CHAPTER 8

PORT HAMMOND REVISITED

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Introduction

The Port Hammond site (DhRp 17) holds a unique position in local archaeology in that it and Marpole were two sites on the lower mainland of British Columbia recorded very early in the professional archaeological literature, and partly excavated. The first published descriptions of shell midden sites in the region, and of the Port Hammond site specifically, was published by Charles Hill-Tout in 1895 as part of the Transactions of the Royal Society of Canada. Hill-Tout made collections of artifacts from Port Hammond and other shell midden sites. In 1897 research by the Jesup North Pacific Expedition commenced under the direction of anthropologist Franz Boas. Harlan I. Smith, the only archaeologist on the expedition, conducted archaeological excavations and surface collections throughout British Columbia in the years 1897 - 1907 (R. Carlson 1990a; Thom n.d.), and excavated at Port Hammond in September and October 1897 and September 1898 (Smith 1903:135-136).

In the century between Smith's work in 1897-1898 and our work there that began in 2000, the site had been visited by professionals and was indeed given the site number, DhRp 17, in 1953 by Walter Kenyon and later described in 1978 by Wayne Hanson and Gordon Mohs, who reported that it extended 1600 m west along the river from the eastern end of Hammond Cedar Mill's property (Derby Reach) to the Katzie Reserve, and about 50 to 100 m back (north) from the present river bank edge (Figure 8:1). The site figured in various early attempts at cultural-historical reconstruction such as Drucker's (1943:116) attempt to seriate Smith's excavated sites on the basis of skull shapes, and Carlson's (1970b:117) suggestion on the basis of artifact comparisons that a Mayne phase component was present there. However, no further field work took place at the site until Antiquus Archaeological Consultants Ltd. began work there in late 2000 and early 2001.

The opportunity to revisit and implement a monitoring program at Port Hammond arose as a result of construction activities associated with removal and replacement of a timber dry kiln building and apron within International Forest Products' (Interfor) Hammond Cedar Mill property. This monitoring program was unique in that the entire proposed impact zone was capped by an extensive 0.5 m-thick concrete foundation laid in the 1960s, that consequently prevented initiation of a detailed archaeological impact assessment (AIA) study prior to commencement of kiln replacement project land-altering activities. While it was known that pre-contact period (prehistoric) artifacts had been found previously in the general area, it was not known if cultural deposits actually existed beneath the existing kiln building or apron concrete foundations.

This chapter does not attempt to provide a detailed account of the nature, distribution, and significance of the data observed and/or recovered from this section of site DhRp 17 because of the extent of previous disturbance of the cultural deposits within the impact zone, and the relatively unrefined recovery methods and techniques used to gather data in the field. Additional information about all aspects of this study is presented in Antiquus (2001).

Site Location and Setting

Site DhRp 17 is situated on the north bank of the Fraser River, approximately 10 km upriver from its confluence with the Pitt River, in the Pitt Meadows area of the Fraser lowland. It lies within the traditional territory of the Katzie First Nation, which includes the banks of the Fraser River, Pitt Meadows, and the Alouette River drainages. The Katzie people speak a mainland Halkomelem dialect of the Coast Salish linguistic family (Smith 1903), and they are generally considered to have participated in a typical South Coast ethnographic culture pattern, with a subsistence economy based heavily on riverine and terrestrial resources.

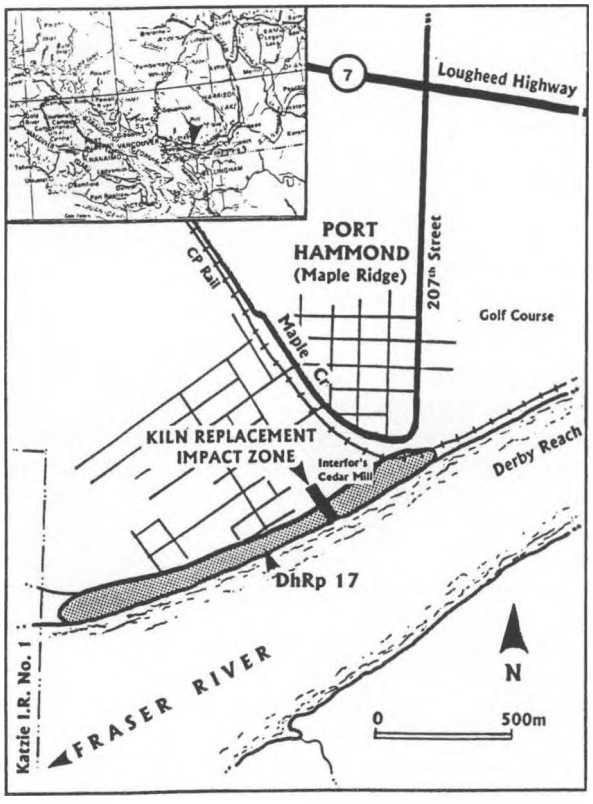

Figure 8:1. **Estimated extent of site DhRp 17 in Port Hammond, and Location of the Kiln Replacement Project.**

The study area, and the Fraser lowlands generally, are situated within the Coastal Western Hemlock (CWH) biogeoclimatic zone. Western hemlock is generally the most abundant arboreal species, but the forest cover also typically includes Western red cedar, and Douglas fir. Red alder is common on disturbed sites, while black cottonwood is present along major rivers like the Fraser. Understory vegetation ranges from sparse to dense, and includes edible species such as huckleberry, salmonberry, Oregon grape, and a variety of blueberries (Driver 1998; Pojar et al. 1994). Common mammalian fauna in the study region include black-tailed deer, moose, grizzly and black bear, and mountain goat. The Fraser River and associated rivers and streams in the study area support five species of Pacific salmon, and also contain white sturgeon, cutthroat trout, and steelhead. Sea mammals, including California and Stellar's sea lions and harbour, northern fur, and northern elephant seals are available in the marine waters of the Straight of Georgia located to the west of the study area. The Fraser lowland also contains the greatest diversity of birds in B.C., including a variety of waterfowl.

The site occupies a well-defined, extensive river terrace and terrace-edge levee berm consisting of sterile, loose, poorly sorted fluvial sand with low percentages of pea gravel and small pebbles overlying a deposit of compact, light yellow, yellow/grey, and grey glacial clay that was encountered at depths varying between 1.5 and 3.0 m below ground surface. Accumulation of natural and cultural sediments and debris over the last 3000 years or so have added another 1.0 to 2.0 m of deposits above the sterile sand, contributing significantly to the development of the terrace-edge berm formation.

That this specific area was considered attractive for settlement to pre-contact period inhabitants of the region for many hundreds of years is easy to understand. It has southern exposure, sandy matrix, slow moving river current for easy navigation of watercraft, good vantage up and down the river, several nearby sources of fresh water, proximity of several good salmon fisheries, and an abundance and diversity of terrestrial plant and animal resources in adjacent and nearby Port Hammond, Pitt Meadows, Barnston Island and Walnut Grove localities.

Review of early recorded information, and our casual inspections of the entire area occupied by DhRp 17 clearly indicate that somewhere between 50 and 75% of it has been disturbed by road construction, and various other land-altering activities associated with residential and industrial developments. Intact cultural deposits appear to be most prevalent as deeply buried (i.e., below 1.0 m below ground surface) in small pockets to fairly large patches (e.g., 100 m^2). Previous extensive heavy equipment disturbance of originally intact cultural deposits within the kiln replacement project impact zone is estimated to have been about 70%.

Smith (1903:136) provided a brief description of the site as it existed in 1897. He wrote:

> At Port Hammond the main shell-heap is located on the alluvial ridge parallel to the north bank of the Fraser River, and is always within fifty feet of the stream, which in places has cut into the shell-layers. It extends along this ridge continuously for about half a mile downstream, beginning at the base of the gravel terrace through which a cut has been made for the Canadian Pacific Railway, and on which was located a burial

> mound. There are some oval shell-knolls on the most westerly part of the main shell-heap where it is low. There are also some such knolls on the natural ridge beyond. They occur at intervals of from perhaps a hundred to a hundred and fifty feet, and probably mark spaces where refuse was thrown between the ancient houses, or in close proximity to the doorways. It is possible, however, that they mark centers of habitation. Beyond the end of the ridge where the land is low there are a few low oval shell heaps, probably refuse from isolated houses. Back of the ridge along which the shell-heap extended, the land is low, and in some places was swampy before the making of dikes and ditches. It is said that in the rear of the shell-heap there was formerly a water-course, which extended from near its eastern end northwestward to Pitt Meadows, and farther on into Pitt River, this affording canoe communication from the rear of the village to the north, while the Fraser afforded connection with the east and west.

On the basis of illustrations of artifacts recovered from the Port Hammond site (Smith 1903, 1907), researchers have generally concluded that the site was occupied primarily during the Marpole phase (Burley 1980; McMillan and Nelson 1989; Mitchell 1990), although a Charles Culture or Mayne component may also be present at the site (R. Carlson 1970b; Leonard Ham, pers. com., 2001).

Douglas College obtained a carved bone club from a private collection from Maple Ridge that is believed to have come from the Port Hammond site. This artifact was radiocarbon dated to 1995±80 radiocarbon years BP (RIDDL-1142) (McMillan and Nelson 1989:216). This date places the artifact firmly within the Marpole phase (ca. 2500 - 1500/1100 BP). Prior to our monitoring project, this was the only radiometric age determination for the Port Hammond site.

The Kiln Replacement Project

The new kiln complex included three structural components: (1) a concrete apron that essentially occupied the same area as the former old kiln building; (2) an enclosed metal kiln building that occupies most of the previous old kiln apron; and (3) an open-sided metal cooling shed that occupies the northern end of the complex.

The old kiln to be replaced was constructed in the 1960s, and it consisted of a three-gabled building and associated "apron" (Figure 8:2). Removal of the concrete apron and excavation of the new kiln foundation with heavy equipment began in October, 2000. No cultural de

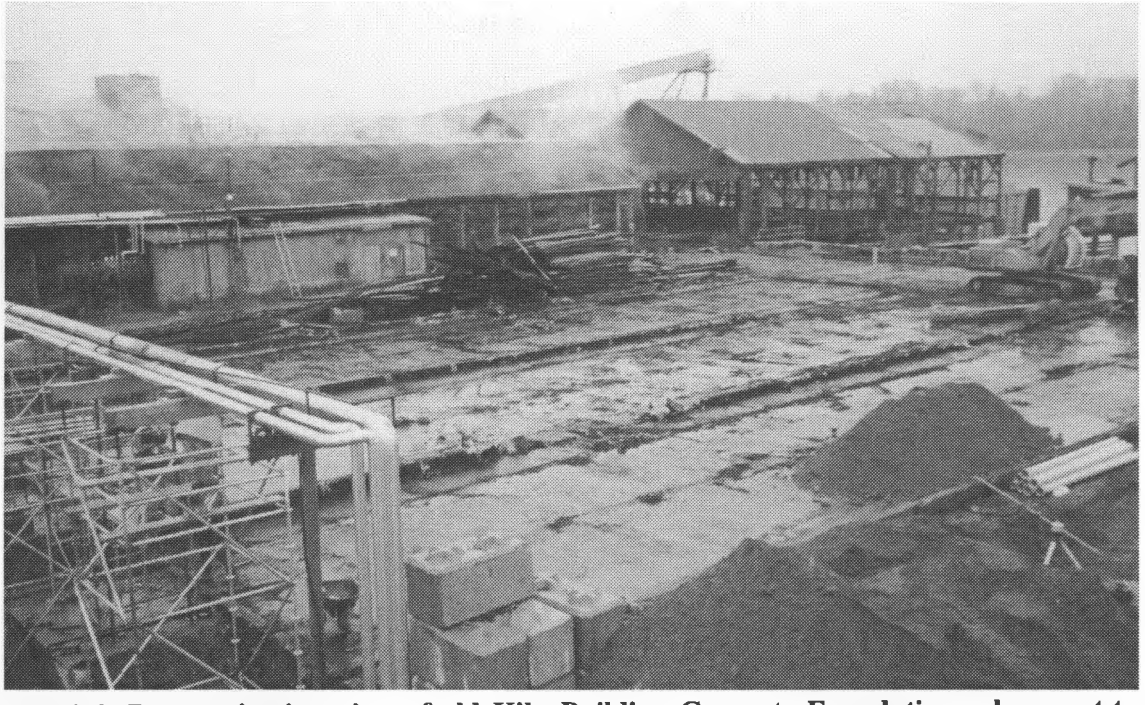

Figure 8:2. **Pre-monitoring view of old Kiln Building Concrete Foundation subsequent to removal of the Kiln Building, looking southeast. An identical building is in the upper left.**

posits were encountered beneath the old kiln apron. Demolition of the old three-gabled kiln building began in October, 2000, and involved total removal of the wooden structure. The 0.5 m-thick concrete slab supporting the old kiln was removed during December, 2000.

The new kiln apron was constructed in the same location as the old kiln. Removal of the sandy overburden beneath the concrete foundation slab exposed cultural deposits in the northern half of the new kiln apron (Figure 8:2) that had been previously disturbed during the construction of the old kiln in the 1960s.

Specific land-altering activities affecting the cultural deposits during the kiln replacement project included: (1) excavation of pipeline trenches along the southern, western, and northern peripheries of the new apron with a large backhoe; (2) removal of 0.5 to 1.0 m-thick sterile and cultural deposits from beneath the old kiln building foundation and old kiln apron with bulldozers and backhoes; (3) construction of a temporary road bed and pipeline right-of-way along the eastern edge of the new kiln apron with bulldozers and backhoe; and (4) heavy equipment traffic over the exposed cultural deposits during machine excavation.

The greatest and most severe impact to cultural deposits occurred in the northern half of the old kiln building foundation, which is now the new kiln apron (Figures 8:2 and 8:14). It is important to note that for the most part, only the uppermost 0.5 m to 1.0 m-thick culture-bearing deposits were removed from the new kiln apron impact zone. Additional cultural deposits lie below the maximum extent of machine excavation in the north half, and below the sterile sandy fill in the southern portion.

Monitoring Objectives

The objectives of the monitoring study conducted at the Port Hammond site were to:

(1) Determine the location and maximum depth of cultural deposits at the site through excavation of deep exploratory test trenches;

(2) Ensure that adverse impacts on significant archaeological deposits were limited and/or halted;

(3) Collect artifacts exposed on the ground surface during the land-altering construction activities;

(4) Ensure proper management of any significant archaeological remains encountered during the land-altering activities;

(5) Catalogue, describe, analyze, and interpret the data retrieved using standard recording and analytic techniques consistent with recent Gulf of Georgia Region archaeological analyses;

6) Prepare a descriptive final report that will present, discuss and interpret the results of the investigation and its significance.

All of these objectives were met in the course of the monitoring program described here.

Monitoring Methods

Monitoring occurred on various days between October 2000and February 2001, and entailed a systematic visual inspection of the entire disturbed ground surface and the displaced matrices. Excavation was halted several times to allow recovery of artifacts and evaluation of exposed stratigraphic deposits. Removed cultural deposits were piled beside the trenches using a backhoe, and were systematically subjected to hand and trowel sorting in order to visually identify and retrieve items.

Recovery methods used during the monitoring program were rudimentary. Throughout much of the impact zone removal of the previously existing yellow sandy fill exposed the top of the much darker cultural deposits. The machine operators were then asked to remove the underlying cultural deposits in 10 to 15 cm-thick levels. A systematic visual inspection of the disturbed matrices was done while the machine excavation was in progress. Subsequently, stockpiled cultural deposits were hand/trowel sorted by a large crew in order to keep an acceptable pace with the machine excavations. After the cultural deposits had been sorted, the backdirt was trucked to the Katzie Reserve and dumped in a landfill. These piles were water-screened using 1/4" (6 mm) mesh by two Katzie community members, who recovered the few items we had missed. While screening of all the matrices would have been preferred, it was simply not practical or possible. When significant items were observed *in situ*, their exact locations were recorded.

Of necessity the analyses focus on the detailed description and subsequent interpretation of the artifacts and features. The distributions and frequencies of various types of observed cultural and natural phenomenon were documented, and where possible, their function(s) and/or significance are inferred. Lithic artifacts are described using terminology considered standard for the Gulf of Georgia region (Mason 1994; Morrison 1997; Pratt 1993; Schaepe 2001; Sto:lo Nation and An-

tiquus Consulting Archaeologists Ltd. 1999). Faunal remains are identified to the most specific taxonomic category possible,.

Scattered human skeletal remains were recovered from several areas within the cultural deposits intersected by the impact zone. Basic data recorded include the elements represented, relative provenience, date of recovery, number of elements or element fragments, side and aspect, and comments regarding relative age, sex, degree of dental wear, etc.

Using the reference collections at Simon Fraser University the floral remains collected were identified to the most precise phylogenetic level possible. Floral remains from soil samples were floated, counted, measured and weighed according to standard palaeoethnobotanical methods. These analyses provide basic information regarding site activities, seasonality, and subsistence practices and are used to assist in the interpretation of features.

The cultural deposits encountered during monitoring were dated using both absolute and relative methods. Radiocarbon dating of a selection of organic samples from features in the site was used for absolute age determinations. Five radiocarbon samples (4 charcoal, 1 bone) from various sections of the impact zone cultural deposits were submitted to Beta Analytic Inc. for radiocarbon age determinations. These five dates range between about 1500 and 2000 years BP, and indicate that this part of site DhRp 17 was occupied during the latter part of the Marpole phase.

An additional test of the relative age of the cultural deposits in the impact zone at DhRp 17 involved selection and comparison of temporally diagnostic artifact types from the assemblage. These included specific forms of bifacial projectile points, hand mauls, bone and antler points and harpoons, and decorative items (Burley 1980; Mitchell 1990). A typical Marpole phase age was indicated.

Four obsidian flakes were sent to the Department of Chemistry at Simon Fraser University for source analysis by XRF conducted by Malcolm James. Two sources were identified. and procedures and results of the analysis are presented in Antiquus (2001).

Monitoring Results and Interpretation

This section presents interpretations and inferences about the general nature, chronology, duration, and frequency of past human activities that took place within the project zone at site DhRp 17. Several researchers have contributed to the information and interpretations presented here. The reader should note that we do not provide a definitive account of every activity represented in this part of the site. Rather, a general reconstruction of the more obvious behaviors are offered.

Lithic Tool Manufacture, Use, Maintenance

A total of 1396 lithic artifacts were recovered during monitoring. Of these, 441 are complete. Artifacts and waste recovered from the investigated portion of DhRp 17 allow a number of important activities associated with stone tool manufacture, use, and maintenance to be inferred (Table 8:1). This assemblage of items is similar to that found by Smith in 1898.

Low frequency of direct evidence for chipped stone tool manufacture (e.g., core fragments, debitage, hammerstones, etc.) indicates little stone tool manufacture in this portion of the site. Very low frequency of waste flakes (n=23) recovered supports this inference. Presence of several bipolar cores indicates that this simple reduction technique was favoured for production of medium-sized and small flakes (2 to 4 cm max. dimension), useful as cutting, scraping, and shaving tools in food procurement and preparation, production of textiles, and manufacture of ceremonial and decorative items.

A fair number of complete and fragmented projectile points were found (Figures 8:3 to 8:5). Many of these were made from extra-local basalts and exotic crystalline and cryptocrystalline silicates. These points indicate hunting activities. The paucity of debitage in the sample suggests that projectile points were made elsewhere at the site, or perhaps were imported through trade.

The surprisingly large sample of complete and fragmented ground nephrite celts/adze blades (Figure 8:7) supports the hypothesis that this part of the site was used mainly for work with adzes in woodworking (i.e. houses, canoes, carving, debarking, etc.). Most of the celts were relatively small, and were clearly exhausted "slugs" that were discarded at the end of their use-life. Several examples were burned as indicated by white or cream coloured exteriors, thermal crazing and cracking, and pot-lid spalling. Nephrite for these celts was most likely obtained from the Lillooet and Bridge River localities in the Mid-Fraser River region (Darwent 1998) through exchange systems operating between the Mid- and Lower Fraser River regions. Whether the nephrite celts arrived as unfinished blanks, or as completed celts remains to be determined. Initially, they would have been considerably longer and per-

Table 8:1. Summary of Lithic Artifact Frequencies Grouped by Inferred Activity.

MANUFACTURING TOOLS/PREFORMS	
Artifact Type	**Frequency**
Abrader	32
Abrader /Saw	5
Abrader fragment	106
Anvil stone/Abrader	2
Anvil stone	19
Anvil stone fragment	1
Bipolar core	76
Core	11
Graver	2
Hammer stone	16
Hammer stone fragment	1
Microblade core	5
Microblade	3
Perforator	6
TOTAL	285
Percent of assemblage	20.4%
Total complete artifacts	177
Percent of complete artifact assemblage	40.1%
WOODWORKING TOOLS	
Celts and fragments	27
Celt fragments	31
Chisel	3
Formed biface – drill	1
Hand maul, nipple-topped	1
Hand maul fragments	10
Wedge	12
TOTAL	85
Percent of assemblage	6.1%
Total complete artifacts	44
Percent of complete artifact assemblage	10.0%
FIBER PROCESSING	
Bifacially retouched flake	3
Unifacial retouched flake	17
Flaked pebble tool	3
Formed biface - scraper/knife	3
Ground awl fragment	1
Notched scraper	1
Utilized flake	74
Utilized slate	5
TOTAL	107
Percent of assemblage	7.7%
Total complete artifacts	106
Percent of complete artifact assemblage	24.0%
HUNTING	
Formed biface - projectile point	44
Formed biface - projectile point fragment	22
TOTAL	66
Percent of assemblage	4.7%
Total complete artifacts	44
Percent of complete artifact assemblage	10.0%

CEREMONIAL/DECORATIVE	
Artifact Type	**Frequency**
Art fragment	3
Bead, disc	1
Bowl	1
Pestle fragment	1
Pendent, argillite	1
Pipe fragment	4
Carved steatite	1
Red Ochre	5
TOTAL	17
Percent of assemblage	1.2%
Total complete artifacts	8
Percent of complete artifact assemblage	1.8%
FISHING	
Fish net weight	7
Ground stone/net gauge	1
TOTAL	8
Percent of assemblage	0.5%
Total complete artifacts	8
Percent of complete artifact assemblage	1.8%
HARPOONING	
Ground slate point	9
Ground point fragment	6
TOTAL	15
Percent of assemblage	1.1%
Total complete artifacts	9
Percent of complete artifact assemblage	2.0%
FOOD PROCESSING	
Ground slate knife	3
Ground slate knife fragment	699
Knife	20
Knife fragment	25
Utilized cortex spall	5
TOTAL	752
Percent of assemblage	53.9%
Total complete artifacts	28
Percent of complete artifact assemblage	6.3%
UNKNOWN FUNCTION	
Ground stone / pebble	9
Quartz crystal	3
Whatzit	2
TOTAL	19
Percent of assemblage	1.4%
Total complete artifacts	17
Percent of complete artifact assemblage	3.9%
DETRITUS	
Flakes	23
Block shatter	6
Mica flake	2
Quartz flake	3
TOTAL	39
Percent of assemblage	2.8%

haps somewhat wider than the exhausted specimens we secured.

A nearly complete pecked nipple-top hand maul, and 10 hand maul fragments (Figure 8:8) can be directly related to woodworking and construction activities (e.g., splitting cedar planks with antler, bone and stone wedges; pounding stakes in the ground; carving and maintaining canoes; and manufacture and carving of a variety of other utilitarian and decorative wooden items). Undoubtedly these "all purpose" hammers functioned in other capacities (e.g., cracking nuts, opening mollusks, etc.), although these were likely of lesser importance. Lithic raw materials used to make the hand mauls were probably obtained locally from fluvial or littoral cobble deposits. Mauls could have been made at the site, although they may have been imported from elsewhere.

About 700 ground slate knife fragments were recovered; some are shown in Figure 8:9. The number of fragments indicates that cutting activities were commonly undertaken in this part of the site, and knives were frequently broken and discarded. They were probably primarily engaged in fish and animal flesh processing (i.e., cleaning, butchering, flensing, etc.). Several researchers who examined the sub-assemblage of slate knives we recovered remarked that many were noticeably thicker than those found in earlier Marpole phase occupations in the Lower Fraser Region.

Complete and fragmented sandstone slab abraders are well represented in the sample (Figure 8:10), indicating that manufacture and resharpening of slate knives, and possibly production and maintenance of bone and antler artifacts, were common activities. Concreted sandstone of varying abrasive grits is available in many locations throughout the Lower Fraser River region, and could have been obtained during visits to specific source locations while undertaking other subsistence tasks, or through informal local trade systems.

Fewer than 100 unmodified utilized flake tools and unifacially-retouched flakes were recovered. Most of these would have been involved in simple cutting, scraping, or shaving tasks related to subsistence and textile (e.g., baskets and mats) manufacture and maintenance. Flakes were probably made by a bipolar reduction technique, as suggested by the recovery of a fair number of bipolar cores, although a lesser number were struck from larger multidirectional cores.

A variety of other task-specific and/or rare stone tools (i.e., a nephrite chisel, a graver, perforators, microblades, whatzits, fish net weights, a net gauge, pipe fragments, an argillite pendant, etc.) (Figure 8:13), were also found in low frequencies. This presence suggests that this part of DhRp 17 was used for a period of time as a residential focus, a fact supported by observed house floor deposits.

Thousands of "boiling stones" or thermally altered large pebbles and small cobbles were observed in the northeastern aspect of the impact zone. Two randomly selected samples indicate that all displayed evidence of having been subjected to intense heat (i.e., discolouration, crazing, cracking, fracturing, pot lid spalling). Most of these stones were granodiorite, granite, quartzite and siltstone, all of which can be obtained locally from glacial and fluvial gravel and cobble exposures. A number of activities can be inferred from the boiling stones, including: boiling marine mollusks, fish, meat and plant foods; construction of cobble lined hearth beds to prolong residential or outdoor warmth and/or to smoke/heat-dry fish and meat; manufacturing canoe hulls; steaming wood, branches and withes for textile manufacture; and possibly for sweat-lodges. That thousands of these cobbles were found in the northeastern part of the impact zone suggests that they may have been used primarily in this part of the site, but more probably, they were transported from elsewhere and discarded along with other refuse to create Hearth Refuse Dump Feature # 1 (see below).

Lithic raw material types represented in the assemblage indicate origins from both local and extra local sources. The basalts with fine-grained to coarse-grained groundmasses were probably obtained locally from glacial drift and fluvial gravel deposits. Vitreous and fine-grained basalts may have originated from the well-known and abundant sources in the Cache Creek locality in the Thompson River region, having been introduced by formally organized and casual exchange (trade) systems operating in the Fraser River drainage between interior and coastal Salish groups.

The various "exotic" cryptocrystalline silicates in the chipped stone tool sub-assemblage probably originated from local and extra-local sources. There are numerous sources of flakeable silicate stone in the Mid-Fraser River region, and some may have been obtained directly from these sources through exchange, or from local riverine fluvial gravel and cobble deposits. Some form of interaction with various groups to the south in Washington and Oregon and to the north around Garibaldi (Reimer, this vol.) is indicated by the presence of obsidian flakes found in the monitoring

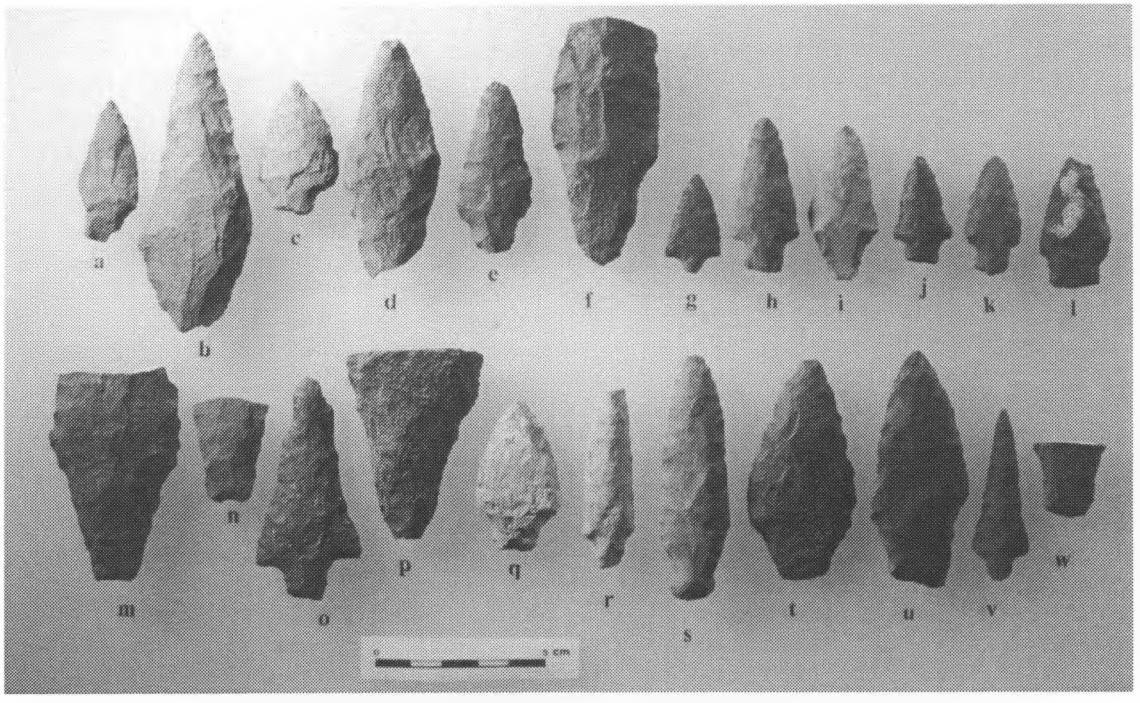

Figure 8:3. **Formed Bifaces and Projectile Points. Item (a): DhRp 17:4; (b): 71; (c): 90; (d): 299; (e): 338; (f): 344; (g): 346; (h): 502; (i): 608; (j): 617; (k): 911; (l): 938; (m): 939; (n): 969; (o): 983; (p): 1007: (q): 1047; (r): 1062; (s): 1097; (t): 1113; (u): 1153; (v): 1226; (w): 1292.**

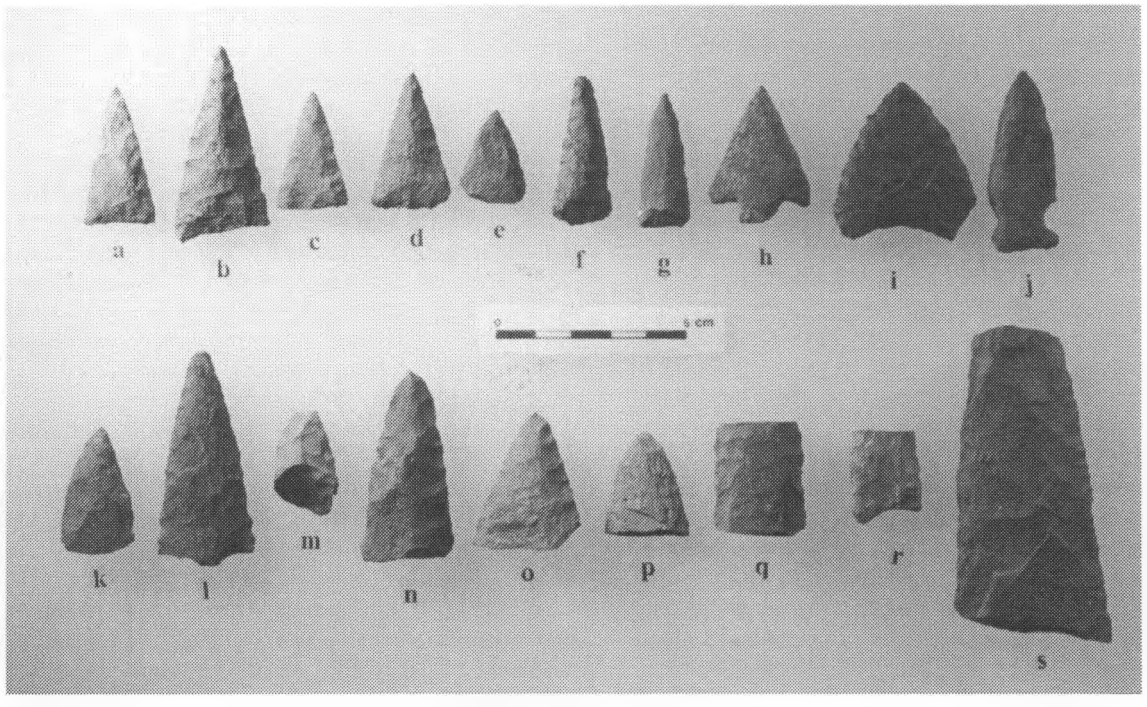

Figure 8:4. **Formed Bifaces and Projectile Points. Item (a): DhRp 17:1; (b): 3; (c): 534; (d): 948; (e): 1150; (f): 1206; (g): 212; (h): 95; (i): 986; (j): 1211; (k): 96; (l): 1299; (m): 567; (n): 715; (o): 220; (p): 1324; (q): 5; (r): 629; (s): 869.**

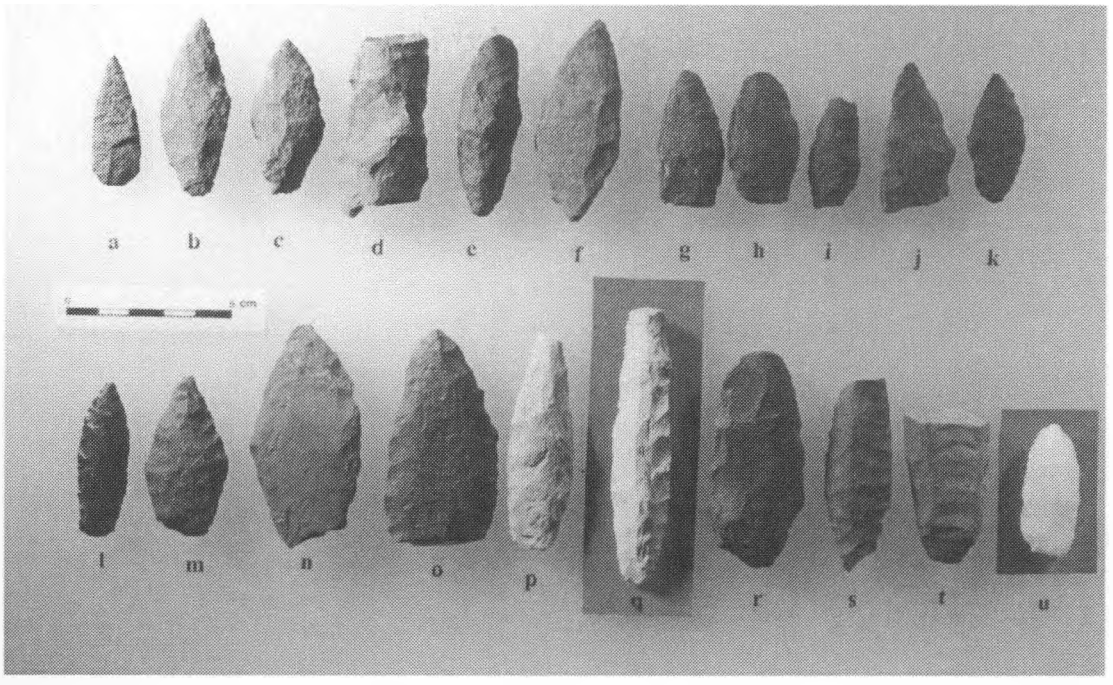

Figure 8:5. **Formed Bifaces and Projectile Points. Item (a): DhRp 17:2; (b): 91; (c): 93; (d): 94; (e): 229; (f): 305; (g): 335; (h): 375; (i): 393; (j): 543; (k): 593; (l): 643; (m): 649; (n): 791; (o): 831; (p): 932; (q): 1037; (r): 1038; (s): 1200; (t): 1266; (u): 1294.**

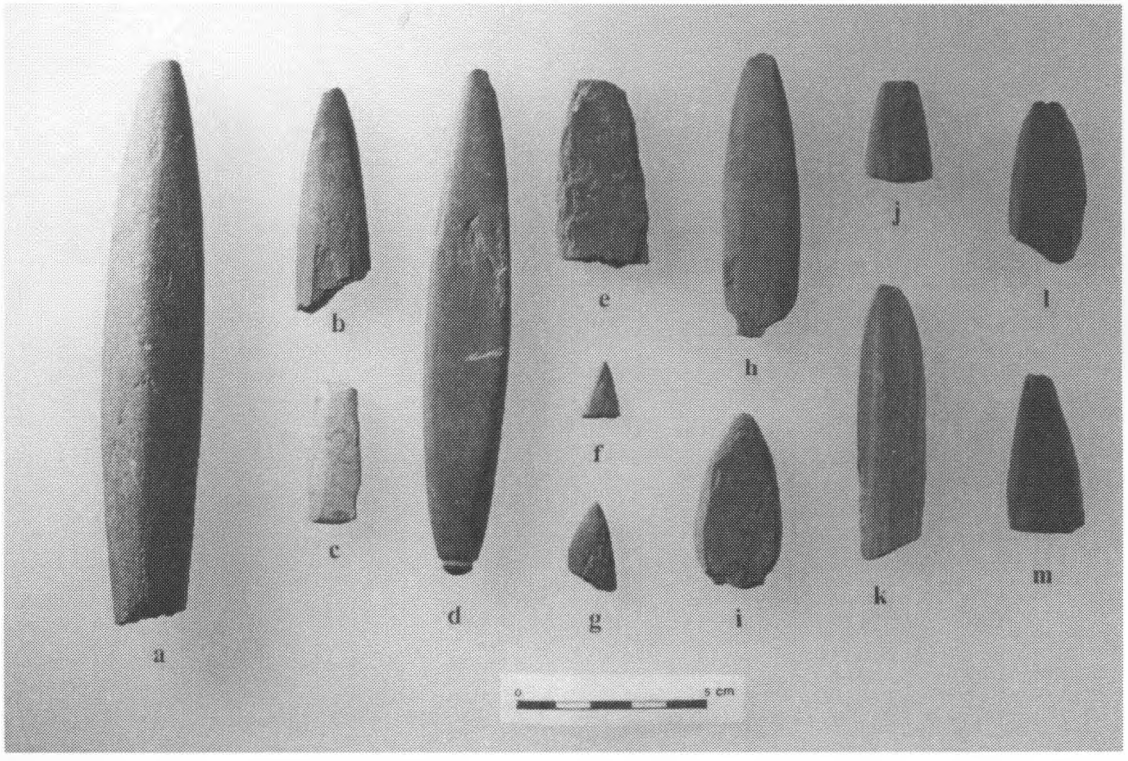

Figure 8:6. **Ground Points and Knives. Item (a): DhRp 17:242; (b): 419; (c): 535; (d): 599; (e): 647; (f): 663; (g): 713; (h): 792; (i): 982; (j): 1003; (k): 1154; (l): 1189; (m): 1277.**

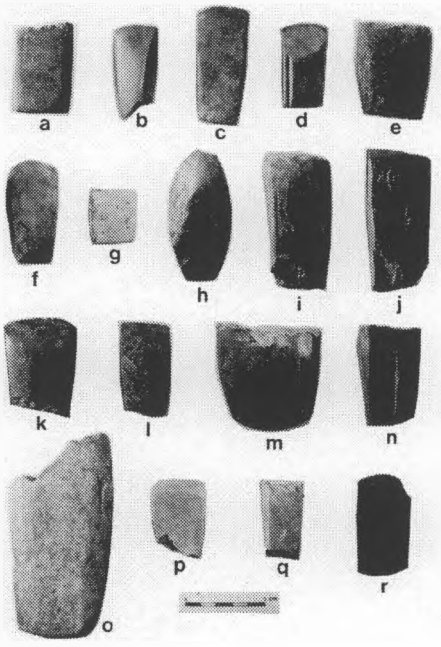

Figure 8:7. **Selected Celts and Celt Slugs. Item (a): DhRp 17:13; (b): 14; (c): 171; (d): 215; (e): 231; (f): 385; (g): 392; (h): 1105; (i): 1141; (j): 963; (k): 968; (l): 964; (m): 985; (n): 1090; (o): 397; (p): 773; (q): 808; (r): 950.**

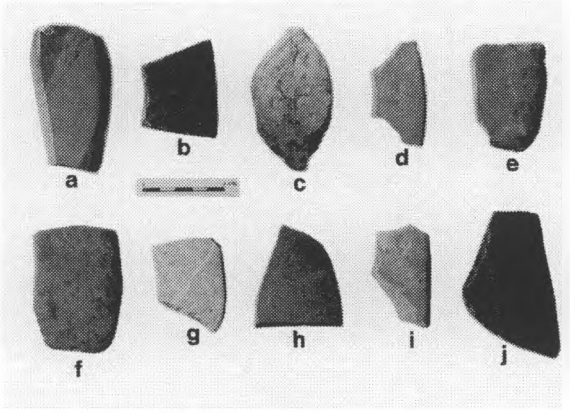

Figure 8:9. **Selected fragmented Ground Slate Knives. Item (a): DhRp 17:441; (b): 455; (c): 805; (d): 837; (e): 945; (f): 976; (g): 17; (h): 72; (i): 18; (j): 98.**

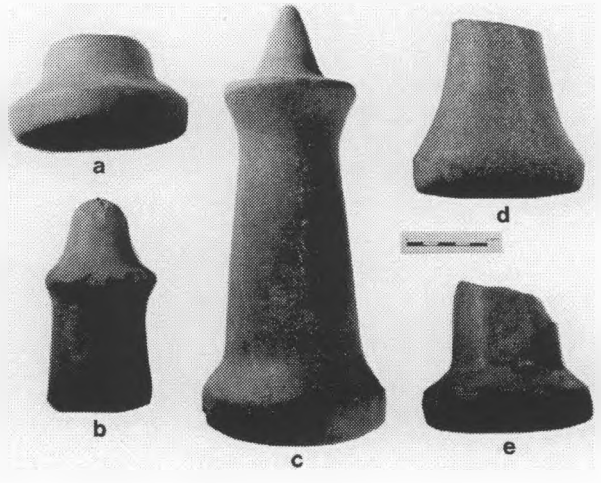

Figure 8:8. **Selected fragmented Hand Mauls. Item (a): DhRp 17:8; (b): 803; (c): 1060; (d): 133; (e): 1257.**

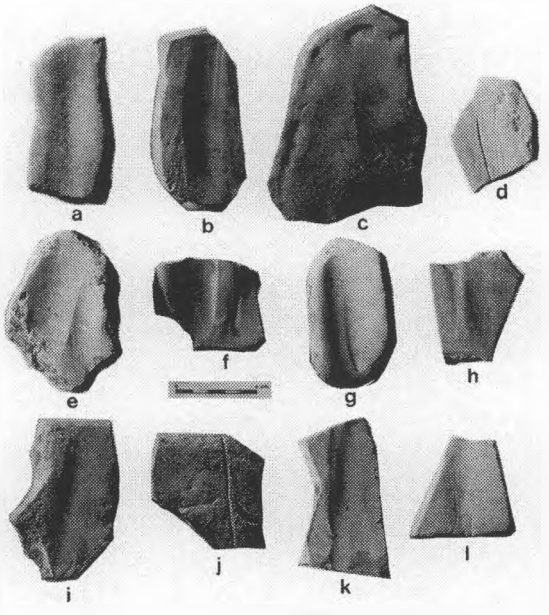

Figure 8:10. **Selected Sandstone Abraders. Item (a): DhRp 17:993; (b): 1094; (c): 1293; (d): 173; (e): 175; (f): 285; (g): 788; (h): 876; (i): 1183; (j): 1203; (k): 336; (l): 806.**

sample. Small quartz crystals, both modified and unmodified, may have been found locally. At least two specimens are made from "Hozameen Chert" found at the north end of Ross Lake along the northern border of Washington south of Hope (Mierendorf 1987a, 1987b; Rousseau 1988), and a biface made from a distinctive reddish-brown chert originating from the Chilliwack River valley near Chilliwack was also recovered (Schaepe 1994; Sto:lo Nation and Antiquus Archaeological Consultants Ltd. 1999).

Faunal Artifact Manufacture, Use, and Maintenance

About 130 bone and antler artifacts were recovered during the monitoring program, representing a number of tool classes and functions. Selected items are shown in Figures 8:11 to 8:13. This sub-assemblage is similar to that found in other Marpole phase components in the Gulf of Georgia region (e.g., Burley 1980, 1989; Carlson 1960, 1970; Matson and Coupland 1995; Mitchell 1971, 1990).

The presence of a fair number of these items in this part of the site suggests that perhaps some were being manufactured there, but there is more evidence to suggest that they were mostly being used, maintained, and discarded when exhausted or broken. The bone and antler tools may have been produced elsewhere at the site, or could have been imported from other villages along the Fraser River. Numerous sandstone abraders were found, particularly those with deep concave surfaces and obvious wide smooth linear grooves (Figure 8:10). These were used to polish, resharpen, maintain, or repair bone and antler tools. Function-specific bone and antler artifacts such as barbed and unbarbed points and harpoons are strong evidence for fishing and hunting (Figures 8:11 and 8:12).

Slender unbarbed points, needles, and awls all suggest working textiles (e.g., basketry and clothing manufacture, etc.). Complete and fragmented antler wedges were well represented in the recovered assemblage, and these are commonly associated with woodworking tasks, particularly splitting cedar planks.

A small number of ceremonial and/or personal decorative items made from bone and antler were found, including two finely carved pendants, a large fragmented carved ring that may have been a gorget worn on a cord around the neck, and a four-holed "whatzit" (Figure 8:13). The latter differs from similar illustrated rectangular whatzits (Dahm 1994:48-49; Duff 1955:49) in that it has four or more holes, rather than only two. These items may have been made and worn/used at the site, having been accidentally lost or intentionally discarded after use. A medial frag-

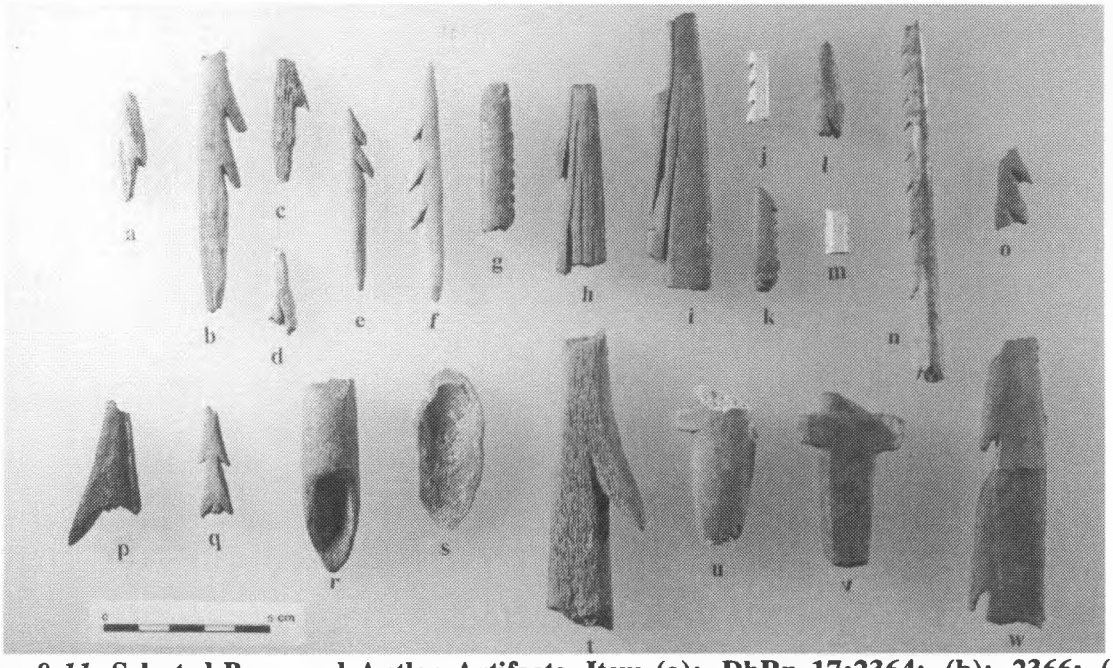

Figure 8:11. **Selected Bone and Antler Artifacts. Item (a): DhRp 17:2364; (b): 2366; (c): 2369; (d): 2391; (e): 2400; (f): 2416; (g): 2418; (h): 2438; (i): 2471; (j): 2455; (k): 2458; (l): 1367; (m): 2473; (n): 2475; (o): 2500; (p): 1114; (q): 2390; (r): 2472; (s): 2384; (t): 2448; (u): 2467; (v): 2468; (w): 2443.**

ment of a unilateral bone harpoon exhibits a decorative motif consisting of parallel lines and ticks (Figure 8:11w) that was likely inscribed with a simple flake tool or graver.

Three complete antler wedges and fourteen antler wedge fragments were identified in the sub-assemblage. Some are shown in Figures 8:12. Harlan Smith (1903:161) found 26 wedges at Port Hammond during his investigations there in 1897 and 1898, further attesting to the importance of woodworking activities at the site. Two complete and three fragmentary bone and antler chisels or basketry plaiting tools were recovered (Figures 8:12k-o). One end of each of these artifacts is beveled from two sides to create a sharpened chisel. This type of tool could also have been used in basketry or net production activities. Two notched bone tools were found (Figure 8:12i,j) that may also have functioned in basketry or textile manufacture.

The sub-assemblage includes seven awls and awl fragments. Twelve single points of bone and antler were also recovered. These artifacts show a range in size from small arrow-sized points to larger spear-sized points. Three of these uni-points are calcined and another is burned. Three bone and antler bi-points were found; two may have armed composite toggling harpoon heads.

The faunal artifact sub-assemblage includes fifteen unilaterally barbed fixed bone and antler points and point fragments. These artifacts (Figure 8:11a-k, m-o) are arrow point to large spear or harpoon size, and have from one to nine formed barbs. Two specimens are calcined and two others are complete. One bilaterally barbed bone or antler fixed point fragment was also recovered (Figure 8:11q). It is a medial section of a point with four intact barb, similar in form to three specimens found by Smith (1903:152) at Port Hammond.

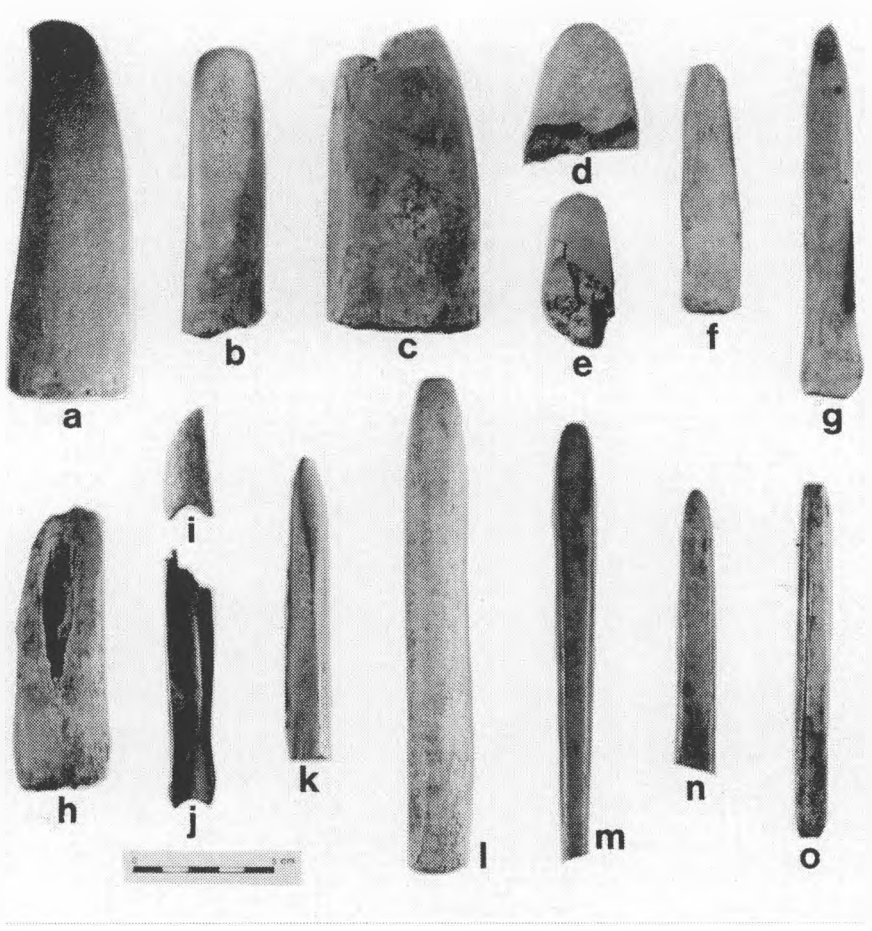

Figure 8:12. **Selected Antler and Bone Artifacts. Item (a): DhRp 17:2368; (b): 2470; (c): 2399; (d): 2383; (e): 2402; (f): 2449; (g): 2450; (h): 2465; (i): 2425; (j): 2502; (k): 2406; (l): 2415; (m): 2372; (n): 2444; (o): 2375.**

Six fragments of fixed, unilaterally barbed harpoon points were found during excavation. These include two antler harpoon point bases, with tang and one or two line guards (Figure 8:11u-v). A medial antler harpoon section with one large barb preserved (Figure 8:11t), and a black coloured antler harpoon tip fragment (Figure 8:11p) are also represented. Perhaps most interesting are two medial fragments of a large antler fixed harpoon with two preserved unilateral barbs and a geometric line design carved on the surface of both fragments (Figure 8:11w and Art.# 2489 [not pictured]). A harpoon point also bearing incised geometric designs was found at Port Hammond by Smith (1903:182), although the design is slightly different than on the more recently recovered specimen. These artifacts are typical of the Marpole phase in the Gulf of Georgia region, and at DhRp 17 they may have been used primarily to hunt sturgeon (Roy Carlson, pers. com., 2001).

One antler single-valve toggling harpoon head is missinf its distal section (Figure 8:11r). The preserved portion includes the medial section and a single, large proximal barb with a short closed socket in the base for the attachment of the foreshaft. Due to its fragmentary nature, whether this specimen was self-arming or armed with a bone or stone point cannot be determined. However, it most closely resembles Borden's (1970:98) "type B" toggling harpoon head, with only one barb and no hole or groove for a retrieving line. This type of harpoon head was two-piece, with a slot for a cutting blade in the same plane as the barb. It is more typical of the Locarno Beach phase in the Gulf of Georgia region.

Finally, one large and heavily weathered composite toggling harpoon valve was found. This artifact (Figure 8:11s) is wider than the more common toggling valves and may have been designed to accommodate an arming point larger than the majority of most points.

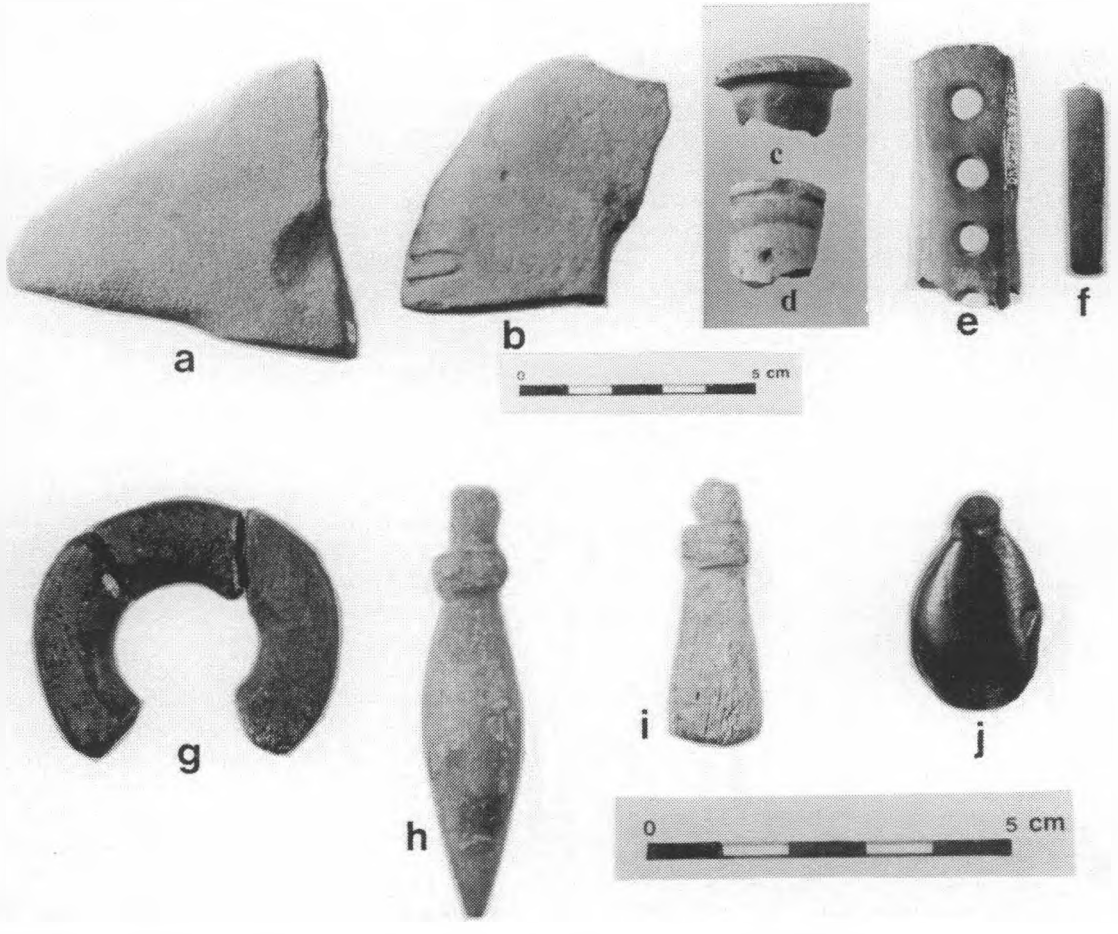

Figure 8:13. **Selected Miscellaneous Stone, Antler, and Bone Artifacts. Item (a): DhRp 17:363; (b): 260; (c): 273; (d): 274; (e): 2373; (f): 262; (g): 2370; (h): 2457; (i): 2495; (j): 1385.**

It is also worth mentioning that a finely carved whalebone club handle was recovered from the Port Hammond site by a collector and donated to Douglas College (McMillan and Nelson 1989). The base of the handle is carved to represent a whale's tail with two human figures in profile forming the flukes. The shaft is broken at the edge of what would have been the grip area of the club. McMillan and Nelson describe this specimen in detail and obtained an AMS radiocarbon date from the artifact of 1995±80 BP (RIDDL-1142). This date is coeval with the earlier dates from the kiln apron impact zone (Table 8:5).

Hunting, Fishing, and Gathering

The artifact assemblage provides ample evidence for hunting, fishing, and food gathering. The actual faunal remains of animal species exploited are additional evidence for these activities. The number of elements and list of species represented are fairly exhaustive, and indicate a very wide variety of species were specifically targeted or casually harvested during other subsistence-related forays away from the village site. Most of the animals represented in the recovered assemblage indicate a heavy reliance on terrestrial and riverine species that would have been locally available during occupation of the site. The exceptions are several species of marine mollusks and herring, commodities that were obtained further to the west on the Pacific Coast.

Numerous artifacts in the assemblage can be related directly to hunting and fishing activities. They include: chipped stone projectile points; numerous ground slate and flaked bifacial knives; flattened cobble net weights; a fish net gauge; unilaterally barbed fixed bone and antler points and harpoons; and elements of a toggling harpoon.

The faunal assemblage recovered during monitoring includes 5048 bone, antler and shell specimens with a total weight of 9,641 grams (Tables 8:2 and 8:3). Of these, 1,992 (7,556.6 g) were identifiable to at least the class level and the remaining 3056 (2084.4 g) were unidentifiable. The majority of recovered faunal remains (87%) are not burned, while a small percentage are burned or calcined (13%). When bone weights are considered, the predominance of unburned bone is further increased (98%). It was possible to identify six specific taxa (deer, bald eagle, duck, salmon, and eulachon) with either burned or calcined elements. The remainder of burned and calcined specimens was either unidentified or identifiable only to the class level.

Table 8:2. Summary of absolute and relative NISP and Weight Frequencies for each Class (or group of classes) of pre-contact period identified Faunal Remains.

Class(es)	NISP	f	Weight (g)	f
Mammalia	870	44.8	5014.9	91.5
Aves (birds)	211	10.9	191.4	3.5
Osteichthyes (bony fish)	726	37.4	135.0	2.5
Invertebrates	135	6.9	136.6	2.5
Total	**1942**	**100.0**	**5477.9**	**100.0**

Good evidence is present in the assemblage for human processing of sea mammal, artiodactyl, and bird remains. The following taxa displayed evidence of cutmarks or percussion impact scars on various bone elements: harbour seal (femur), elk (humerus, magnum), deer (scapula), and bald eagle (carpometacarpus, ulna). Dogs are unlikely to have been butchered (although the possibility exists) and some rodents may be intrusive in site deposits.

Carnivore chewing damage was identified on elements of three taxa: harbour seal (femur), *Canis* sp. (scapula), and Canada goose (humerus). Among identified (to at least order) taxa, rodent gnawing damage was evident on *Canis* sp. (femur) and elk (antler tine) elements. The specific effects of these taphonomic processes on the composition of the faunal assemblage are unknown, but appear to be relatively minor.

The most predominant class of faunal remains is Mammalia (45% of pre-contact identified fauna, by NISP). This figure would be increased further if the faunal artifacts (n=133), made almost exclusively of land mammal bone, were included in the total. However, the proportion of fish in the assemblage would significantly increase if both eulachon and herring were recovered in a representative manner. Based upon the abundance of eulachon and herring in the matrix samples, these two taxa are vastly under-represented among identified fauna at DhRp 17.

The sample of pre-contact faunal remains recovered from the impact zone indicated that dog is most common among identified mammals followed by elk and deer. Domestication of dogs was a common practice for all Salish groups, and the archaeological record from the interior and coastal regions of B.C. suggests that from 2000 to 1500 years BP, stocky, medium-sized dogs resembling wolves, coyotes, and huskies (Crellin 1994

Table 8:3. NISP and MNI Values for all pre-contact identified Fauna (mammal, bird, fish, and invertebrate) recovered from DhRp 17.

Order	Taxon	Common name	NISP	% Mammal	%All taxa	MNI
Artiodactyla	*Odocoileus* sp.	Deer	28	3.22	1.44	2
	Cervus elaphus	Elk	36	4.14	1.85	3
	Cervidae	Elk, deer, moose	1	0.11	0.05	1
	Artiodactyl	Even-toed ungulate	28	3.22	1.44	1
	Med. Artiodactyls	Deer-sized artiodactyl	1	0.11	0.05	1
	Med-lrg. Artiodactyls	Deer-sized and larger	3	0.34	0.15	1
	Lrg. Artiodactyls	Larger than deer-sized	6	0.69	0.31	1
Carnivora	*Ursus americanus*	Black bear	3	0.34	0.15	1
	Ursus sp.	Bear	3	0.34	0.15	1
	Procyon lotor	Raccoon	1	0.11	0.05	1
	Lynx sp.	Lynx, bobcat	1	0.11	0.05	1
	Canis sp.	Dog, wolf, coyote	145	16.67	7.47	11
	Canidae	Fox, coyote, dog, wolf	2	0.23	0.10	1
	Carnivora	Carnivore	1	0.11	0.05	1
Rodentia	*Ondatra zibethicus*	Muskrat	1	0.11	0.05	1
	Castor canadensis	Beaver	4	0.46	0.21	1
	Rodentia	Rodent	1	0.11	0.05	1
Pinipedia	*Phoca vitulina*	Harbour seal	3	0.34	0.15	1
Miscellaneous	Ungulate	Hoofed mammal	3	0.34	0.15	1
	Lrg. Ungulate	Larger than deer-sized	1	0.11	0.05	1
	Mammal	Mammal	121	13.91	6.23	1
	Sml. Mammal	Smaller than dog	16	1.84	0.82	1
	Sml-med. Mammal	Deer-sized and smaller	49	5.63	2.52	1
	Med. Mammal	Dog to deer-sized	67	7.70	3.45	1
	Med-lrg. Mammal	Dog-sized and larger	289	33.22	14.88	1
	Lrg. Mammal	Larger than deer-sized	56	6.44	2.88	2
Total Mammal			**870**	**100.00**	**44.75**	**40**

Order	Taxon	Common name	NISP	% Bird	%All taxa	MNI
Anseriformes	*Branta canadensis*	Canada goose	2	0.95	0.10	1
	Anser caerulescens	Snow goose	11	5.21	0.57	4
	Anser sp.	Goose	4	1.90	0.21	2
	Anas sp.	Dabbling ducks	83	39.34	4.27	19
	Anatidae	Swans, geese, ducks	16	7.58	0.82	4
Charadriiformes	*Laurus* sp.	Gull	1	0.47	0.05	1
	Uria sp.	Murre	1	0.47	0.05	1
Ciconiiformes	*Ardea herodias*	Great blue heron	1	0.47	0.05	1
Falconiformes	*Haliaeetus leucocephalus*	Bald eagle	10	4.74	0.51	2
Galliformes	Tetraonida	Grouse	2	0.95	0.10	1
Miscellaneous	Aves or small. Mammal		59	27.96	3.04	1
	Aves	Bird	15	7.11	0.77	2
	Sml. Aves	Duck-sized and smaller	1	0.47	0.05	1
	Med-lrg. Aves	Duck-sized and larger	3	1.43	0.15	1
	Lrg. Aves	Larger than duck-sized	2	0.95	0.10	1
Total Bird			**211**	**100.00**	**10.84**	**42**

Table 8:3. NISP and MNI Values for all pre-contact identified Fauna (mammal, bird, fish, and invertebrate) recovered from DhRp 17 (cont'd).

Order	Taxon	Common name	NISP	% Fish	%All taxa	MNI
Acipenseriformes	*Acipenser* sp.	Sturgeon	54	7.44	2.78	1
Clupeiformes	*Clupea harengus pallasi*	Pacific herring	7	0.96	0.36	1
Cypriniformes	*Ptychocheilus oregonensis*	Northern pikeminnow	2	0.28	0.10	1
Pleuronectiformes	*Lepidopsetta bilineata*	Rock sole	3	0.41	0.15	1
Salmoniformes	*Oncorhyncus* sp.	Pacific salmon	571	78.65	29.40	1
	Salmo gairdneri	Rainbow trout	2	0.28	0.10	1
	Thaleichthys pacificus	Eulachon	48	6.61	2.47	1
Miscellaneous	Osteichthyes	Bony fishes	39	5.37	2.01	1
Total Fish			**726**	**100.00**	**37.37**	**8**
Class	**Taxon**	**Common name**	**NISP**	**% Invert.**	**%All taxa**	**MNI**
Gastropoda	Buccinidae/Muricidae/Nassariidae	Whelks	2	1.48	0.10	2
	Gastropoda	Univalves	4	2.96	0.21	1
Pelecypoda	*Clinocardium nuttallii*	Basket cockle	1	0.74	0.05	1
	Tresus sp.	Horse clam/gaper	3	2.22	0.15	2
	Mytilidae	Mussels	55	40.74	2.83	1
	Mactridae/Tellinidae/Veneridae	Clams	12	8.89	0.62	1
Maxillopoda	*Semibalanus cariosus*	Thatched barnacle	6	4.44	0.31	1
Miscellaneous	Mollusca	Mollusks	52	38.52	2.68	1
Total Invertebrate			**135**	**100.00**	**6.95**	**10**
Total Pre-Contact Identified Fauna			**1942**		**100.00**	**100**

Crellin and Heffner 2000; Crockford and Pye 1997) were most common. It is likely that similar dogs resided at DhRp 17.

Other than providing family companionship and protection, dogs were utilized in hunting, to pack commodities on subsistence forays, and to assist in disposal of unwanted domestic and butchering wastes. Additionally, ethnographic Coast Salish peoples kept a breed of small, white "wool" dog, the hair of which was woven into blankets (Schulting 1994). It is not known whether such dogs were present on the lower Fraser River during the Marpole phase.

Dogs would have also contributed significantly to disturbance of cultural deposits during pre-contact period times (particularly in the midden/dump deposits), and may have also contributed to the preservation of some faunal remains by burying and forgetting them in anaerobic matrix contexts. Some animal remains (e.g., salmon, mammals, birds, etc.) may be under-represented in the recovered faunal sample as a result of consumption by dogs. Indeed, there is direct evidence for canine gnawing on some specimens. We know of no direct evidence to suggest that dogs were consumed for food, and ethnographic accounts suggest they were not.

Specimens identified only as artiodactyls probably also represent predominantly elk (wapiti) and deer. Remaining terrestrial carnivores identified include black bear, raccoon, and lynx or bobcat. Identified rodents include beaver and muskrat. A single taxon of sea mammal, harbour seal, is also represented in the sub-assemblage. In addition, during his excavations at Port Hammond during 1897 and 1898, Smith (1903:140-141,161) found an unspecified number of bones from the following mammalian taxa: whale, dolphin, seal, bear, elk, moose, deer, mountain goat, beaver, otter, raccoon, skunk, dog, and bat. This indicates that sea mammals may have made a more significant contribution to the diet than the three recovered harbour seal elements would suggest. Of course, this is assuming the whale and dolphin remains represent subsistence activities rather than raw materials for artifact manufacture.

Bird remains recovered from the site compose 11% of pre-contact period identified fauna (by NISP), clearly of lesser subsistence importance than either mammals or fish. Ducks dominates bird remains. Geese are a distant second, and include snow goose as well as Canada goose. Other bird remains found in low frequency include bald eagle, grouse,

great blue heron, gull and a murre. Smith (1903:141) also found an unspecified number of cormorant and crow remains.

Pacific salmon (*Oncorhyncus* sp.) are clearly most predominant among the fish subassemblage (79% of total fish). Sturgeon is a distant second, followed closely by eulachon. Pacific herring, rock sole, northern pikeminnow, and rainbow trout complete the identified fish. The relative contribution of fish to the faunal assemblage is under-represented, due to very limited recovery of herring and eulachon elements. Despite the effects of this bias in the recovery of small fish bone, it appears unlikely that fish were more important to the diet than large mammals (deer, elk, bear, harbour seal), as these taxa represent proportionately much larger amounts of meat per skeletal element. A conservative assessment of relative subsistence importance would suggest (primarily terrestrial) mammals and fish made roughly equal contributions to the diet. Bird remains are clearly less abundant and made a smaller dietary contribution. It appears that the contribution of shellfish to subsistence was also secondary to mammals and fish, although with the data currently available this conclusion is more difficult to support.

The vast majority of shellfish remains encountered during excavations were highly fragmentary and mostly impossible to quantify. Based on the limited quantitative data and a qualitative assessment of the amount of highly crushed shell present in the impacted area of the site, shellfish appear to be a secondary food resource. Smith (1903:141) provides a description of shellfish remains recovered from the Port Hammond site in 1897 and 1898 that is very detailed for its time. Bivalves found in significant numbers at the site include butter clam, pacific littleneck, bay mussel, basket cockle, horse clam and bent-nose macoma. Native pacific oyster and giant pacific scallop were recovered in small numbers. Whelk were recovered in fair numbers, and barnacles and sea urchin were also found.

None of these shellfish species can be obtained in the immediate area of the Port Hammond site. It is necessary to travel at least 32 km to the mouth of the Fraser River, or elsewhere along the coast, to obtain these saltwater mollusks. Alternatively, the distance overland to the head of Burrard Inlet, the closest marine shellfish habitat, is about 15 km.

Pacific herring remains probably indicate fishing at the time of spawning in late winter or early spring, more specifically February to April with the heaviest concentrations in March (Hart 1973:97). Eulachon are available in the lower Fraser River during their spawning period from the middle of March to the middle of May (Hart 1973:149), indicating spring occupation of the site. Rock sole spawns between February and April and occurs in shallower water during the summer (Hart 1973:622). However, this species of flatfish is available in the Gulf of Georgia year round and occurs only in small numbers at DhRp 17, so cannot be considered a good indicator of seasonality. Salmon were present in the lower Fraser River in large numbers during spawning runs from late summer to late fall, and were likely harvested near DhRp 17 during this time of year. However, salmon are known to have been stored in large numbers for winter consumption (Cannon 1998; Carlson 1995; Eldridge and Acheson 1992; Matson 1992; Matson and Coupland 1995) making it less useful as an indicator of seasonality.

That the site was likely occupied in early fall for salmon harvesting and preservation, and again in early spring for herring and eulachon fishing suggests a continuous occupation through the winter at this large shell-midden site. There are few reasons for catching and preserving winter salmon supplies at one location, moving to another site for a short winter stay, only to return to the original location in early spring for the herring season (Cannon 1991:59). Presence of snow goose remains further supports winter occupation. Overall, the recovered faunal assemblage indicates continuous occupation of the site from early fall to mid-spring (September to April). No faunal data supports occupation during the summer months (June, July, and August), although the floral analysis results appear to suggest use of the site in spring and summer. If floral data are included and assumed to be reliable indicators of seasonality, then site occupation can be considered as year-round.

When the faunal assemblage is considered as a whole, marine subsistence resources (most fish, shellfish, and harbour seal) appear somewhat more important to overall diet than do terrestrial resources (land mammals and most birds). While this is not the marine-dominated diet suggested by Marpole phase faunal assemblage and stable carbon isotopic evidence from Crescent Beach (DgRr 1) and Beach Grove (DgRs 1) on Boundary Bay (Arcas Consulting Archaeologists 1996; Chisholm 1986: Appendix B; Matson 1992:395-408, 416), it is broadly similar to results reported for the Marpole component at Glenrose Cannery (DgRr 6) on the Fraser Delta. Matson

(1976, 1981) has concluded that the Marpole phase faunal assemblage from Glenrose is indicative of a fall-winter season of occupation, and so in this regard should be roughly comparable with Port Hammond. Indeed, when considering marine versus terrestrial resource use, the Glenrose faunal assemblage shows distinct similarities with the DhRp 17 results. The importance of elk, deer, bear, duck, and goose is also seen at Glenrose, as is the even greater contribution of bay mussel, salmon, herring, sturgeon and harbour seal to subsistence. The relative contributions to the diet are generally very similar between the two sites, although several minor differences are present. The most significant of these differences are the greater proportion of bay mussel and the absence of eulachon at Glenrose. The lesser importance of shellfish (primarily mussel) at Port Hammond appears logical, given the locations of the sites relative to the seacoast. The absence of eulachon from Glenrose may be the result of a sampling bias.

Burial of Deceased

Human skeletal remains were found scattered in several areas throughout the impacted cultural deposits. Most of the remains had been disturbed and altered primarily by post-contact period land-altering activities during the late 1950s and early 1960s. Some disturbance of human remains could have occurred accidentally during the pre-contact period while constructing house floor foundations, and fire and storage pits.

The disturbed remains do not allow any firm affirmation of the initial mode(s) of interment, such as whether they were originally extended, flexed, pronate, supinate, or disarticulated. None of the human remains were dated by ^{14}C assay, so it is difficult to confidently assign them specifically to the Marpole phase occupation, although it is very likely that they date between 2000 and 1500 years BP.

Scattered complete and fragmented human skeletal elements were recovered from various locations in the disturbed and intact cultural deposits within the new kiln apron impact zone. Preservation of the remains ranged from very poor to excellent, with cranial, mandibular, dental and longbone shaft fragments being the best preserved. Demographically, the sample consists of elements belonging to adults, adolescents and juveniles. Most of the major skeletal elements of the body are represented.

The recovered skeletal data could only be examined and described briefly in the lab. Recorded details are provided in Antiquus (2001). At the request of the Katzie First Nation, no photographs were taken. Mr. William Pierre, a spiritual leader for the Katzie community, conducted reburial ceremonies on several occasions during our fieldwork. The bones were reburied in a manner that ensured no further disturbance.

The presence of scattered human remains in the kiln impact zone at DhRp 17, and previous accounts of recovery of skulls and other remains at various times in the last 100 years, attest that human remains are probably quite common throughout most of this site. This is not uncommon for most major village sites in the Lower Fraser River and Gulf of Georgia regions (Ham 1982; Matson and Coupland 1995).

Floral Resource Harvesting

Analysis of matrix samples taken from a column sample, possible house-floor, and hearth feature at the Port Hammond site yielded a large number of botanical remains that were attributable to nine taxa, including six families. A total of 67 seeds were recovered from seven flotation samples (Table 8:4). These 67 seeds include nine identified species and four unidentified species. Results of this analysis indicate that both elderberry and *Rubus* (salmonberry, raspberry, blackberry, and thimbleberry) were important food plants during the Marpole phase at the site. Sedges (Cyperaceae) identified in the samples may have been used as materials for the manufacture of basketry, netting, mats, and/or textiles. Site seasonality cannot be inferred with great certainty. However, the presence of seeds from fruits that were normally eaten fresh appears to suggest occupation during the spring and summer. Seeds typically stored for winter use were not found.

Construction and Maintenance of Residential Structures and Canoes

The high incidence of woodworking tools attests to large-scale projects involving erection and maintenance of plank-houses, canoe construction, and other carving tasks (Figures 8:7 to 8:12; Table 8:1). Cedar and other major species of wood are ubiquitous in the Port Hammond locality, and would have been readily available in immediate proximity to DhRp 17. They would have been harvested with stone and antler tools and/or fire, and residential structural elements (e.g., support posts, planks) and canoe blanks transported to the site. Large trees could have also been har-

vested by canoe from the Fraser River as they passed downstream during spring runoff.

Pre-Contact Period Features

During this monitoring project two large pre-contact period features were encountered in the northeastern aspect of the new kiln apron impact zone (Figure 8:14). These included the remains of a large hearth/fire refuse dump area, and a small portion of the intact cultural deposits that had microstratigraphic superposed lenses of ash, charcoal, and shell that were interpreted to be associated with specific house floor levels and/or house-related activity events.

Hearth Refuse Dump Feature 1

A large hearth/fire refuse dump feature or area was observed to extend throughout the northeast aspect of the new kiln apron impact zone (Figure 8:14). It averaged about 20 to 25 cm thick, and sloped down northward to a depth of about 1.5 m below the old kiln foundation floor. The majority of the matrix was mainly characterized by a moderately compact, mucky dark black mixture of sand, silt, clay, charcoal, and decayed cultural materials with literally thousands of fire-altered pebbles and cobbles. Artifacts recovered from this area were primarily of stone, and noteworthy items include ground celts, ground slate knifes, projectile points, bipolar cores, abraders, perforator and hammer stones. A sample of large thermally altered pebbles and small cobbles in this feature were taken. It is obvious that they were being selected according to specific characteristics, and that they were imported to this part of the site from nearby beaches or river embankment exposures. Radiocarbon samples from this feature yielded dates of 1600±60 BP (Beta 153919) and 1560±60 BP (Beta 153917) (Table 8:5).

The large size of this feature and nature and condition of cultural materials found within and adjacent to it suggests that the northeast corner of the new kiln apron impact zone was once used for extensive woodworking activities, such as canoe making. Heatestones similar to those found at DhRp 17 are

Table 8:4. Raw data from the plant inventory. Note: cf. species compared to Montgomery 1977 and Schoch et al. 1988, as comparative samples were not available.

Area/ Sample Type	Sample Size (Liters) and Depth below Surface	Seeds	Charcoal Weight (g) 4.0/2.0mm	Charcoal Weight (g) 1.0/.425mm & Catchpan	Total Charcoal Weight (g)
Zone 6 Section 8/ Column sample	5-10 cm (1 L)	Unidentified A 1	0.83	9.99	10.82
	10-15 cm (1 L)	*Carex* 1, *Rubus* 3 *Sambucus* 6	0.98	10.99	11.97
	15-20 cm (1 L)	*Rubus* 7, *Sambucus* 17 Unidentified B1 Unidentified C 1	0.58	21.25	21.83
	20-25 cm (1 L)	*Sambucus* 6	0.76	7.07	7.83
	25-30 cm (1 L)	"Grass" 1, *Fragaria* 1 *Rubus* 5, *Sambucus* 4 *Scirpus* 2	0.96	3.19	4.15
Zone 6 Section 8/House floor	5-30 cm	*Chenopodium* 1 cf. *Eleocharis* 1 cf. *Polygonum* 1 *Sambucus* 6, Unidentified D1	3.54	11.68	15.22
Zone 7 Section 6/charcoal sample	40 cm (0.5 L)	*Sambucus* 1	**38.37**	**17.22**	55.59
TOTAL		**67**	**46.02**	**81.39**	**127.41**

Figure 8:14. **View of main impact zone showing location of Hearth Refuse Dump Feature # 1 (lower left). The crew is working over the area containing intact microstratigraphic sections of house floor deposits, looking south.**

known to have been used in steaming the interior of canoes as part of the manufacturing process. Outdoor cooking or warming fires may have also been constructed in this location, and very likely this is where most of the heating of the stones occurred. Undoubtedly, many stones were also used in houses to boil and steam food, and to line the bottoms of hearths to retain and radiate heat when inside fires were low. When their use-lives had been expended, they were discarded in this specific part of the site forming a sort of trash fill containing the contents of cleaned-out hearths, fire-altered rock, broken and lost tools, faunal remains, etc. The presence of virtually thousands of pebbles and cobbles suggests a long period of use and discard. This hearth/fire refuse dump feature is in close association with the house floors described below.

Intact House Floor Deposits

In several locations in the mid-central aspect of the new kiln apron impact zone we encountered pockets and patches of moderately disturbed to intact cultural deposits that displayed thin microstratigraphic layers and lenses of moderately compact overlapping layers of crushed shell, thin layers of charcoal, burnt clay and ash. These deposits are interpreted as portions of superposed house floors. This part of the impact zone also had a conspicuously high density of faunal remains and artifacts including basketry needles, harpoons, bone points, celts, ground slate knives, projectile points, abraders, and wedges. These floor deposits were subjected to some detailed data recovery (Antiquus 2001:62-63), but most were removed by backhoe with little attention to *in situ* recovery of items.

Relative and Absolute Dating

The cultural deposits encountered during monitoring were dated using both "absolute" and "relative" methods.

Relative Dating

Temporally diagnostic or "time marker" artifacts recovered from the cultural deposits in the new kiln impact zone display characteristics and traits considered to be most prevalent

or typical during the Marpole phase, which is currently estimated to have commenced around 2500 BP, and terminated ca. 1500 and 1100 BP (Matson and Coupland 1995). Notable items include nipple-topped hand mauls (Figure 8:11), various specific styles of stemmed and corner-notched projectile points and bifaces (Figures 8:3-8:5), and unilaterally barbed bone and antler harpoons and points (Figure 8:11). Radiocarbon dating results on bone and charcoal samples collected from the impact zone range in age from ca. 2000 to 1500 years BP.

While no direct convincing evidence for Locarno Beach phase (ca. 3500 to 2500 BP) occupations was identified within the impact zone, a component of this earlier cultural period may indeed lie beneath the deposits we investigated and below the current foundation of the new kiln apron.

Absolute Dating

Five radiocarbon samples submitted to Beta Analytic Inc. in Florida, produced age determinations ranging from about 2000 to 1500 years BP (Table 8:5). Standard radiometric analyses were performed on the samples. These five dates ranged between about 1500 and 2000 radiocarbon years BP, indicating that this part of DhRp 17 was occupied during the latter part of the Marpole phase which spanned from ca. 2500 to 1500/1100 years BP.

X-Ray Fluorescence Results

Four obsidian lithic waste flake samples recovered during our monitoring study were submitted to the Department of Chemistry, SFU to determine their probable sources. The results indicate that three samples originated from the Garibaldi Park source, and the fourth was from "Flow C" of the Glass Butte source in Oregon. The small number of obsidian flakes recovered from the kiln replacement impact zone at DhRp 17 indicates that this raw material was not particularly important to stone tool manufacture and use. Locally available raw materials were deemed suitable for performing the vast majority of tasks, and obsidian may have been considered more of a novelty and rarity, much like quartz crystals.

Concluding Remarks

These most recent archaeological investigations at Port Hammond provide an important comparative data set on Marpole phase culture. Recovered lithic and faunal artifacts indicate a wide variety of activities took place in this part of the site, most notably woodworking and food resource processing. Faunal and floral remains support feature and artifact data in indicating that DhRp 17 was a winter village during the Marpole period. Prehistoric inhabitants exploited a substantial number of food and raw material resources at this site, most of which were available locally, although long distance trade and coastal resource use are clearly evident. Seasonal occupation of this permanent village site likely spanned from at least September to April, although the paleoethnobotanical results suggest the possibility of summer habitation in some form. All recovered artifact, feature, and subsistence information along with five radiocarbon dates place the deposits firmly within the Marpole phase, although the possibility of earlier site

Table 8:5. Summary of Radiocarbon Sample Assay Age Determination Results.

Temporary Sample #	Permanent Lab No.	Sample Material	Provenience	Radiocarbon Age
DhRp 17-R1	Beta-153916	Elk bone Collagen	Trench 2; 20-30 m N; 1.0-1.5 m BS*	1900±70 BP
DhRp 17-R2	Beta-153917	Charcoal	N corner of Unit 1; Zone 7,Section 11, 10 cm BS*	1560±60 BP
DhRp 17-R3	Beta-153918	Charcoal	SE corner of Zone 6, Section 5; from large hearth at 20-25 cm BS*	1530±60 BP
DhRp 17-R4	Beta-153919	Charcoal	Zone 6, Section 8; Edge of Zone 6-7, 50 cm BS*; below dense ash lenses.	1600±60 BP
DhRp 17-R5	Beta-153920	Charcoal	Zone 8; Drainage Hole 1;Bottom of cultural deposits at about 1.0 m BS*	1910±80 BP

*BS = Below Surface (i.e., from the top of the dark culture-bearing deposits within the impact zone).

use exists in other site areas or in deeply buried deposits. Our data strongly support the inference that this site was a large permanent village with a riverine and terrestrial economy.

In our opinion, this monitoring study is an outstanding example of how a number of agencies can work collectively to resolve a direct adverse conflict existing between a major development and an important archaeological resource. That there was no impact assessment study conducted before the monitoring posed a problem, but the fieldwork was carried out in a manner that allowed all practical impediments or scheduling difficulties to be resolved with only minor inconvenience to any agency involved. Despite previous disturbance and coarse recovery methods, the data recovered permitted the foregoing general reconstruction of human behaviour in this part of the site.

Much of the remaining portions of DhRp 17 still have a high heritage value. Recovery and analysis of the data from the kiln replacement project impact zone has provided a good comparative Marpole phase artifact assemblage, a fair amount of information about faunal resources exploited, and a good sample of dog remains that could be subjected to further detailed study. Future systematic investigations of other undisturbed cultural deposits would undoubtedly provide a great deal more information about human behaviour and activities that transpired at this important site.