Chapter 5

A Paleoethnobotanical Comparison of Four "Small" Housepits

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Introduction

This chapter presents an initial comparison of the paleoethnobotanical analyses of four housepit floors, including HP's 9, 12, 90, and 104. These are all considered "small" housepits at the Keatley Creek site. A paleoethnobotanical analysis of three different-sized housepits (HP's 3, 7, and 12; Vol. I, Chap. 9; Vol. II, Chap. 4) suggests that small housepits were the homes of people with less access to resources, and perhaps less status. The paleoethnobotanical analyses of the four similar-sized small housepits discussed in this chapter have demonstrated that there were variations within house sizes as well as between house sizes, and that some of these variations may also have depended on status, while others depended on the function of the structure. Berry seeds are common in all of the small houses, as are chenopods and conifer needles. There are differences in the species of berries found in each home, however, possibly indicating a variation in access to resources. There are also differences in the amount of plant remains recovered from each housepit that are considered to be the remains of food plants versus those considered to be non-food plant remains. Non-botanical differences are discussed in Volume II, Chapter 1.

When the paleobotanical data is combined with the other material and ethnographic data, HP's 12 and 90 appear to have been small residential homes on the edge of the main Keatley Creek village area. Housepits 9 and 104 were located on terraces well outside of the village core. Housepit 9 appears to have been occupied by people with access to special resources. Housepit 104 appears to have been used for special activities. This distinction is based on the particular plant inventory of each housepit, and on the different types of activity areas they appear to contain.

This chapter begins with the two "residential" homes and then considers the two potential special purpose structures. The distribution of floral remains across each housepit floor is used, along with other archaeological and ethnographic evidence, to isolate probable activity areas within the homes. Housepits 9 and 90 are discussed in detail. The distribution of activity areas within each of the four "small" housepits are then compared, along with the actual species recovered from each home, in order to examine the function of these homes as part of the larger village. The chapter concludes with a number of recommendations for further paleoethnobotanical work at Keatley Creek, and perhaps other Interior Village sites, including the analysis of structures or features other than housepits.

A detailed cultural and environmental background has already been given in Volume I, Chapters 1, 4–6, and 9–10. The paleoethnobotanical analysis of the three different-sized housepits (HP's 3, 7, and 12) discussed in Volume I, Chapter 9 has shown that there are

identifiable remains of plants left on the floors and in the rims of the housepits at Keatley Creek and that these remains vary between house sizes (Vol. II, Chap. 4). These plant remains have included plants clearly used for food, for technology, and perhaps also for medicine and for ritual. They have also included many plant remains that have not been identified to species or for which the past purpose is unclear. The distribution of the various types of remains and the different species have helped to identify sleeping, cooking, storage, and refuse areas and to examine differences in resource use, and perhaps status, between houses.

Housepit 12

The analysis of HP 12 was completed by Dana Lepofsky and included 16 samples from the late Plateau Phase floor of the housepit, dated at 1,550 BP (Vol. II, Chap. 4). Prior to this analysis, there were some indications that small pithouses were the homes of people with lower social and economic standing than those people who lived in the large pithouses. Any differential plant use patterns found to exist between housepit sizes was expected to reflect these apparent socioeconomic differences. Housepit 12 did, in fact, support this theory. It proved to have a much lower diversity, frequency, and density of plant remains than the large and medium housepits to which it was compared.

Potential activity areas identified include sleeping or sitting areas covered in conifer boughs and a hearth that appears to have been used for warmth but not for plant processing. Another hearth area may have been used for cooking meat, but apparently it was not used for plant foods. These activity areas are shown in Figure 1 and in Figure 3 of Volume II, Chapter 4. The bedding areas are believed to be indicated by concentrations of conifer needles. Conifer boughs were used for bedding and other types of matting or lining ethnographically (Turner 1979; Parish et al. 1996). No concentrations of seed remains were identified on the housepit floor that might have identified plant processing areas or other features. In fact, only 16 seeds were recovered from the floor of HP 12, representing five taxa. This contrasts with the thousands of seeds and more than 25 taxa in HP 7 and hundreds of seeds and more than ten taxa in HP 3. There were also far fewer conifer needles in HP 12 than were found in the medium and large housepits. Species of Chenopodiaceae (Goosefoot), Ericaceae (Heather), Pinaceae (Pine), Poaceae (Grass), and Rosaceae (Rose) families were recovered, with Chenopodium being the most ubiquitous seed remain and *Pseudotsuga menziesii* (Douglas-fir) being the most common conifer needle remain. Food plants included *Amelanchier alnifolia* (Saskatoon) and an unknown species of Ericaceae.

Refer to Figure 1 and Table 1 (and Vol. II, Chap. 4) to review the distribution and other details of the floral remains recovered from HP 12.

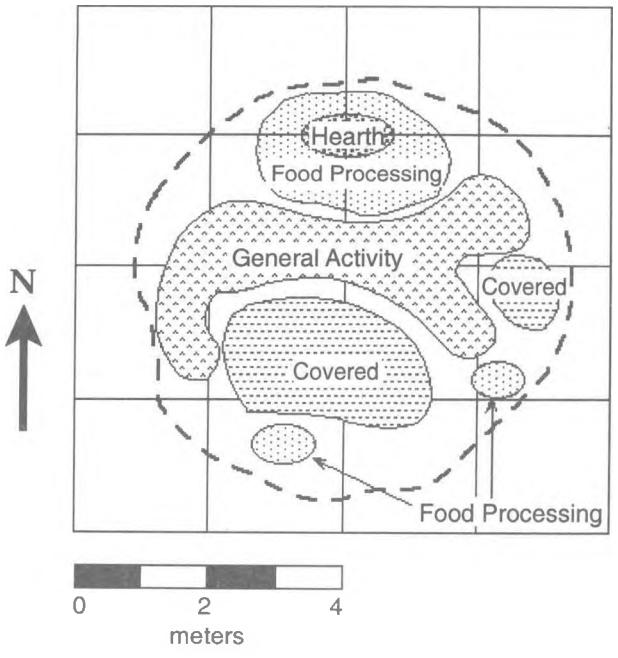

Figure 1: Housepit 12 activity areas based on soil chemical analysis (Chap. 6). See also Fig. 3 in Chap. 4.

Housepit 90

The analysis of HP 90 was completed by myself and included twelve samples from the late Plateau Phase floor of the housepit, dated at 1,410 BP (Vol. III, Chap. 10). This analysis also supported the socioeconomic theory mentioned above. Although HP 90 proved to have a higher diversity, density, and frequency of floral remains than the previous small residential housepit (HP 12), it was much lower than the medium or large housepits analyzed to date. Housepit 90 also appeared to have been occupied by people with little social or economic standing. According to Hayden (Vol. II, Chap. 1), single occupations were a common pattern in homes located on the site periphery. Ethnography suggests that these houses may have been lived in by people who were less permanent members of the village or who had to live apart for other reasons, and whose social status was perhaps less secure (Teit 1906). This theory is supported by the artifacts, and perhaps also the plant remains, which were recovered from HP 90.

Housepit 90 measured seven meters in diameter, which is comparatively small for a housepit at the

Keatley site, there were few lithic artifacts or fauna recovered from it, and few of these were "special" in nature, which might have indicated a special-purpose pithouse (Vol. II, Chap. 1). There were no clear hearth contexts and few large pieces of charred wood were recovered from it, which may indicate that the people who lived there had little access to firewood, which would likely have an adverse affect on the amount of charred plant remains left behind. In fact, the artifacts and features gave "an overall impression of poverty" (Vol. III, Chap. 12).

Possible activity areas identified on the basis of floral distributions include a sleeping or sitting area along the wall covered in pine boughs, a cooking area, and a storage area (Fig. 2A). These activity areas are consistent with what we might expect to find based on ethnographic descriptions of pithouses and on previous research at the site. The individual species recovered, including species of Chenopodiaceae, Ericaceae, Hydrophyllaceae (Waterleaf), Pinaceae and Poaceae, were also expected. Chenopods were the most common and most ubiquitous taxa once again, but it is not clear if these species were merely incidental weeds or if they were actually being used at the site.

The HP 90 analysis recovered approximately 700% more floral remains in total than the analysis of HP 12, and there were three more species identified which does not really support the "overall impression of poverty" given by the rest of the analysis of HP 90. Housepit 12 appears to be much less well off based on the plant remains alone, if access to plant materials is an indicator of status at the Keatley site, which it may be. To determine which of these small housepits is the atypical one will require further research of small, residential housepits.

Housepit 90 appears to have been burned on purpose, rather than accidentally, and the burning was relatively complete (Vol. III, Chap. 10). This burning probably enhanced the preservation of floral remains in HP 90. Stratum IV, the floor deposits, contained charcoal and burned wood in the matrix, with concentrations of burned wood along the east wall and northeast "corner." Several lithic flakes were found in these areas. Thick concentrations of smaller pieces of charred material were also found in several places near the southeast wall. What these small "charcoal dumps" might represent is unclear. They may be hearth sweepings pushed up against the wall, although the lack of ash and long segments of charred wood make this questionable, according to Hayden (Vol. III, Chap. 10). The deposits within 1 m of the wall are softer and darker than the gravely deposits in the center of the house. The only other explanation, in Hayden's opinion, is that these accumulations may have resulted from the burning of the house on abandonment, either as roof collapse, or as part of some organic material placed against the walls. The gravely deposits in the center of the floor may have helped to keep the working areas free of mud, along with the cobbles that appear to have been placed in a shallow pit in the middle of the floor. Samples for paleoethnobotanical analysis were taken from systematic grid locations and from subsquares that were noticeably high in charcoal content, such as the "charcoal dumps," and/or located within or near features.

Housepit 90 Procedures

Twelve one-litre samples from HP 90, from subsquares representing approximately 15% of the floor, were floated by hand using the "garbage can" method (Watson 1976) and the light fraction passed through 2.0 mm and 0.425 mm screens. The dried light fraction of each sample was then screened through 4.0 mm, 2.0 mm, 1.0 mm, and 0.50 mm mesh to facilitate sorting. Sorting was done using a dissecting microscope (6–40×) and subsamples were sorted into uncharred and charred constituents. Uncharred remains were not considered to be significant in this analysis as, according to Lepofsky (Vol. I, Chap. 9), these would not be prehistoric although she notes that housepit rim deposits could allow for uncharred preservation. Charred remains were divided into groups of seeds, needles, charcoal, and other plant parts, and then identified to species, where possible, with the aid of Lepofsky's reference collection, and with her assistance. Charcoal was not normally identified to species, and was only weighed. This was due to the time required for this type of analysis, and the fact that it would have little to add to this analysis as most of the organic material from the central floor of the deposit appears to have been burned to ash and no particularly large pieces were recovered. It would have been difficult to distinguish technological wood from fuel or construction wood with only fragmentary remains, for example. Nevertheless, several pieces were identified to species from the potential hearth area on the southeastern side of the pithouse (Fig. 2A) to attempt to identify the fuel source. Charcoal was not separated out from the 0.5 mm size in five out of the nine samples due to the time involved in this task, although this size class was examined for any seeds or other recognizable remains in all samples.

Species counts were absolute, rather than ubiquitous, as the final burning of the pithouse is likely to have concealed any cultural patterning that would make a ubiquitous count useful (Lepofsky 1997a). Unidentified species were labeled "Type A," "Type B," and so on.

Housepit 90 Results

A total of 52 seeds were recovered from the floor samples of HP 90, from a maximum of nine species. The total of conifer needles recovered equaled 68 fragments from a maximum of four species. This is a fairly low density without a great deal of diversity when compared to previous analyses of larger housepits that were also apparently used for residential purposes (Vol. I, Chap. 9). Along with HP 12, HP 90 demonstrates a paucity of floral remains in comparison to the larger housepits and this may indicate that people of lower status had less access to plant resources, or to firewood for cooking which would lead to less food plant remains becoming charred.

The plant species that were recovered and positively identified from HP 90 are listed below by family, with a discussion of their probable role in the culture and how they may have come to be preserved in the housepit floor context. In some cases it was only possible to determine identifications to family level, but this proved to be enough information to make some suggestions as to how these plants might have been used at the site. Several seed types and one species of conifer needle remain unidentified.

Housepit 90 Plant Inventory

Chenopodiaceae (goosefoot family)

Thirty-six seeds from this family were recovered, including one that was uncharred. Chenopods were found in nine of the twelve samples, with their frequency ranging from a single seed to ten in one sample. The species represented may include *Chenopodium album* as several of the seeds fit within the size range of 1.0–0.5 mm^2, as noted by Lepofsky (Vol. I, Chap. 9). If this is the case, these seeds are likely intrusive as *C. album* is an introduced species whose young leaves were used historically by Interior Salish peoples as a vegetable or potherb. Given the depth below surface at which all of the seeds were found (40–60 cm), and the fact that they were found in a patterned (vs. random) context that was clearly archaeological and not much disturbed, it would seem more likely that they are from a native species. Native species that might have grown in the area include *C. capitatum* (strawberry blite or Indian paint), whose seeds are known to have been used by Southern Interior peoples as a dye source (Turner et al. 1990; Parish et al. 1996; Turner 1998), and *C. botrys* (Jerusalem-oak goosefoot), whose use as a scent and charm has been documented for the Thompson (Nlaka'pmx) (Steadman, in Turner et al. 1990). *C. atrovirens*, or *C. fremontii* (dark lamb's quarters) may also be a potential species as its range extends into the Lillooet area (Ray Coupé, personal communication). Its oily seeds were ground into meal by the Klamath ethnographically and it has been recovered from archaeological contexts on the U.S. Interior Plateau ca. 2,700 BP (Lepofsky 1997b).

The chenopods recovered from HP 90 appear to be from at least two species as they vary in size somewhat, with one "species" measuring approximately 1 mm in diameter ("Type A"), and one that is distinctly larger, measuring approximately 1.5 mm in diameter ("Type B"). Whichever species are present, they may have been accidentally brought in and charred during the final burning of the pithouse on abandonment and not used at all. Chenopods produce very large numbers of seeds in the fall and the seeds recovered in archaeological contexts at Keatley Creek may have been brought in mixed with other grasses.

Chenopods were the most abundant taxon found in this analysis, making up 36 of 150 recovered items (approximately 23%). In fact, chenopods are the most common seed taxa in five out of the six housepits analyzed to date. There may be a bias here, however, as chenopods are easy to recognize and appear to preserve particularly well.

Ericaceae (heather family)

Arctostaphylos uva-ursi: One kinnikinnick seed was recovered near the side entrance of the housepit. Kinnikinnick berries were cooked and eaten by Interior peoples and kinnikinnick leaves were smoked like tobacco (Teit 1906; Parish et al. 1996). The seed recovered from HP 90 might have come from a berry incidentally included with leaves; however, hundreds of kinnikinnick seeds were also recovered in HP's 3 and 7 (Vol. I, Chap. 9) which would suggest that the berries themselves were important.

The nine "Type C" seeds were recovered from several contexts and appear to be from another species of Ericaceae. Many members of this berry family were utilized by the ethnographic Stl'atl'imx and small Ericaceae seeds have been a ubiquitous component in several contexts at the Keatley site (Vol. I, Chap. 9), including in HP 9 floor samples. The seeds recovered from HP 90 were found in two charcoal-rich deposits that together may represent a hearth area and one deposit that may represent a hearth dump, suggesting that these berries were being cooked. Another possible Ericaceae seed appears to be from a third species ("Type D") and was recovered from a sample taken near the side entrance of the housepit.

Hydrophyllaceae (waterleaf family)

Phacelia linearis: Three seeds of this species were recovered from HP 90. This species is noted to have had medicinal value in historic times (Steadman, in Turner et al. 1990). One seed was found in an apparent charcoal dump context near the wall of the housepit (Vol. III, Chap. 10), along with a chenopod and three

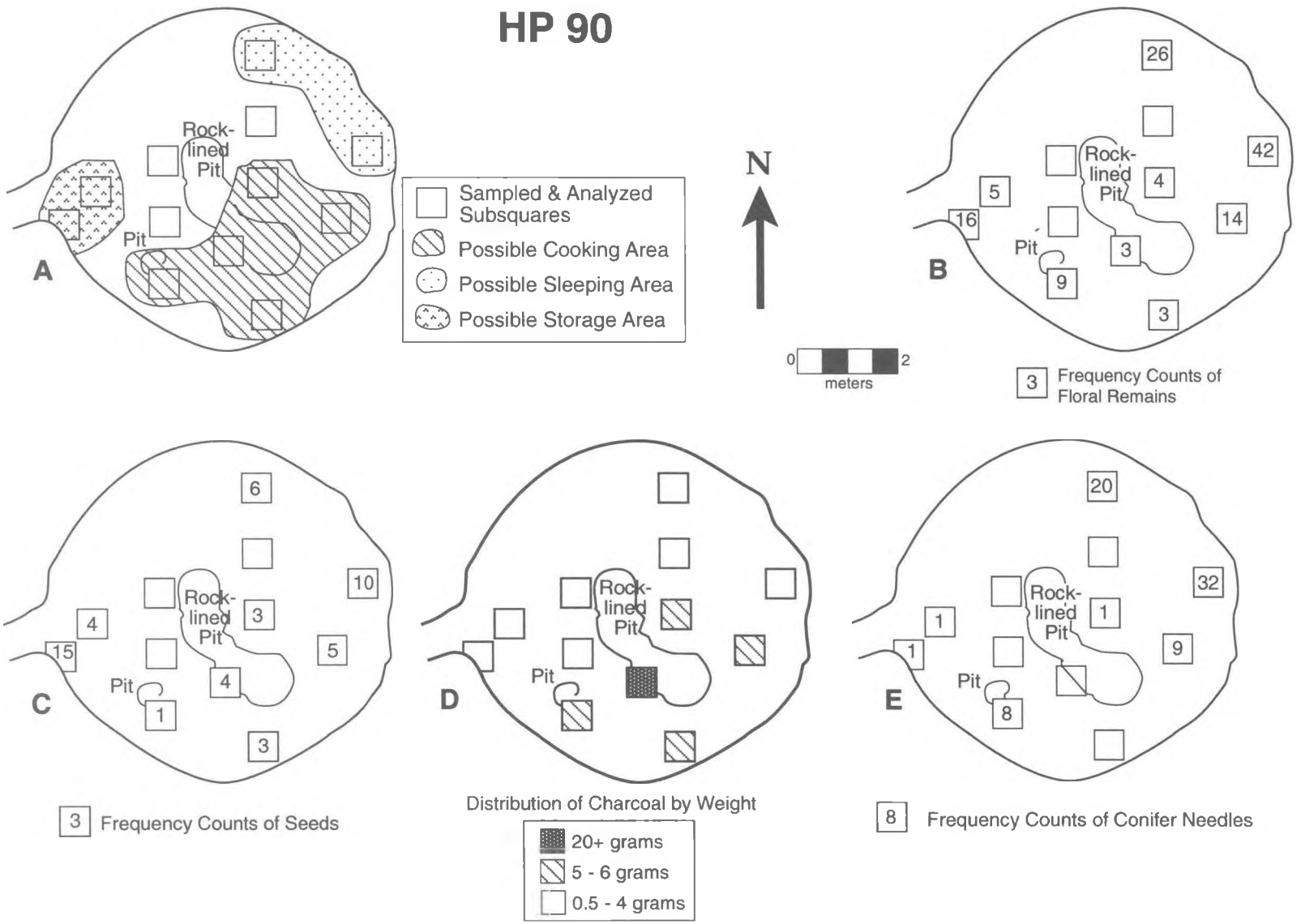

Figure 2: (A) Housepit 90 reconstructed activity areas and sampled subsquares and features; (B) total floral remains per subsquare; (C) total recovered seeds per subsquare; (D) charcoal concentrates by weight; (E) conifer needles.

seeds of an unidentified Ericaceae species ("Type C") that also occur in two other samples. Two more Phacelia seeds were found near the side door of the housepit. Phacelia seeds were also recovered during the analysis of HP's 3, 7, and 9.

It is often difficult to recognize medical or ritual plants as there is not much ethnographic information available for these categories, and without a clear context of use they might be confused with "weeds" (Lepofsky 1997a). The Phacelia seeds recovered in this analysis may have been "weeds" brought in accidentally as their context of use is unclear; however, the occurrence of this species in several housepits and at Squilax, another Interior Plateau village site (Lepofsky 1990) would suggest that this plant was used in some way. The distribution of Phacelia across the Keatley Creek site may provide clues as to who was providing or receiving medical care, for example if it appears in concentrations in particular types of structures or associations or if its distribution appears more random throughout the site. In the Lillooet cultures, according to Turner (1992), medicines were generally gathered, prepared and administered by specialists whose knowledge was passed down through generations.

Pinaceae (pine family)

Pinus ponderosa: Nine needle bundle bases were recovered from two subsquares along the east wall of HP 90. Ponderosa pine needles were also recovered from HP's 3 and 7. Ponderosa pine was a common fuel source at the site and the cambium was eaten by the ethnographic Lil'wet'ul and Nlaka'pmx (Vol. I, Chap. 9; Teit 1906; Turner 1992). The needle bundle bases recovered in HP 90 may have come from fuel wood used in cooking as eight of them were recovered in a possible cooking area. The ninth bundle base was recovered from a sample along the northeast wall and may have come from pine boughs used for bedding. The spicy smell of the boughs was appreciated for bedding, according to Turner (1998). According to the reconstruction of activity areas in other small housepits (Vol. III, Chap. 7), sleeping areas were probably located along one side of the pithouse perimeter. The concentration of conifer remains from all species in HP 90 was highest along the northeast wall, suggesting that this was where the sleeping areas were.

Pseudotsuga menziesii: Forty-five Douglas-fir needle fragments were recovered in five different samples. This species was also recovered in HP's 3 and 7. Ethnographically, Douglas-fir was a fuel source (Turner 1998) and the needles may have come from boughs used for fuel. Charred Douglas-fir wood was identified from three of the five samples which may represent a hearth area (Fig. 2A) which would be consistent with this use. Most of the needles came from deposits near the housepit wall, however, which may indicate that Douglas-fir boughs were used for bedding in a sleeping area along the east wall. According to Turner (1998), fir boughs were used for this purpose throughout the Interior. A similar pattern of Douglas-fir needle distribution was observed in HP's 3, 7, and 12. Eight needle fragments were also found together with a chenopod in one sample which was taken near a feature that may represent a small boiling pit. Douglas-fir twigs and needles were apparently used by Interior peoples to make a tea (Parish et al. 1996) which could explain the presence of these needles if the pit feature noted in Figure 2B does, in fact, represent a small boiling pit.

Poaceae (grass family)

One grass rachis, found together with ten chenopods, 31 conifer needles, and one conifer needle bundle base, was recovered from one of the samples thought to be from the sleeping or sitting area along the northeast wall of HP 90. Grasses were used for floor coverings, for lining cooking pits, and for basketry ethnographically (Teit 1906; Turner 1979; Parish et al. 1996). This rachis could have come from grass used in creating the sleeping or sitting area or it could be an incidental inclusion, either from a weed plant or from another activity area within or near HP 90.

Unidentified

Sixteen unidentified conifer needles ("Type E") were recovered from a sample along the east wall of HP 90. These needles may also have once been bedding material. A possible conifer bud was recovered in this analysis along with two species of chenopod (Types A and B) and several fragments of Ericaceae seeds (Type C) in a sample near the west wall and close to the side entrance of the pithouse. One unidentified seed ("Type F") was recovered from the sample next to the side entrance, which also included ten chenopod seeds (Type A), two Phacelia seeds, one kinnikinnick seed, one Ericaceae seed (Type D), and one Douglas-fir needle. This sample, together with its neighbor, may represent a storage area (Fig. 2A).

Distribution of Floral Remains (HP 90)

There appear to have been several ways that the floral remains recovered in this analysis became charred. Seeds and needles from food or medicinal plants may have fallen into hearths and been charred immediately, or they may have fallen onto the floor

during cooking or processing and been pushed into "corners," or left in place to be charred during the burning of the pithouse. Food plants may have included Chenopodiaceae leaves or seeds and Ericaceae berries, with Douglas-fir needles being used in tea. Medicinal plants may have included *Phacelia linearis*. Technological plants may have included *Chenopodium capitatum* as a dye source, and *Pseudotsuga menziesii* and *Pinus ponderosa* as bedding materials and/or as fuel sources. Special use plants may have included *Chenopodium botrys* as a scent for pillows or personal adornment and *Arctostaphylos uva-ursi* for tobacco. Incidental inclusions of "weeds" may have been responsible for all or some of the chenopods, and perhaps also for the Phacelia. However, both of these plants have appeared in such quantity and in so many archaeological contexts at Keatley Creek, and at other Interior Plateau village sites that their intentional use seems likely to me.

The gross total of floral remains recovered from each subsquare is displayed in Figure 2C. The high concentrations of recovered items around the northeastern wall of the pithouse are partly a result of the conifer needles found there; however, there were also more seeds recovered from these two subsquares than in most of the other subsquares (Fig. 2D). They each contained a fair amount of charcoal in comparison to other samples (Fig. 2E) and large pieces of charred wood were recovered from them during the excavation. Various artifacts were also recovered along this part of the pithouse wall, most of which were broken. Previous research at Keatley Creek suggests that sleeping and sitting areas made with conifer boughs were located along the housepit walls and that garbage may have been swept out of the middle of the floor to be deposited along the walls or dumped outside, adding to the rim deposits (Vol. I, Chap. 9). The central floor area samples of HP 90 produced very few floral remains and that may also support this hypothesis. The concentration of seeds by the door in the western wall cannot be explained at this point as HP 90 is currently the only excavated housepit at the site with this style of entrance and no comparisons can be made. The seeds found by this door could represent the remains of garbage stored by the door to be taken out later and then forgotten, or perhaps the remains of parcels of food or other supplies stored by the door upon entering the home.

The two species of Ericaceae seeds are the only plant remains that can be considered likely to be food plants. Any of the chenopods and the Douglas-fir needles found near the possible boiling pit may be food remains, but there is not enough evidence to confidently include these as food plants. The Ericaceae seeds are found in several sample contexts, including one that is thought to be from a cooking area in the southeastern area of HP 90 (Fig. 2A). The other samples that contained Ericaceae seeds were thinly spread out in the central floor area and slightly more concentrated near the northeastern wall. The Ericaceae seeds probably came from dried berries that were cooked as they would be unlikely to be fresh if the occupation was limited to the winter season since Ericaceae species generally ripen during the summer. The berries may also have been misplaced from their storage area and subsequently charred during the burning of the pithouse.

If the chenopods were food plants they may have been ground and used as a cereal as they were in other parts of North America. The existence of mortars and pestles was noted ethnographically for the Lillooet people by Teit (1906); however, there is no archaeological evidence for seed grinding tools at the Keatley Creek or in the British Columbia Interior which makes this an unlikely explanation for their presence at the site. However, tools such as ground-stone mauls have been found in burial contexts along the Fraser River only a little to the north (Scott Cousins, personal communication). It is possible that the burials associated with the Keatley Creek site might also contain mauls or perhaps grinding tools. If chenopod greens were eaten as a vegetable, as they were ethnographically in the area (Vol. I, Chap. 9), the seeds would be unlikely to be present in the pithouses unless the plants were consumed in the homes during the late spring or summer. There has been little to suggest that most pithouses were occupied at that time of year. To say whether the Douglas-fir needles were used in a tea beverage would require more evidence of their presence near boiling pits or in association with the remains of other plants thought to be used in tea making.

The only plant remains believed to be from species used medicinally are the three Phacelia seeds, which were found next to the west side entrance and near the east wall of the pithouse. The door sample may represent a temporary storage area (see above). The east wall sample also includes food plant remains and conifer needles and may be a random collection of remains swept together as debris from a number of activities. The Phacelia seeds recovered in HP 90 do not appear to reflect discrete medical activities but suggest that medical activities involving them may have taken place in housepits of all sizes at the site since this type of seed was also recovered from HP's 3, 7, and 9.

Technological plants appear in several areas of the housepit. Eight of the 45 *Pseudotsuga menziesii* needles were recovered near the possible hearth or cooking area in the southeastern area of the housepit (Fig. 2A). This may indicate that this species was used as fuel and that the needles were an incidental inclusion. Douglas-fir was a popular fuel source ethnographically (Vol. I,

Chap. 9) and a few pieces of Douglas-fir charcoal were identified from three of the hearth area samples. Thirty-four of the Douglas-fir needles, eight ponderosa pine needle bundles, and seventeen unidentified conifer needles were recovered along the northeast wall, which may indicate that this area was lined with conifer boughs, although concentrations of needles were much higher in the analyses of HP's 3 and 7 (Vol. II, Chap. 4). The remaining conifer needles appear to be randomly distributed and may simply have been dropped on the floor and been burned during the abandonment of the pithouse.

A hearth or cooking area may have existed in the southeastern area of the pithouse (Figs. 2A and 2D), based on the fact that the five samples from this area each contained more than five grams of charcoal, and one of them included more than 20 grams. These weights are notably higher than any of the other samples. This area also contained most of the food plants. Several pieces of Douglas-fir charcoal were identified from three of these deposits which may represent a fuel source as noted above. There were no obvious concentrations of fire cracked rock in that area or anywhere in the housepit, however, and the possible boiling pit (Figs. 2A) is the only recognizable cooking feature, unless the larger rock-filled pit was used for cooking in some way.

Several of the above mentioned samples were located near the southeast wall and identified by the excavators as "organic dumps." These dump samples each contained more than five grams of charcoal and included various seeds and needles. If the pithouse floor was cleaned or swept periodically the loose dirt might have been pushed up against the wall and any dropped seeds or needles included in the dumps this way. Hearth sweepings might also have occasionally been disposed of in this way, which would explain the high percentages of charcoal, although no ash concentrations were found in these dumps.

Housepit 90 Conclusions

The formation processes indicated by this analysis, including cleaning events, cooking events, and post-occupational burning seem to fit the conclusions made by Lepofsky (Vol. I, Chap. 9). The density and diversity of species recovered from HP 90 as a whole, however, are not exactly what we might expect following the analysis of HP 12, and from the artifacts and features noted during the excavation of HP 90. There were more floral remains in total and there were more species identified than were recovered from HP 12, which does not really support the "overall impression of poverty" suggested by the rest of the analysis of HP 90. Housepit 12 appears to be much less well-off based on the plant remains alone.

Housepit 90's plant remains and their distribution reflect its function as a residential housepit. Several of the activity areas identified in this analysis seem to fit the reconstruction of small housepits by Alexander (Vol. III, Chap. 7). These areas include a sleeping or sitting area that may be represented by conifer needle concentrations along the northeast wall of the housepit, and a cooking area that may be represented by a small boiling pit and concentrations of charcoal and food plants in the southeastern area of HP 90. A storage area for garbage or for supplies may have existed near the west side entrance where a variety of plant remains were found in a concentration that seems unlikely to be the result of random events.

The particular species recovered from HP 90 were not surprising or unique but the fact that chenopods were again recovered from several pithouse floor contexts may suggest that this species (or perhaps several species) were utilized at the site and not merely intrusive, as has been suggested by Lepofsky. There are several species that could have grown in the area that are known to have been used ethnographically in the British Columbia Plateau region. With further research with a more extensive reference collection it should be possible to determine if any of these species have been found at the Keatley Creek site or at the Squilax site near Little Shuswap Lake (Lepofsky 1990). The presence of Phacelia in HP 90, in addition to its presence in HP's 3 and 7 and at the Squilax site, supports its inclusion as an important taxa at the Keatley Creek site and perhaps in prehistoric medicinal practices on the Interior Plateau. Ericaceae seeds and conifer needles continued to be a ubiquitous component of the plant inventory.

Housepit 9

This analysis was completed by myself and included 17 samples taken from the Kamloops Horizon floor of the housepit (1200–200 AD). These samples represented approximately 20% of the floor area. It was expected that HP 9 would demonstrate a different pattern of plant use from HP 12 or 90 since HP 9 appeared to have been a special-purpose structure, based on the other artifacts and features it contained. Several loon bones were found, for example, which were not found anywhere else at the site. Loon bones are associated ethnographically with shamans (Vol. II, Chap. 1). Pipe fragments and prestige materials such as nephrite were also recovered. Housepit

9 also exhibited unusual storage capacity, and unlike every other structure tested to date, it was not burned. The individual plant remains were not found to be unique however, and did not suggest any special activities, although a relatively large amount of food plant remains were recovered when HP 9 is compared to HP's 12 and 90.

Housepit 9 is located on a terrace southeast of the main village at Keatley Creek on the south side of the creek. There are several other housepits and also several cache pits and roasting pits on that terrace, most of which have not been dated, and it is not yet clear if any of them are contemporaneous. With a diameter of 7.8 m, HP 9 is a little larger than HP 90. It appears to have been occupied by several groups of people at different times in its history. This analysis only considers one of those occupations, Stratum VIII.

Housepit 9 does not appear to have been particularly unique in terms of its floral remains based on their density, diversity, or distribution. Although several species were recovered that might have been used medicinally, the floral remains from HP 9 fit what might be called "the general residential pattern" observed for other small housepits at the Keatley site to date. They do not suggest the home of a specialist on their own. As noted above, more food plant remains were recovered from HP 9 than from HP's 12 or 90, with seventeen items compared to ten and two.

The remains of food species, and in fact all plant species, appear to have been similar to the other three small housepits analyzed to date (Table 1). The distribution of floral remains in HP 9 fits the general pattern of identifiable activity areas observed in HP's 12 and 90 as well, including a central plant processing area with bedding areas along the walls. There is a problem, however, in that the conifer needle concentrations, although minor, might suggest that the bedding areas are along the south wall of the housepit. Alexander's reconstruction of HP 9 suggests that the bedding areas are along the northeast and southwest walls (Fig. 3A). Perhaps the needles that were recovered in the south represent some other activity, such as the preparation of medicinal plants including pine species or use associated with the large storage pit.

Housepit 9 Procedures

Seventeen one-litre samples from HP 9 were processed to recover floral remains, as per the procedures discussed for HP 90 above. The reference collections of Dana Lepofsky and the author were used for identification in this case. Charcoal was not separated out of the 0.5 mm subsample due to time constraints and it was not identified to species in any size class as it all appeared to be from wood, rather than "root" plants, and was not expected to add any new information to the analysis at this point.

Housepit 9 Results

A total of 36 seeds were recovered from the Stratum VIII samples of HP 9, from a minimum of 10 species. Seventy-four conifer needles or other conifer parts were

Table 1. Recovered Taxa: Small Housepits

	HP 9	HP 12	HP 90	HP 104
Caprifoliaceae sp.				1
Chenopodiaceae sp.	10	10	36	3
Ericaceae sp.	16	2	9	
Arctostaphylos uva-ursi			1	
Vaccinium sp.	1			
Graminae			1	
Hydrophyllaceae sp.				
Phacelia linearis	3		3	
Pinaceae sp.	74			1,521
Pinus ponderosa		111	9	
Pseudotsuga menziesii		4,339	45	
Poaceae sp.				1
Rosaceae sp.				
Amelanchier alnifolia		2		
Unidentified seeds	7	2		13
Total Items	111	4,466	103	1,539

recovered, from a minimum of two species. (Note: most of the conifer needles were extremely fragmented and none of them were identified beyond the family level but they do appear to vary enough to include at least two species.) With an average of 6.5 items per subsquare sample, HP 9 demonstrates a lower density of floral remains than HP 90 with an average of 10 items per subsquare sample. Housepit 9 has a similar diversity of species to HP 90, however, with a minimum of 12 species compared to a maximum of 13. The density and diversity of HP 9 is lower than both HP 90 and the medium and large housepits analyzed by Lepofsky (Vol. I, Chap. 9).

The plant species that were recovered and positively identified are listed below by family, with a discussion of their probable role in the culture and how they may have come to be preserved in the housepit floor context. In some cases it was only possible to determine identifications to family level, but this proved to be enough information to make some suggestions as to how these plants might have been used at the site. Several seed types and one species of conifer needle remain unidentified.

Housepit 9 Plant Inventory

Chenopodiaceae (goosefoot family)

Ten charred seeds from the chenopod family were recovered (along with one that was not charred). Three out of the four samples that contained chenopods also contained relatively high (>8) concentrations of conifer needles. The fourth sample containing chenopods also contained four conifer needle fragments. The many chenopods that have been recovered from the Keatley site are generally thought to be from weeds that were incidentally introduced into the pithouses, perhaps with bedding materials, and then charred when the pithouse was burned on abandonment (Lepofsky 1997a). The distribution of the chenopods recovered from HP 9 (Fig. 3B) might be explained with this theory, as all of the samples that contained chenopods are located within or near the bedding areas, as reconstructed by Alexander in Figure 3A.

There may be two species of chenopod represented in HP 9 as two fairly distinct sizes of seeds were recognized. One "species" measures just less than 1 mm in diameter on average, while the other measures approximately 1.5 mm in diameter. This size variation was also observed in the chenopods recovered from HP 90, and from several other housepits as well, as noted above.

As discussed above, chenopods may have been used as food plants, technological plants, and/or as a perfume, or they may have been considered weeds. Any chenopod species might have been mixed in with grasses used in bedding or incidentally introduced as each plant produces thousands of seeds and even one plant could explain the seeds recovered from HP 9. However, there is no evidence of grass seeds in HP 9 and the chenopods do not produce burrs or anything that might stick to clothing etc. and the seeds are not dispersed by air. Chenopods do not grow with conifers and are therefore unlikely to have found their way into the pithouses mixed with fir or pine branches unless they were specially gathered for this purpose. It seems more likely that chenopods were used in some way. It is unfortunate that it is so difficult to identify chenopods to species. According to Pearsall (1989:149), their identification often requires scanning electron microscopy and detailed metric and shape data. This type of detailed analysis has not been available to date.

One uncharred chenopod seed looks quite fresh and may have contaminated the sample during the excavation. It is dark red in color and approximately 1.5 mm in diameter. Its red color may indicate that its species is *Chenopodium capitatum* (strawberry blite).

Ericaceae (heather family)

Sixteen seeds from the Heather family were recovered. This family includes many edible berry species, including blueberries, huckleberries, and kinnikinnick berries, and the seeds recovered from HP 9 probably represent food remains. The samples containing these seeds were clustered in the southeastern and central portions of the housepit (Fig. 3C), perhaps suggesting a food preparation or storage area. These clusters are within the hearth and food preparation and storage areas of HP 9 as reconstructed by Alexander in Figure 3A.

Two different species of Ericaceae are represented in the floral remains from HP 9, including a species of *Vaccinium* and an unknown species that was also recovered from HP 90. This second species is the most common species of seed recovered from HP 9, representing 40% of the total seed inventory. It was also a fairly common species in HP 90.

Hydrophyllaceae (waterleaf family)

Three seeds from the waterleaf family were recovered, and all of them appear to be *Phacelia linearis*. *Phacelia linearis* was used medicinally in ethnographic times, as noted above. The distribution of Phacelia within HP 9 is restricted to two samples; both located in the southern half of the housepit, near the center (Fig. 3D). This distribution may suggest a discrete medicinal preparation area, although it is difficult to make such an assumption based on three seeds. Conifer needles and food plant remains were also recovered from these samples. It appears more likely that this area of the housepit was used for several kinds of plant preparation.

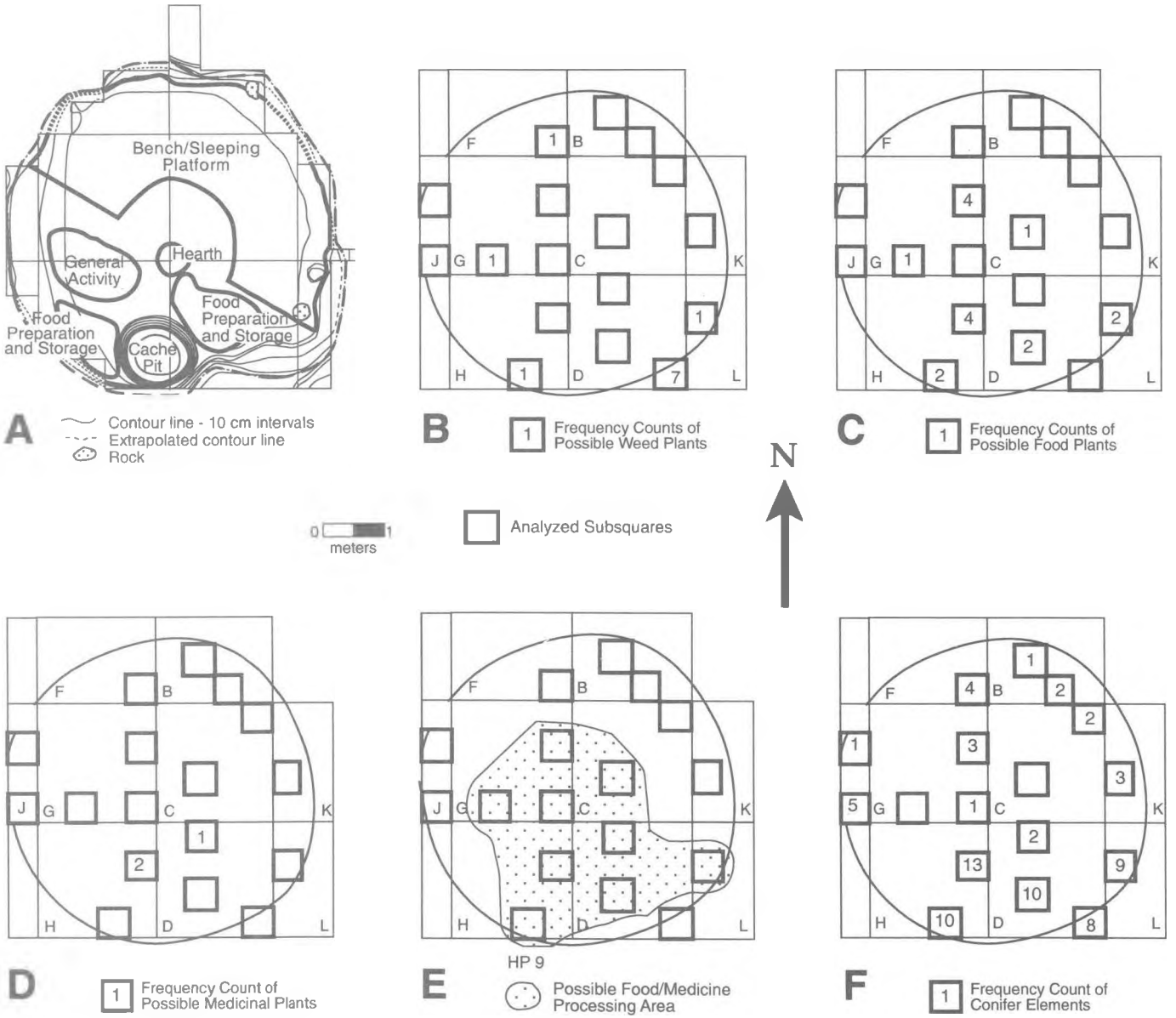

Figure 3: (A) Housepit 9 reconstructed activity areas; (B) distribution of potential weed plant remains; (C) distribution of potential food plant remains; (D) distribution of potential medicinal plant remains; (E) potential food/medicine plant processing area; (F) distribution of conifer parts.

Phacelia linearis seeds were also recovered from HP's 3, 7, and 90, as noted above. Three were recovered from HP 90, seven came from HP 3, and 26 were recovered from HP 7. If *Phacelia linearis* was a medicinal plant, it appears to have been used by, or at least in the treatment of, people of varying social status at the site.

Unidentified Seeds

Seven seeds remain unidentified. These seeds appear to represent four different taxa, possibly including a single example of a *Fragaria* (strawberry) species. Their distribution does not mean much at this point without their identification, but they are also clustered in the southern half of the housepit, near the center. When combined with the distribution of the Ericaceae and Hydrophyllaceae seeds, it suggests a general plant processing area of some kind in this part of the pithouse (Fig. 3E).

Pinaceae (pine family)

Seventy-four conifer parts that appear to be from the pine family (rather than the cypress family) were recovered from HP 9. At this point they have not been identified to a species level due to their fragmentation. Sixty-five of these were needles or needle fragments, one was a needle bundle, and nine were miscellaneous conifer parts. Pine cambium was eaten and the boughs were used for bedding ethnographically, as noted above.

There is a concentration of conifer parts in the southeastern/southcentral area of the housepit (Fig. 3F). This concentration is quite marked with these samples containing 8–13 conifer fragments, whereas other samples contained 0–5 fragments. This may not be significant as the numbers are all small; however, the overall density of floral remains in the housepit is low, and small differences may be considered notable. This apparent concentration does not really fit with Alexander's reconstruction of the bedding areas of HP 9 being along the northeastern and southwestern portions of the wall. In fact, these areas demonstrated quite a low concentration of conifer remains, except for perhaps on their extreme edges (Fig. 3F). The concentration found in the southeastern/southcentral area may represent some other activity, perhaps plant processing or storage.

Housepit 9 Discussion

Housepit 9 does not appear to have been particularly unique in terms of its floral remains, based on their density, diversity, or distribution. The remains of food plants, and in fact all plants, appear to have been similar in terms of species to the other small housepits. The distribution of floral remains in HP 9 fits the general pattern of identifiable activity areas observed in HP's 12 and 90, although the bedding areas are not identifiable based on the floral remains in this case. There are more remains of food than in the other small housepits, but more samples were analyzed for HP 9 than for the others and may account for this difference. However, considering that this housepit was not burned, the plant inventory is quite large.

The distribution of floral remains within HP 9 indicates a processing area for foods, and perhaps medicines, in the southern half of the pithouse, near the center (Fig. 3E). This distribution fits with Alexander's reconstruction of a food preparation and storage area, and also a hearth being located in this area. The distribution of conifer parts may reflect some type of conifer plant processing as it does not appear to reflect a bedding area, based on Alexander's reconstruction. The only floral-based activity area apparent within HP 9 is the general plant processing area. There does not appear to have been more than one area for these activities, which is consistent with what has been found in other small housepits to date. There are no marked differences between any of the small housepits analyzed to date, based on the floral remains, unless the higher amounts of food and medicinal plants recovered in HP 9 are not the result of sampling. If they are not, they may reflect greater access to these resources.

There may be one other potentially significant detail about the HP 9 floral remains. The unidentified Ericaceae species was by far the most common seed species recovered (representing 40% of the total seed inventory). This might suggest a preference for or access to this species by the inhabitants of HP 9. This species was also the most common food plant remain recovered in HP 90, while *Amelanchier alnifolia* (Saskatoon Berry) seeds were the most common food plant recovered in HP 12.

Housepit 9 Conclusions

Based on the floral remains alone, HP 9 does not appear to have been the home of a specialist, or specialists. No unique species of flora, except perhaps *Fragaria*, were recovered and the distribution of the floral remains matched the general pattern observed in the analyses of other small housepits at the Keatley Creek site. There may be some significance to the distribution of conifer parts in HP 9 that has not been identified yet, however, as the majority of needles were recovered from the apparent plant processing area, rather than the bedding areas as has occurred in other housepits. The density of food plants may also be significant, as it appeared to be somewhat higher than in other small housepits. Finally, the inhabitants of HP 9 did not appear to be especially "poor," unlike those of HP 12, but they appear to have had less access to the range of plant resources enjoyed by the

inhabitants of HP 7. It is possible, of course, that the fact that HP's 12 and 90 housed less people meant that there was less food required and therefore fewer food remains to recover.

Housepit 104

Several Simon Fraser University students undertook this analysis as a class project and analyzed one sample taken from the late Kamloops Phase floor of the housepit, dated at 250 BP. This was the only occupation of HP 104. The date places it approximately one thousand years later in time than the other housepits discussed in this chapter, which of course lowers its comparative value. The sample discussed in this analysis was taken from the peripheral floor area (Fig. 4). It was expected that HP 104 would demonstrate a different pattern of plant use than HP 12 (the only other small housepit analyzed at that time), as it appeared to have been a special purpose structure, perhaps used for ritual events (Vol. II, Chap. 12; Vol. III, Chap. 11). The low density of lithics and the high density of burned bone compared to other housepits at the site may suggest this. It is difficult to compare this late dated, single paleoethnobotanical sample to the multiple samples taken from the other pithouses, but results do provide some support for the theory that HP 104 might have been a special structure. Its plant inventory and distribution is a little different than the other three small pithouses and does not fit the apparent "residential" pattern.

The HP 104 sample contained members of the Caprifoliaceae (Honeysuckle), Chenopodiaceae, Pinaceae and Poaceae families, along with several unidentified species. Chenopods, pine needles and grass seeds are common to most pithouse assemblages. Several unusual paleobotanical finds suggest that HP 104 may not have been an average residence. More than one thousand conifer needles were recovered in the single sample that was analyzed, which is an unusually high concentration. A dense mat of charred grass was found along the southern wall during the excavation (Fig. 4), which is also a unique find at the site. This matting might be explained as bedding areas, but it could also be explained as seating areas for a sweat ritual or other ceremony (Reimer 1995). A single Caprifoliaceae seed was also recovered, which was an unusual find at the Keatley site. Unfortunately, it has not been identified to species as yet.

Three seeds from the Caprifoliaceae family were also recovered from the rim of HP 7, the large housepit. One of these was identified as being *Sambucus* cf. *cerulea* (Blue Elderberry). This is an edible species that was used for a number of purposes ethnographically (Parish et al.; Turner 1998). The HP 104 seed could be from a number of species found in the Lillooet area and known to have been used ethnographically, including *Sambucus* cf. *cerulea*, *Lonicera ciliosa* (Orange Honeysuckle), *Lonicera involucrata* (Black Twinberry), *Symphoricarpos albus* (Common Snowberry), or *Viburnum edule* (High-bush Cranberry). According to Turner (1997), children would suck the nectar from Orange Honeysuckle flowers. The woody vines of Orange Honeysuckle were used for weaving, binding, and lashing and reinforcing suspension bridges according to Parish et al. (1996:84). Black Twinberry twigs were used by the Stl'atl'imx to make a tea and Common Snowberry berries were used for eye medicine (Parish et al. 1996). High-bush Cranberry berries were gathered in the autumn and eaten and the bark was steamed and inhaled for sore throats.

To determine whether HP 104 was used for ritual purposes, further excavation and paleoethnobotanical analysis would be required. The floor has only been partially excavated at this point. The plant remains could provide many clues. For example, if no food plant remains were found in the housepit at all this would be a strong indication that HP 104 was not a residential structure. If the conifer needle concentration remained high across the floor this might also suggest a ceremonial structure, or at least a non-residential structure requiring such flooring or seating. More grass matting might also suggest this. The presence of juniper

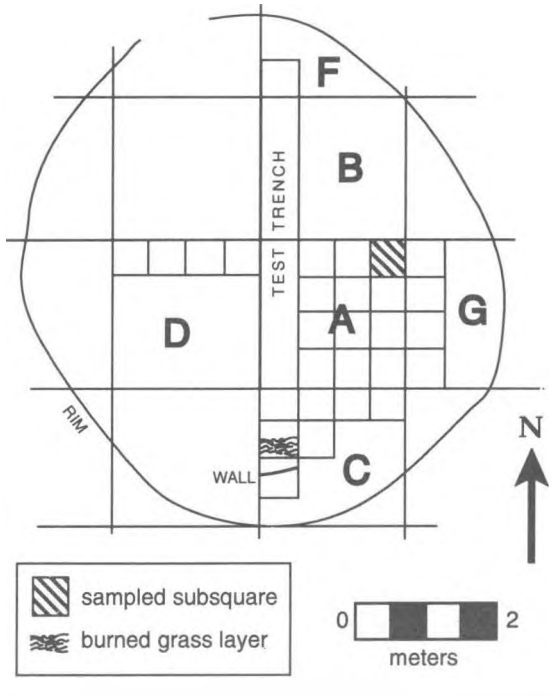

Figure 4: Housepit 104 showing single sampled subsquare location.

(*Juniperus*) or other ritually used plants would also suggest this. It seems clear at this point, however, that HP 104 was not the normal residence of high-status individuals, based on the ethnographic patterns noted a century later or on the archaeological patterns that are beginning to emerge from a thousand years earlier.

Overall Discussion

It would appear that the small housepits at Keatley Creek were generally the regular residences of lower status people, while in some cases they functioned as special purpose structures. This is suggested by the variation in the quantity and frequency of species found in each housepit and their distribution as tabled and discussed below.

Lepofsky's work at Keatley Creek has shown that the floors of the housepits were relatively intact and undisturbed at the time of excavation. This does not mean that they were undisturbed while people were living in them, however, as noted above. Modern plant intrusions, including uncharred and/or Eurasian introduced species, have been few and their density is typical of minor soil movement caused by roots and insects. The distribution of remains has suggested discrete areas of food processing, hearth areas, and sleeping or sitting areas. This was the practice in ethnographic pithouses as well.

The concentration of floral remains has been generally low, despite the apparent diversity found in the larger housepits, and may reflect frequent cleaning events in the housepits. It has been suggested by Lepofsky that most plant remains were dumped in the rim deposits, where floral remain density is much higher. Although many of the plant remains associated with the hearths would have been charred during processing, many others would have been charred during the burning of the entire pithouse structure upon abandonment. Without this burning event the density of remains in the floor deposits would probably be even lower.

This analysis suggests that general activity areas can be identified in small housepits at Keatley Creek on the basis of plant remains. These activity areas suggest residential homes (HP's 12 and 90) and may suggest places where specialized activities took place (HP's 9 and 104). The variation in species and distribution of species between housepits may suggest differential or preferential access to certain plant sources. For example, HP 9 appears to have had especially good access to the unknown species of Ericaceae in comparison to the other small housepits while none of the small housepits appear to have had much access to Saskatoon Berries which were ethnographically the most important berry resource (Turner 1992). Individual botanical remains may also be significant. For example, HP 104 contained a seed from the Caprifoliaceae family, which was a rare find at the site.

Results from the analysis of the HP 90 floor are comparable to results from HP's 3, 7, and 12 as HP 90 appears also to have been a residential housepit, rather than a special purpose structure. The plant remains that were recovered include common species used for technology and food, as well as what appears to be a common medicinal species. The activity area patterns fit the residential pattern of a number of activity areas for plant processing and storage with a sleeping area along the periphery. The percentage of the floor that was sampled is also comparable (approximately 15%). In terms of dates, however, HP 90 appears to have been occupied during the late Plateau Phase, making it slightly older than the housepits analyzed by Lepofksy (Vol. I, Chap. 9). Whether this small time difference had a significant effect on plant use patterns remains to be determined but there is no initial reason to think that this might have been the case.

The analysis of the HP 9 floor suggests that this housepit was a little out of the ordinary. More food plants were recovered from HP 9 than from HP's 12 and 90, in terms of quantity, and also of diversity for HP 12. This may be especially significant when it is considered that this housepit was not burned on abandonment, which probably means that its floral record is more scanty than other structures that were burned. The activity areas fit the expected pattern of several plant processing or storage areas in the center of the housepit, with bedding areas along the walls. It is also worth nothing that the distribution of Phacelia within HP 9 is restricted to two samples; both located in the southern half of HP 9, near the center (Fig. 3D). This distribution may suggest a discrete medicinal preparation area, although such an assumption should not be made based on three seeds. Conifer needles and food plant remains were also recovered from these samples. It appears more likely that this area of the housepit was used for several kinds of plant preparation. Approximately 20% of the floor was analyzed, which is a little more than has been completed for other housepits to date. Housepit 9 is approximately the same age as HP's 3, 7, and 12, making it slightly younger than HP 90, as noted above.

Housepit 104 does not appear to have been a residential housepit, although further excavation and analysis will need to be completed to support this view. The plant remains that were recovered included no known food plants and one rare species. The late date of HP 104 and the fact that only one sample has been analyzed make it of less comparative value but it appears that it would be worth investigating this pithouse further as it does seem to be a unique example.

Overall Conclusions

Small housepits at the Keatley Creek site appear to have been inhabited by people who had less access to resources than those people living in the medium or large housepits analyzed to date. A range of access to plant resources appears to have existed within the small housepits as well. For example, HP 12 contained a lower density and diversity of food and medicinal plant remains than HP's 9 or 90, but it contained a much higher density of conifer needles. Housepit 12 appears to have been the only household with access to Saskatoon Berries, however.

The species that have been recovered from the small housepits have been similar and are limited to several members of the chenopod, grass, heather, rose, waterleaf, and pine families, and a single example of the honeysuckle family. Each housepit has a slightly different floral record, which may or may not reflect access to plant resources. No medicinal plant remains were recovered from HP's 12 or 104. This may suggest that no one was sick there, rather than that they did not have access to medicinal plants.

The identifiable activity areas in the "residential" housepits include a central plant processing area and peripheral bedding areas. Housepit 104 is a little different, however. It does not appear to contain the remains of any food plants. The HP 104 sample also contained an unusually high concentration of conifer needles, which might suggest a special activity. It should be noted that all of the small housepits analyzed at this point may be atypical as they are located outside of the main village area and they may have been occupied by families that were not part of the "normal" social ranking (HP's 9, 12, and 90), or used for special activities (HP 104).

Suggestions for Further Research

As noted above, the analyses of HP's 9, 12, 90, and 104 have demonstrated that a range of plant use existed within the small housepits at the Keatley Creek site. Some of these small housepits were probably not pithouses at all, but small special-purpose structures not used for regular habitation. For the time being, enough paleoethnobotanical data has probably been collected for small housepits in general. The floral remains from several more medium and large housepits should be analyzed, however, to determine if the density and diversity recovered from HP's 3 and 7 are repeated, and if so, what kind of variation can be found within the class of larger housepits. Perhaps a demonstrated preference for, or access to, certain species of plants will be found in each of these larger housepits in the same way certain lithic materials have been shown to be associated with specific large houses (Vol. I, Chap. 16). The small housepits analyzed here hint at such differential access.

As well as the testing and analysis of a few more medium and large housepits noted above, there are a number of further paleoethnobotanical studies that should be carried out with the materials that have already been recovered. For example, the unidentified seeds from all six housepits analyzed to date should be compared to determine if any of the same species have been recovered and if any of the species can be identified, at least to a family level. Another study that should be undertaken is a comparison and identification of the chenopods recovered from the Keatley Creek site. For several reasons, it appears to me that at least one species was used in some way, rather than simply included in housepits on an incidental basis. A number of species of chenopods are known to have been used historically and prehistorically in the Lillooet area. Chenopods have been the most common seed recovered in five out of six housepits analyzed to date. Chenopods have also been found in pithouses at other sites on the British Columbia Plateau (Lepofsky 1990). In my opinion, there is currently no fully satisfactory explanation for their presence at Keatley Creek. If the species can be identified, their presence and distribution may have a significant contribution to make to our interpretations of plant use at the Keatley Creek site.

Finally, paleobotanical analyses of non-housepit features at the Keatley Creek site are currently being completed by the author. These analyses are expected to provide additional information on what plant species were used and how they were cooked. For example, it is apparent that there were large plant-cooking pits located on the terraces of the village periphery.

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