Chapter 1

The Opening of Keatley Creek: Research Problems and Background

Brian Hayden

Introduction

The Fraser River Investigations into Corporate Group Archaeology project (FRICGA) began in 1985 with a simple question: why unusually large housepits occurred in the Lillooet area of the British Columbia Interior Plateau. With hindsight, this was an ambitious undertaking, one fraught with massive data collection and many collateral problems. In the 1960's and 70's, Arnoud Stryd (1973) had pursued the elusive nature of prehistoric social organization in the same region, only to be overwhelmed by the magnitude of the undertaking. He did, however, establish important baselines that enabled the present project to proceed much further.

The project has brought many of us into contact with a very remarkable culture and its mysteries, probably one of the most complex prehistoric hunter/gatherer cultures in the Western Hemisphere. Our original research goal has confronted us with new problems and new ways of dealing with prehistoric remains that have been both challenging and extremely rewarding. Why dogs were domesticated, how to speciate salmon vertebrae, what prehistoric resource exploitation was like, and how to chemically identify different chert sources are only a few of these problems. In addition to these questions, we have also had to deal with much larger issues such as why the large, complex communities around Lillooet were so different from other hunter/gatherer bands that were much more egalitarian and nomadic, with no more than 25–50 members. In contrast to simpler hunter/gatherers, some of the Lillooet communities housed well over 1,000 people living in seasonally sedentary houses with pronounced wealth differences and hierarchies.

The Lillooet region turned out to be an ideal location for dealing with all the above and many more archaeological issues. The Lillooet region is relatively simple to model in terms of environments and resources. It is also a semi-arid area where the preservation of bone and botanical remains is good. The prehistoric housepit architecture used in the region makes it easy to identify and analyze individual households. There is a vigorous native tradition in the area which is part of the same culture tradition that we were investigating. The region also abounds with spectacular geography and engaging people which makes an enjoyable place to work.

The goal of this chapter is to describe the research history and goals of the project, to describe the selection of the site and its context, to describe the general cultural sequence at the site, population estimates for the site and the region, and to set out the assumptions, theoretical orientations, methods, and techniques of investigation that enabled us to reach conclusions about the prehistoric social and economic organization of the residential corporate groups at Keatley Creek.

Organization of the Volumes

The report is organized into three volumes. Each volume has a separate thematic focus, these are: taphonomy, socioeconomic organization, and excavation documentation. This organization is somewhat different from traditional archaeological site report formats where all the information pertaining to a given type of material such as lithics or fauna is presented together in a single chapter or section. Given the complexity of the database at Keatley Creek and the complexity of the issues being addressed, it was thought that a traditional type of material-focused organization would make it difficult for readers to follow all of the related arguments, models, and issues related to the central themes of the research at Keatley Creek. We therefore chose to structure the organization of these volumes around the major research questions at the site, especially site formation processes and prehistoric socioeconomic organization. For those accustomed to the more traditional material-focused organization of site reports, this may at first seem somewhat awkward since some of the information on lithics, for example, is presented in all three volumes. However, after reading a few chapters, and especially with some judicious use of the table of contents and indexes of the volumes, readers should be able to orient themselves sufficiently to find any type of information that they are interested in. We also have included frequent chapter cross-references to direct readers to other relevant data or interpretations in the report.

Volume I

Because questions of taphonomic biases, disturbance, mixing, and basic issues of accurate identification of the origins of sediments must be dealt with prior to any consideration of artifactual patterning, the first volume deals with general formation processes at the Keatley Creek site. Chapters include sediment analyses, microfabric analyses, faunal taphonomy, botanical taphonomy, lithic strategies and source identifications, and specific comparisons of rim to roof to floor formation processes. Background chapters on basic geological, environmental, climatic, typological, and dating issues are also included in this first volume.

Volume II

The second volume deals with evidence for social and economic organization at the Keatley Creek site. Overall differences between housepit assemblages are dealt with as well as differences in the internal organization of space and domestic groups. Prestige artifacts are analyzed, including the large assemblage of domesticated dogs from HP 7. In addition to botanical, faunal, chemical, and lithic patterning, this volume contains an ethnographic summary of accounts of pithouse life, an analysis of architecture and heating strategies, an overall synthesis of what the socio-economic organization of the Keatley Creek community was probably like, and an evaluation of the results of the Fraser River Investigations into Corporate Group Archaeology project.

Volume III

In order to present as full a picture of the data upon which the previous and the following interpretations are based, relatively detailed reports of all the test trenches and extended excavations are presented in the third volume. The third volume also contains a description of the lithic typology used by the project, an illustrated catalog of all the modified bone tools from the site, and a special analysis of unusual scapula tools at the site. The intention is for this volume to be used as a kind of reference book, similar to a dictionary. It should be consulted whenever any questions about excavation or stratigraphic details of a housepit arise from reading analyses or interpretations in the other volumes.

Research Questions

The main focus of our research—why unusually large, multi-family structures occur—is an inherently interesting problem for archaeologists who aspire to understand what life was like prehistorically and why cultures change. These are some of the original aims of processual archaeologists. Large multi-family structures, which I will refer to as "residential corporate groups," only appear to occur in special circumstances prehistorically, and they constitute one of the clearest indications of basic changes in social structure that archaeologists have been able to recover (Hayden and Cannon 1982). Moreover, the formation of certain types of residential corporate groups may be related to the development of socioeconomic inequalities, or at least, one distinctive evolutionary line of such social developments (Hayden 1995).

From the outset, it was clear that in order to understand why the housepits in the Lillooet region were so large (some being 20 m in diameter), it was also going to be necessary to understand the social and economic organization of the inhabitants of these structures in far greater detail than had hitherto been attempted. Not all archaeologists were convinced that this was feasible given the common perception that housepit deposits were so culturally churned and mixed over long periods that uncontaminated living surfaces would be impossible to identify or isolate (Fladmark 1982; Wilmeth 1977). Fortunately, Arnoud

Stryd had more encouraging counsel that spurred the project on and ultimately led us to demonstrate the basic integrity of the deposits in most housepits.

Thus, from a relatively simple question emerged many research facets that had to be dealt with. These subsidiary facets included:

1) The separation of site components into more or less contemporaneous components;
2) The detailing of site formation processes in order to determine what the contents of different deposit types represented and whether living floors could be identified, and if so, the degree of mixing involved in their formation;
3) The recovery and identification of artifact patterning on living floors, and the interpretation of the meaning of this patterning;
4) The identification of individual domestic groups within structures and the identification of artifacts associated with each group;
5) The generation of meaningful typologies for monitoring behavioral patterns on living floors;
6) Understanding how the large winter village sites with large housepits fit into the rest of the settlement pattern of the community, and especially what this might mean in terms of storage practices, and other materials brought to or taken away from the winter settlements;
7) Understanding the resource base of the community and houses;
8) Understanding the socioeconomic organization of the large, medium, and small structures in the winter villages, including the problem of determining *how much*, if any, inequality existed; Sanger (1971:255–6) and Stryd (1973:90) both thought that there was greater inequality prehistorically than in historic accounts; how could such notions be tested or even evaluated?
9) Monitoring any changes over time in any of the above; and
10) Examining the possible role of climatic change.

There are still other collateral aspects to be considered, but the ten listed above are some of the major issues that had to be dealt with. Other theoretical areas of interest include understanding the development of ownership rights over goods and resources, the domestication of dogs, warfare, the emergence of metal and prestige item use, and reasons for historical changes in local cultures.

Site Selection

Investigating larger than average housepits can be carried out at many sites on the Northwest Plateau (Figs. 1 and 2). However, I reasoned that if there were critical differences between normal households and

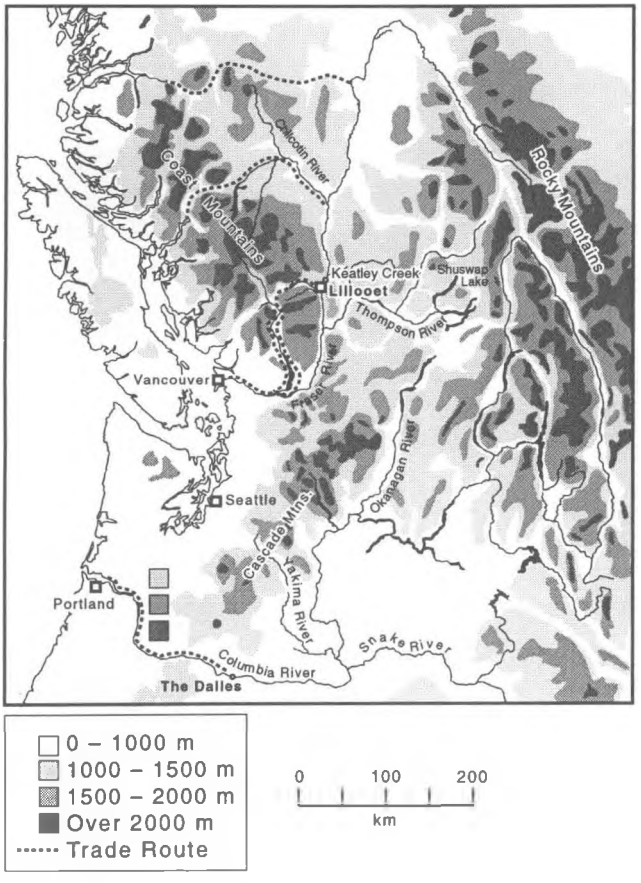

Figure 1. The Northwest Plateau geographic area.

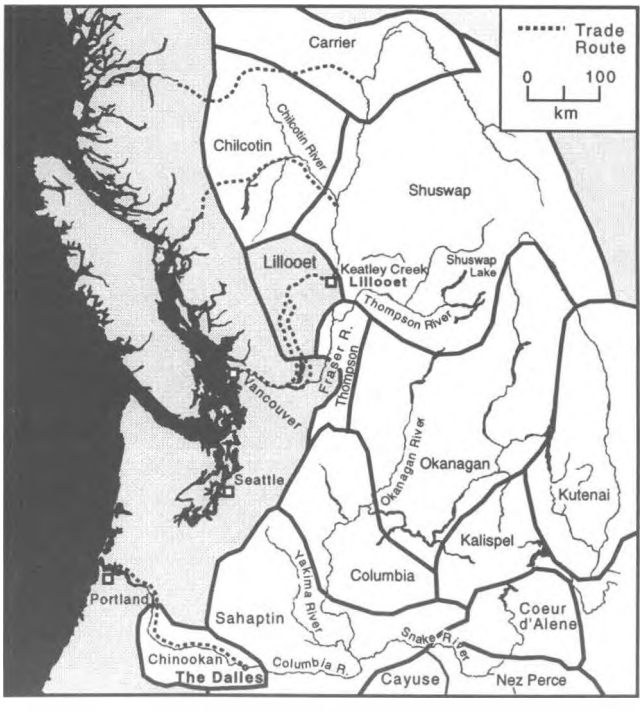

Figure 2. The Northwest Plateau culture area and its major ethnic divisions (from Hunn 1990).

residential corporate groups in the social and/or economic arenas, the largest housepits would present the most extreme archaeological expression of social and economic differences. Given the difficulty archaeologists generally have in recovering socio-economic information at this level, the most extreme case with the largest housepits, thus, seemed the best place to start.

Morley Eldridge had brought the existence of very large Interior housepits to my attention and argued that the prehistoric cultures in these areas were probably quite complex. With a small pilot grant in 1984, I asked Anne Eldridge to undertake a survey of all recorded housepit sites in British Columbia in order to determine where the largest structures were located. From this initial research, two areas stood out: the Farwell Canyon area near the confluence of the Chilko and Fraser Rivers, and the Lillooet region. The Lillooet region had by far more numerous examples of sites with large housepits. The Lillooet sites were also unusually large communities, some of the largest in the Interior of Western Canada. This added another interesting dimension to the investigation.

After narrowing the research field to the Lillooet region, Arnoud Stryd generously accompanied me on

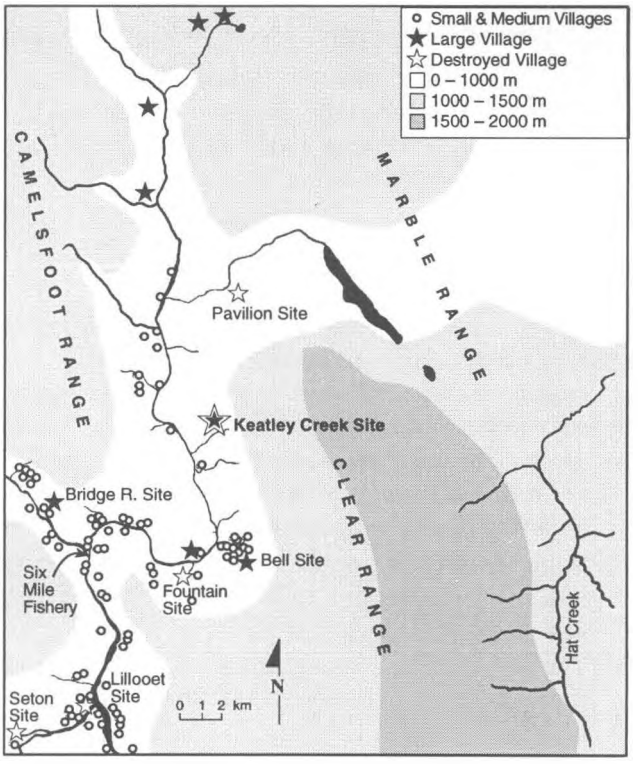

Figure 3. The Lillooet region, indicating the position of all recorded housepit villages (Stryd and Hills 1972, with data from the Archaeology Branch).

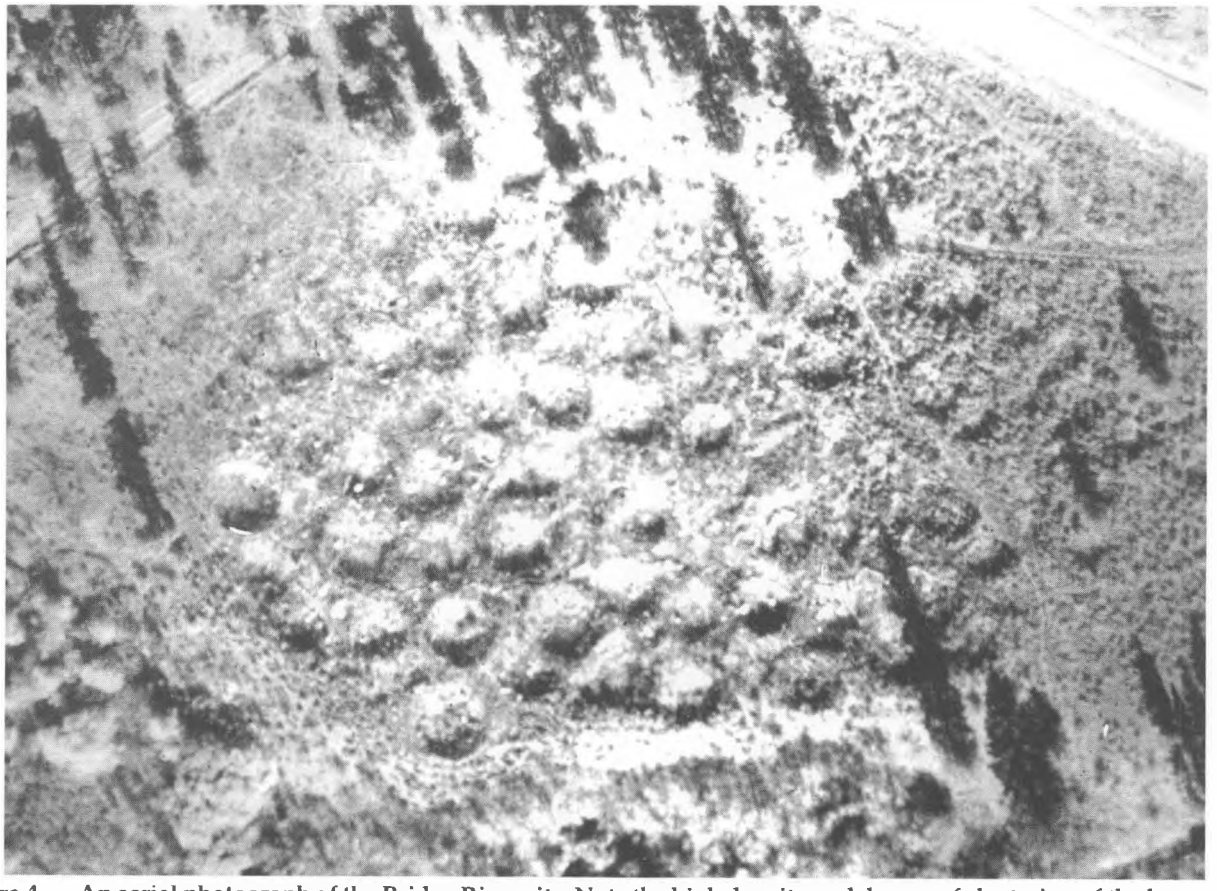

Figure 4. An aerial photograph of the Bridge River site. Note the high density and degree of clustering of the housepits, giving the impression of a bounded settlement. Imagery by Arthur Roberts.

a tour of all the potential sites where project goals might be investigated with the best chance of success. He had concentrated most of his excavation work at the Bell site (Fig. 3) where there were 23 housepits and 8 "flats" (different types of dwellings or possibly filled-in housepits). There were two other unusually large sites near Lillooet, both relatively unexcavated, and both containing large housepits: the Bridge River site with about 60 housepits (Fig. 4) and the Keatley Creek site with over 100 housepits (Fig. 5). Other relatively large housepit sites apparently existed at Texas Creek, at the east end of Seton Lake with over 75 housepits (Stryd and Hills 1972), at Fountain flats, and at Pavilion. However, if large numbers of structures did exist at these locations, they have been obliterated by road-building, modern settlements, and agricultural activities. Only a few remnant housepits have been recorded at each of these locations.

Stryd and I also visited the large housepit site along Kelley Creek (EfRk 1) with about 100 housepits. However, no unusually large housepits occurred at this location and initial indications were that the site developed under contact conditions. Other reports of large villages and pithouses near Leon Creek (15 km upstream from Pavilion Creek) and at McKay Creek (4.5 km upstream from Pavilion Creek) could not be verified at the time. Leon Creek was inaccessible and examination of the McKay Creek area failed to disclose any large sites. The existence of large villages at both Leon Creek and McKay Creek has been subsequently confirmed. Still other reports of "large numbers" of housepits having been bulldozed up the Bridge River at the Moha, and smaller but substantial numbers being turned into gardens on the Bridge River Reserve, indicate still larger regional populations. Examination of private collections from these sites indicates that they were occupied during the same major periods (Shuswap, Plateau, and Kamloops) as the other classic Lillooet sites.

Of the three surviving large housepit sites near Lillooet that we were able to visit, the Keatley Creek site (EeRl 7) was not only the largest, but also had the largest sizes of structures, with one measuring 21 m in diameter. Keatley Creek therefore became the object of intensive excavation and analysis from 1986 to 1993. The chapters in these volumes constitute the result of this research.

Figure 5. An aerial photograph of the Keatley Creek site. The creek runs diagonally from the upper left to lower right. Imagery by Arthur Roberts.

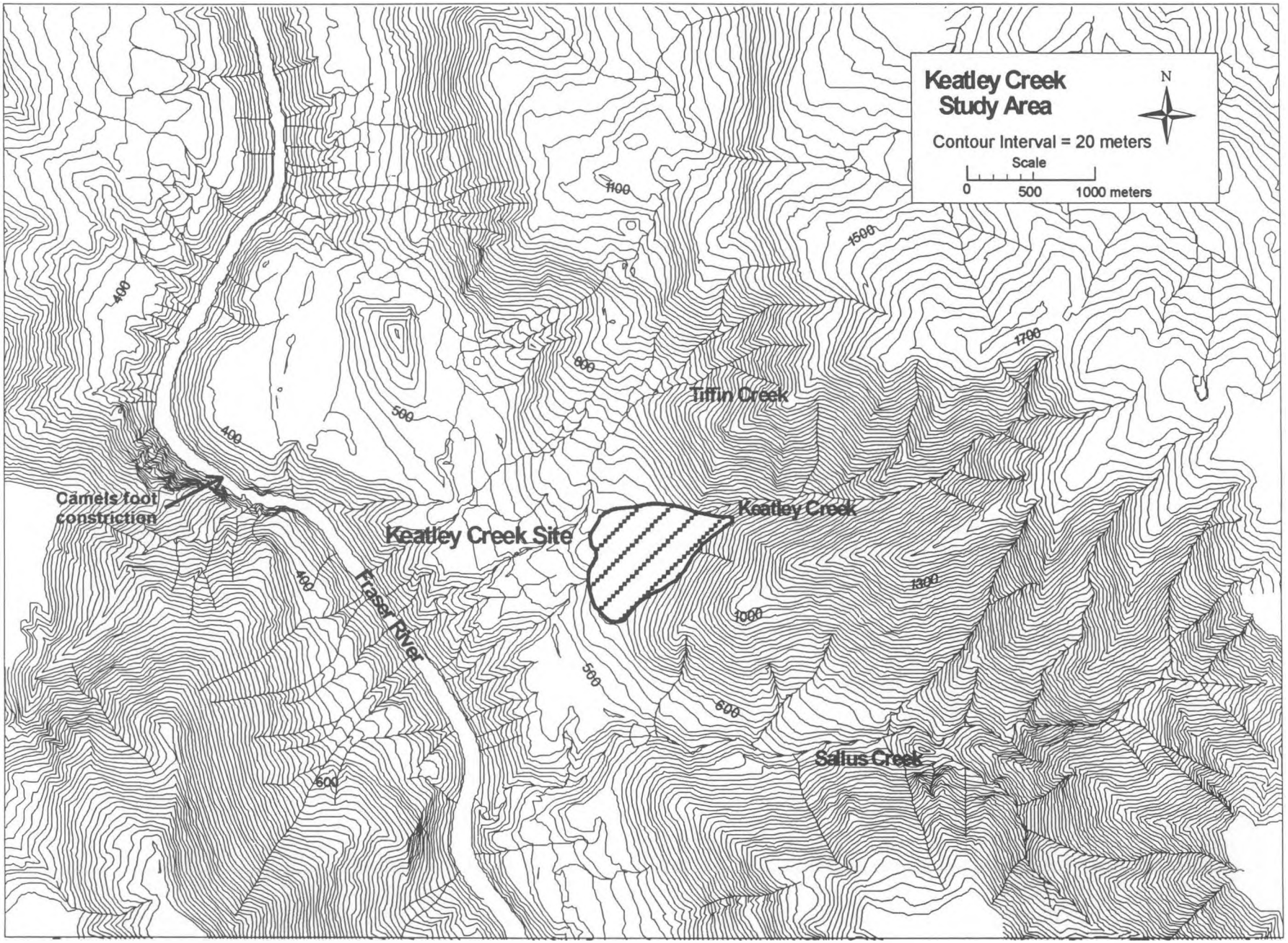

Figure 6. Topography of the Keatley Creek and Sallus Creek drainages showing the Keatley Creek site location.

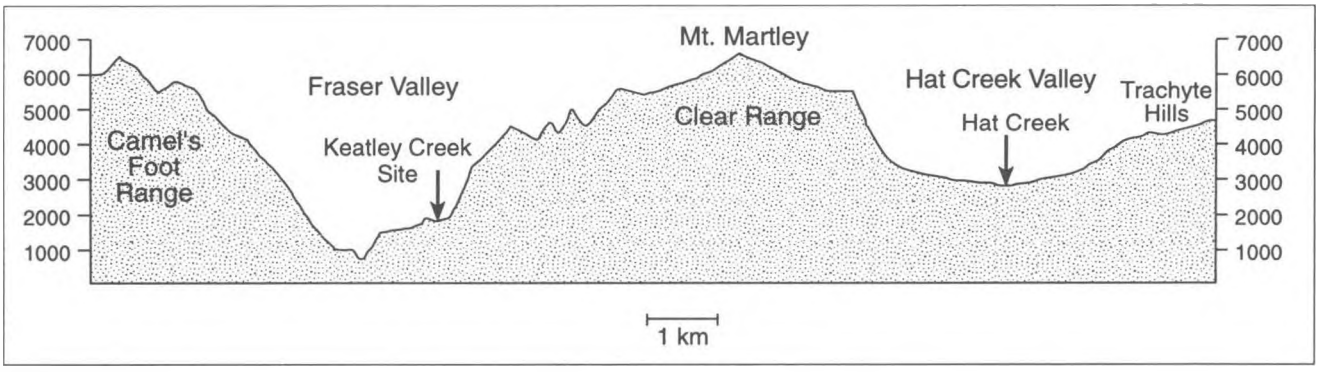

Figure 7. Transect from the Camelsfoot Range on the west side of the Fraser River, through the Keatley Creek site, over the Clear Range Mountains and through the Hat Creek Valley.

The Keatley Creek Site: Context and Ethnographic Background

The Keatley Creek site is spread over considerable vertical and horizontal space. At its maximum, the site extends from 550–640 m asl (1,800–2,100 feet asl) and stretches over 800 m along the back of a gravelly glacial terrace in the Middle Fraser River Valley. It is approximately 25 km upstream from the modern town of Lillooet (Fig. 3), and some 350 km upstream from the mouth of the Fraser River. At the eastern edge of the site, the Clear Range Mountains emerge abruptly and soar rapidly to alpine meadows reaching 1,980 m (6,500 feet asl) (Fig. 6). Below the glacial terrace, the valley flattens into a slightly lower riverine outwash terrace and then plunges precipitously down an erosional gorge to the river some 250 m (800 feet) below (Figs. 7 and 8A). The Fraser River at this point is about 210 m (700 feet).

Keatley Creek itself is also known as 15 Mile Creek (i.e., 15 miles upriver from the Cariboo trail head which is marked today by a road monument at the east end of the old bridge across the Fraser River to Lillooet). Given the ravines cut into bedrock and glacial tills, Keatley Creek must have had substantial waterflows during some periods of the Holocene; however, today the creek is largely subsurface and only emerges as a surface flow for a few hundred meters in the vicinity of the site. There is an interesting break both in the surface water run and in the vegetation of the creek bed where the creek bed passes the eastern core of the site. Mike Rousseau (personal communication) has suggested that part of the northern creek bed walls may have sloughed off as an earthflow and buried the stream channel; this seems a likely explanation. It is doubtful that the stream would have had significantly more water in the past 4,000 years since the drainage basin of Keatley Creek is considerably smaller than nearby Sallus Creek (14 Mile Creek), which does support a continuous year-round flow of water (Fig. 6).

The core of the Keatley Creek site is situated north of the creek bed in what may have been a large kettle depression containing a small kame-like hill at the north edge of the site. The densely occupied core in this depression covers about 4 ha (9.9 acres). This is a substantial size even by coastal standards; the largest Nuu-chah-nulth site is only 2.4 ha (Marshall 1992:102, 113). The permanent site datum was placed at the summit of the kame hill (Figs. 9 and 11). Several hundred meters north of the datum, there are shallow depressions and a few unusual charcoal rich ditch and ring structures which are probably associated with historical charcoal making and wood-cutting activities, either for the nearby railroad or for the substantial placer mining activities along the Fraser River only a few kilometers upstream. These features have not been investigated. A major train stop, called Glen Fraser, was situated only one kilometer due west of the site on the main river terrace. In 1986, Glen Fraser was still featured on road maps of British Columbia, and was still listed as a regular train stop even though there were no standing buildings and no inhabitants of the locality. The historical camp remains that we discovered near the surface in many housepits are undoubtedly related to this early European occupation of the locality.

The peripheries of the site extend up onto the rim of the kame terrace on the riverside, and up onto two small terrace remnants on the mountain side (Fig. 9). In addition, a few cultural depressions are found in the creek bed up to the point where the creek exits the mountains, and down near the road that enters the site along the creek bed, while lithic concentrations continue to occur sporadically along the creek bluffs out onto the river terrace. At its maximum, the site extends about 400 m from the mountain base towards the Fraser River. Scattered housepits and cache pits also occur on the terraces south of the creek. While the vast

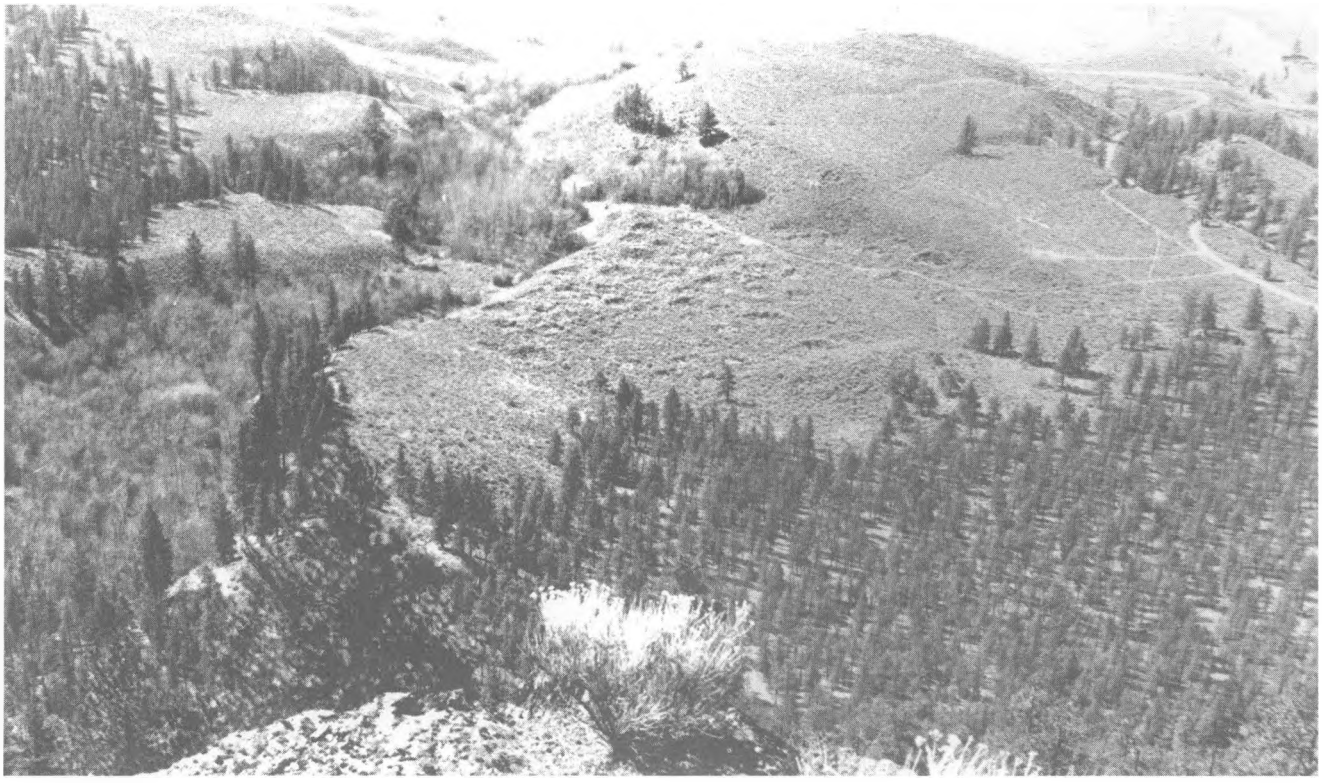

Figure 8A. A view of the core of the Keatley Creek site from the mountain slopes to its east.

Figure 8B. The core of the Keatley Creek site after the 1994 fire removed the sagebrush cover.

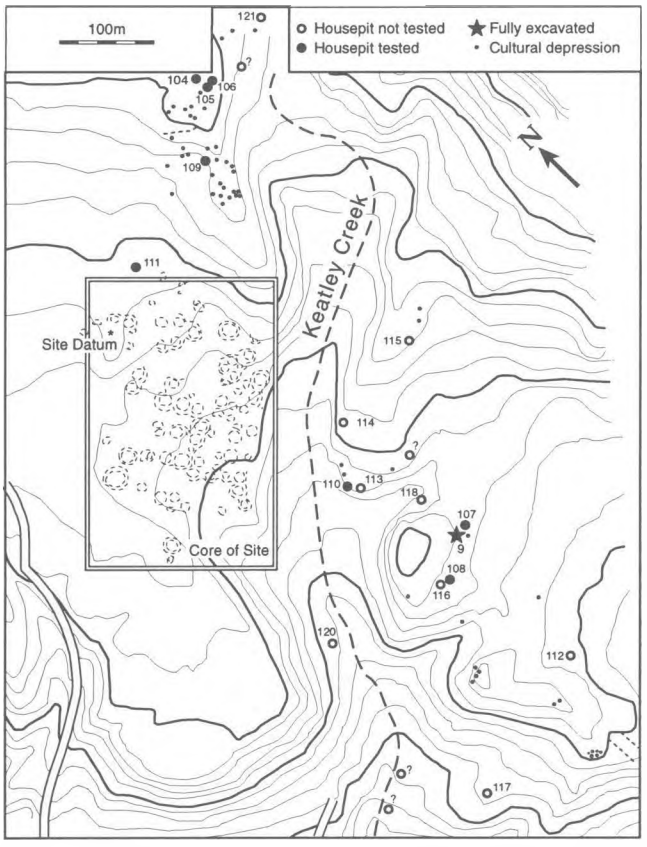

Figure 9. A contour map of the entire Keatley Creek site showing assigned numbers of housepits outside the core. The core area covers about 5 ha, while isolated housepits and small features in peripheral areas of the site cover another 8 ha. Several features and possible structures also occur along the creek about 60 m upstream from the top of the map. The map was generated by Triathalon Inc. from stereoscopic aerial photographs. Contour interval = 5 m. Imagery by Arthur Roberts.

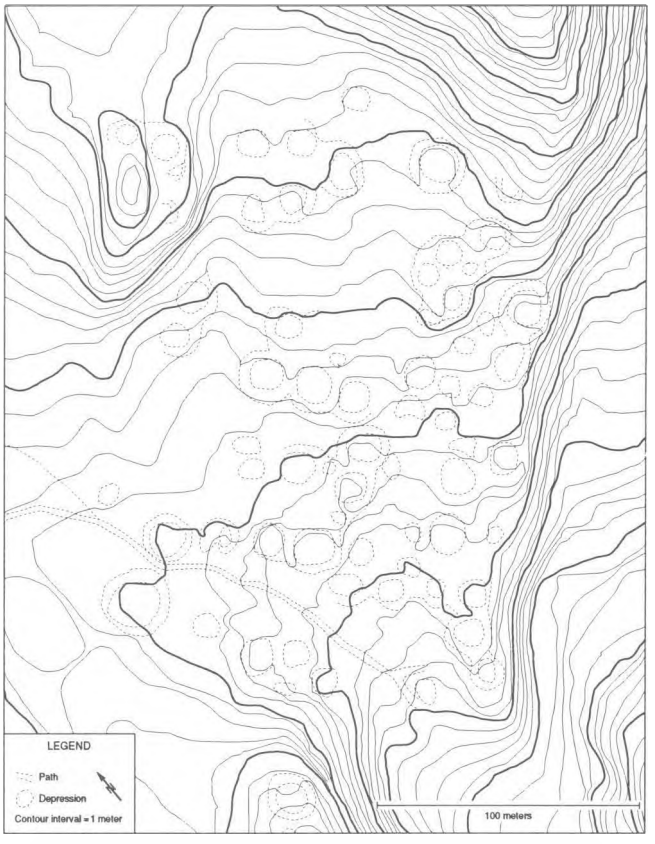

Figure 10. A contour map of the core area of Keatley Creek. Contour interval = 1 m.

majority of occupation occurs within the kettle-like depression in an area of about 4 ha, the outlying housepits and cache pits create a total site area on the order of 12 ha (Fig. 9).

Until 1994, the core of the site was covered in sagebrush, grasses, and small optunia cactus, with the upslope peripheries colonized by ponderosa pine and juniper, and the creek bed densely occupied by cottonwood, willow, aspen, some birch, and wild roses (see Lepofsky, Vol. I, Chap. 9). An early photograph of the site by James Teit (National Museums of Canada Photography No. 43555) indicates that sagebrush was well established at the end of the nineteenth century, even though local oral history as recounted by Tommy Conn and Chris Bob maintains that grassland used to be much more extensive at the site prior to 1950, and that there was more water in the creek bed but fewer trees. According to the present landowner, these changes may have been related to the past practice of overwintering cattle at Keatley Creek due to its sheltered position. On the other hand, in 1994, a forest fire completely removed all of the vegetation at the site (Fig. 8B), and given evidence of firescars on trees, this must have happened in the past as well. Thus, the site vegetation probably goes through cycles of grass and sagebrush colonization.

The site area has been of marginal value for feeding range animals, and this has undoubtedly helped to conserve the site as has its minimal water flow which has made the locality unattractive for agriculture. Approximately half of the site is on British Columbia Crown land. The other half has formed part of the Diamond S Ranch. Despite its limited grass feed and water, the overwintering of cattle at the site during the period after the goldrush (1858–1950) probably degraded surface deposits to some degree. While the waterflow was sufficient at one time to support a small orchard and homestead on the terrace immediately west of the site (to establish water rights), no such undertaking seems viable there today.

Around the time that Europeans arrived in the area, the entire eastern side of the Fraser River around Lillooet appears to have been inhabited by Shuswap

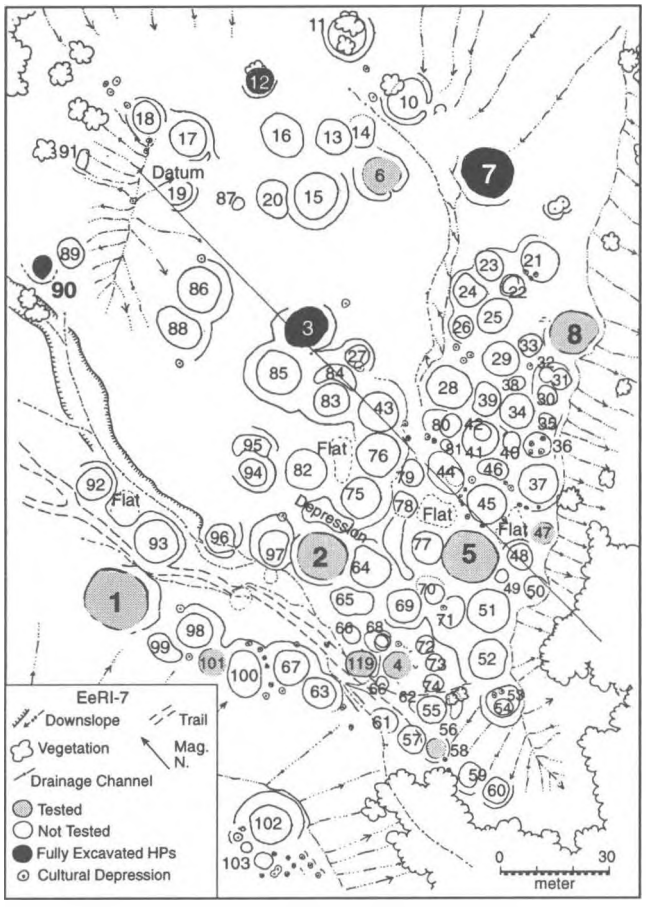

Figure 11. The Keatley Creek site core with assigned numbers of housepits. The five largest housepits are designated in bolder numbers.

speaking bands, although the Lillooet-speakers gradually became more numerous and ultimately dominated the communities of Fountain and Pavilion through intermarriage (Teit 1906:200). A detailed ethnographic and subsistence economy analysis of this region was undertaken as part of our initial research program. The results of this ethnographic study have been published as a separate volume (see Hayden 1992a). Thompson speaking communities used the Hat Creek Valley along the eastern slopes of the Clear Range (Fig. 3), while the Keatley Creek site is located at the bottom of the western slopes.

All three linguistic groups, Shuswap, Lillooet, and Thompson, are closely related linguistically and culturally, forming the main members of the Interior Salishan family. The current Lillooet term for all the Lillooet bands living along the Middle Fraser River and its lakes is, "Stl'átl'imx." This corresponds to Teit's term, "Upper Lillooet." Dorothy Kennedy and Randy Bouchard (1978:Table 1) recorded the native Lillooet term "tl'atl'lh" (derived from "sticky") for the name of the Keatley Creek locality, which is similar to the name "ta tlh" recorded for the site by Dawson (1892:42) in the last century. However, since most early ethnographers indicate that the locality was Shuswap speaking up until the nineteenth century (Teit 1906:200; 1909:463) there is no certain native name that might link the site with its earlier inhabitants.

Structural Remains at the Site and Domestic Groups

One of the most attractive reasons for conducting prehistoric research into social and economic organization on the Northwest Plateau is that individual residential structures are so easy to identify and differentiate. In contrast to the heavily vegetated coastal shell middens where post holes, not to mention living floors or structure limits, can be difficult to recognize except under special circumstances (e.g., Matson and Coupland 1995:208; Samuels 1991; Ames et al. 1992; Coupland 1985 and 1988; Marshell 1992; Chatters 1989), the sparse vegetation of the arid Interior and the excavation of residences into the ground creates ideal circumstances for the surface recognition of individual structures as well as external cache pits (Figs. 8, 9, 10, and 11). Moreover, the practice of covering roofs with dirt helped protect organic materials associated with living floors from decay once the roofs had collapsed. Using both aerial photographs and on-ground inspection, it was therefore possible to fully map all of the last used semi-subterranean housepits and cache pits at the Keatley Creek site (Fig. 11). Remains of a few earlier housepits were also encountered buried underneath the structures that were last used at the site. In conformity with established British Columbian academic usage, the term, "housepit," will be used to refer to archaeological house depressions, whereas the term, "pithouse," will be used to refer to semi-subterranean structures that were still functioning, i.e., with standing roofs.

In all, there are 119 housepit size depressions at Keatley Creek and approximately an equal number of smaller identifiable external features, most of which are probably cache pits. In this tabulation, we have assumed that structures less than 5 m in diameter (all measurements are taken from rim-crest to rim–crest) are unlikely to be residential structures, although excavations of some of these depressions has revealed that a few may have been residences for single families or individuals, or even temporary residences for menstruating women (e.g., Extra Housepit Excavations [EHPE's] 4 and 26). Other small cultural depressions were roasting pits, and still others seem too small to have been used for significant food storage (see Vol.

III, Chap. 11). While the total number of small depressions is not great for a site of this size, their functions are varied and it is difficult to use them for site-wide interpretations without excavating them.

Nor is it possible to assume that all larger cultural depressions were habitations used contemporaneously, e.g., in the calculation of population levels. While it is certainly true that the vast majority of the depressions over 5 m in diameter were probably residential structures, there appear to be several important exceptions, largely located in peripheral areas. At least one depression located in the creek bed (EHPE 20) resembled a moderate size housepit, but was clearly a very large roasting pit similar to those excavated by Pokotylo and Froese (1983) in the Hat Creek Valley. The three tested structures that occupy terrace remnants above the core of the site (HP's 104, 105, and 109) also appear to be ritual in nature. Even though these are clearly not normal residential structures, the convention of designating them by HP (housepit) numbers will be retained for referring to them in the following analyses with the implicit understanding that what is actually meant is, "housepit-sized cultural depression."

The details of pithouse construction are presented by Alexander (Vol. II, Chap. 2), and MacDonald (Vol. II, Chap. 15), and I will mention discernible changes over time in my review of culture history at the site. It is sufficient to note at this point that pithouses were generally constructed at Keatley Creek by excavating a circular area down into the ground to a depth of 0.4–1.0 m so that the bottom formed a flat floor and the material taken out formed a rim around the excavation. For larger houses, internal support posts were erected, although these were not generally used for smaller houses (e.g., HP's 9, 12, and 90). A framework of logs was then set up around the edge forming a cone with an open central space as a smokehole and entrance. The framework was filled in with poles forming a solid base on which bark slabs or mats were laid, after which pine or fir needles were added and then dirt from the rim was heaped over the surface for additional insulation.

People entered and left by ladders placed through the smokehole or by side entrances which appear to be common in small structures and may also have been regularly used in large houses but are simply more difficult to identify archaeologically. We discovered a great deal of variability not only in construction, but also in the manner in which the inside space of different sized housepits was organized. In some houses, activities seem to determine how space was used, in other houses, domestic units appear to be the dominant concern in how space was used. These are topics to be covered in Volume II. Throughout the analyses, we avoid using the terms, "household," or "family," because these are ambiguous ethnographic terms and because even when precisely defined they would be impossible to operationalize archaeologically. We prefer to use the more archaeologically-friendly term, "domestic group," and "domestic area," to refer to recognizable areas where a group either slept and/or cooked and/or carried out other manufacturing or storage activities as a unit distinct from other similar groups either within the same structure or between structures. "Domestic group" carries no implication as to whether the group consisted of a single nuclear family, an extended family, unrelated individuals, families with slaves, or several unrelated nuclear families. The term is simply an indication of the minimally identifiable socioeconomic group of people that carried out normal domestic activities together in a bounded identifiable area; it is similar to Hill-Tout's (1978b:109) term, "fire group."

Regional and Community Settlement Patterns

Considerable survey work was undertaken by Arnoud Stryd during his research around the Bell site, only 5.5 km (3.4 miles) downstream from Keatley Creek. We can therefore be relatively certain that the great majority of housepit sites in the Middle Fraser Valley around Lillooet have been recorded (Fig. 3). Unfortunately, few of these recorded sites have been dated in even a relative sense. On the other hand, the large Classic Lillooet housepit sites such as Keatley Creek and the Bell site appear to have been used from the beginning of the Plateau housepit tradition (during the Shuswap horizon ca. 3,500–2,400 BP—Stryd and Rousseau, 1995) until about 1,100 BP when a major depopulation of the Lillooet region appears to have taken place and lasted for a number of centuries (Hayden and Ryder 1991). Relatively dense populations (0.3–1.0 people per square km—Hayden 1992b:530) had been re-established by the time Europeans arrived in the nineteenth century, but the large Classic sites were never intensively reoccupied and historical winter pithouse villages rarely consisted of more than a few structures, with the communities at Fountain, Lillooet, and Bridge River being notable because of their 8–9 pithouses (Teit 1906:199; see also Teit 1900:192).

Six of the nine small sites tested by Stryd (1980) turned out to be contemporaneous with the occupations of the large Classic Lillooet sites. This, plus the fact that the large sites were occupied for about 75% of the entire period that pithouses were used in the region, makes it seem likely that a very large number of the undated smaller sites that have been recorded in the Lillooet

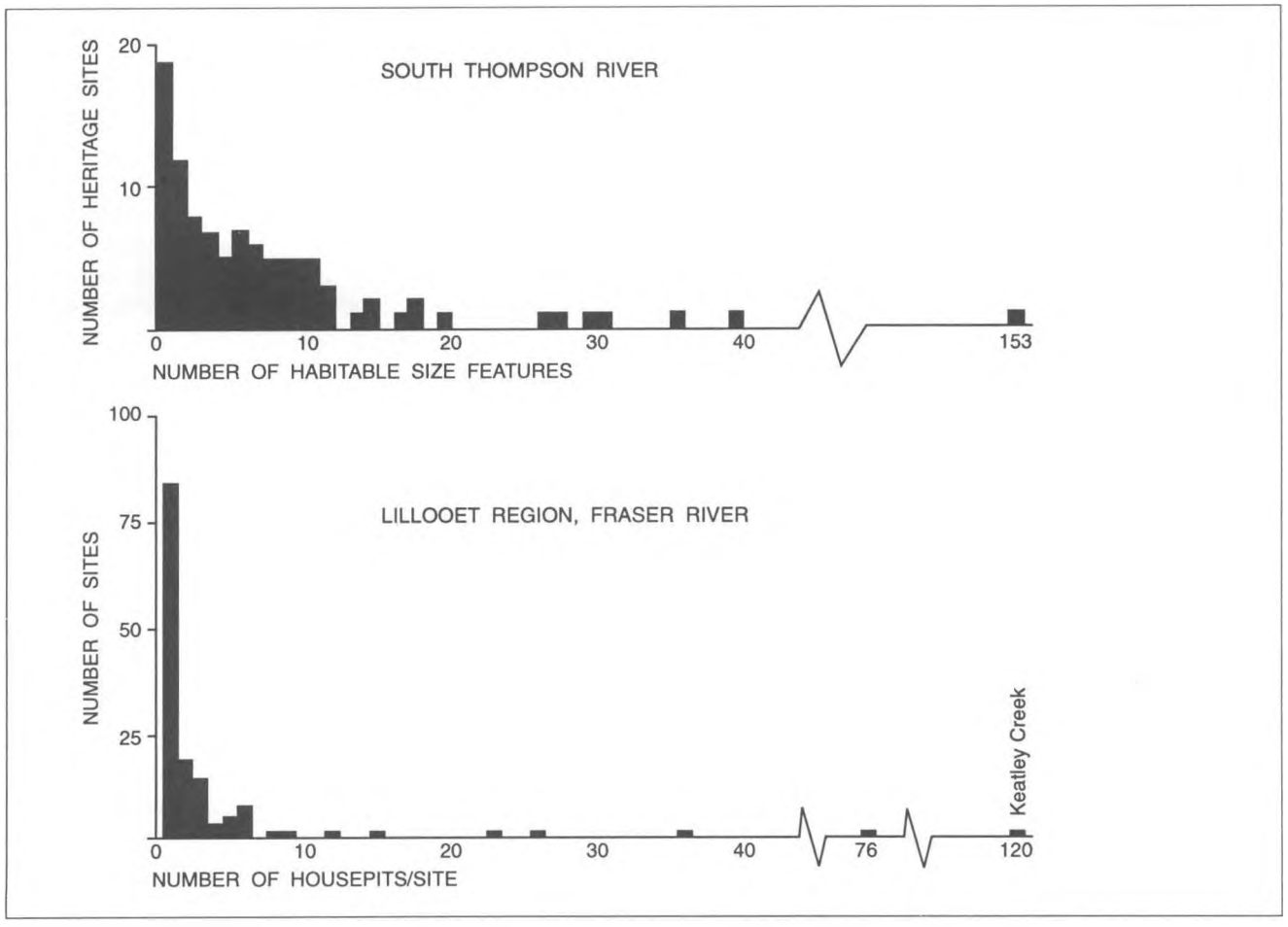

Figure 12. Settlement size distribution (based on number of housepits) for sites along the South Thompson River (above), and the Fraser River from Lytton to Lillooet (below), (Mohs 1981:56).

region were occupied contemporaneously with the large sites such as Keatley Creek. This makes it reasonable to conduct an exploratory examination of the size distribution of sites for potential indications of hierarchies in the regional settlement pattern. The results (Fig. 12) show a two or three tier grouping of settlements with sites: those with less than 20 housepits forming one tier, sites with 20–60 housepits forming another tier, and sites with more than 100 housepits (such as Keatley Creek) forming a possible third tier. Rick Schulting calculated the Gini coefficient for the Lorenz curves in both the Lillooet and South Thompson regions (Fig. 13). The Gini values and Lorenze curves measure the degree of inequality in distributions. Values were strikingly similar: 0.64 for the Lillooet region and 0.57 for the South Thompson region although it is interesting that the Lillooet region is the more extreme value. Even considering only sites that have confirmed contemporaneity with the large Classic Lillooet villages, these are strong indicators of complexity, perhaps greater complexity than was observed by Europeans.

Another striking pattern in the Classic Lillooet regional settlement pattern involves the location of three of the remaining major sites: Keatley Creek, the Bell site, and the Bridge River site. All three occur in unusual locations that were never reused once abandoned about 1,100 BP. The Keatley Creek community was located in a secluded hollow, as if hidden. Its position may have been good for defense, but also might be accounted for simply by considerations of shelter from the wind and nearness to wood and water. Two large sites near McKay Creek also seem situated for shelter from winter winds. Dawson (1892:8) notes that winter village sites are often chosen for their shelter from the wind as well as proximity to water and dry sandy soil. On the other hand, the positions of the Bell site and the Bridge River site seem to lend themselves to easy defense. The Bell site is at the top of a steep mountain incline and is also hidden among the trees, while the Bridge River site occupies an extremely compact core area at the edge of a terrace so that one wonders if there may not have been a palisade around the community that might account for its extreme

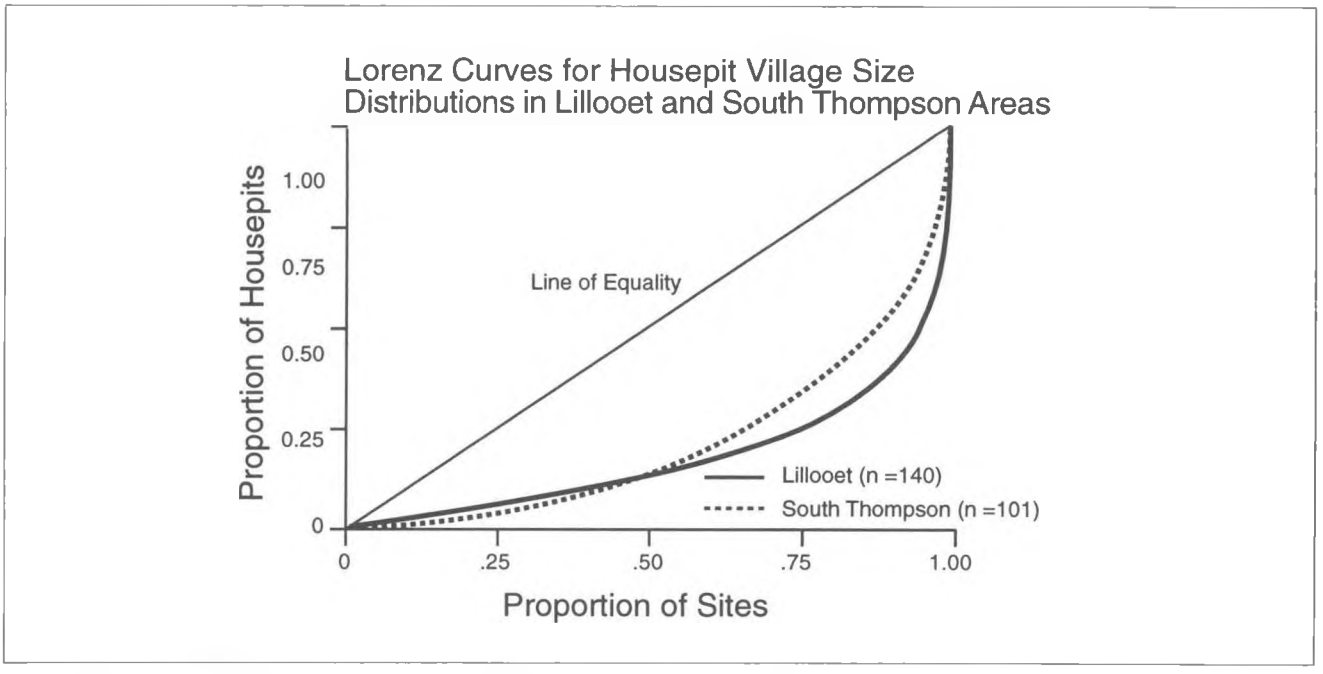

Figure 13. Settlement size distribution Lorenz curves for sites along the Fraser River in the Lillooet Region and for the South Thompson River (courtesy of Rick Schulting).

compactness. Although protohistoric and historic communities used the same major fishing sites and other resource locations as their Classic Lillooet predecessors, they chose to situate their settlements in different locations. There are many possible reasons for the abandonment of the large Classic Lillooet winter villages around 1,100 years ago. June Ryder and I (Hayden and Ryder 1991) have suggested that massive landslides in the Fraser Canyon around that time probably blocked salmon runs for decades, causing the collapse of spawning cycles and upstream prehistoric communities such as Keatley Creek that depended heavily on salmon for food and trade.

Simon Fraser (Lamb 1960:120) observed about 1,000 people camped "in shades" (probably mat shelters) at a single location near Lillooet on 17 July in 1808; however, this appears to have been for the summer salmon runs and probably included people from many winter villages as well as visitors. Simon Fraser also noted palisaded communities near Lillooet, the largest being 100 × 24 feet (Lamb 1960:82). These palisaded villages were clearly summer sites with the palisade forming one side of the shade shelters. There is no mention of pithouses in these settlements. Teit (1906:236) also recorded that fortresses were common, although no evidence of them has been found archaeologically. Moreover, it is not clear to what extent the conditions observed by Simon Fraser had already been affected by trade in European goods which he observed in some abundance even in 1808 at Lillooet. In comparable situations on the Skeena River (MacDonald 1989:18; MacDonald and Cove 1987:ix) and in the neighboring Carrier territories (Goldman 1940:334–9; Bishop 1987), the introduction of European trade led to palisaded and larger settlements as well as to increased socioeconomic inequality and concentration of power. Campbell (1990:20) documents similar trends on the Columbia River. Thus, it is difficult to argue from ethnographic evidence that palisaded settlements should be or should not be expected prehistorically.

Within the large prehistoric settlements, there is also some evident patterning. While Stryd (1973:81) remarked that the larger housepits at the Bell site seemed to cluster close to the watercourse, thereby exhibiting some access priviledges, this is clearly not the case at Keatley Creek where the five largest structures (HP's 1, 2, 5, 7, and 8) are spaced so as to maximize the distance between them (Fig. 11). It is almost as though each dominated its own local neighborhood of less important, but economically and politically allied supporters and kin. This would certainly be consistent with observations from the Northwest Coast by Garfield and McNeary (Coupland 1988:229; see also Maschner and Hoffman 1994) to the effect that there were 3–5 smaller commoners' dwellings for every chief's house. Moreover, because we know from our test excavations that the large housepits were occupied from the beginning of the housepit occupational sequence (during the Shuswap horizon) to the end of the Keatley Creek occupation, it is apparent that the spacing considerations between large housepits probably prevailed from very early

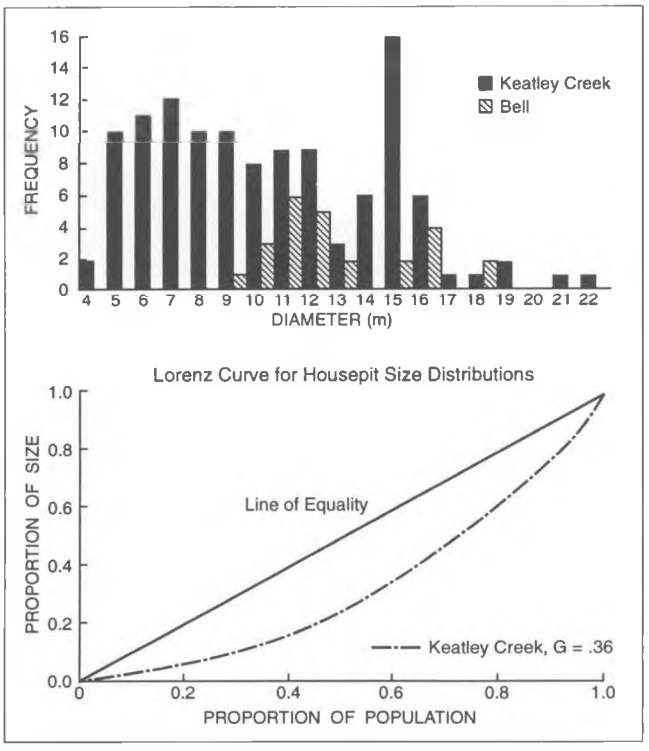

Figure 14. Housepit size distribution (rim to rim diameters) at Keatley Creek and the Bell site (from Stryd 1973) and the corresponding Lorenz curve for Keatley Creek (courtesy of Rick Schulting).

times in the site's history. Stryd (1973:81) also observed that large housepits do not occur in small sites or by themselves. This indicates that there was some economic, social, and political support from smaller houses required for the existence of large houses, resulting in a structural hierarchy.

A size distribution graph of the diameters of housepits at both the Bell site and the Keatley Creek site (Fig. 14) reveals a basic hierarchical pattern such as one might expect in communities with significant socioeconomic differences between households. from the projectile point styles associated with the housepits, we can be fairly certain that the smaller housepits were occupied at the same time as the larger housepits. There is a striking bimodal distribution of housepit sizes at the 5–12 and 14–16 m range in both sites, with very large structures (over 17 m) being so few in number that it is difficult to tell whether they might constitute a third mode at Keatley Creek. The overall distributions depart from an ideal "egalitarian" Gini coefficient of 0.0 (the coefficient is 0.36) while the maximum possible value of inequality is 1.0. We will return to these observations in the final chapter of Volume II.

As noted previously, special purpose structures such as large special meat roasting pits and probable ritual structures appear to occur on the periphery of the site, especially in upslope areas. Other special structures such as sweatbaths and other types of large roasting pits may occur in the creek bed possibly buried by earthflows or creek deposits.

On a more curious note, the specific location of some housepits is often interesting to observe. While we often attribute much greater wisdom to our predecessors than to ourselves in such matters as avoiding flood plains for building permanent structures, Keatley Creek provides a number of examples of poor judgement in the placement of housepits. Several housepits were constructed at the bottom of what are even today obvious, although very small, intermittent stream beds. One of these structures (HP 119) filled up extremely rapidly and completely to the top of its rim with sands and silts to a depth of two meters, while another (HP 118) seems to have undergone a similar fate. At first we wondered if these were not artificially created dance plazas or other special features. Still other structures, such as HP's 7 and 90, show clear evidence of water seepage and problems due to poor positioning. Other structures have been partially filled with alluvium after abandonment. It is possible that the "flats" described by Stryd (1973:77) at the Bell site were housepits that had been filled in by these, or similar, processes.

Interestingly, in the Interior Salish myths that Teit (1909, 1917) recorded, the theme of water filling up houses by magic or other means occurs frequently. Most water damage to pithouses still in use probably occurred during the warmer months when torrential storms can deposit large amounts of water in short periods of time. Precipitation in the winter is lighter and generally occurs as snow. While the pithouses may not have been occupied fully in the warmer seasons, considerable damage must still have been done to the architecture and any stored items within the houses.

Population Estimates

In 1847 Alexander Anderson, a Hudson's Bay Company trader, estimated that there were 4–5,000 natives that lived in the "Fountain" area—presumably referring to the Lower Fountain (6 Mile Fishery) and the Upper Fountain (10 Mile Fishery) on his map (Drake-Terry 1989:30–2). In comparison to Simon Fraser's earlier observations and to Teit's later estimates, Anderson's figures seem quite inflated, and may represent unusual congregations at optimal times of the year at these especially lucrative fishing and trading locations. On the other hand, Anderson's estimates are within the range that might be expected prehistorically at maximum exploitation levels during Classic Lillooet times.

Teit (1906:199) estimated that there were 1,200 people living in the entire Upper Lillooet, or Stl'átl'imx, region before European impacts or epidemics. He recorded the number of pithouses for each of the major settlements during this period, and refered to a "lesser number" or "a few scattered" structures between the major villages. If we assign about ten structures to this lesser residual category, the total number of pithouses for the region would be on the order of 60. This translates to an average of 20 people per housepit. The estimate of 20 people living in an average house accords very well with our independent estimates for the number of people living in small to medium sized housepits for the late prehistoric period. Our independent estimates are based on calculations of ethnographically documented floorspace per person from a North American cross-cultural sample. This estimate is about 2.5 m^2 per person (see Spafford 1991:24; Hayden et al., 1996). There is certainly some variation around the central tendency in these cross-cultural data, and this variation is reflected in the range of probable population densities for given floor areas highlighted in Table 1. We have used the values most closely corresponding to the central tendencies. A reasonable case can also be made for slightly higher densities (about one person per 2.0 m^2) in smaller ethnographic housepits than in larger housepits where most densities are on the order of one person per 2.5–3.0 m^2 (see Hayden et al. 1996). This is the reason for the slightly different density estimates used for small and large housepits in Table 2. The use of lower density figures for estimating resident populations of medium and large housepits results in a relatively conservative total population estimated. Diana Alexander's assessment using only data from the Plateau arrived at estimates about twice as dense as those that I am using and almost twice the number of inhabitants for the largest pithouses (Vol. II, Chap. 2). However, I have decided to use the far more conservative estimates based on the larger cross-cultural sample, preferring to err on the side of caution. However, the following population estimates might easily be increased by 50% and still be considered justifiable. On the other hand, Samuels (1991:204–7) reports that Coastal "family areas" with 2–12 people in each were 4–5 m in diameter. This is remarkably similar in size to the size of "domestic area" sectors that were identified on strictly archaeological criteria in HP's 3 and 7 at Keatley Creek (Vol. II, Chap. 11). The population estimates based on the number of resident families implied by these "domestic areas" accords well with our conservative housepit population estimates based on floor areas. Thus, floor area estimates are used in determining the population levels at Keatley Creek.

In order to approximate the population of Keatley Creek at its height, it is necessary to make a number of assumptions. First, it is reasonable to assume on the basis of our test pits and with the evidence for continuous occupation in Bakewell's analysis (Vol. I, Chap. 16), that all of the five largest housepits were occupied contemporaneously and for the vast majority of the site's history. This is probably also true of the medium sized housepits such as HP 3 that occur in the 13–17 m diameter range (a total of 32 housepits in all). It is really only the smaller housepits that seem to have been occupied for relatively short periods of time and which may include some non-residential structures as well. Given the rarity of housepit overlap, i.e., cross-cutting surface relationship of housepits (indicating non-contemporaneity), it would seem that a high proportion of the housepits present in the core of the site were probably occupied more or less simultaneously. The equidistant spacing of the largest housepits also suggests that the areas between these major structures were occupied by other smaller structures when the original locations for the large housepits were chosen,

Table 1. Pithouse Population Estimates

House Radius (m)	Floor Area (m^2)	Pithouse Population									
2.50	19.6	19	13	9	7	6	5	4	4	3	
3.00	28.3	28	18	14	11	9	8	7	6	5	
3.50	38.5	38	25	19	15	12	10	9	8	7	HP 12
4.00	50.3	50	33	25	20	16	14	12	11	10	
4.50	63.6	63	42	31	25	21	18	15	14	12	
5.00	78.5	78	52	39	31	26	22	19	17	15	HP 3
5.50	95.0	95	63	47	38	31	27	23	21	19	
6.00	113.1	113	75	56	45	37	32	28	25	22	HP 7
6.50	132.7	132	88	66	53	44	37	33	29	26	
7.00	153.9	153	102	76	61	51	43	38	34	30	
m^2/person		1	1.5	2	2.5	3	3.5	4	4.5	5	

Table 2. Estimating the Maximum Site Population at Keatley Creek (see text for detailed discussion)

1. Assuming there is a linear relationship between rim and floor diameter and based on the data from HP's 12, 3, & 7 generated the following regression formula:

   floor diameter = 2.7 + 0.47 (rim diameter)

2. Population density is assumed to be higher in smaller housepits. Figures used for density estimates were:

   large HP's = 2.5 m^2/person

   small HP's = 2 m^2/person

3. Excavated housepits with diameters > 14 m (n=6) consistently have evidence of occupations extending across at least 2 Plateau Pithouse horizons. Evidence of occupation during 3 or even 4 horizons is present in 4 out of the 6. So, large housepits were probably occupied throughout much of the site's history.

   Smaller housepits tend to have shorter occupations. Probably only a portion of small housepits were occupied at any given time. Thus the estimated population of large and medium HP's = 1,100; with $^1/_4$ of small HP's = 1,500 total site population, or with $^1/_2$ of small HP's = 1,900 total site population.

and presumably for some time thereafter. Most of our testing of the small housepits has indicated that a high proportion were last occupied during the Plateau horizon (2,400–1,200 BP). If we assume that a conservative 25% of the small structures (N=80) were simultaneously in use, this means about 20 small structures were in use at the peak occupation of the site together with the 32 medium sized and the five large structures. Using the floor area per person estimates that were generated by our cross-cultural analysis, Spafford (1991:24) estimated about 45 residents for the large housepits, 25 for the medium sized housepits, and 16 for the smaller housepits. This would result in 1,100 residents for the combined medium and large housepits, plus 400 residents for the estimated 20 contemporaneous small structures, for a total peak site population of 1,500 (Tables 1 and 2).

This accords reasonably well, and very conservatively, with the estimate provided by Teit of 1,200 people in approximately 60 small or medium sized pithouses (at an average of 20 people per house). Even if we reduce the resident density of large and medium sized housepits to one person for every 3.0 m^2 of floor area, this still results in a site population of 1,187, without attempting to account for families that overwintered in mat lodges rather than in pithouses, a practice Teit documented numerous times (Teit 1900:195; 1906:213; 1917:22; 1930:226; also Dawson 1892:8). Among other pithouse using groups such as the South Okanagan and Pomo, only the richer families had pithouses (Post and Commons 1938:40; Barrett 1975:42), and this may have also been a factor of importance in the Lillooet region. It is also possible that large houses held many more residents, at much higher densities of people per floor area, than we have allowed. Several ethnographers report large houses with 60 to 70 to 80 or even 100 residents (Hill-Tout 1978a:58; Post and Commons 1938:40; Nastich 1954:37). This is considerably more than the 45 residents that we have assumed occupied the largest housepit we excavated which approaches the maximum recorded housepit size anywhere on the Plateau. Thus, we have a fair degree of confidence that the total site population at Keatley Creek at its greatest would have *minimally* been on the order of 1,200–1,500 people with some allowance for a few structures not being in constant use. The maximum site population may have been substantially more. I will discuss variations by chronological period below.

If the other Classic Lillooet communities together with the Bell site and the Bridge River site, as well as sites on Seton Lake, at Pavilion, at Texas Creek, McKay Creek, Leon Creek, and smaller communities such as those recorded and tested by Stryd, are all considered contemporaneous at some time in the past, then the regional population of the Stl'átl'imx area must have been considerably greater than even the early levels reported by Teit. In fact, Stryd (1973, 1980) reports an occupation history at the Bell site similar to Keatley Creek, that is, all the large housepits were occupied during the three major Late Prehistoric periods, the Shuswap, Plateau, and Kamloops horizons. This in turn, would imply much more abundant salmon runs during Classic Lillooet times since it is difficult to imagine any of the other resources having been substantially more abundant during this period, whereas we are quite confident that dramatic changes took place in the salmon runs (see Vol. II, Chap. 8). There is strong evidence that the large and medium sized housepits at Keatley Creek were continuously occupied (see Vol. I, Chap. 16), and there is no reason to assume that this would not have also been true at the other large Classic Lillooet villages. If we minimally assume that populations at all the other locations *combined* were on the same order of magnitude as the population at Keatley Creek, then the regional population density would be on the order of two to three people per square km (see Hayden 1992b:530). With such an increase in population density (and the increased density in resources that this implies), compared to historic records, it might well be expected that the

Classic Lillooet communities would exhibit more complexity than those historically observed. Unfortunately, the uncertain and usually powerful influence of trade for European goods may have had a disproportionate effect on socioeconomic complexity even among relatively low density populations as demonstrated among the Alkstcho (Goldman 1940). Thus, the question of the relative complexity of historic, protohistoric, and prehistoric communities in the Lillooet region must be deferred to a later discussion (Vol. II, Chap. 17).

Sampling, Testing, and Excavating at Keatley Creek

Sampling and Testing

Having decided to focus our archaeological research at Keatley Creek, it remained to decide which housepits to excavate. As already noted, the very nature of the research problem suggested that we should excavate one of the largest housepits in order to maximize chances of detecting and understanding the strongest material, social, and economic patterns associated with residential corporate groups. We therefore tested the five largest structures at the site to determine which had the clearest indications of intact and recognizable living floor deposits. In order to understand how these larger housepits differed in terms of economy and social organization from other housepits, a sample of small and medium sized housepits was also tested with an emphasis on smaller housepits in order to provide as much contrast as possible to the large residential corporate groups, and therefore, hopefully reveal basic factors related to the emergence of residential corporate groups in the area.

In selecting housepits in the small size range for testing, emphasis was placed on peripheral structures rather than those in the core since it was reasoned that the structures closest to the center of the site would have the highest chances of being built into earlier structures, would have the most complex stratigraphy, and therefore be the most difficult to interpret. The few small structures that we did test in the site core, did, in fact, tend to exhibit unusually complex stratigraphy that was difficult to interpret (e.g., HP's 48, 57, and 101). A high proportion of the smaller housepits on the periphery of the site were tested, and a selection from these was made for more extensive excavation based upon the clarity of their stratigraphy, particularly as related to living floor deposits, as well as upon their perceived contemporaneity with the living floors in the large housepits. Only two medium sized housepits were tested or excavated, chosen partly on the basis of the lower density of other housepits in the immediate vicinity (thereby reducing chances of complex or disturbed stratigraphy), and partly on a simple judgemental basis. We also avoided housepits that had been heavily disturbed by unauthorized excavators. Probably 80% of the structures exhibited limited disturbance of a few square meters. Only three or four structures had been intensively plundered.

In all, 23 housepit size structures (Fig. 11) were tested; this constitutes 20% of all the housepit size structures at Keatley Creek. The floors of five structures were completely excavated, including three small housepits (HP's 9, 12, and 90), one medium sized housepit (HP 3), and one large housepit (HP 7). While small housepits can be excavated by small crews in one or two field seasons, the careful excavation of medium and large sized housepits requires much larger crews, resources, and analytical capabilities. The funding available for the project therefore restricted our sampling of medium and large sized housepits to one each. It would have clearly been desirable to have excavated other examples from the medium and large housepit size categories; however, from our experience in testing other large structures, our results seem representative of the group as a whole. The strong results that have emerged from our research also inspires confidence that the major patterns that we have detected will be confirmed by future work along similar lines. In terms of a pioneering and exploratory research project, I feel that the results have more than justified the procedures and efforts involved. We have succeeded in establishing some of the soundest foundations available for understanding past social and economic organization in prehistoric Canada.

Testing of housepits was standardized by the excavation of trenches 50 cm wide laid out from the top of the southernmost point of the rim and extending due north to a point approximately in the center of the housepit. Trenches were divided into 2 m linear sections, and sediments were excavated in natural layers where these were apparent, and in arbitrary 10 cm levels contoured to the surface where no stratigraphy was apparent. The southern sector of housepits was chosen because I suspected that higher ranking individuals might set up their domestic affairs in the southern sectors inside pithouses due to possible warming effects of the roof by the winter sun (e.g., Thomas 1988:576). If there were any striking differences to be immediately detected between housepits during our sampling program, I thought testing them in the southern sector would be the most likely to reveal such differences. This manner of testing structures was efficient (given the small width of the test trench involved), minimally disturbed housepit desposits, provided important stratigraphic information about the

suitability of each structure for further excavation, and also provided key information from rims on the intensity of occupation, length of occupation, and period of occupation of the structure. These test trenches also enabled us to determine which depressions were not structures or were specialized structures, how frequent burning of roofs occurred at the site, and provided important glimpses of internal features such as large storage pits that occurred in most test trenches of large housepits but were never encountered in test trenches of small housepits. In all, a great deal of information was derived from this testing program that enabled us to reconstruct the site structure and history in considerable detail (see Vol. II, Chap. 17; Vol. III, Chap. 10).

In order to determine further details about site structure and activities, as well as to determine whether selective removal of bone material and dumping of bone occurred (thus biasing our view of housepit subsistence), we undertook a program of testing 13 of the approximately 125 clearly non-housepit depressions (termed, Extra Housepit Excavations, or EHPE's). In many cases, a 50 cm test trench across these features involved excavating half of the entire feature. These features proved to be unexpectedly varied, including roasting pits, large storage pits, small storage pits, and small structures (see Vol. III, Chap. 11). No unusually dense concentrations of bone materials were recovered from any of these features.

We also initiated a series of shovel test pits across the northern part of the site, in open areas between housepits (Fig. 11). These served not only to monitor the intensity of activities in spaces between housepits, but also provided soil samples for pedological and chemical analyses (see Vol. I, Chaps. 6 and 7; Vol. II, Chap. 6). The results show that there was very little activity that occurred away from the immediate vicinity of most housepits.

Excavation

Each housepit or extra-housepit excavation was considered an independent excavation unit. Local datum points were established for each formal excavation, including test pits (generally in the southest corner of the original test trench), and all measurements for the excavation unit were taken from the local datum (referred to as depth below datum—BD). Depths below surface (BS) were also sometimes recorded to provide some sense of the actual depth of the features being excavated. All local datums and excavation units were integrated into an overall site map and given absolute depths below the site datum. These site-wide coordinates were rarely if ever used due to the large, complex and cumbersome notation system required to cover a site with the extent and topographical relief of Keatley Creek.

Housepits selected for extensive excavation were first cleared of sagebrush and cactus, and then gridded out into 2 × 2 m squares with arbitrary letter designations assigned to each square and recorded on the excavation unit map. Each 2 × 2 m square was then divided into a standardized sequence of 16 subsquares, designated by numerals 1–16 (Fig. 15). Each subsquare was 50 × 50 cm, a size which I found from previous experience to provide maximum control over stratigraphically complex deposits, as well as providing relatively fine level resolution for the plotting of artifacts on surfaces. This procedure obviated the need to plot three coordinates for every tool of interest (as well as eliminating the need to identify every tool of interest at the time of excavation) in order to graph the distribution of artifacts on living floors. Excavating in 50 cm subsquares proved to be very efficient. This procedure also avoided the problems inherent in opening up entire square meters (or even 4 m^2) at a time when stratigraphy could be ambiguous and when analysts wanted to know with more precision where specific artifacts came from within such large areas. The positions of time diagnostic or unusual artifacts found *in situ* were also extrapolated to the nearest profiling wall of a square, and the precise relative stratigraphic position recorded on the profile. Although this approach described above requires the filling out of many more provenience cards than the use of larger excavation units, I feel the results have amply demonstrated its advantages and utility.

In order to minimize time spent in filling out provenience forms, a "quick-check" card was developed so that excavators had only to enter key provenience data (housepit number, square, subsquare, stratum, and level) and circle the type of deposit, as well as check off the contents (lithic, faunal, or botanical), initial the card, and record the number of fire-cracked rocks excavated in a stratum or level. Other specialized information fields were used for soil, flotation, and radiocarbon samples. There was also a small centimeter scale along one edge with the Wentworth breakpoints for granules, pebbles, and cobbles marked out.

Four of the 16 subsquares in each square of an excavation unit were designated as "sampling subsquares." Slightly more than one liter samples were taken from all floor deposits (and occasionally roof deposits) in the sampling subsquares, forming a systematic sample pattern across the floors. A small amount of these samples was reserved for chemical tests (see Vol. II, Chap. 6), and the remainder was floated for botanical remains by water screening with a 1 mm mesh (see Vol. I, Chap. 9; Vol. II, Chaps. 4 and 5). Heavy fractions were

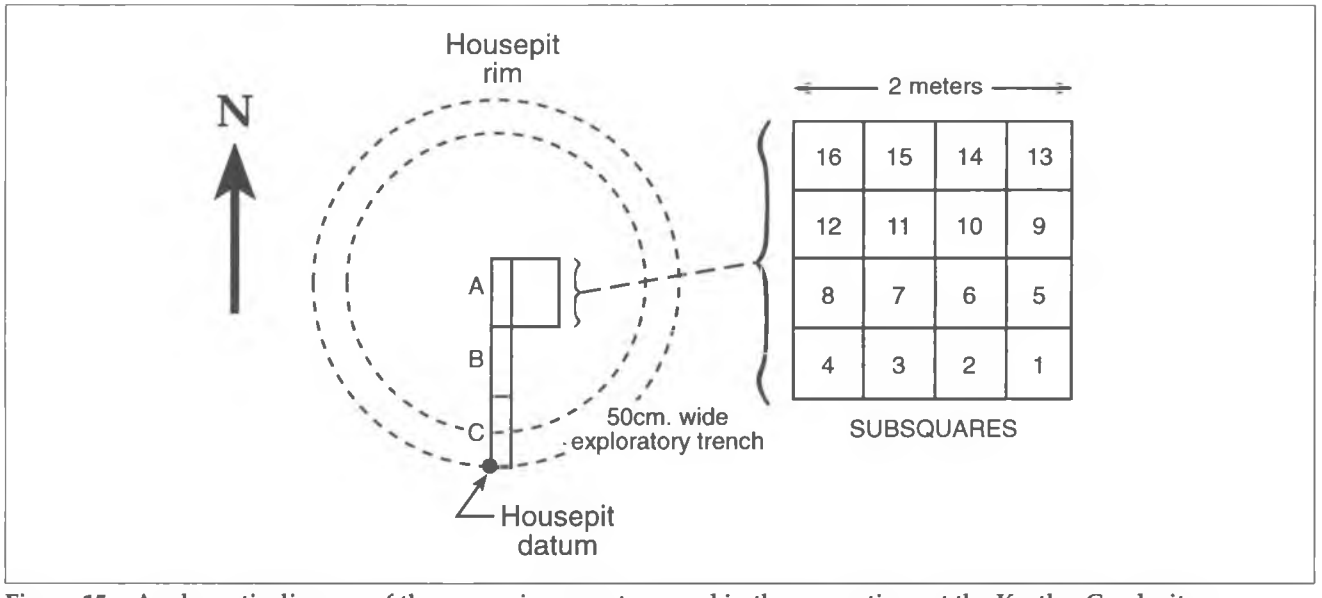

Figure 15. A schematic diagram of the provenience system used in the excavations at the Keatley Creek site.

then analyzed for small debitage and bone (Vol. II, Chap. 9), while the light fractions were analyzed for botanical remains. Otherwise, all deposits were screened with a 1/4 inch mesh screen.

Extensive excavations always proceeded from a known stratigraphic profile, initially from the test trench walls, in order to maximize good stratigraphic control. The nature of these deposits is described in detail in other chapters of this volume. A great deal of variability was encountered in virtually all deposit types (floors, roofs, and rims). In order to attempt to record some sense of this variability and the characteristics of each deposit type, stratigraphic records were filled out detailing the general pattern of cobble, pebble, gravel, sand, silt, and clay content, as well as frequencies of charcoal, artifacts, bone, and degrees of compactness, staining, color, bioturbation, or other modifications. During the first field season, excavators recorded the dip of all bone and chipped stone materials in order to determine whether there were differences in the angle of repose of these items in floor versus roof deposits. After 1987, excavators were asked to place cobbles and pebbles in their buckets after screening in order to monitor the relative proportion of these elements in various strata. This provided a good empirical, and relatively accurate, check on variability between and within strata. With percentage lines marked on the inside of buckets, most people had little difficulty in estimating the various clast percentages to within 10%.

Archaeological deposits were divided up into strata (deposits covering a large portion of the local excavation unit), levels (arbitrary subdivisions of usually 5 or 10 cm within thick strata), and fill units (highly localized deposits such as those in storage pits or those forming identifiable dumping events on certain parts of the floor).

In hindsight, it is possible to identify some of the features of this excavation program that worked well and others that might be improved. Among the aspects that worked well were the use of 50 cm subsquares; the use of cards that could be easily and quickly filled out (including fields for all important types of information, such as floor characteristics); the insistence that excavators attempt to interpret the nature and origin of strata in the field; the use of localized datum points for each housepit or extra-housepit excavation and the tying of these localized points into an overall site grid and datum point; the use of nails in the field to mark important boundaries between strata and to mark positions of important artifacts in wall profiles; recording of important artifacts in field notes by means of outline drawings; the systematic taking of flotation samples across floors and some other strata; the recording of the depth of fire reddening in hearth features; and the systematic estimation of pebble and cobble fractions of deposits.

Aspects of the project that would be improved in an ideal world would include the incorporation of recording specialists whose sole job would be to record profiles, photograph important aspects of the site, as well as specialists in screening and recognizing/recording fire cracked rock, quartzite and other unusual types of artifact materials. However, realistically, this creates a great deal of monotony on the job and it might be difficult to find individuals willing to take on such tasks full time.

Research History of the Lillooet Region

Little archaeological research was conducted in the Lillooet region until the 1960's. However, in the neighboring downstream stretch of the Fraser River between Lillooet and Lytton, George Dawson (1892) and Harlan I. Smith (1899) conducted some of the earliest archaeological work in the province, concentrating on the recovery of burials without establishing any refined cultural sequences. Dawson (cited in Smith 1899:159) also reported finding beads or pendants of galena and bone at Lillooet. Prehistoric burials were also recovered by Charles Borden at Cache Creek between 1954 and 1956 (Pokotylo et al. 1987) and by Borden and Sanger at a location disturbed by earth moving equipment near Texas Creek (Sanger 1968). Further afield, Smith (1900) excavated burials near Kamloops and Sanger (1969a) recovered another set of disturbed burials in the same region.

In the 1960's about 25 sites were recorded by geologist Len Hills (Hills 1961; Stryd and Hills 1972), and David Sanger (1963,1966) began excavations at the Lochnore-Nesikep Creek Locality about 26 km downstream from Lillooet along the Fraser River. This locality includes a now destroyed site which once included 24 housepits according to the landowner (Bert Lehman, personal communication) with artifacts indicating that the site was contemporaneous with the Keatley Creek site. Sanger (1967, 1969b, 1970) established the first major chronological sequence for Interior British Columbia.

Sanger's chronological sequence was subsequently refined by a number of researchers beginning with Arnoud Stryd and others involved in his Lillooet Archaeological Project (Stryd 1972, 1973, 1980, 1981; Stryd and Baker 1968; Stryd and Lawhead 1978; Blake 1974; Rittenberg 1976). Stryd's work included the comprehensive survey and mapping of all housepit sites in the Lillooet region with the exception of a few subareas including the area between Keatley Creek and Pavilion. He also tested a number of housepit sites and conducted extensive excavations at the Bell site.

In 1976, David Pokotylo began the intensive survey of sample quadrats in the Upper Hat Creek valley and the Clear Range uplands, located along the opposite slopes of Mount Martley from Keatley Creek (Fig. 6). Pokotylo also undertook test excavations at a number of the sites located in Hat Creek valley (Pokotylo 1978, 1981; Pokotylo, Greaves, and Burnard 1983). Some of the most surprising results included the identification of roasting pits up to 7 m in diameter (Pokotylo and Froese 1983).

More recently, Michael Rousseau (Rousseau 1986, 1989; Rousseau and Gargett 1987; Rousseau and Richards 1988) has undertaken survey and excavation work in the Cornwall Hills area on the opposite side of Hat Creek, and extended his work down to the Thompson River. Farther upstream from Keatley Creek, R.G. Matson and Martin Magne (Magne 1985; Magne and Matson 1987) have undertaken survey and excavation work in the Chilko River drainage, a tributary of the Fraser River.

As a result of these research projects, plus a number of consulting investigations and other research done in the Kamloops region or elsewhere on the Plateau, a reasonably detailed synthesis of culture history has emerged for the Plateau. The major syntheses have been the work of Richards and Rousseau (1987), Stryd and Lawhead (1978), Pokotylo and Mitchell (1993), and Stryd and Rousseau (1995). One of the major achievements of these syntheses, particularly those of Rousseau, Richards, and Stryd, has been the secure identification of time-sensitive projectile point styles for each of the periods and each of the major horizons on the Plateau. The following summary of the occupation at Keatley Creek is based upon these syntheses.

Culture History at Keatley Creek

Early Prehistoric (11,000–7,000 BP)

There is only one possible indication of the presence of Early Prehistoric period man at the site. This is the basally edge-ground fragment of a point that may be related to Windust point types (see Vol. I, Chap. 3, and also Stryd and Rousseau 1995). Given the fragmentary nature of this point, it is also possible that it could be from the Middle Prehistoric period. This point base was recovered from loessic deposits underneath the rim of HP 5 which contained microblades in the upper levels. Unfortunately, little organic material was preserved in this stratum and the very limited area exposed by the test trench did not provide any opportunity to investigate these deposits further.

Middle Prehistoric Period (7,000–3,500 BP)

There is localized but very strong evidence for the use of Keatley Creek as a probable base camp during the Middle Prehistoric period. Interestingly, both of the major deposits that we encountered from this period occurred underneath the thick rim deposits of large housepits with indications that the rims began to accumulate in the following Shuswap horizon. Very

high densities of microblades (over 100 per square meter in some 10 cm levels) occurred in the upper loess deposits under the rim of HP 5 in association with the Early Prehistoricperiod point base, a Lehman point fragment, and other less diagnostic tool types (see Vol. I, Chap. 3; Vol. III, Chap. 10.7). Lochnore point fragments in redeposited contexts were also recovered from HP 5. Because of the elevated location of this structure on the top edge of the creek bed wall, this dense concentration of artifats probably either represents a warm weather activity locus, or is in close proximity to a substantial winter shelter. Little organic material or staining are preserved in these deposits.

The other deposit from this time period occurs under the south and southwest portion of the rim of HP 7. Microblades are associated with a Lehman and several Lochnore point fragments plus other less diagnostic tool types (Vol. I, Chap. 3; Vol. III, Chap. 5). These early deposits also extend under a small part of the southwest living floor of HP 7. Limited testing of the eastern "till" wall of HP 7 indicated that much of this material was redeposited and contained occasional flaked artifacts which may also be derived from upslope Middle Prehistoric occupations.

Under the southwest rim of HP 7, microblades and points occurred in loess deposits similar to those under the HP 5 rim. There was little organic material or staining. While most of these loess deposits appeared to be in undisturbed contexts, some of the upper deposits directly under the southwestern rim were softer with more random dips and orientations of flaked stone artifacts. It was from these apparently disturbed deposits that Lochnore point fragments were found. Groups making Lochnore style points are generally considered to be intrusive in the area and to have replaced earlier groups that manufactured Lehman style points (Sanger's Nesikep tradition, or Stryd and Rousseau's Lehman phase) around 5,500–4,500 BP (Fig. 16). The Lochnore groups (Sanger's Lochnore complex, or Stryd and Rousseau's Sqlelten tradition—see Stryd and Rousseau 1995) probably spoke Interior Salish languages. However, Wilson (1992:187) has recently questioned whether Lehman and Lochnore are really two distinct cultural entities. According to the traditional model, the bearers of the intrusive Sqlelten cultural tradition continued to occupy the region until, and after, European contact. Assuming that the Lehman and Lochnore point styles belong to different, and apparently competing, cultural traditions, it is unusual to find them in the same site.

We do not know if the Lochnore bands constructed any pithouses at Keatley Creek, although the concentrations of lithic materials at two widely separated spots where very large housepits were later built might seem to favor such an interpretation, as does the presence of a deeply buried housepit floor under the northwest rim of HP 7 which we did not have the resources to explore. The recent recovery of Lochnore housepits dating to 4,400–4,000 BP at the Baker site near Kamloops (Wilson 1992) constitutes the first definite occurrence of housepits in British Columbia from the Middle Prehistoric period. The documentation of housepits in Lochnore times in the neighbouring Thompson River drainage makes the presence of housepits at Keatley Creek seem more probable for this same time period, even though most or all of them may have been obliterated by subsequent constructions.

Although Rousseau (Rousseau et al. 1991) views Lochnore and other Middle Prehistoric communities as foragers (in Binford's 1980 classification), I suspect that the Lochnore phase represents the appearance of the frst moderately successful mass harvesting and storage technology associated with the exploitation of salmon, a technology which was refined and became the basis for the entire Plateau Pithouse Tradition (defined by Richards and Rousseau in 1987) which constitutes the latter part of the Sqlelten Tradition. Before the spread of Lochnore communities throughout the Plateau with their seasonally permanent winter pithouses, storage facilities, dogs, and other Pithouse Tradition traits (Wilson 1992), Lehman groups must have relied to a much greater extent on the year-round

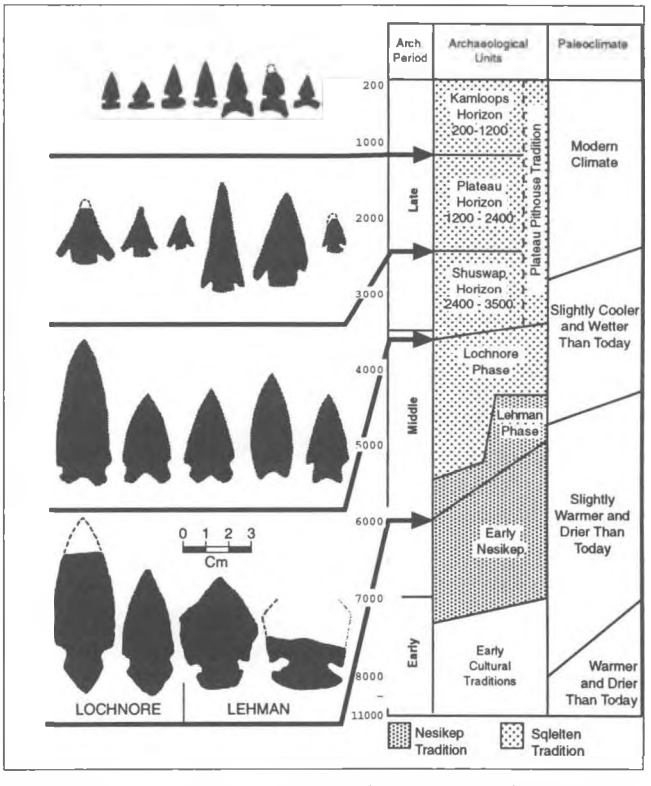

Figure 16. The culture-historical sequence of the British Columbia Plateau (Stryd and Rousseau 1995).

hunting of large and small game. It is these Lehman groups that would have been much more like Binford's foragers.

Schalk and Cleveland (1983:32) and Matson and Coupland (1995:304–5) view the establishment of semi-sedentary settlements based on salmon storage (such as is implied for some Lochnore communities) as a development of equal magnitude to the shift to agriculture in other regions. This clearly was the case in the Lillooet region and ultimately led to one of the most pronounced developments of collector (Binford 1980) and complex hunter/gatherers in Canada. Carbon isotope analysis indicates that Early Prehistoric groups in the region were only using salmon to a very modest extent: nine percent as measured from the Gore Creek burial, east of Kamloops, dated at 8,250 BP (Chisholm and Nelson 1983). By 4,950 BP, groups were well on their way to transforming their subsistence base, as indicated by two burials from the Clinton region upstream from Keatley Creek. Both individuals had obtained about 40% of their protein diet from salmon (Chisholm 1986:124) which increased to 50–67% by the Plateau horizon of the Pithouse Tradition (Chisholm 1986:124; Lovell et al. 1986). I suspect that the two individuals buried at Clinton belonged to Lochnore communities that had already begun to harvest and store salmon in bulk for at least part of the winter; however, it is not possible at this point to state with certainty that they belonged to Lochnore rather that Lehman communities.

Whether it was Lochnore groups that scooped out their own and earlier deposits and dumped them to the southwest of the future HP 7, or whether it was the Shuswap horizon descendants of the Lochnore community at Keatley Creek that scraped out these Middle Prehistoric deposits, is impossible to determine at this point.

The Late Prehistoric Period (3,500–200 BP)

The Late Prehistoric period is divided into three horizons: the Shuswap horizon, the Plateau horizon, and the Kamloops horizon. What I have termed "the Classic Lillooet culture" begins with the establishment of large houses and pithouse villages late in the Shuswap horizon and ends with the abandonment of these large villages and large structures around 1,100 BP.

The Shuswap Horizon (3,500–2,400 BP)

While the climate around Lillooet was slightly cooler and wetter during Lochnore times than it is today, an essentially modern climate was established during the Shuswap horizon (Vol. I, Chap. 4; as well as, Stryd and Rousseau 1995; Mathewes and King 1989). It is during the Shuswap horizon that the first widespread occurrence of permanent, seasonally used housepits is apparent together with other attributes typical of the Plateau Pithouse Tradition (see Richards and Rousseau 1987). Presumably, it was the successful exploitation and storage of salmon which made this development possible. It is interesting to note that while climate change may have affected the availability of salmon, deer, and elk, the Keatley Creek site continued to be used throughout the Middle and Late Prehistoric periods as a favored location, probably primarily for winter residence during all of these periods.

At Keatley Creek, almost all of the large housepits that were tested or excavated contained exclusively Shuswap style points in the basal levels of their rim middens. Many medium sized housepits also appear to contain basal rim levels formed during the Shuswap horizon. Only one indication of a Shuswap occupation was detected in a smaller housepit (Fig. 17; and Vol. I, Chap. 3), but no exclusively Shuswap occupation floors were encountered with the exception of one buried floor edge under the northwest rim of HP 7. Since the stratigraphic layers in the rims of the large and medium sized housepits did not exhibit any indications of disturbance or redeposition (see Vol. I, Chaps. 3 and 17), it seems relatively certain that Shuswap residents had constructed substantial winter structures at Keatley Creek and that they returned to these structures on a regular yearly basis. Because of the overall undisturbed nature of these deposits, it also seems likely that the Shuswap structures were about the same size as the structures represented in the last occupation of the site. That is, it does not appear that the large (and perhaps medium sized) structures changed in size to any significant degree from their Shuswap horizon occupations until their final abandonment. Moreover, in several cases, the distinctive lithic procurement profiles of the large housepits begin in the Shuswap levels and continue essentially unchanged until abandonment (Vol. I, Chap. 16). It is difficult to account for different procurement patterns between housepits that persist through time unless one also assumes some sort of continuity of corporate rights and land use patterns persisting over the same period of time. If this is the case, the Shuswap levels in the rims of the large housepits indicate the initial founding of large corporate groups which we argue later owned the most lucrative fishing locations. These corporate groups, then, would have persisted for 1,300 (minimally) to 2,400 (maximally) years.

Richards and Rousseau (1987:30) note the presence of occasional prestige items in Shuswap horizon deposits, such as nephrite tools, although decorated or

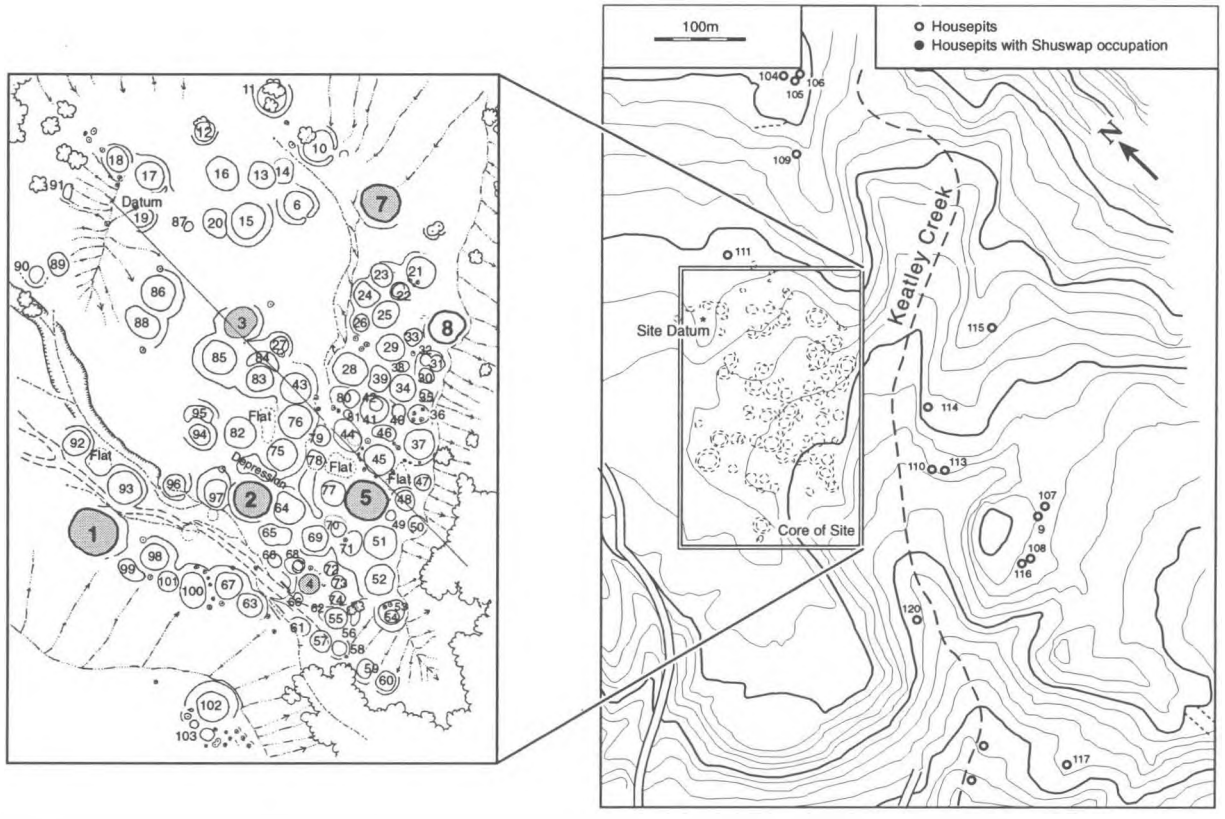

Figure 17. Housepit locations where Shuswap deposits were encountered at the base of the rims.

sculptured items are quite rare. Burials, in general, are rare from this time period, which may largely explain the relative paucity of prestige items. However, in the bottom Shuswap levels of the rim of HP 7 at Keatley Creek, we also recovered one half of a moose antler segment that had been sawn, split in half, and hollowed out, as if to create part of a protective container (see Vol. III, Chap. 2). Since there is no prehistoric indication of any moose closer than Prince George, a distance of 650 km., this appears to represent considerable long distance trade or contact. Given its unusual nature, its apparent non-functional role, and its long-distance origin, this artifact constitutes a prestige item used by some of the earliest pithouse occupants of HP 7.

Richards and Rousseau (1987:25) and Stryd (personal communication) also suggest that some of the pithouses of this horizon may not have had earth covered roofs given the shallowness and lack of roof-like material on the rims at many sites. This is entirely consistent with the stratigraphic evidence that we recovered in Shuswap and the succeeding Plateau levels of rim deposits in the large and medium sized housepits (Vol. I, Chap. 17).

Thus, during the Shuswap horizon at Keatley Creek, it appears that the full extent of the site's core area was occupied, and that residential corporate groups with rights over productive fishing locations and specific tracts of land in the mountains had become established and began building the large and medium size housepits at the site. It does not appear that many smaller housepits were constructed at this time, although more sampling of housepits in the core area of the site is required to verify this. Members of the large residential corporate groups began producing and acquiring prestige artifacts either locally or through long-distance contacts.

The Plateau Horizon (2,400–1,200 BP)

Although Richards and Rousseau (1987:32) characterize the Plateau horizon as a time when housepits diminish in size, this is clearly an inappropriate characterization of the situation at Keatley Creek. Virtually all of the large housepits continue to be used and may have even expanded slightly. All of the post holes used for major roof supports cluster in a few narrowly delimited floor areas in both HP 3 and 7, indicating continuity of the same basic structure design and size over time. Moreover, there is no indication in rim deposits of major breaks and the placement of fire-reddening and large storage pits conforms entirely to the maximum size of the housepits as represented by the last occupation during the Kamloops horizon. Some of these large bell-shaped pits appear to have been used during the Plateau horizon on the basis of the point styles found in their fill (although this is not definitive), again indicating little change in structure size during these

periods. Thus, a number of lines of evidence indicate that the large housepits remained close to their maximum size before, during, and after the Plateau horizon.

On the other hand, our test excavations in smaller housepits suggest that a relatively large proportion of the more peripheral small housepits were built and used during the Plateau horizon (Fig. 18), usually for comparatively brief time periods probably spanning only one or a few generations (see Table 1 in Vol. I, Chap. 17; Vol. III, Chap. 10). Thus, it appears that the maximum site size and population at Keatley Creek was probably reached during the Plateau horizon with the perimeter of the site being expanded by the addition of small housepits. Residents of some of these smaller housepits appear to exhibit substantial variability in their relative social and economic standing. Some are relatively poor, some are relatively rich, and some are relatively specialized. At least one example of a specialized, probably ritual structure, was used during the Plateau horizon at Keatley Creek (HP 105) and there may well be others (e.g., HP 9). The florescence of these small, independent residences may be related to the occurrence of cooler, wetter climates around 2,000–2,400 BP coincident with the Neoglacial (Mathewes and King 1989). Such conditions could have enhanced salmon runs and broadened the surplus base for many families.

Richards and Rousseau (1987:32) indicate that there are no side-entrances during this horizon, although there is at least one, and probably two, good late Plateau examples at Keatley Creek (HP's 9 and 90). They also suggest that earth covered roofs became common, although there is no evidence for this among the large and medium sized housepits at Keatley Creek. The narrow earth benches that they see as common in this horizon are not common at Keatley Creek except for one occurrence along the east wall of HP 7.

Prestige items probably become more common than during the Shuswap horizon, especially in the Lillooet-Lytton region (Richards and Rousseau 1987:36–8). The grave goods associated with the infant burial at the Bell site (Stryd 1981, 1973) probably date from this horizon according to Richards and Rousseau (1987:39). At Keatley Creek, however, not enough intact Plateau horizon living floors or rim deposits have been excavated from large housepits to argue this point with any statistical conviction. The remains of copper recovered at Keatley Creek could be from Plateau horizon deposits, while it seems more certain that at least some of the nephrite (e.g., HP's 9 and 90) is from this period. Other prestige objects are more difficult to date because they are from pits or roof contexts (Vol. II, Chap. 13), although Richards and Rousseau (1987:36–9) argue that copper jewelry, incised decorations, bone beads and tools, and extensive trade with coastal groups (for shells) and with the Rocky Mountains began in this horizon. Richards and Rousseau also

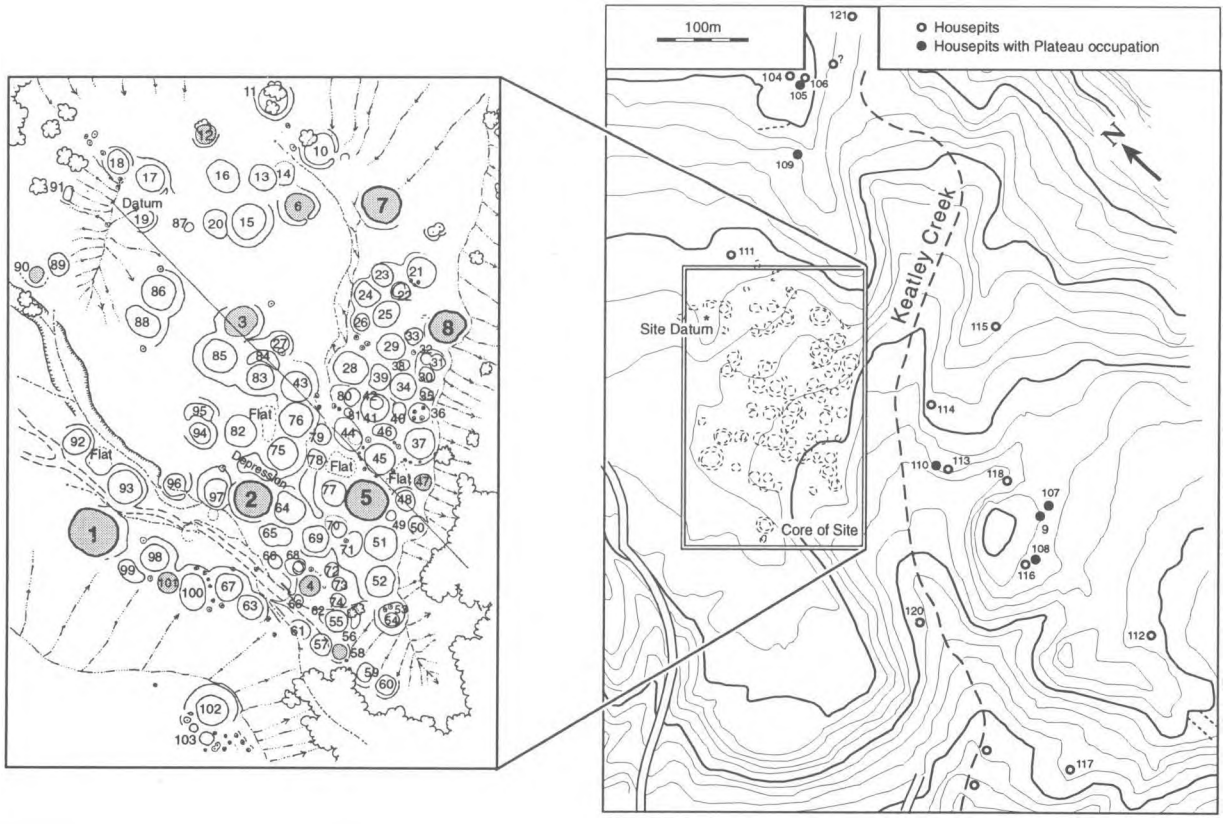

Figure 18. Housepit locations with Plateau occupation deposits.

imply that antler digging stick handles first occur in the Plateau horizon. This is consistent with the context of the antler handle that we recovered at Keatley Creek, which may also have been used as a status item. The occurrence of 60 bone buttons in a pit in HP 105 almost certainly also represents a ritual and prestige occurrence during the same time period, possibly the remains of the earliest button blanket in British Columbia.

The only other change in artifacts that is evident is a reduction in the size of some projectile points during the last centuries of the Plateau horizon probably representing the introduction of the bow and arrow (Richards and Rousseau 1987:34). This also appears to occur at Keatley Creek, although precise temporal control on the appearance of these smaller points is difficult to establish (see Vol. I, Chap. 3). While Rousseau (1992) argues that the key-shaped scraper is a diagnostic type for the Plateau and Shuswap horizons, it also seems to occur as a regular type in the early Kamloops horizon floor assemblages at the site.

Other notable archaeological occurrences during this horizon are the large root roasting pits in the Hat Creek Valley which date primarily to the Plateau horizon, and become significantly smaller after AD 800 (Pokotylo and Froese 1983). As the nearest large population to these root gathering areas, it seems highly likely that the roots, game animals, and lithic sources of the Upper Hat Creek Valley were being systematically exploited during warmer months by the residents of the Keatley Creek site. Isotopic analysis of burials near Lillooet by Chisholm (1986:124) indicates that individuals were obtaining about 60% of their protein from salmon during the Plateau horizon. This is essentially the same as much more recent values, showing that heavy reliance on salmon was well established by 2,400 BP, and, as previously noted, was quite substantial as early as 4,000 BP (contra Thomison 1987 and Johnston 1987).

In sum, in comparison to the Shuswap horizon, there are indications for greater populations, more socioeconomically diverse households, greater socioeconomic inequality, greater production of prestige and exchange items, greater exploitation of salmon, and greater use of mountain root gathering areas during the Plateau horizon at Keatley Creek and its vicinity. The large residential corporate groups at the site appear to have continued to dominate community life and were undoubtedly the most powerful forces within the community.

The Kamloops Horizon (1,200–200 BP)

If the beginning date for the Kamloops horizon provided by Richards and Rousseau (1987) is accurate, and the abandonment dates estimated for the Bell and Keatley sites (ca. 1,100 BP) are also accurate, the Kamloops occupation of the Keatley Creek site is limited to the first one hundred years of the beginning of this horizon. A number of living floors that were excavated appear to occur very close to the transition between the Plateau and Kamloops horizon, such as HP's 9, 12, and perhaps 90. The major technological change used to characterize occupations of the Kamloops horizon is the occurrence of small, side-notched projectile points, generally accepted as indicating the use of bow and arrow technology. The presence of larger corner notched points (typical of the Plateau horizon) in the early Kamloops living floors may well represent the persistence of the earlier atlatl or thrusting spear technology, or even an atlatl point and knife technology, along side the more complex, costly, and risky bow and arrow technology, especially in its early manifestations (Vol. I, Chap. 3). Thus, atlatl technology may have continued to be used during the beginning of the Kamloops horizon as a backup hunting system, as a system which provided convenient butchering knives with detachable foreshafts (a function which arrowheads could not serve), or as a system used primarily by poorer individuals or less skilled individuals.

In addition, steatite pipes and other steatite carvings appear about the same time as arrowpoints (at Keatley Creek and elsewhere on the Plateau—Stryd 1973:34–5; Richards and Rousseau 1987:45). While Richards and Rousseau (1987:45–7) also suggest that many bone and sculptural types or styles are also unique to, or especially common in, the Kamloops horizon (e.g., incised bone and antler), these rarely occur at Keatley Creek in contexts that would enable us to assign them to a specific period. Mica flakes, which Stryd (1973:34–5) thought might characterize Kamloops horizon deposits, seem to occur in Kamloops and slightly earlier contexts at Keatley Creek. We found no zoomorphic pestles, which Stryd, and Richards and Rousseau associate with the Kamloops horizon, although a zoomorphic pestle in a private collection was reported to have come from HP 92. In general, Schulting (1995) finds an increasing degree of socioeconomic inequality represented in burial assemblages of the late Prehistoric and Protohistoric period on the Plateau.

The Kamloops rim deposits (or perhaps beginning in the later Plateau horizon deposits) are the first to provide unequivocal evidence for the large scale use of dirt for covering the roofs of large and medium sized housepits (Vol. I, Chap. 17)—an observation originally made by Stryd (personal communication). The largest structures continue to be maintained at about the same size, and presumably with the same powerful political and economic roles in the community as in previous periods. There is no evidence for either a substantial increase or decrease in the size of the large housepits.

While some small housepits may have been constructed during this short period, it proved unexpectedly difficult to find any clear, undisturbed examples (Fig. 19). On the basis of this observation, I would suggest that the total site population may have decreased at the beginning of the Kamloops horizon, and that formerly independent small households may have been incorporated into the larger residential corporate groups. This may have been the result of increasing socioeconomic competition, possibly drier conditions with reduced salmon runs, increasing control over resources by the more powerful corporate groups, and/or the increasing marginalization of the poorer members of the community. On the other hand, the apparent low frequency of small Kamloops horizon houses may simply be a product of the much shorter duration of the Kamloops occupation at the site (100 years) compared to the Plateau horizon occupation (1,200 years).

Only a few multi-notch points were recovered from the Keatley Creek site indicative of use in the late Kamloops horizon (ca. 400–200 BP). One multinotch point was found at the edge of the site on the surface near a game trail leading into the mountains. It may have therefore resulted from a hunter's visit to the site. Several other points were from a cache pit on the far southern site periphery (Vol. III, Chap. 11.22). No convincing evidence of winter re-occupation of the site core during late Kamloops times has been encountered, although it is clear that some peripheral structures were used around the time of European contact, especially those on the upper terraces.

The Historic Period (200–50 BP)

There was a notable resurgence of occupation at the site during the early Historic period as evidenced by the remains of small transient campsites in the bottom of many housepit depressions. These generally contain large pieces of butchered bone, remains of a hearth, occasional segments of bark or buckskin, and early historic glass or metal artifacts. They also frequently include chipped stone assemblages. It seems likely that these groups were attracted to the Euro-Canadian gold rush presence at Glen Fraser and the surrounding areas, and simply used the Keatley Creek location as a convenient, somewhat removed camping area. A single bifacially pointed piece of glass was recovered on the surface of the site which may be from the Historic period, but might equally well be from earlier knapping by archaeologists or others, given the extensive disturbance by amateur archaeologists at the site.

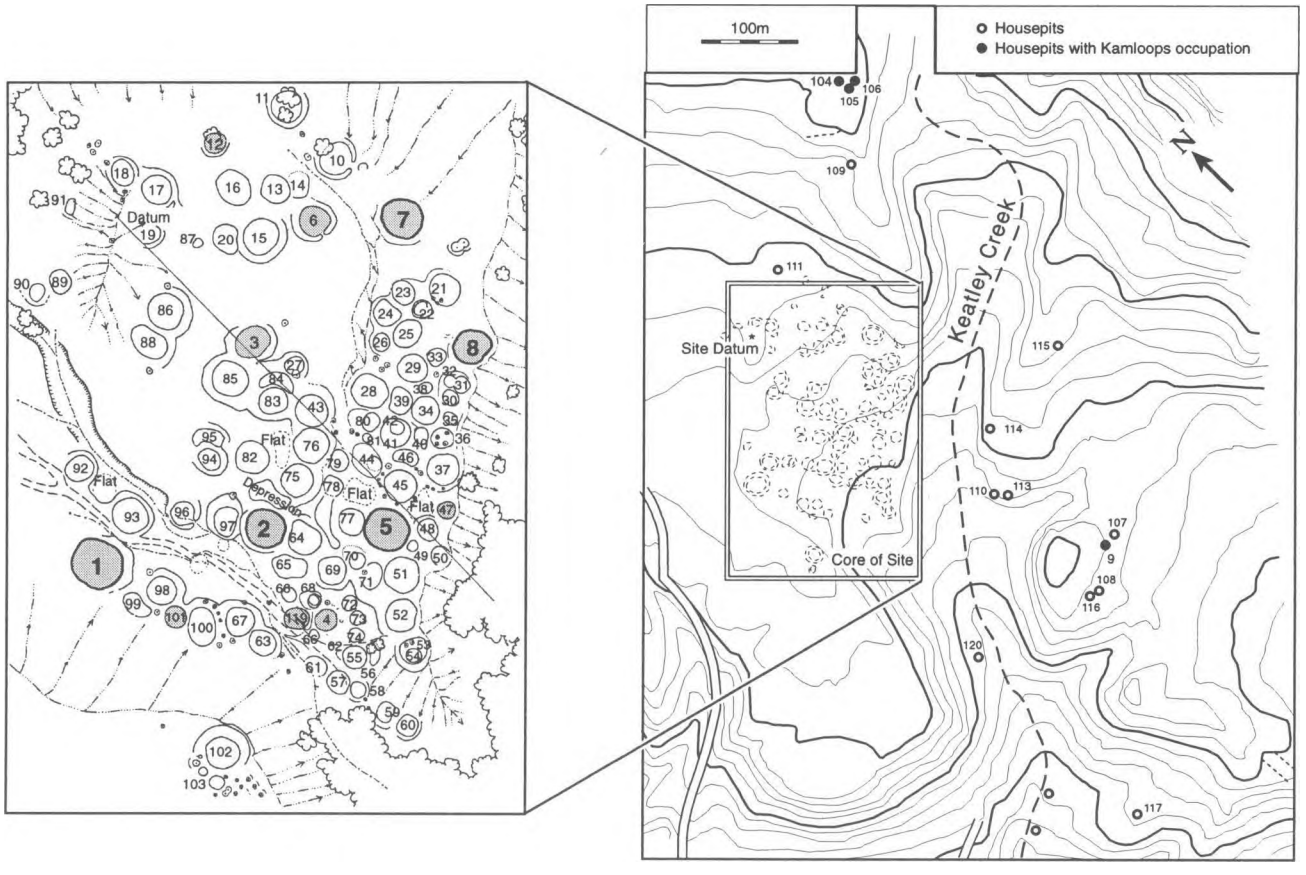

Figure 19. Housepit locations with Kamloops occupations.

The Salish and the Origins of Complex Cultures

There are two basic opinions concerning the geographical origin of complex societies in the Northwest. The development of complex societies may also be related to the spread of Salishan speakers, a topic on which opinions are equally divided. On initial examination of the Coastal versus the Interior environments, it might seem a more natural development for salmon mass harvesting and storage technology to develop first in the arid Interior. In regions such as Lillooet, salmon are densely concentrated in back eddies below rapids. Moreover, the arid climate facilitates drying and the development of long-term storage. In Coastal estuaries, there are no such eddies and the climate is generally damp and unpredictable making long-term storage much more difficult. Thus, it seems to make more logical sense to view the salmon mass harvesting and storage technology as an Interior development. If the development of cultural complexity is dependent on stored salmon surpluses, as Carlson (1991:121; 1993), Hunn (1990:214), Donald and Mitchell (1975), Mitchell and Donald (1988:321), Matson (1985; 1992:420), Matson and Coupland (1995:148, 243–5), and many others have argued, then it would seem to make more sense to view complexity as emerging first in the Interior and then spreading to the coast (e.g., Burley 1980).

Unfortunately, the empirical data at hand seem to indicate a much more elaborate, and perhaps earlier development of prestige technology on the Coast rather than in the Interior. By 5,000–4,000 BP, burials with lip plugs and ornaments of shell or soapstone occur on the Coast. By 4,000–3,500 BP there is good evidence for burial potlatching, status differentiation, surplus wealth, art, sculpture, and masked ceremonialism (Carlson 1989, 1991). This is the approximate date of the beginning of the Shuswap horizon in the Interior where there is only limited evidence for the development of prestige technology. Matson (1992:421) also remarks that evidence for settled village life is no earlier in the Interior than on the Coast, and that these may be coeval developments.

The discrepancy between theory and observation may be explained in several ways. First, the most compelling evidence for prestige technology, status differentiation, surplus wealth, and art in these early periods comes from the burials at the Pender Island cemetery site (Carlson 1991, 1993). No comparable burials have been excavated in the Interior from this time period, and it is possible that when sufficient Interior burials are excavated from this time period a similar level of prestige technology will be evident. Certainly, the recent excavations at the Baker site near Kamloops indicate that significant wealth differences existed in the Interior by 4,400 BP involving trade for coastal shells, differential access to salmon, domesticated dogs, jewelry, and ground stone (Wilson 1992:171, 176). Similar developments were occurring on the Columbia Plateau where Chatters (1986) reports a marine shell adze blade dating to 4,000 BP and Ames et al. (1981:92, 107) report a pipe and bone jewelry from the 4,300 BP.

The second possible way of reconciling the theoretical priority of Interior harvesting/storage technology with the observed priority of Coastal prestige technology is to view the basic mass harvesting and salmon storage technology as being developed in the Middle Prehistoric period, by Lochnore populations. This technology could have then spread both to the Coast and the Interior with differing results due to differences between the Coast and the Interior in salmon (and other resource) abundance and/or in terms of the labor requirements for undertaking mass harvesting and successful long-term storage. It is clear that the resource abundance is much greater and more evenly spread over seasons on the Coast compared to the Interior and that much more labor is required for the harvesting, processing, and effective storage of salmon on the Coast. Both conditions can be construed as leading to a greater degree of complexity on the Coast than in the Interior, even with the same harvesting and storage technologies.

At this point, we do not know where the origins of the Lochnore populations lie, whether in the Interior or on the Coast. If people in Lochnore communities originally perfected the mass harvesting and long-term storage of salmon, I would expect them to have done this somewhere in the Interior, resulting in expanding populations both in the Interior and onto the Coast as a result of the ability to assemble larger war parties and take over desirable resources. Keeley (1996) observes that the single best predictor of success in warfare is the size (and logistical support) of the opposing forces. There are abundant accounts of attempted and successful takeovers of desirable fishing locations in the Interior (Teit 1906:237; 1909:524; 1930:258; Bouchard and Kennedy 1985:37, 58–61). Thus, groups that successfully developed resource strategies enabling them to increase the size of their communities and the logistical subsistence support of warriors (dried salmon), would have a major advantage over other groups and could be expected to expand over time. As previously noted, there is general agreement that Lochnore communities were some of the earliest Salishan speakers in the Interior. Basing their arguments on social structure characteristics, Rosman and Rubel (1986) argue that the Coastal Salish migrated

from the Interior, and that most of the Coastal cognatic societies (Kwakiutl, Nootka, and Bella Coola) were heavily influenced by the Interior Salish. Ives (1987), too, argues that many of the Coastal social organization characteristics originated in the Interior. However, this is not generally agreed upon, and Suttles (1976:68), Stryd and Rousseau (1995), as well as Kincade (1991) argue for a Coastal origin of Proto-Salish on historical linguistic grounds. I think it makes more sense to view Salishan speakers as expanding with the advantages of a new technological and storage technology that would have been easiest to develop in the dry Interior. There is, as yet, no convincing spread of a tradition identifiable with Salishan speakers on the Coast around 5,500 BP similar to the emergence and spread of the Lochnore communities in the Interior.

Achieving Project Goals

With the preceding background information in mind, how is it possible to deal with the question of central concern to the research program, namely, why unusually large residential structures developed in the Lillooet region and what their socioeconomic organization was like? The associated problems of understanding why these large structures occurred in unusually large villages and whether they were associated with unusually complex hunting and gathering cultures also seemed pertinent questions to address in understanding these structures.

In order to deal with these issues, the following strategy was adopted. First, given the considerable amount of effort involved in constructing large houses, the lower thermal efficiency of large houses (Vol. II, Chap. 16), and the inherent problems involved in maintaining harmony and cooperation among the 40–50 people that lived in large structures, it seemed reasonable that the residents of large pithouses must have benefited in some very tangible way from their choice to build and reside in large structures (see Hayden and Cannon 1982).

Moreover, since these large structures only appear in the Late Prehistoric period on the Plateau in conjunction with substantial changes in subsistence and technology, it seemed likely that resource conditions were probably related to the emergence of these residential corporate groups. The fact that the Lillooet region historically contained the most lucrative fisheries in the entire Interior Fraser drainage also seemed to indicate that resources somehow probably played a key role in the answer to our questions. Cultural ecology and cultural materialism deal with both the influence of resources on behavior and with the practical benefits of behavior involving substantial outlays of energy, time, and organization. No other paradigms (cognitive anthropology, structuralist anthropology, post-processualism) seemed to have as much potential for explaining why large residential corporate groups emerged at the specific time and place that they did. Thus, it seemed most efficient to explore cultural ecological and cultural materialist explanations first in order to see if they could adequately account for the large residences, large villages, and complex cultures of the Lillooet region. When research funds are relatively limited, testing or exploring the most likely theories or paradigms first is the only approach that is reasonable, unless alternatives can be tested easily and quickly which is rarely the case. Thus, at Keatley Creek, if no sense could be made of large housepits and villages following the cultural ecological paradigm, then clearly other theoretical models would have to be explored.

As I mentioned at the outset, we examined the resource base of the Keatley Creek prehistoric community in many ways. However, obtaining a clear, accurate picture of the subsistence economy from archaeological remains alone is a difficult undertaking. Many food remains are not preserved. Many of the remains that might be preserved are left at procurement sites like fishing sites rather than at consumption sites like the Keatley Creek winter village (Fig. 20). Much of the meat that was hunted was deboned before being brought to the winter village. Bones that were brought back were generally smashed into small pieces. Other parts of animals or fish (especially fins) might be given to dogs. Boiling of fish bones could also diminish their preservation. Waste bone within the Keatley Creek village might also be dumped away from the pithouse of residence, in unused storage pits or abandoned pithouses. Thus, it is clear, that at best, we only have a rather biased sample of the total subsistence regime of the Keatley Creek community or of households within the community. In order to understand the subsistence remains in any coherent terms it would be necessary to understand, at least in general terms, the entire subsistence round together with the taphonomic and formation processes that created the subsistence assemblages both at Keatley Creek and elsewhere. This is one of the main reasons why a detailed ethnoarchaeological project was initiated concerning the traditional subsistence of the Stl'átl'imx Indians in the vicinity of Keatley Creek (Hayden 1992a).

Given all of the problems involved in making direct quantified inferences about resource exploitation from the subsistence remains alone, it became clear that it would be necessary to use proxy measures for many of the estimates of resource characteristics. Thus, the relative amount of food storage capacity in pits, the-

relative bone densities between housepits, the degree of sedentism, the regional population density, and evidence of surplus in the form of trade or prestige artifacts, could all be used as indicators of exploitable resource abundance in the region, and to some extent at the site itself. We have therefore paid special attention to all of these features during excavation and analysis.

Because of the strong basic cultural continuity through prehistoric and historic times in the region and the Plateau in general, it was also meaningful to employ ethnographic analogies at the level of synthetic cultural descriptions, together with ethnohistory and ethnoarchaeology as guides to the subsistence and other behavior represented in the archaeological deposits at Keatley Creek. While these data sources provided numerous invaluable insights into the interpretation of otherwise enigmatic artifacts, features, and patterning, we were constantly aware of minor and major discrepancies in almost every domain between ethnographic descriptions and archaeological occurrences, e.g., different hide working tools, the presence of abundant fish fins in some housepits, the preponderance of a totally different species of salmon from those used historically, different architectural details, and differences in the basic organization of house interiors and social units. At best, the descriptions of traditional cultures that were available were relicts that had been variously transformed by the influences of Euro-Canadian (or Russian) traders, missionaries, ranchers, gold miners, and government officials. Moreover, even the best ethnographies were frequently silent on important details such as differences between elites and nonelites in subsistence and other areas. Thus, while the existing historical and ethnographic information has been an invaluable resource, it has not been used uncritically. We have employed it primarily as a guide to directing our questions, inquiries, and observations.

Another way of assessing the exploitable food resources of Keatley Creek and neighboring catchment areas was to simply inventory the principal food resources traditionally used in the area. This was accomplished by various researchers in conjunction with the ethnoarchaeological research related to the work at Keatley Creek (see chapters in Hayden 1992a). Approximations of wildlife, plant, and fish resources were generated in this publication, and together with ethnoarchaeological observations helped considerably in modeling the approximate overall yearly subsistence budget that must have characterized the community at Keatley Creek. Observations of archaeological deposits at many of the recently and historically used procurement sites helped to impart confidence that

Figure 20. A salmon bone and waste refuse dump in a ravine at the Six Mile fishery (east bank).

basic exploitation patterns had not changed in the last centuries or millenia.

While our excavations at winter villages may have only revealed a partial and biased sample of subsistence remains, our excavations were much more successful in revealing the basic social and economic organization inside housepits. It is in this domain that most of the artifactual analysis has concentrated, including all botanical remains, faunal remains, and lithic artifacts. The patterning evident on housepit floors revealed critical information about the hierarchical socio-economic differences between subgroups of residents of a single house. This, in turn, has been invaluable for understanding how the large residential corporate groups functioned, and, I believe, how and why they emerged in the first place.

Dealing directly with resources, is only one facet of understanding the puzzle of complexity. Other kinds of archaeological and ethno-archaeological analyses can be explored in trying to describe and understand complexity. In order to measure complexity on a regional and site level, I have used a number of indicators which will be presented more fully in Volume II Chapter 17. At the regional level, the existence of site hierarchies, the association of large sites with the most productive fishing locations, the occurrence of prestige or long distance exotics, and the differences in grave goods between burials can all be used as indicators of complexity. At the site level, hierarchies in house sizes, differential storage capacity, the occurrence of prestige or long distance exotics in some houses, differences in hearth sizes, differences in utilization of preferred animal or fish species, community size, and the excavation of cemeteries (which we have not undertaken), are all potentially productive ways of measuring complexity. This is an issue of some considerable interest given the very different existing points of view on the fundamental nature of Plateau communities.

Following Boas, Ray (1939) was pivotal in establishing the more traditional view that Plateau cultures were essentially egalitarian and peaceful (see also Jorgensen 1980:143). This pattern was portrayed as having only been disturbed by relatively recent cultural diffusion of status distinctions and raiding from the Coast. In contrast to the egalitarian views of Plateau culture, Sanger (1971:255), Stryd (1973:90), Cannon (1992), Schulting (1995), and others have advanced strong arguments for much more variability on the Plateau with strongly hierarchical communities extending back many thousands of years in some regions of the Plateau. The excavations at Keatley Creek have certainly contributed significantly to this debate.

Finally, in order to obtain a much better idea of just how complex the society at Keatley Creek was, and to increase my own understanding of how residential corporate groups functioned within the Lillooet communities and how the communities functioned as a whole, I conducted a comparative review of ethnographic communities that spanned the range of initial inegalitarian to incipient chiefdom types of organization. Because of operational and theoretical problems with the terms, "tribal," and "ranked" societies, I have opted not to use those terms. I use the term "trans-egalitarian" to refer to the range of societies from initial inegalitarian communities to proto-chiefdoms. The most traditional and the best documented cases that I found were from the New Guinea Highlands; however, I also incorporated Northwest Coast and Interior groups. This exercise (Hayden 1995), has provided a useful framework both for understanding the likely structure of the prehistoric society at Keatley Creek, and for situating it along a continuum of complexity and other social dimensions. Because of the historical connexions with the Coast and the existence of residential corporate groups on the Coast, I have also relied on coastal ethnographies in places to help understand how the corporate groups of Keatley Creek were probably organized and structured.

Given the many uncertainties that existed at the outset of this project, it seems that we have been unusually fortunate in having gambled and discovered an untapped wealth of insights into the social and economic organization of a remarkable hunting and gathering culture. Our results are pertinent to the understanding of corporate groups, private ownership, social and economic inequalities, and many other fundamental kinds of cultural issues that are still important in contemporary communities. I hope readers will enjoy the unraveling of the tale of the Classic Lillooet culture as much as I have over the many years.

References

Ames, Kenneth, James Green, and Margaret Pfoertner
1981 *Hatwai (10NP143) Interim Report.* Archaeological Reports No. 9, Boise State University, Boise, Idaho.

Ames, Kenneth, D. Raetz, S. Hamilton, and C. McAfee
1992 Household Archaeology of a Southern Northwest Coast Plank House. *Journal of Field Archaeology* 19:275–290.

Barrett, S.A.
1975 Pomo Buildings. In R. Heizer (Ed.), *Seven Early Accounts of the Pomo Indians and Their Culture,* pp. 37–63. Archaeological Research Facility, Department of Anthropology, University of California, Berkeley.

Binford, Lewis
1980 Willow Smoke and Dogs; Tails: Hunter-gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4–20.

Bishop, Charles
1987 Coast-interior Exchange: The Origins of Stratification in Northwestern North America. *Arctic Anthropology* 24:72–83.

Blake, Michael
1974 *Ollie Site (EdRk 9) Final Report.* Report submitted to Salvage Section, Archaeological Survey of Canada, National Museum of Man, and Archaeological Sites Advisory Board of British Columbia.

Bouchard, Randy, and Dorothy Kennedy
1985 *Lakes Indian Ethnography and History.* Unpublished report prepared for the Archaeology Branch, British Columbia Ministry of Culture, Tourism, and Small Business, Victoria, B.C.

Burley, David
1980 *Marpole: Anthropological Reconstructions of a Prehistoric Northwest Coast Culture Type.* Archaeology Dept., Simon Fraser University Publication No. 8, Burnaby.

Campbell, Sarah
1990 *Post-Columbian Culture History in the Nothern Columbia Plateau, A.D. 1500–1900.* Garland Publishing: New York.

Cannon, Aubrey
1992 Conflict and Salmon on the Interior Plateau of British Columbia. In Brian Hayden (Ed.), *A Complex Culture of the British Columbia Plateau,* pp. 506–524. University of British Columbia Press, Vancouver, B.C.

Carlson, Roy
1989 Review of Prehistoric Economies of the Pacific Northwest Coast, *Canadian Journal of Archaeology* 13:232–237.

Carlson, Roy
1991 The Northwest Coast before A.D. 1600. *Proceedings of the Great Ocean Conferences, Vol. 1,* pp. 110–136. Oregon Historical Society, Portland.

Carlson, Roy
1993 Evolution of the Northwest Coast Cultural System. Paper presented at the annual meeting of the Society for American Archaeology, St. Louis.

Chatters, James
1986 *The Wells Reservoir Archaeological Project.* Archaeological Report 86–6. Central Washington Archaeological Survey, Central Washington University, Ellensburg.

Chatters, James
1989 The Antiquity of Economic Differentiation within Households in the Puget Sound Region, Northwest Coast. In by Scott MacEachern, D. Archer, and R. Garvin, (Eds.), *Households and Communities,* pp. 168–178. Archaeological Association, University of Calgary, Calgary.

Chisholm, Brian
1986 *Reconstruction of Prehistoric Diet in British Columbia using Stable-carbon Isotopic Analysis.* Unpublished Ph.D. dissertation, Simon Fraser University, Burnaby, B.C.

Chisholm, Brian, and D. Erle Nelson
1983 An Early Human Skeleton from South Central British Columbia: Dietary Inferences from Carbon Isotopic Evidence. *Canadian Journal of Archaeology* 7:85.

Coupland, Gary
1985 Household Variability and Status Differentiation at Kitselas Canyon. *Canadian Journal of Archaeology* 9:39–56.

Coupland, Gary
1988 Prehistoric Economic and Social Change in the Tsimshian area. In Barry Isaac (Ed.), *Prehistoric Economies of the Pacific Northwest Coast. Research in Economic Anthropology, Supplement 3,* pp. 211–244. JAI Press, Inc.: Greenwich, Connecticut.

Dawson, George
1892 Notes on the Shuswap People of British Columbia. *Proceedings and Transactions of the Royal Society of Canada* 9(2):3–44.

Donald, Leland, and Donald Mitchell
1975 Some Correlates of Local Group Rank among the Southern Kwakiutl. *Ethnology* 14:325–346.

Drake-Terry, Joanne
1989 *The Same as Yesterday.* Lillooet Tribal Council: Lillooet, B.C.

Goldman, Irving
1940 The Alkatcho Carrier of British Columbia. In Ralph Linton (Ed.), *Acculturation in Seven American Indian Tribes,* pp. 333–386. Appleton-Century-Crofts: New York.

Fladmark, Knut
1982 An introduction to the prehistory of British Columbia. *Canadian Journal of Archaeology* 6:95–156.

Hayden, Brian (Ed.)
1992a *A Complex Culture of the British Columbia Plateau: Traditional Stl'atl'imx Resource Use.* University of British Columbia Press, Vancouver.

Hayden, Brian
1992b Ecology and Complex Hunter/gatherers. In Brian Hayden, (Ed.), *A Complex Culture of the British Columbia Plateau,* pp. 525–563. University of British Columbia Press, Vancouver.

Hayden, Brian
1995 Pathways to Power: Principles for Creating Socioeconomic Inequalities. In T.D. Price and G. Feinman (Eds.), *Foundations of Social Inequality.* Plenum Press, New York.

Hayden, Brian, and Aubrey Cannon
1982 The Corporate Group as an Archaeological Unit. *Journal of Anthropological Archaeology* 1:132–158.

Hayden, Brian, and June Ryder
1991 Prehistoric Cultural Collapse in the Lillooet Area. *American Antiquity* 56:50–65.

Hayden, Brian, Gregory Reinhardt, Steven Taylor, David Crellin, and Dan Holmberg
1996 Space Per Capita and the Optimal Size of Housepits. In Gary Coupland and E. Banning (Eds.), *People Who Lived in Big Houses*, pp. 151–164. Prehistory Press: Madison, Wisconsin.

Hills, Leonard
1961 *A Preliminary Archaeological Survey of the Fraser River from Lillooet to Big Bar.* Unpublished manuscript on file with the British Columbia Provincial Archaeology Branch, Victoria.

Hill-Tout, Charles
1978a *The Salish People, Vol. 1: The Thompson and the Okanagan.* Talonbooks, Vancouver.

Hill-Tout, Charles
1978b *The Salish People, Vol. 2: The Squamish and the Lillooet.* Talonbooks, Vancouver.

Hunn, Eugene
1990 *Neh'I-Wana, The Big River: Mid-Columbia Indians and Their Land*. University of Washington Press, Seattle.

Ives, John
1987 The Tsimshian are Carrier. In R. Auger, M. Glass, S. MacEachern, and P. McCartney (Eds.), *Ethnicity and Culture*, pp. 209–225. Archaeology Association, University of Calgary, Calgary.

Johnston, Robbin
1987 *Archaeological Evidence of Fishing in the Southern Plateau, a Cultural Area of the Columbia Plateau.* Unpublished M.A. thesis, University of Idaho.

Jorgensen, Joseph
1980 *Western Indians: Comparative environments, languages, and cultures and 172 western American Indian tribes.* W.H. Freeman, San Francisco.

Keeley, Lawrence
1996 *War Before Civilization*. Oxford University Press, New York.

Kennedy, Dorothy, and Randy Bouchard
1978 Fraser River Lillooet: An Ethnographic Summary. In, Arnoud Stryd and Stephen Lawhead (Eds.), *Reports of the Lillooet Archaeological Project*, Mercury Series, National Museum of Man, Ottawa, No. 73, pp. 22–55.

Kinkade, M. Dale
1991 Prehistory of the Native Languages of the Northwest Coast. *In Proceedings of the Great Ocean Conferences, Vol. 1, The North Pacific to 1600*, pp. 137–158. Oregon Historical Society Press: Portland.

Lamb, W. Kaye (Ed.)
1960 *The Letters and Journals of Simon Fraser 1806–1808*, Macmillan, Toronto.

Lovell, Nancy, Brian Chisholm, D. Erle Nelson, and Henry Schwarcz
1986 Prehistoric Salmon Consumption in Interior British Columbia. *Canadian Journal of Archaeology* 10:99–106.

MacDonald, George
1989 *Kitwanga Fort report*. Canadian Museum of Civilization, Ottawa.

MacDonald, George, and J. Cove, (Eds.)
1987 *Trade and Warfare: Tsimshian Narratives 2.* Canadian Museum of Civilization, Mercury Series, Directorate Paper No. 3.

Magne, Martin
1985 Taseko Lakes Prehistory Project: A Preliminary Report. *The Midden* 17(3):10–12.

Magne, Martin, and R.G. Matson
1987 Projectile Point and Lithic Assemblage: Ethnicity in Interior British Columbia. In R. Auger, M. Glass, S. MacEachern, and P. McCartney (Eds.). *Ethnicity and Culture*, pp. 227–242. Archaeological Association, University of Calgary, Calgary.

Marshall, Yvonne
1992 *A Political History of the Nuu-chah-nulth People.* Unpublished Ph.D. dissertation, Archaeology Department, Simon Fraser University, Burnaby, B.C.

Maschner, Herbert, and B. Hoffman
1994 The evolution of village life on the North Pacific. Paper presented at the 59th Annual Meeting of the Society for American Archaeology, Anaheim, CA.

Mathewes, Rolf, and Miriam King
1989 Holocene Vegetation, Climate and Lake Level Changes in the Interior Douglas Fir Biogeoclimatic Zone, British Columbia. *Canadian Journal of Earth Sciences* 26:1811–1825.

Matson, R.G.
1985 The Relationship between Sedentism and Status Inequalities Among Hunters and Gatherers. In Marc Thompson, Maria Teresa Garcia and Francois Kense (Eds.), *Status, Structure and Stratification*, pp. 245–252. Archaeological Association, University of Calgary, Calgary.

Matson, R.G.
1992 The Evolution of Northwest Coast Subsistence. In D. Croes, Rebecca Hawkins, and B. Isaac (Eds.), *Long-Term Subsistence Change in Prehistoric North America*, pp. 367–428. JAI Press, Greenwich, Conn.

Matson, R.G., and Gary Coupland
1995 *The Prehistory of the Northwest Coast*. Academic Press: San Diego.

Mitchell, Donald, and Leland Donald
1988 Archaeology and the Study of Northwest Coast Economies. In B. Isaac (Ed.), *Prehistoric Economies of the Pacific Northwest Coast*, pp. 293–351. JAI Press, Greenwich, Conn.

Mohs, Gordon
1981 *An Assessment and Evaluation of Heritage Resources in the South Thompson River Valley of British Columbia.* Occasional Papers, No. 8, Heritage Conservation Branch, Ministry of Provincial Secretary and Government Services, Province of British Columbia. Victoria, B.C.

Nastich, Milena
1954 *The Lillooet: An Account of the Basis of Individual Status.* Unpublished M.A. thesis, Dept. of Economics, Political Science and Sociology, University of British Columbia, Vancouver.

Pokotylo, David
1978 *Lithic Technology and Settlement Patterns in Upper Hat Creek Valley, B.C.* Unpublished Ph.D. dissertation, Dept. of Anthropology and Sociology, University of British Columbia, Vancouver.

Pokotylo, David
1981 Towards an Understanding of Prehistoric Upland Settlement Behavior in the British Columbia Southern Interior Plateau. In P. Francis, F. Kense, and P. Duke (Eds.), *Networks of the Past: Regional Interaction in Archaeology*, pp. 379–396. Archaeological Association, University of Calgary, Calgary.

Pokotylo, David, Marian Binkley, and Joanne Curtin
1987 The Cache Creek Burial Site (Eerh 1), British Columbia. *British Columbia Provincial Museum Contributions to Human History* No. 1.

Pokotylo, David, and Patricia Froese
1983 Archaeological Evidence for Prehistoric Root Gathering in the Southern Interior Plateau of British Columbia: A Case Study from Upper Hat Creek. *Canadian Journal of Archaeology* 7:127–158.

Pokotylo, David, Sheila Greaves, and Lina Burnard
1983 Archaeological Reconnaissance in the Clear Range, B.C. Unpublished paper presented at the 16th Annual Meeting of the Canadian Archaeological Association, Halifax, Nova Scotia.

Pokotylo, David, and Donald Mitchell
1993 Prehistory of the Northern (Canadian) Plateau. To appear in *Handbook of North American Indians*, Vol. 12: Plateau. Smithsonian Institution Press, Washington, D.C.

Post, Richard, and Rachel Commons
1938 Material Culture. In L. Spier (Ed.), *The Sinkaietk or Southern Okanagan of Washington*, pp. 35–70. General Series in Anthropology, No. 6. George Banta Publishing, Menasha, Washington.

Ray, Verne F.
1939 Cultural Relationships in the Plateau of North-Western America. *Publications of the Frederick Webb Hodge Anniversary Publication Fund* Vol. 3. The Southwest Museum, Los Angeles.

Richards, Thomas, and Michael Rousseau
1987 *Late Prehistoric Cultural Horizons on the Canadian Plateau*. Department of Archaeology, Simon Fraser University Publication No. 16, Burnaby, British Columbia.

Rittenberg, David
1976 Lillooet Archaeology Project: 1976 Field Season. Unpublished Ms. on file with Archaeological Sites Advisory Board, Victoria, B.C.

Rosman, Abraham, and P. Rubel
1986 The Evolution of Central Northwest Coast Societies. *Journal of Anthropological Research* 42:557–572.

Rousseau, Mike
1986 Results of the 1986 Ashcroft Indian Bank Archaeological Project. *The Midden* 18(5):7–9.

Rousseau, Mike
1989 Upper Oregon Jack Creek Heritage Resources. *The Midden* 21(2):5–11.

Rousseau, Michael
1992 *Integrated Lithic Analysis: the Significance and Function of Key-Shaped Formed Unifaces On the Interior Plateau of Northwestern North America*. Department of Archaeology, Simon Fraser University, Publication No. 20, Burnaby, B.C.

Rousseau, Mike, and Rob Gargett
1987 Prehistoric Resource Use On Cornwall Hills Summit. *The Midden* 19(5):6–9.

Rousseau, Mike, R. Muir, and D. Alexander
1991 Results of the 1990 Archaeological Investigations Conducted in the Oregon Jack Creek Locality, Thompson River Region, South-Central British Columbia. Unpublished manuscript on file with the British Columbia Provincial Archaeology Branch, Victoria.

Rousseau, Mike, and Thomas Richards
1985 A Culture-Historical Sequence for the South Thompson River-Western Shuswap Lakes Region of British Columbia: The Last 4000 Years. *Northwest Anthropological Research Notes* 19(1):1–32

Rousseau, Mike, and Thomas Richards
1988 The Oregon Jack Creek Site (Edri-6). *Canadian Journal of Archaeology* 12:39–63.

Samuels, Stephan
1991 *Ozette Archaeological Project Research Reports: Vol. 1: House Structure and Floor Midden*. Washington State University, Department of Anthropology Reports of Investigations 63, Pullman.

Sanger, David
1963 Excavations at Nesikep Creek (Edrk: 4). *National Museum of Canada, Bulletin* No. 193, Ottawa. pp. 130–161.

Sanger, David
1966 Excavations in the Lochnore-Nesikep Creek Locality, British Columbia: Interim Report. *National Museum of Canada, Anthropology Papers*, No. 12, Ottawa.

Sanger, David
1967 Prehistory of the Pacific Northwest Plateau as Seen from the Interior of B.C. *American Antiquity* 32:186–197.

Sanger, David
1968 The Texas Creek Burial Site Assemblage, British Columbia. *Anthropology Paper, National Museum of Canada*, No. 17, Ottawa.

Sanger, David
1969a The Chase Burial Site (Eeqw:1), British Columbia. *National Museums of Canada, Contributions To Anthropology VI. Bulletin 224.* pp. 86–185.

Sanger, David
1969b Cultural Traditions in the Interior of British Columbia. *Syesis* 2: 188–200.

Sanger, David
1970 The Archaeology of the Lochnore-Nisikep Locality, B.C. *Syesis* 3: Supplement 1.

Sanger, David
1971 Discussion. In A. Stryd and R. Smith (Eds.), *Aboriginal Man and Environments on the Plateau of Northwest America*, pp. 255–256. Archaeological Association, University of Calgary, Calgary.

Schalk, Randal, and G. Cleveland
1983 A Chronological Perspective on Hunter-Gatherer Land Use Strategies in the Columbia Plateau. In R. Schalk (Ed.), *Cultural Resource Investigations for the Lyons Ferry Fish Hatchery Project, Near Lyons Ferry, Washington*, pp. 11–56. Laboratory of Archaeology and History Project Report 8. Washington State University, Pullman.

Schulting, Rick
1995 *Mortuary Variability and Status Differentiation on the Columbia-Fraser Plateau*. Archaeology Press, Simon Fraser University, Burnaby, B.C.

Smith, Harlan I.
1899 *Archaeology of Lytton, British Columbia*. Memoirs of the American Museum of Natural History, Volume 1, Part 3.

Smith, Harlan I.
1900 *Archaeology of the Thompson River Region, British Columbia*. Memoirs of the American Museum of Natural History, Volume 1, Part 6.

Spafford, James
1991 *Artifact Distributions on Housepit Floors and Social Organization in Housepits at Keatley Creek.* Unpublished M.A. thesis. Archaeology Department, Simon Fraser University, Burnaby, B.C.

Stryd, Arnoud
1972 Housepit Archaeology at Lillooet, British Columbia: The 1970 Field Season. *B.C. Studies* 14:17–46.

Stryd, Arnoud
1973 The *Later Prehistory of the Lillooet Area, British Columbia.* Unpublished Ph.D. dissertation, Department of Archaeology, University of Calgary, Calgary.

Stryd, Arnoud
1980 A Review of the Recent Activities Undertaken by the Lillooet Archaeological Project. *The Midden* 122:5–20.

Stryd, Arnoud
1981 Prehistoric Sculptures from the Lillooet Area of British Columbia. *Datum* 6(1):9–15.

Stryd, Arnoud, and James Baker
1968 Salvage Excavation at Lillooet, British Columbia. *Syesis* 1:47–56.

Stryd, Arnoud, and L. Hills
1972 An Archaeological Site Survey of the Lillooet-Big Bar Area. *Syesis* 5:191–209.

Stryd, Arnoud, and Stephen Lawhead (Eds.)
1978 *Reports of the Lillooet Archaeological Project* No. 1. National Museum of Man, Mercury Series, No. 73. Ottawa.

Stryd, Arnoud, and M. Rousseau
1995 The Early Prehistory of the Mid Fraser Thompson River Area of British Columbia. In Roy Carlson and L. Dalla Bona (Eds.), *Early Human Occupation in British Columbia,* pp. 177–204.

Suttles, Wayne
1976 Productivity and Its Constraints: A Coast Salish Case. In Roy Carlson (Ed.), *Indian Art Traditions of the Northwest Coast,* pp. 67–87. Archaeology Press, Simon Fraser University, Burnaby, B.C.

Teit, James
1900 The Thompson Indians of British Columbia. *Memoirs, American Museum of Natural History* 1(2).

Teit, James A.
1906 The Lillooet Indian. *American Museum of Natural History Memoirs* 2(5).

Teit, James A.
1909 The Shuswap. *American Museum of Natural History Memoirs* 2(7):447–789.

Teit, James
1917 *Folk-Tales of Salishan and Sahaptin Tribes.* American Folk-Lore Society: New York.

Teit, James
1930 The Salishan Tribes of the Western Plateaus. *Bureau of American Ethnology Annual Report* 45:25–396.

Thomas, David H.
1988 The *Archaeology of Monitor Valley. 3. Survey and Additional Excavations.* American Museum of Natural History, Anthropological Papers 66(2). New York.

Thomison, P.
1987 *When Celilo was Celilo, An Analysis of Salmon Use During the Past 11,000 Years in the Columbia Plateau.* M.A. thesis, Oregon State University, Corvalis.

Wilmeth, Roscoe
1977 Pit House Construction and the Disturbance of Stratified Sites. *Canadian Journal of Archaeology* 1:135–140.

Wilson, Ian
1992 Excavations at the Baker Site Edqx 43, Monte Creek. Unpublished manuscript on file with the British Columbia Provincial Archaeology Branch, Victoria.