs B.P)	Calibrated Date (mean+ 2 sigma ra.
AA82438	29	20/1, IId, F1	wood charc.	-22.2	1462±37	see below
AA82439	57	20/2, Vb	wood charc.	-21.3	1581±39	see below
AA82440	60	54/1, IIk, F9	wood charc.	-21.6	1380±37	see below
AA82441	51	24/2, II, F2	wood charc.	-25.3	1199±37	see below
AA82442	15	54/1, IIf, F6	wood charc.	-20.4	1222±37	see below

[*1]Housepit/Area, stratum, feature

Data presentations rely upon conventions outlined in Prentiss et al. (2008). Previous dating permitted us to define four occupation periods of the Bridge River site as follows (dates are calibrated means): BR 1 (1797-1614 cal. B.P.), BR 2 1552-1326 cal. B.P.), BR 3 (1275-1261 cal. B.P.), and BR 4 (610-145 cal. B.P.). Commonly used stratigraphic designations are as follows: I=surface, II=floor, III=rim, IV=silt-loam substrate; V=roof, and XII=undefined cultural fill. Sub-designations with lower case letters (e.g. IIa) refer to earlier dated strata in a sequence of similar strata. Sub-designations with numbers in parentheses (e.g. II(1)) refer to variants of the same general type, but not necessarily from a different occupation (exceptions in HP 54). Stratigraphy is illustrated in wall profiles from each excavation block (Appendix XXX).

Table 3.2. Housepit 20, Area 1 stratigraphic summary (italicized dates are extrapolated from adjacent units; non-italicized figures are new dates for this stratum/2008 field season).

Field Code	Original Profile	Final Code/Profile	Features	Date/ Occ. Period
I	I/V	I		4
V	I/V	V		4
II	II	II		4 *328*
Va	Va	Va		3
IIa	IIa	IIa		3 *1284*
IIb	IIb	IIb		3?
IIc	IIc/IIc1	IIc		2
IIc1	IIc/IIc1	IIc(1)		2
Vb		Vb		2
IId	IId	IId	1, 2, 3	2 1462

Table 3.3. Housepit 20, Area 2 stratigraphic summary (italicized dates are extrapolated from adjacent units; non-italicized figures are new dates for this stratum/2008 field season).

Field Code	Original Profile	Final Code/Profile	Features	Date/ Occ. Period
I	V	I		4
V	V1, V2	V[1]		4
II	II	II		4 *328*
XII	Va	Va(1)		3
	XII	Va(2)[2]		3
IIa	IIa	IIa	5(1), 5(2), 11	3 *1284*
Va	Vb	Vb		3?
IIb	IIb1, IIb2	IIb	9	3?
Vb	Vc	Vc		2 1581
IIc	IIc	IIc		2
IId	IIc	IId	6, 7	2 *1462*

[1](V1 and V2 retained on profile)
[2](all XII bags convert to Va(2)

Table 3.4. Housepit 20 stratigraphic cross-reference (calibrated dates are at two sigmas).

Floor/ Roof#	AA1	AA2	Date	Period - Calib
	I	I		4
RF1	V	V		4
FL1	II	II	328±31[*2]	4 473-390-307 BP
RF2	Va	Va		3
FL2	IIa	IIa	1284±36[*2]	3 1293-1194-1095 BP
RF3		Vb		3
FL3	IIb	IIb		3
RF4		Vc	1581±38[*1]	2 1687-1502-1316 BP
FL4	IIc/IIc1	IIc		2
RF5	Vb			2
FL5	IId	IId	1462+37	2 1407-1353-1299 BP

[*1]The unconformity associated with the 1581 date could reflect old wood bias or some other minor mixing given the context of this date as a piece of charred wood from a roof deposit. However, given its stratigraphic context and the substantial overlap in range with the 1462 date when calibrated, I think it still likely reflects a BR 2 occupation.
[*2]See Prentiss et al. (2008) for further information.

Table 3.5. Housepit 24, Area 1 stratigraphic summary (italicized dates are extrapolated from adjacent units; non-italicized figures are new dates for this stratum/2008 field season).

Field Code	Original Profile	Final Code/Profile	Features	Occ. Period
I	I/V	I		3
V	I/V	V		3
III	III	III		3
II/IIa	II	II	1, 2, 3, 4, 5	3 *1296*
IV	IV	IV		3
XV	XV	XV		

Table 3.6. Housepit 24, Area 2 stratigraphic summary (italicized dates are extrapolated from adjacent units; non-italicized figures are new dates for this stratum/2008 field season).

Field Code	Original Profile	Final Code/Profile	Features	Occ. Period
I	I/V	I		3
V	V	V		3
III	III	III		3
II	II	II	1, 2, 3, 4	3 1199
IIa		Feature 1		3

Table 3.7. Housepit 24, Area 3 stratigraphic summary (italicized dates are extrapolated from adjacent units; non-italicized figures are new dates for this stratum/2008 field season).

Field Code	Original Profile	Final Code/Profile	Features	Occ. Period
I	I	I		3
V	V	V		3
III	III	III		3
II	II	II	1, 2, 4, 5	3 *1199*
IIa[1]				
IIb[1]				

[1](IIa and IIb=Feature 5 fill – change levels to reflect upper F5 strata originally called IIa and IIb in subsquares 15 and 21)

Table 3.8. Housepit 24 stratigraphic cross-reference (calibrated dates are at two sigmas).

Stratigraphic Type	AA1	AA2	AA3	Date/ Calib	Period
Surface	I	I	I		3
Roof	V	V	V		3
Rim/Roof	III	III	III		3
Floor	II	II	II	1199±37 1276-1124-972 1296±36[*1] 1296-1223-1150	3

*[1]See Prentiss et al. (2008) for further information.

Table 3.9. Housepit 54, Area 1 stratigraphic summary (italicized dates are extrapolated from adjacent units; non-italicized figures are new dates for this stratum/2008 field season).

Field Code	Original Profile	Final Code/Profile	Features	Date/ Occ. Period
I	I	I		4
V	V(1), V(2)	V(1), V(2)[1]		4
II	II	II		4
III	III	III		
IIa	IIa	II(1)	7	4
IIb	IIa	II(1)		4
Va	Va	Va		3
IIc	IIb	IIa		3
IId	IIb	IIb	3	3
IIe	IIb	IIc		3
Vb	Vb	Vb		3 *1219*
IIf	Vb	Vb		3
IIg	IIc	IId	5	3
IIh	IIc	IIe		3
IIi	IId	IIf		3 1222
IIj	IId	IIg		3
Vc	Vc	Vc		3 *1258*
IIk	IIe	IIh		3
IIl	IIf	IIi		2 *1438*
IIm	IIf	IIj		2
IIn	IIf	IIk	9	2 1380

[1](All bags remain coded to strat. V)

Table 3.10. Housepit 54, Area 2 stratigraphic summary (italicized dates are extrapolated from adjacent units; non-italicized figures are new dates for this stratum/2008 field season).

Field Code	Original Profile	Final Code/Profile	Features	Date/ Occ. Period
I	V	I		4
V, III/Va1, Va1, Va2	V	V[1]		4
V/II	V	V[1]		4
II	II	II		4
XIV	II(1)	Va		3
IIa	IIa	IIa	1	3
Va	Va	Vb		3
IIb	IIb	IIb		3
IIb1	IIb	Vc[2]		3 *1219*
IIb2	IIb	Vc[2]		3
Vb/IIc	IIb	Vc[2]		3
Vb2[3]				
IIc	IIc	IIc	2, 4, 6	3
IId (all levels)[4]				

[1] (III/Va1, Va1, Va2, and V/II should be labeled in stratigraphic order as V, levels 1-4, as appropriate)

[2] (IIb1, IIb2, and Vb/IIc should be treated as levels of Vc [levels 1-3]); this is probably equivalent to Vb from Activity Areas 1 and 3.

[3] (Feature not on profile)

[4] (Feature fill: Subsq. 10 Strat. IId=Feature 2; Subsquare 9 Strat IId=Feature 4; Subsquare 8 Strat. IId=Feature 4; Subsquare 7 Strat. IId=Feature 6)

Table 3.11. Housepit 54, Area 3 stratigraphic summary (italicized dates are extrapolated from adjacent units; non-italicized figures are new dates for this stratum/2008 field season).

Field Code	Original Profile	Final Code/Profile	Features	Date/ Occ. Period
I	I/V	I		4
V	V	V		4
II	II	II	8	4
XIV	XIV(1), XIV(2)	Va		3
IIa	IIa(1)	IIa		3
IIa(1)	IIa(1)	IIa(1)	5, 7	3
IIb	IIa(3)	IIb	1, 6a	3
Va	Va	Vb		3 *1219*
IIb(1)	IIa(1)	IIb(1)	6b	3
IIc	IIa(2)	IIc		3
IId	IIa (3 and 4)	IId		3
IIe, IIe1	IIa (3 and 4)	IIe	2, 4	3
IIf	IIa (3 and 4)	IIf	3	3 *1222*
Vb	Vb	Vc		3 *1258*
IIg	IIb	IIg		3
Vc	Vc	Vd		2 *1438*
IIh	IIc	IIh		2
IIi	IId(1)	IIi		2
IIj	IIe, IIf	IIj		2 *1380*
IIk	IIf	IIk	9, 10	2
IIk(1)	IIg	IIl		2
			6c (truncated by 6b unknown stratum)	

Table 3.12. Housepit 54 stratigraphic cross-reference (calibrated dates are at two sigmas).

Floor/ Roof Number	A1	A2	A3	Date/ Calib	Period
	III				nd
	I	I	I		4
RF1	V	V	V		4
FL1	II/II1	II	II		4
RF2	Va	Va	Va		3
FL2	IIa	IIa	IIa		3
RF3		Vb			3
FL3	IIb	IIb	IIa(1)		3
RF4		Vc			3
FL4	IIc	IIc	IIb		3
RF5	Vb		Vb	1219±35[*2]	3
				1261-1161-1061 BP	
				1312±35	
				1295-1237-1178	
FL5	IId		IIc		3
FL6	IIe		IId		3
FL7	IIf		IIe	1222±37	3
				1287-1134-980 BP	
FL8	IIg		IIf		3
RF6	Vc		Vc	1258±35[*2]	3
				1280-1182-1083 BP	
FL9	IIh		IIg		3
RF7			Vd	1438±36[*1*2]	2
				1389-1341-1293 BP	
FL10	IIi		IIh		2
FL11	IIj		IIi		2
FL12	IIk		IIj	1380±37[1]	2
				1479-1284-1089 BP	
FL13			IIk		2
FL14			IIl		2

[*1]Given the complete overlap in calibrated range I view these dates as approximately the same date.
[*2]See Prentiss et al. (2008) for additional information. Results of the 2008 field season at Bridge River provided improved stratigraphic data resulting in reinterpretation of strata from HP 54 (Prentiss et al. 2008: Figure 9): I (Prentiss et al. 2008:Figure 9)=I (this report); V=V; Va=V; III=Va; II=IIa, IIa1, and possibly, IIb; IIa/IIb/F2/F3=IIb/Vb; IIc=IIb(1)-IIf; F5=Vc; IId=IIg; F6=Vd; IIe=IIh; and F4=F6b.

Sediments

A range of sedimentary data was collected in the field including compaction, color, clast size and cultural content. Field descriptions were backed up by a rigorous analysis of sedimentary micromorphology (see Goldberg, Appendix XXX). Quantitative assessments represent percentage scores for each stratum derived from the sum of all excavations unit containing that stratum. Throughout all excavations, floor sediments were identifiable as lighter in color (compared to adjacent burned roof sediments), compact and composed primarily of clay. They also tended to be marked by the presence of artifacts lying horizontally on their surfaces. Roofs contained minimally compact burned sediments and large quantities of charcoal and larger rocks. Artifacts in roof contexts tended to be randomly distributed at unpredictable slopes and aspects.

Excavation of Housepit 20, Area 1 (Table 3.13) revealed five floors and three burned roof strata. The excavator recognized little variation in floor sediments while roof sediments have a pattern of distinctly higher clay content at greater depths. In contrast, the Housepit 20, Area 2 excavation revealed (Table 3.14) higher clay content in early floors and roofs. Integration of floor and roof data from Housepit 20 excavations indicates the presence of five floors and associated roofs, though some early roofs are apparently not consistently represented across the housepit. Radiocarbon dating from this field season (Tables 3.1 and 3.4) and 2003 (Prentiss et al. 2008) indicates that the upper-most roof and floor date to BR 4 times. The middle two floors (IIa and IIb) and roofs (Va and Vb) formed during BR 3 occupations. The lowest floors (IIc and IId) and roofs (Vc and Vd) date to the BR 2 period.

Table 3.13. Housepit 20 Area 1 sediment characteristics (percentage clast sizes, Munsell color, compaction [high, medium, low], charcoal (yes or no), Fire-Cracked Rock [FCR] counts [pebble and cobble size]) and estimate of total excavated cubic meters per stratum.

	Stratum								
	I	V	II	Va	IIa	IIb	IIc[*1]	Vb	IId
Cobbles	0	0	1	1	0	0	0	1	0
Pebbles	0	1	1	1	1	1	1	1	1
Gravels	1	2	4	2	4	4	4	4	4
Sands	35	21	16	18	15	16	14	18	20
Silts	54	61	60	60	62	63	61	35	62
Clays	10	15	18	18	18	16	20	41	13
Color	10YR 3/1	10YR 3/1	10YR 4/2	10YR 4/2	10YR 4/2	10YR 4/2	10YR 4/2	10YR 4/2	10YR 5/2
Compaction	M	L	H	M	H	H	M/H	M	H
Charcoal	Y	Y	Y	Y	Y	Y	Y	Y	Y
FCR	77	107	489	278	265	299	496	55	38
Meters^3 Exc.	.04	.04	.15	.3	.26	.15	.15	.05	.1
FCR/m^3	1925	2675	3260	927	1019	1993	3307	1100	380

[*1]IIc may include roof material artificially inflating FCR counts.

Table 3.14. Housepit 20 Area 2 sediment characteristics (percentage clast sizes, Munsell color, compaction [high, medium, low], charcoal (yes or no), and Fire-Cracked Rock (FCR) count) and estimate of total excavated cubic meters per stratum.

	Stratum									
	I	V	II	Va(2)	IIa	Vb	IIb	Vc	IIc	IId
Cobbles	1	0	0	0	0	0	0	1	1	0
Pebbles	1	1	2	2	1	2	1	2	1	1
Gravels	1	1	2	3	2	2	2	2	2	2
Sands	25	20	23	24	22	22	23	21	23	23
Silts	62	70	59	57	55	56	56	49	48	42
Clays	10	8	14	14	20	18	18	25	25	32
Color	10YR 3/1	10YR 2/1	10YR 4/1	10YR 4/2	10YR 4/1	10YR 5/3	10YR 4/2	10YR 3/1	10YR 3/3	10YR 3/3
Comp.	L	L	H	L	H	M	H	M	H	H
Charcoal	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FCR	13	116	365	393	333	302	77	221	107	82
Meters^3 Exc.	.08	.15	.26	.3	.08	.21	.1	.06	.06	.06
FCR/m^3	12.5	773	1403	1310	4162	1438	770	3683	1783	1366

Excavations of three areas in Housepit 24 revealed comparatively simple stratigraphy featuring a single roof and floor. A possible rim horizon was recognized throughout much of the excavations as indicated by lighter colored sediments and its location trending thickest towards the rim of the housepit. However, given the fact that it covers much of the excavated floors and that the sediments are not significantly different from the formal roof zone (V) it is entirely possible that this merely represents roof material incorporating lighter colored rim material. The floor is characterized in all areas by higher clay content, greater compaction and reduced numbers of fire-cracked rock. Dating of Housepit 24 to BR 3 times is confirmed by radiocarbon dates derived from this field season (Tables 3.1 and 3.8) and the 2004 field season (Prentiss et al. 2008). Significantly, while the 2004 field season date was derived from loose charcoal from floor sediments, the new date was derived from an in situ hearth feature uncovered from the floor of Area 2.

Table 3.15. Housepit 24 Area 1 sediment characteristics (percentage clast sizes, Munsell color, compaction [high, medium, low], charcoal (yes or no), and Fire-Cracked Rock (FCR) count) and estimate of total excavated cubic meters per stratum.

	Stratum			
	I	V	III	II
Cobbles	2	3	1	0
Pebbles	9	10	10	6
Gravels	6	9	10	12
Sands	14	9	10	9
Silts	61	52	52	46
Clays	8	17	17	27
Color	10YR 2/1	10YR 2/1	10YR 4/2	10YR 3/2
Comp.	L	M	M	H
Charcoal	Y	Y	Y	Y
FCR	362	1238	706	234
Meters^3 Exc.	.13	.25	.23	.25
FCR/m^3	2785	4952	3069	936

Table 3.16. Housepit 24 Area 2 sediment characteristics (percentage clast sizes, Munsell color, compaction [high, medium, low], charcoal (yes or no), and Fire-Cracked Rock (FCR) count) and estimate of total excavated cubic meters per stratum.

	Stratum			
	I	V	III	II
Cobbles	2	6	2	1
Pebbles	4	8	10	2
Gravels	10	12	15	6
Sands	36	17	19	7
Silts	43	47	40	32
Clays	5	10	14	52
Color	10YR 2/1	10YR 2/1	10YR 3/3	10YR 6/3
Comp.	L	L	L	H
Charcoal	Y	Y	Y	Y
FCR	99	1021	136	94
Meters^3 Exc.	.06	.35	.02	.13
FCR/m^3	1650	2917	6800	723

Table 3.17. Housepit 24 Area 3 sediment characteristics (percentage clast sizes, Munsell color, compaction [high, medium, low], charcoal (yes or no), and Fire-Cracked Rock (FCR) count) and estimate of total excavated cubic meters per stratum.

	Stratum			
	I	V	III	II
Cobbles	0	0	0	0
Pebbles	3	3	3	2
Gravels	4	5	7	6
Sands	18	16	22	20
Silts	74	70	50	43
Clays	1	6	18	29
Color	10YR 3/1	10YR 2/1	10YR 4/2	10YR 3/2
Comp.	L	L	L	H
Charcoal	Y	Y	Y	Y
FCR	58	261	491	45
Meters^3 Exc.	.06	.15	.4	.08
FCR/m^3	967	1740	1228	563

Excavations of three areas in Housepit 54 revealed a startlingly complex and deep stratigraphic sequence (. Dating revealed that like Housepit 20, Housepit 54 developed through BR 2-4 occupations (Tables 3.1 and 3.12). However, different from Housepit 20, the initial occupation of Housepit 54 came late in BR 2 times (most likely post 1400 cal. B.P.). Given that only one floor and roof (V and II/II(1)) clearly dates to BR 4 times, this means the other 13 floors and six identified burned clay roofs formed during a likely period of less than 200 years or approximately 15 years per floor. This figure is close to predictions offered elsewhere (Alexander 2000) for the standard length of time expected for occupations of a specific housepit before refurbishing of the roof became necessary due to wood-rot or infestation by insects and rodents. Given the presence of multiple burned roofs, the Housepit 54 data also indicate that nearly 50% of the time refurbishing of the housepit required burning of the roof (assuming burned roof sediments reflect refurbishing rather the effects of warfare). Much like the early floors from Housepit 20 Area 1, BR 2 and 3 floors at Housepit 54 consist primarily of clay sediments. Excavators noted that larger clasts tended to be buried within floors below a thin horizon of nearly pure clay. Further investigations will be necessary to determine if floor thickness and sedimentary structure reflects length of occupation or merely floor construction technique (see Goldberg, Appendix XXX).

Table 3.18. Housepit 54 Area 1 sediment characteristics (percentage clast sizes, Munsell color (all 10YR), compaction [high, medium, low], charcoal (yes or no), and Fire-Cracked Rock (FCR) count) and estimate of total excavated cubic meters per stratum (M^3). All stratigraphic units contain charcoal.

	Cob.	Peb.	Grav.	Sand	Silt	Clay	Color	FCR	M^3	Comp.	FCR/ m^3
I	2	3	2	20	72	1		56	.08	L	700
V	5	7	5	8	75	0	2/1	215	.23	L	935
II	2	6	3	3	45	41	4/2	189	.08	M	2363
III	4	8	4	2	53	29	5/2	217	.35	L	620
II(1)	2	6	2	3	39	48	3/1	163	.18	H	906
Va	4	5	4	12	40	35	4/6 4/2 3/2	154	.3	L	513
IIa	2	5	3	0	24	66	5/2	73	.06	H	1217
IIb	1	5	3	0	25	66	5/2	54	.06	H	900
IIc	3	6	3	1	33	54	2/1	41	.08	H	513
Vb	4	4	3	4	23	62	4/6	74	.12	M	617
IId	2	5	3	9	26	45	6/2	50	.05	H	1000
IIe	4	6	4	3	19	64	4/2	59	.03	H	1966
IIf	1	6	5	5	23	60	3/1	38	.04	H	950
IIg	6	5	5	0	13	71	3/1	39	.04	H	975
Vc	6	5	4	8	13	64	2/1	71	.1	M	710
IIh	2	4	3	3	15	73	3/1	34	.06	H	567
IIi	2	4	4	2	12	76	3/1	146	.15	H	973
IIj	2	7	5	0	15	68	3/1	30	.08	H	375
IIk	0	3	2	0	3	92	3/1	31	.04	H	775

Table 3.19. Housepit 54 Area 2 sediment characteristics (percentage clast sizes, Munsell color (all 10YR), compaction [high, medium, low], charcoal (yes or no), and Fire-Cracked Rock (FCR) count) and estimate of total excavated cubic meters per stratum (M^3). All stratigraphic units contained charcoal.

	Cob.	Peb.	Grav.	Sand	Silt	Clay	Color	FCR	M^3	Comp.	FCR/ m^3
I	1	4	6	8	81	0	3/1	164	.06	L	2733
V	1	7	7	7	73	5	3/1	437	.13	L	3361
II	0	2	7	8	52	31	4/1	42	.04	M	1050
Va	2	4	10	8	51	25	5/4 5/3	264	.13	L	2030
IIa	0	3	8	7	44	38	4/2	66	.06	M	1100
Vb	1	2	8	8	52	29	3/1 5/4	46	.13	L	354
IIb	1	2	6	7	48	36	4/2	30	.09	H	333
Vc	1	6	9	12	44	28	3/2	71	.1	L	710
IIc	0	3	5	16	29	47	4/3	22	.09	H	244

Table 3.20. Housepit 54 Area 3 sediment characteristics (percentage clast sizes, Munsell color (all 10YR), compaction [high, medium, low], charcoal (yes or no), and Fire-Cracked Rock (FCR) count) and estimate of total excavated cubic meters per stratum (M^3). All stratigraphic units contained charcoal.

	Cob.	Peb.	Grav.	Sand	Silt	Clay	Color	FCR	M^3	Comp.	FCR/ m^3
I	0	8	8	13	67	4	3/1	188	.08	L	2350
V	2	15	5	15	60	3	3/1	164	.15	L	1093
II	0	7	7	6	30	50	3/2	64	.08	H	800
Va	5	20	20	5	37	13	4/1 2/1	442	.15	L	2947
IIa	2	2	15	1	20	60	3/2	99	.08	H	1238
IIa(1)	2	2	15	1	20	60	3/2	98	.08	H	1238
IIb	0	5	5	5	20	65	3/2	32	.09	H	356
Vb	0	15	5	20	40	20	4/3	30	.08	M	375
IIb(1)	0	5	5	5	20	65	4/2	26	.05	H	520
IIc	2	10	5	3	22	58	4/2	72	.08	H	900
IId	2	10	5	3	30	50	4/1	58	.06	H	967
IIe	2	3	2	25	25	43	4/1	20	.06	H	333
IIf	0	10	5	3	20	62	4/1	28	.02	H	1400
Vc	0	10	5	3	30	52	4/6	43	.13	M	330
IIg	0	5	10	15	0	70	5/2	45	.08	H	563
Vd	5	10	10	5	50	20	3/3	71	.04	M	1775
IIh	0	5	10	15	0	70	5/4	38	.06	H	633
IIi	0	7	10	15	16	52	3/2	42	.21	H	200
IIj	0	7	7	16	0	70	4/3 3/2	23	.1	H	230
IIk	0	7	7	0	0	86	2/1	30	.05	H	300
IIl	0	7	7	0	0	86	3/2	0	.01	H	0

Features

A variety of data were collected for features permitting identification of feature type, content, and as appropriate, volume. Profiles and plan views of features can be seen in Appendix XXX). Feature numbers on Tables 3.21-3.28 reflect our original feature numbering system in the field. Missing numbers are feature designations, later cancelled.

Area 1 of Housepit 20 contained three features. Feature 1 is a very shallow or "surface" hearth placed directly over Feature 2, dating 1462±37 B.P. It was indicated by red oxidation ring and scattered small fragments of charcoal. Feature 2 is a large bell-shaped cache pit. Feature 3 is an extremely large oval shaped cache pit. Contents of each cache pit appeared to reflect redeposited floor-like material, especially in the case of Feature 3. Both contained fire-cracked rock as well as an assortment of lithic artifacts and faunal remains. Features 1-3 date to the BR 2 occupation associated with floor IId.

Table 3.21. Feature data from Housepit 20, Area 1 (SH=Surface Hearth, CP=Cache Pit; FCR=Fire-Cracked Rock).

Feature				Sediments				Estimated	FCR	BR
#	Type	Cob.	Peb.	Grav.	Sand	Silt	Clay	Vol. (cm^{3})	Count	Period
1	SH	0	0	0	18	63	19	N/A		2
2	CP	0	0	3	19	63	15	203,472	77[*1]	2
3	CP	1	2	4	14	29	50	562,500	517[*2]	2

[*1]FCR data collected from approximately 75% of estimated feature volume (152,604 cm^3).
[*2]FCR data collected from approximately 34% of estimated feature volume (191,250 cm^3)

Five features were identified in Housepit 20 Area 2. Feature 5 is a large bell-shaped cache pit associated with Stratum IIa (BR 3). Apparently the pit was excavated, used, filled with refuse (5a), then partially re-excavated and filled with more refuse (5b). Feature 6 is a hearth remnant found at the base of Feature 5 and appears to reflect a BR 2 occupation hearth, perhaps on the IId floor, substantially impacted by later excavation of Feature 5b. Feature 7 is a shallow basin-shaped hearth located in the IId floor (BR 2). Feature 9 is a shallow pit whose sediments are very similar to the surrounding sediments of floor IIb (BR 3). While it was recognized by the excavator on this floor, the feature was not visible in the wall profile. Consequently its function remains unknown. Feature 11 is a very large bell-shaped cache pit initiated from the IIa floor (BR 3). Contents include a large quantity of randomly distributed/mixed oxidized sediments, fire-cracked rock, and charcoal, as if much of the fill in the pit consisted of hearth clean-out materials.

Table 3.22. Feature data from Housepit 20, Area 2 (SH=Surface Hearth, BH=Basin-Shaped Hearth; CP=Cache Pit; SP=Shallow Pit; FCR=Fire-Cracked Rock).

Feature #	Type	Cob.	Peb.	Sediments Grav.	Sand	Silt	Clay	Estimated Vol. (cm^3)	FCR Count	BR Period
5	CP	0	2	2	30	6	60	510,250	135[*1]	3
6	SH[*2]		N/A					N/A	0	2
7	BH		N/A					N/A	1	2
9	SP	0	1	1	25	74	20	80,384	25[*3]	3
11	CP	0	4	6	20	50	20	381,510	215[*4]	3

[*1]FCR data collected from approximately 47% of estimated feature volume (243,750 cm^3).
[*2]This is a remnant of a shallow or surface hearth partially destroyed by excavation of F5 during BR 3 times.
[*3]FCR data collected from approximately 25% of estimated feature volume (20,096 cm^3)
[*4]FCR data collected from approximately 40% of estimated feature volume (152,985 cm^3)

Five features were excavated in Housepit 24 Area 1, all on the stratum II floor (BR 3). Feature 1 is a shallow rocky hearth with oxidation and charcoal staining but no solid charcoal. Features 2 and 4 are shallow post-holes. Neither of the pits is large enough to have been a major roof-support. However, they may have served either as supports for racks or extra braces for roof beams. Each is filled with rocky roof-like material. Feature 3 is a wide, bell-shaped cache pit. Sediments were high in clay content and extremely hard (the excavator described them as "cemented"). Regardless, feature sediments included a range of lithic artifacts and faunal remains and appear to reflect general household refuse. Feature 5 is another deep, bell-shaped cache pit with similar sedimentary structure and contents to Feature 3.

Table 3.23. Feature data from Housepit 24, Area 1 (SH=Surface Hearth, BH=Basin-Shaped Hearth; CP=Cache Pit; SP=Shallow Pit; PH=Post Hole; FCR=Fire-Cracked Rock; N/A=Data Not Available or Not Applicable).

Feature #	Type	Cob.	Peb.	Sediments Grav.	Sand	Silt	Clay	Estimated Vol. (cm^{3})	FCR Count	BR Period
1	BH	30	25	0	0	25	20	N/A	14	3
2	PH	10	10	5	5	50	20	3561	0	3
3	CP	2	4	5	9	44	36	392,500	197[*1]	3
4	PH	0	0	0	10	55	35	2000	N/A	3
5	CP	0	5	6	8	42	39	351,680	65[*2]	3

[*1] FCR data collected from approximately 50% of estimated feature volume (196,250 cm^3).
[*2] FCR data collected from approximately 25% of estimated feature volume (87,920).

Area 2 of Housepit 24 contained four features all associated with Stratum II sediments (BR 3). Feature 1 is a wide but shallow, bell-shaped cache pit. Sediments were very compacted and contained large numbers of fish bones, head parts in particular. Feature 2 is a basin-shaped hearth containing extensive amounts of charcoal and fire-cracked rock and dating, 1199±37 B.P. Feature 3 is the edge of an apparently shallow pit containing redeposited floor-like material. Function remains unknown. Feature 4 is a remnant of an originally larger cache pit, impacted by the excavation of Feature 1 during BR 3 times. Like Feature 1 it also contains very compacted silt-dominated sediment and frequent fish bones suggesting a similar original function.

Table 3.24. Feature data from Housepit 24, Area 2 (SH=Surface Hearth, BH=Basin-Shaped Hearth; CP=Cache Pit; SP=Shallow Pit; PH=Post Hole; FCR=Fire-Cracked Rock; N/A=Data Not Available or Not Applicable).

Feature #	Type	Cob.	Peb.	Sediments Grav.	Sand	Silt	Clay	Estimated Vol. (cm^3)	FCR Count	BR Period
1	CP	0	1	4	10	40	45	353,250	81[*1]	3
2	BH	5	10	5	10	35	35	56,912	43	3
3	SP	1	2	3	3	26	96	24,000[*2]	17	3
4	CP	1	3	5	7	30	54	50,000[*3]	53	3

[*1] FCR data collected from approximately 60% of estimated feature volume (211,950 cm^3)
[*2] It was impossible to calculate an estimate for feature volume as too little was exposed. The listed volume is an estimate of the excavated area only.
[*3] This is a remnant of a likely larger cache pit feature, impacted by excavation of F1. The volume figure reflects an estimate of the actual excavated material in this feature.

Four features were excavated in Housepit 24, Area 3. Feature 1 is a large cache pit containing a heterogeneous array of floor-like sediments, none of which are as highly compacted as those found in Areas 1 and 2. Most significantly, this feature contained a nearly intact dog skull and a likely articulated dog paw (most of the bones were found in the screen). Other materials included one dentalium shell and a more random array of lithic artifacts. Feature 2 is a shallow and relatively narrow post-hole excavated into Feature 1 suggesting continuing use of the filled Feature 1 as a floor-surface. Similar to the small post-holes found in Area 1, this post-hole probably reflects a post for a rack or a supporting brace for a roof beam. Feature 4 is a very large post-hole (at least 70 cm in depth) excavated into Feature 5. Given the size of this post-hole, it is likely that this may have been associated with a major roof support post. The volume of Feature 5 could not be estimated due to its apparent very large size. However, it is clear that this is a bell-shaped cache pit, filled in a series of events, one of which included many post-cranial elements of a dog (possible the same dog as found in Feature 1) and a large amount of fire-cracked rock.

Table 3.25. Feature data from Housepit 24, Area 3 (SH=Surface Hearth, BH=Basin-Shaped Hearth; CP=Cache Pit; SP=Shallow Pit; PH=Post Hole; FCR=Fire-Cracked Rock; N/A=Data Not Available or Not Applicable).

Feature #	Type	Cob.	Peb.	Sediments Grav.	Sand	Silt	Clay	Estimated Vol. (cm^{3})	FCR Count	BR Period
1	CP	0	6	4	40	10	40	136,884	46[*1]	3
2	PH	0	7	3	30	20	40	904	0	3
4	PH	7	3	8	15	30	45	55,070	23	3
5	CP	7	3	8	20	7	55	93,750[*2]	114	3

[*1]FCR count is derived from an estimated 50% of the feature (68,442).
[*2]Limited excavations precluded our ability to accurately estimate volume for this very large cache pit. The volume figure listed is an estimate of actual volume excavated.

Four features were encountered and recorded during excavation of Housepit 54, Area 1. Feature 3 is a shallow basin-shaped hearth located on the stratum IIb floor (BR 3). Feature 5 is a shallow basin-shaped hearth located on the stratum IId floor (BR 3). Feature 7 is a BR 4 period house-post excavated from stratum II(1) through the base of the excavation below Stratum III sediments. The upper surface of the post is burned and apparently chopped, while its lower portion is intact and unburned. While study of the post is on-going, it is clear that, given its narrow width (about 10-12 cm) and position against the northwest wall of the house, it reflects a rack support post or a thin roof beam brace. Feature 9 is a deeply buried basin-shaped hearth from floor IIk (dated 1380±37 B.P., BR 2), the earliest floor in this area of Housepit 54.

Table 3.26. Feature data from Housepit 54, Area 1 (SH=Surface Hearth, BH=Basin-Shaped Hearth; CP=Cache Pit; SP=Shallow Pit; PH=Post Hole; FCR=Fire-Cracked Rock; N/A=Data Not Available or Not Applicable).

Feature #	Type	Cob.	Peb.	Sediments Grav.	Sand	Silt	Clay	Estimated Vol. (cm^3)	FCR Count	BR Period
3	BH			N/A				850	0	3
5	BH			N/A				3737	0	3
7	PH[*1]	0	5	5	10	40	40	N/A	2	4
9	BH			N/A				7598	0	2

[*1]This is a posthole containing the original post, extending throughout the unit from II(1) through the base of III(1).

Four features were identified and excavated in Housepit 54, Area 2. Feature 1 is a large post-hole containing a portion of a burned post in stratum IIa (BR 3). Given its position and size, this could be a remnant of a major roof support post. Feature 2 is a moderate sized bell-shaped cache pit located on floor IIc (BR 3). Feature 4 is a large bell-shaped cache pit located on floor IIc (BR 3). Feature 6 is a very large and deep cache pit also located on floor IIc (BR 3). This feature was partially impacted by later excavation of Feature 4. All cache pits contained relatively dark floor-like sediment containing a limited set of fire-cracked rock, faunal remains and lithic artifacts, which is presumed to reflect floor/kitchen refuse used to fill these pits once their primary function ended.

Table 3.27. Feature data from Housepit 54, Area 2 (SH=Surface Hearth, BH=Basin-Shaped Hearth; CP=Cache Pit; SP=Shallow Pit; PH=Post Hole; FCR=Fire-Cracked Rock; N/A=Data Not Available or Not Applicable).

Feature #	Type	Cob.	Peb.	Sediments Grav.	Sand	Silt	Clay	Estimated Vol. (cm^3)	FCR Count	BR Period
1	PH	0	5	10	35	50	0	13,816	2	3
2	CP	0	5	12	10	45	28	66,725	30[*1]	3
4	CP	1	2	5	8	45	39	200,960	70[*2]	3
6	CP	0	2	4	7	39	48	218,750[*3]	27	3

[*1]FCR acquired from estimated 50% of total pit volume (33,362).
[*2]FCR acquired from estimated 50% of total pit volume (100,480).
[*3]This cache pit is too large to accurately estimate total volume from limited excavations. This figure is an estimate of actual excavated volume.

Ten features were excavated in Housepit 54, Area 3. Feature 1 is a deep and narrow post-hole from floor IIb(1) (BR 3) likely reflecting a post used to help support a roof beam (though not a primary roof support). Feature 2 is a shallow, basin-shaped hearth from floor IIe (BR 3). The feature contained one piece of fire-cracked rock, charcoal stained sediment and was surrounded by a distinct oxidation ring. Feature 3 is a shallow basin-shaped hearth with no fire-cracked rock, charcoal, charcoal stained sediment and an oxidation ring, all located on the IIf floor (BR 3). Feature 4 is a large basin-shaped hearth on floor IIe (BR 3) with charcoal, heat oxidation on its margins and base, and several pieces of fire-cracked rock. Feature 5 is a moderate-sized basin shaped hearth on floor IIa(1) (BR 3) with charcoal, fire-cracked rock, and limited oxidation of surrounding sediments. Feature 6a is a moderate-sized basin-shaped hearth excavated from floor IIb (BR 3) through Vb sediments into the top of Feature 6b, containing charcoal and areas of oxidation. Feature 6b is an exceptionally large bell-shaped cache pit excavated from floor IIb(1) (BR 3). Despite the feature's exceptional capacity its sediments contain relatively few pieces of fire-cracked rock, lithic artifacts or faunal remains. Feature 6c is a remnant of another, likely older cache pit truncated by Feature 6b. However, its date of excavation and use remains unknown. Feature 7 is a shallow basin-shaped hearth located on floor IIa(1) (BR 3) containing charcoal and soil oxidation. Feature 8 is a small bell-shaped cache pit excavated from the stratum II floor (BR 4). It contains dark, highly organic sediments similar in clast sizes to surrounding materials and relatively limited fire-cracked rock. Features 9 and 10 are shallow pits excavated into the IIk floor (BR 2) and filled with dark, floor-like material. Function of these features remains unclear.

Table 3.28. Feature data from Housepit 54, Area 3 (SH=Surface Hearth, BH=Basin-Shaped Hearth; CP=Cache Pit; SP=Shallow Pit; PH=Post Hole; FCR=Fire-Cracked Rock; N/A=Data Not Available or Not Applicable).

Feature #	Type	Cob.	Peb.	Sediments Grav.	Sand	Silt	Clay	Estimated Vol. (cm^3)	FCR Count	BR Period
1	PH	0	15	5	0	70	10	15,700	4	3
2	BH	0	1	5	0	70	25	4239	1	3
3	BH	0	0	2	0	80	18	1271	0	3
4	BH	0	10	10	0	70	10	7065	7	3
5	BH	25	20	5	5	35	10	15,072	26	3
6A	BH	0	10	10	10	60	10	11,250	18	3
6B	CP	1	12	12	5	50	20	1,360,012	186[*1]	3
6C	CP	0	15	15	10	20	40	N/A	0	N/A
7	BH	2	15	15	13	40	15	12,501	32	3
8	CP	0	5	5	20	60	10	48984	15[*2]	4
9	SP	0	0	15	5	60	20	12,057	2	2
10	SP	0	0	15	5	60	20	1570	0	2

[*1]FCR data collected from approximately 21% of estimated total volume (288,750).
[*2]FCR data collected from approximately 75% of estimated total volume (36,738).

Discussion

The 2008 field results offer some intriguing implications for interpreting change and examining variation in housepit occupations at the Bridge River site. Fire-cracked rock (FCR) data from housepit floors and roofs were tabulated to provide a preliminary look at potential occupant density (assuming that FCR frequencies provide at least some reflection of the frequency of cooking events [e.g. Prentiss et al. 2007]). There is a clear trend towards increasing numbers of FCR for cubic meter excavated between BR 2 and 4 (Figure 3.1). The pattern is less clear however, when considered on an individual housepit basis (Figure 3.2). In this case, Housepit 54 maintains the trend towards greater numbers in BR 4 times. In contrast Housepit 20 shows no real difference between BR 2 and 4 but a major drop in numbers during BR 3. While this may indicate a lower BR 3 population compared to BR 2 or 4 times, the pattern may also be a byproduct of sampling error since only two areas could be excavated during 2008. Housepit 24 demonstrates the highest numbers of FCR of any housepit excavated in 2008.

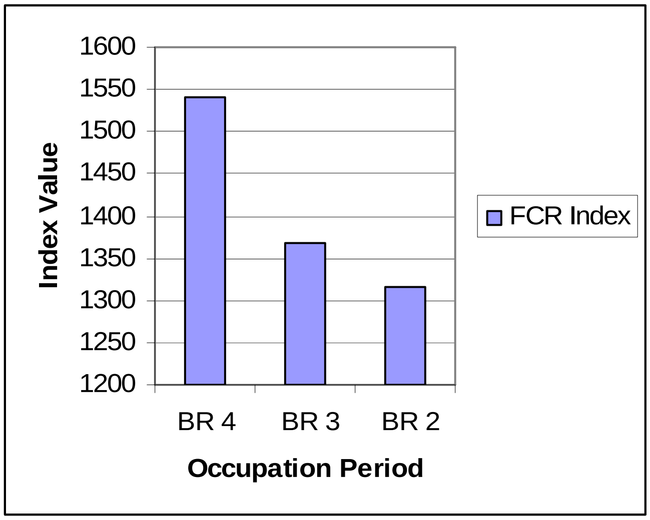

Figure 3.1. FCR/m^3 excavated for all excavated components plotted by occupation period.

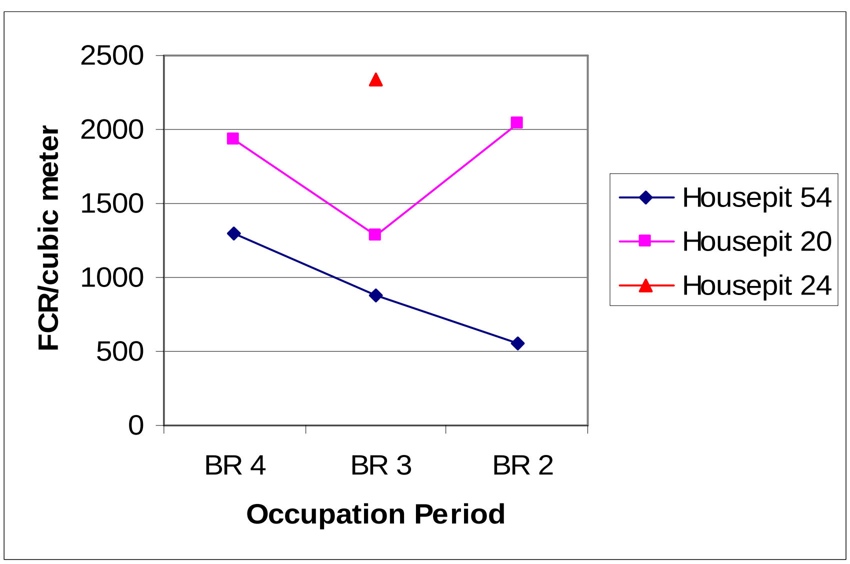

Figure 3.2. FCR/ cubic meter plotted over time by all components in each housepit.

Hayden (1997) has argued that cache pit volume can be a useful indicator of variation in the ability of households to accumulate surplus food. Consequently it can be a measure of household population size and potentially also, a marker of status differences. Data from the 2008 excavations at Bridge River suggest substantial storage capacity was developed during BR 3 times (Figure 3.3). The reduced cache pit volume from BR 4 is curious given the high numbers of FCR potentially reflecting intensive cooking activities. It suggests the possibility that a significant amount of storage may have been accomplished in external pits or above ground structures. Three potential external cache pits were identified in the vicinity of Housepit 20 (Dietz 2005).

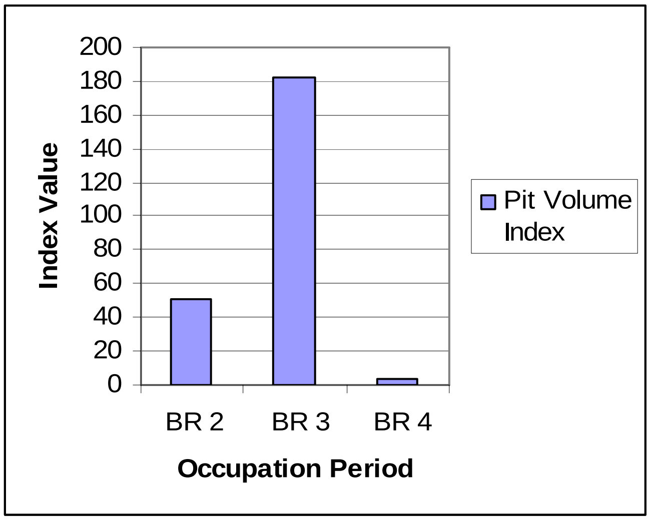

Figure 3.3. Cache pit cm^3/excavated cm^2 for housepits with BR 2, 3 and 4 occupations (HP 20 and 54).

Variation in cache pit volume during BR 3 times was measured in three ways. Mean cache pit volume indicates little difference between Housepits 20 and 24 while Housepit 54 has clearly larger cache pits (Figure 3.4). The pattern is supported when mean cache pit volume is plotted as a ratio to housepit floor area (Figure 3.5). The same pattern is also seen when total cache pit volume is expressed relative to excavation area and floor area (Figure 3.6).

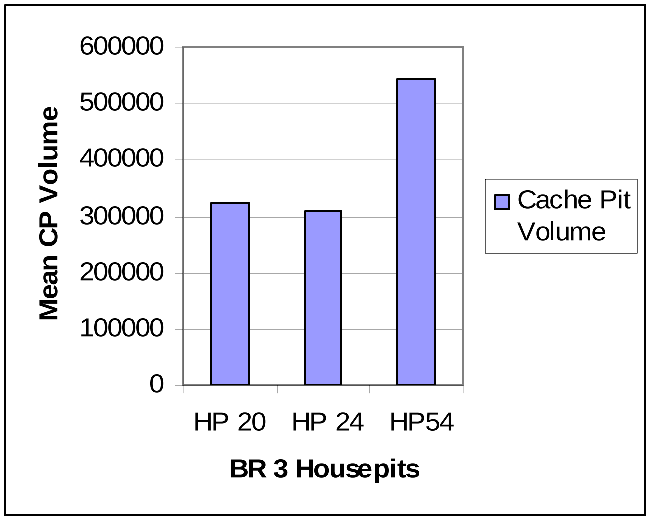

Figure 3.4. Mean cache pit volume for BR 3 housepits.

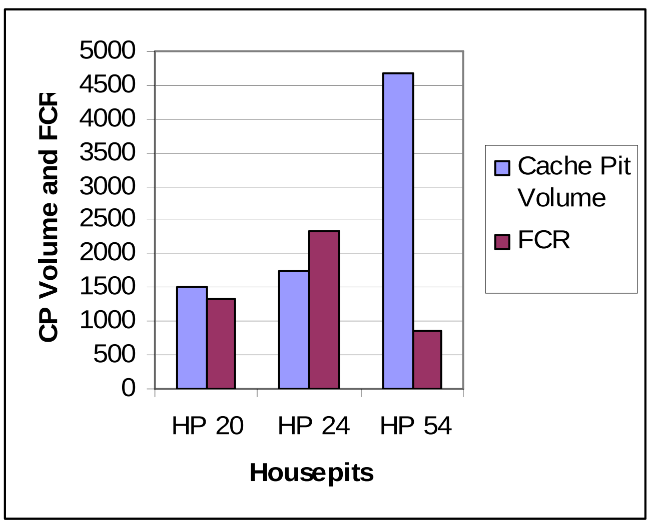

Figure 3.5. BR 3 mean cache pit volume/floor area and FCR/cubic meters (combined floor and roof data) expressed across three BR 3 occupation housepits.

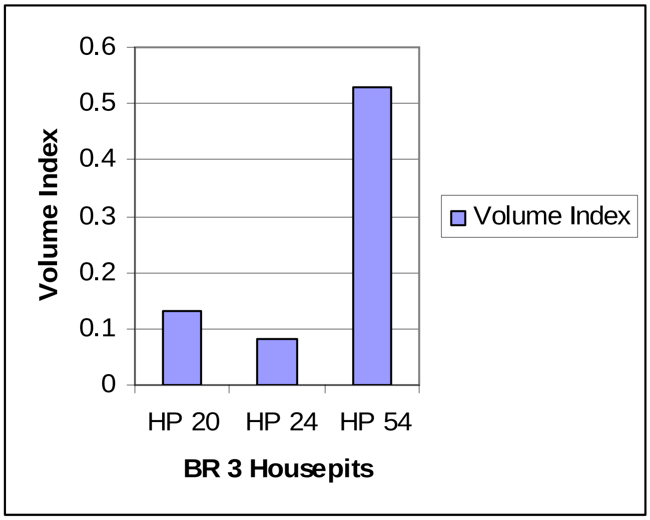

Figure 3.6. BR 3 Volume index (total excavated pit volume/excavation block square cm)/housepit floor area) expressed across BR 3 deposits from three housepits.

It is clear that no matter how it is measured, Housepit 54 has by far the most substantial cache pit volume of the three housepits during the BR 3 period. This is the opposite of the pattern reflected in the FCR data where Housepit 54 has the lowest scores. Taken at face value, this suggests that while Housepit 54 inhabitants were lower in number per capita (and likely absolutely as well), they maintained the most substantial storage capacity. Meanwhile, they appears to have been little different between Housepits 20 and 24 in potential storage capacity. If household ranking was based entirely upon potential to store surplus, the smallest house (54) would clearly rank on top during BR 3. And if that is the case then house size (e.g. big house=high status) may not be a good indicator of household socio-economic status at Bridge River. Clearly this hypothesis requires further testing as is explicated in subsequent chapters.

CHAPTER FOUR

LITHIC ARTIFACTS

(Anna Marie Prentiss, Nicole Crossland, and Lee Reininghaus)

Introduction

This chapter describes the 17,289 lithic artifacts recovered from Housepits 20, 24, and 54 during the 2008 field season at the Bridge River Site, British Columbia. The chapter also provides a preliminary analysis of assemblage variability that incorporates a variety of data drawn from studies of faunal remains, fire-cracked rock and features.

Debitage and Tool Analysis

Debitage were sorted by raw material, thermal alteration, size, technological type, cortex, and when feasible, fracture initiation. A total of about 40 raw material types were defined during the debitage and tool analysis. Thermal alteration was marked as present or absent, and defined by a suite of characteristics. Lithic artifacts that had flake scars with a smooth or soapy texture when compared to older surfaces with a grainier or duller texture were likely heat-treated (Whittaker 1994:73). Another defining characteristic for heat-treated lithics was color. Lithics that had a greasy luster, crazing, and or a pink to reddish color were likely to have been heat-treated (Crabtree and Butler 1964:1; Purdy and Brooks 1971:322). Debitage and tools were sorted by size into five categories, extra small (<.64 sq cm), small (.64 to 4 sq cm), medium (4 to 16 sq cm), large (16 to 64 sq cm), and extra large (>64 sq cm) (Prentiss 1998, 2001:148). Completeness-related types were defined and sorted using a modified Sullivan and Rozen typology (MSRT) (Prentiss 1998; Sullivan and Rozen 1985).

This MSRT typology initially sorted debitage by size, then the presence or absence of a single interior surface (ventral face). Debitage that did not have a single interior surface or ventral face was defined as Nonorientable. The next step was to determine whether or not the debitage had a point of applied force (platform). If there was no point of applied force (platform), the debitage was defined as a Medial/Distal Fragment. Subsequently, the debitage was analyzed to determine if it had a sheared axis of flaking (split longitudinally). If the sheared axis of flaking (split longitudinally) was present the flake was defined as a Split Flake. Then, the margins of the flake were examined to determine whether or not they were intact. If the margins were not intact the flake was defined as a Proximal Fragment, if the margins were intact the flake was defined as a Complete Flake. Lastly any debitage that was sorted as a Complete Flake, Proximal Flake, or Split Flake, was analyzed to determine its fracture initiation. The fracture initiations were divided up into 3 categories, Cone, Bend, and Wedge. Cone initiations are typically associated with hard hammer percussion, while Bend initiations are typically associated with soft hammer percussion. Wedge initiations typically result from bipolar lithic reduction. Of the 5-debitage categories, Medial/Distal Fragments accounted for 78% of all lithic debitage recovered in 2004. Debitage cortex was measured on the Dorsal face of the flake on a scale as follows: Primary (75-100% cortex cover), Secondary (1-74% cortex cover), Tertiary (0% cortex cover). Tertiary cortex cover (0%) on debitage accounts for 96% of all lithic debitage recovered in 2004.

Tools recovered were sorted using a wide range of characteristics. Size on certain tools, such as projectile points, was determined using calibers. Size on other tools such as bipolar cores was determined using the debitage size scale. All tools were drawn and when necessary, some tools such as projectile points were drawn showing multiple faces and margins. Macroscopic as well as microscopic techniques were employed to determine use-wear on tools. Macroscopic techniques utilized the naked eye as well as hand lenses 4x, 8x, and 12x. Microscopic techniques utilized Motic SMZ-168-BP; .75x – 50x zoom microscopes. Use-wear analysis defined such things as polish, rounding, striations, crushing, etc. Measurements were taken on tools to determine edge angle when necessary. Edge angle measurements were determined using Wards Contact Goniometer. When tools had more than one distinctive edge, the tool was termed as an employable unit or EU (Knudson 1983). Edge retouch characteristics were recorded including retouch face (normal, inverse, bifacial), retouch invasiveness (abrupt, semi-abrupt, invasive), and retouch form (scalar, step, hinge). All tools were drawn in profile and plan view to permit future analyses. The Bridge River lithic tool typology (originally based on Hayden's Keatley Creek typology) was applied to all lithic artifacts recovered in 2008. Several new tool types were added to this typology during the lithic analysis (see Appendix C) for a complete list of all tool types including new tool types added for the lithic artifacts recovered in 2008). The typological classification provides a quick reference for tool morpho-functional types and is not intended to replace more focused attribute based approaches to analysis.

Lithic Artifacts from Housepit Strata

The lithics data are presented by Housepit, Activity Area and Stratum. Numbers of debitage and lithic tools are given, in addition to a more comprehensive breakdown of tool type. When particularly distinct stone tools are encountered, they are described at greater length.

Housepit 20, Area 1

There are a total of 1088 lithic artifacts that were recovered from HP 20, AA 1. This includes 961 pieces of debitage and 127 tools.

Stratum I

Stratum I consists of 31 pieces of debitage and no tools.

Stratum V

Stratum V consists of 18 pieces of debitage and 6 tools. Of the tools, there is one convergent knife-like biface, one bipolar core, one end scraper and three slate scrapers.

Stratum II

Stratum II consists of 148 pieces of debitage and 14 tools. These tools are comprised of two are scraper retouch flakes with hide polish, two bipolar cores, one unifacial knife, one double scraper, one convergent scraper, three utilized flakes, one slate scraper and one slate scraper. Of special note, one artifact has been utilized as three specific tools, a “Key-shaped” unifacial scraper, a single scraper and a bifacial knife. Also of note is a mano which has been ground on both faces and pecked along the margins.

Stratum V-A

Stratum V-A contains 41 pieces of debitage and 7 tools. The tools are comprised of one bifacial knife, one scraper retouch flake with hide polish, one unifacial knife, one stage 3 biface, a miscellaneous piece of ground stone, and one slate scraper. In addition, there was one artifact used in multiple fashions, as both a utilized flake and as a small piercer.

Stratum II-A

Stratum II(A) is comprised of 95 pieces of debitage and 13 tools. The tools consist of one Kamloops side-notched point with a concave base, one single scraper, one small piercer, five unifacial knives, three utilized flakes, and two pieces of miscellaneous ground stone. Of particular interest is the high number of unifacial knives.

Stratum II-B

Stratum II-B contains 91 pieces of debitage and 10 tools. Of the ten tools there are three utilized flakes, one piece esquillee, one bipolar core, one single scraper, one convergent scraper, one slate scraper, one burin and one point fragment.

Stratum II-C

Stratum II-C consists of 191 pieces of debitage and 25 tools. These tools are comprised of one Kamloops side-notched point with a straight base, one bifacial knife, one Kamloops perform, six bipolar cores, one small piercer, two unifacial knives, two utilized flakes, one miscellaneous ground stone, three slate scrapers, one miscellaneous cut stone, one side-notched bifacial drill (on a Kamloops point), and a biface fragment. There are a number of tools that require special attention. There are three artifacts that were used as a more than one tool. One tool is a Shuswap point with shallow side-notched concave basal margin that has also been used as a bifacial drill. This is similar to the side-notched bifacial drill noted above, but on a Shuswap point as opposed to a Kamloops point. Also of note is an artifact used as a bifacial knife and small piercer. The other multi-use lithic is a single scraper and notch. In addition, of particular interest is an ochre-grinding stone.

Stratum II-C(1)

Stratum II-C(1) contains 42 pieces of debitage and 6 tools. The tools consist of one bipolar core, two utilized flakes, one slate scraper, one spall tool, and one artifact that is both a utilized flake and single scraper.

Stratum V-D

Stratum V-D consists of 27 pieces of debitage and 3 tools. The tools consist of two unifacial knives and an additional unifacial knife that was also used as a small piercer.

Stratum II-D

Stratum II-D is comprised of 277 pieces of debitage and 43 tools. The tools consist of one bifacial knife, one bifacial drill, two bipolar cores, two single scrapers, one small piercer, thirteen unifacial knives, five utilized flakes, one hammerstone, two miscellaneous ground stones (one of which is a possible bowl shard), eight slate scrapers, one cut adze, one small triangular point with a straight base and no notches, and one large square stemmed dart point,. Multiple use artifacts include two bifacial knives that are also small piercers and one artifact that has been used as a bifacial knife on two edges and a single scraper on another. Of special note is a large shallow ground stone bowl fragment made of steatite.

Housepit 20, Area 2

There are a total of 1698 lithic artifacts from Housepit 20, Activity Area 2. This includes 1588 pieces of debitage and 110 tools.

Stratum I

Stratum I consists of 37 pieces of debitage and one tool. The sole tool is a bipolar core.

Stratum V

Stratum V contains 80 pieces of debitage and 9 tools. The tools are comprised of one scraper-like biface, one single scraper, two unifacial knives, one endscraper, one convergent scraper, one utilized flake, and one slate scraper. Of special note is the presence of a "Key-shaped" scraper. It is medium in size and is made of dacite. It shows no sign of use wear, but retouch is present. Also of note is the presence of hafting wear.

Stratum II

Stratum II contains 132 pieces of debitage and 15 tools. The tools consist of one Kamloops side-notched point with a concave base, one Plateau corner-notched point with a straight base, a bifacial knife, one scraper retouch flake with hide polish, one bipolar core, one notch, one unifacial knife, one convergent scraper, two slate scrapers, one slate knife, one ochre grinding stone, and a hafted knife on a spall.

Stratum V-A(2)

Stratum V-A(2) contains 141 pieces of debitage and 10 tools. The tools include one bifacial perforator, one bifacial drill, one bipolar core, three unifacial knives, one spall tool, one miscellaneous groundstone, and one slate scraper. One multi-use tool was recovered; it was utilized as both a "Key-shaped" scraper and unifacial knife.

Stratum II-A

Stratum II-A consists of 425 pieces of debitage and 35 tools. The tools consist of one Kamloops side-notched point with a concave base, one bifacial drill, one scraper retouch flake with hide polish, five bipolar cores, one single scraper, ten unifacial knives, three convergent scrapers, three utilized flakes, one spall tool, one piece of miscellaneous ground stone, and three slate scrapers. In addition, one tool has multiple-uses as both a single scraper and small piercer. There are two unique artifacts to note. One is a small steatite tubular pipe fragment. It is a fragment of a mouthpiece. It bears ornamentation on the edge where the lips would touch. The ornamentation is a series of vertical lines that would (presumably) go all around the top of the mouthpiece. Another artifact of interest is a large ground stone effigy made of serpentine. It is thought to possibly be an owl. There are carved designs on the sides of the effigy, that vary closely resemble wings. The head has been crudely chipped, with partially complete eyes, beak and head. The base of the effigy has been ground flat to enable it to stand upright. Also to note is the high number of unifacial knives.

Stratum V-B

Stratum V-B consists of 367 pieces of debitage and 9 tools. The tools include one Shuswap shallow side-notched point with a straight basal margin, one bipolar core, two unifacial knives, one utilized flake, one scraper retouch flake with hide polish, and one bifacial fragment. Two tools have multiple uses. One of these artifacts is a scraper retouch flake with hide polish, which was then used on another edge as a single scraper. The other artifact was used both as a unifacial knife and as a utilized flake.

Stratum II-B

Stratum II-B contains 57 pieces of debitage and 3 tools. The tools include: one bifacial drill, one scraper retouch flake with hide polish, and one endscraper.

Stratum V-C

Stratum V-C is comprised of 94 pieces of debitage and 6 tools. The tools consist of one bipolar core, three unifacial knives, one utilized flake, and one miscellaneous biface.

Stratum II-C

Stratum II-C is comprised of 112 pieces of debitage 14 tools. The tools consist of: one bipolar core, one small piercer, six unifacial knives, one utilized flake, two slate scrapers, one slate knife, one piece of miscellaneous cut stone, and one abruptly retouched truncation on a flake.

Stratum II-D

Stratum II-D consists of 143 pieces of debitage and 8 tools. The tools include: one scraper retouch flake with hide polish, two bipolar cores, two unifacial knives, one utilized flake, and two bifacial fragments.

Housepit 24, Area 1

Housepit 24 Activity Area 1 contains a total 2832 lithics. This includes 2715 pieces of debitage and 117 tools.

Stratum I

Stratum I consists of 317 pieces of debitage and 15 tools. The tools include one Kamloops side-notched point with a concave base, one bipolar core, one unifacial knife, one endscraper, one utilized flake, one spall tool, one slate knife, and one miscellaneous point. There are two tools that have been used multiple ways, one as a bifacial knife, the distal tip of a biface, a slate scraper and small piercer. There are two tools with multiple uses, one is small piercer and bifacial knife. The other is a convergent knife-like biface and a utilized flake on a break. Of special note is the presence of an extra small stone bead made of steatite. It is complete in nature. Also of special note is a cut stone scraper on an igneous spall, the only of its kind in this collection. It was chipped on one edge and cut on the other converging to a point on the base. It bears scraper-like use wear along the top.

Stratum V

Stratum V consists of 955 pieces of debitage and 32 tools. The tools include four Kamloops side-notched points with a concave base, one Plateau corner-notched point with a concave base, one bifacial drill, two bipolar cores, eight unifacial knives, one endscraper, one convergent scraper, one utilized flake, one miscellaneous ground stone, ochre, one stone bead, one ground stone ornament, five slate scrapers, ochre, a utilized flake on a thin flake edge, ground slate, and two point fragments. Also present are two tools that have multiple uses. These include: one artifact that has been utilized as bifacial drill and unifacial knife, and an artifact that is both a single scraper and an abrader. Special notice should be paid to two artifacts. One is an extra small steatite bead. Another is the presence of ground stone ornament. This is an extra small ornament made of steatite. It looks like four beads that have not been separated that get slightly larger, one after the other. There is no presence of a hole or the beginnings of a hole that would indicate its intended use was to be a bead, but rather could have been used for another reason. It is speculated to be a rattlesnake rattle effigy.

Stratum III

Stratum III contains 592 pieces of debitage and 42 tools. The tools include one bifacial knife, one scraper retouch flake with hide polish, three bipolar cores, three single scrapers, six unifacial knives, two endscrapers, one convergent scraper, one utilized flake, five miscellaneous ground stones, seven slate scraper, one slate knife, one small triangular point with a straight base and no notches, one point tip, one Kamloops side notched point with a concave base, two pieces of ground slate, and two bifacial fragments. Of particular note are four ground stone artifacts. One such artifact is a ground ornament. It is a small piece of serpentine that has been both cut and polished. It is a fragment of a larger piece, but may have at one time hung as a pendent due to its partial hole. Another artifact of note is an extra small stone bead made of steatite. The presence of a rare ground stone cube is also of note. It is made of steatite, ground on all sides and is medium in size. The last artifact of special note is a miscellaneous ground stone base that could possible be a fragment of an effigy or bowl. It is ground flat on one surface and is curved in nature. There is also evidence of grinding on what would be the side of the artifact. There is presence of a red residue on the opposite side of the base. It is extra large and made of an igneous intrusive rock.

Stratum II

Stratum II contains 834 pieces of debitage and 27 tools. The tools consist of one Kamloops side-notched point with a straight base, two bifacial knives, one scraper retouch flake with hide polish, two bipolar core, seven unifacial knives, three spall tools, and a point fragment. There are a number of tools that have multiple uses as well. These include: two artifacts used as a bifacial knife and as a unifacial knife, a single scraper also used as a utilized flake, a unifacial knife which is also a single scraper, a slate scraper which is also a slate knife, and a convergent scraper that is also a notch. A few artifacts deserve further attention. One is a small microblade. This microblade is made of dacite and has use-wear on one of its margins. Another artifact of note is 3 extra small stone beads. One is made of schist. It is likely that it was broken in manufacture because it is both broken and incomplete.

Stratum II-A

Stratum II-A consists of 10 pieces of debitage and one tool. The only tool is an anvil stone.

Stratum IV

Stratum IV consists of 5 pieces of debitage.

Stratum XV-

Stratum XV contains 2 pieces of debitage.

Housepit 24, Area 2

The Activity Area 2 in Housepit 24 is comprised of 1888 lithic artifacts. This includes 1837 pieces of debitage and 51 tools.

Stratum I

Stratum I consists of 130 pieces of debitage and 6 tools. The artifacts include one abrader, three pieces of ground slate, and one slate scraper. The other artifact has two uses, as both a small piercer and as a utilized flake.

Stratum V

Stratum V is comprised of 647 pieces of debitage and 21 tools. The lithic tools include two Kamloops side-notched points with concave bases, two bifacial knives, two bipolar cores, one unifacial knife, two utilized flakes, one multidirectional core, one piece of ochre, one slate scraper, one slate knife, two cut adzes, one utilized flake with knife wear, one utilized flake on a strong flake edge, two pieces of ground slate, and one ground slate chopper. Additional, there is one tool multiple use tool. The artifact is both a unifacial knife and a bifacial knife.

Stratum III

Stratum III contains 150 pieces of debitage and one tool. The sole tool is a slate scraper.

Stratum II

Stratum II is comprised of 911 pieces of debitage and 23 tools. The artifacts include one Shuswap corner removed point with a concave base, one bipolar core, two unifacial knives, one single scraper, one utilized flake, two convergent scrapers, one miscellaneous ground stone, eleven pieces of ochre, and two slate knives. Of special interest is a medium sized fragment of a nephrite adze.

Housepit 24, Area 3

Housepit 24 Activity Area 3 is comprised of 2815 lithic artifacts. This includes 2736 pieces of debitage and 79 tools.

Stratum I

Stratum I contains 50 pieces of debitage.

Stratum V

Stratum V consists of 822 pieces of debitage and 27 tools. The tools include one bifacial knife, three scraper retouch flakes with hide polish, two bipolar cores, one microblade, one notch, four unifacial knives, one end scraper, one utilized flake, one spall tool, one miscellaneous ground stone, four slate scrapers, one point fragment, one single scraper, one piece of miscellaneous ground stone, one lightly retouched expedient knife, and one biface fragment. There is one artifact with two uses, as both a convergent scraper and a notch. Of particular interest is a medium sized ground nephrite scraper. The scraper shows signs of use wear with perpendicular striations and rounding.

Stratum III

Stratum III contains 677 pieces of debitage and 16 tools. The tools include one Plateau corner-notched point with a straight base, one bifacial drill, one scraper retouch flake with hide polish, three bipolar cores, one unifacial knife, one utilized flake, two miscellaneous ground stones, and three slate scrapers. Two artifacts have multiple uses, one is a single scraper and unifacial knife, the other tool is a utilized flake and single scraper. Of particular note is a stage 1 sliced bead. It is a medium sized basalt pebble with four cuts in the stone.

Stratum II

Stratum II consists of 992 pieces of debitage and 23 tools. The tools include one Kamloops side-notched point with a concave base, two bipolar cores, one single scraper, seven unifacial knives, one utilized flake, one miscellaneous biface, one abrader, three slate scrapers, one ochre grinding stone, and one ground slate adze that has not been cut. Multiple use tools include: one artifact that has been used both as a unifacial knife and a bifacial knife, and an artifact that is both a unifacial knife and a single scraper. One artifact of particular interest is a cut-adze preform made of silicified shale. Another interesting artifact is a large mano with a burnt surface.

Stratum II(1)

Stratum II(1) contains 195 pieces of debitage and 13 tools. The tools are comprised of one Plateau corner-notched point with a concave base, one bipolar core, two single scrapers, two unifacial knives, two utilized flakes, one slate knife, one small piercer, one piece of bipolar debitage, and one ground stone cube-shaped object. In addition, one artifact has two uses, as a small piercer and unifacial knife.

Housepit 54, Area 1

There are a total of 2305 lithic artifacts recovered from HP 54, AA 1. These include 2094 pieces of debitage and 211 tools.

Stratum I

Stratum I consists of 209 pieces of debitage and 15 tools. The tools consist of one distal tip of a biface, one double scraper, one Late Plateau point, two pieces of ground slate, two slate scrapers, one slate scraper fragment, and one piece of miscellaneous ground stone. Three lithic artifacts display multiple tool characteristics. One artifact, a dacite biface, has been utilized as a perforator and shows use wear consistent with scraping and cutting activities. The other two artifacts have two tool functions. One is a notch and a utilized flake, and the other is a single scraper and a utilized flake. Of special note, a copper bead, a miscellaneous metal artifact, and steatite tubular pipe fragment. The copper bead is extra small in size, measuring 4mm in diameter, with a thickness of 3 mm. The steatite tubular pipe fragment is unique due to rounding on the broken edges, and may have been carried around for some time after breakage.

Stratum V

Stratum V contains 250 pieces of debitage and 48 tools. The tools consist of one Kamloops point, one Plateau point, one scraper retouch flake with hide polish, one piece esquillee, two bipolar cores, seven single scrapers, one double scraper, one expedient knife, one slate knife, four utilized flakes, one spall tool, one wedge-shaped bifacial adze, one multi-directional core, two pieces of miscellaneous ground stone, one abrader, two biface fragments, one distal tip of a biface, six pieces of ground slate, nine slate scraper fragments, and two slate scrapers. Also present are five tools that have been utilized in multiple fashions. These include: one jasper bipolar core utilized as a bifacial perforator and as a utilized flake, an artifact that is a convergent scraper, single scraper and a small piercer, an artifact that represents a convergent scraper and an expedient knife, an artifact used single scraper and a utilized flake, and a green chert artifact utilized as a unifacial borer and a utilized flake. Of special interest are three miscellaneous metal artifacts, one stone bead, one glass bead, and a piece of ground nephrite. The stone bead is made of steatite and has a 4mm diameter and a thickness of 2 mm, while the glass bead has a diameter of 8 mm. The glass bead is an opaque blue color and measures 8 mm in diameter.

Stratum II

Stratum II is compromised of 146 pieces of debitage and 6 tools. The tools consist of one Kamloops point, one bipolar core, one single scraper, one utilized flake, one slate scraper flake, and one bifacial fragment.

Stratum III

Stratum III consists of 314 pieces of debitage and 33 tools. The tools consists of one Kamloops point, one bipolar removal, two bipolar cores, one unifacial perforator, one stage 3 biface, two pieces of miscellaneous ground stone, one end scraper, one inverse scraper, three utilized flakes, two abraders, two pieces of ground slate, one unused slate scraper, one alternate slate scraper, two slate scraper fragments, one ground slate adze displaying heavy crushing on all sides, one piece of cut stone, one alternate scraper, and four biface fragments. In addition, there are two tools that have multiple use-wear characteristics. One of these artifacts has been used as a slate scraper and a wedge shaped adze, and the other utilized as a slate knife and scraper. There are two artifacts of unique interest: one metal artifact and a nephrite adze edge fragment. The metal artifact, measuring approximately 4 cm in length, appears to be a sheet of metal rolled into a cone resembling a jingler or some other sort of dress ornamentation.

Stratum II (1)

Stratum II (1) consists of 319 pieces of debitage and 19 tools. The tools include one side-notched point with no base, one Kamloops point, two single scrapers, two utilized flakes, one small flake core, three miscellaneous pieces of ground slate, 6 slate scraper fragments, two slate knives, and one slate knife fragment.

Stratum V-A

Stratum V-A contains 240 pieces of debitage and 12 tools. The tools consist of one bifacial knife, one distal tip of a biface, one knife-like biface fragment, one scraper retouch flake with hide polish, one piece esquillee, one single scraper, one small flake core, two slate scraper fragments, and one biface fragment. One tool has been used in multiple fashions, as a utilized flake and a notch. Of special interest is a small sized miscellaneous piece of metal.

Stratum II-A

Stratum II-A consists of 85 pieces of debitage and 4 tools. The tools include one Kamloops stemmed point, one bipolar core, and one slate scraper flake. In addition, one tool has been used as a unifacial perforator as well as a utilized flake.

Stratum II-B

Stratum II-B contains 93 pieces of debitage and 1 tool. The tool is a medium sized slate scraper fragment.

Stratum II-C

Stratum II-C contains 75 pieces of debitage and 3 tools. Of these tools there are two bifacial fragments and one slate scraper flake.

Stratum V-B

Stratum V-B consists of 90 pieces of debitage and 15 tools. The tools are comprised of one Kamloops point, two bipolar cores, one single scraper, one single scraper with hide polish, two convergent scrapers with hide polish, three pieces of ground slate, one slate scraper, two slate scraper fragments, and one biface fragment. Of special interest is the presence of a copper ring. The ring measures 21 by 19 millimeters and appears to have been manufactured from a natural source of copper. The ring is not a fully closed circle, and may have been intended for some sort of body piercing.

Stratum II-D

Stratum II-D contains 9 pieces of debitage and 2 tools. The first tool is a hammerstone with pecking marks across the base and the other tool is a piece of miscellaneous ground slate.

Stratum II-E

Stratum II-E consists of 28 pieces of debitage and 6 tools. The tools include one single scraper, one bipolar core, one knife-like biface, one bifacial knife with hide polish, and one quartzite hammerstone with extensive battering on one edge. In addition, two tools have multiple uses. The first is a lightly retouched expedient knife also utilized as a single scraper. The other is a dacite biface utilized as a small piercer and displaying use wear consistent with cutting activities.

Stratum II-F

Stratum II-F contains 59 pieces of debitage and 8 tools. The tools consist of one alternate scraper, one expedient knife, one utilized flake, two pieces of ground slate, one slate scraper, and one piece of cut slate. In addition, one tool was used as an expedient knife and as a utilized flake.

Stratum II-G

Stratum II-G consists of 15 pieces of debitage and 3 tools. These tools include one dacite cobble, one abrader with visible striations, and one piece of miscellaneous ground stone.

Stratum V-C

Stratum V-C contains 36 pieces of debitage and 6 tools. The tools consist of one utilized flake, one unifacial denticulate, one double scraper, two slate scrapers, and one Plateau corner notched point with straight sides and a concave base.

Stratum II-H

Stratum II-H contains 27 pieces of debitage and 3 tools. These tools include one biface fragment, one large biface reduction flake, and one freehand basalt core.

Stratum II-I

Stratum II-I consists of 143 pieces of debitage and 10 tools. The tools are comprised of one bipolar core, one single scraper, two utilized flakes, one stage 3 biface, two pieces of ground slate, two slate scrapers, one dacite cobble, and one biface fragment. In addition one tool has been used as both a notch and a single scraper.

Stratum II-J

Stratum II-J contains 63 pieces of debitage and 4 tools. Of these tools there are two utilized flakes, one slate scraper flake and one biface fragment.

Stratum II-K

Stratum II-K contains 13 pieces of debitage and 2 tools. The first tool is a slate scraper and the other is a extra large sized basalt metate. The metate has a pecked and ground surface and a presence of red residue.

Housepit 54, Area 2

There are a total of 2189 lithic artifacts recovered from HP 54, AA 2. This includes 2036 pieces of debitage and 153 tools.

Stratum I

Stratum I contains 47 pieces of debitage and 9 tools. The tools consist of one Kamloops point, one single scraper, one andesite hammerstone, three slate scraper flakes and two slate scrapers. Of special note is the presence of a non-culturally modified quartz crystal. The crystal is an aggregate of small crystals projecting from a central location. It is small in nature and white to clear in color.

Stratum V

Stratum V consists of 407 pieces of debitage and 50 tools. The tools are comprised of one perform, one distal tip of a biface, one convergent knife-like biface, three bipolar cores, three single scrapers, two notches, two end scrapers, three expedient knives, six utilized flakes, five small flake cores, four pieces of ground slate, four slate scraper fragments, two slate scrapers, one slate knife, one piece of cut stone, one retouched cobble chopper and scraper, three biface fragments, and one expedient knife. In addition, two artifacts have multiple tool characteristics. One artifact has been used as a notch, unifacial borer and as a single scraper. The other has been utilized as a small piercer and as an expedient knife. Of special note, the stratum contained a steatite tubular pipe fragment and a chert thumbnail scraper.

Stratum II

Stratum II consists of 73 pieces of debitage and 4 tools. The tools include one preform with bifacial retouch, one Kamloops preform, one utilized flake, and one expedient knife.

Stratum V-A

Stratum V-A consists of 131 pieces of debitage and 23 tools. The tools are comprised of: one scraper retouch flake with hide polish, two single scrapers, three utilized flakes, two small flake cores, one miscellaneous biface, one sandstone abrader with striations, four pieces of ground slate, one abraded cobble with striations, three slate scraper fragments, one point tip, and two biface fragments.

Stratum II-A

Stratum II-A contains 100 pieces of debitage and 7 tools. The tools consist of one bifacial knife, one alternate scraper, one utilized flake, one stage 3 biface, one ground slate flake, one slate scraper and one slate flake.

Stratum V-B

Stratum V-B consists of 124 pieces of debitage and 14 tools. The tools include one Kamloops point, one Plateau point, one bifacial knife, one bifacial drill, one preform, one piece esquillee, one single scraper, one small piercer, one expedient knife, one utilized pisolite flake, three slate scraper fragments, and one fragment of a biface.

Stratum II-B

Stratum II-B contains of 187 pieces of debitage and 7 tools. The tools consist of one convergent knife-like biface, one single scraper, one small flake core, one piece of miscellaneous ground stone, one slate scraper flake, and one bifacial fragment. In addition, one tool has been utilized as a bipolar core and as a utilized flake.

Stratum V-C

Stratum V-C contains 390 pieces of debitage and 15 tools. The tools are comprised of two Kamloops preforms, one bipolar core, two single scrapers, one inverse scraper, one double scraper, one utilized flake, one core rejuvenation flake, one Late Plateau point, one abrader, and one piece of ground slate. In addition, three dacite tools have been utilized for multiple purposes. Two artifacts have been used as a bipolar core and a utilized flake. The other tool represents four different tool characteristics: a convergent scraper, inverse scraper, single scraper, and a utilized flake.

Stratum II-C

Stratum II-C contains 577 pieces of debitage and 23 tools. The tools consist of one single scraper, one expedient knife, one multi-directional core, one miscellaneous biface, three slate scraper fragments, one Plateau corner notch point with no base, two bipolar cores, one small piercer with bright polish, one chalcedony double scraper, five utilized flakes, one multi-directional core, one piece of miscellaneous ground stone, one abraded cobble with striations, and one slate knife. One artifact has been used as a convergent scraper and as a utilized flake. In addition, an ortho-quartzite denticulate with a weathered appearance was present and is thought to represent an old artifact not associated with the site.

Housepit 54, Area 3

There are a total of 2474 lithic artifacts recovered from HP 54, AA 3. This includes 2268 pieces of debitage and 206 tools.

Stratum I

Stratum I contains 114 pieces of debitage and 13 tools. The tools consist of one Kamloops point, one ground slate adze on a natural break, one single scraper, two pieces of ground slate, three slate scraper flakes, one bipolar core, one utilized flake, one piece of miscellaneous ground stone, and one piece of miscellaneous cut stone. Of special interest is a medium sized stone pendant/eccentric. The piece is made from dacite and resembles a small Kamloops point with an unusually large eared base.

Stratum V

Stratum V consists of 275 pieces of debitage and 21 tools. The tools include five single scrapers, one notch, one alternate scraper, one convergent scraper, three small flake cores, one miscellaneous biface, one piece of ground slate, two slate scraper fragments, one slate scraper, two slate knife fragments, one small triangular point, one scraper on a split cobble. Of special interest is a stone bead with a diameter of roughly 5 mm and a thickness of 2mm.

Stratum II

Stratum II contains 209 pieces of debitage and 14 tools. The tools consist of one Kamloops point, one bifacial knife, one single scraper, one end scraper, two biface fragments, three slate scrapers, one slate scraper fragment, and one slate knife flake. Two artifacts displayed more than one tool characteristic. A piece esquillee was also utilized as a single scraper, and another tool was used as a unifacial perforator, single scraper and as an expedient knife. Of special interest is a spindle whorl made of steatite. The spindle whorl is large in size, measuring between 3 and 5 cm in diameter and 8 mm thick.

Stratum V-A

Stratum V-A consists of 268 pieces of debitage and 27 tools. The tools include one stage 4 biface, one bifacial drill, one preform, one distal tip of a biface, two scraper-like bifaces, one piece esquillee, four single scrapers, one expedient knife, one utilized flake, one hammerstone, three slate scrapers, three slate scraper fragments, one small notch, one biface fragment, and one expedient knife. Two of these tools have been utilized in multiple fashions. One tool has been identified as a utilized flake as well as a knife-like bifacial fragment, and the other has been used as a single scraper and as a utilized flake. Of special note are two additional artifacts, a painted stone tool and a piece of copper. The painted stone tool is extra large in size measuring 6.5 by 9 cm and 2 cm thick. The tool displays evidence of heavy grinding and striations in various directions, with red residue across the ventral surface. The copper artifact is extra small in size, measuring only 6 by 3 mm. The artifact looks like a tiny flake of copper, curved to form a half cylinder, and may be a broken piece of a bead.

Stratum II-A

Stratum II-A contains 66 pieces of debitage and 8 tools. The tools consist of two single scrapers, one unifacial knife, two slate scrapers, one slate knife and one wedge. One tool was utilized as a single scraper, unifacial borer, and as a utilized flake.

Stratum II-A-1

Stratum II-A-1 consists of 121 pieces of debitage and 24 tools. Of these tools, there are three Kamloops points, one bifacial drill, one knife-like bifacial fragment, one piece esquillee, two single scrapers, one double scraper, one utilized flake, two small flake cores, one piece of ground slate, one slate scraper fragment, one slate scraper, one slate knife, two ground slate adzes, one ground stone cube, and one point fragment. In addition, one tool was utilized as a single scraper and an expedient knife. Of special note: one stone bead, one nephrite adze chip, and one spindle whorl made of steatite. The spindle whorl is large, with a diameter between 3 and 4 cm. The stone bead is made from steatite and has a diameter of 5 mm.

Stratum II-B

Stratum II-B contains 197 pieces of debitage and 8 tools. The tools consist of three bipolar cores, one end scraper fragment, one piece of ground slate, one slate scraper fragment, one slate scraper, and one Kamloops point with corner notches and a split base.

Stratum V-B

Stratum V-B consists of 30 pieces of debitage and 3 tools. The tools include one multi-directional core, one piece of ground slate, and one slate scraper fragment.

Stratum II-B-1

Stratum II-B-1 contains 274 pieces of debitage and 43 tools. The tools consist of one stage 4 biface, one knife-like biface, one piece esquillee, five bipolar cores, three single scrapers, four expedient knives, six utilized flakes, one multi-directional core, one small flake core, one late Plateau point, one miscellaneous biface, one piece of ground slate, seven slate scraper fragments, one slate scraper, two slate knife fragments, one hafted bifacial scraper, two biface fragments, and one expedient knife. Two additional expedient knives were also utilized in more than one fashion. One expedient knife was also used as a convergent scraper, and the other as a utilized flake. Of special note is the presence of a chert key-shaped scraper. The scraper is large in size, measuring 4 cm in length.

Stratum II-C

Stratum II-C consists of 129 pieces of debitage and 5 tools. The tools are comprised of one single scraper, one alternate scraper, one multi-directional core, and one slate knife. In addition, one slate scraper was also utilized as a slate knife.

Stratum II-D

Stratum II-D contains 52 pieces of debitage and 5 tools. The tools consist of one bipolar core, one piercer, and two pieces of ground slate. In addition, one cut slate adze was also utilized as a slate knife.

Stratum II-E

Stratum II-E consists of 86 pieces of debitage and 5 tools. The tools include one piece esquillee, two slate scraper fragments, one biface fragment, and one single scraper, also used as a utilized flake.

Stratum II-F

Stratum II-F contains 82 pieces of debitage and 9 tools. These tools consist of three bipolar cores, one convergent scraper, one slate scraper flake, one single scraper, one alternate scraper, and one slate scraper fragment. Of special note is a thumbnail scraper made of dacite.

Stratum V-C

Stratum V-C contains 26 pieces of debitage and 2 tools. The first tool is a bipolar core and the other a utilized flake.

Stratum II-G

Stratum II-G consists of 60 pieces of debitage and 3 tools. The tools include one dacite thumbnail scraper, one miscellaneous piece of ground stone, and a Shuswap (type 10) point, with ears and a concave base.

Stratum V-D

Stratum V-D contains 12 pieces of debitage and 0 tools.

Stratum II-H

Stratum II-H contains 23 pieces of debitage and 4 tools. The tools consist of two pieces of miscellaneous ground slate, one slate scraper fragment, and one cut slate adze with ground sides.

Stratum II-I

Stratum II-I is comprised of 67 pieces of debitage and 9 tools. The tools include three bipolar cores, one unifacial knife, one miscellaneous biface, one hammerstone, one slate scraper flake, and two slate scrapers.

Stratum II-J

Stratum II-J contains 137 pieces of debitage and 2 tools. One of the tools is a bipolar core, and the other is a single scraper, both made from dacite.

Stratum II-K

Stratum II-K contains 26 pieces of debitage and 2 tools. The first tool is a bipolar core and the other is a single scraper.

Stratum II-L

Stratum II-L contains 14 pieces of debitage and 0 tools.

Data Analysis

The following section outlines preliminary analysis of lithic artifact data recovered during the 2008 field season. There are two major goals to this work. First, we test the assumption that excavated activity areas, defined by geophysical signatures represent redundant domestic space. Second, we combine lithics data with measures derived from faunal studies (see Chapter Five) and feature and fire-cracked rock data (Chapter Three) to examine markers of inter-household socio-economic and political variation.

Analysis of Occupational Consistency

In order examine variation in economic behavior and social status between groups of household residents we need to be able to know that we actually are recognizing the activity areas associated with those groups. Drawing from studies of hearth-centered occupation signatures at Keatley Creek Hayden (1997a) successfully argued that household domestic units could be identified and productively studied. While our geophysical studies successfully defined redundant cooking and storage features in nearly all excavated areas, we need to independently confirm through artifact studies that these places actually do represent such domestic activity areas.

If excavated activity areas reflect the actions of household domestic units then they should contain a consistent mix of items associated with common domestic activities such as food preparation, clothing manufacture, and tool maintenance and production. Thus, we expect to see a range of light and heavy duty scrapers, knives, wood-working tools like notches and wedges, projectile points, and groundstone tools (e.g. Alexander 2000; Hayden and Spafford 1993; Prentiss 2000). In order to test this we collected data from eight excavated contexts containing adequate sample sizes (20+ tools) for analysis of inter-assemblage variation (Table 4.1). All raw data were transformed into a ratio scale by scoring the item with the highest count to 100 and scaling all others in relation to this figure. This is done to avoid structural correlations and sample size bias in multivariate analysis. It is clear from Table 4.1 that while there is some consistency to the items in the matrix, there also some variation. Heavy duty tools vary most in their representation. Greater variation is evident in proportional representation. Housepit 54 floors are dominated by slate tools while Housepit 20 and 24 floors are dominated by flake knives.

One way to test for consistency in artifact representation is to use techniques from the field of reliability assessment (Nance 1987; Prentiss 1998). Principal Components Analysis (PCA) coupled with coefficient theta is useful for assessing consistency of measurements in multivariate data sets (Carmines and Zeller 1979). If consistent, the PCA results should include an initial eigenvalue covering at least 40% of the total variation and un-rotated loadings should fall primarily on the first component. Results of this analysis provide a mixed signal. The initial eigenvalue is well over 40% of variance but the loadings are relatively evenly distributed on two components.

Table 4.1. PCA analysis of lithic assemblage consistency: ratio-scale transformed data matrix.

Data matrix

Case			Variables 1	2	3	4	5	6
HP	Occupation	Area	LS	HT	FK	B/P	ST	UF
54	4	1	27			45	100	18
54	3	1	25		38	63	100	25
54	3	2	50	13	38	50	100	88
54	3	3	53	15	29	41	100	26
20	3	2	60	20	100	10	30	
20	2	1	19	10	100	29	57	48
24	3	1	42		100	17		17
24	3	3	18	18	100	27	27	27

LS=Light Duty Scrapers; HT=Heavy Duty Tools; FK=Flake Knives; B/P=Bifaces and Projectile Points; ST=Slate Tools (about 90% slate scrapers); UF=Used Flakes

Table 4.2. Initial PCA statistics.

Total Variance Explained

Component	Initial Eigenvalues Total	% of Variance	Cumulative %	Extraction Sums of Squared Loadings Total	% of Variance	Cumulative %
1	2.927	48.790	48.790	2.927	48.790	48.790
2	1.610	26.840	75.630	1.610	26.840	75.630
3	.858	14.301	89.930			
4	.462	7.702	97.633			
5	.104	1.741	99.373			
6	.003	.627	100.000			

Extraction Method: Principal Component Analysis.

Table 4.3. PCA loadings matrix.

Component Matrix

	Component 1	2
LS	-.180	.690
HT	-.477	.706
FK	-.917	-.006
B/P	.955	-.007
ST	.934	.270
UF	.203	.747

Extraction Method: Principal Component Analysis.
a 2 components extracted.

Clearly the results of the PCA indicate a lack of perfect consistency. However, we do not know how inconsistent the pattern actually is. This can be more precisely assessed using coefficient theta, a statistic designed for measuring reliability (or consistency) using the results of PCA (Carmines and Zeller 1979; Prentiss 1998). Theta is defined and applied as follows:

$$t=[n/(n-1)][1-(1/x)] \quad (1)$$

t=theta
n=number of variables
x=largest eigenvalue

$$.792= [6/(6-1)][1-(1/2.972)] \quad (2)$$

A standard rule of thumb in reliability assessment is that acceptable reliability (limited random error) occurs at a theta score of .8 or higher (1.0 being perfect reliability or consistency). The results of this analysis are very close to the .8 figure suggesting a relatively high degree of consistency. The evident variation appears to be primarily the result of differences in proportions of slate tools (primarily scrapers) versus bifacial knives in different houses. This could be the result of either different tool use traditions in different house groups or it could result from activity variation. This is well demonstrated by an analysis of factor scores from the PCA (Table 4.4, Figure 4.1). Hierarchical clustering of housepit floors relying upon the factor scores illustrates a clear distinction between Housepit 54 floors and those of Housepits 20 and 24. However, the relatively high degree of consistency argues against these artifact assemblages being the result of different more specialized activity areas. Consequently, we conclude that the excavated assemblages reflect domestic activity areas.

Table 4.4. Factor scores resulting from the consistency analysis.

Comp. 1	Comp. 2	HP	Occ.	Area
.95710	-1.03510	54	4	1
1.332	-1.00497	54	3	1
1.04492	1.59923	54	3	2
.55646	.63344	54	3	3
-1.16079	1.07838	20	3	2
-.39068	-.18314	20	2	1
-1.14982	-.83688	24	3	1
-.89038	-.25095	24	3	3

Figure 4.1. Cluster analysis dendrogram derived from clustering of factor scores.

```
 Dendrogram using Average Linkage (Between Groups)

                     Rescaled Distance Cluster Combine

   C A S E    0         5        10        15        20        25
  Label  Num  +---------+---------+---------+---------+---------+

HP  # Occ Area
HP 54  4   1
⇩×⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩↘
HP 54  3   1   ⇩↙                                                     ▭⇩↘
HP 54  3   2
⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩×⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩↙  ⇔
HP 54  3   3   ⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩↙                                             ⇔
HP 20  3   2   ⇩⇩⇩×⇩⇩⇩↘                                                ⇔
HP 20  2   1   ⇩⇩⇩↙   ▭⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩↘
⇔
HP 24  3   1   ⇩⇩⇩⇩⇩⇩⇩↙
▭⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩↙
HP 24  3   3   ⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩⇩↙
```

Drawing on ethnographic accounts from throughout the Pacific Northwest (see summaries in Ames and Maschner 1999; Matson and Coupland 1995; Hayden 1995), it is well understood that status inequality was traditionally predicated upon the ability of households to maintain adequate numbers of working adults who could be relied upon to produce goods ranging from food items to ornaments. Surplus was used in a complex process of exchange and competitive generosity designed to further enhance the reputation and social position of house groups and select individuals. Archaeologists have typically assumed that this was an adaptive process that could be reconstructed archaeologically via demonstrated linkages between house size, storage capacity, ability to harvest particularly valued foods, access to local and more exotic trade items, and accumulation of markers of prestige.

The linkage between house size, internal demographics, productive capacity, and wealth has often been more assumed than demonstrated. This is particularly evident in the Mid-Fraser Canyon where large housepits are generally assumed to reflect high status groups, in comparison to smaller houses thought reflect poorer groups (Hayden 1994, 1997a). Prentiss et al. (2007) demonstrated that large houses were likely not always ranked higher than smaller houses suggesting that change over time may have shifted rules for status acquisition and prestige marking. Data from the 2008 field season at Bridge River offer the opportunity to explore some of these issues relying upon variety of data sets. Given excellent preservation of faunal remains in BR 2 and 3 contexts, frequent large cache pit features, and relatively large numbers of lithic artifacts and fire cracked rock, we are able to directly examine relationships between potential demographics, storage capacity, predation, exchange and wealth.

We calculated a series of indices to measure socio-economic and demographic variation at Bridge River (Table 4.5) from data derived from five Bridge River household components. Bridge River 4 was excluded due to poor faunal preservation. While the Housepit 24 data derive from a single floor and roof, other data come from components often with several superimposed floors and roofs. Groups of floors and roofs associated with specific occupation periods were combined to elevate sample sizes.

Predation was measured in three ways. Prey evenness, as a marker of search versus pursuit tactics (Chatters 1987; Prentiss et al. 2007), was calculated from faunal remains (identifiable to taxon at the level of genus). Relative role of mammal hunting was assessed with two indices: a biface index (ratio of bifacial tools to all chipped stone tools) was calculated as a possible marker of tool production associated with hunting. Previous studies at Keatley Creek demonstrated a strong relationship between the biface index and the frequency of mammal bones in archaeological contexts (Prentiss et al. 2007). Second, a mammal index (total mammals/total fauna) was used as a proxy for frequency of successful mammalian hunting (see also Prentiss et al. 2007). Correlation coefficients between these measures suggest a relatively strong pattern of inter-correlation (Table 4.6). In essence, evenness increases as mammals are added to a generally fish (salmon) dominated diet. Biface knives and projectile points were essential hunting tools. Consequently, we need rely upon only one of these measures for subsequent multivariate analysis.

Table 4.5. Measures of socio-economic variation.

Housepit and Component	Faunal Evenness: “J” (Pielou)	Prestige item index: Items/m^3	Nonlocal Raw Material Index: Items/m^3	Prestige Raw material Index: Items/m^3	Biface index: Bifaces/ All tools	Mammal index: Mammals/ All fauna	Cache Pit volume: Volume/ m^2	FCR index: FCR/m^3
20 3	0.43	1.4	3.6	6.21	0.48	0.21	6.6	1391
24 3	0.44	12.3	92.5	15.4	0.48	0.27	14.2	2337
54 3	0.25	1.6	38.8	15.2	0.29	0.13	15.1	872
54 2	0.28	0	15.2	0	0.14	0.09	0	555
20 2	0.5	2.1	8.3	10.4	0.64	0.2	11.5	2081

Table 4.6. Correlation coefficients for the evenness and biface and mammal indices.

Correlations

		Even	Biface	Mammal
Even	Pearson Correlation	1	.924*	.805
	Sig. (2-tailed)	.	.025	.100
	N	5	5	5
Biface	Pearson Correlation	.924*	1	.791
	Sig. (2-tailed)	.025	.	.111
	N	5	5	5
Mammal	Pearson Correlation	.805	.791	1
	Sig. (2-tailed)	.100	.111	.
	N	5	5	5

* Correlation is significant at the 0.05 level (2-tailed).

Potential wealth and influence was measured with three indices. All were calculated as ratios of items to excavated cubic meters. Prestige objects are actual formed items that include stone beads, pendants, art objects, and nephrite tools. Prestige raw materials reflect pieces of raw material (typically debitage) left over from production of prestige objects or more standard tools made from special raw material sources (obsidian, nephrite, and steatite). Non-local raw materials reflect the ability of household members to gain access to toolstone from areas associated with other coevally occupied villages in the Mid-Fraser area and from more distant sources. For purposes of this analysis we include obsidian, Hat Creek jasper, and Fountain Valley pisolite. Correlation coefficients between these variables (Table 4.7) suggest a relationship between non-local raw materials and prestige objects. Prestige raw materials do not correlate well suggesting that local deposits of nephrite and steatite may not have been the exclusive domain of select groups.

Table 4.7. Correlations coefficients for prestige objects, Non-local raw materials, and Prestige Raw materials.

		prestige	nonlocal	Prestige RM
Prestige	Pearson Correlation	1	.918*	.616
	Sig. (2-tailed)	.	.028	.269
	N	5	5	5
Nonlocal	Pearson Correlation	.918*	1	.659
	Sig. (2-tailed)	.028	.	.226
	N	5	5	5
Prestige RM	Pearson Correlation	.616	.659	1
	Sig. (2-tailed)	.269	.226	.
	N	5	5	5

* Correlation is significant at the 0.05 level (2-tailed).

Cache pit volume (expressed per excavated square meters) was used as a measure of potential storage capacity (and potentially, ability to amass surplus). The FCR index was used as a measure of variability in frequency of cooking activities and potentially, occupation density per household (Prentiss et al. 2007). Interestingly, these indices do not correlate well (Table 4.8) suggesting a "disconnect" between FCR accumulation and cache pit size. This result is primarily the result of massive cache pits in Housepit 54 associated with relatively low FCR counts, compared to Housepit 24 with both large cache pits and high FCR counts. One possible implication is that Housepit 54 maintained substantial storage capacity despite a smaller population of inhabitants per capita.

Table 4.8. Correlation coefficients for Cache Pit volume and FCR.

		CP Vol.	FCR
CP Vol	Pearson Correlation	1	.571
	Sig. (2-tailed)	.	.315
	N	5	5
FCR	Pearson Correlation	.571	1
	Sig. (2-tailed)	.315	.
	N	5	5

Principal components analyses (PCA) were undertaken in order to independently explore the interaction among indices measuring predation, storage and cooking frequency. Correlations between predation indices permitted us to drop two indices. Similar correlations between prestige indicators permitted some data reduction (non-local was retained due to its higher sample size). The lack of correlation between Prestige Raw materials and the other indices suggests that this variable should be considered independently from the others. Thus two PCAs were run, one with the non-local raw materials index, the other using the prestige raw materials index. By reducing matrix complexity to specific variables it was possible to avoid matrix problems that can occur due to correlated variables and consequent, negative eigenvalues. Each analysis relied upon a significant eigenvalue cutoff of 1.0. Component scores were retained for subsequent examination to explore the performance of each household component.

PCA #1 examined the relationship between the mammal, prestige raw material, cache pit volume and FCR indices (Tables 4.9-4.12; Figures 4.2 and 4.3). Results suggest relatively strong inter-correlations between all variables supporting the model asserting a relationship between population density, storage capacity, hunting behavior, and accumulation of prestige raw materials. Examination of component scores suggests that only one housepit (24) strongly contributes to this solution (Figure 4.3). Housepit 54 during the BR 2 occupation has a strongly negative score given its low mammal index and lack of cache pits. This result is likely at least partially a result of sampling issues since it is evident that many portions of the BR 2 occupation were destroyed by excessively large BR 3 cache pits as was recorded in Areas 2 and 3 (Chapter Three). Hunting indices are relatively strong in both occupation periods of Housepit 20, though apparently this did not translate into obvious material wealth in either BR 2 or 3 times.

Table 4.9. Correlation matrix for PCA#1.

Correlation Matrix

		Mammal	Prest. RM	CP Vol.	FCR
Correlation	Mammal	1.000	.555	.538	.928
	Prest. RM	.555	1.000	.992	.565
	CP Vol.	.538	.992	1.000	.571
	FCR	.928	.565	.571	1.000

Table 4.10. Initial statistics for PCA #1.

Total Variance Explained

Component	Initial Eigenvalues Total	% of Variance	Cumulative %	Extraction Sums of Squared Loadings Total	% of Variance	Cumulative %
1	3.075	76.878	76.878	3.075	76.878	76.878
2	.846	21.146	98.024			
3	.007	1.827	99.851			
4	.0005	.149	100.000			

Extraction Method: Principal Component Analysis.

Table 4.11. Component loadings for PCA #1.

Component Matrix

	Component 1
Mammal	.858
Prest. RM	.891
CP VOl.	.888
FCR	.870

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Table 4.12. Component scores for PCA #1.

20 3	-0.17958
24 3	1.16903
54 3	0.10531
54 2	-1.54507
20 2	0.45031

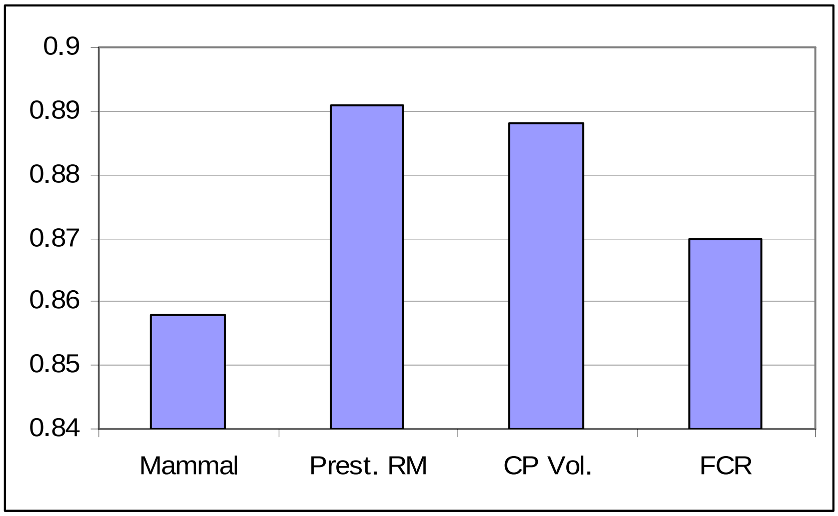

Figure 4.2. Component one loadings for PCA #1.

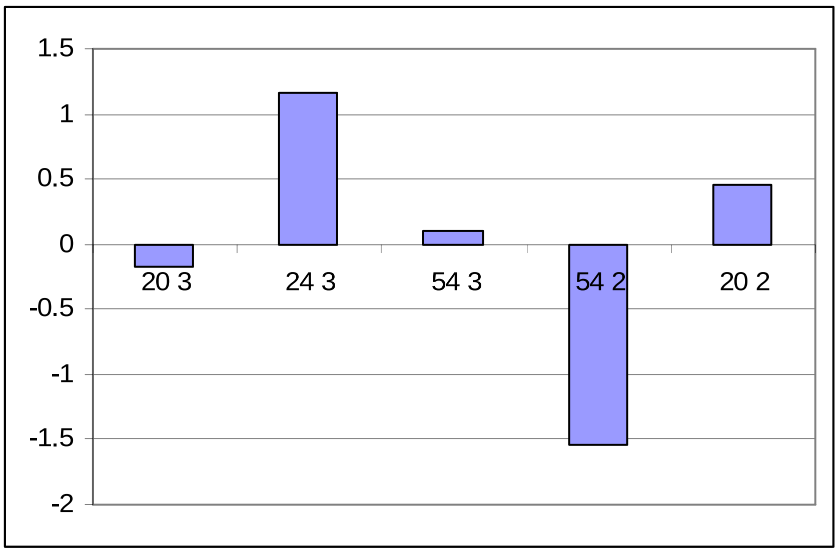

Figure 4.3. Component one scores for PCA #1.

PCA #2 explored correlations between the mammal, cache pit volume, FCR and non-local raw materials indices. Results of this PCA are remarkably similar to that of PCA #1 (Tables 4.13-4.16, Figures 4.4-4.5). All variables contribute to the solution. The plotted component scores illustrate the same pattern; that the integrated package of population density, storage capacity, mammal predation, and wealth manifest strongly in only one housepit component, HP 24, during BR 3 times. These results imply that while variation in predation storage and demographics was continuous during BR 2 and 3 times, markers of inequality did not develop until the BR 3 period. This also implies that housepit size was not the primary marker of status, since Housepit 20 is the largest of the three houses, yet it appears little better off than the much smaller Housepit 54. Readers should be aware however, that excavations of Housepit 20 are incomplete and more work is scheduled for 2009. Further, sampling of BR 2 components has been limited to deep occupations in Housepits 20 and 54. More extensive investigations of BR 1 and 2 contexts are planned for the 2009 field season.

Table 4.13. Correlation matrix for PCA #2.

		Mammal	CP Vol.	FCR	Non-local
Correlation	Mammal	1.000	.538	.928	.511
	CP Vol.	.538	1.000	.571	.565
	FCR	.928	.571	1.000	.462
	Non-local	.511	.565	.462	1.000

Table 4.14. Initial statistics for PCA #2.

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.804	70.112	70.112	2.804	70.112	70.112
2	.698	17.448	87.560			
3	.431	10.765	98.325			
4	6.698E-02	1.675	100.000			

Extraction Method: Principal Component Analysis.

Table 4.15. Component loadings for PCA #2.

	Component
	1
Mammal	.909
CP Vol.	.787
FCR	.905
Non-local	.735

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Table 4.16. Component scores for PCA #2.

20 3	-.21699
24 3	1.43685
54 3	-.16889
54 2	-1.33406
20 2	.28309

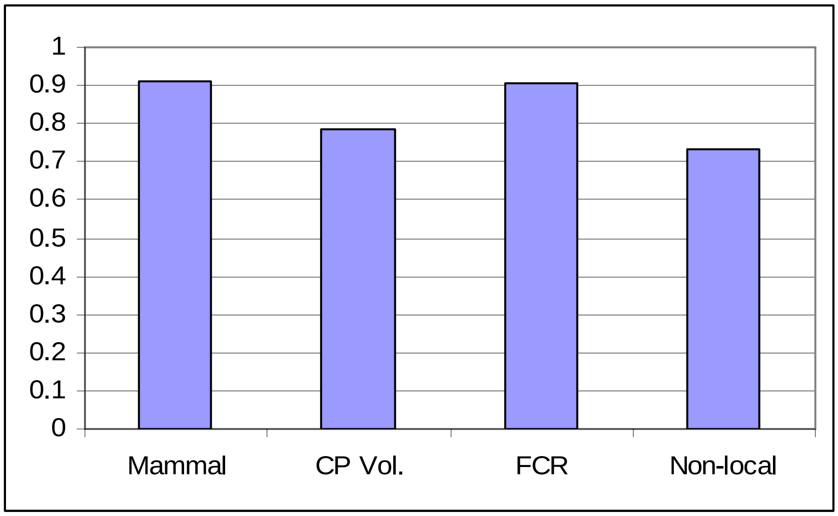

Figure 4.4. Component one loadings for PCA #2.

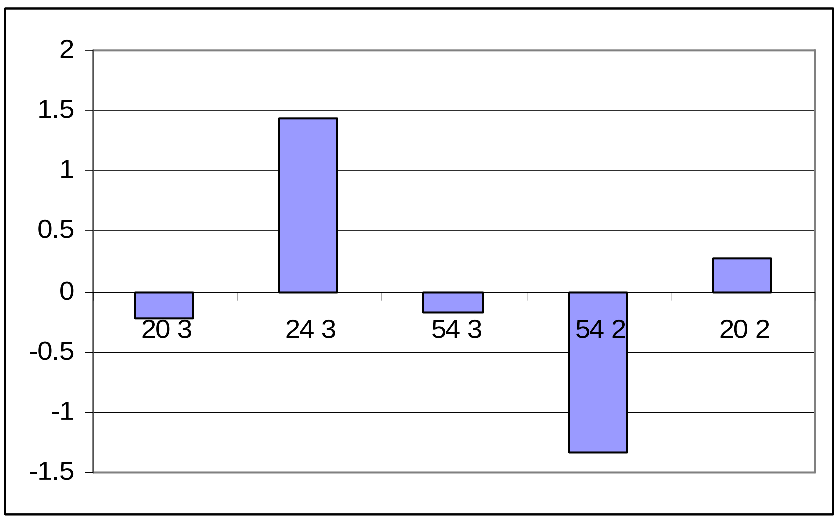

Figure 4.5. Component one scores for PCA #2.

Summary

Excavations at Housepits 20, 24, and 54 provided a sample of 17,289 lithic artifacts from the 2008 field season. Analysis of assemblage contents on an inter-activity area basis suggests a relatively high degree of redundancy implying that these areas do reflect activities of domestic units. One interesting by-product of this study is that some (or all) houses may have maintained unique tool manufacture and use traditions through time favoring different classes of tools. This may be indicated by the slate tool dominated tool making tradition of Housepit 54 compared to the more dominant chipped-stone tool traditions of Housepits 20 and 24 (especially 20). Analysis of interrelationships between predation, storage, demography, and wealth indicates that indeed these variables are generally correlated but that they only manifest strongly in such an integrated fashion in select houses, namely Housepit 24 during BR 3 times. While still preliminary, these results tend to support the contentions of Prentiss et al. (2007); that inter-household ranking and possibly other forms of inequality did not emerge in the Mid-Fraser villages until approximately 1200 B.P.

CHAPTER FIVE

FAUNAL ANALYSIS

(Eric Carlson and Hannah Schremser)

Introduction

Portions of 3 housepits were excavated during the 2008 field season at the Bridge River site. Housepits 20, 24, and 54 were chosen based on their size variation and the presence of multiple occupational surfaces and roof collapse episodes which together span the complete history of the Bridge River site from its initial occupation at 1900 BP to its abrupt abandonment at 1100 BP (Bridge River phases 1-3) (Prentiss et.al. 2008). A Protohistoric reoccupation of the village is represented in Bridge River Phase 4 (ca. 400 BP). The Bridge River Research Design (Prentiss 2003) sought to further refine the project by targeting discreet activity areas within each of the pithouses believed to represent domestic sub-units within multifamily structures (Prentiss et.al. 2008; see also Hayden 1997; Lepofsky et. al 1996; and Teit 1906). Activity areas were identified through geophysical work of Guy Cross (Prentiss et. al. 2008).

One critical aspect of the Bridge River Research Project has been to explore trends in subsistence economies throughout the history of this early complex hunter-gatherer village (Bochart 2005; Prentiss 2003; Prentiss et.al. 2008). Analysis of the archaeofauna provides an opportunity at Bridge River to track such diet choices through remarkably well-stratified floor deposits spanning the site's complete history, correlating increasing sedentism in the region with models of prey choice (Broughton and Grayson 1992; Grayson and Cannon 1999), resource intensification (Chatters 1998; Broughton 2004; Butler and Campbell 2005; Prentiss and Kuijt 2004), resource extensification, resource depression (Butler 2000), specialization (Butler and Campbell 2004), and/or logistical targeting of specific prey choice items (Binford 1980; Butler and Campbell 2004).

In addition to tracking subsistence trends, the current research is also concerned with identifying evidence of emergent social inequality at the village site. Models of culture change have revolved around these central concepts (subsistence change and emergent social inequality) which are seen as critical in explaining the dramatic prehistoric shift throughout the Northwest Coast and northern Plateau from relatively small, mobile egalitarian foraging groups to large, sedentary villages often supporting over 1000 inhabitants and exhibiting institutionalized social inequality (Chatters and Prentiss 2003; Hayden 1997; Matson and Coupland 1995; Prentiss et.al. 2006, 2007, 2008). Linking diachronic and spatial variation in faunal remains to shifts in socioeconomic differentiation has been an increasing focus of current research on the emergence of complex hunter-gatherer societies (Arnold 1996; Hayden 1997; Kuijt and Prentiss 2004; Lepofsky et.al. 1996; Matson and Coupland 1995; Prentiss et.al. 2007; Price and Feinman 1995, etc.), and concerns such issues as private ownership of resource localities (such as fishing locations on the Fraser, deer hunting territories, and highland geophytes locales) documented by early ethnographers in the Mid-Fraser region (Hayden 1992;Teit 1906).

Spatial patterning of fauna including variation in taxonomic abundance and diversity is thought to signify differential access to certain food resources, a salient characteristic of emergent complex hunter-gatherer societies (Arnold 1996). Additional indicators of inequality that may be teased out of the Bridge River fauna include the association of certain taxa with prestige items such as nephrite adzes, anthropomorphic mauls, copper, and trade goods such as coastal shell (Hayden 1997; Lepofsky et.al. 1996; Prentiss et.al. 2007). Variation in taxonomic diversity and abundance are believed to be indicators of social inequality and have been linked to large-sized pithouses and with elite areas within multifamily houses at the Keatley Creek Site (Lepofsky et.al. 1996). Recognition of such indicators of inequality through the fauna may further our understanding of the timing and processes of emergent social complexity at the Bridge River site and throughout the region.

Traditional models of culture change in the Northwest and Northern Plateau often have assumed a vague process of increased exploitation and efficiency in the mass harvesting, drying, and storage of salmon resources, leading to the establishment of large aggregated villages made possible through the storage of surplus (see Butler and Campbell 2004). Processes of population packing and resultant circumspection, territorialism, sedentism, risk-reduction strategies (Binford 2001), and/or managerial necessities (Ames 1994) are then assumed to lead to inevitable social differentiation.

Feinman (2005:259) notes, "resource abundance, scarcity, and risk can all create opportunities and stresses. But these factors do not provide a necessary and sufficient explanation for the significant restructurings that characterize the institutionalization of inequality." Indeed, explanatory theoretical frameworks which take into consideration aspects of human decision-making (Jochim 1976), the roles of individual agents/practice theory (Boudieu 1978; Hayden 1997, 1995), society's willingness to allow institutionalized inequality (Weissner 2002), and even Darwinian evolutionary explanations which move beyond models of intentionality and directed adaptation (Chatters and Prentiss 2003, Prentiss et.al. 2007, Prentiss et.al. 2008), are needed to expand our thinking beyond mere ecological/functional determinism. The author feels that together, analysis of subsistence choice through time coupled with analysis of evidence for social inequality (seen in the variation in taxonomic abundance and variation across the site and within multi-family structures) at the Bridge River site, may provide a rich assessment of culture change throughout the region and offer contributions to the study of processes of emergent complexity in other cultures throughout the world.

In order to measure trends in subsistence change and social complexity at the Bridge River site, understanding the relationship between salmon and mammals as prey choice items is critical. A mammal index (see Broughton 2004; Prentiss et. al. 2007) is used here to measure the relative abundance of each taxonomic class through time. Such a measurement is derived from the number of large/medium to large mammal specimens divided by the sum of the number of large/medium to large mammal specimens and the number of fish (*onchorhynchus sp.)* bones for each analytic unit being measured. Taxonomic diversity is also assessed, and includes measurements of richness and evenness (Pielou 1966; Reitz and Wing 1999). Richness is the number of different taxa present within the faunal assemblage, whereas evenness takes into consideration the abundance of specimens for each of the identified taxonomic categories. Spatial variation in diversity has been shown to be an indicator of social differentiation (Lepofsky et.al. 1996).

Broughton (2004) sees resource intensification (here termed "extensification") as a shift from high-ranked resources to broader diversity of lower-ranked prey choice items, signifying a decline in foraging efficiency initiated by resource depression of highest ranked prey choice taxa (a situation seen at the latest phases of Keatley Creek, just prior to abandonment (Prentiss et.al. 2007). A counter view is that through time, the Bridge River inhabitants **narrowed** their resource base towards a more limited salmon/root diet, possibly as a consequence of technological innovations which made for the more productive harvesting, drying, and storage of these resources and optimal climatic conditions, signifying an overall increase in localized foraging efficiency. This process is called specialization (Butler and Campbell 2004).

Archaeofaunal data indicate an increase throughout the history of the Bridge River site in the relative frequency of salmon to mammal resources, as well as a decline in measurements of taxonomic diversity (such as evenness and richness). It is proposed by the author that such a scenario of specialization may have left the community too narrowly focused on salmon/root resources and subsequently unable to redirect subsistence activities to other prey choice items if the salmon/root crops declined in abundance through climate change, catastrophic events like landslides or simply natural yearly fluctuations in abundance of salmon runs (Kew 1992), resulting in the collapse of the village at the end of BR3. Unlike the inhabitants of Keatley Creek who were able to redirect their subsistence practices towards a wider diversity of lower-ranked terrestrial resources during low salmon harvests, the Bridge River inhabitants may have inadvertently over-exploited secondary food resources throughout the history of the village, leaving them with few subsistence alternatives when salmon abundance fluctuated.

Important in our study, is the shifting role of deer (*Odocoileus sp.)* in the diet/culture of the prehistoric Bridge River community. Ethnographic work highlights the importance of deer as a prestige food and the choice food for potlatch ceremonies (ceremonial feasts and gift exchanges) (Alexander 1992; Teit 1906). The Bridge River fauna provides an opportunity to track aspects of variation in deer abundance and distribution of specific deer elements across the site and through time, and which may indicate the emergence of this taxon as a prestige food.

Our findings indicate that indeed subsistence behavior does change throughout the history of the Bridge River site, though not at the levels anticipated. Earliest occupations of BR2 show greater taxonomic diversity while later occupations, beginning in early BR3 and extending into terminal BR3, show a narrowing of prey choices (i.e. specialization), as well as in increase in smaller size grades of processed mammal bones. Mammal indices show trends towards a more salmon-dominated diet through BR2-BR3 phases. Subsistence trends during BR4, a terminal prehistoric and proto-historic re-occupation of the site following a several hundred year hiatus indicate an increase in mammals as a substantial food resource, possibly a result of rejuvenated deer populations following the devastating human population declines in the region (e.g. Butler 2000). Alternatively, taphonomic processes may have also impacted fauna from BR4 to a greater extent than the earlier phases, due to the absence of overlaying floors which acted to seal/protect lower deposits. BR4 floors are more susceptible to surface leaching of water, as well as ground disturbances linked to krotovina activity, roots, and looting. These processes may have caused substantial destruction of more fragile bones like salmon causing mammalian remains to be disproportionately represented.

Certain epistemological concerns need to be addressed relating to the interpretation of the faunal material. In particular is the cultural significance and symbolism often attributed to certain taxa beyond merely attributing fauna as a consumed food resource, such as food taboos associated with crest animals or use of animal parts for ceremonial or tool-making purposes (Gifford-Gonzalez 2008; Hodder 1982; Robb 1998). In the Bridge River faunal assemblage, use of elements, and by proxy, taxa, which may not be associated with consumption may include

Aves wing parts which may have served a decorative/ceremonial significance (Teit 1906), as well as *Aves* long bone fragments reworked into ornaments such as incised beads and gaming pieces. In addition, incisors of beaver and squirrel are often used as carving tools, *Canis familiaris* remains are often found in ritualized contexts showing no consumptive evidence (Crellin 1989; Hayden, personal communication), shell used as beads/ornaments/game pieces, *Ursus sp*. for teeth ornaments, and even certain deer elements (such as pre-maxillas and toe bones) may indicate that hides, and not meat, were being traded into the Bridge River village (Prentiss et.al. 2007, 2008, personal communication). As Robb (1998:330) notes, "The archaeological world is a cultural world, and by dividing it into *a priori* categories of material and symbolic, we deny the degree to which things like economy are fundamentally cultural and things like ideas are embodied in material practices." And as Hodder (1980:viii) states "…archaeology is a cultural science, and all social strategies and adaptation must be understood as part of cultural, symbolically meaningful context," i.e. faunal assemblages must be understood as being at least partially "culturally and symbolically formed." The Bridge River faunal analysis was conducted with these concerns in mind.

Methodology

Fauna was analyzed at the Department of Anthropology lab facilities at the University of Montana, Missoula, MT. Comparative collections and critical assistance were provided by David Dyer, curator of the Philip L. Wright Zoological Museum at the University of Montana. 100% of the faunal material was analyzed for taxonomic class, genera, and element. Where possible, specimens were identified down to sub-species classifications. Human modification to bones was assessed which included identifying evidence of butchering and processing techniques such as burning, cut-marks, chopping, hacking, and fragmenting morphology. Additional human modification of fauna was recorded and included alterations to bones for use as formal tools such as awls, needles, ornaments, etc. or various stages of their manufacture. Non-fish faunal material fragments were categorized into 6 size grades (see figures below). Variation in size grades of fauna through time and across space may indicate shifting trends in butchering and processing techniques. Specifically, intensified grease and marrow extraction techniques resulting in the higher frequencies of smaller bone fragments may indicate more intensive use of certain prey items, especially large mammals, in the BR3 phase of the village. Diameters of complete *onchorhynchus sp.* vertebrae (thoracic, precaudal, and caudal) were recorded. Other fish elements were not measured. In addition, all fauna was weighed by taxonomic class for each archaeological context. Analysts agreed that this additional measure of abundance would be useful in assessing relative frequencies of taxa, this is especially important when comparing abundance between taxonomic classes (i.e. fish to mammal).

Taphonomic characteristics were also recorded, which included assessing the degree of bone weathering based on Behrensmeyer's (1978) criteria. Bones are separated into 5 categories of increasing weathering stages (Table 5.1). Such an assessment is important when determining the taphonomic background noise inherent in site formation processes and may help alleviate bias in the analysis (Gifford 1981). It was found that deposits from the later phases including BR3 and BR4, showed more weathering than earlier, deeper deposits (BR2, BR1). As noted above, this may be a result of earlier deposits being more protected by subsequent layering of later clay floors which acted to seal faunal material in relatively anaerobic environments. Later stratigraphic contexts nearest the ground surface are susceptible to a combination of ground water leaching down into the sediment as well as surface disturbances such as rodent burrowing, roots, looting, etc. Richness indices were calculated as counts of taxons and are presented purely for descriptive purposes (not controlling for sample size).

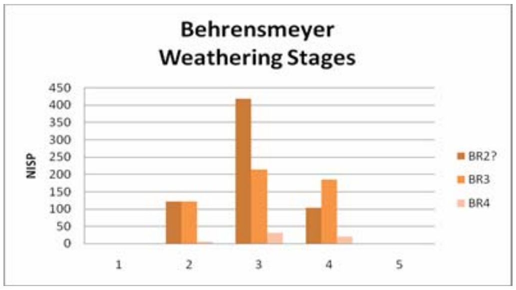

Figure 5.1. Housepit 20 weathering stages.

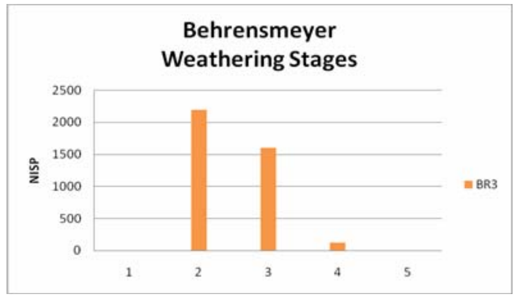

Figure 5.2. Housepit 24 weathering stages.

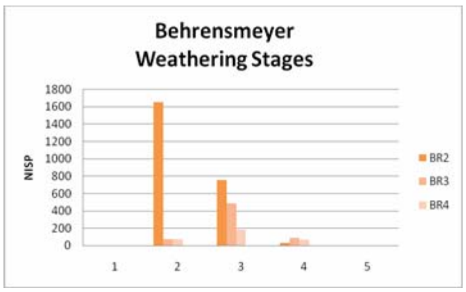

Figure 5.3. Housepit 54 weathering stages.

Worked Bone

A total of 52 worked bone specimens were recovered from the fauna. Of these, 10 were identified as awls, 1 a needle with eye-hole, 5 beads/ornaments of mammal and bird bone, two beads made from Mollusca, 1 scraper made of an elk scapula, a split antler tool, 2 modified beaver incisors, and one modified squirrel incisor. 29 additional fragments of worked bone were recovered as well, most exhibiting polish. 30 worked bone artifacts were recovered from Housepit 54, 8 from Housepit 24, and 12 were recovered from Housepit 20. Broken down by phases across the site, 4 total worked bone fragments were recovered from BR4 contexts, 32 from BR3 contexts, and 14 from BR2. These trends suggest a dramatic increase in the utilization of such artifacts occurring during the later periods of BR3, just prior to abandonment. Also, all the bone ornaments (with the exception of two Mollusca beads from HP24 and one from HP54), were recovered from Housepit 20, the largest housepit at the site. Such variation in unique faunal material may indicate emergent social inequality between houses especially when coupled with other evidence such as non-faunal prestige items (such as a stone bird effigy recovered from HP 20).

Dogs

73 *Canis familiaris* elements were recovered from two cache pits within Housepit 24, area 3. Articulated portions of two individuals appear to be divided between the pits, a pattern

seen elsewhere in the Mid-Fraser (Crellin 1989; Hayden 1997). One of the pits (feature 1) also contained an upper left canine from *Ursus sp.* and a dentalium shell bead, possible symbolic offerings. Cut-marks were noted on the dog mandible and cranium, but further butchering and consumption evidence such as element fracturing and burning are not obvious.

Two additional *Canis familiaris* elements were recovered from the fauna at the site: one complete metacarpal from Area 2 of housepit 24 and one proximal metatarsal fragment from housepit 54, stratum IIg (BR3).

Features

Importantly, occupation surfaces across the site contain cache pits and hearth features which were encountered during excavation. Often such pits were filled with what appears to be floor sweepings/detritus (including fauna, lithics, and fire-cracked rock) representing a wide range of floor activities from the occupation surfaces associated with the features, following the cleaning-out of the original stored material. In the current analysis, the contents of cache pits are included with the fauna from their associated stratigraphic occupation layer (See Chapter 3 for a description of cache pits).

Faunal Remains

The remainder of this chapter details the analysis of the faunal material from the 2008 excavations at the Bridge River Site. Each of the three houses will be assessed first, by stratigraphic layer and further by excavation area. A diachronic and spatial assessment follows that tracks subsistence change as well as examines evidence for emergent complexity throughout the four phases of the Bridge River site.

Faunal material recovered from the 2008 excavations at the Bridge River site consisted of a total of 9218 specimens, 2246 of which were *mammalia*, 6701 were *Onchorhynchus sp.*, 16 were *aves*, and 5 *mollusca*. 225 specimens were of unidentifiable class. In addition, 14 formal tools were identified, as well as 33 fragments of worked bone. 17 coprolites of *Canis familiaris* were recovered from the site.

Housepit 20

A total of 1330 identified specimens were recovered from HP20, 750 of which were recovered from Area 1 and 580 from Area 2. Fifteen stratigraphic layers were identified spanning early BR2, BR3, and BR4.

Table 5.1. Summary of Housepit 20 stratigraphy**.**

Area	Stratum	Phase	Dates (cal)
1	IIb, IIc, IIc(1), Vd, IId	BR2	
2	Vd, IIb, Vc, IIc, IId,Vb	BR2	
1	Va, IIa	BR3	
2	Va(1), Va(2), IIa	BR3	
1	I, V, II, II(1)	BR4	
2	I, V, II	BR4	

Area 1, BR 2 Fauna

Fauna from BR2 (Stratum IId, Vb, IIc(1), IIc, IIb,) includes a total of 216 mammal bones, 2 Aves bones, 176 *Onchorhynchus sp*. bones, and 10 specimens of indeterminate taxa. Mammal index is caluculated at .55 (mammals/mammals+fish). Two worked bone specimens were recovered consisting of a bead made from Aves element and a scraper made from a *Cervus canadensis* (elk) scapula. Area 1, BR2 contains a relatively high percentage of *Odocoileus sp.* and large mammals.

Table 5.2 Summary of Housepit 20, Area 1 faunal remains**.**

Stratum	*Large Mammal*	*Med/lg Mammal*	*Med. Mammal*	*Odocoileus Sp.*	*Canis familiaris*	*rodentia*	*aves*	*Castor canadensis*	*Cervus canadensis*	*Martes pennanti*	*Tamia-sciura*	*unk*	*Total*
I													
V												1	1
II	1	16		1								3	21
II(1)	2	1											3
Va	9	12											21
IIa	9	26		2			1						38
Vb	n/a												
IIb	5	7		1									13
Vc													
IIc	47	35		19			2		1		2	7	113
IIc(1)	4	5		2									11
Vd	1										1		2
IId	30	50		6								3	89

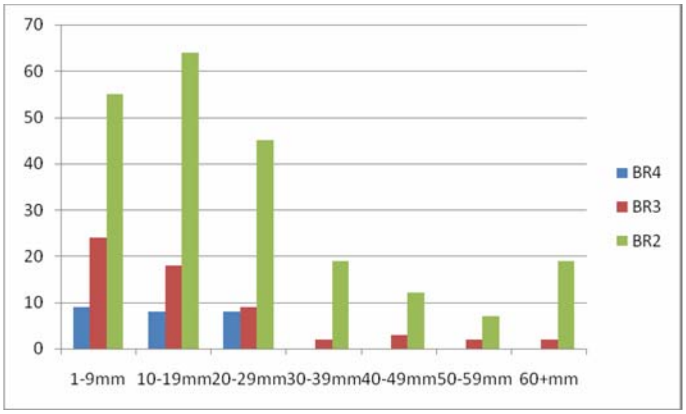

Figure 5.4. Size grades bone fragments for Housepit 20, Area 1**.**

Stratum IId contains 86 mammal bones, 79 *Onchorhynchus sp.*, and 3 specimens of indeterminate taxa. Of the mammalian specimens, 1 metapodial fragment, 2 distal phalanges, a tooth fragment, distal femur fragment, and proximal second vestigial phalanx of *Odocoileus sp*. were recovered. Eight diaphysis fragments and 21 unidentifiable element fragments from large mammals were recovered. 1 tooth fragment and 49 unidentifiable fragments from medium to large mammals also recovered. *Onchorhynchus sp*. remains include 1 cranial fragment and 78 post-cranial elements.

Stratum Vd contains 2 mammal bones consisting of one tooth fragment from a large artiodactyl and a lower left incisor from a *Tamiascurus* (red squirrel). Fifteen total *Onchorhynchus sp.* specimens were recovered including 7 cranial and 8 post-cranial elements.

Stratum IIc(1) contains 11 mammal bones and 6 *Onchorhynchus sp*. bones. One innominate fragment and a right distal metacarpal from *Odocoileus sp*. were recovered. Two diaphysis fragments and 2 unidentifiable elements from large mammals were recovered. Five unidentifiable elements from medium to large mammals were recovered. *Onchorhynchus sp*. remains include 6 post-cranial elements.

Stratum IIc contains 104 mammal bones, 2 Aves, 56 *Onchorhynchus sp*. bones, and 7 elements of indeterminate taxa. One femur fragment, 5 metatarsal fragments, 2 vertebral fragment, a proximal third phalanx, 2 left pre-maxilla fragments, one maxilla fragment, 2 right distal tarsal epiphyses, left first molar, and two rear foot sesamoids from *Odocoileus sp* were recovered. Eight diaphysis fragments, and 39 unidentifiable elements from large mammals were recovered. Thirty-five unidentifiable element fragments from medium to large mammals were recovered. In addition, *Tamiascurus* (red squirrel) left and right upper incisors were recovered. Two Aves elements were also recovered consisting of an unidentifiable fragment, and an ornament made from a section of long bone. The ends of ornament were scored and snapped during manufacture and then ground. The complete piece was then polished. A *Cervus canadensis* scapula tool was recovered exhibiting polish and use-wear along distal transverse edge of blade. *Onchorhynchus sp*. remains include 4 cranial elements and 52 post-cranial elements.

Stratum IIb contains 13 mammal bones, and 19 *Onchorhynchus sp*. bones. Of the mammalian specimens, one *Odocoileus* sp.metapodial fragment was recovered. Large mammal elements include 1 diaphysis fragment and 4 unidentified element fragments. Seven unidentifiable specimens from medium to large mammals were recovered. *Onchorhynchus sp*. remains include 19 post-cranial elements.

Area 1, BR 3 Fauna

Fauna from BR3 (Stratum Va and IIa) include a total of 59 mammal bones, and 266 *Onchorhynchus sp*. Mammal index is .18 (mammals/mammals+fish). One polished and incised bone ornament fragment was recovered.

Stratum IIa contains 38 mammal bones, and 79 *Onchorhynchus sp*. bones. Of the mammalian specimens, 1 lower left 4^{th} premolar and a vertebral fragment from *Odocoileus sp*. were recovered. Three diaphysis fragments and 6 unidentifiable fragments were recovered from large mammals. Twenty-six indeterminate element fragments recovered from medium to large mammals. Worked bone includes one polished ornament fragment of Aves long bone which is spirally fractured with incised design consisting of pairs of transverse bands and cross-hatched design extending down the length of artifact. *Onchorhynchus sp*. remains include 79 post-cranial elements

Stratum Va included 21 mammal bones and 187 *Onchorhynchus sp*. specimens. Two diaphysis fragments and seven unidentifiable fragments from large mammals were recovered. Twelve unidentifiable element fragments of medium to large mammals were also recovered. *Onchorhynchus sp*. remains include 21 cranial fragments and 166 post-cranial elements.

Area 1, BR 4 Fauna

Fauna from BR4 (Stratum I, V and II, II(1)) included 52 specimens. Stratum I contained no faunal material. Stratum V contained only one unidentifiable bone fragment from an indeterminate taxa.

Stratum II contained 24 mammal bones, 14 *Onchorhynchus sp*. bones, and 3 specimens of indeterminate taxa. Of the mammalian specimens, 4 vertebral fragments, 1 first phalanx, and a metapodial fragment from *Odocoileus sp.* were recovered. Sixteen unidentifiable specimens from medium to large mammals and 2 indeterminate specimens from medium sized mammals were also recovered. *Onchorhynchus sp*. remains include 7 cranial fragments and 7 post-cranial elements.

Stratum II(1) contained 2 large mammal specimens, consisting of one vertebral fragment and one diaphysis fragment from large mammals. In addition, 1 unidentified medium to large mammal specimen was recovered. *Onchorhynchus sp*. remains include 7 post-cranial elements.

Area 2, BR 2 Fauna

Fauna from BR2 (Stratum IId, Vd, IIc(1), IIc, Vc, IIb, and Vb) included a total of 129 mammal bones, 2 *aves*, 129 *Onchorhynchus sp*. Bones and 14 specimens of indeterminate taxa. Mammal index is .5.

Table 5.3. Housepit 20, Area 2 faunal data.

Stratum	*Large Mammal*	*Med/lg Mammal*	*Med. Mammal*	*Odocoileus Sp.*	*Canis familiaris*	*rodentia*	*aves*	*Castor canadensis*	*Cervus canadensis*	*Martes pennanti*	*Tamia-sciura*	*unk*	*Total*
I													
V													
II	6	5		1									12
II(1)	n/a												
Va		1		1									2
IIa	65	73	5	17			4					3	167
Vb	8	11		1									20
IIb	2	13											15
Vc	1	3	2	1		1						1	9
IIc	11	44		9		1	1	1		1		10	78
IIc(1)	n/a												1
Vd		1											1
IId	13	3		2			1	1					20

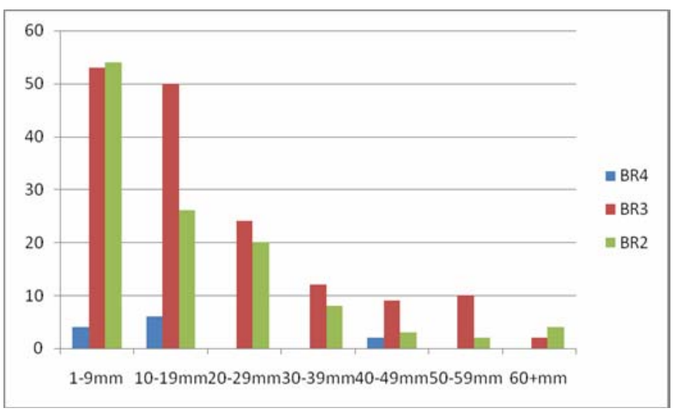

Figure 5.5. Size grades of bone fragments for Housepit 20, Area 2.

Stratum IId contains 19 mammal bones, one Aves bone, 71 *Onchorhynchus sp*. bones, and three fragments of indeterminate taxa. Of the mammalian specimens, one rib fragment and one vertebral fragment of *Odocoileus sp*. were recovered, and one tooth enamel fragment from *Castor canadensis*. One vertebral fragment and 12 unidentifiable element fragments from large mammals were also recovered. *Onchorhynchus sp*. remains include 11 cranial fragments and 60 post-cranial elements.

Stratum IIc contains 67 mammal bones, one unidentifiable Aves item, 49 *Onchorhynchus sp*. bones, and 10 fragments of indeterminate taxa. Of the mammalian specimens, one left innominate fragment, a proximal metapodial fragment, four vertebral fragments, a second phalanx, and a fragment of internal auditory meatus (cranial fragment) from *Odocoileus sp.* were recovered. One upper right molar of *Castor canadensis,* first lower left molar of martes pennant, and an unidentified Rodentia element were also recovered. Large mammal elements include one diaphysis fragment and 10 unidentifiable fragments. One proximal rib fragment and 41 unidentifiable element fragments of medium to large mammals were recovered. *Onchorhynchus sp*. remains include 2 cranial fragments and 47 post-cranial elements.

Stratum Vc contains 8 mammal bones, 8 *Onchorhynchus sp*.bones, and one fragment of indeterminate taxa. The mammalian specimens included one distal phalanx of *odocoileus sp*. one indeterminate fragment from a large mammal, as well as one tooth fragment and two indeterminate fragments from medium to large mammals. In addition, one indeterminate element fragment each was recovered from both a medium sized mammal and a Rodentia. *Onchorhynchus sp*. remains include 8 post-cranial elements.

Stratum IIb contains 15 mammal bones and 1 *Onchorhynchus sp*. specimen. Of the mammalian specimens, one vertebral fragment and one innominate fragment from large mammals were recovered, as were 13 unidentifiable element fragments from medium to large mammals. *Onchorhynchus sp*. remains include 1 post-cranial element.

Stratum Vb contains 20 mammal bones consisting of 1 *Odocoileus sp*. carpal, three diaphysis and 5 unidentifiable element fragments of large mammals, and 11 unidentifiable elements from medium to large mammals.

Area 2, BR 3 Fauna

Fauna from BR3 (Stratum Va and IIa) included a total of 166 mammal bones, 5 Aves (all worked bone), 61 *Onchorhynchus sp*., and three fragments of indeterminate taxa. A total of 6 worked bone artifacts were recovered consisting of three awls and three ornaments (beads or game pieces). Mammal index is .73.

Stratum Va includes only one distal epiphyseal fragment of a metapodial from an *odocoileus sp.* and an unidentifiable fragment from a medium to large mammal.

Stratum IIa contains 164 mammal bones, 61 *Onchorhynchus sp*. bones and 3 fragments of indeterminate taxa. Of the Mammalia specimens, a proximal first phalanx, four vertebral fragments, one carpal, one left proximal radius, a left innominate fragment, one distal metapodial fragment, one complete distal phalanx, three tooth fragments and one lower incisor from *Odocoileus sp.* were recovered. Six diaphysis fragments and 59 indeterminate element fragments from large mammals were recovered. Three rib fragments from medium mammals were recovered. One vertebral fragment, six diaphysis fragments, a proximal rib fragment, and 63 unidentified element fragments from medium to large mammals were recovered. Three rib fragments from a medium sized mammal were also recovered. Three long bone fragments and an indeterminate fragment from Aves were recovered. One proximal scapula fragment (glenoid process) from *Lagomorph sp.* was recovered. In addition, 6 worked bone tools were recovered consisting of three ornaments (beads or game pieces)made from bird bones which all exhibit polish, scored-snapped-ground ends, incised designs, and three awls made from splintered fragments of large mammal metapodials. One additional awl fragment was recovered as well, made from an unidentifiable Aves element. *Onchorhynchus sp*. remains include 5 cranial fragments and 56 post-cranial elements.

Area 2, BR 4 Fauna

Fauna from BR4 (Stratum I, V and II) included 12 mammal bones. No *Onchorhynchus sp*. remains were recovered. Mammal index is calculated at 1.0.

Stratum I and V contained no faunal remains. Stratum II contains one metapodial fragment from an *Odocoileus sp*. One vertebral fragment and 5 unknown element fragments from large mammals. Five unknown fragments from medium to large mammals were also recovered.

Summary

Housepit 20 shows a marked decline in taxonomic richness through time. The mammal index indicates variation between activity areas through time. Area 1 shows decreasing reliance on mammals as a food resource between BR2 and BR3 while Area 2 shows a slight increase. Notably, BR4 shows a rebound in the relative importance of mammal in the diet to fish (see discussion below for possible explanations).

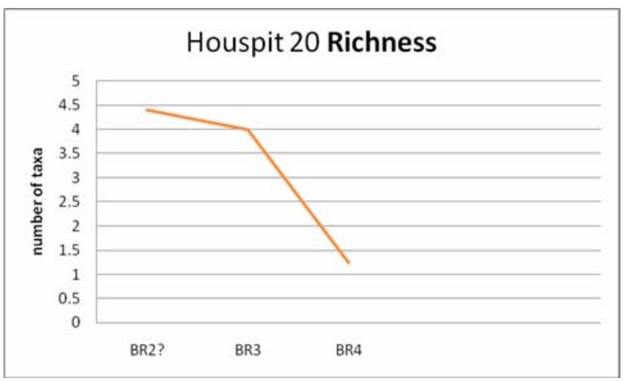

Figure 5.6. Measure of Richness for Housepit 20.

Table 5.4. Mammal index for Housepit 20.

Mammal Index(HP20) Area 1	**BR2?**						**BR3**		**BR4**			
	IId	IIc(1)	IIb	IIc	Vd	Vc	Va	IIa	II	II(1)	V	I
(Mammal/Mammal+Fish)	.52	.65	.41	.65	.12	n/a	.10	.32	.63	.22	n/a	n/a
Combined period:	.55						.18		.43			

Mammal Index(HP20) Area 2	**BR2?**						**BR3**		**BR4**			
	IId	IIc(1)	IIb	IIc	Vc	Vb	Va	IIa	II	II(1)	V	I
(Mammal/Mammal+Fish)	.21	n/a	.94	.58	.50	1.00	1.00	.73	1.00	n/a	n/a	n/a
Combined period:	.50						.86		1.00			

Mammal Index(HP20) Areas 1 and 2	**BR2?**	**BR3**	**BR4**
Combined period:	.52	.52	.71

Housepit 24

A total of 3908 identified specimens were recovered from HP24, 199 of which were recovered from Area 1, 3049 from Area 2, and 660 from Area 3. Seven stratigraphic levels were identified, all dating to Bridge River 3 (BR3). Of the total NISP for housepit 24, 460 specimens were identified as mammalian, 3419 as *Onchorhynchus sp*., 2 *mollusca*, and 12 specimens of indeterminate taxa. Seven worked bone specimens were recovered from Housepit 24. These include a split and ground antler tool (possibly a spoon), two awl fragments and 4 polished bone fragments. Sixteen coprolites were recovered of *Canis familiaris.* Fifteen of the 16 coprolites were from floor contexts and spread relatively evenly between the three excavation areas. Housepit 24 contained extensive dog remains (see Appendix). All worked bone, with the exception of a dentalium shell bead, from HP24 are made from mammal elements. Mammal index for BR3 is .11.

Area 1

Fauna from Area 1, BR3 (Stratum I, V, III, II, IIa, IV, and XV) included a total of 181 items. Of the total, 72 were of the Mammalia class and 109 were *Onchorhynchus sp*. Mammal index is calculated at .4. No worked bone was recovered from this area.

Table 5.5. Faunal data from Housepit 24, Area 1.

Stratum	*Large Mammal*	*Med/lg Mammal*	*Med. Mammal*	*Odocoileus Sp.*	*Canis Familiaris*	*rodentia*	*aves*	*Castor canadensis*	*Lagomorph*	*Ursus*	*Tamia-sciura*	*unk*	*Total*
I		3											3
V													
III		1		1									2
II	2	20		1								9	32
IIa	7	23		3								1	34
IV													
XV													

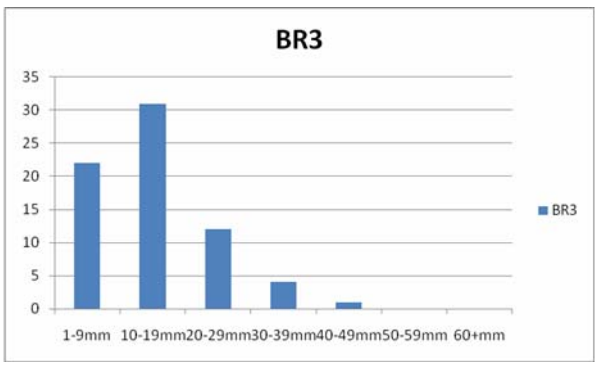

Figure 5.7. Size data from Housepit 24, Area 1.

Stratum XV and IV contained no faunal material. Stratum IIa contained a total of 34 mammal bones and 14 *Onchorhynchus sp*. bones. Mammal index is calculated at .71. In addition, Area 1 contains 5 coprolite samples assumed to be canid. One polished bone fragment was recovered. Of the mammalian specimens, a proximal end of second phalanx and two vertebral fragments of *Odocoileus sp.* were recovered. Seven unidentifiable element fragments from large mammals were recovered. Twenty-three unidentifiable element fragments from medium to large mammals were recovered as well. *Onchorhynchus sp*. remains include 2 cranial fragments and 12 post-cranial elements.

Stratum II contained a total of 32 mammal bones and 95 *Onchorhynchus sp*. bones. Mammal index is calculated at .25. Three coprolites presumed to be canid were also recovered. Of the mammalian specimens, 11 vertebral fragments and a fragment of upper right molar from *Odocoileus sp.* were recovered. One vertebral fragment and one unidentifiable element fragment from a large mammal were recovered. One tooth fragment and 19 unidentifiable element fragments from medium to large mammal were recovered. *Onchorhynchus sp*. remains include 5 cranial fragments and 90 post-cranial elements.

Stratum III contained two mammal bones, consisting of one complete second phalanx from an *odocoileus sp.* and an unidentifiable element fragment from a medium to large mammal.

Stratum V contained no faunal material. Stratum I contain three mammal bones consisting of unidentifiable element fragments from medium to large mammals. One fragment exhibited polish.

Area 2

Fauna from BR3 (Stratum I, V, III, II, and IIa) included a total of 103 mammal bones, 5 Aves bones, and 3177 *Onchorhynchus sp*. bones. Mammal index is calculated at .3. The abundant *Onchorhynchus sp*. counts are due to the presence of a cache pit (Feature 2), which contained 3-5 salmon heads and abundant post-cranial elements, including articulated vertebrae, rays, and ribs. Additional taxa represented in Area 2 include Lagomorphs, *Canis*, Rodentia *Muridea*, and Mollusca. Two bone tools were recovered from area 2 including a split *Odocoileus sp*. antler spoon and an unidentifiable polished fragment.

Table 5.6. Housepit 24, Area 2 faunal data.

Stratum	*Large Mammal*	*Med/lg Mammal*	*Med. Mammal*	*Odocoileus Sp.*	*Canis Familiaris*	*rodentia*	*aves*	*Castor canadensis*	*Lagomorph*	*Ursus*	*Tamia-sciura*	*unk*	*Total*
I												1	1
V													
III													
II	18	50	2	5	2	5			1			22	107

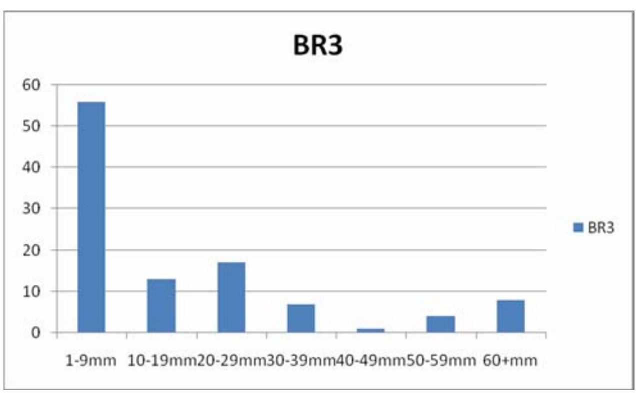

Figure 5.8. Housepit 24, Area 2, size data.

Stratum IIa contained no faunal material. Stratum II contained a total of 102 mammal bones, and 3177 *Onchorhynchus sp*., one Lagomorph NISP, and 5 *Rodentia muridea*, 2 Mollusca NISP. In addition, 2 coprolites also recovered. Mammal index is .3. Of the mammalian specimens, two metapodial fragments an unfused distal ulna, and a pre-maxilla fragment from *Odocoileus sp*. One distal femur fragment, five diaphysis fragments, left scapular fragment and 12 unidentifiable element fragments from large mammals were recovered. One incisor fragment and an epiphyseal fragment and 48 unidentifiable element fragments were recovered from medium to large mammals. A distal phalanx and complete metacarpal from *Canis familiaris* were recovered. One midsection fragment of a Lagomorph femur was found. Two cranial fragments, right mandibular fragment, left mandibular fragment, and a left maxilla fragment from *Rodentia muridea* (deer mouse), representing one, possible intrusional, individual. Split antler spoon (more). *Onchorhynchus sp*. remains include 3115 cranial fragments and 62 post-cranial elements. Stratum III and V contained no faunal material. Stratum I contained only one unidentifiable element fragment.

Area 3

Fauna from Area 3, BR3 (Stratum I, V, III, II, and II(1) included a total of 223 mammal bones and 368 *Onchorhynchus sp*. bones. There was a .38 mammal index (.29 without *Canis*). 3 coprolites (*Canis)* were recovered. Rodentia and *Laporidae* are also represented in the fauna of area 3 as well as 6 specimens of indeterminate taxa. Two polished bone fragments recovered and one dentalium shell bead.

Table 5.7. Area 3 faunal data.

Stratum	*Large Mammal*	*Med/lg Mammal*	*Med. Mammal*	*Odocoileus Sp.*	*Canis familiaris*	*rodentia*	*aves*	*Castor canadensis*	*Lagomorph*	*Ursus*	*Tamia-sciura*	*unk*	*Total*
I													
V													
III	4	2											6
II	32	89		12	73	3		1	1	1		5	217
II(1)													

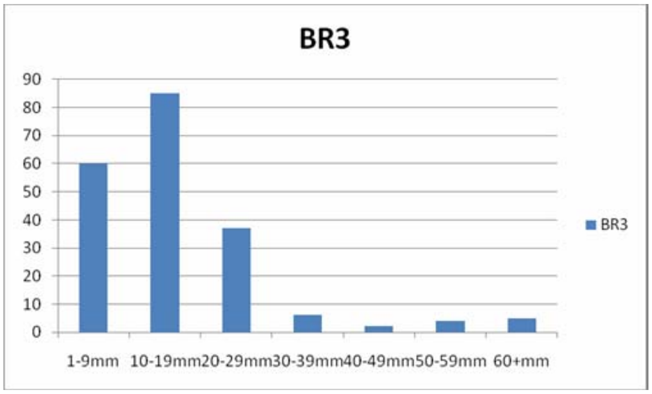

Figure 5.9. Size data Housepit 24, Area 3**.**

Importantly, two cache pits in Area 3 contained portions (one partially articulated) of two *Canis familiaris* skeletons, as if the *Canis* had been partially dismembered at the time of death and various portions distributed in multiple cache pits (this is a pattern seen at the Keatley Creek site (see Crellin 1989; Hayden 1997). In total, 73 *Canis* elements were recovered from features 1,2,3 within Area 3, representing approximately 80% of one individual (remainder of the *Canis* skeletal elements remain in unexcavated adjoining units). In addition to the canid elements, feature 1 contained 1 dentalium shell bead and an upper left canine of an *ursus sp.* Importantly, contents of the cache pits including *Canis familiaris, Ursus sp.* and dentalium do not appear to have been deposited as food items.

Stratum II contained a total of 217 mammal bones and 365 *Onchorhynchus sp*. bones. Mammal index is .37 (not including *Canis* is .28). Taxa represented include *Odocoileus, Laporidae, Canis, Ursus,* Rodentia. One dentalium ornament was recovered. Of the mammalian specimens, two carpals, one distal metatarsal, one innominate frag, one fragment of first sacral vertebra, one lumber vertebral fragment, proximal second phalanx, and a thoracic vertebral fragment from *Odocoileus sp.* were recovered. Two left mandibular fragments and a cranial fragment from *Rodentia sp*. were recovered. Lower incisor from *Laporidae* recovered, as was the upper left canine of *Ursus sp*. (either a large black bear or grizzly (Dyer personal communication). All *Canis familiaris* elements from area 3 were recovered from Features 1,2, and 3 (see table). Evidence of carnivorous gnawing on 4 of distal ribs from *Canis sp*. suggests that carcass may have been immediately interred after death, and those scavengers targeted the visceral area, often the initial focus of canid scavengers (David Dyer personal communication). *Onchorhynchus sp*. remains include 21cranial fragments and 344 post-cranial elements.

Stratum III contained 6 mammalian NISP and 3 *Onchorhynchus sp*.

Summary

Table 5.8 summarizes mammal index data.

Table 5.8. Housepit 24 mammal index summary.

Mammal Index(HP24) Area 3	**BR3**						
	XV	IV	IIa	II	III	V	I
(Mammal/Mammal+Fish)	n/a	n/a	n/a	.28	.67	n/a	n/a
Combined period	.47						

Mammal Index(HP24) Area 2	**BR3**						
	XV	IV	IIa	II	III	V	I
(Mammal/Mammal+Fish)	n/a	n/a	n/a	.3	n/a	n/a	n/a
Combined period	.3						

Mammal Index(HP24) Area 1	**BR3**						
	XV	IV	IIa	II	III	V	I
(Mammal/Mammal+Fish)	n/a	n/a	.71	.25	n/a	1.0	1.0
Combined period:	.74						

Housepit 54

A total of 3980 identified specimens were recovered from HP54, 2311 of which were recovered from Area 1, 605 from Area 2, and 1050 from Area 3. Of the total NISP for housepit 54, 1114 specimens were identified as mammalian, 2623 as *Onchorhynchus sp*., 3 *mollusca*, and 209 indeterminate. Ten Aves specimens were recovered, two *Amphidae* specimens, and three coprolites recovered. In addition, 31 worked bone specimens were recovered from Housepit 54. Of these, 7 were classified as awls, 17 polished bone tool fragments, 1 needle, 3 worked beaver incisors, and 1 worked squirrel incisor. One *Canis familiaris* coprolite was recovered from Feature 6C of Area 3 (unknown stratum). A total of 21 stratigraphic layers were identified in Housepit 54, spanning about 200 yrs of occupation between BR2-BR3. A later Proto-historic occupation (BR4) is represented by 4 additional stratigraphic layers. Stratigraphy includes both floor and roof-collapse deposits, 6 floors identified with BR2, 7 floors with BR3, and 2 with BR4. In addition to floor surfaces, stratigraphy associated with roof collapses (those with “V” prefixes) are present throughout the stratigraphic sequence.

Table 5.9. Stratigraphy assigned to BR periods for Housepit 54.

Area	Stratum	Period
1	Vc, IIh, II I, IIj, IIk	BR2
2	Vc, IIc	BR2
3	Vc, IIg, Vd, IIh, II I, IIj, IIk, IIL	BR2
1	Va, IIa, IIb, IIc, Vb, IId, IIe, IIf, IIg	BR3
2	Va, IIa, Vb, IIb	BR3
3	Va, IIa, IIa(1), IIb, Vb, IIb(1), IIc, IId, IIe, IIf	BR3
1	I, V(1), V(2), II, III, II(1)	BR4
2	I, V, II	BR4
3	I, V, II	BR4

Area 1, BR 2

Fauna from BR2 (Stratum Vc, IIh, II I, IIj, and IIk) include a total of 134 mammal bones, 5 Aves bones, 1557 *Onchorhynchus sp*. bones, 2 *Amphidae*, and 11 specimens of indeterminate taxa. Mammal index is calculated at .8. In addition, 5 worked bone artifacts were recovered.

Table 5.10. Housepit 54, Area1 faunal remains.

Stratum	*Lrg Mam-mal*	*Med/lrg Mam-mal*	*Med. Mam-mal*	*Odo coile us Sp.*	*rodentia*	*aves*	*Castor canade nsis*	*Martes pennanti*	*Lago-morph*	*Amphi-idae*	*mink*	*Tamia-sciura*	*unk*	*Total*
I	2			1									1	4
V		18		1									16	35
II		10		1										11
III		71					1	1					7	81
II(1)	6	39		4									6	64
Va	3	25		2									4	34
IIa		6	1										6	13
IIa/IIb	5												2	7
IIb	1	2											3	6
IIb/IIc														
IIc		10											6	16
IId		12				1	1							14
Vb		48											5	52
IIe	5	24					2							31
IIf	6	29		2									5	42
IIg	1	41		1	1								13	59
Vc	1	23		6								1	8	38
IIh	1	10											1	13
IIh/II i		1												1
II i	2	50		12		1	3			2			1	71
II j		15		1										16
IIk						1							1	2

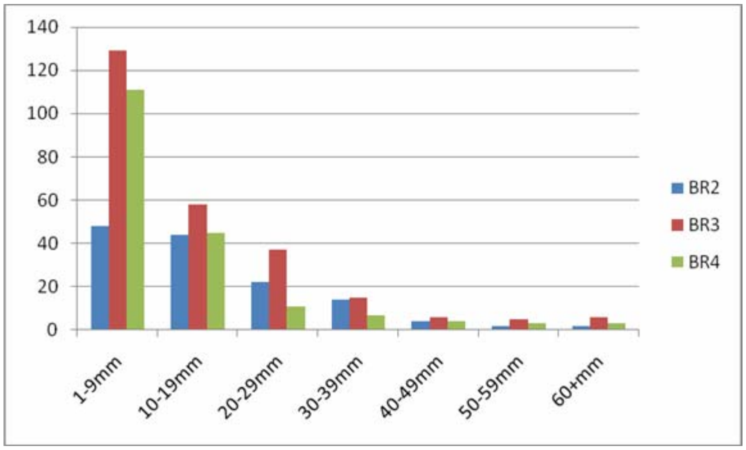

Figure 5.10. Size grades of Area 1 fauna.

Stratum II K contained a total of 1 mammal bone (Rodentia), 136 *Onchorhynchus sp*. Bones (primarily post-cranial fragments), and one specimen of indeterminate taxa. Mammal index is <.1. One worked bone fragment was recovered exhibiting polish and lateral striations. *Onchorhynchus sp*. remains include 37cranial fragments and 99 post-cranial elements.

Stratum II J contained a total of 16 mammal bones and 378 *Onchorhynchus sp*. bones, Mammal index is calculated at 4%. Of the total mammal NISP, one unfused vertebral disc from a sub-adult *Odocoileus sp.* was recovered. One unfused epiphysial fragment and 15 unidentifiable bone fragments from medium to large mammals were recovered. In addition, one roughly sharpened and polished awl was recovered from stratum II J, made of medium to large mammal long bone fragment. *Onchorhynchus sp*. remains include 66 cranial fragments and 312 post-cranial elements.

Stratum II I contained a total of 65 *mammalia*, 5 a*ves*, and 2 *amphibiae* NISP, 891 *Onchorhynchus*, and one fragment of indeterminate taxa. Mammal index is calculated at .8. Of the mammalian specimens, nine vertebral fragments, one occipital condyle, a left innominate fragment, and a proximate rib fragment exhibiting cut and chop marks from *Odocoileus sp.* were recovered. One rib fragment and one vertebral fragment from large mammals were recovered. One rib fragment, two diaphysis fragments, and 47 unidentifiable element fragments from medium to large mammals were recovered. One diaphysis fragment, a sternum fragment and a phalanx from aves were recovered. Proximal humerus of a *Rodentia*. Interestingly, a left humerus and a left femur of a toad or frog (*Amphibae*) were recovered, representing one MNI. *Onchorhynchus sp*. remains include 139 cranial fragments and 652 post-cranial elements.

Stratum IIh contains a total of 14 mammal bones and 105 *Onchorhynchus sp*., and one specimen of indeterminate taxa. Mammal index calculated at 12%. Of the mammalian specimens, five vertebral fragments, including an unfused vertebral disc from a subadult, one diaphysis fragment, and 6 unidentifiable fragments from medium to large mammals were recovered. One innominate fragment from a Lagomorph. One highly polished awl with scoring was recovered made from the mid-section of a large mammal rib. *Onchorhynchus sp*. remains include 52 cranial fragments and 53 post-cranial elements.

Stratum Vc contains a total of 38 mammal bones and 47 *Onchorhynchus* sp. bones, as well as eight specimens from indeterminate taxa. Mammal index is calculated at .45. Of the mammalian specimens, one left pre-maxilla fragment and five vertebral fragments of *Odocoileus sp*. were recovered. An unidentifiable fragment of a large mammal was also recovered. One proximal rib fragment and 22 unidentifiable bone fragments of medium to large mammals were recovered. In addition, two worked bone fragments were recovered which include a worked lower incisor of a red tree squirrel (*Tamiascurus)* and a polished/worked bone fragment from a medium to large mammal. *Onchorhynchus sp*. remains include 7 cranial fragments and 40 post-cranial elements.

Area 1, BR 3 Fauna

Fauna from BR3 (Stratum Va, IIa, IIb, IIc, Vb, IId, IIe, IIf, IIg) included a total of 246 mammal bones, 215 *Onchorhynchus sp*. bones, 3 Aves, and 40 specimens from indeterminate taxa. Mammal index is calculated at .53. Worked bone from BR3, Area 1 includes 4 artifacts.

Stratum II G contains 59 Mammalia specimens and 64 *Onchorhynchus* sp. specimens, and 13 specimens from indeterminate taxa. Of the mammalian specimens, one vertebral fragment from *Odocoileus* was recovered, as was a third left lower incisor from a *Martes pennant*. A proximal metatarsal recovered from a *Canis familiaris*. In addition, one unidentifiable specimen from a large mammal and 41 unidentifiable specimens from medium to large mammals were recovered. *Onchorhynchus sp*. remains include 64 post-cranial elements.

Stratum IIf contains 42 mammal bones, 14 *Onchorhynchus sp*. bones, and one indetermined specimen. Of the mammalian specimens, one carpal (radius) and a fragment of left distal humerus from *Odocoileus sp.* were recovered. One vertebral fragment, two diaphysis fragments, one fragment of a left innominate, and two unidentifiable fragments from large mammals were recovered. Two diaphysis fragments and 27 unidentifiable specimens from medium to large mammals were recovered. In addition, one polished fragment worked bone was recovered. *Onchorhynchus sp*. remains include 14 post-cranial elements.

Stratum IIE contains 29 mammal bones, 33 *Onchorhynchus sp*. bones, and 2 Aves. Of the mammalian specimens, five vertebral fragments from large size mammals were recovered as well as one diaphysis fragment and 24 unidentified specimens from medium to large sized mammals. A humerus fragment and a proximal carpometacarpus from *Galliforme sp*. (grouse or ptarmigan) were recovered. In addition, one bone awl was recovered. *Onchorhynchus sp.* remains include 33 post-cranial elements.

Stratum Vb contains 48 mammal bones, 20 *Onchorhynchus sp*. bones and 5 specimens from indeterminate taxa. Of the mammalian specimens, two diaphysis fragments, one proximal scapula fragment and 45 indeterminate specimen fragments from medium to large size mammals were recovered. In addition, one bone needle fragment and a polished fragment of worked bone were also recovered. *Onchorhynchus sp.* remains include 20 post-cranial elements.

Stratum IID contains 13 mammal bones consisting of one cranial fragment from R*odentia* and 12 unidentifiable specimens from medium to large size mammals, 5 *Onchorhynchus* sp., and 1 second phalanx from *Galliforme sp*. (grouse). *Onchorhynchus sp.* remains include 5 post-cranial elements.

Stratum IIC contains 10 mammal bones, 5 *Onchorhynchus* sp. bones, and 6 indeterminate specimens. Of the mammalian specimens, three diaphysis fragments, 1 vertebral fragment and 6 unidentifiable element fragments are from medium to large sized mammals. *Onchorhynchus sp.* remains include 5 post-cranial elements.

Stratum IIB contains 3 mammal bones consisting of a diaphysis fragment from a large mammal and two unidentifiable fragments from medium to large mammals. Three post-cranial *Onchorhynchus sp*. elements were recovered. In addition, 3 specimens from unknown taxa were recovered.

Stratum IIA/IIB contains 5 mammal bones consisting of 3 diaphysis fragments and 2 unidentifiable fragments from large mammals. Two specimens of indeterminate taxa were also recovered.

Stratum IIA contains 7 mammal bones, 63 *Ochorhynchus sp.*, and 6 specimens of indeterminate taxa. Of the mammalian specimens, one vertebral and one diaphysis fragment and 5 unidentifiable specimens from medium to large mammals were recovered. *Onchorhynchus sp.* remains include 3 cranial fragments and 60 post-cranial elements.

Stratum Va contains 30 mammal bones, 8 *Onchorhynchus sp.* and 4 specimens from unidentifiable taxa. Of the mammalian specimens, two diaphysis fragments were recovered from large sized mammals, and two diaphysis and 23 unidentifiable element fragments were recovered from medium to large sized mammals. A second phalanx of *Odocoileus sp*. was recovered. In addition, one worked bone fragment made from the split diaphysis fragment of a large mammal. *Onchorhynchus sp*. remains include 8 post-cranial elements.

Area 1, BR 4 Fauna

Fauna from BR4 (Stratum I, V(1), V(2), II, III, and II(1)) contains a total of 165 mammal bones and 22 *Onchorhynchus sp*. bones, and 30 specimens from indeterminate taxa. The mammal index was calculated at .88. Worked bone from BR4, Area 1, includes 2 artifacts.

Stratum II(1) contains 58 mammal bones, 4 *Onchorhynchus sp*. bones, and 6 specimens of indeterminate taxa. Of the mammalian specimens, one vertebral fragment and three tibia fragments from an *Odocoileus sp.* (one individual) were recovered. Two diaphysis fragments including a polished bone fragment from large sized mammals were recovered. One diaphysis fragment and 38 unidentifiable fragments from medium to large mammals were recovered. *Onchorhynchus sp.* remains include 4 post-cranial elements.

Stratum III contains 74 mammal bones, 14 *Onchorhynchus sp.* bones, and 7 specimens of indeterminate taxa. Of the mammalian specimens, one diaphysis fragment and 70 unidentifiable element fragments from large mammals were recovered. Two worked bone fragments were recovered, one a split lower incisor from *Castor canadensis* with polish, and one a femur fragment of a medium sized *aves* which has polish/scoring. One *Martes pennant* upper left incisor recovered. *Onchorhynchus sp.* remains include 14 post-cranial elements.

Stratum II contains a total of 11 mammal bones and 1 *Onchorhynchus sp.* bone. Of the mammalian specimens, one femur fragment from *Odocoileus sp*., and 10 unidentifiable element fragments from medium to large sized mammals were recovered. *Onchorhynchus sp.* remains include 1 post-cranial element.

Stratum V contains a total of 19 mammal bones, three *Onchorhynchus sp.*, and 16 specimens of indeterminate taxa. Left proximal radius of *Odocoileus sp*. and 18 unidentifiable element fragments from medium to large mammals were recovered. *Onchorhynchus sp.* remains include 3 post-cranial elements.

Stratum I contains a total of 3 mammal bones and one specimen of indeterminate taxa. Proximal distal phalanx of *Odocoileus sp.* and a worked bone fragment exhibiting polish from a large sized mammal were recovered.

Area 2, BR 3 Fauna

Fauna from BR3 (Stratum Va, IIa, Vb, and IIb) contains a total of 168 mammal bones, 347 *Onchorhynchus sp.* bones and 44 specimens of indeterminate taxa. The mammal index was calculated at .33.

Table 5.11. Housepit 54, Area 2 faunal remains.

Stratum	*Lrg Mam -mal*	*Med/lrg Mam-mal*	*Med. Mam-mal*	*Odocoileus Sp.*	*rodentia*	*aves*	*Castor canadensis*	*Tamia-sciura*	*unk*	*Total*
I		3							4	7
V	2	13							18	33
II		5		1					8	14
Va		66	30						4	100
IIa		5		2					9	16
Vb										
IIb	2	8		1		1			6	18
Vc	1	5		1					7	14
IIc	5	12		3		1			18	39

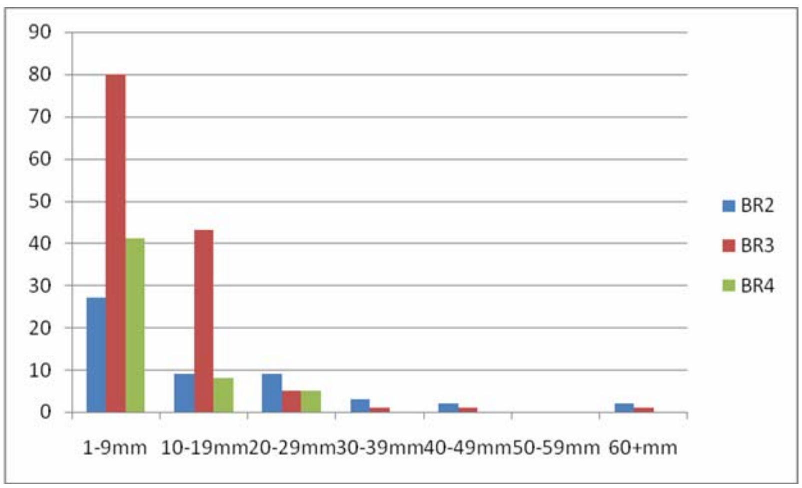

Figure 5.11. Housepit 54, Area 2 faunal size grades.

Stratum IIc contains a total of 39 mammalia specimens, 272 *Onchorhynchus sp.* specimens, and 18 unidentifiable fragments. Three vertebral fragments of *Odocoileus sp.* were recovered. One diaphysis fragment from *Rodentia*. Three diaphysis and 2 unidentifiable fragments were from large mammals. Two diaphysis fragments and 10 unidentifiable fragments were from medium to large mammals. *Onchorhynchus sp*. remains include 47 cranial fragments and 225 post-cranial elements.

Stratum Vc contains a total of 14 mammal specimens, 17 *Onchorhynchus sp*. specimens and 7 unidentifiable specimens. One vertebral fragment of *Odocoileus sp.* was recovered. One unidentifiable fragment of a large mammal and five unidentifiable fragments of medium to large mammals were also recovered. *Onchorhynchus sp*. remains include 17 post-cranial elements.

Stratum IIb contains 12 mammal bones, 57 *Onchorhynchus sp*. bones, and 6 specimens of indeterminate taxa. One metapodial fragment from *Odocoileus sp.* was recovered. One diaphysis fragment and an unidentifiable fragment from large mammals was recovered. Eighteen unidentifiable element fragments from medium to large size mammals and one left tibia of *Rodentia* were recovered. *Onchorhynchus sp.* remains include 1 cranial fragment and 56 post-cranial elements.

Stratum Vb contains no faunal material. Stratum IIa contains 7 mammal bones and 9 specimens of indeterminate taxa. Mammal remains include proximal end of third phalanx and proximal rib fragment of *Odocoileus sp;* 5 unidentifiable fragments from medium to large mammals were also recovered.

Stratum Va contains 96 mammal bones, one *Onchorhynchus sp*. bone, and 4 specimens of indeterminate taxa. Mammalia include 9 diaphysis fragments and 57 unidentifiable element fragments from medium to large size mammals. Thirty unidentifiable elements from medium sized mammals also recovered. *Onchorhynchus sp.* remains include 1 post-cranial element.

Area 2, BR 4 Fauna

Fauna from BR4 (Stratum I, V, II) includes a total of 24 mammal bones, 5 *Onchorhynchus sp*. specimens, and 30 specimens of indeterminate taxa. The mammal index calculated at .83.

Stratum II contains a total of 6 mammal bones and 8 specimens of indeterminate taxa. One tooth fragment from *Odocoileus sp.* and 5 unidentifiable element fragments from medium to large mammals were recovered.

Stratum V contains 15 mammal bones, 5 *Onchorhynchus sp*. bones, and 18 specimens of indeterminate taxa. Two unidentifiable fragments from large mammals as well as one diaphysis fragment and 12 unidentifiable fragments from medium to large mammals were recovered. In addition one worked bone fragment exhibiting polish from a medium to large mammal was found. *Onchorhynchus sp.* remains include 5 post-cranial elements.

Stratum I contains 3 unidentifiable fragments from medium to large size mammals and 4 specimens of indeterminate taxa.

Area 3, BR 2 Fauna

Fauna from BR2 (Stratum Vc, IIg, Vd, IIh, II I, IIj, IIk, and II L) include a total of 103 mammal bones, 457 *Onchorhynchus sp.* specimens, 1 Aves, one Mollusca and 14 specimens of indeterminate taxa. The mammal index is calculated at .18. Identified taxa include *Odocoileus sp*., *Martes pennant, Tamiasciura*, *Rodentia*, as well as large and medium to large bodied mammals. Worked bone from BR2, Area 3 includes 1 small Mollusca bead, two worked bone fragments exhibiting polish, and two awls, one made from a bird ulna and the other made from the proximal metatarsal of *Odocoileus sp.*

Table 5.12. Housepit 54, Area 3 faunal remains.

Stratum	*Lrg Mam -mal*	*Med/lrg Mam-Mal*	*Med. Mam-mal*	*Odocoileus Sp.*	*rodentia*	*aves*	*Castor canadensis*	*Martes pennanti*	*mink*	*Tamia-sciura*	*unk*	*Total*
I		4										4
V	7	17		3							6	33
II	13	6				1	1				8	17
III												
II(1)												
Va	2	30	1	1		1					2	37
IIa	3	8		1							7	19
IIa(1)	49	7									7	63
IIa(2)	16			1								17
IIb	1	3									50	54
IIb(1)	1	25		3	11		1		1		7	48
IIc	2	1		2							5	10
Vb												
IId						1					11	12
IIe	9	2				1					3	15
IIf	1	5									8	14
IIf/Vc				1								1
Vc		1										1
IIg	2	4		2							5	13
Vd		6									1	7
Vd/IIh	3			1								4
IIh	3	13		10	2						1	29
II i		2								3		5
IIj	6	10	1	1						1	5	24
IIj/IIk	4	2								1		7
IIk			1									1
II L												

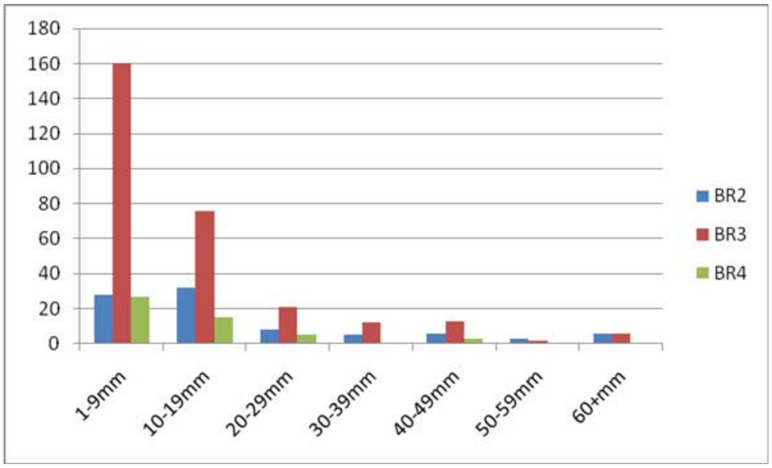

Figure 5.12. Housepit 54, Area 3. faunal size grades.

Stratum II L contains no faunal material. Stratum IIK contains one diaphysis fragment from a medium sized mammal and 21 *onchorhynchus sp.* specimens. Two *mollusca* specimens were also recovered, one an indeterminate fragment and the other worked into a small bead (see photo). *Onchorhynchus sp.* remains include 7 cranial fragments and 14 post-cranial elements.

Stratum IIJ/IIK represents a stratigraphic mixing of both stratum IIj and stratum IIk. Stratum IIJ/IIK contains a total of 7 mammal bones, 56 *Onchorhynchus sp.* elements, 4 unidentifiable fragments from large sized mammals, and one diaphysis and an unidentifiable fragment from medium to large mammals. One left mandibular fragment was also recovered. *Onchorhynchus sp.* remains include 17 cranial fragments and 39 post-cranial elements.

Stratum IIJ contains a total of 24 mammal specimens, 111 *onchorhynchus sp.* specimens, and five specimens from indeterminate taxa. One unfused distal portion of an *Odocoileus sp.* metacarpal was recovered. As well as the left humerus of a *Tamiscurus* (chipmunk). One diaphysis fragment and 5 unidentified specimens from large mammals and 10 unidentifiable specimens from medium to large mammals are present. One fragment of worked bone exhibiting polish was recovered as well. *Onchorhynchus sp.* remains include 28 cranial fragments and 83 post-cranial elements.

Stratum II I contains a total of 31 mammal specimens, 191 *onchorhynchus sp.* specimens, 1 Aves, 1 Mollusca, and two specimens from indeterminate taxa. Specific taxa represented include *Odocoileus sp*., *Martes pennanti,* and *Rodentia*. The mammal index is .14. One vertebral fragment and one proximal rib fragment from *Odocoileus sp.* were recovered. Two unidentifiable specimens were from large mammals. One vertebral fragment, two diaphysis fragments, one rib fragment, one mandibular fragment and 20 unidentifiable specimens from medium to large sized mammals. One left canine came from *Martes pennant*. One fragment of a Mollusca and 2 *Rodentia* elements, a left tibia and a right mandible fragment, were recovered. In addition, one awl was recovered made from the ulna of a large Aves (possibly a loon or pelagic bird). *Onchorhynchus sp.* remains include 55 cranial fragments and 136 post-cranial elements.

Stratum IIh contains a total of 29 mammal specimens and 49 *Onchorhynchus sp.* specimens. One specimen of indeterminate taxa was also recovered. The mammal index is calculated at .37. Three innominate fragments, 1 right mandible fragment, one metatarsal fragments, 4 vertebral fragments and a right mandibular articulation from *Odocoileus sp.* were recovered. One diaphysis fragment, a vertebral fragment, and one unidentifiable fragment from large sized mammal were recovered. One metapodial fragment and 12 unidentifiable fragments from medium to large mammals were recovered. In addition, fragments of a tibia and crania were recovered. *Onchorhynchus sp.* remains include 19 cranial fragments and 30 post-cranial elements.

Stratum Vd/IIh is a mixing of stratum Vd and stratum IIh, unavoidable during excavation. Vd/IIh contains 4 mammal specimens consisting of one vertebral fragment from *Odocoileus sp*. as well as a sternum fragment and 2 unidentifiable fragments from a large sized mammal.

Stratum Vd is a collapsed roof containing 7 unidentifiable mammal specimens, *19 Onchorhynchus sp*., and one specimen of unidentifiable class. *Onchorhynchus sp*. remains include 19 post-cranial elements.

Stratum IIg contains 11 mammal bones, 9 *Onchorhynchus sp*., and 5 unidentifiable fragments. In addition, two tools were recovered which include a complete awl made from the proximal end of a *Odocoileus sp*. metatartarsal fragment and a fragment of a worked bone exhibiting polish. One incisor from *Odocoileus sp.* was recovered, as well as two vertebral fragments from a large size mammal. Three unidentifiable specimens from medium to large sized mammals were also recovered. *Onchorhynchus sp.* remains include 2 cranial fragments and 7 post-cranial elements.

Stratum Vc contains only one specimen from a medium to large mammal and one post-cranial *Onchorhynchus sp.* element.

Area 3, BR 3 Fauna

Fauna from BR3 (Stratum Va, IIa, IIa(1), IIb, Vb, IIb(1), IIc, IId, IIe, and IIf) include a total of 171 mammal bones, 85 *Onchorhynchus sp.* specimens, 2 Aves bones, and 116 specimens of indeterminate taxa. The mammal index is calculated at .67. Worked bone from BR3, Area 3 includes 8 artifacts.

Stratum IIf contains 6 mammal bones, 4 *Onchorhynchus sp.*, and 8 specimens of indeterminate taxa . One unidentifiable fragment from a large mammal was recovered. One diaphysis fragment and 4 unidentifiable fragments from medium to large mammals were recovered. *Onchorhynchus sp.* remains include 4 post-cranial elements.

Stratum IIe contains 11 mammal bones, 10 *Onchorhynchus sp*. bones, one Aves bone, and 3 of indeterminate taxa. Of the mammalian specimens, 8 were diaphysis fragments and one was unknown from large mammals. Two indeterminate fragments from medium to large mammals were recovered. The Aves specimen was an occipital from a large size bird. *Onchorhynchus sp*. remains include 10 post-cranial elements.

Stratum IId contains 11 fragments of indeterminate taxa and one worked bone specimen made from an Aves mid-shaft fragment exhibiting lateral notching, and a grooved and snapped lateral edge. *Onchorhynchus sp.* remains include 2 post-cranial elements.

Stratum Vb contained no faunal material. Stratum IIc contains 5 mammal bones, 5 specimens of indeterminate taxa and 1 *Onchorhynchus sp.* element. Of the mammalian specimens, one indeterminate fragment of a large mammal was recovered. In addition, a worked-bone tool with a ground tip and grooved and snapped lateral edge made from the rib of a large mammal was also recovered. A complete second phalanx of an adult *Odocoileus sp.* and an unfused epiphysis of a second phalanx from a sub-adult Odocoileus sp. were recovered (two MNI). One indeterminate fragment of a medium to large mammal also recovered. *Onchorhynchus sp*. remains include1 post-cranial element.

Stratum IIb(1) contains 41 mammal bones, 44 *Onchorhynchus sp.* bones, and 7 specimens of indeterminate taxa. Of the mammalian specimens, one vertebral fragment and one tibia fragment from *Odocoileus sp.* were recovered. In addition, a worked bone fragment made from the distal end of an *Odocoileus sp*. rib was recovered exhibiting a scored and snapped lateral edge. One diaphysis fragment of a large mammal and 24 unidentifiable fragments from medium to large mammals were recovered. One left radius of *Castor canadensis* was recovered exhibiting lateral scoring, polish, and a grooved and snapped transverse break. The left lower canine of a mink and one coprolite (canid?) was also recovered. Eleven *Rodentia* elements were recovered representing one intrusive individual.

It is important to note that most of the faunal material collected from IIB(1) is from a cache pit context (Feature 6b). This large bell-shaped pit (100cm diameter, 170cm deep) appears to have been cleaned of original stored resources and filled in with detritus (floor sweepings) of stratum IIB(1) floor material including FCR, debitage, fauna, etc. Articulated Salmonidae remains at the bottom-most levels of the feature may represent original use of feature 6b as a salmon-storage cache. *Onchorhynchus sp.* remains include 1 cranial fragment and 56 post-cranial elements.

Stratum IIb contains 4 mammal bones, 1 *Onchorhynchus sp*. bone, and 50 specimens from unidentifiable taxa. Of the mammalian specimens, 1 unidentifiable fragment from a large mammal, and 3 unidentifiable fragments from medium to large mammals were recovered. *Onchorhynchus sp.* remains include 1 post-cranial element.

Stratum IIa(2) contains 16 unidentifiable fragments from large mammals and one *Odocoileus sp.* fragment. No *onchorhynchus sp.* remains were recovered.

Stratum IIa(1) contains 56 mammal bones, 17 *onchorhynchus sp.* specimens, and 7 fragments from unidentifiable taxa. Of the mammalian specimens, 3 diaphysis fragments and 46 unidentifiable fragments from large mammals were recovered. One diaphysis and 6 unidentifiable specimens from medium to large sized mammals were recovered. *Onchorhynchus sp.* remains include 17 post-cranial elements.

Stratum IIa contains 12 mammal bones, 2 *Onchorhynchus sp*. bones, and 7 specimens from unidentifiable taxa. Of the mammalian specimens, one innominate fragment (acetabular fragment) from *Odocoileus sp.* was recovered. One indeterminate fragment from a large sized mammal as well as two worked bone fragments from unidentifiable fragments of large sized mammals was also recovered. *Onchorhynchus sp.* remains include 2 post-cranial elements.

Stratum Va contains 35 mammal bones, 6 *Onchorhynchus sp*. bones, and 2 fragments from unidentifiable taxa. Of the mammalian specimens, one metapodial fragment from *Odocoileus sp*. was recovered. One vertebral and one diaphysis fragment from large mammals, as well as one diaphysis fragment and 29 unidentifiable fragments from medium to large mammals were recovered. Two worked bone fragments exhibiting polish from medium to large mammal elements were also recovered. One right tibiometatarsus fragment from Aves was recovered. *Onchorhynchus sp.* remains include 6 post-cranial elements.

Area 3, BR 4 Fauna

Fauna from BR4 (Stratum I, V, II) includes a total of 51 mammal bones, 10 *Onchorhynchus sp.* bones, one Aves bone, and 14 specimens of indeterminate taxa. The mammal index is calculated at .84.

Stratum II contains 21 mammal bones, one Aves bone, 6 *Onchorhynchus sp.* bones, and 8 specimens of indeterminate taxa. Of the mammalian specimens, 13 diaphysis fragments and one unidentifiable fragment from large mammals were recovered. One diaphysis fragment and 5 unidentifiable fragments from medium to large mammals were recovered. One fragment of upper incisor enamel from *Castor canadensis*, and an epiphysial fragment of Aves were also recovered. *Onchorhynchus sp.* remains include 6 post-cranial elements.

Stratum V contains 27 mammal bones, 4 *Onchorhynchus sp.* bones, and 6 specimens of indeterminate taxa. One right innominate fragment (acetabular fragment), a tooth fragment, and a metapodial fragment from *Odocoileus sp*. were recovered. Seven unidentifiable fragments from large mammals and 17 unidentifiable fragments from medium to large mammals were also recovered. *Onchorhynchus sp*. remains include 4 post-cranial elements. Stratum I contains 3 unidentifiable fragments from medium to large mammals.

Summary

Housepit 54 shows a gradual increase in the relative frequency of mammal to fish (mammal index) throughout time signifying the increasing importance of deer in the diet of the inhabitants. At the same time, there is marked decline in the richness measure from BR2- BR4, all things equal, showing a possible narrowing of prey choice through time. Housepit 54 contains unique taxa in BR2 which include elements of *Amphidae*, *Galliforme*, *Tamiscurus sp.*, and *Castor canadensis.* Area 1, in particular, seems to produce a high diversity of taxa, as well as high faunal abundance, and more prestige artifacts from all phases than the other activity areas of the house.

Table 5.13. Mammal index summary, Housepit 54, Area2.

Mammal Index(HP54) Area 1	**BR2**					**BR3**								
	IIk	IIj	II i	IIh	Vc	IIg	IIf	IIe	Vb	IId	IIc	IIb	IIa	Va
(Mammal/Mammal+Fish)	.1	.4	.8	.12	.45	.48	.75	.47	.71	.72	.67	1.00	.16	.79
Combined period	14%					66%								

Mammal Index(HP54) Area 1	**BR4**				
	II(1)	III	II	V	I
(Mammal/Mammal+Fish)	.93	.84	.92	.86	1.00
Combined period:	.91				

Mammal Index(HP54) Area 3	**BR2**							
	IIL	IIk	II j	II i	IIh	Vd	IIg	Vc
(Mammal/Mammal+Fish)	n/a	.4%	.16	.14	.43	.37	.55	1.00
Combined period:	.38							

Mammal Index(HP54) Area 3	**BR3**										
	IIf	IIe	IId	Vb	IIc	IIb (1)	IIb	IIa(2)	IIa(1)	IIa	Va
(Mammal/Mammal+Fish)	.60	.52	n/a	n/a	.83	.48	.80	1.00	.77	.86	.85
Combined period:	.74.										

Mammal Index(HP54) Area 3	**BR4**		
	II	V	I
(Mammal/Mammal+Fish)	.78	.87	1.00
Combined period:	.88		

Mammal Index(HP54) Area 2	**BR3**	
	IIc	Vc
(Mammal/Mammal+Fish)	.12	.45
Combined period:	.29	

Mammal Index(HP54) Area 2	**BR3**			
	IIb	Vb	IIa	Va
(Mammal/Mammal+Fish)	.17	n/a	.44	.99
Combined period:	.53			

Mammal Index(HP54) Area 2	**BR4**		
	II	V	I
(Mammal/Mammal+Fish)	1.00	.75	1.00
Combined period	.92		

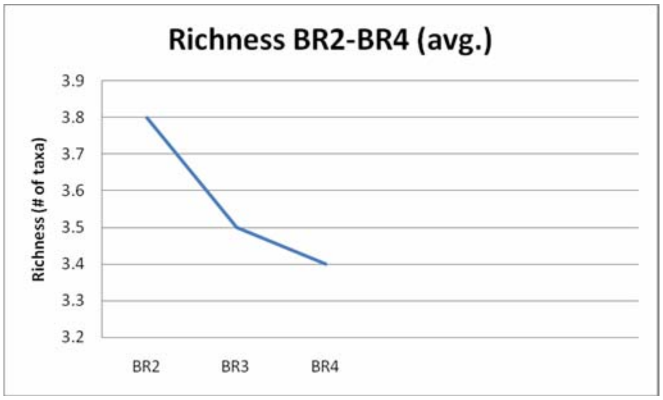

Figure 5.13. Richness measurements for Housepit 54.

Discussion and Conclusion

The 3 housepits excavated in 2008 together contain stratified occupation surfaces spanning nearly the complete history of the village, from close to its onset to its abandonment (BR2-BR3). A proto-historic reoccupation of the village (BR4) occurs after a several hundred year hiatus from the site. Two to three activity areas were targeted for excavation in each of the three pithouses which are thought to represent living areas of domestic sub-groups residing within multifamily structures. Carefully planned and executed excavation methods allowed faunal material to be collected from each of the occupation surfaces and from cache pits originating from their associated surfaces, for each of the discreet activity areas. Such a remarkable archaeological context allows the opportunity for the analysis of particular aspects of the village to be tracked both diachronically and spatially. This is especially important within the wider regional context of culture change which saw the transition from highly mobile, egalitarian foragers to large sedentary villages exhibiting institutionalized inequality just prior to the earliest Bridge River occupations. The faunal analysis of the site has been focused on two interrelated aspects of the Bridge River village, subsistence change through time and emergent social inequality.

The results of the analysis tend to support the idea that indeed, subsistence behaviors did change through time at the Bridge River site. Mammal indices indicate that in some houses (Housepit 20) mammals decreased in importance as a prey choice item in relation to fish. In Housepit 54, however, fauna indicate a gradual increase in the importance of mammals in the diet. Housepit 24 which contains only one occupation from BR3 has a mammal index measurement of .41, falling within a similar range of the other houses for this phase.

The proto-historic reoccupation of Bridge River Site, represented in BR4, shows a marked increase in the mammal index from the earlier phases. This may indicate two possibilities: It may signify a rebound in the terrestrial mammal populations as a response to human depopulation of the region (Alexander 1992; Butler 2000; Jones et.al. 1999; Kew 1992). Or it may signify taphonomic processes biasing the preservation of certain fragile taxa (e.g. fish) in the archaeological record. As noted above, later occupations may be susceptible to ground water leaching and surface disturbances such as krotovina activity, roots, and looting. Earlier occupations are better protected by over-laying clay floor surfaces.

Richness (as time has not permitted formal testing for sample size issues all conclusions are highly preliminary and subject to revision) measurements across the village show a gradual decrease in taxonomic diversity through time, indicating the possibility that specialization (Butler and Campbell 2004) was occurring, i.e that subsistence activities became more narrowly and intensely focused on the harvesting of salmon and roots (see Peacock and Lepofsky 2004;Kuijt and Prentiss 2004b). This trend may be a result of increased efficiency in the mass harvesting, processing and storage of these resources, signifying an increase in foraging efficiency (Broughton 2004; Butler and Campbell 2004). In such a scenario, salmon would be elevated to the most highly preferred local food resource, supplanting terrestrial taxa such as deer in importance. Another possibility is here suggested by the authors and holds that a primary diet focused on salmon and roots and supplemented with a diversity of secondary terrestrial mammal resources during the earliest phases of the village became gradually narrowed to salmon and roots through resource depression of secondary resources such as deer. The first regional experiments with large sedentary villages such as Bridge River were initially very successful as evidenced in their exponential growth through time. However, localized resource depression of terrestrial mammals may have gradually occurred over the long history of the village, especially in the Bridge River locality with relatively few non-salmon/root food resources (Alexander 1992). Such a scenario of secondary resource depression would leave the Bridge River inhabitants susceptible to yearly fluctuations in salmon or root productivity, as they would have no ulterior food choices to fall back on.

This scenario is further supported by trends in the abundance of deer elements through time and the distribution of particular deer elements. The analysis shows that deer element abundance declines markedly through time across the village, especially between BR2 and BR3 periods, just prior to abandonment. In addition, a preponderance of cranial elements are found in the earliest occupations of the village but not in the later BR3 phase. In BR3, a greater proportion of lower limb bones are present. Prentiss et.al. (2007) note a similar trend at Keatley Creek and explain it through a process of resource depression and transport costs (schlepp effect) (Daly 1969). As localized resources such as deer become over-exploited, hunters are required to travel farther distances to make a kill making travel time and weight of the remains which need to be transported back to the village, a concern. Optimization models predict that increasingly lighter elements/carcass portions will be transported back to the site the farther away a kill is made (Daly 1969). In the earlier Bridge River fauna, cranial elements may indicate that deer were abundant and could be killed close to the village. Lack of cranial elements in later periods suggest that hunters were making kills farther from the village and making decisions **not** to transport back heavier elements (crania, axial parts, and upper limb bones).

It is important to note that the idea of secondary resource depression is counter to some of the findings at the Keatley Creek site. Prentiss et.al. (2007) found that the large mammal index increased through time, signifying a relative decline in salmon consumption. Much like Broughton (2004), Prentiss et.al. found an increase in the diversity of lower-ranked taxa in the diet. Such findings are evidence of a decrease in foraging efficiency suggesting a decline in salmon abundance, and an overall stressed condition correlated with regional warming trends. Their research was supported by linkages to an increase in tool types indicative of terrestrial hunting activities. Inhabitants of Keatley Creek were apparently able to shift their subsistence strategies away from salmon to cope with resource depression, at least for a few hundred years. However, there is also evidence for resource depression in the form of changing deer element frequencies much like that described for the Bridge River site in this report.

The Bridge River Site, however, in one of the region's first experimentations with sedentism (Prentiss et.al. 2008), may have gradually depleted most local secondary food resources throughout its early history. With a late period decline in salmon populations, there may have been insufficient secondary food resources to fall back on. Localized events of resource depression may have had catastrophic results for communities, like Bridge River, who grew too narrowed in their subsistence strategies.

Faunal evidence for emergent social inequality at the Bridge River site remains inconclusive at this stage in the research. Ongoing analysis on the subject, however, may reveal variation in faunal abundance, diversity and associations between certain taxa and prestige objects. One related pattern that has been identified in the fauna concerns the distribution of bone tools and ornaments. BR3 across the site sees a marked increase in the abundance of formal bone tools (primarily awls and ornaments), which may be an indicator of increasing complexity across the site. Housepit 20 contains the majority of bone ornaments from this period (and all manufactured from sections of *Aves* long bones). Cultural significance of the taxa chosen for certain tool types is another question currently under investigation.

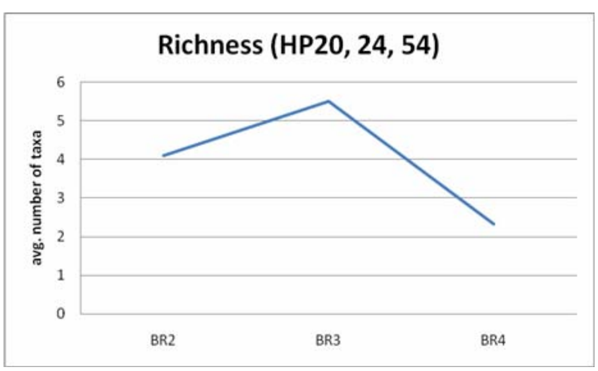

Figure 5.14. Richness measurements for housepits 20, 24, and 54**.**

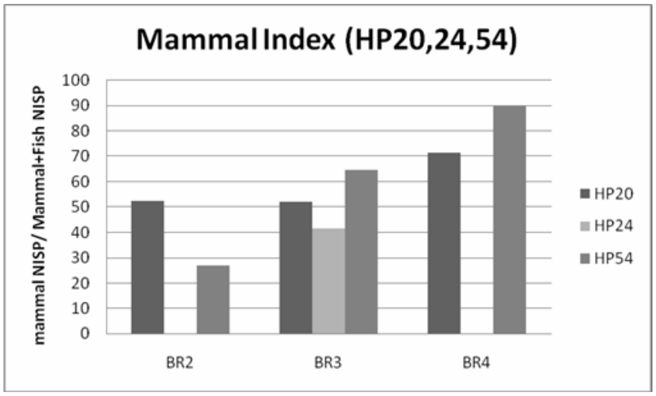

Figure 5.15. Mammal index for Housepits 20, 24, and 54.

Table 5.14. Housepit 20. Deer elements.

Element		BR2?							BR3	BR4
		IIb	IIC(1)	IID	IIC	Vd	Vc	Vb	IIa	II
Cranial	Maxilla frag				2					
	Pre-maxilla frag				1					
	Tooth		1		1				7	
	Int.auditory meatus				1					
axial	Vertebra frag			1	6	1			6	4
	Rib frag		1							
	Scapula									
	Innominate frag.		1		2				2	
Upper limb	Femur frag			1	1					
	Humerus frag									
	Radius frag								1	
	Ulna frag									
	Tibia frag									
	Fibula frag								1	
Lower limb	Metapodial (undifferentiated)	1		1	3				1	2
	Metatarsal frag				5					
	Metacarpal frag		1							
	carpal							1	1	
	tarsal									
	1st phalanx								1	1
	2nd phalanx				1					
	3rd phalanx		2		1		1		1	
	sesamoid				4					
	Vestigal phalanx		1							

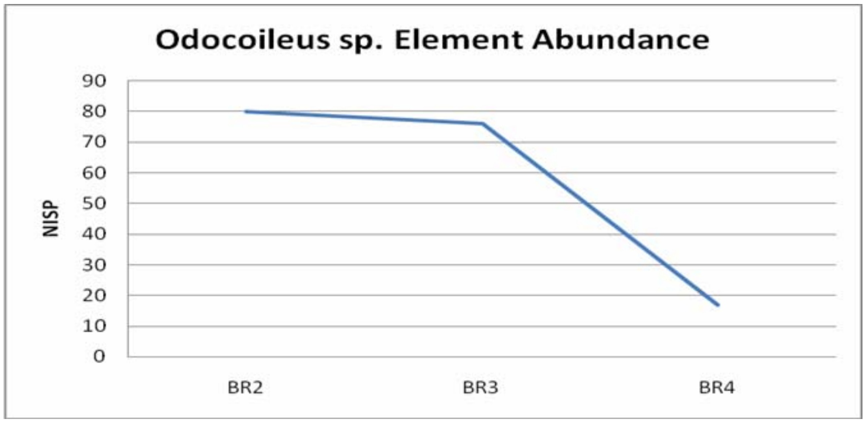

Figure 5.16. Deer element abundance (Housepits 20, 24, 54).

Table 5.15. Housepit 24, deer elements.

Element		BR3			
		II	IIA	III	V
Cranial	Maxilla frag				
	Pre-maxilla frag	1			
	Tooth	1			
	Antler frag	1			
Axial	Vertebra frag	13	2		
	Rib frag				
	Scapula				
	Innominate frag.	1			
Upper limb	Femur frag				1
	Humerus frag				
	Radius frag				
	Ulna frag	1			
	Tibia frag				
	Fibula frag				
Lower limb	Metapodial (undifferentiated)	2			
	Metatarsal frag	1			
	Metacarpal frag				1
	carpal	2			
	tarsal				
	1st phalanx				
	2nd phalanx	1	1	1	
	3rd phalanx				
	sesamoid				
	Vestigal phalanx				

Table 5.16. Housepit 54, Deer elements.

Element			BR2						BR3							BR4			
		IIg	IIh	II i	II j	Va	Vc	Vd	IIb	IIb(1)	IIc	IIf	IIg	IIa	Va	I	II	II(1)	V
Cranial	Maxilla frag																		
	Pre-maxilla frag						1												
	Tooth	1														2			1
	Occipital condyle			1															
	Mandible frag		2																
axial	Vertebra frag		4	10	1		6	1		1	3		1					1	
	Rib frag			2						1				1					
	Scapula																		
	Innominate frag.		3	1										1					1
Upper limb	Femur frag																1		
	Humerus frag											1							
	Radius frag																		1
	Ulna Frag																		
	Tibia frag									1								3	
	Fibula frag																		
Lowe r Limb	Metapodial (undifferentiated)				1	1			1										1
	Metatarsal frag	1	1																
	Metacarpal frag																		
	carpal											1							
	tarsal																		
	1st phalanx											1							
	2nd phalanx										2				2				
	3rd phalanx													1		1			
	sesamoid																		
	Vestigal phalanx																		

Table 5.17. Housepit 20, distribution of deer elements.

	BR2?							BR3			BR4
	Vb	**II d**	**Vd**	**II c**	**Vc**	**II c(1)**	**II b**	**II a**	**Va**	**Va(1)**	**II**
Area 1		6	1	19		2	1	2			6
Area 2	1	2		9	1			18	1		1
Totals:	42							21			7

Table 5.18. Housepit 24, distribution of deer elements.

	BR3				
	II a	**II**	**III**	**V**	**I**
Area 1	3	12	1	1	
Area 2		5			
Area 3		13		1	
Totals:	36				

Table 5.19. Housepit 54, distribution of deer elements.

	BR2							
	II L	**II K**	**II j**	**II i**	**II h**	**Vd**	**II g**	**Vc**
Area 1			1	12	1		1	5
Area 2								1
Area 3			1	2	11		2	1
Totals:	38							

Table 5.20. Housepit 54, distribution of deer elements.

	BR 3									
	II f	**II e**	**II d**	**II c**	**IIb(1)**	**Vb**	**II b**	**II a(1)**	**IIa**	**Va**
Area 1	2									3
Area 2				3			1		3	
Area 3				2	3				1	1
Totals:	19									

Table 5.21. Housepit 54, distribution of deer elements.

	BR4					
	II (1)	**III**	**II**	**V(1)**	**V**	**I**
Area 1	4		1		1	1
Area 2			1			
Area 3			1		1	
Totals:	10					

CHAPTER SIX

CONCLUSIONS

(Anna Marie Prentiss)

The 2008 excavations at the Bridge River site focused on specific "activity areas" within selected housepits as defined by strong negative magnetic anomolies defined in geophysical research. Excavation units were placed in three areas of Housepits 24 and 54 and two areas on Housepit 20. These excavations resulted in the definition of complex occupational sequences in Housepits 20 and 54 and a single occupation floor and associated roof in Housepit 24. A wide range of artifacts and faunal/floral remains were recovered including 17,289 lithic artifacts and 9218 faunal remains (inclusive of bone tools and ornaments). Paleoethnobotanical studies resulted in the identification of 308 charred seeds and 550 pine/fir needles from cache pit and hearth feature contexts. Five new radiocarbon dates were run and a series of micromorphology samples were collected from each house and are currently undergoing analysis. The following discussion outlines conclusions in stratigraphy and dating, subsistence studies, and lithic technology.

Geophysical investigations continued to refine interpretations of feature distributions within housepit floors. Final results of geophysical studies in 2008 and 2009 are still pending however a high degree of success was had in defining cache pit features using magnetic susceptibility. Indeed, 2008 excavations were placed consistently over strong negative anomalies in hopes of finding features associated with domestic activity areas. In seven of eight excavations, one or more large cache pits and associated domestic artifacts, faunal remains, and sometimes, hearth features were uncovered. We expect similar success in the 2009 field season.

The 2008 excavations revealed startling stratigraphy. Housepit 24 had the simplest stratigraphy including a single occupation floor and associated roof sediments. Housepit 24 featured a more complex sequence with five floors spanning Bridge River 2, 3 and 4 occupations. Bridge River (BR) 2 and 3 floors and to some degree, roof sediments including a fairly high degree of clay content. BR 4 floor and roof material was more dominated by silt with far less clay. This favored better preservation of faunal and floral materials in the deeper BR 2 and 3 contexts. Housepit 54 had the most complex stratigraphy with at least 14 superimposed floors and seven roofs. Like Housepit 20, but perhaps to an even greater degree, Housepit 54 featured roofs and floors from BR 2 and 3 times heavily dominated by clay sediments. BR 4 sediments had far less clay and consequently, poorer faunal preservation.

The 2008 excavations resulted in identification and excavation of 41 features that included post holes (one with an intact house post), shallow hearths, and a variety of cache pits. Cache pits were generally bell-shaped and varied from relatively shallow (about 50 cm in depth) to over one meter deep. The largest cache pits were associated with BR 2 and 3 occupations. In contrast, BR 4 cache pits were relatively rare and when present (e.g. at HP 54, Area 3), comparatively low in volume. Overall, total cache pit volume was greatest for the BR 3 occupation and HP 54 contained the most extensive cache pits when measured as volume per excavated area. Interestingly, Housepit 24 contained by far the highest counts of fire-cracked rock (controlled for volume excavated).

Paleoethnobotanical (PEB) samples were extracted from most excavated features. While the technical identification of botanicals was completed, interpretation of results has only just begun. In general, the most common items recovered were Saskatoon, Kinnikinnick, soapberry, mountain ash, Heath, and Rose. As these berries ripen at different times during the summer it is likely that many were harvested and cooked or dried for later winter consumption. Needles included Douglas fir, Grand fir, Hemlock and Ponderosa Pine and were likely used in starting firs, bedding and possibly for woven mats as might be found in roof contexts.

Faunal analyses revealed a consistent pattern of predation emphasizing salmon but also including a range of additional taxons including deer, elk, beaver, bear, rabbit, birds, toads, and possibly, small mammals. While data analyses are ongoing, current data suggests some potentially interesting patterns. There are some hints in the faunal data that the range of prey species may have become restricted to some degree by BR 3 times. Degree of fragmentation in mammalian remains is high suggesting intensive processing for fat extraction. In addition there appears to be a shift from transport of whole (or nearly so) carcasses during BR 2 times to transport of limb parts during BR 3. This mirrors findings by Prentiss et al. (2007) who also noted such a shift at the Keatley Creek site at similar dates. An implication is that as the human population rose, non-fish game animals were heavily hunted leading to resource depression (e.g. Broughton 1994). There some hints of ritual processes in the presence of butchered dog remains along with a bear tooth in cache pits in Housepit 24. Cut marks imply skinning but there is little direct evidence for cooking. A number of unique bone and shell tools were found including a bone spoon, numerous bone awls, and bone beads.

A large collection of lithic artifacts were recovered with a number of interesting patterns. Highest numbers of flake knives were found in Housepits 20 and 24. Greatest counts of projectile points and slate tools were located in Housepit 54. Highest counts of potential prestige objects (beads, nephrite tools, etc.) were discovered in Housepit 24. An analysis of consistency in lithic assemblages between activity areas supports the ideas these were indeed places of redundant domestic activities. A multivariate analysis of lithic assemblage content, faunal patterns, prestige items and raw materials, fire-cracked rock, and cache pit volume indicated that only one housepit (24) featured strong inter-relationships between all of these items. This offers the potential implication that inter-household differentiation in wealth, group size and storage capacity did not fully develop until BR 3 times. It also implies that housepit size may not have been a perfect predictor of household status. However, this is only a tentative conclusion given incomplete excavations at Housepit 20 to be completed in 2009.

Final conclusions regarding the development of social complexity during a time of rapid village growth will not be possible until 2009 field and lab work are completed. In addition, materials from the 2008 investigations are still under analysis. Current results continue to support earlier models suggesting village emergence around 1800-1900 B.P. and rapid growth to peak size between 1100 and 1200 B.P. Reoccupation appears to have happened after about 500 B.P. and reached peak size at ca. 300 B.P. Social changes during BR 1-3 times may have included the development of two social groups occupying different portions (“neighborhoods”) in the site. The nature of such groups and the reasons behind their development has yet to be explored. Social inequality, as marked by inter-household differentiation in access to non-local lithic raw materials, collection of prestige goods, large storage capacity, and high population density appears to not have evolved until BR 3 times, coincident with predation patterns associated with local secondary resource depression. Significant variation in village size in the Bridge River valley and adjacent Fraser Canyon suggest the possibility of settlements on three scales: very large villages or towns (Bridge River, Keatley Creek), smaller villages (Bell), and small hamlets (Gibbs Creek, etc.). A future goal of Mid-Fraser Canyon archaeology should be to refine our understanding of relationships between these communities and to explore the possibility that some may reflect more complex political relationships in the "Classsic Lillooet" period than are evident from the ethnographic record.

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Appendix A
Maps

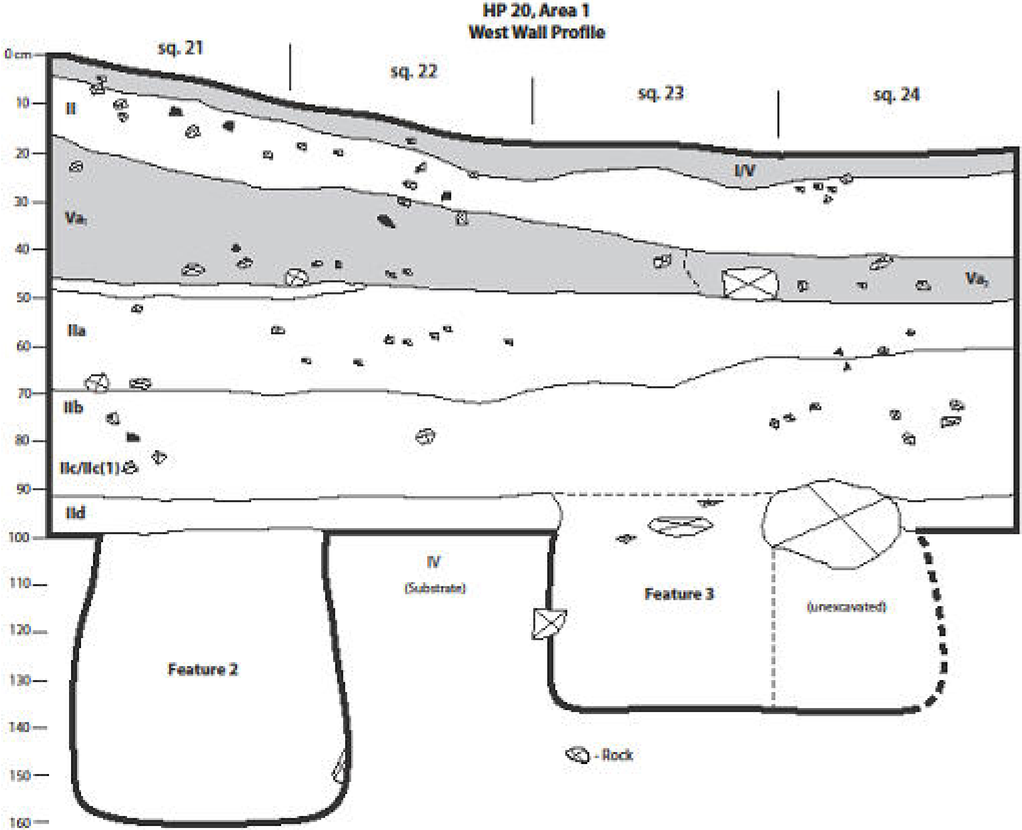
Appendix B
Photographs

Appendix C
Lithic Artifact Typology

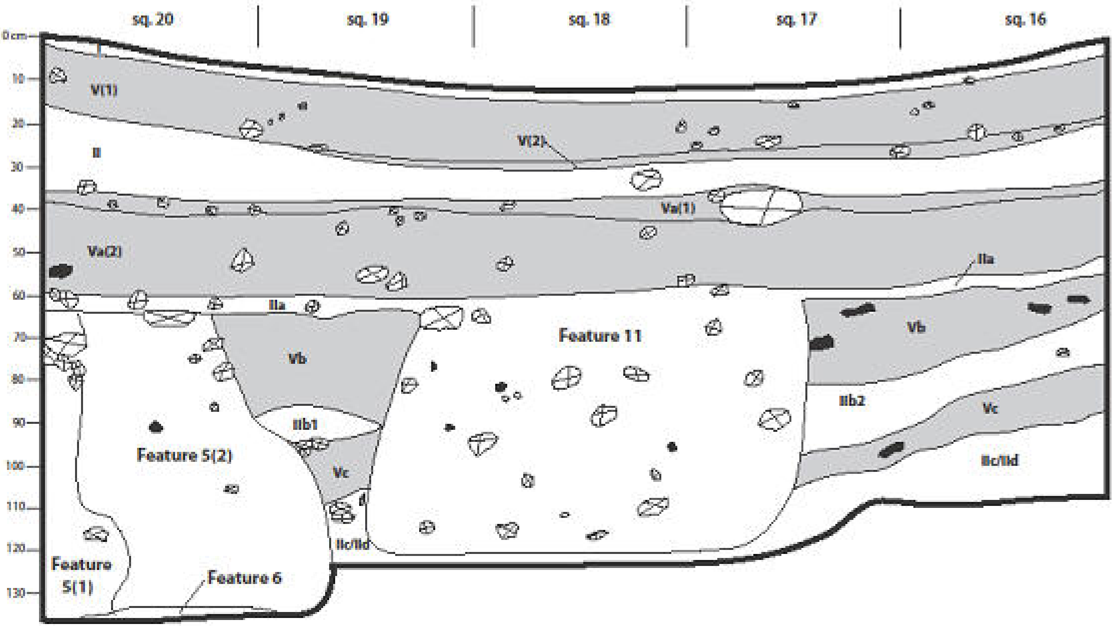
Appendix D
Paleoethnobotanical Report

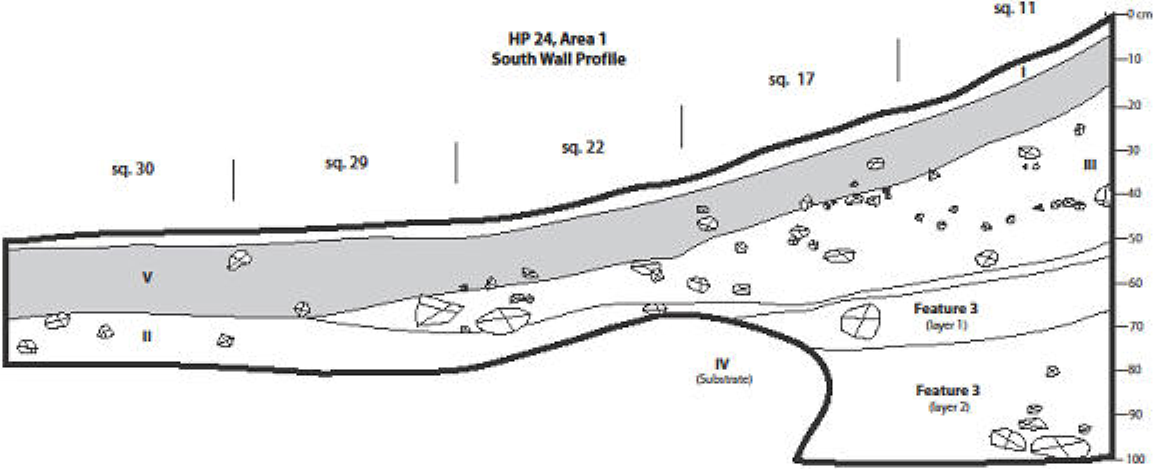
Appendix E
Faunal Analysis of Dog Remains

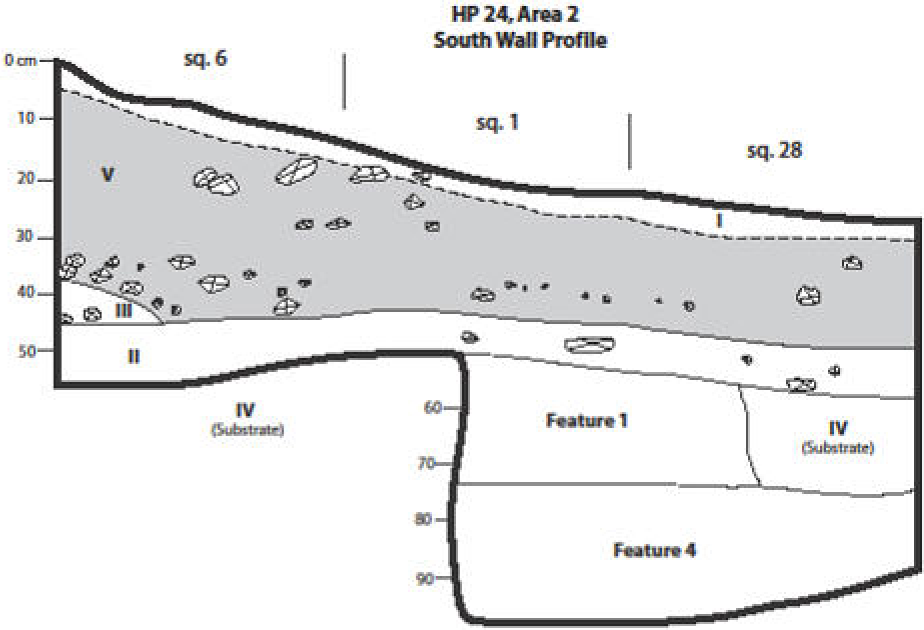
Appendix F
Micromorphology Methods


HP 20, Area 1
West Wall Profile
sq. 21
sq. 22
sq. 23
sq. 24
0 cm
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
II
I/V
Va₁
Va₂
IIa
IIb
IIc/IIc(1)
IId
IV
(Substrate)
Feature 2
Feature 3
(unexcavated)
- Rock

HP 20, Area 2
East Wall Profile




HP 24, Area 1
South Wall Profile
sq. 30
sq. 29
sq. 22
sq. 17
sq. 11
I
III
V
II
Feature 3
(layer 1)
IV
(Substrate)
Feature 3
(layer 2)
0 cm
10
20
30
40
50
60
70
80
90
100



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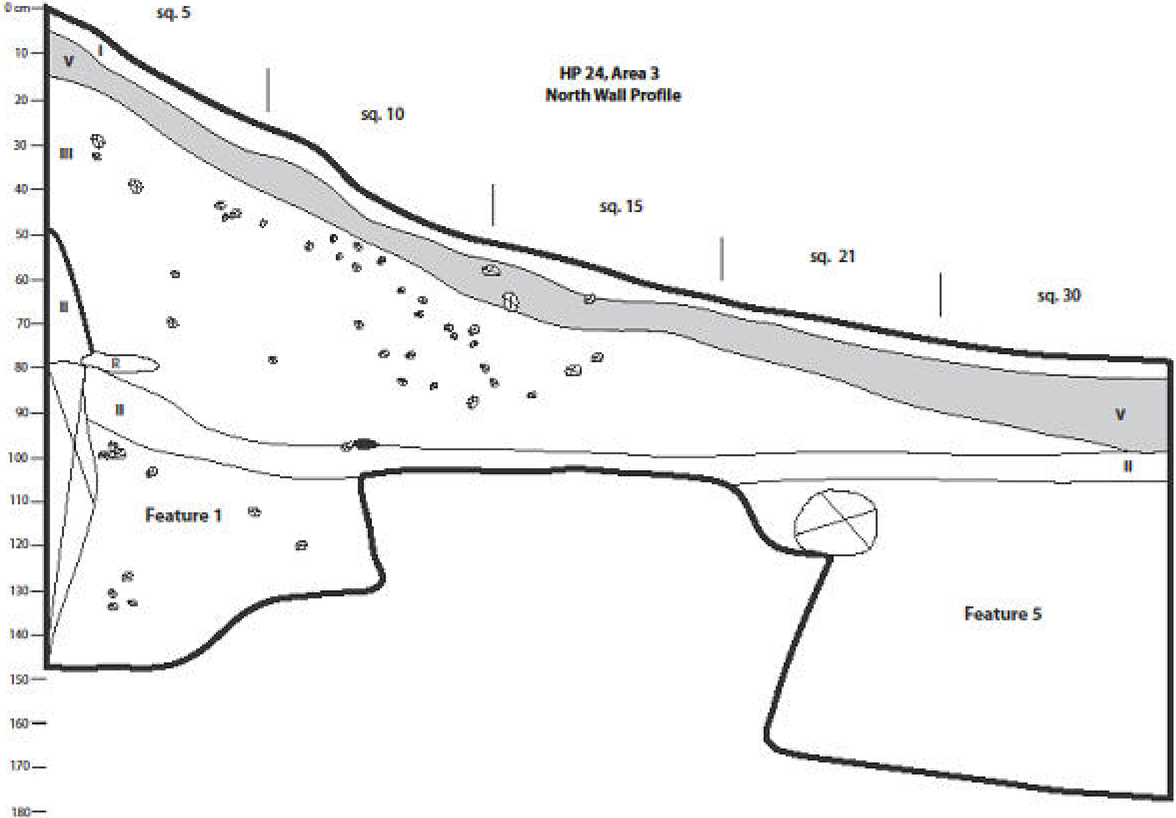
South Wall Profile
0 cm
10
20
30
40
50
60
70
80
90
sq. 6
sq. 1
sq. 28
V
I
III
II
IV
(Substrate)
Feature 1
IV
(Substrate)
Feature 4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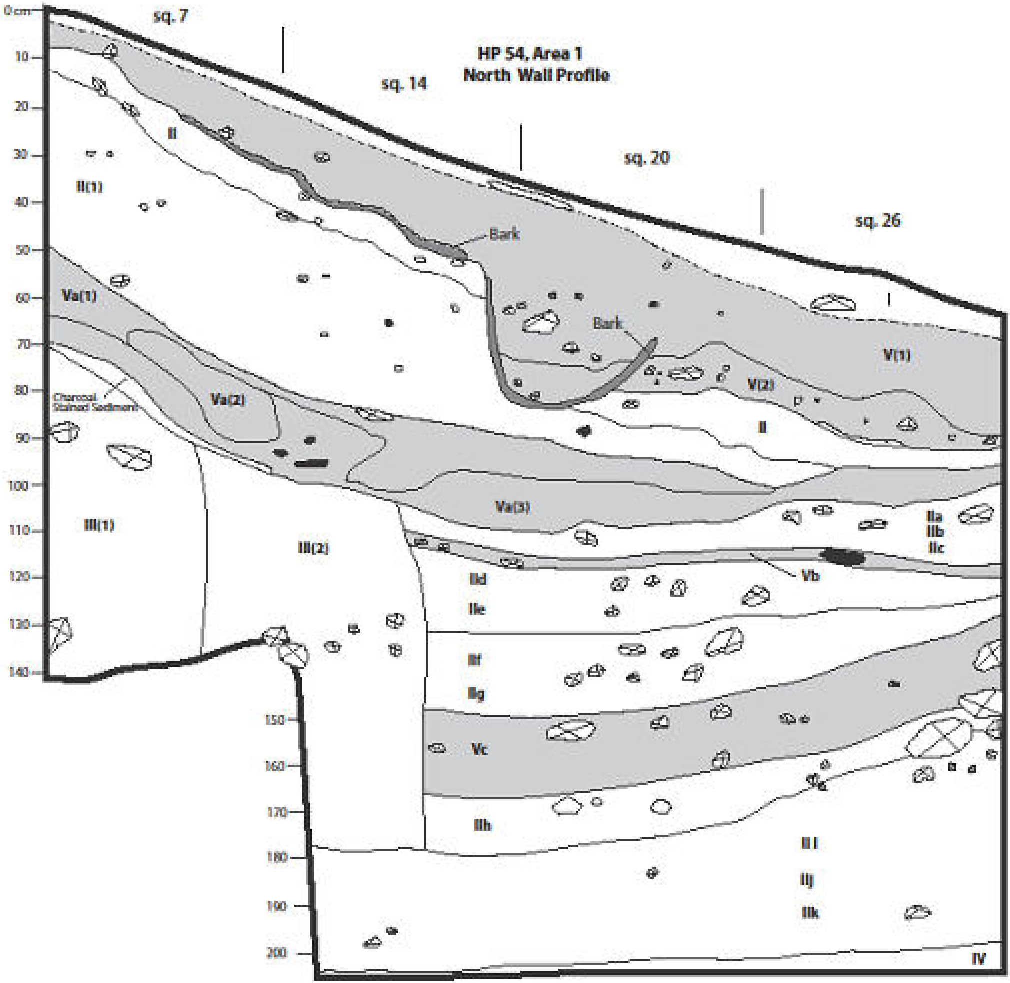
North Wall Profile
sq. 5
sq. 10
sq. 15
sq. 21
sq. 30
I
II
III
V
R
Feature 1
Feature 5
0 cm
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180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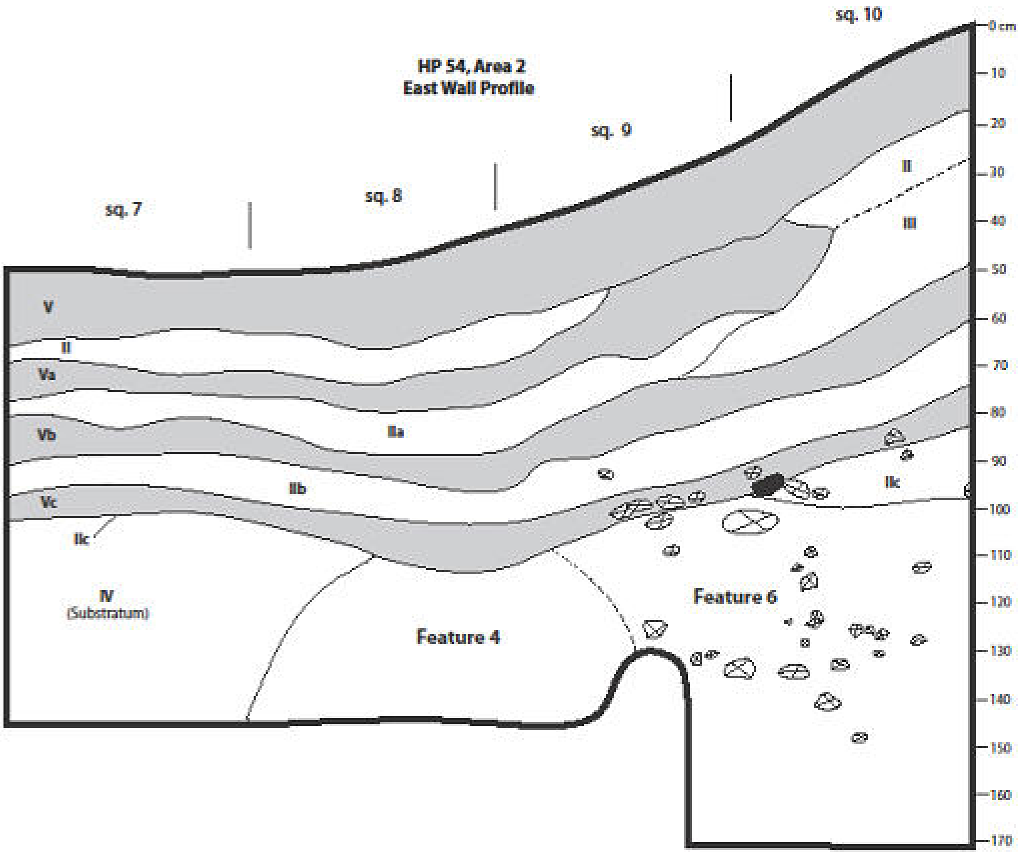
North Wall Profile
sq. 7
sq. 14
sq. 20
sq. 26
0 cm
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
II
II(1)
Bark
Bark
Va(1)
Va(2)
Va(3)
V(1)
V(2)
Charcoal Stained Sediment
III(1)
III(2)
IIa
IIb
IIc
Vb
IId
IIe
IIf
IIg
Vc
IIh
II I
IIj
IIk
IV



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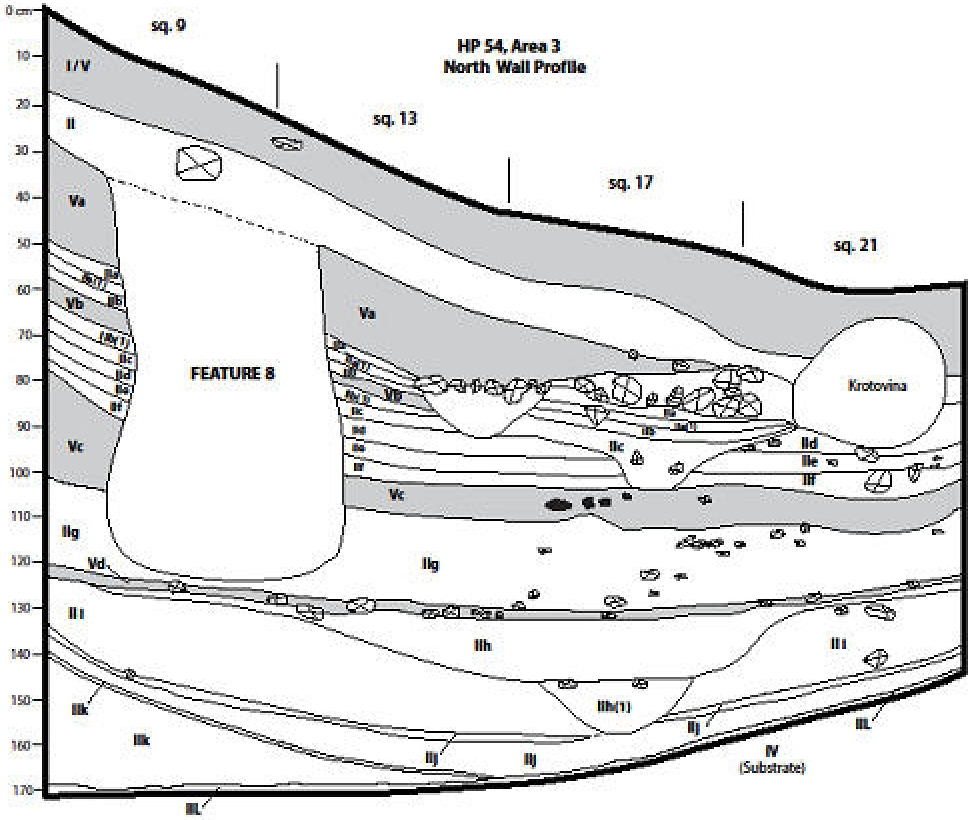
East Wall Profile
sq. 7
sq. 8
sq. 9
sq. 10
0 cm
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
V
II
Va
Vb
IIa
IIb
Vc
IIc
II
III
IIc
IV
(Substratum)
Feature 4
Feature 6



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North Wall Profile
sq. 9
sq. 13
sq. 17
sq. 21
0 cm
10
20
30
40
50
60
70
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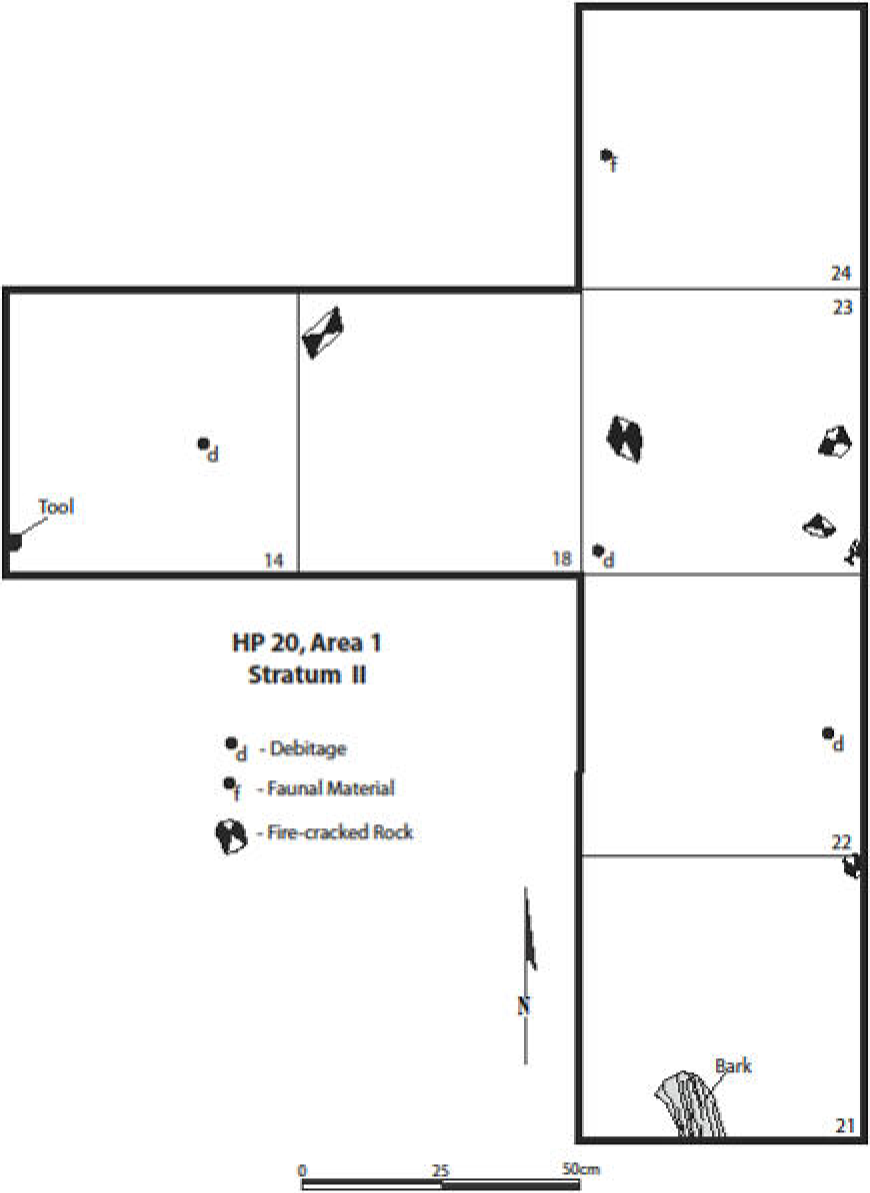
90
100
110
120
130
140
150
160
170
I / V
II
Va
Vb
Vc
Vd
FEATURE 8
Krotovina
IIc
IId
IIe
IIf
IIg
IIh
IIh(1)
III
IIk
IIj
IIL
IV
(Substrate)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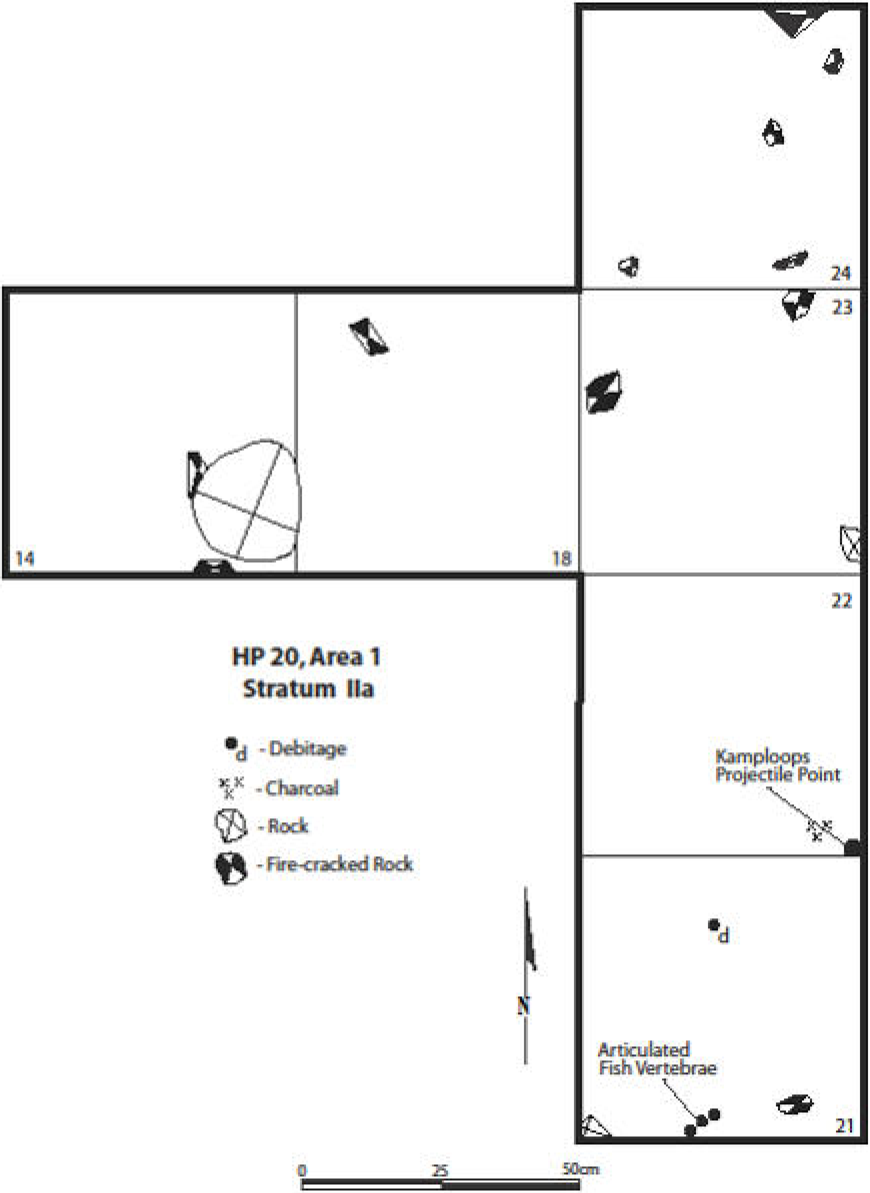
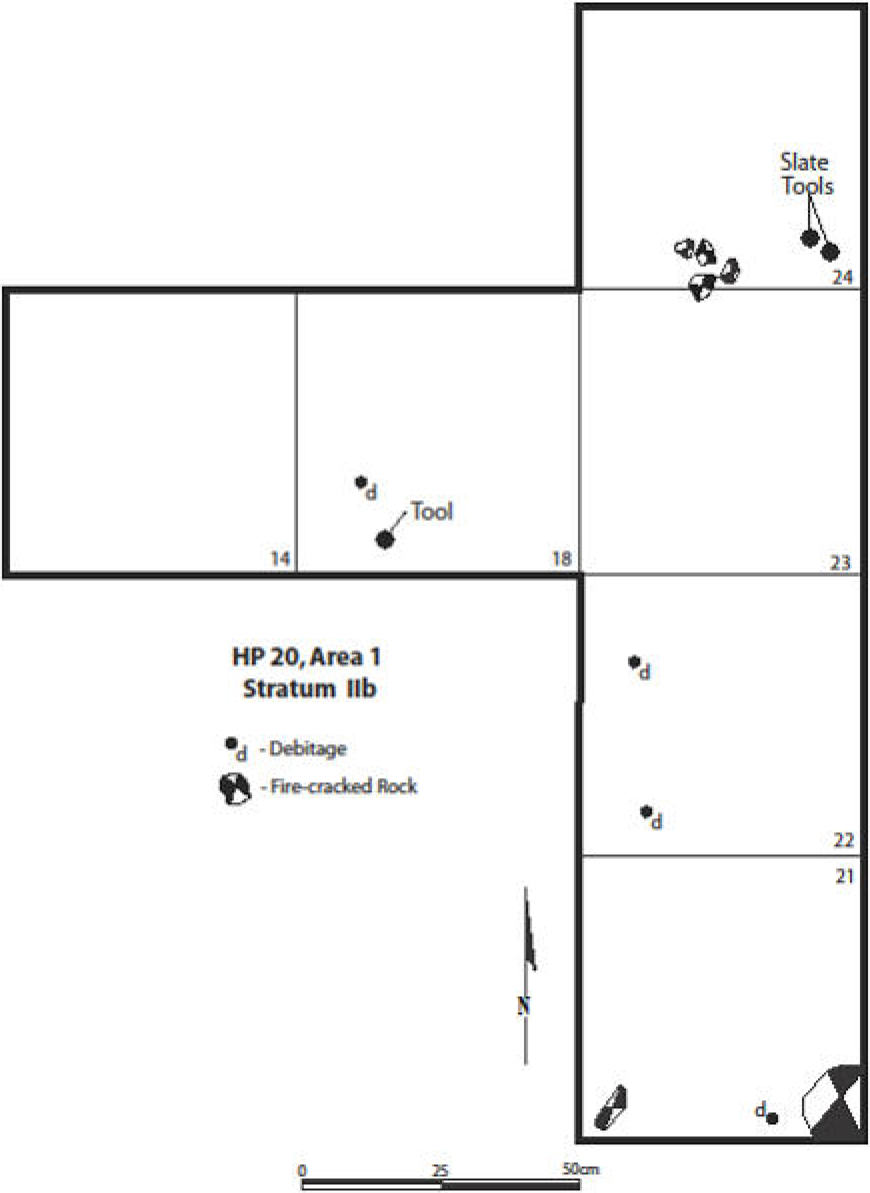
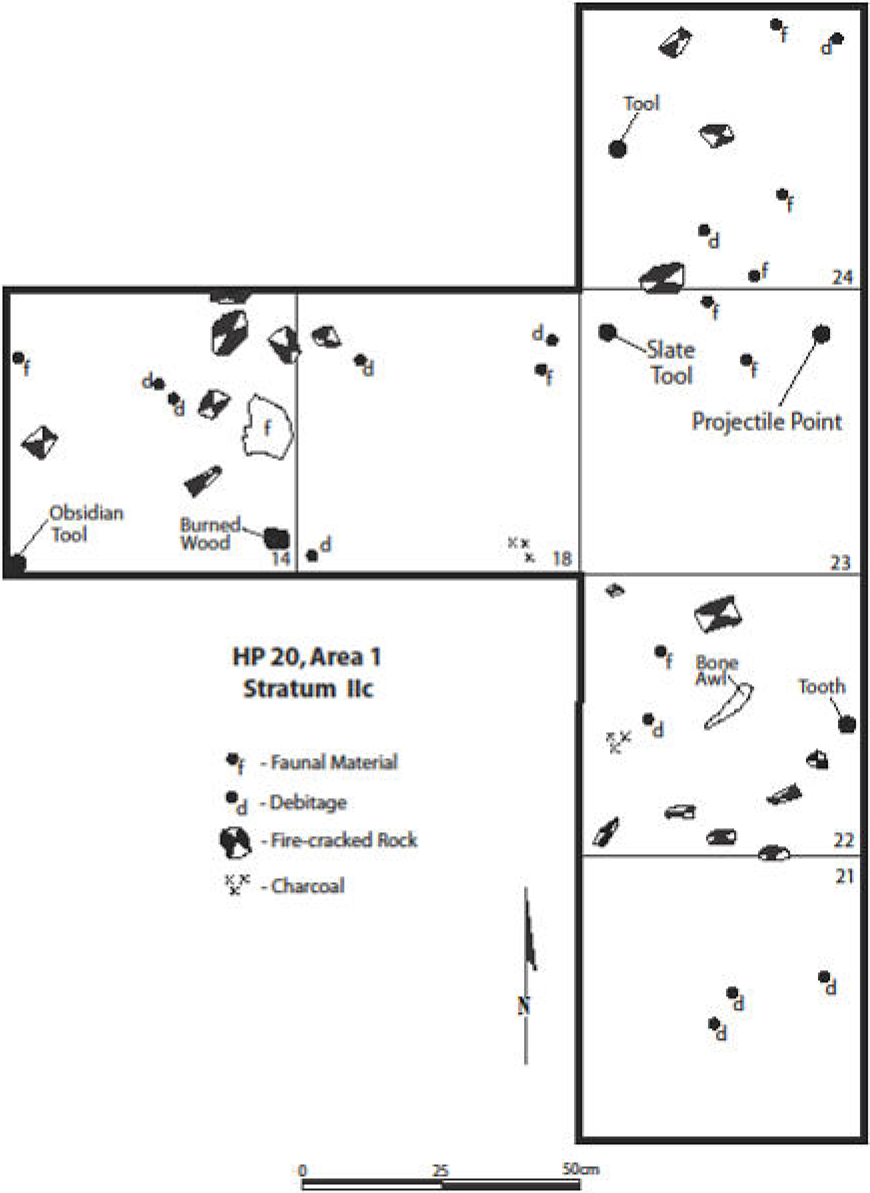
Stratum II
d - Debitage
f - Faunal Material
- Fire-cracked Rock
Tool
14
18
24
23
22
21
Bark
N
0
25
50cm



24
23
14
18
22
HP 20, Area 1
Stratum IIa
d - Debitage
- Charcoal
- Rock
- Fire-cracked Rock
Kamploops
Projectile Point
d
N
Articulated
Fish Vertebrae
21
0
25
50cm



Slate
Tools
24
d
Tool
14
18
23
HP 20, Area 1
Stratum IIb
d
d
- Debitage
- Fire-cracked Rock
d
22
21
N
d
0
25
50cm


f
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Tool
f
d
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Slate
Tool
f
Projectile Point
23
d
f
f
d
d
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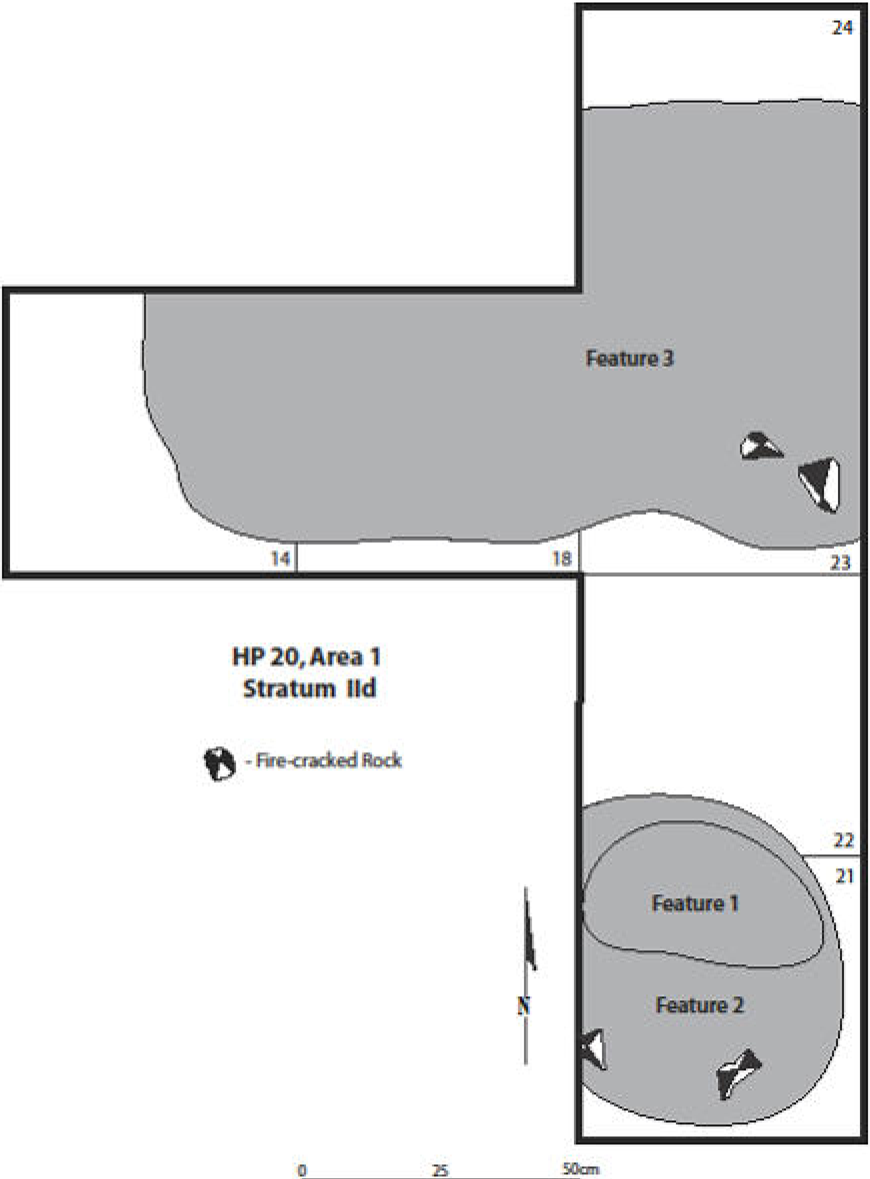
f
Obsidian
Tool
Burned
Wood
14
d
18
f
Bone
Awl
Tooth
d
22
21
d
d
d
HP 20, Area 1
Stratum IIc
f - Faunal Material
d - Debitage
- Fire-cracked Rock
- Charcoal
N
0
25
50cm


24
Feature 3
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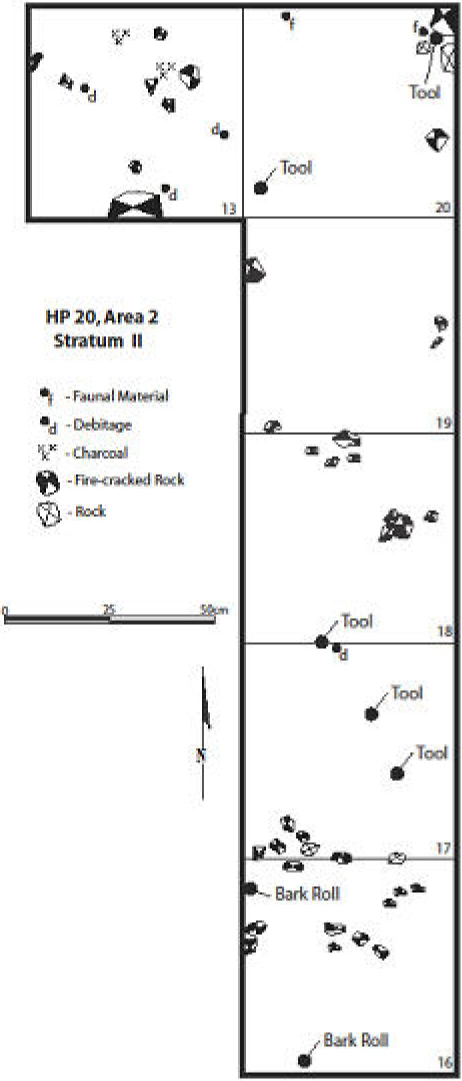
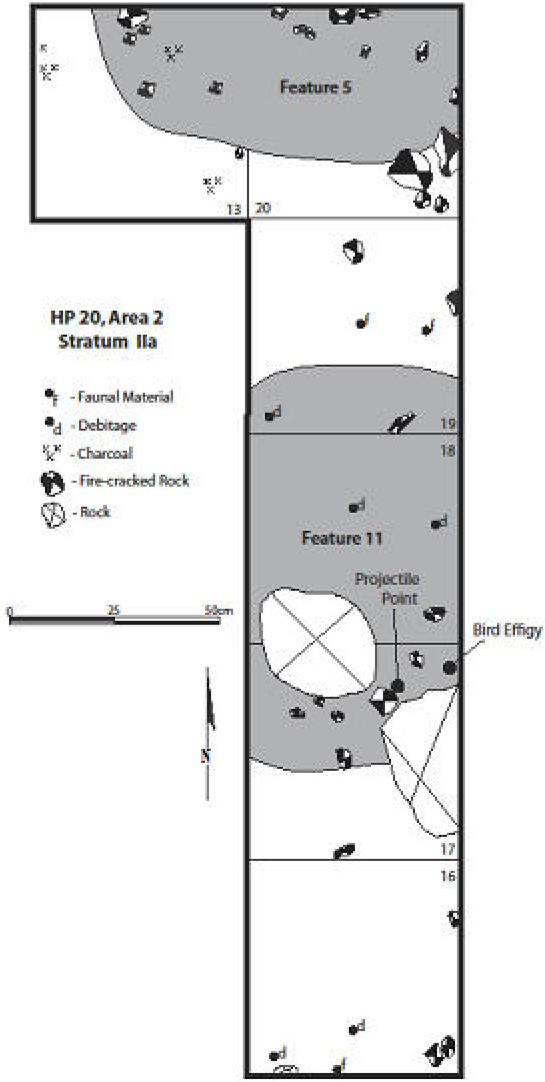
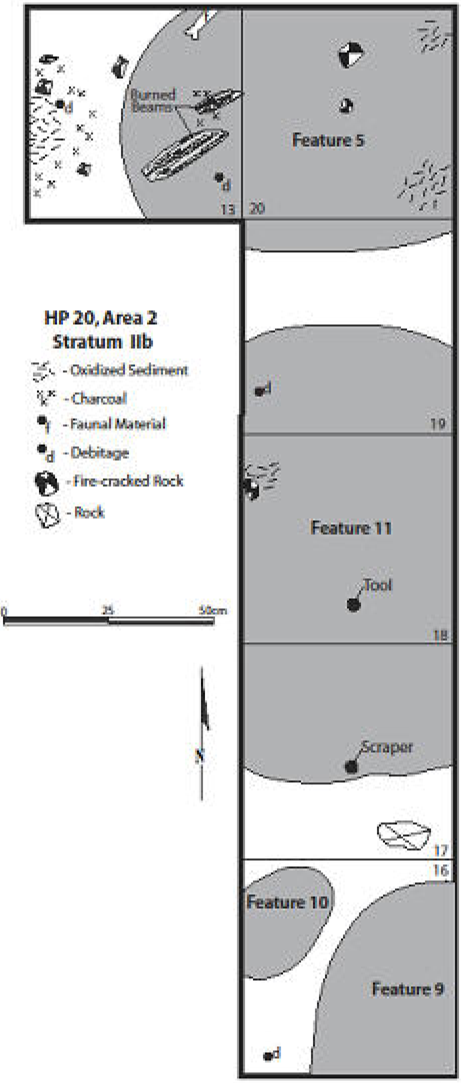
HP 20, Area 1
Stratum IId
- Fire-cracked Rock
22
21
Feature 1
Feature 2
N
0
25
50cm

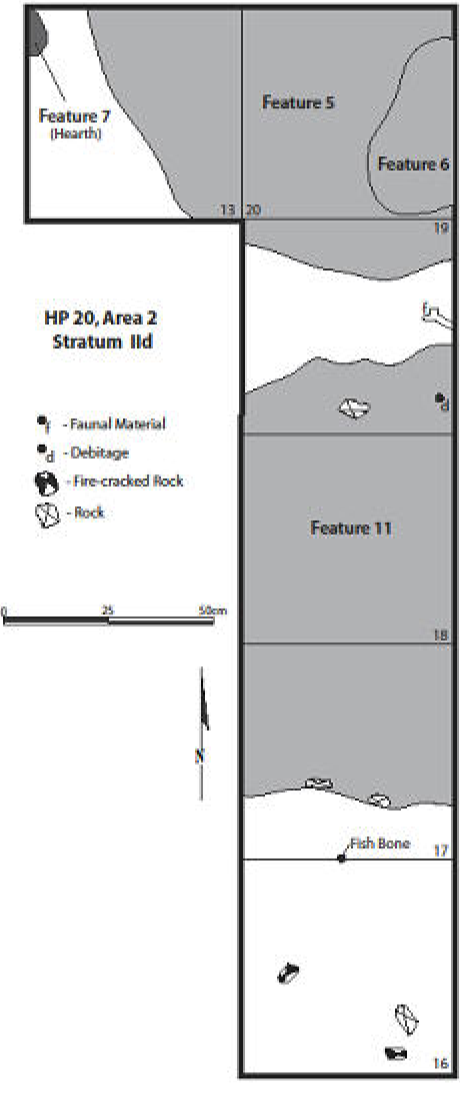


HP 20, Area 2
Stratum II
f - Faunal Material
d - Debitage
- Charcoal
- Fire-cracked Rock
- Rock
0
25
50cm
N
13
20
19
18
17
16
Tool
Tool
Tool
Tool
Tool
Bark Roll
Bark Roll
f
f
d
d
d
d

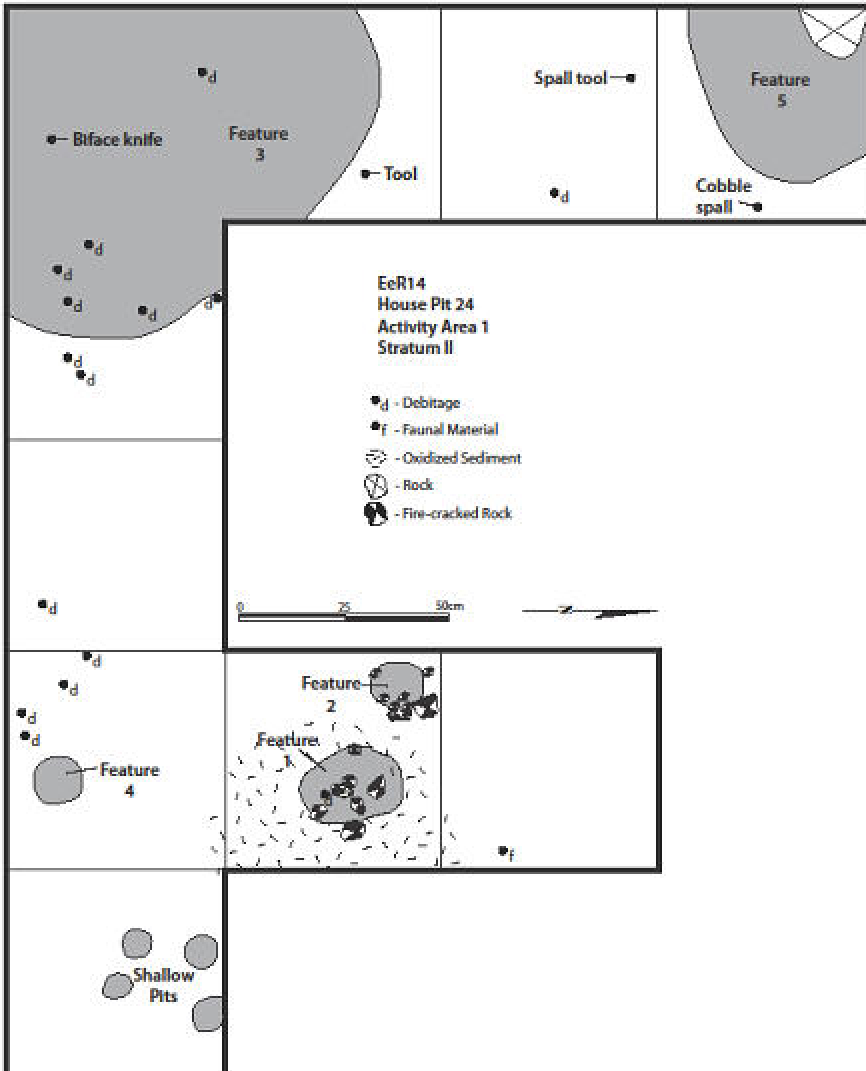


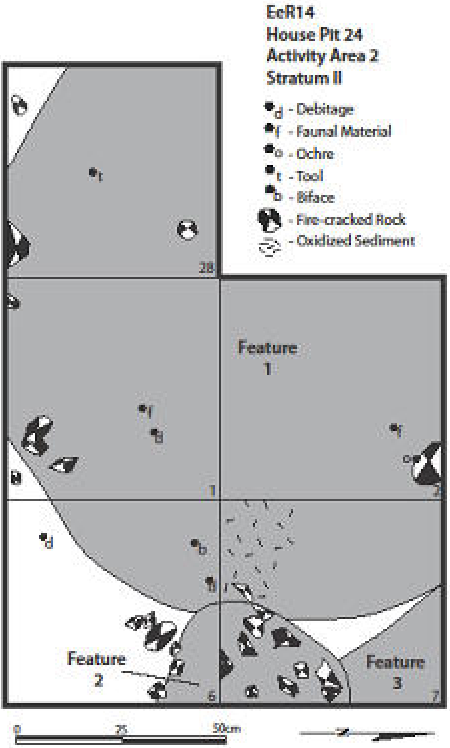
Feature 5
13
20
HP 20, Area 2
Stratum IIa
- Faunal Material
- Debitage
- Charcoal
- Fire-cracked Rock
- Rock
19
18
Feature 11
Projectile Point
0
25
50cm
Bird Effigy
N
17
16

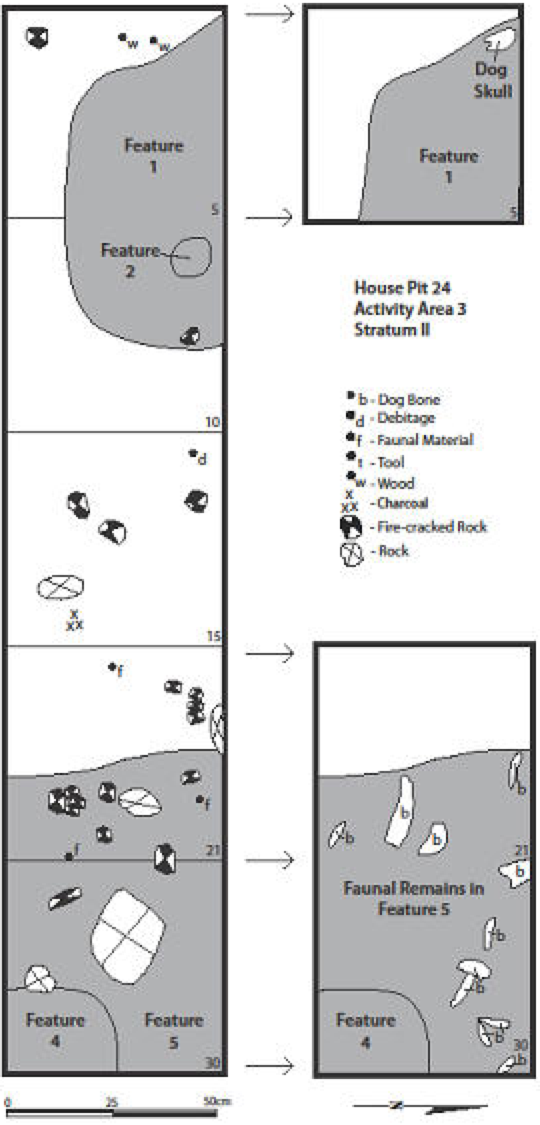

HP 20, Area 2
Stratum IIb
- Oxidized Sediment
- Charcoal
- Faunal Material
- Debitage
- Fire-cracked Rock
- Rock
0
25
50cm
N
Burned Beams
Feature 5
13
20
19
Feature 11
Tool
18
Scraper
17
16
Feature 10
Feature 9



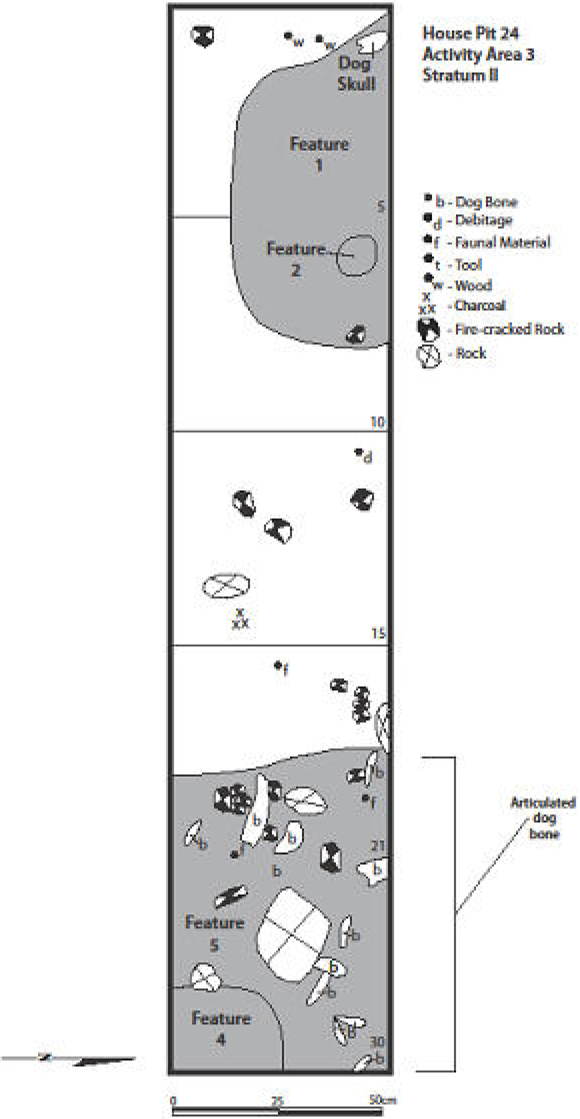
Feature 7
(Hearth)
Feature 5
Feature 6
13
20
19
HP 20, Area 2
Stratum IId
f
d
f - Faunal Material
d - Debitage
- Fire-cracked Rock
- Rock
Feature 11
0
25
50cm
18
N
Fish Bone
17
16

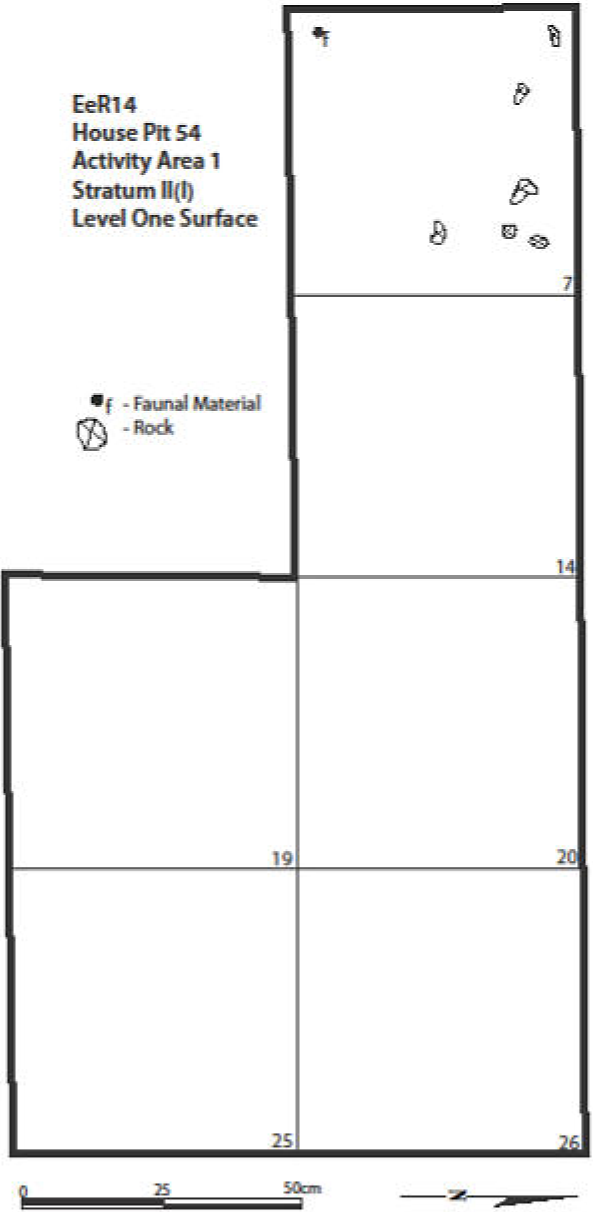

Biface knife
Feature
3
Tool
Spall tool
Feature
5
Cobble
spall
EeR14
House Pit 24
Activity Area 1
Stratum II
- Debitage
- Faunal Material
- Oxidized Sediment
- Rock
- Fire-cracked Rock
0
25
50cm
Feature
2
Feature
1
Feature
4
Shallow
Pits

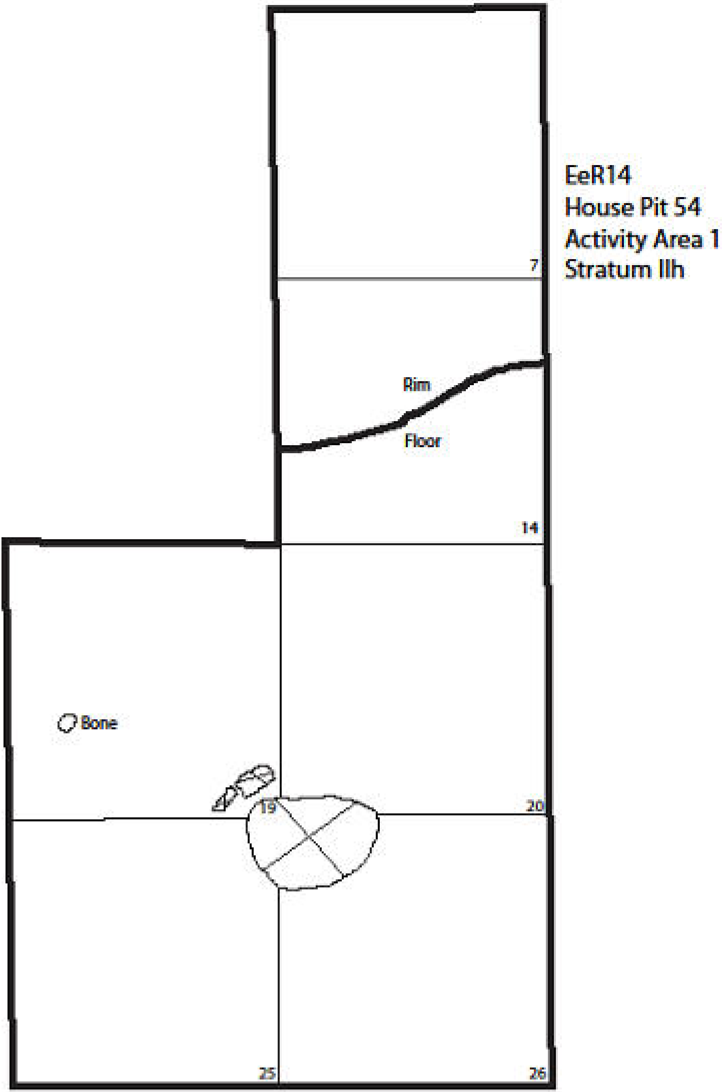

EeR14
House Pit 24
Activity Area 2
Stratum II
d - Debitage
f - Faunal Material
o - Ochre
t - Tool
b - Biface
- Fire-cracked Rock
- Oxidized Sediment
t
28
Feature
1
f
d
f
o
1
2
d
b
d
Feature
2
6
Feature
3
7
0
25
50cm



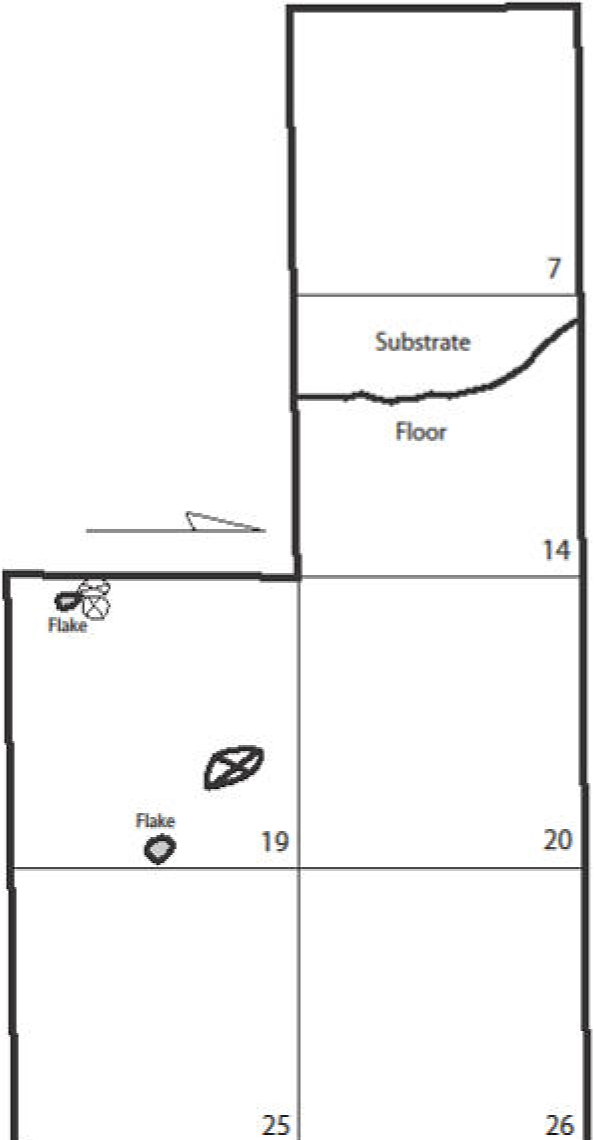
Feature 1
Feature 2
Feature 4
Feature 5
Dog Skull
Faunal Remains in Feature 5
House Pit 24
Activity Area 3
Stratum II
b - Dog Bone
d - Debitage
f - Faunal Material
t - Tool
w - Wood
- Charcoal
- Fire-cracked Rock
- Rock
5
10
15
21
30
0
25
50cm

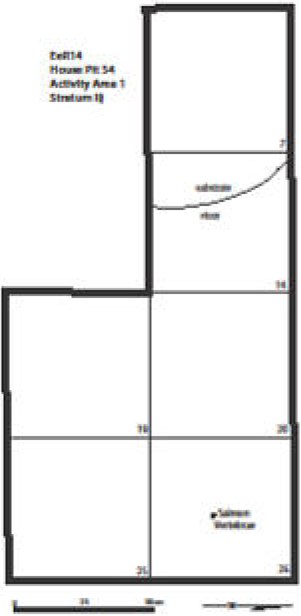

House Pit 24
Activity Area 3
Stratum II
Dog Skull
Feature 1
Feature 2
Feature 5
Feature 4
b - Dog Bone
d - Debitage
f - Faunal Material
t - Tool
w - Wood
- Charcoal
- Fire-cracked Rock
- Rock
Articulated dog bone
5
10
15
21
30
0
25
50cm

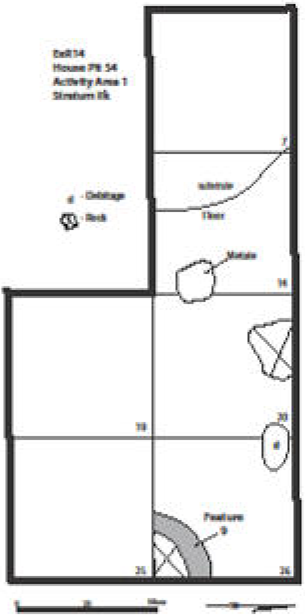

EeR14
House Pit 54
Activity Area 1
Stratum II(I)
Level One Surface
f - Faunal Material
- Rock
7
14
19
20
25
26
0
25
50cm
N

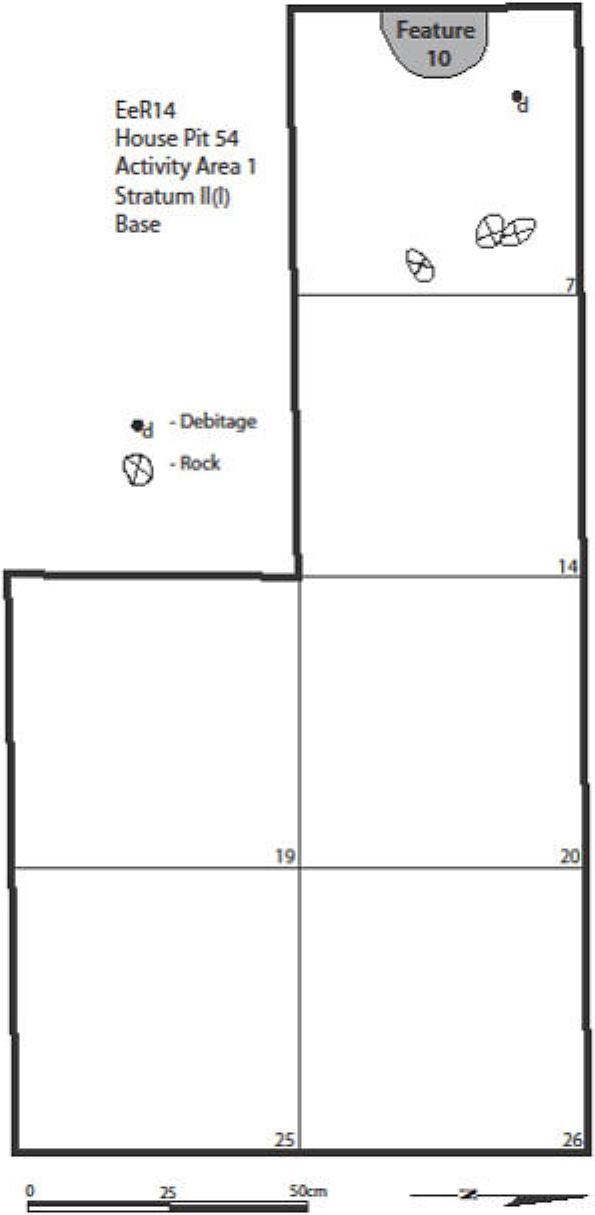

EeR14
House Pit 54
Activity Area 1
Stratum IIh
7
Rim
Floor
14
Bone
19
20
25
26

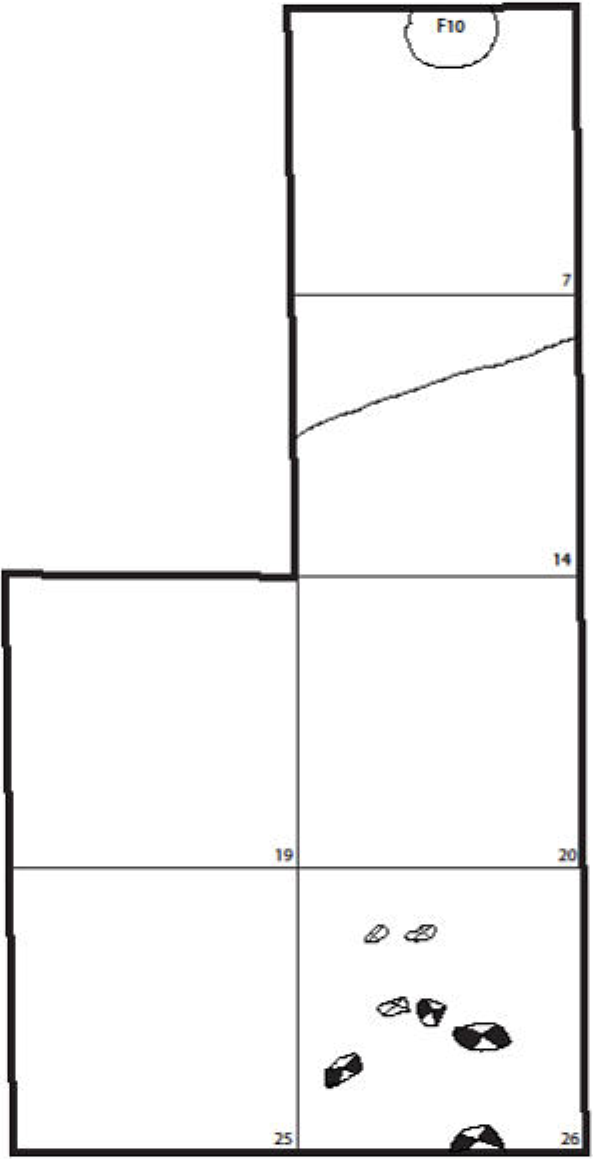
EeR14
House Pit 54
Activity Area 1
Stratum IIi



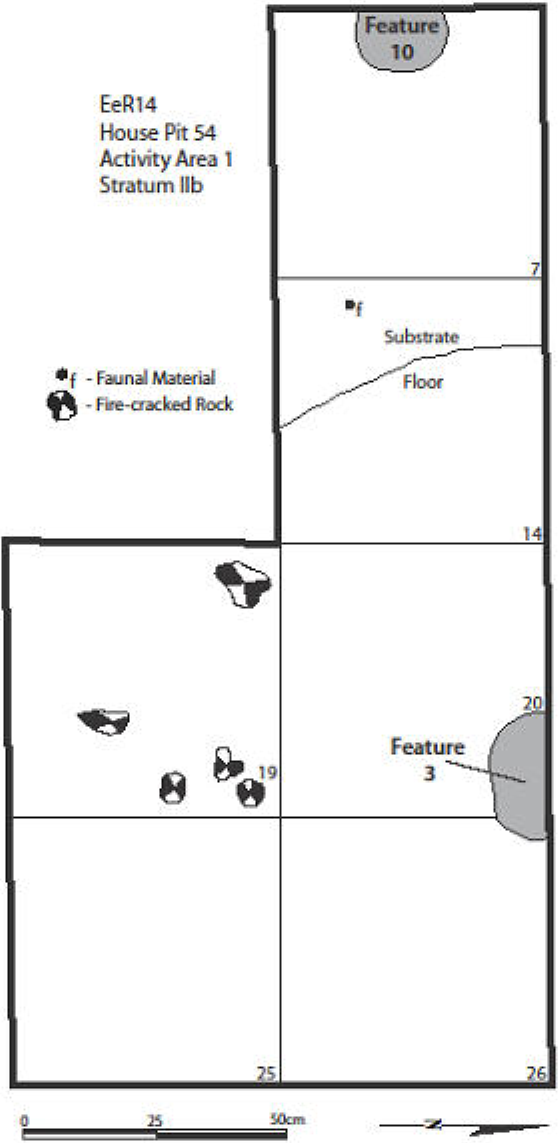

House Pit 54
Activity Area 1
7
14
19
20
25
26
Salmon
Vertebrae

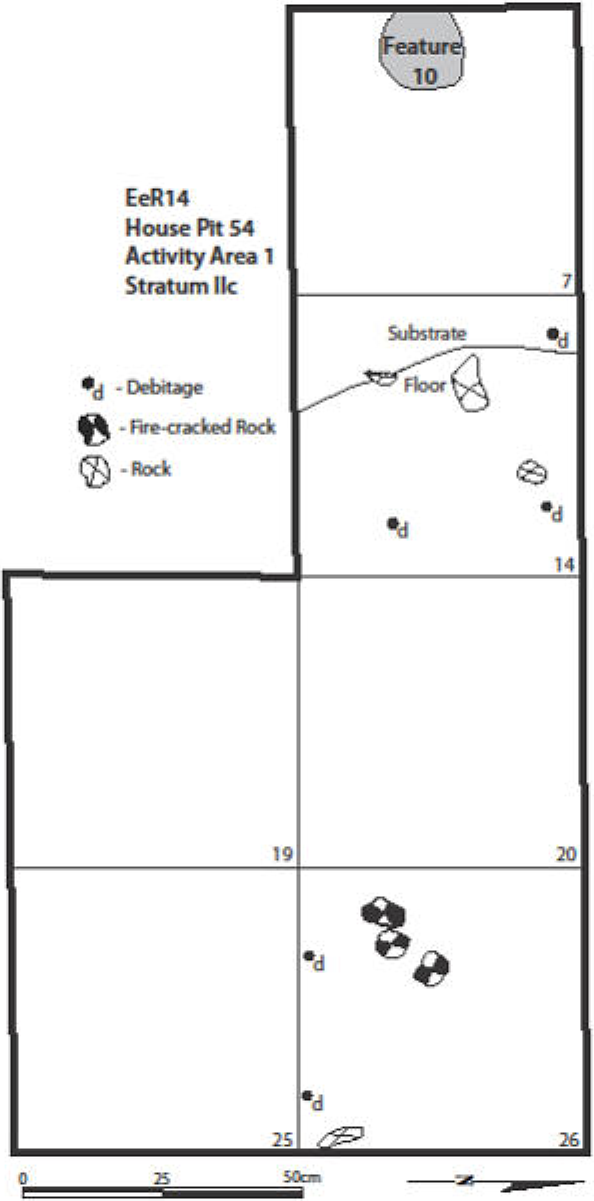

House Pit 54
Activity Area 1
Rock
Floor
7
14
19
20
25
26
Feature
9


Feature 10
d
EeR14
House Pit 54
Activity Area 1
Stratum II(I)
Base
7
d - Debitage
- Rock
14
19
20
25
26
0
25
50cm
N

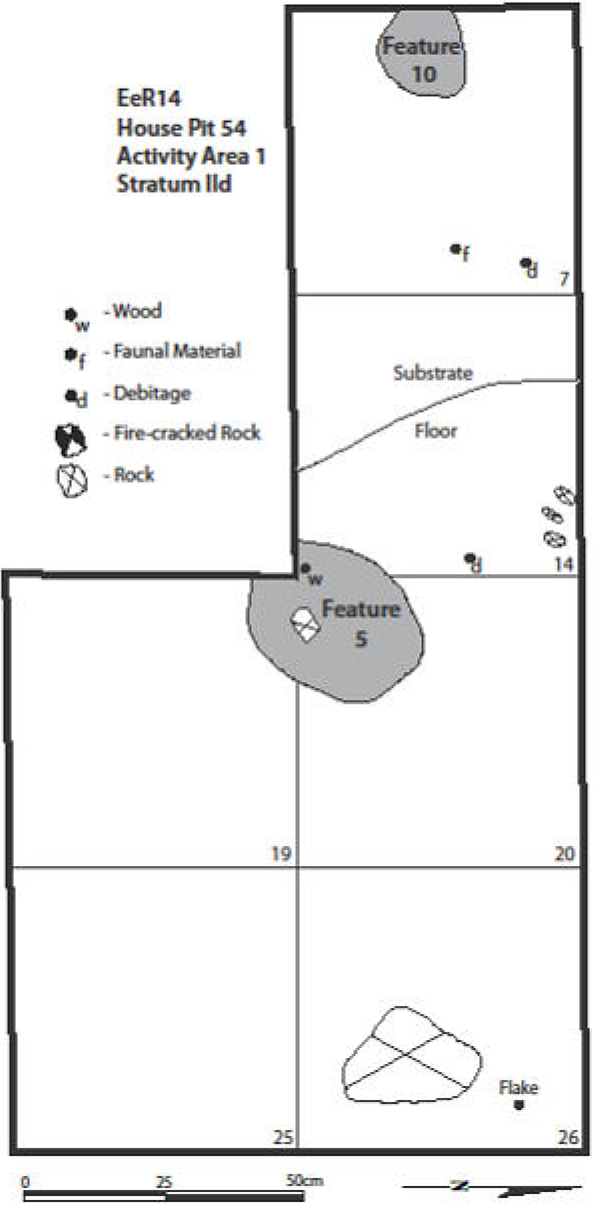


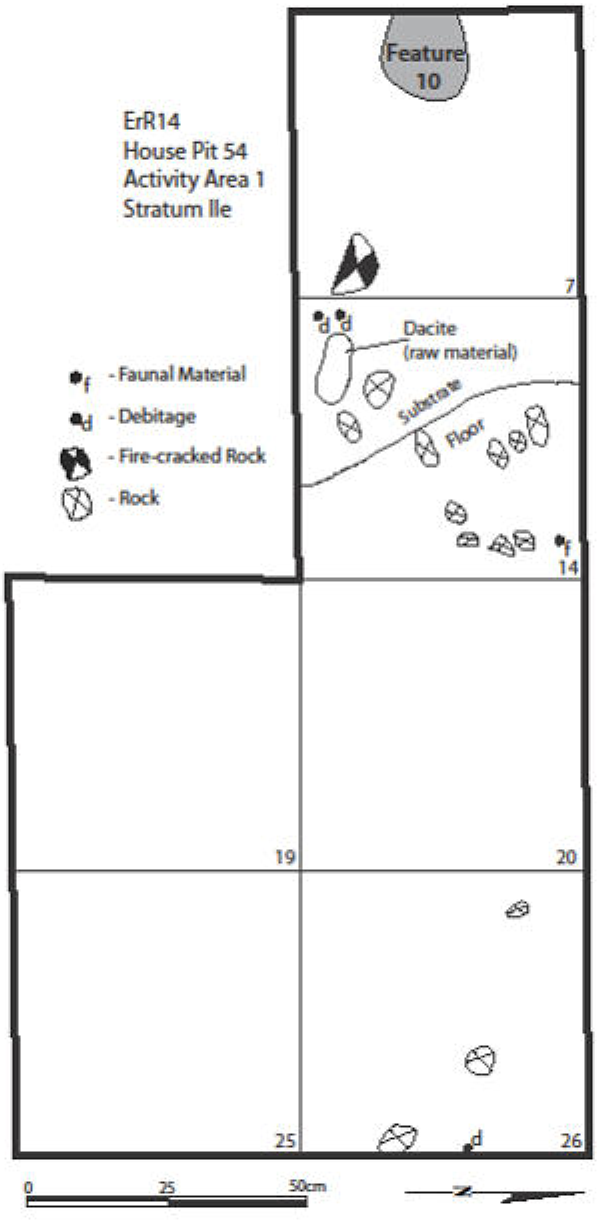
Eer14
House Pit 54
Activity Area 1
Stratum IIa

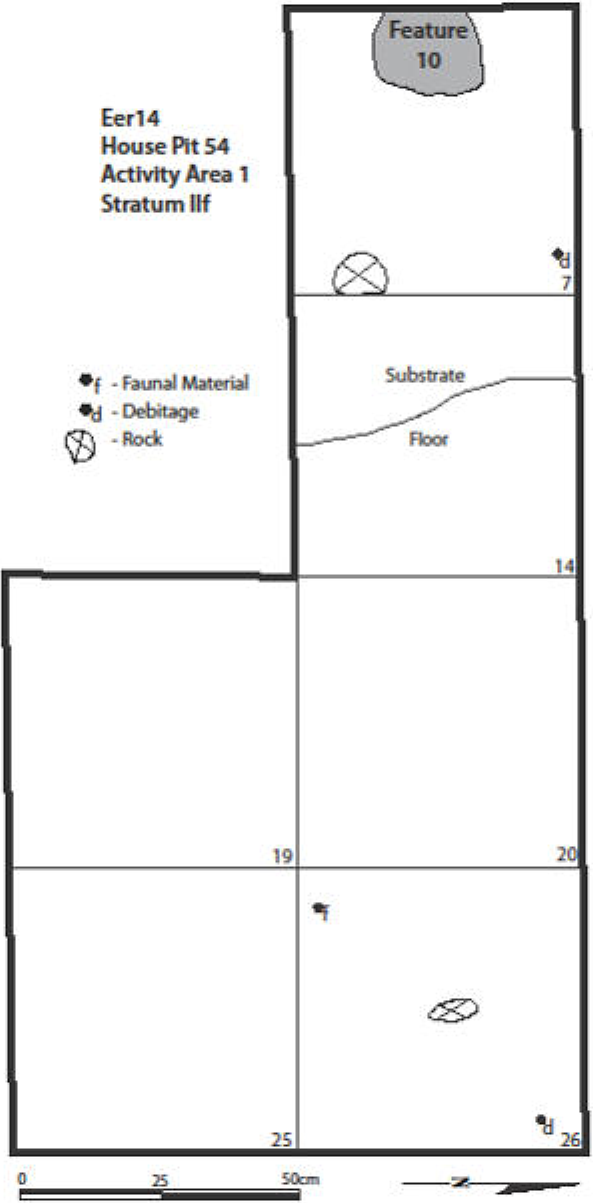

EeR14
House Pit 54
Activity Area 1
Stratum IIb
f - Faunal Material
- Fire-cracked Rock
Feature 10
7
f
Substrate
Floor
14
20
Feature 3
19
25
26
0
25
50cm



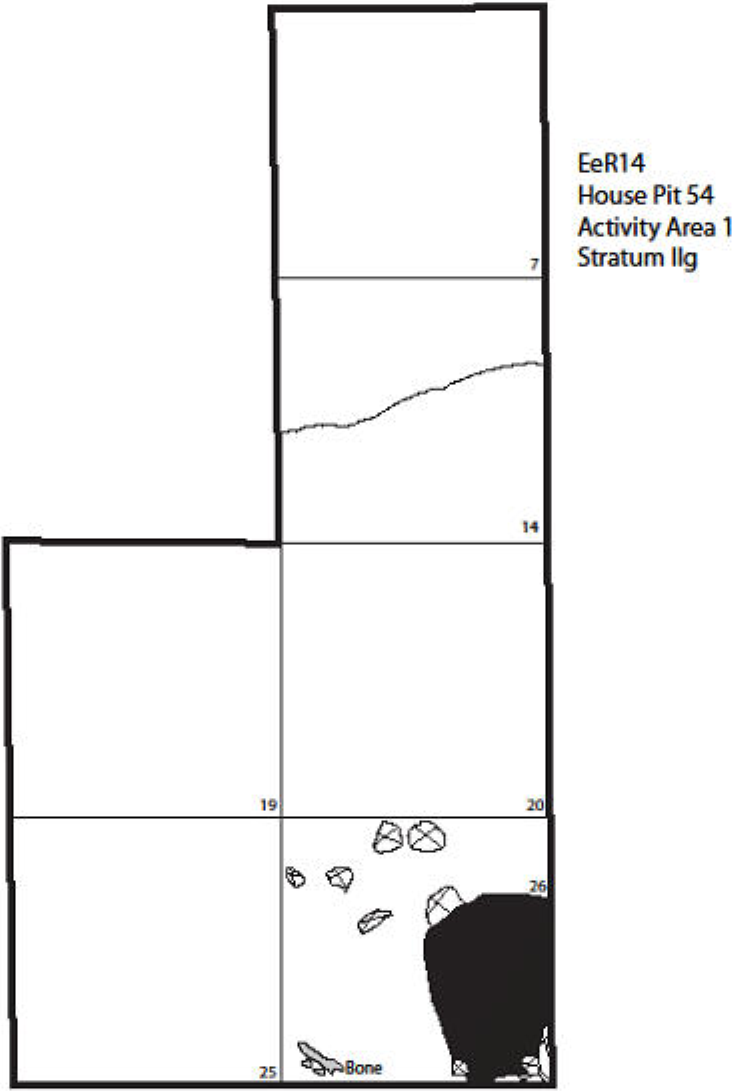
Feature 10
EeR14
House Pit 54
Activity Area 1
Stratum IIc
d - Debitage
- Fire-cracked Rock
- Rock
7
Substrate
Floor
d
14
19
20
25
26
0
25
50cm


EeR14
House Pit 54
Activity Area 1
Stratum IId
- Wood
- Faunal Material
- Debitage
- Fire-cracked Rock
- Rock
Feature 10
Feature 5
Substrate
Floor
Flake
7
14
19
20
25
26
0
25
50cm

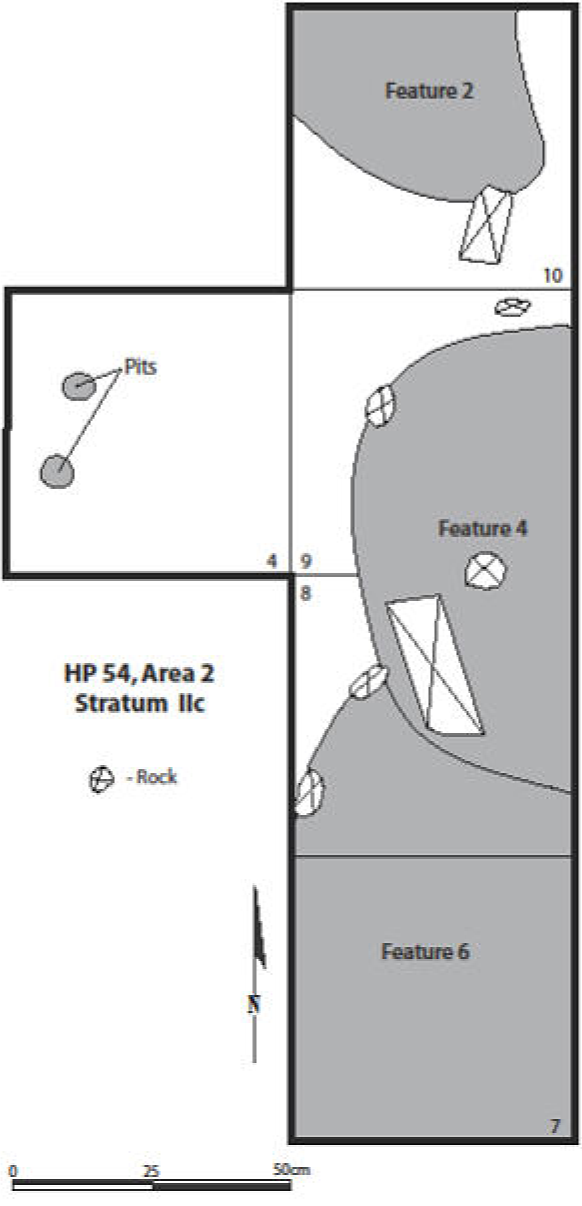

Feature 10
ErR14
House Pit 54
Activity Area 1
Stratum IIe
Dacite (raw material)
Substrate Floor
- Faunal Material
- Debitage
- Fire-cracked Rock
- Rock
7
14
19
20
25
26
0
25
50cm
N

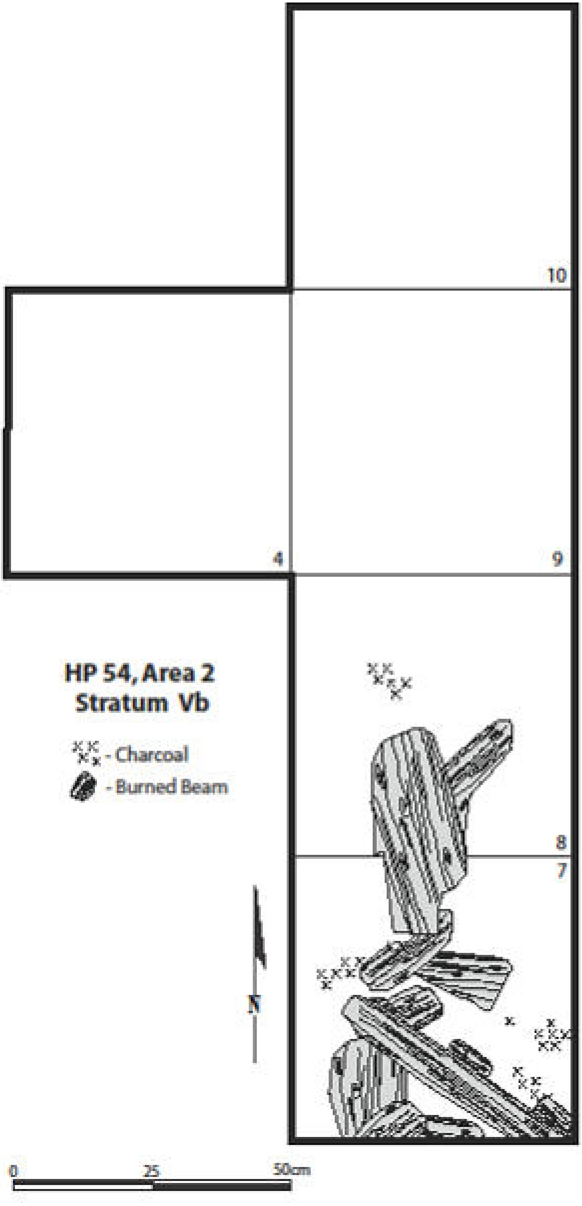


Feature 10
Eer14
House Pit 54
Activity Area 1
Stratum IIf
d
7
f - Faunal Material
d - Debitage
- Rock
Substrate
Floor
14
19
20
f
d
25
26
0
25
50cm



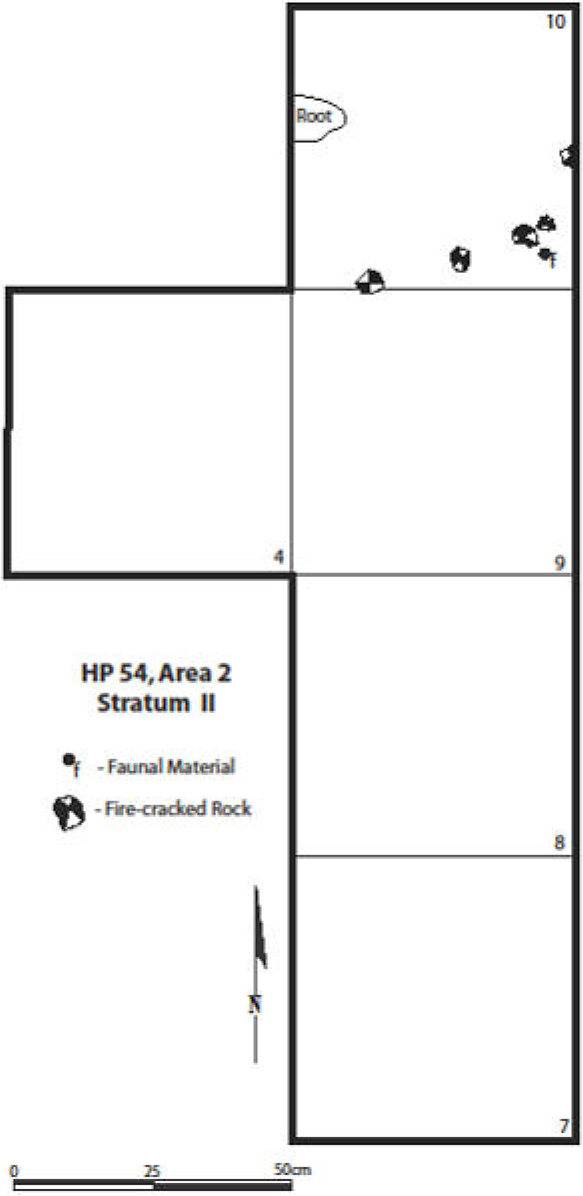
EeR14
House Pit 54
Activity Area 1
Stratum IIg
7
14
19
20
26
25
Bone

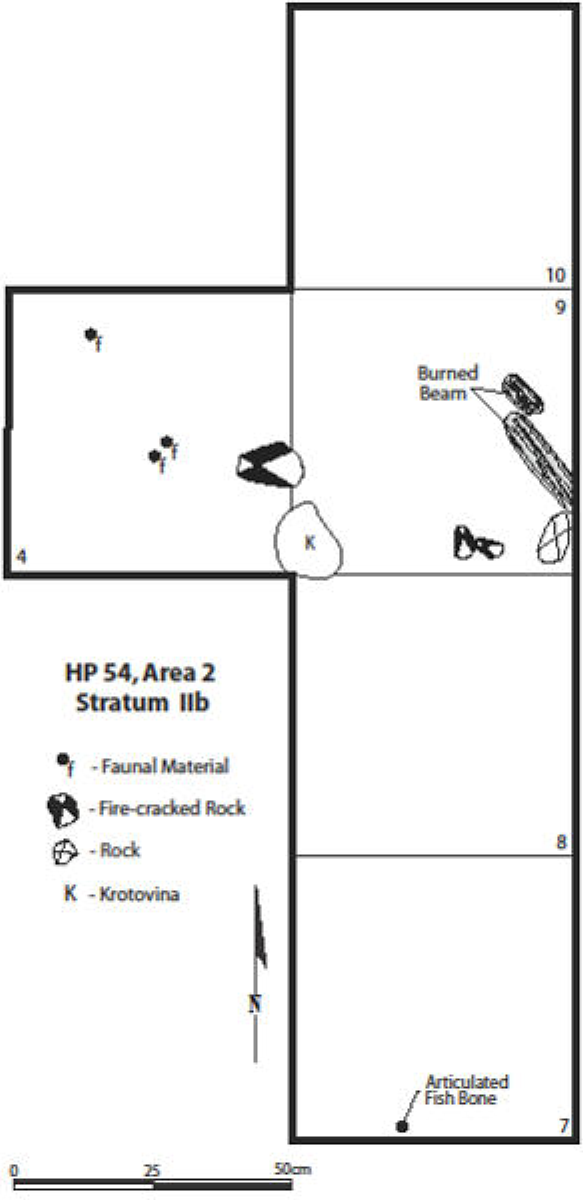

Feature 2
10
Pits
Feature 4
4
9
8
HP 54, Area 2
Stratum IIc
- Rock
Feature 6
N
7
0
25
50cm



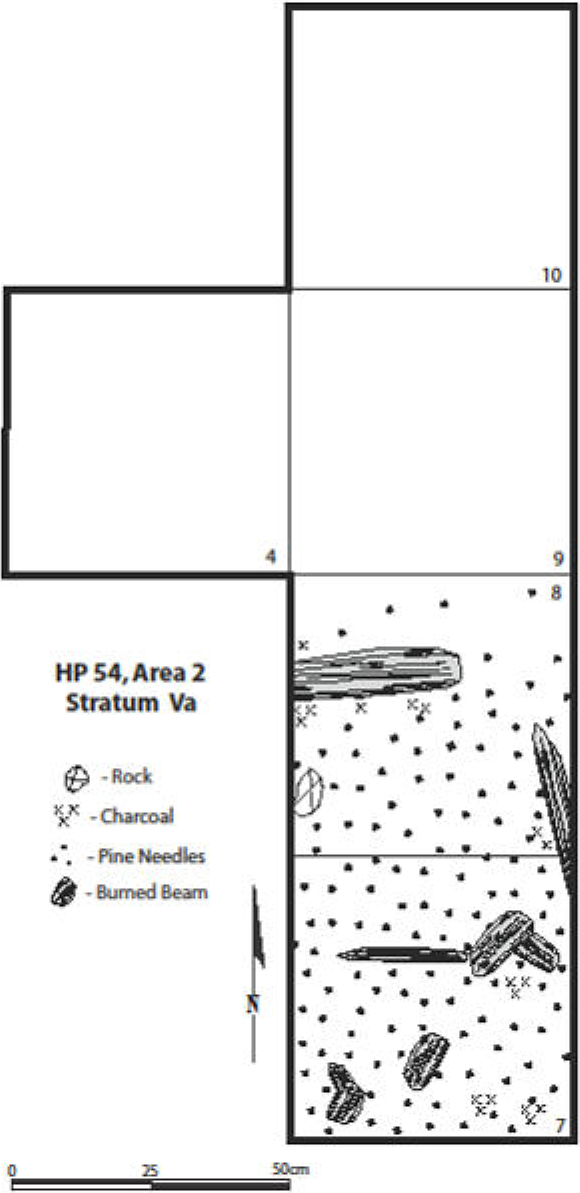
10
4
9
8
7
HP 54, Area 2
Stratum Vb
- Charcoal
- Burned Beam
N
0
25
50cm


HP 54, Area 2
Stratum II
- Faunal Material
- Fire-cracked Rock
HP 54, Area 2
Stratum Va
- Rock
- Charcoal
- Pine Needles
- Burned Beam
Feature 1
Burned Wood
Slate Tool
HP 54, Area 2
Stratum IIa
- Debitage
- Fire-cracked Rock
- Charcoal
HP 54, Area 2
Stratum Vb
- Charcoal
- Burned Beam
Burned Beam
HP 54, Area 2
Stratum IIb
- Faunal Material
- Fire-cracked Rock
- Rock
K - Krotovina
Feature 4
Feature 6
HP 54, Area 2
Stratum IIc
- Rock

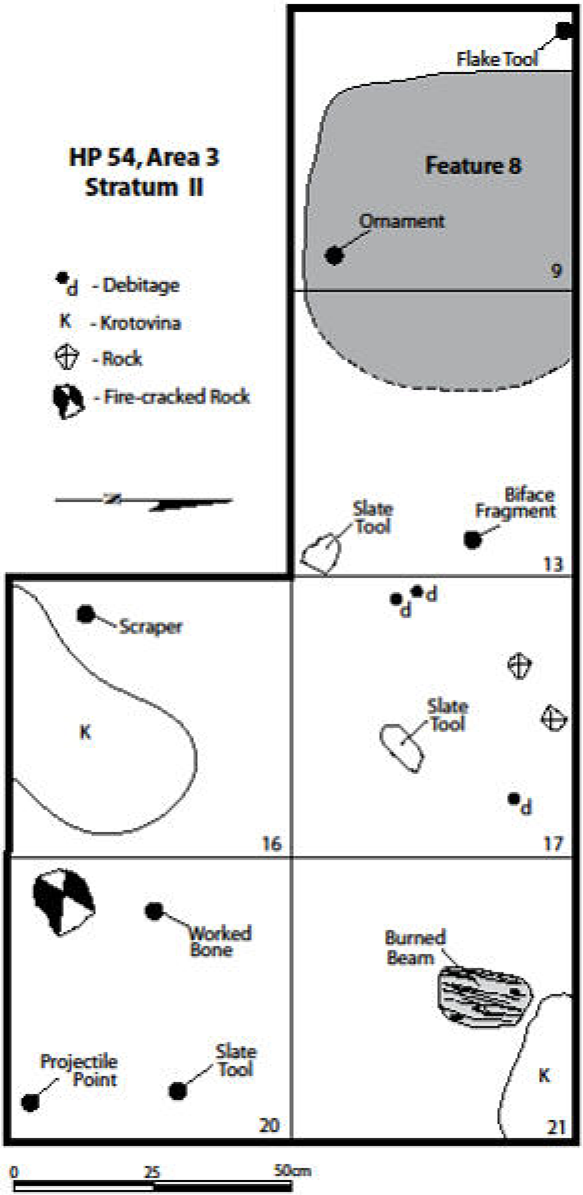

10
Root
f
4
9
HP 54, Area 2
Stratum II
f - Faunal Material
- Fire-cracked Rock
8
N
7
0
25
50cm



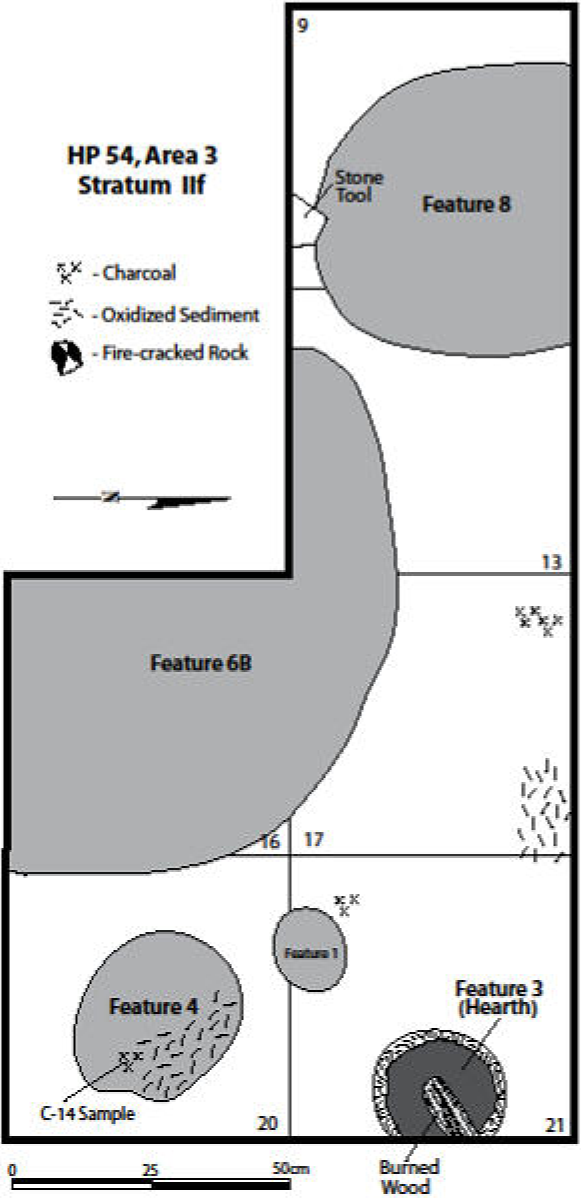
10
9
Burned
Beam
4
K
8
7
Articulated
Fish Bone
HP 54, Area 2
Stratum IIb
f - Faunal Material
- Fire-cracked Rock
- Rock
K - Krotovina
N
0
25
50cm

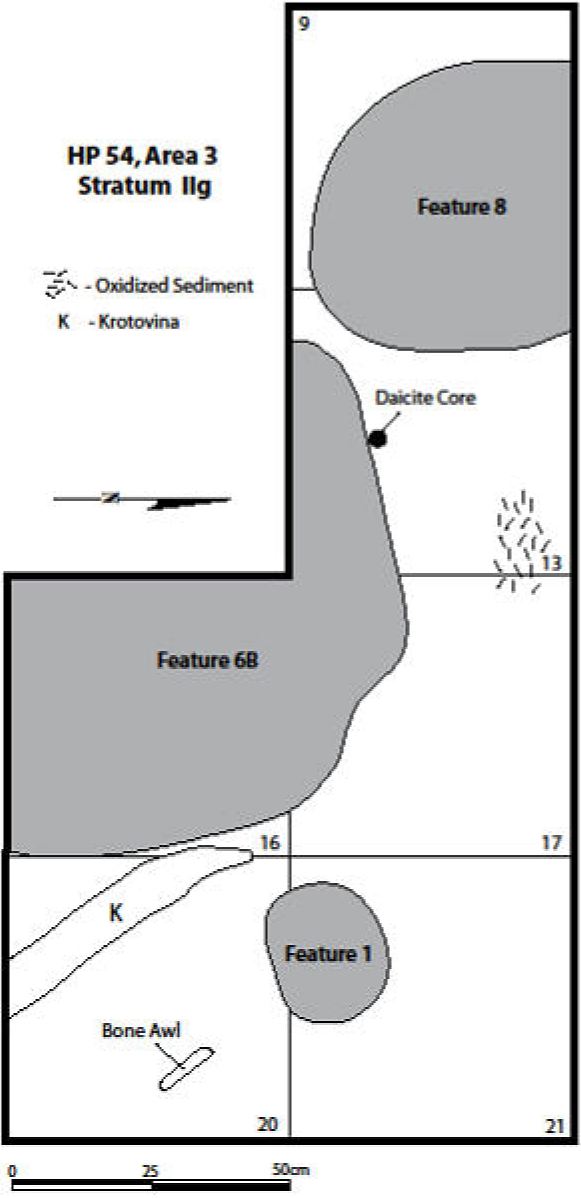


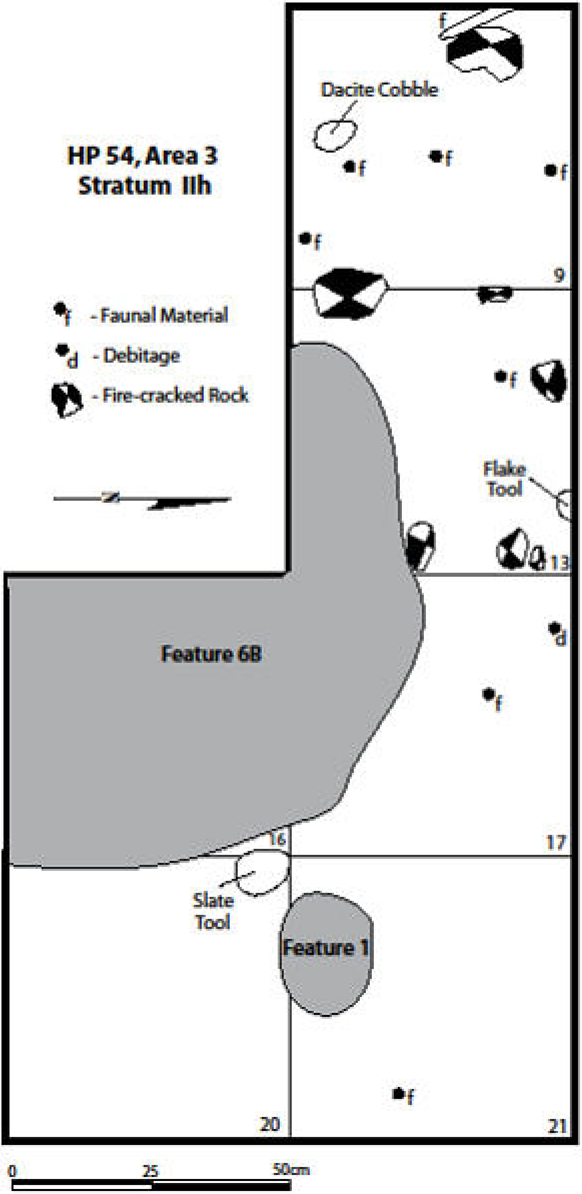
HP 54, Area 2
Stratum Va
- Rock
- Charcoal
- Pine Needles
- Burned Beam
N
10
4
9
8
7
0
25
50cm



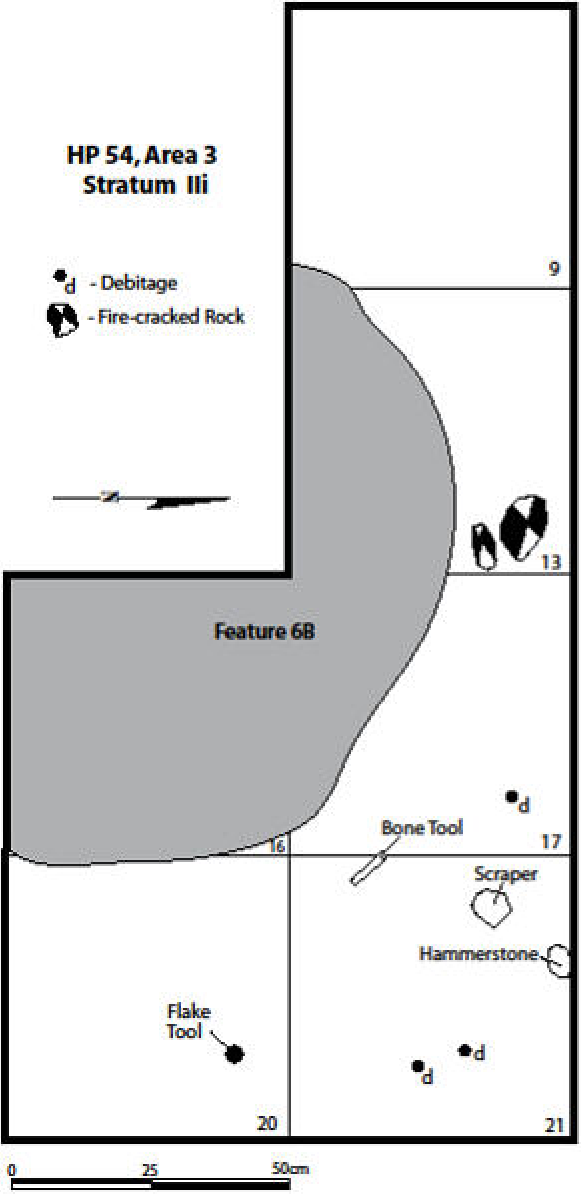
HP 54, Area 3
Stratum II
d - Debitage
K - Krotovina
- Rock
- Fire-cracked Rock
Flake Tool
Feature 8
Ornament
9
Slate Tool
Biface Fragment
13
Scraper
K
16
d
d
d
Slate Tool
d
17
Worked Bone
Projectile Point
Slate Tool
20
Burned Beam
K
21
0
25
50cm

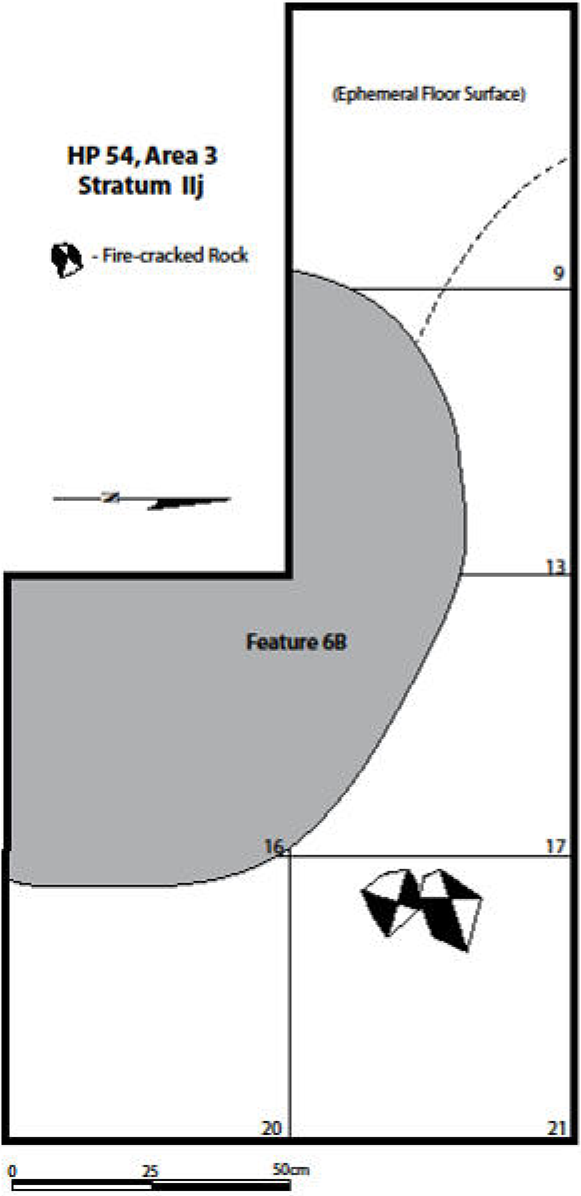

HP 54, Area 3
Stratum IIf
- Charcoal
- Oxidized Sediment
- Fire-cracked Rock
9
Stone Tool
Feature 8
13
Feature 6B
16
17
Feature 1
Feature 4
Feature 3 (Hearth)
C-14 Sample
20
21
Burned Wood
0
25
50cm

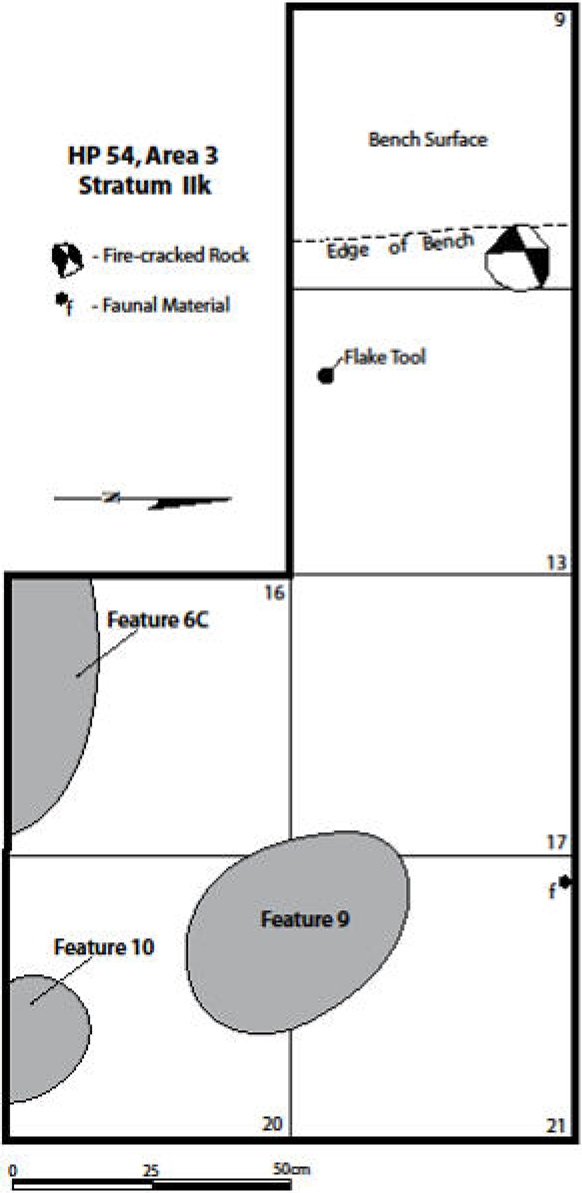

HP 54, Area 3
Stratum IIg
- Oxidized Sediment
K - Krotovina
9
Feature 8
Daicite Core
13
Feature 6B
16
17
K
Feature 1
Bone Awl
20
21
0
25
50cm

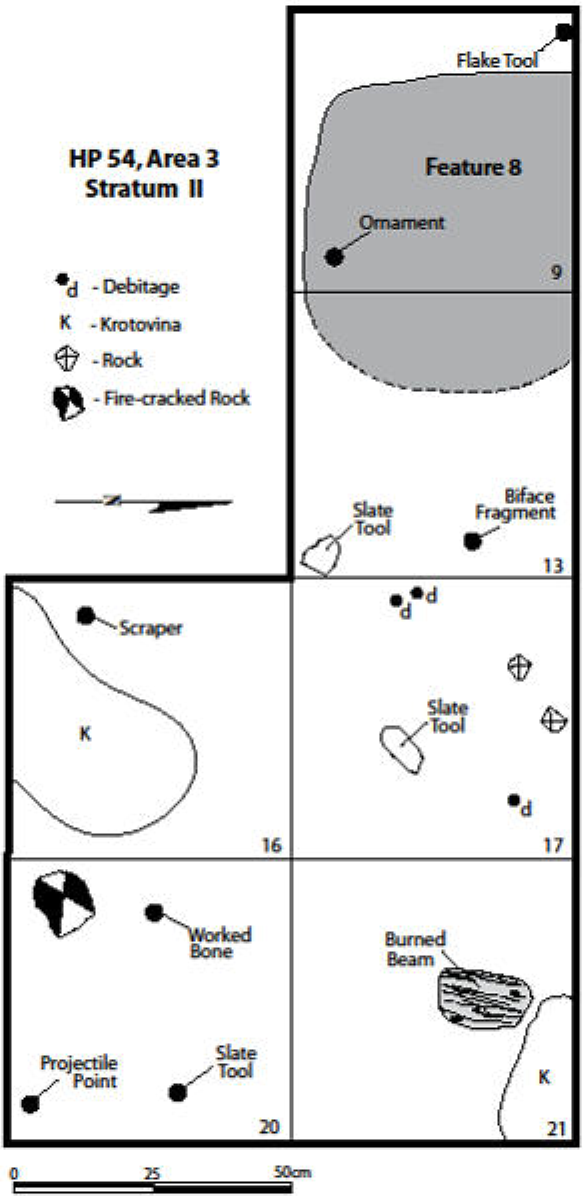


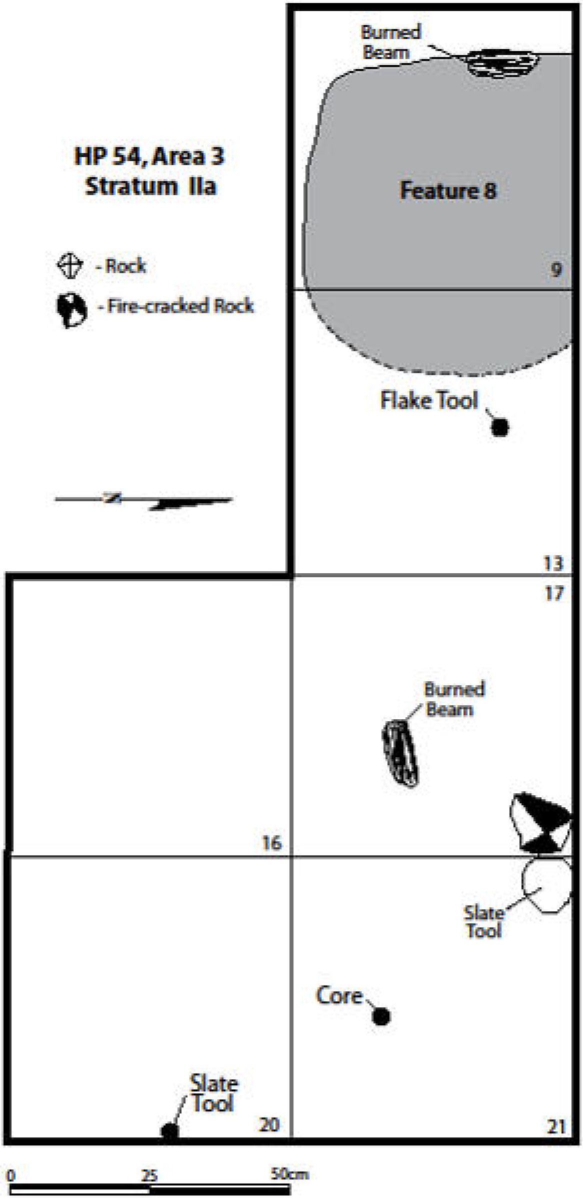
HP 54, Area 3
Stratum IIh
f - Faunal Material
d - Debitage
- Fire-cracked Rock
Dacite Cobble
f
9
13
16
17
20
21
Flake Tool
Feature 6B
Slate Tool
Feature 1
d
0
25
50cm

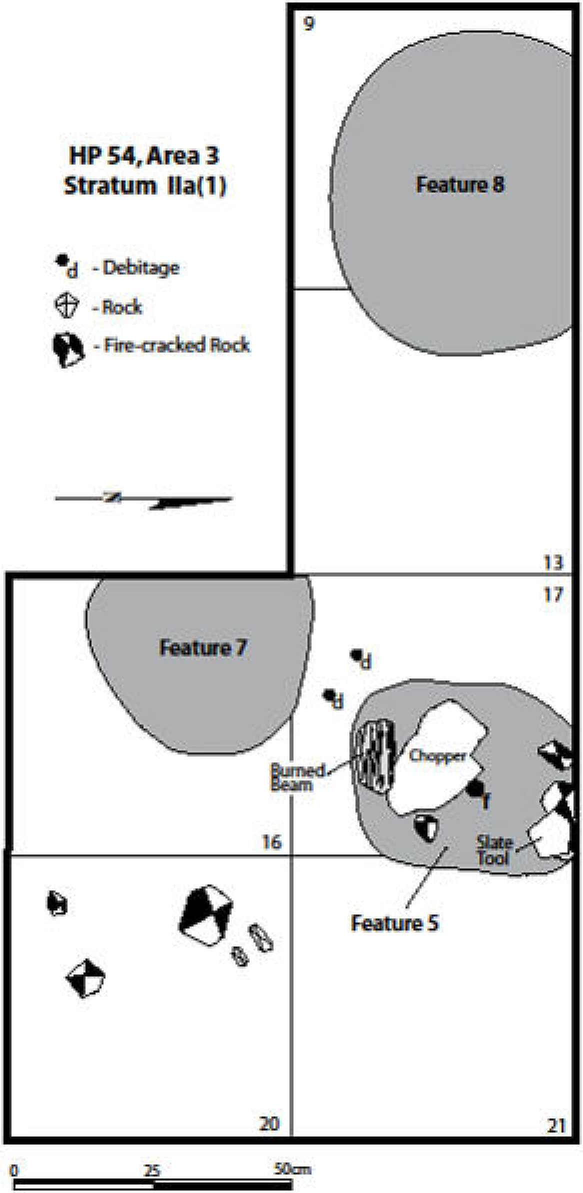

HP 54, Area 3
Stratum IIi
d - Debitage
- Fire-cracked Rock
9
13
Feature 6B
16
17
Bone Tool
d
Scraper
Hammerstone
Flake
Tool
d
d
20
21
0
25
50cm

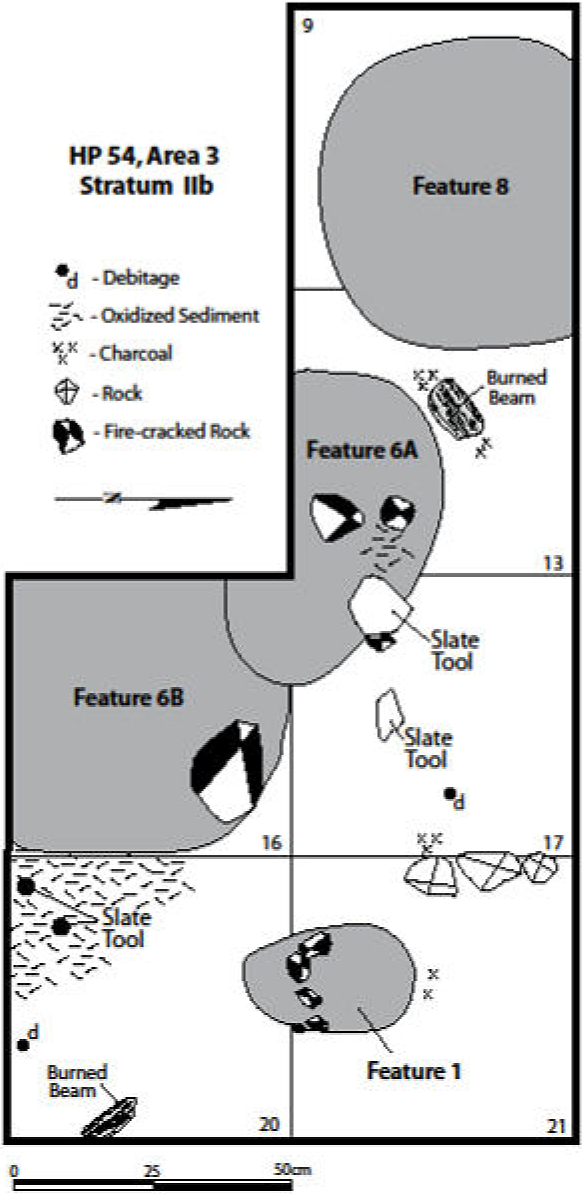

HP 54, Area 3
Stratum IIj
- Fire-cracked Rock
(Ephemeral Floor Surface)
9
13
Feature 68
16
17
20
21
0
25
50cm

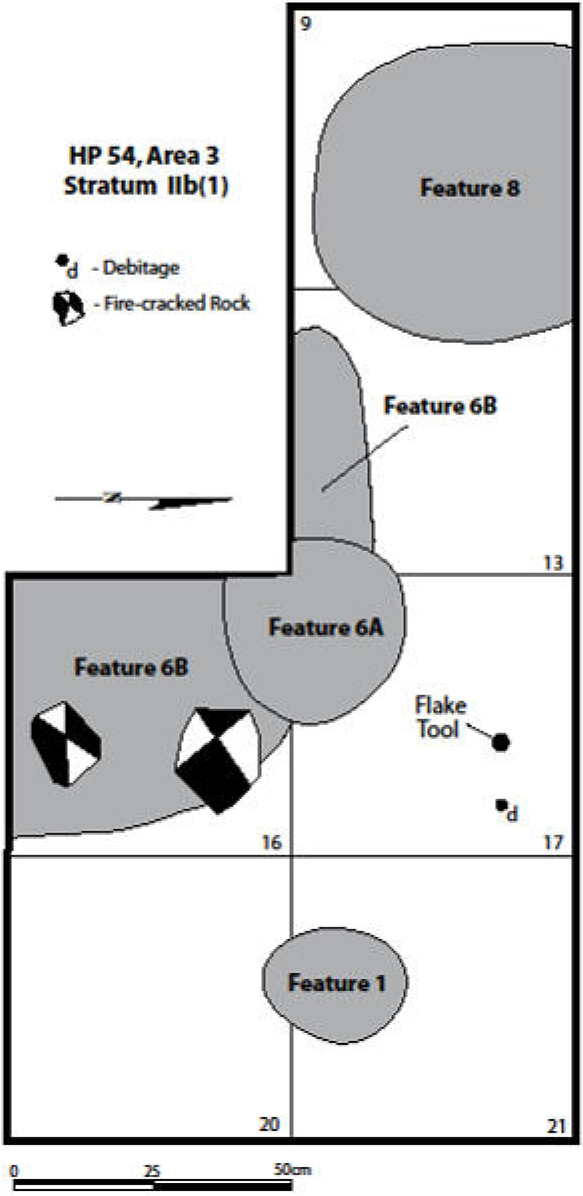

HP 54, Area 3
Stratum IIk
- Fire-cracked Rock
f - Faunal Material
Bench Surface
Edge of Bench
Flake Tool
9
13
16
17
20
21
f
Feature 6C
Feature 9
Feature 10
0
25
50cm


HP 54, Area 3
Stratum II
d - Debitage
K - Krotovina
- Rock
- Fire-cracked Rock
Flake Tool
Feature 8
Ornament
9
Slate Tool
Biface Fragment
13
Scraper
K
16
d
d
d
Slate Tool
d
17
Worked Bone
Projectile Point
Slate Tool
20
Burned Beam
K
21
0
25
50cm

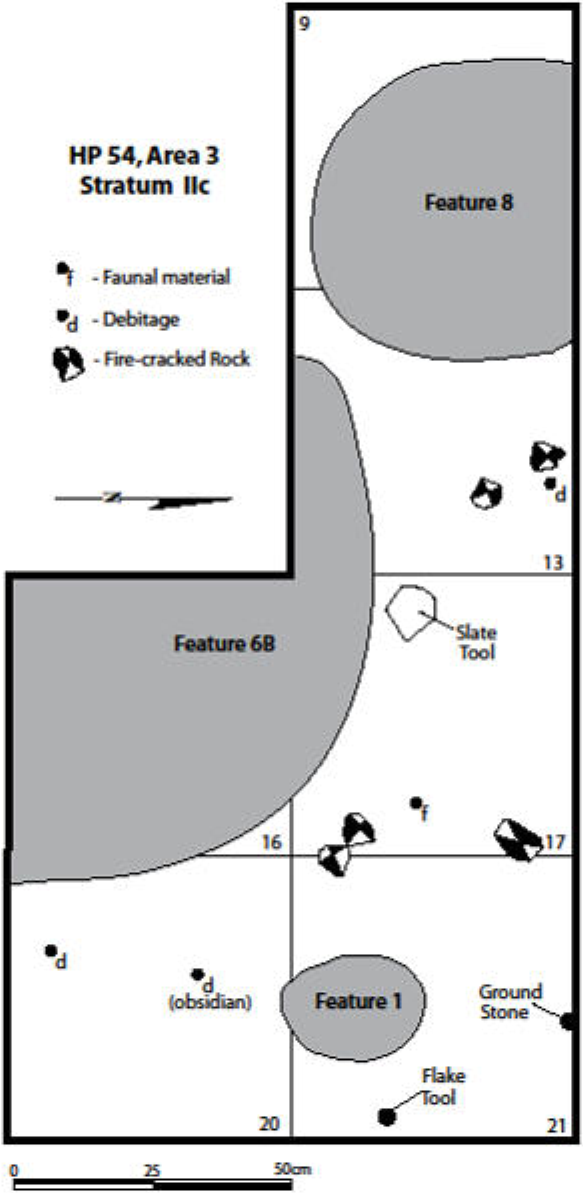

HP 54, Area 3
Stratum IIa
- Rock
- Fire-cracked Rock
Burned Beam
Feature 8
9
Flake Tool
13
17
Burned Beam
16
Slate Tool
Core
Slate Tool
20
21
0
25
50cm


HP 54, Area 3
Stratum IIa(1)
d - Debitage
- Rock
- Fire-cracked Rock
9
Feature 8
13
17
Feature 7
d
d
Chopper
Burned Beam
f
16
Slate Tool
Feature 5
20
21
0
25
50cm

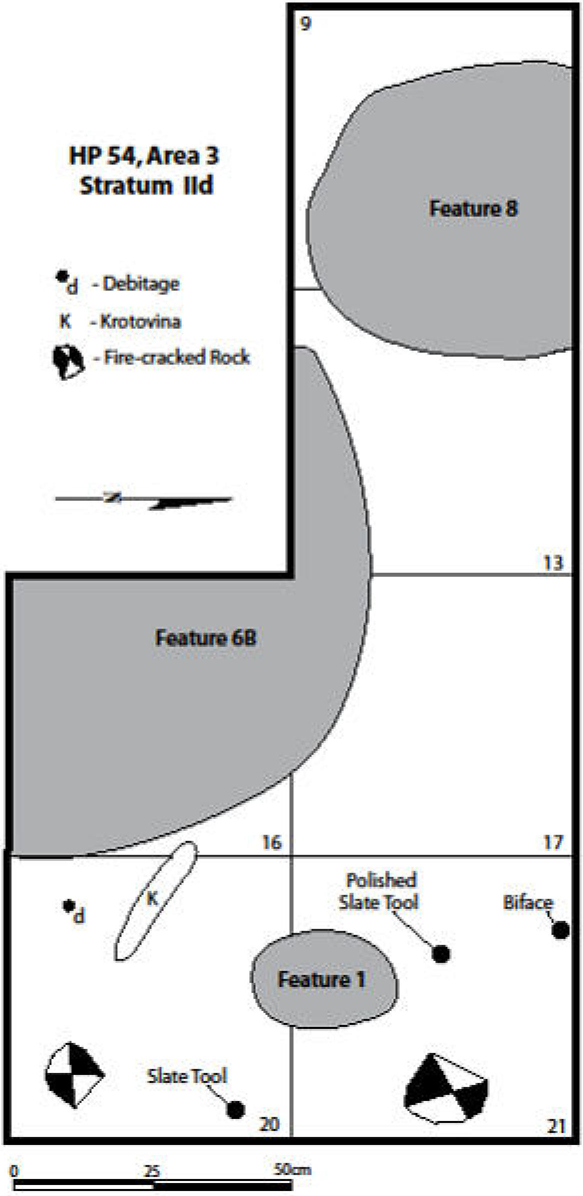

HP 54, Area 3
Stratum IIb
d - Debitage
- Oxidized Sediment
- Charcoal
- Rock
- Fire-cracked Rock
9
Feature 8
Burned Beam
Feature 6A
13
Slate Tool
Feature 6B
Slate Tool
d
16
17
Slate Tool
d
Burned Beam
Feature 1
20
21
0
25
50cm



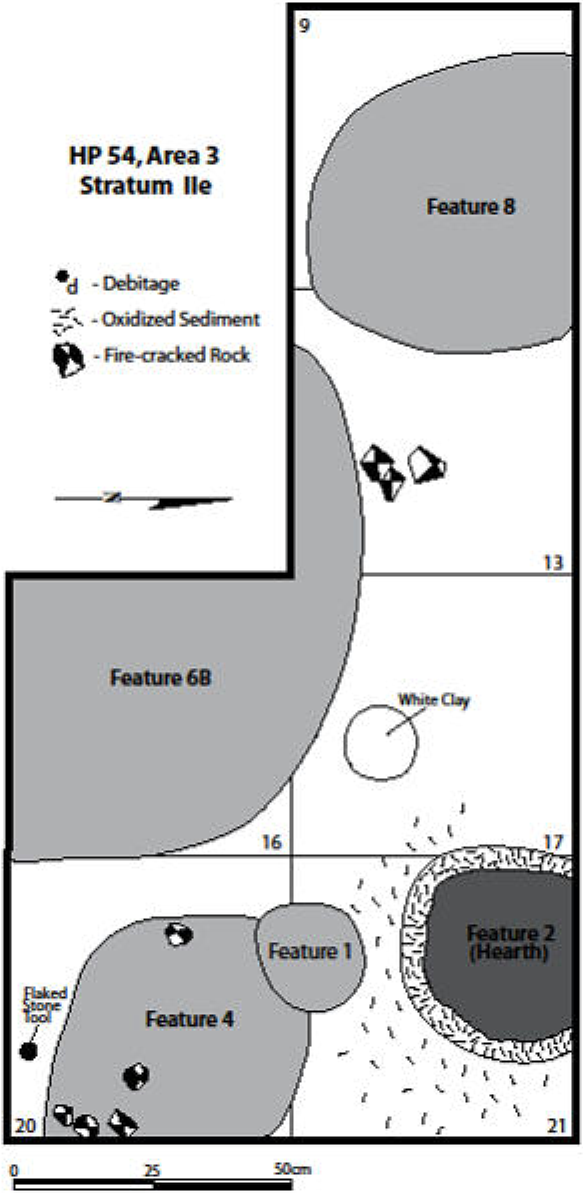
HP 54, Area 3
Stratum IIb(1)
d - Debitage
- Fire-cracked Rock
9
Feature 8
Feature 6B
13
Feature 6A
Feature 6B
Flake Tool
d
16
17
Feature 1
20
21
0
25
50cm

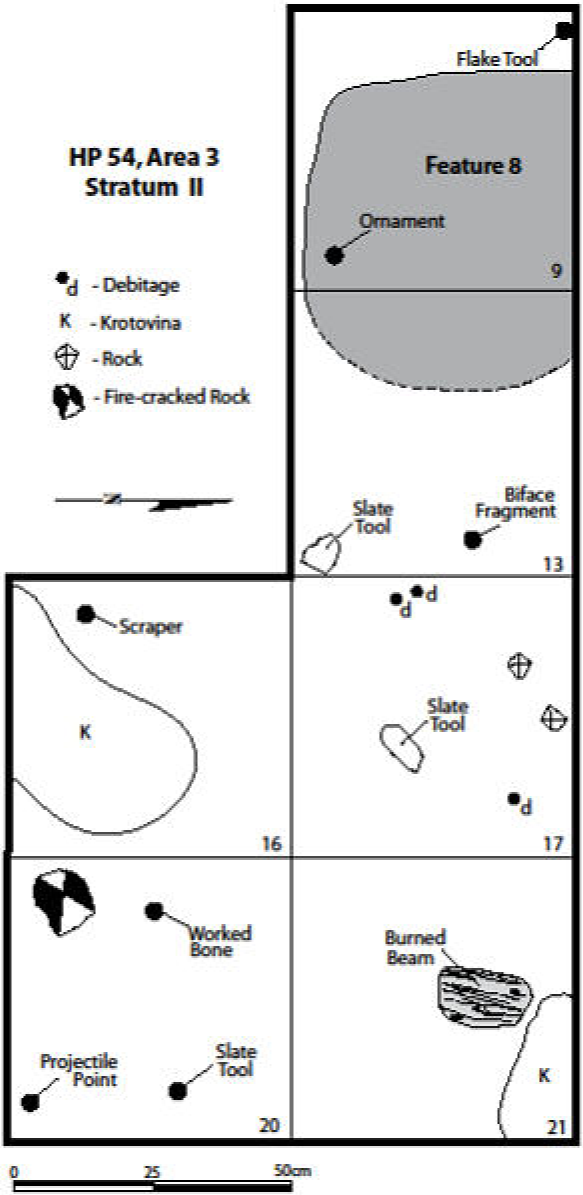


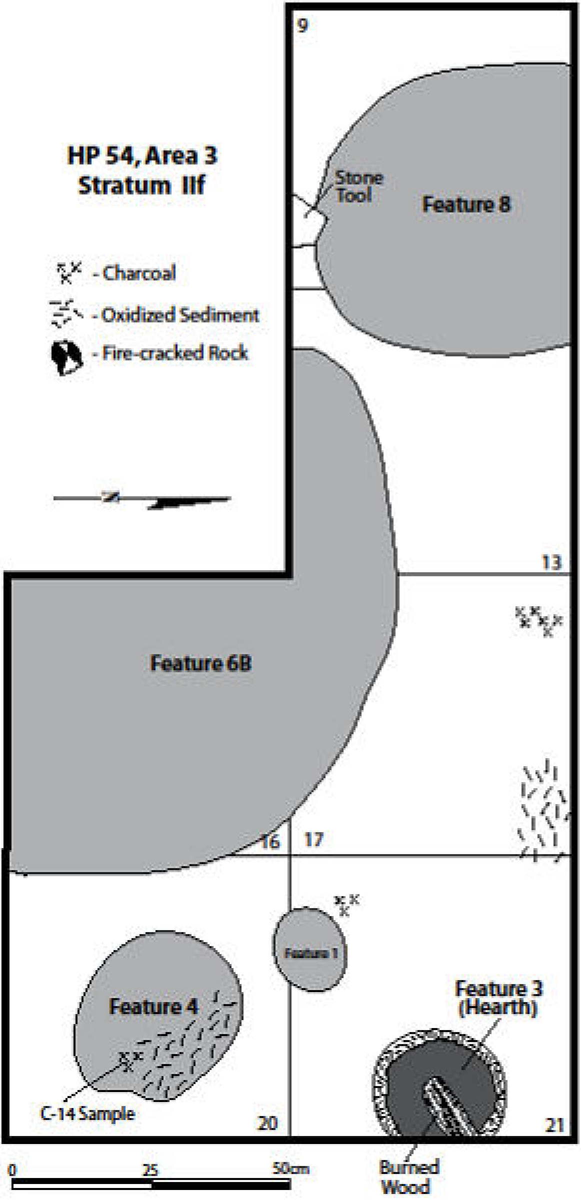
HP 54, Area 3
Stratum IIc
f - Faunal material
d - Debitage
- Fire-cracked Rock
9
Feature 8
d
13
Feature 6B
Slate Tool
f
16
17
d
d (obsidian)
Feature 1
Ground Stone
Flake Tool
20
21
0
25
50cm

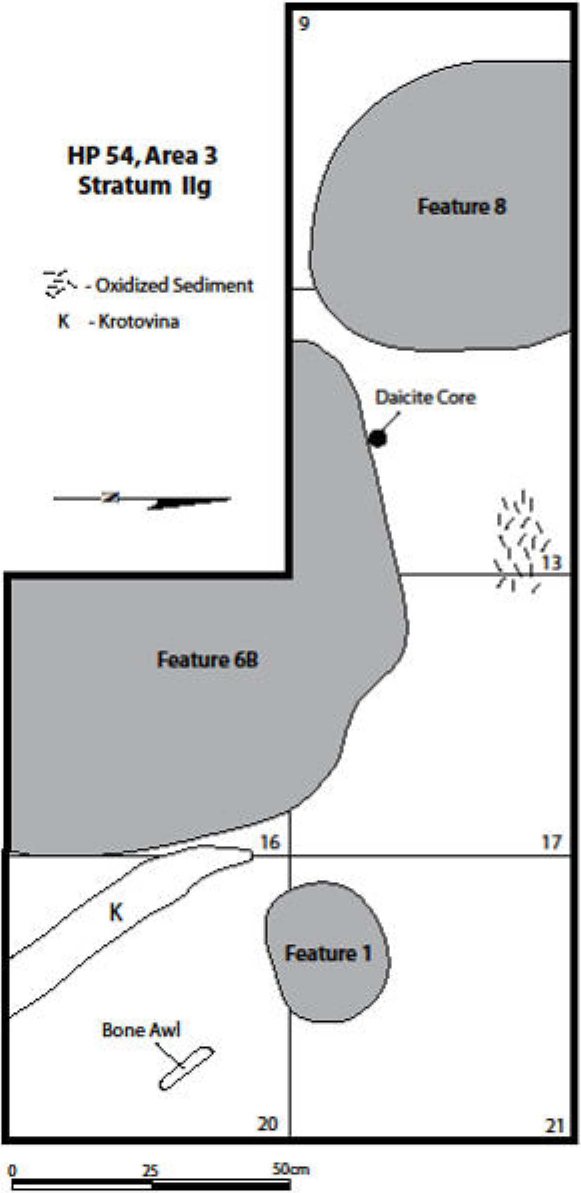


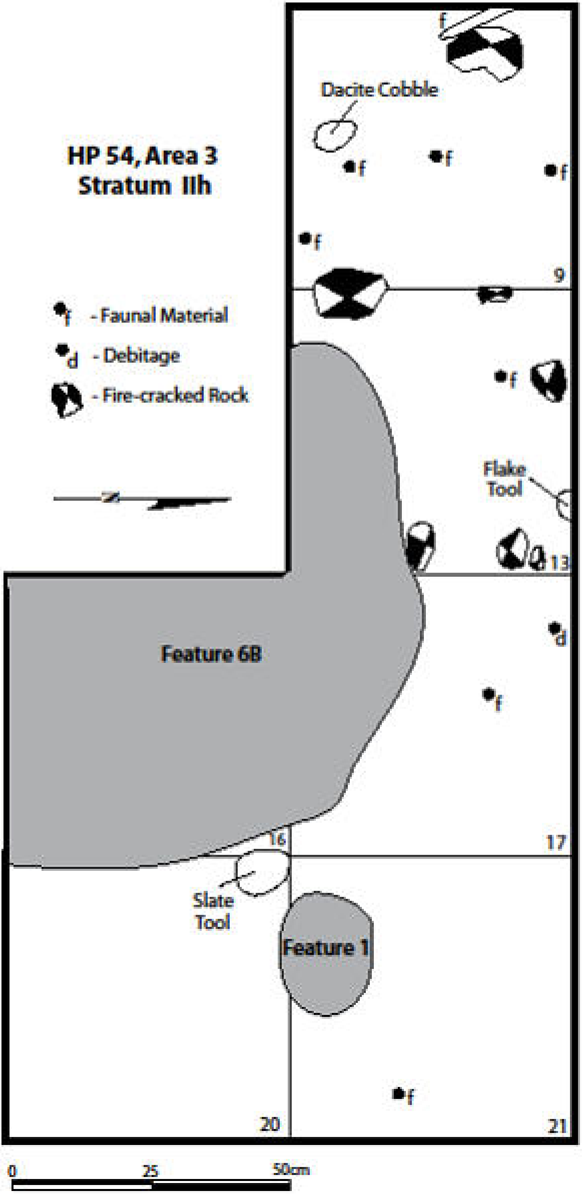
HP 54, Area 3
Stratum IId
d - Debitage
K - Krotovina
- Fire-cracked Rock
9
Feature 8
13
Feature 6B
16
17
K
d
Polished
Slate Tool
Biface
Feature 1
Slate Tool
20
21
0
25
50cm

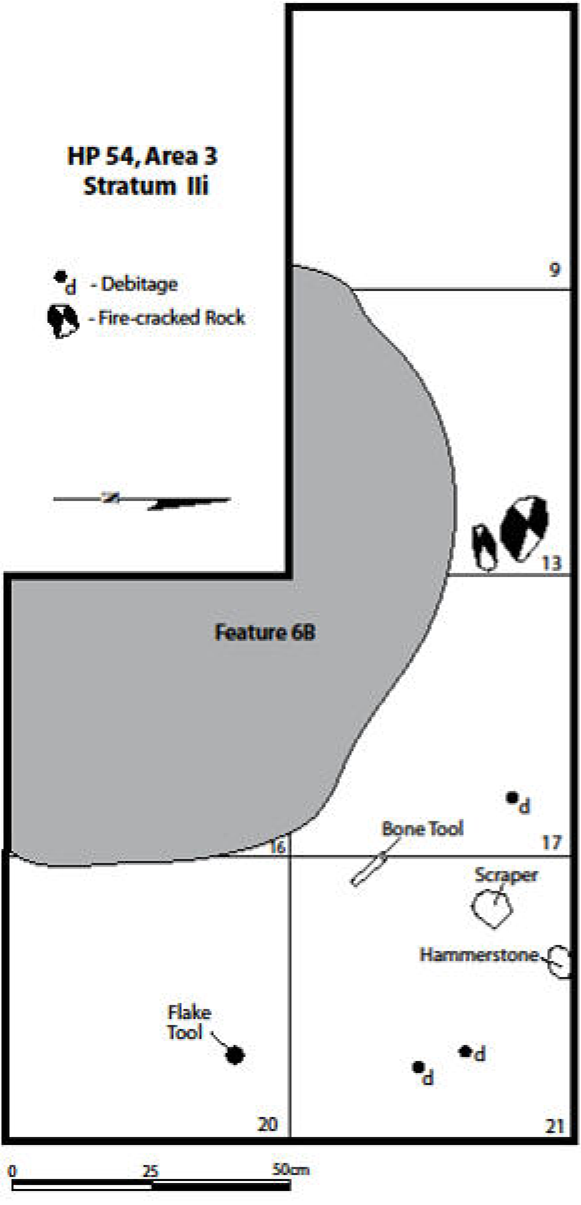

HP 54, Area 3
Stratum IIe
d - Debitage
- Oxidized Sediment
- Fire-cracked Rock
9
Feature 8
13
Feature 6B
White Clay
16
17
Feature 1
Feature 2 (Hearth)
Flaked Stone Tool
Feature 4
20
21
0
25
50cm

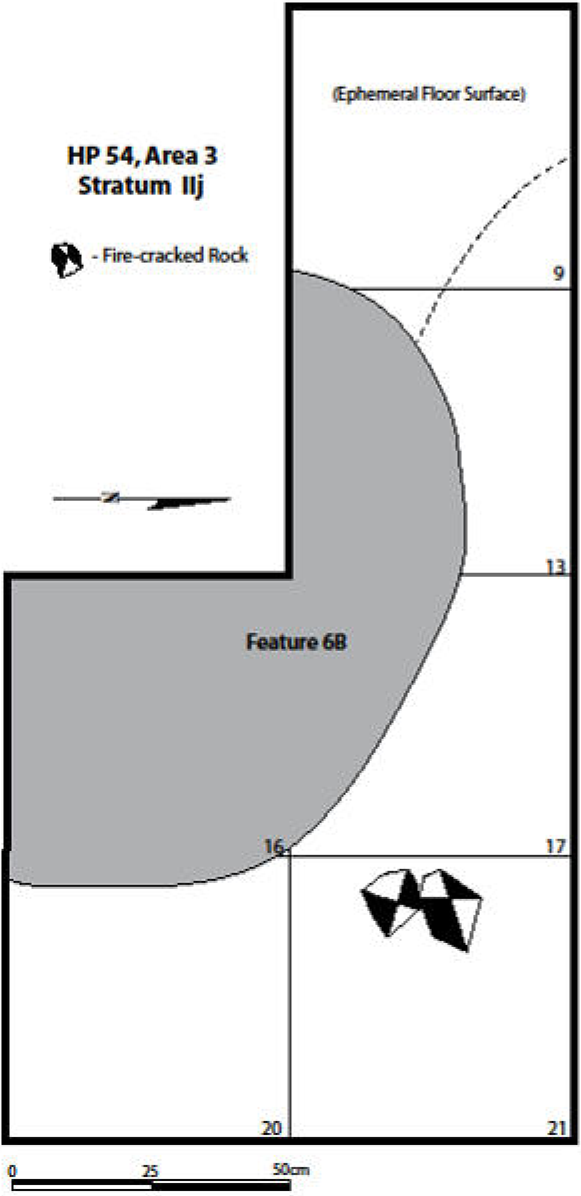

HP 54, Area 3
Stratum II
d - Debitage
K - Krotovina
- Rock
- Fire-cracked Rock
Flake Tool
Feature 8
Ornament
9
Slate Tool
Biface Fragment
13
Scraper
K
16
d
d
d
Slate Tool
d
17
Worked Bone
Projectile Point
Slate Tool
20
Burned Beam
K
21
0
25
50cm

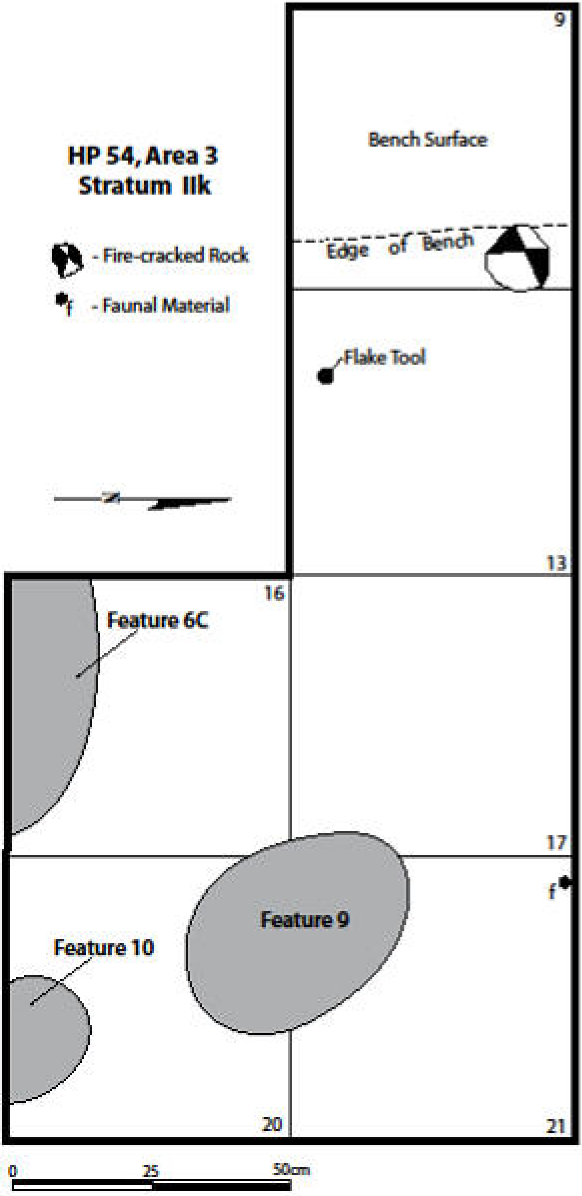

HP 54, Area 3
Stratum IIf
- Charcoal
- Oxidized Sediment
- Fire-cracked Rock
9
Stone Tool
Feature 8
13
Feature 6B
16
17
Feature 1
Feature 4
Feature 3 (Hearth)
C-14 Sample
20
21
Burned Wood
0
25
50cm

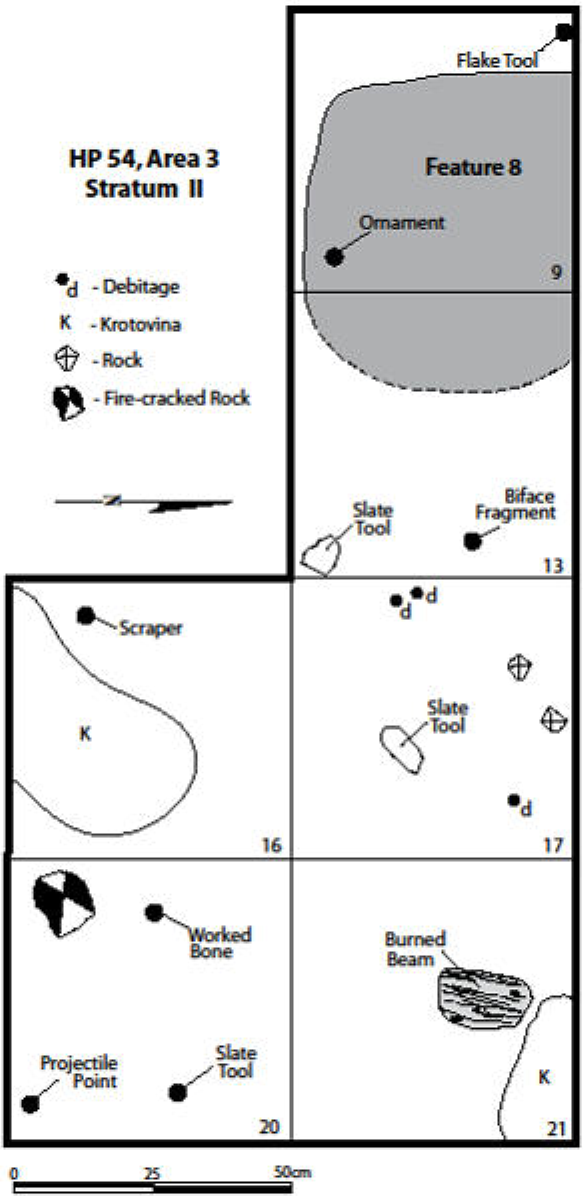

HP 54, Area 3
Stratum IIg
- Oxidized Sediment
K - Krotovina
9
Feature 8
Daicite Core
13
Feature 6B
16
17
K
Feature 1
Bone Awl
20
21
0
25
50cm

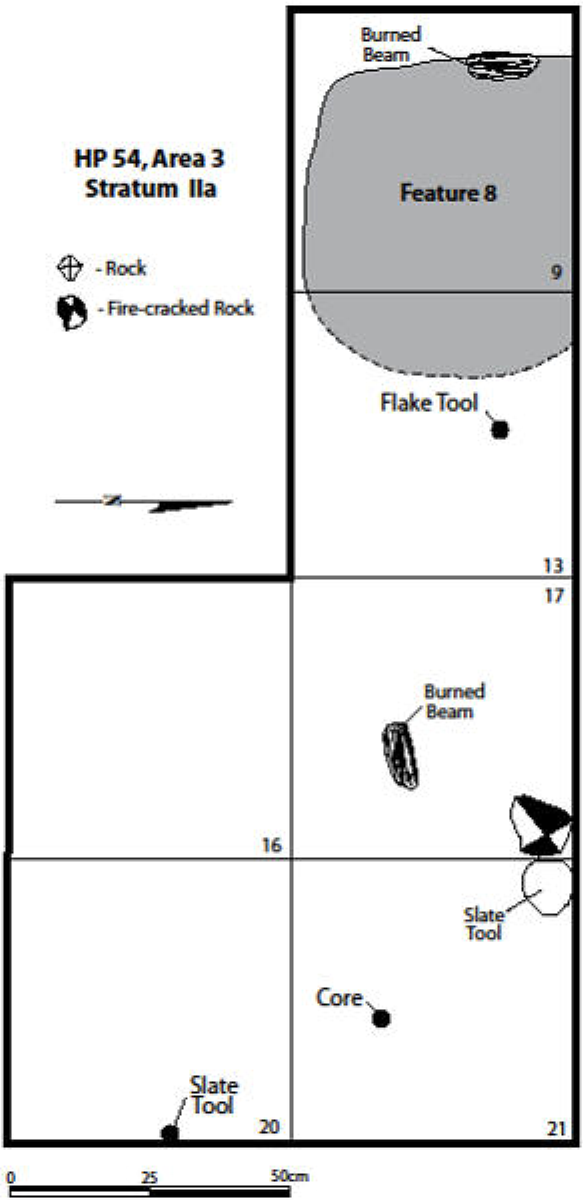

HP 54, Area 3
Stratum IIh
f - Faunal Material
d - Debitage
- Fire-cracked Rock
Dacite Cobble
Flake Tool
Feature 6B
Slate Tool
Feature 1
9
13
16
17
20
21
0
25
50cm

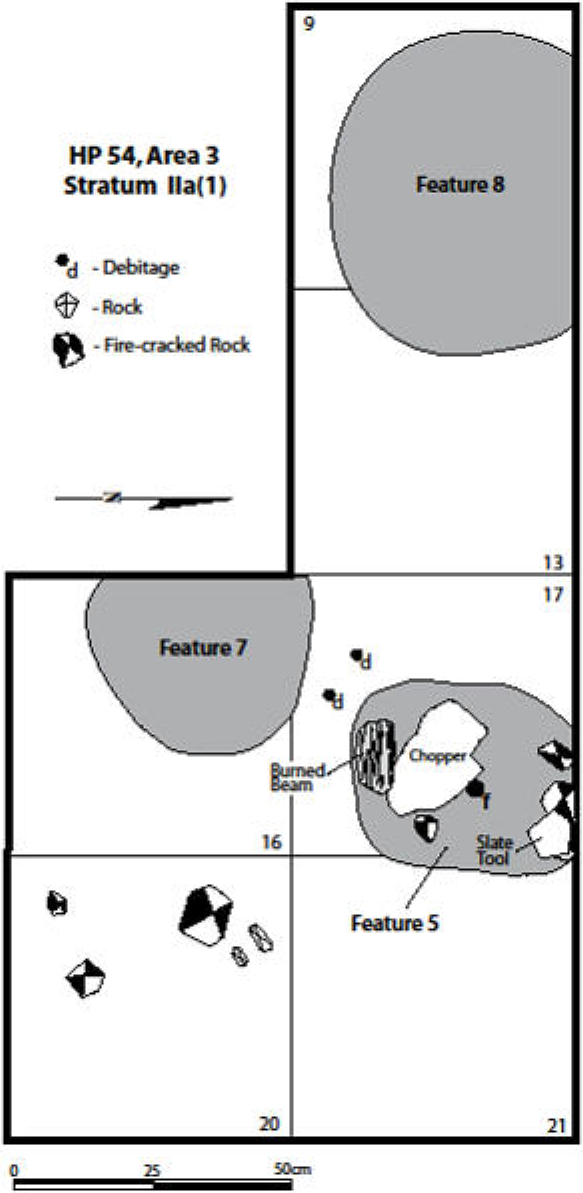

HP 54, Area 3
Stratum IIi
d - Debitage
- Fire-cracked Rock
9
13
Feature 6B
d
Bone Tool
16
17
Scraper
Hammerstone
Flake
Tool
d
d
20
21
0
25
50cm

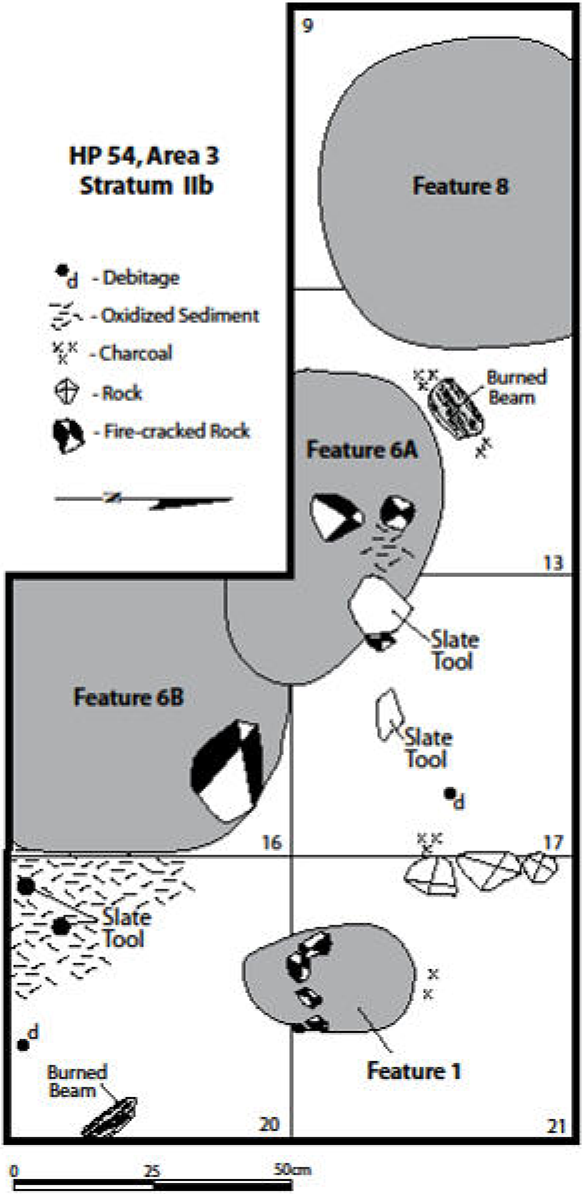

(Ephemeral Floor Surface)
HP 54, Area 3
Stratum IIj
- Fire-cracked Rock
9
13
Feature 68
16
17
20
21
0
25
50cm

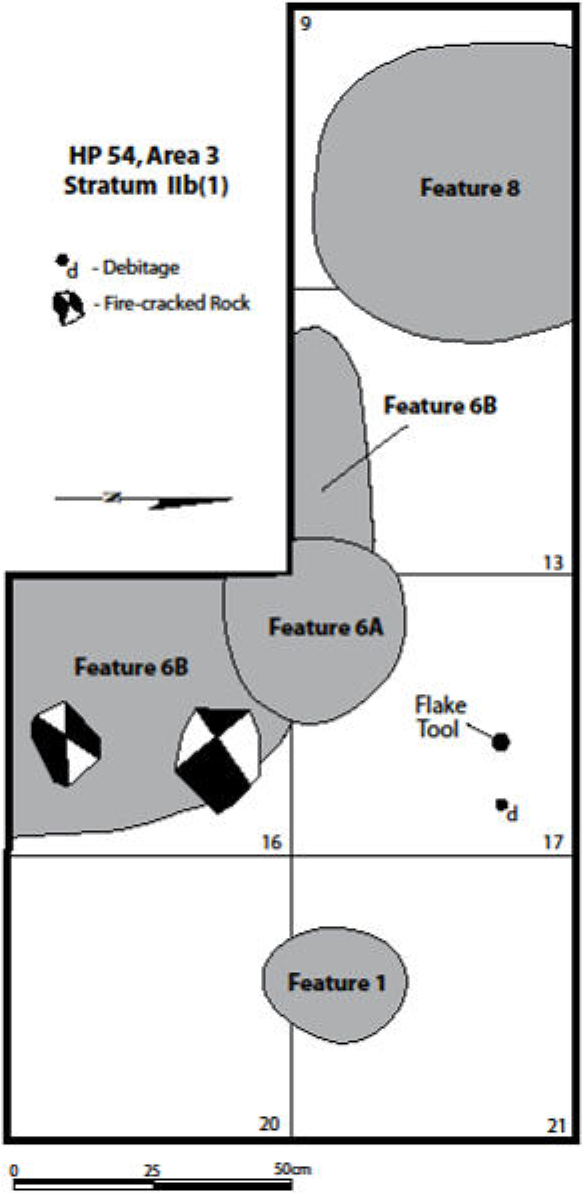

HP 54, Area 3
Stratum IIk
- Fire-cracked Rock
f - Faunal Material
Bench Surface
Edge of Bench
Flake Tool
9
13
16
17
20
21
f
Feature 6C
Feature 9
Feature 10
0
25
50cm

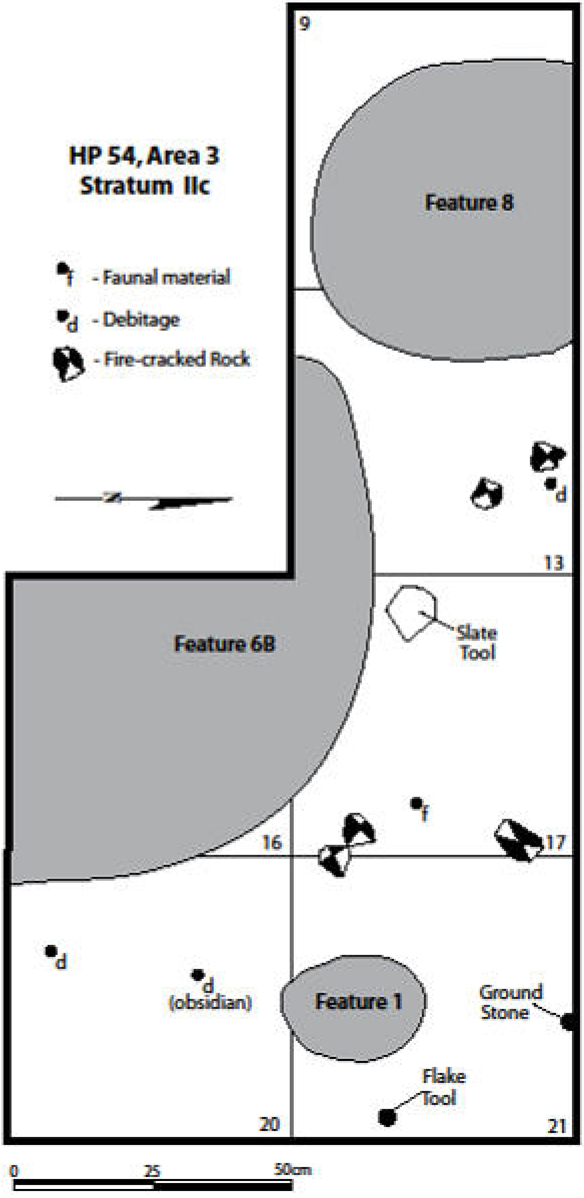

HP 54, Area 3
Stratum II
d - Debitage
K - Krotovina
- Rock
- Fire-cracked Rock
Flake Tool
Feature 8
Ornament
9
Slate Tool
Biface Fragment
13
Scraper
K
16
d
d
Slate Tool
d
17
Worked Bone
Projectile Point
Slate Tool
20
Burned Beam
K
21
0
25
50cm

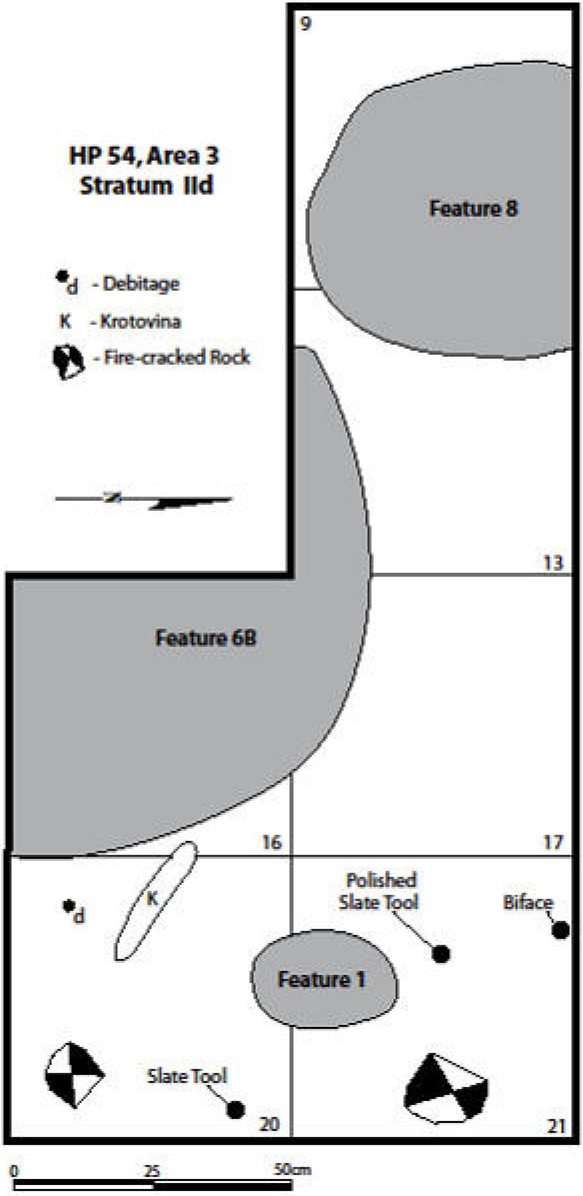

HP 54, Area 3
Stratum IIa
- Rock
- Fire-cracked Rock
Burned Beam
Feature 8
9
Flake Tool
13
17
Burned Beam
16
Slate Tool
Core
Slate Tool
20
21
0
25
50cm


HP 54, Area 3
Stratum IIa(1)
d - Debitage
- Rock
- Fire-cracked Rock
9
Feature 8
13
17
Feature 7
d
d
Chopper
Burned Beam
f
Slate Tool
16
Feature 5
20
21
0
25
50cm

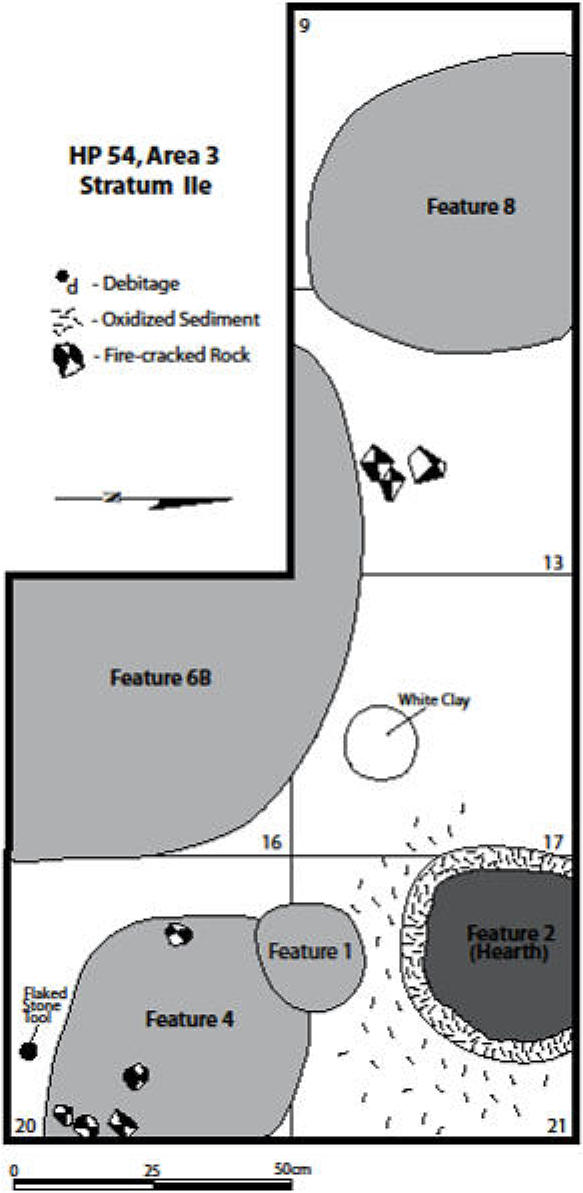

HP 54, Area 3
Stratum IIb
d - Debitage
- Oxidized Sediment
- Charcoal
- Rock
- Fire-cracked Rock
9
Feature 8
Burned Beam
Feature 6A
13
Slate Tool
Feature 6B
Slate Tool
d
16
17
Slate Tool
d
Burned Beam
Feature 1
20
21
0
25
50cm


HP 54, Area 3
Stratum IIb(1)
d - Debitage
- Fire-cracked Rock
9
Feature 8
Feature 6B
13
Feature 6A
Feature 6B
Flake
Tool
d
16
17
Feature 1
20
21
0
25
50cm

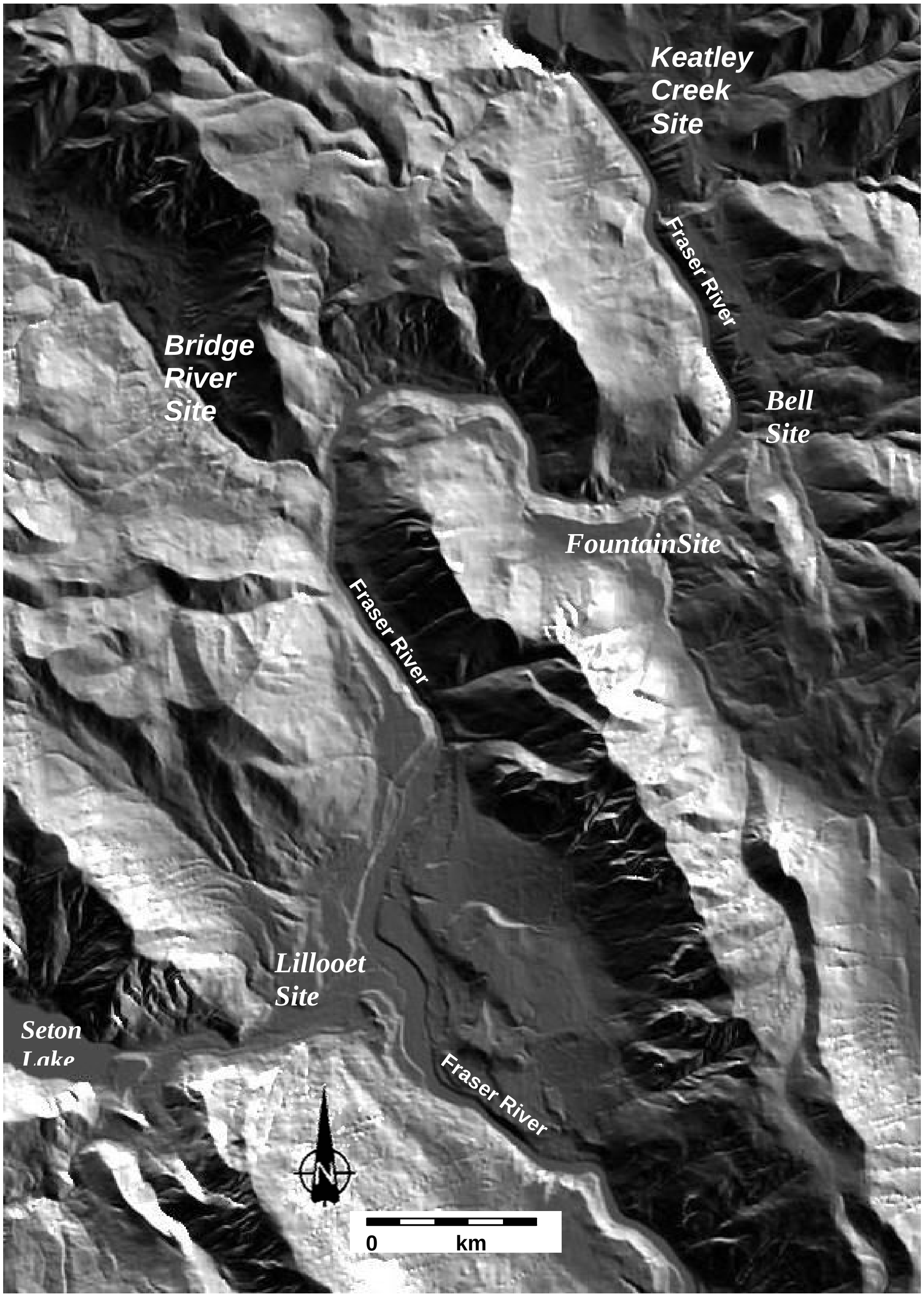

HP 54, Area 3
Stratum IIc
f - Faunal material
d - Debitage
- Fire-cracked Rock
9
Feature 8
d
13
Feature 6B
Slate Tool
f
16
17
d
d
(obsidian)
Feature 1
Ground Stone
Flake Tool
20
21
0
25
50cm



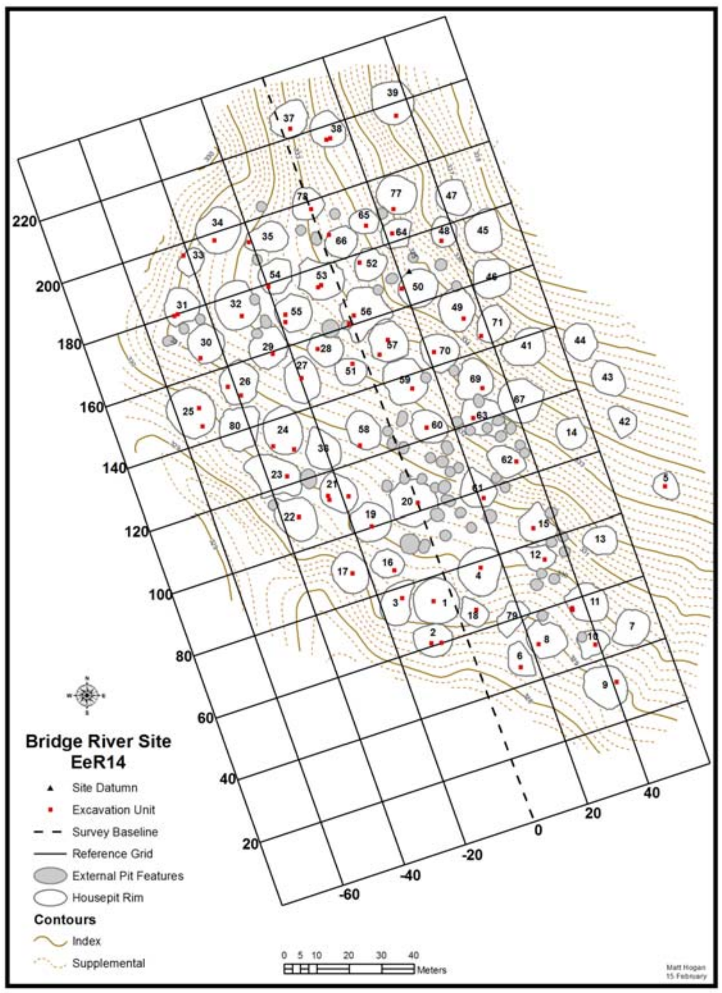
HP 54, Area 3
Stratum IId
d - Debitage
K - Krotovina
- Fire-cracked Rock
9
Feature 8
13
Feature 6B
16
17
K
d
Polished
Slate Tool
Biface
Feature 1
Slate Tool
20
21
0
25
50cm



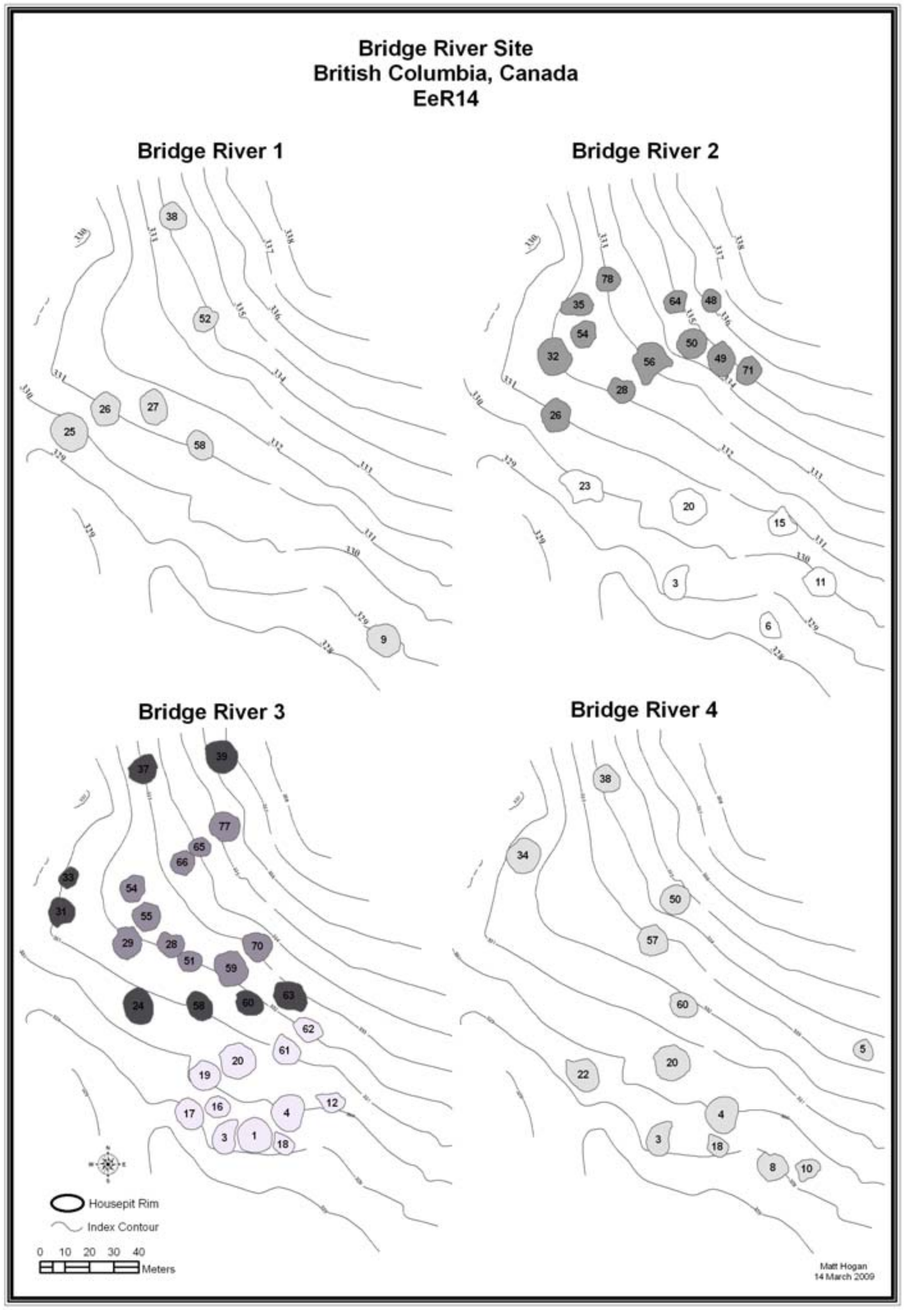
HP 54, Area 3
Stratum IIe
d - Debitage
- Oxidized Sediment
- Fire-cracked Rock
9
Feature 8
13
Feature 6B
White Clay
16
17
Feature 1
Feature 2
(Hearth)
Flaked
Stone
Tool
Feature 4
20
21
0
25
50cm



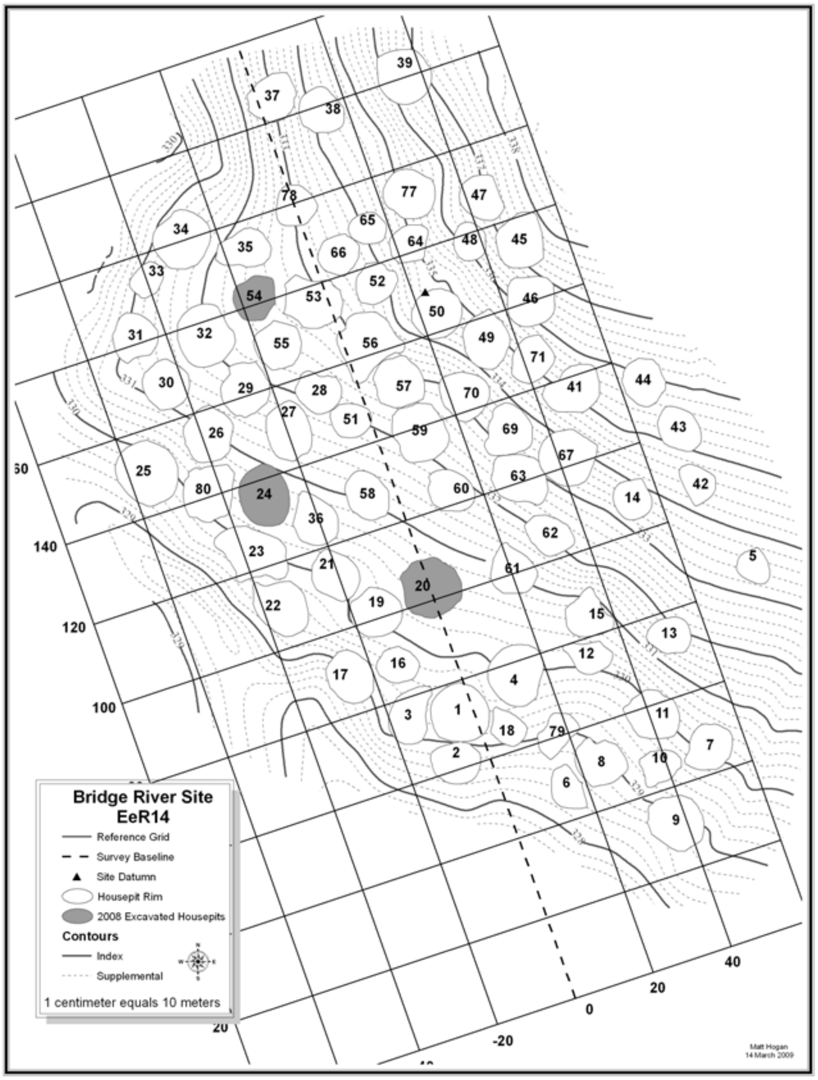
Major archaeological sites in the Middle Fraser Canyon.



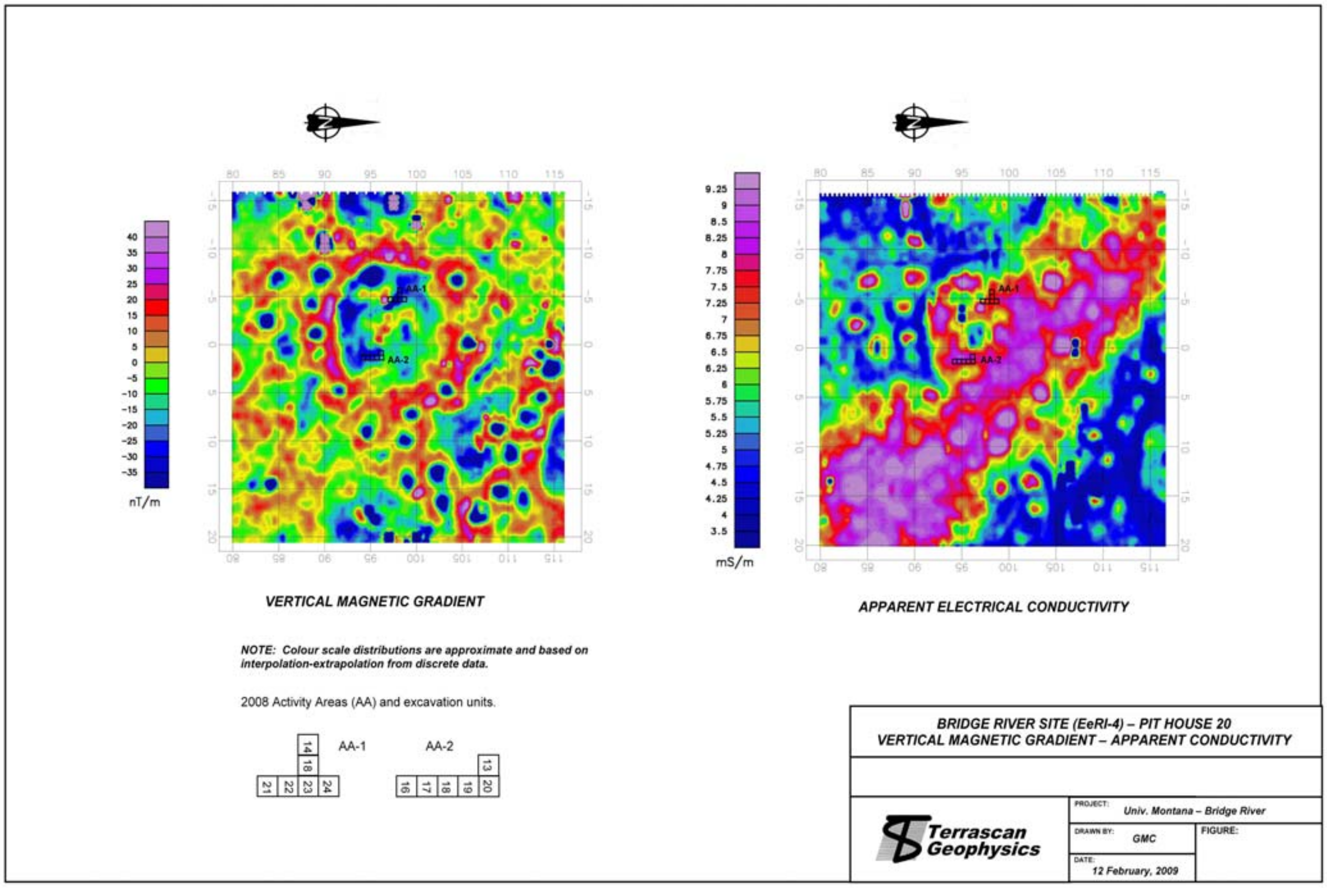
Bridge River site map with superimposed excavation grid.



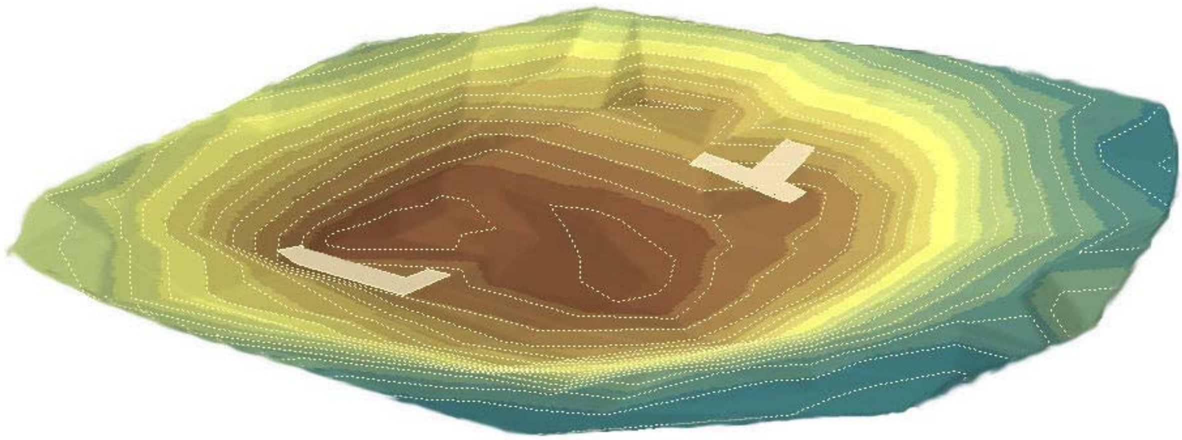
Map of house distributions across the Bridge River site by occupation period (updated with new radiocarbon dates).



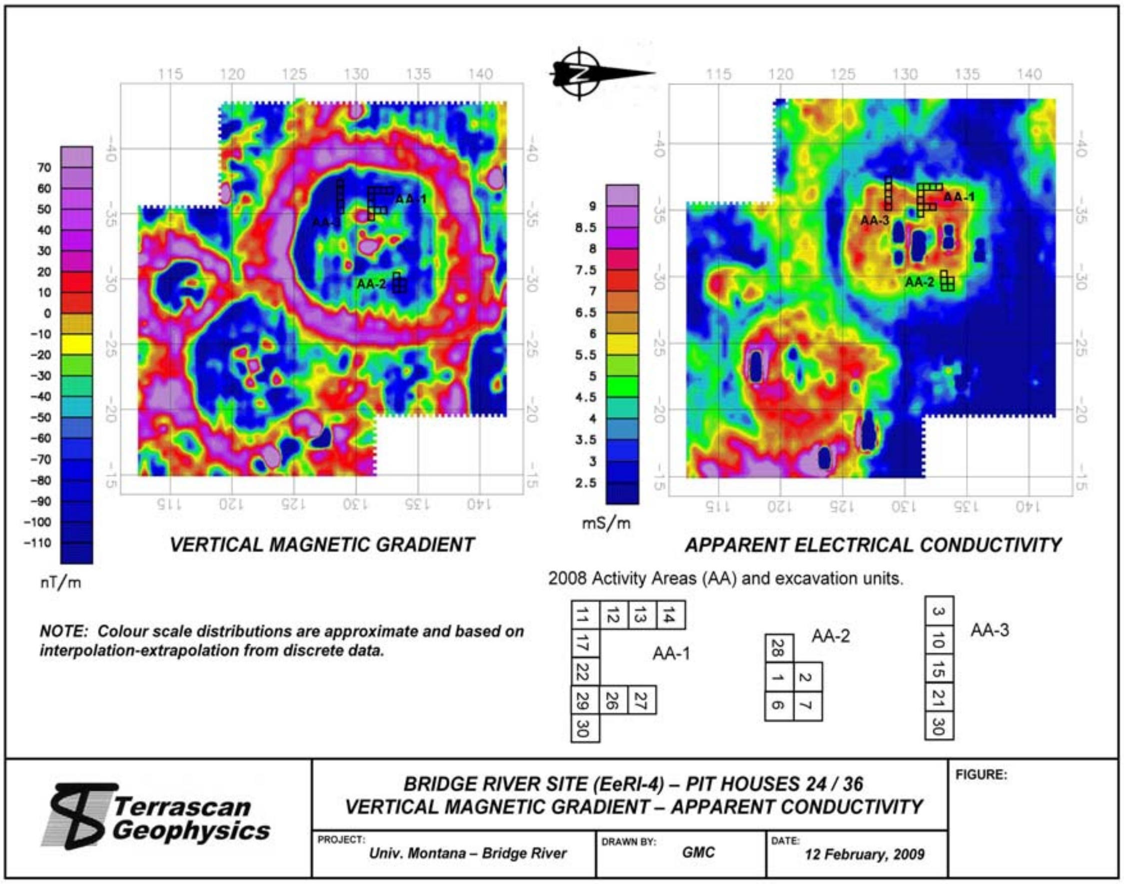
Bridge River site housepits excavated during the 2008 field season.



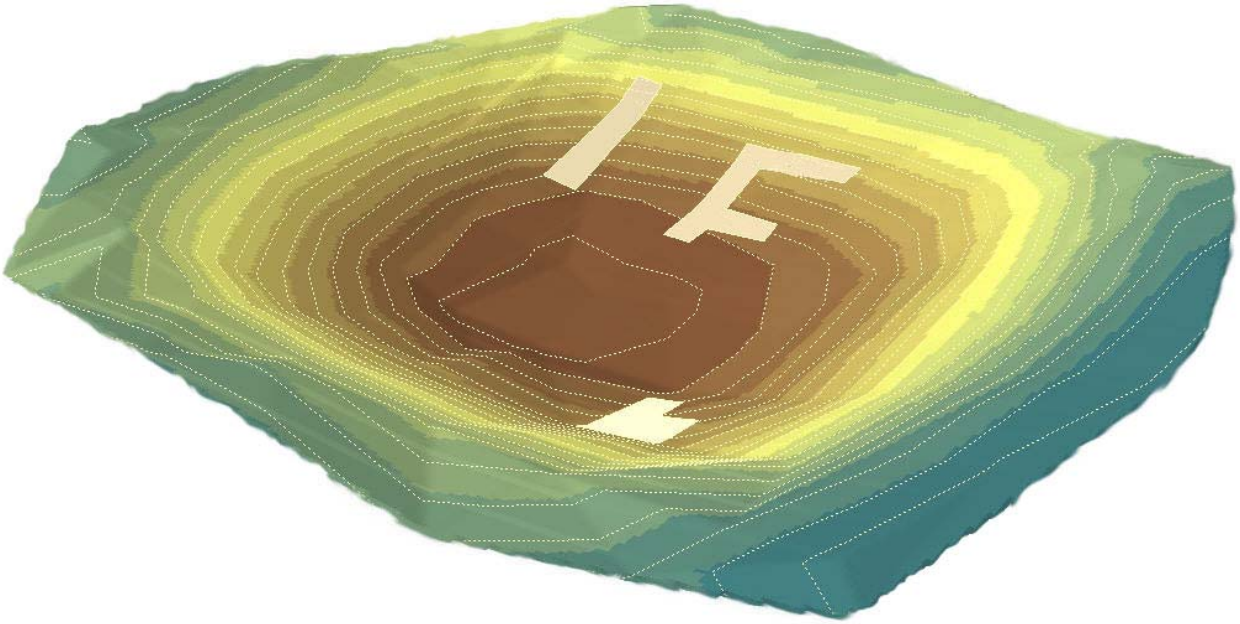
Geophysical maps of Housepit 20 with plotted excavation units from 2008.



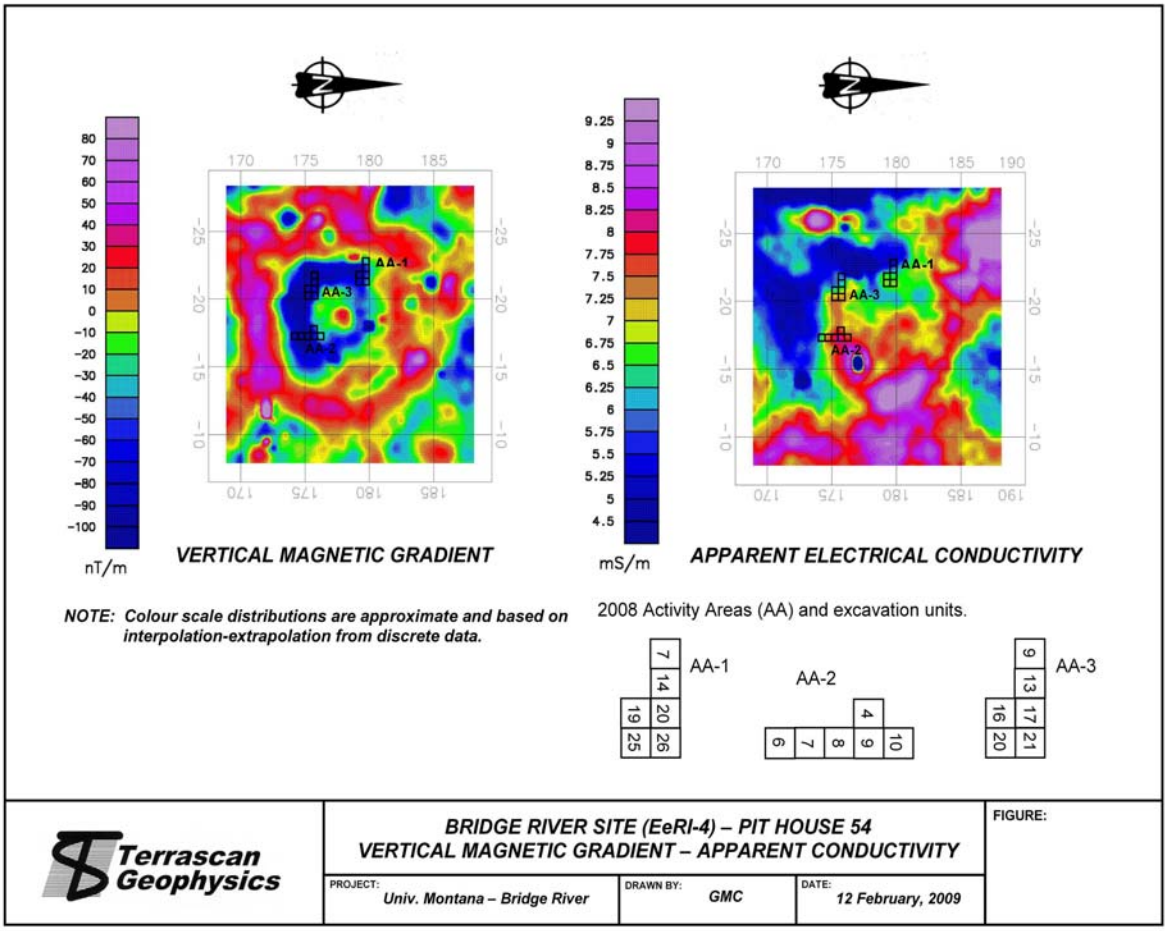
Contour map of Housepit 20 with excavation units superimposed (view facing SW).



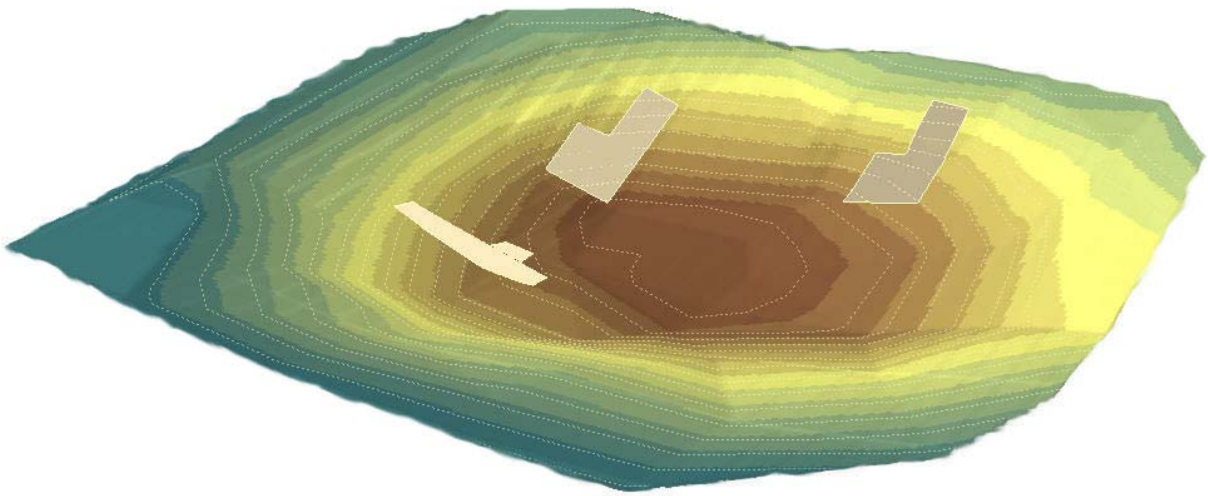
Geophysical maps of Housepit 24 with plotted excavation units from 2008.



Contour map of Housepit 24 with excavation units superimposed (view facing SW).



Geophysical maps of Housepit 54 with plotted excavation units from 2008.

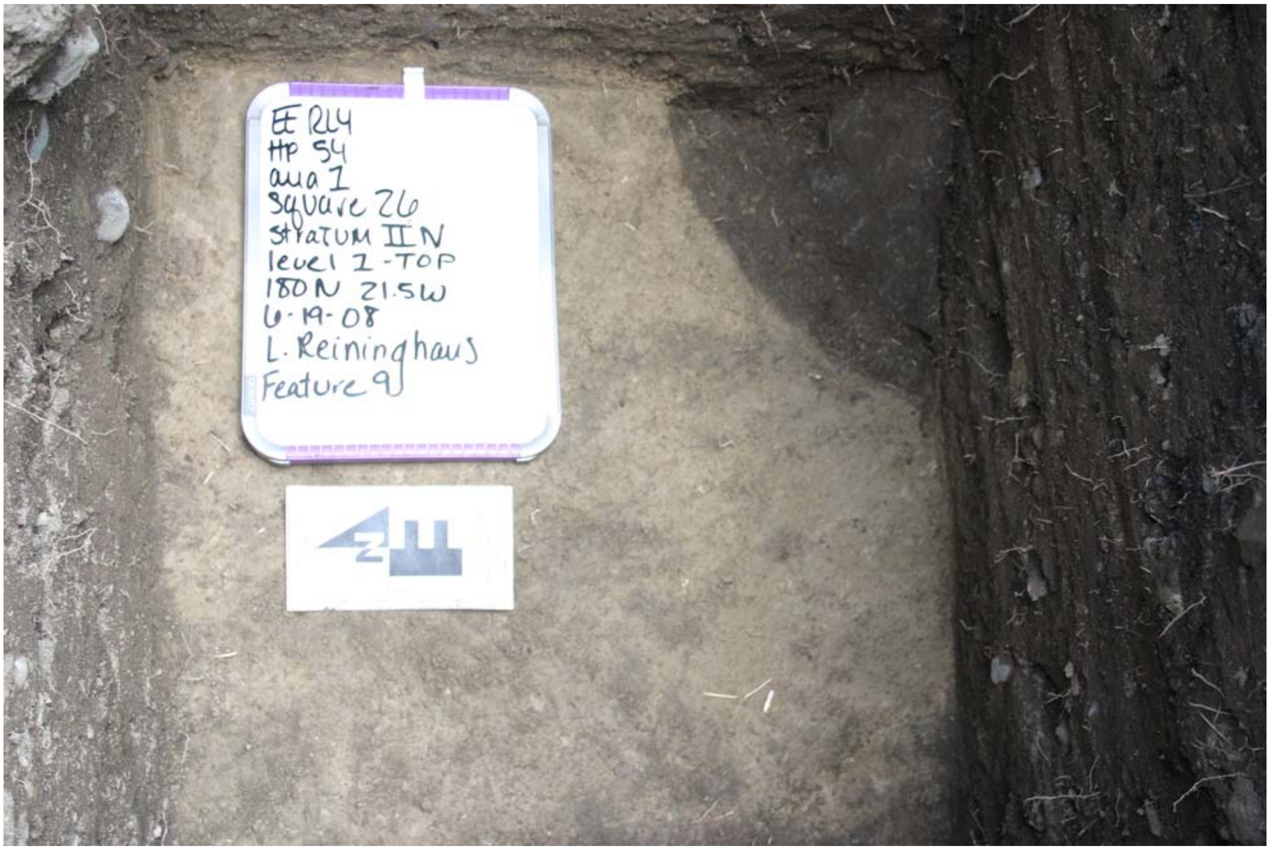


Contour map of Housepit 54 with excavation units superimposed (view facing SW).

Housepit 54 (view facing west).

Housepit 54, Area 1, North Wall Profile.

Housepit 54, Area 1, BR 4 *in situ* post



Housepit 54, Area 1, Feature 9.

Housepit 54, Area 3, North Wall Profile.

Housepit 54, Area 3, Feature 8 plan view, post-excavation.

Housepit 54, Area 3, Features 6b and 6c (lower left) profiles and partial plan views.

Housepit 54, Area 2, East Wall profile, south end.

Housepit 54, Area 2, East Wall profile, north end.

Housepit 54, Area 2, Features 2 and 4 Plan View.

Housepit 24, view facing south.

Housepit 24, Area 3, North Wall Profile, west end.

Housepit 24, Area 3, North Wall Profile, middle and east end.

Housepit 24, Area 3, Feature 1, facing west.

Housepit 24, Area 3, Feature 1 detail, dog skull.

Housepit 24, Area 1, Scatter of shallow pits.

Housepit 24, Area 1, Feature 5, Plan View.

Housepit 24, Area 2, Squares 1 and 6, North Wall Profile.

Housepit 24, Area 2, South Wall Profile.

Housepit 24, Area 2, Feature 2, Plan View.

Housepit 20, view facing south.

Housepit 20, Area 2, East Wall Profile.

Housepit 20, Area 2, East Wall Profile, Detail.

Housepit 20, Area 1, West Wall Profile, south end.

Housepit 20, Area 1, Features 1, 2, 3, Plan View.

Housepit 20, Area 1, Unit 14, Feature 3, Plan View.

Bridge River lithics Database Key (originally adapted from Brian Hayden's Keatley Creek lithic typology with addended artifact types):

Unifacially Retouched Artifacts

143 - Scraper retouch Flake
150 - Single Scraper
155 – Keeled Scraper
156 – Alternate Scraper
158 – Key Shaped uniface
163 – inverse scraper
164 – Double scraper
165 – convergent scraper
70 – expedient knife
74 – lightly retouched expedient knife
148 – flake with polish sheen
170 expedient knife normal retouch
171 – flake with trampling retouch
180 - used flake
71 – used flake on break
72 – used flake on thin flake edge
73 – used flake on strong flake edge
157 – miscellaneous uniface
161 – thumbnail scraper
162 – end scraper
153 – small piercer
152 – unifacial borer
160 – unifacial denticulate
159 – unifacial knife
151 – unifacial perforator
50 – unifacial blade tool
188 – retouched backed tool
154 – notch
54 – small notch
88 – Dufour bladelet
183 – spall tool
184 – retouched spall tool
1 – miscellaneous
232 – stemmed scraper
255 – Abruptly retouched truncation on a flake

Bifacial Artifacts

192 – Stage 2 biface
193 – Stage 3 biface
131 – Stage 4 biface

139 – fan tailed biface
140 – knife-like biface
141 – scraper-like biface
144 – convergent knife-like biface
6 – biface fragment
135 – Distal tip of a biface
4- biface retouch flake with hide polish
130 – bifacial knife
8 – large biface reduction flake
132 – bifacial perforator
133 – bifacial drill
145 – piece esquillees
2 – miscellaneous biface
225 “Tang” knife
240 – chipped wedge tool on angular slate or shale
258 – Hafted knife on a spall
262 – Side notched bifacial drill (drill on Kamloops point)

Points

191 – blank
91 – small blank
134 – preform
36 – point fragment
35 – point tip
99 – misc. point
109 – side-notch point no base
102 – Lehman point
101 – Lochnore point
137 – Kamloops preform
110 – Kamloops Side-notched point concave base
111 – Kamloops Side-notched point straight base
112 – Kamloops Side-notched point convex base
113 – Kamloops multi-notched point
114 – Kamloops stemmed
136 – Plateau preform
115 – Plateau corner-notched point concave base
116 – Plateau corner-notched point straight base
117 – Plateau corner-notched point convex base
118 – Plateau corner-notched point no base
119 – Plateau basally-notched point straight base
19 – Late Plateau point
120 – Shuswap base
121 – Shuswap contracted stem slight shoulders
122 – Shuswap contracted stem pronounced shoulders
123 – Shuswap parallel stem slight shoulders

124 – Shuswap parallel stem pronounced shoulders
125 – Shuswap corner removed concave base
126 – Shuswap corner-removed “eared”
127 – Shuswap Stemmed single basal notch
128 – Shuswap shallow side-notched straight basal margin
129 – Shuswap shallow side-notched concave basal margin
231 – ground/sawed slate projectile point
244 – small triangular point
245 – large straight to concave base side-notch point
229 – Shuswap 10: Stem/eared with concave base
237 – “El Khiam” style point: side notched point on a triangular blade-like flake
251 – slate side-notched point with a straight base
236 – limestone or marble projectile point
256 – Kamloops split base corner notched
254 – Large square stemmed dart point

Cores

186 – multidirectional core
187 – small flake core
189 – unidirectional core
146 – bipolar core
149 – microblade core
147 – microblade
182 – core rejuvenation flake
221 – core on slate tool

Groundstone

218 – celt
209 – ornamental ground nephrite
203 – ground slate
219 – groundstone maul
211 – groundstone mortar
190 – hammerstone
204 – steatite tubular pipe
202 – sandstone saw
200 – misc. groundstone
207 – abraded cobble or block
208 – abraded cobble spall
201 – abrader
205 – abrader/saw
185 – wedge-shaped bifacial adze
206 – anvil stone
220 – ground slate piercer/borer with chipped edges
228 – groundstone adze on a natural break

250 – ground nephrite scraper
235 – metate
234 – burnishing/polishing stone
242 – ochre grinding stone
222 – slate scraper
226 – sawed gouge (two converging sawed edges forming a robust point)
230 – slate knife
233 – nephrite adze
241 – sawed adze
246 – slate knife with bored hole
257 – Ground slate adze, without cutting
259 – Groundstone cube
260 – Mano
261 – Groundstone effigy
263 – Ground slate chopper
264 – sawed adze perform
265 – Shallow ground stone bowl
266 – sawed scraper on an igneous spall
267 – Miscellaneous groundstone base, possible effigy or bowl
238 – groundstone spike
239 – small stone bowl

Ornaments

217 – copper artifact
212 – mica ornament
216 – ground or sculpted ornament
214 – stone bead
210 – ochre
215 – stone pendant or eccentric
252 – copper bead
253 – copper pendant
243 – sawed/sliced bead (early stage in production)

Other

213 – metal artifact
254 – debitage
255 – bipolar debitage
247 – misc. drilled object
248 – misc. sawed stone
249 – painted stone tool
227 – sawed stone disk
223 – burin spall tool
224 – burin

Size

XSM – extra small
SM – small
MED – medium
LRG – large
XLRG – extra-large

SRT

N/O – nonorientable
M/D – Medial-distal
S – split
P – proximal
C – complete

Cortex

T – tertiary (0% cortex)
S – secondary (1-98% cortex)
P – primary (99-100 % cortex)

Fracture Initiation

C – Cone
B – Bend
W – Wedge

Material

1 – dacite
2 – slate
3 – silicified shale
4 – coarse dacite
5 – obsidian
6 – pisolite
7 – coarse basalt
8 – nephrite
9 – copper
10 – ortho-quartzite
11 – basalt
12 – steatite/soapstone
13 – chert (shades of green)
14 - chert (white to shades of brown, yellow)
15 – jasper (shades of red, orange, gray; can be banded)

16 – jasper (Hat Creek variety: shades of butterscotch/brown/orange; mottled with dendrites)
17 – chalcedony – (all colors except yellow variants)
18 – chalcedony (yellow variants)
19 – igneous intrusives
20 – granite/diorite
21 – white marble
22 – green siltstone
23 – sandstone
24 – graphite
25 – conglomerate
26 – andesite
27 – vesicular basalt
28 – phylite
29 – limestone
20 – mica- black
31 – porphory
32 – silicified wood
33 – soapstone
34 – schist
35 – misc.
36 – serpentenite/serpentine
37 – gray vitric tuuf
38 – gypsum
39 – mudstone
40 – galena
41 – quartz crystal
42 – metal/iron

Bridge River Excavation 2008: Archaeobotanical Analysis

This paper reports the results of archaeobotanical analysis of forty-four bulk samples from the archaeological site known as Bridge River EeRl-4. These samples were analysed using flotation, microscopic examination, and comparison to reference collections housed at Simon Fraser University. The analysis of these samples is focused on recovery of smaller macroremains such as "seeds". For the purpose of this study, "seed" refers to various fruiting structures including: achene, legume, and caryopsis, as well as the 'true seed' which describes the fertilized ovule, stored nutrients (endosperm or cotyledons) and a seed coat (testa) (Fahn 1995). Carbonized materials, including large particles of charcoal >2.0 mm in size, were extracted from 100% of the samples and quantified but not taxonomically identified. In addition, 100% of macroremains which were >.250 mm in size were also extracted, quantified, and identified.

Methods:

In this study, samples from 2008 excavations were processed by flotation at Bridge River site during the field season by students from Montana University. Dried samples were placed into labeled plastic bags and transported to Simon Fraser University for analysis.

Standard palaeoethnobotanical techniques were used in the sorting and identification of macroremains. Light fractions were weighed, and then screened through a series of stacked sieves with mesh sizes of 4.0 mm, 2.0 mm, 1.0 mm, .425 mm and .250 mm. Each of the five fractions was weighed and sorted independently. In this study, the contents of the coarser sieves (4.0mm and 2.0mm) were sorted in their entirety into the components of archaeological significance: seeds, needles, wood charcoal, cone parts, unidentifiable plant remains, bone, shell and lithics. All the fractions captured in finer sieves(1.00mm, 0.425mm and .250mm) were sorted exclusively for seeds and needles. In order to facilitate the sorting process, only the 2.00 and 0.425mm mesh sieves were used to sort the samples when the total weight of a light fraction sample was less than 20g. Also, when many conifer needles were present in the sample, only one fourth of it was sorted exclusively for conifer needles and the number recovered was simply multiply by four to get an estimate number(as indicted by * on the flotation number in Table 1). All of the sieved samples were then examined under a dissecting microscope with a magnification range of 6-40x.

Identifications are primarily based on the visible characteristics of the seed morphology: form and structure; however, some seeds can be positively identified only by examining the internal morphology of the true seed. Seed identifications were made with the aid of several reference manuals on seed identification (Martin and Barkley 1961; Montgomery 1977). Also, the plant remains from Bridge River were examined side-by-side with modern specimens from comparative collections housed at Dr. Dana Lepofsky's palaeoethnobotany laboratory at the Archaeology Department of Simon Fraser University. I would like to express my continued appreciation to Dana for the extensive use of her facilities and collections.

The most solid identifications are indicated by the genus of family name with no other symbols indicated. When a family name is listed with no genus, the specimen could only be identified to the family level based upon its characteristics, such as general shape, size and surface textures.

Unidentifiable seeds are fragments do not have diagnostic features that indicate their identity, given the use of a binocular microscope.

Results:

The assemblage of charred macroremains from EeRl-4 is summarised in Table 1. A total of 23 taxa representing 19 plant families were identified, in the form of seeds, needles, and other macrobotanical remains. Of the 308 seeds recovered, 305 have been identified and are classified into 13 known taxa. Fleshy berries are represented by the seeds of Saskatoon, common bearberry (a.k.a kinniknnick), soapberry, mountain ash, Heath family and Rose family. Other herbaceous species identified from seeds are: grasses, sedges, chenopod, bedstraw, and waterleaf. One charred Ponderosa pine seed was identified. Douglas-fir, Grand-fir, Hemlock, and Ponderosa pine are represented by needles. Most of the needle base bundles are represented by Ponderosa pine whereas paper birch was recognized from charred bark fragments. Quantifications of plant remains are made as counts, rather than weight, because many of the plant remains are small seeds of negligible weight. These taxa are lost when weights were used to display the samples. Following Lepofsky et al. (1996), conifer needle counts represent the total number of fragments. Charcoal is represented by weights, as is standardized in archaeobotanical reports due to the high number and size range of fragments (Pearsall 1989). In addition to quantification, all remains were also assigned a ubiquity measure (Table1). Ubiquity measures the percentage of taxon presence across a group of samples regardless of its abundance in each context. Presence values provide a measure of comparison within an assemblage that to a certain extent controls for the differential preservation of species (Popper 1988).

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1990 Plant Anatomy. Fourth ed. Butterworth-Heinemann Ltd, Oxford.

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1996 Reconstructing prehistoric socioeconomies from palaeoethnobotanical and zooarchaeological data: an example from the British Columbia Plateau. Journal of Ethnobiology 16, 31-62.

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Pearsall, D.M.
1989 Palaeoethnobotany. Orlando: Academic Press.

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1988 Selecting Quantitative Measurements in Paleoethnobotany. In Current Palaeoethnobotany: Analytic Methods and Cultural Interpretations of Archaeological Plant Remains, eds. C. Hastorf and V. Popper. University of Chicago Press: Chicago, pp.53-71.

Table 1: Macroremains from 2008 excavation at Bridge River

CONTEXT									SEEDS(N)															NEEDLES(N)						OTHER				
Housepit#	Activity Areas	Flotation#	Unit/Square	Stratum	Level	Feature#	Level/Layer	Volume(l)	*Amelanchier alnifolia*	*Arctostaphylos uva-ursi*	*Carex* sp.	*Chenopodium* sp.	Ericaceae[1]	*Galium* sp.	*Phacelia* sp.	*Pinus* sp.	Poaceae	Rosaceae	*Shephardia canadensis*	*Scirpus* sp.	*Sorbus* sp.	Unidentifiable fragment	TOTAL	*Abies grandis*	*Pinus ponderosa*	*P. menziesii*	*Tsuga*	Unidentifiable	TOTAL	Cone parts(N)	Conifer bud(N)	Needle base(N)	Fish bone/fauna(g)	Bark fragment(g)
HP54	AA1	69	20	II d	1	3		0.75															0		1	2		1	4					
		78	20	II g	1	5		2.0		10	1	2	6										19			12	3		15					
		79*	20	II h	1			1.75		3		8	1	2									14	8	2	22	18	10	60					
		149	20	II i	1	6		0.5				3											3			3			3			1		
		60	20	II f	1	4		1.0		9			10										19			13	1		14				0.86	
		287	20	II L	1			1.5				1	2										3		1	3			4			1		0.06
		291*	26	II N	1	9		1.75				2	2										4		18	62	18	12	110		2		0.47	0.21
	AA2	14	10	II	1			2.0		1			1										2		1	2	1		4		1	1		
		65	10	II c		2	1	2.5	1	4													5						0	1			nil	
		153	17	II c	1	6		2.75	2	8		1	1							1			13			10		2	12			1	0.02	
		193	8	II c		4	6	2.0															0		2	7	1		10					
		200	8	II d	1	6	1	2.25															0						0					
		201	8	II d	1	6	4	1.75															0						0					
	AA3	276	9	II A(1)	1	8	2	1.25	2			1	2		1		2						8	2		6	3		11					
		182	16	II A(1)	1	7		1.5	2	8		1	10	48			1			1	2	3	76	1	1	3		1	6					
		47	21	II b	1	1		1.3	3	28		6	18	23			1						79						0				0.02	
		171*	17	II b1	1	6	base	1.25		1													1	20	8	60	24		112	1	1			
		207*	16	II b1		6b	6	1.5		1							1		1				3		8	30	14	4	56					
		234	13	II b	1	6a	1	2.0					1							1			2			1			1					
		50	21	II e		2	1	1.5															0						0					
		105	20	II b1	1	4		2.5				1											1			4			4					
		67	21	II f	1	3		0.75		4													4						0					
		293	13	II G	1			1.25															0						0				0.06	
		294	?	II K	1			1.5		1													1		2				2					
		209	16	?		6c	1	1.75					2	1									3		1	2			3					
								TOTAL:	10	78	1	26	56	74	1	0	5	0	1	3	2	3	260	31	45	242	83	30	431	2	4	4	1.43	0.27
HP24	AA1	211	12	II		3	1	1.25															0						0					
		236	29	II	1	4		1.75															0						0				nil.	
		17	26	II	1	1		0.75															0						0					
	AA2	246	28	?		1	1	1.75															0						0					
		271	7	II	1	2	1	1.75					2	3			1						6			2	2	1	5					
		277	7	II	1	3	1	1.0				1	1				1						3		1	6	1		8			1		
	AA3	295	30	II	8	5	8	1.5															0						0					
		146	10	II a	2	1	1	1.75	1	1							1						3		3	3			6					
								TOTAL:	1	1	0	1	3	3	0	0	3	0	0	0	0	0	12	0	4	11	3	1	19	0	0	1	nil.	0
HP20	AA1	114	22	II	1			1.5					3										3						0					
		42	24	II b	1			1.5						1									1		2	3	1		6				0.01	
		144	22	II d	1	2		1.75	1	2		1	1				2	1					8	2	10	16	3		31			3	0.04	
		203	23	II d	2	3	3	2.0		3		1											4		2	4			6	1			0.12	
		247	18	II d	1	4	1	1.5		1							1						2		3	2			5					
		186	21/22	?		2	11	1.5		3		1											4	3	7	6	2	1	19					
	AA2	213	17	II a	1			2.0					2						1				3	1	3	3	1	1	9					
		185	18	II a	1			1.5															0			3	1		4					0.25
		115	20	II c	1			1.5															0		1				1				0.21	
		43	13	II c	1			2.0		3		1	1			1							6		5	13			18	1			nil.	
		116	20	II d	1	3		2.5	2	3													5			1			1	1			nil.	
								TOTAL:	3	15	0	4	7	1	0	1	3	1	1	0	0	0	36	6	33	51	8	2	100	3	0	3	0.38	0.25
								GRAND TOTAL:	14	94	1	31	66	78	1	1	11	1	2	3	2	3	308	37	82	304	94	33	550	5	4	8	1.81	0.52
								UBIQUITY(%):	18	43	2	34	41	14	2	2	20	2	5	7	2	2		16	48	66	36	20		11	7	14	30	7

Ericaceae[1]--- These are roughly 1.2mm by 0.7mm in size, oblong in long section and obovate to triangular in cross section (like a banana).

Wood Charcoal Wt.(g)
0.51
0.7
0.57
0.33
1.16
1.38
4.58
5.0
3.84
4.27
2.68
0.16
0.04
1.39
1.84
0.06
2.06
1.26
2.9
4.38
2.33
0.94
1.87
0.06
0.76
45.07
0.04
2.35
0.29
0.06
2.4
1.78
0.2
0.5
7.62
3.57
0.97
2.37
2.53
2.88
2.35
0.61
0.99
2.53
4.45
3.85
27.1
79.79
100

The Bridge River Dogs
(Hannah E. Schremser)

This section offers a preliminary description of the *Canis familiaris* remains recovered from the 2008 Bridge River field season. These remains were recovered from Area 3 of Housepit 24 within Feature 1 and Feature 5. Feature 1, a cache pit, contained the canid skull and a few postcranial elements, while Feature 5, a large bell-shaped cache pit, contained the majority of the remains. These remains included a substantial amount of metacarpals and metatarsals, long bones, caudal vertebrae, and a fractured innominate. The majority of fractures occurred postmortem due to weathering and recovery. (taphonomy?) Originally, it was thought that all the remains represented one dog, but there is one example of multiple elements, two left calcanei, which indicates at least two dogs in the assemblage.

There are features of the recovered dog remains that show signs of cultural modification: the skull, mandible, humerus, innominate, and caudal vertebrae. These modifications are in the forms of perimortem fracturing and cut marks. The aim of this section is to offer a simple osteological description of the skeletal elements of the domestic dogs. A brief discussion of the implications of such cultural modifications will conclude this section.

Figure 1: right innominate and right femur articulated *in situ*

Identification of *Canis familaris*

There are several features particular to *Canis familiaris* when compared to other canids such as *Canis lupus*, wolves, and *Canis lantrans*, coyotes, which aided in determining that the canid remains from Housepit 24 are domestic dog. The Philip L. Wright Zoological Museum of the University of Montana provided the comparative canid collection. The four major traits used to identify the Bridge River canid remains as domestic dog include the overall robusticity of the elements, the zygo-maxillary suture, the posterior border of the coronoid process of the mandible, and the absence of the first premolar (Colton 1970; Gilbert 1990). The cranium is generally smaller than a wolf and more robust than a coyote. The zygo-maxillary suture is straighter on dogs as is the case with the cranium from Bridge River, and s-shaped in coyotes and wolves. The post cranial elements are intermediate between wolf and coyote specimens, smaller than that of a wolf and shorter and more robust than that of a coyote. The posterior border of the coronoid process of the mandible is concave in the dog and straight in the wolf and the coyote. Figures 2 and 3 show a concave posterior border of the coronoid process in the Bridge River canid mandible. The lack of the lower first premolars in the canid remains is a trait of New World aboriginal dogs; there is no specific reference to the presence and absence of the first premolars in wolves and coyotes (Colton 1970).

Osteological Analysis

The elements of the Bridge River dogs recovered make up roughly 25 percent or less of a complete dog. With two left calcanei in the material, conclusions support that there is more than one dog represented in the assemblage. The larger left calcaneus was found in Feature 1, while the smaller calcaneus was found with the other postcranial remains in Feature 5. This is the only significant indicator of multiple dogs present. Only a portion of Feature 5 was excavated in the 2008 field season, and it is possible that there are more canine remains to be found in the rest of the cache pit.

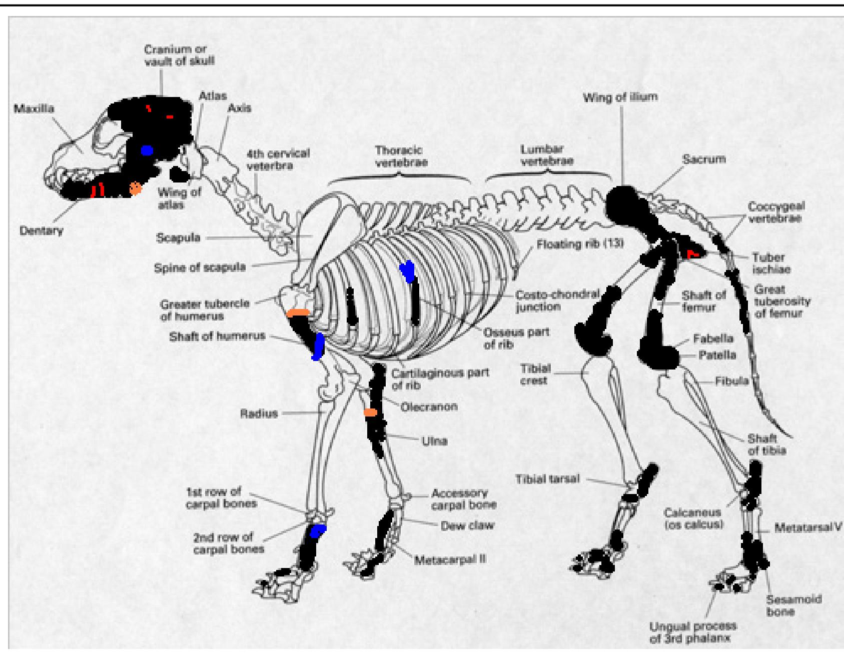

Figure 2: skeletal elements of the dog recovered from Housepit 24

There are more elements of the feet and posterior of the dog than of any other part. This is mainly due to the ratio of bones that make up the feet compared to other parts of the body. Bones of the feet also show less weathering and post mortem fracturing than other elements. Figure 3 is a rough estimation map of skeletal elements making up the dogs. Red denotes the areas exhibiting cut marks, blue denotes perimortem fracturing, and orange denotes carnivore gnawing. The cultural implications of these cultural modifications will be briefly discussed following this initial osteological description.

The dog skull recovered from Feature 1 was found along with a possibly articulated paw recovered from the screen in addition to the larger calcaneus. The skull is missing the maxilla, as well as the left zygomatic process and half of the right zygomatic process. The breaks occur along suture sites suggesting partial fusion seen in a younger dog. The cranial vault on the left side also presents excavator damage of a 8.5 mm asymmetrical oval causing fracturing. The suture line that extends from the sagital crest is unfused, but this could possibly caused by damage during excavation. Figure 3 shows the cranium recovered from Feature 1 missing zygomatic processes and maxilla. Located on the parietal there are ten shallow cut marks, five on either side, averaging 5 mm in length. It is speculated that these marks are indicative of skinning and muscle removal from the skull, which is also seen on the left side of the mandible.

Figure 3: dorsal aspect of the cranium

Both the left and right sides of the mandible were recovered from Feature 5. The bones show little evidence of weathering. Figure 2 shows the right side of the mandible has a small hole 9.4 mm long and 6.7 mm wide on the coroniod process in addition to fracturing radiating from the puncture. The edges around the puncture suggest the trauma occurred perimortem, and from a force entering on the medial aspect of the mandible. The border of the coroniod apex also shows damage, but evidence is inconclusive whether it occurred perimortem or postmortem. Shallow pitying on the lateral aspect suggests modification from scavenging and carnivore gnawing. The left half of the mandible, shown in Figure 3, has similar evidence of scavenging in addition to significant cut-marks on the medial aspect below the large carnassial on the horizontal ramus. The locations of these cut-marks are associated with the skinning process (Fernàndez-Jalvo et al. 1999). There is also damage to the anterior of the mandible where three incisors would fit.

Figure 4: right mandible

Figure 5: left mandible

The majority of teeth are present in the mandible, with only the third molar missing on the right side of the mandible and the three incisors on the left side of the mandible. The teeth will provide useful information for aging of the dog. The initial assessment suggests an insignificant amount of wear to the teeth denoting a younger aged dog, although our comparative collection is not extensive and further work will be needed for an accurate assessment. A very exciting observation is the absence of the dog's first premolars, which is a trait of New World aboriginal dogs (Colton 1970).

The post cranial remains of the dog were also located in Feature 5. These remains include a substantial amount of metacarpals, long bones, caudal vertebrae, a few ribs, and the fractured innominate. There is a significant amount of postmortem fracturing on many of the long bones and bones of the hind feet. Weathering is more significant for these bones, with portions of the feet and long bones missing. No cervical, thoracic, or lumbar vertebrae were recovered from Feature 5.

Figure 6: right humeral diaphysis showing proximal carnivore gnawing and distal irregular spiral fracture

The only long bone that shows significant signs of cultural modification is the right humerus. The right humeral diaphysis exhibits a perimortem irregular spiral fracture, along with carnivore gnawing on the proximal end, as seen in Figure 5 above. The presence of carnivore gnawing on the fragment is suggestive of scavenging following the fracture which most likely occurred from the twisting of the bone ends in two different directions.

There were a significant number of bones of the feet, both front and hind, recovered. Many are fractured because of weathering, leaving many of the feet in fragments. The only evidence of perimortem fracturing on the lower limbs is found on the right second metacarpal on the proximal end. The other three metacarpals were found with the fractured metacarpal, and show no signs of trauma. The left fifth metacarpal was the only metacarpal from the left paw to be recovered, but multiple first, second, and distal phalanges were present in addition to multiple carpals.

A majority of the pelvis was recovered from Feature 5. The left ilium is missing, and the preliminary assessment of the fracture line is inconclusive as to time of occurrence. Figure 1 illustrates the acetabulofemoral joint articulated *in situ*, showing that the right side was fractured during excavation, not perimortem. The left os coxae is culturally modified with shallow cut-marks on the ischiatic tuberosity perpendicular to the crest (Figure 6). The right os coxae also shows similar cut-marks in the same area as the left side. It is fractured through the acetabulum, leaving the acetabular rim in three pieces (Figure 7). The epiphyseal edge of the iliac crest is not fully fused, suggesting that the dog belonging to the pelvis is of a younger age consistent with the lack of tooth wear on the mandible.

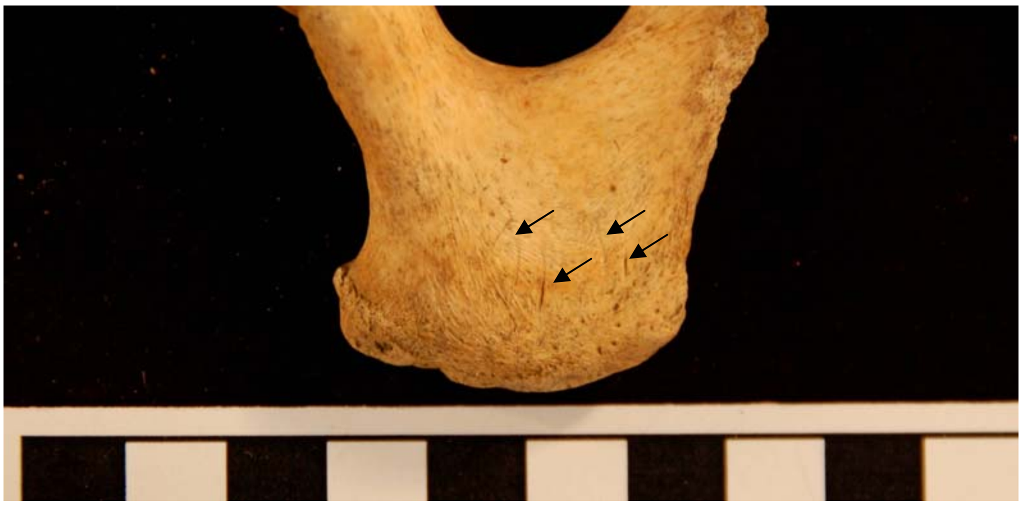

Figure 7: left ischiatic tuberosity showing cut-marks

Figure 8: innonimate showing cut marks on left ischium

Figure 9: caudal vertebre showing signs of trauma and healing

The only vertebrae recovered from Feature 5 are the caudal vertebrae making up the tail of a dog. Within these elements was one vertebra that showed signs of trauma and healing. The event occurred well in advance of death giving the tail time to heal. Figure 8 above shows the healed fracture as a deformation of the proximal end of the vertebra.

The cause of death is most likely related to the cut marks and fracturing of the humerus, ribs, and metacarpal, and the puncturing of the right coronoid process. This initial osteological assessment offers evidence that the dog was skinned following death. It is speculated at this time that one of the dogs, if not both, were utilized as a ritual sacrifice and possibly feasted upon. The long bones show no evidence of cut marks on the ends, which would denote butchering and flesh removal. There is little evidence of heat modification in this preliminary investigation, although ethnographic information suggests that dogs were prepared in roasting pits, singeing the hair off, and cooking the body with skin and meat on the bone (Snyder 1991). The bones could potentially be protected from direct contact with heat and show little sign of burning with the flesh present (Crellin 1994). Once cooked the meat could be removed easily from the bone by hand leaving no evidence of defleshing.

Conclusion

Similar osteological analysis on domestic dogs at Keatley Creek done by David F. Crellin in 1994 revealed no evidence of butchering, but did express evidence of carnivore gnawing in the assemblage. Crellin presents information about the cultural practice of dog sacrifice, where by dogs were hung on poles outside of pithouses where they were left to decompose. Certain elements of the dog would fall to the ground where they could be carried off by carnivores including other dogs (Crellin 1994). This scenario is inconsistent with the data from Bridge River.

Crellin offers extensive ethnographic evidence for eating dogs in the North American Plains as well as on the Pacific Northwest. The eating of dogs was not uncommon in areas surrounding Bridge River (Snyder 1991). Dog eating ceremonies occurred throughout the Pacific Northwest, specifically among the Kwakuitl, Bella Coola, and the Coast Salish.

The preliminary analysis remains inconclusive as to the exact fate of the Bridge River dogs. More work during the 2009 field season at the site could provide insight into these canid remains. Isotopic analysis of rib fragments will reveal the dogs' diet, which is speculated to closely resemble the diet of people at Bridge River. In addition, there is potential for future DNA analysis on the dog remains from Housepit 24.

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Procedures for Imbedding Sediments and Soils with Polyester Resin

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I. Drying

Oriented block samples collected in the field must be completely dried before they can be impregnated. This is accomplished by placing them in a drying oven for about 2 days or longer at 60°C. If the sample has been completely enclosed in plastic wrapping (i.e., postal) tape, portions of it must be opened in order to allow moisture to escape.

II. Impregnation

A. Chemicals

1. Resin and hardener - Polyester resin was used to impregnate the samples. Most polyester resins commercially available contain an chemical accelerator which speeds up gelling time so that the resin sets in the order of minutes or hours. These resins however, are not suitable for impregnation of unconsolidated soils, sediments and archaeological materials because these substances require long soaking times in order to allow the resin to adequately penetrate the pores of the sample. In the Micromorphology Laboratory, we use a low viscosity, unpromoted resin manufactured by Advance Coatings, Westminster, MA (tel.: 800-247-1117; ask for Russell Cook) which gels only with the addition of a catalyst (here, methyl ethyl ketone peroxide - MEKP). This resin was chosen principally because of its low viscosity and minimal shrinking. General information about the impregnation of soils and loose sediments can be found in Murphy (1986) and Courty et al. (1989).

2. Dilutant - In order to further reduce the viscosity, the resin is diluted with styrene (also available from Advance Coatings). Styrene is mixed with the polyester in the approximate ratio of 700 ml resin to 300 ml styrene, and well stirred.

3. Catalyst - As mentioned above, the catalyst used to set off the polymerization of the resin was methyl ethyl ketone peroxide (MEKP). This was added to the diluted polyester/styrene mixture, accompanied by thorough stirring, at the ratio of ~6 ml MEKP per liter of diluted polyester/styrene mixture.

B. Procedures [All procedures described here should be performed under a fume hood which provided proper ventilation].

1) The dried samples are placed in used and washed ½ gallon and gallon milk containers (both plastic and paper) that have been cut off at the top. It is ideal to choose samples that will just fit into the container with a space of about 1 cm on the sides. This permits the sample to soak in a small bath of resin. In cases where the container is too big for the sample , more than one sample can be put into the same container. In such instances, a map should be made to keep track of the position of individual samples. In any case, the sample number and orientation should be marked on the container with a permanent marker; orientation should be indicated with an arrow (↑) to indicate the up-direction of the sample.

2) a) The polyester mixture is then poured into the sample containers to a level which covers roughly half the sample.

b) The canister containing the samples and polyester mixture are then carefully fitted into a vacuum desiccator which is attached to a vacuum pump; in order to save time it is best to place as many samples as possible into the desiccator, stacking them on each other if appropriate.

c) Air is then evacuated from the desiccator [both glass and polycarbonate types were used] for an initial period of ~15-20 minutes.

d) Air is then slowly back into the chamber. Normally, the level of the polyester mixture has descended, since some of it has gone into the sample. Thus, at this point, the level of the polyester mixture should be topped up to roughly its initial position.

e) This process is repeated for 2 times, after which the samples are removed from the desiccator and set aside.

3) Curing

Curing time is a function of several factors: the amount of catalyst used, the ambient temperature, size of the sample, and freshness of the resin. Other things being equal, curing generally takes between 3 to 5 days, during which the liquid is transformed into a gel-like mass and then into a hard, brittle substance.

When the blocks have reached a gel-like consistency they are placed in the drying oven at about 50-60° C for 24 hours. They are then ready to be sliced and made into thin sections.

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