CHAPTER 7

The Bear Cove Fauna and the Subsistence History of Northwest Coast Maritime Culture

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Introduction

The excavation of the Bear Cove site (EeSu 8), a shell midden on the northeast end of Vancouver Island, produced a large and well-preserved sample of faunal remains. The excavation in 1978 was sponsored by the British Columbia Heritage Conservation Branch and was initiated to mitigate the impacts of a proposed ferry terminal development. The Fort Rupert Village Committee drafted a Band Council Resolution on March 9, 1978, that authorized the excavation of the site. Bear Cove is one of the few known sites on the British Columbia coast with an Early Period lithic and faunal component. At over 8000 years in age, it is the earliest C-14 dated site on Vancouver Island excavated to date. The primary purpose of this paper is to present the analysis and age of the Bear Cove faunal assemblage, and to discuss it within the context of the origins and development of maritime subsistence patterns on the Northwest Coast.

Bear Cove is located within the traditional territory of the Kwakwala (or southern Kwakiutl) peoples (Codere 1990) (Figure 7:1). The site is in a small cove in Hardy Bay across from the town of Port Hardy (Figure 7:2). It is just two kilometers east around Dillon point from the village of Fort Rupert in Beaver Harbour where Franz Boas conducted much of his ethnographic field work at the turn of the twentieth century (Boas 1909,1921,1934).

Although Boas spent little time documenting aspects of economic organization of interest to archaeology, such as seasonal settlement patterns or detailed resource utilization, he did map geographical place names illustrating resource use and ownership patterns of sites. No place name was recorded for the exact location of the Bear Cove site, although he (Boas 1934) did record a place on the southern shore of Bear Cove as "a place where chitons are cooked". Although two species of chitons were identified in the Bear Cove archaeological fauna, they represent less than one percent of the shellfish identified. Boas also recorded a place name slightly south of Bear Cove translated as "a place of origins" (Galois 1994), a name that is intriguing in that it supports the antiquity of the Bear Cove locality revealed by the radiocarbon dates and early lithic assemblage. Hebda's (1983) pollen and plant macro-fossil study of the Bear Cove Bog,

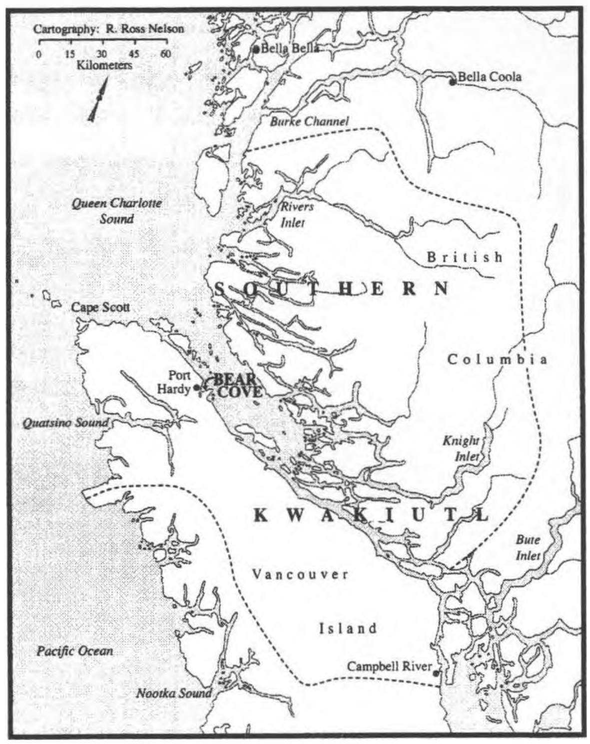

***Figure 7:1.* Map of the Central Coast of British Columbia showing Kwakiutl Territory and the Location of the Bear Cove site on the northern end of Vancouver Island.**

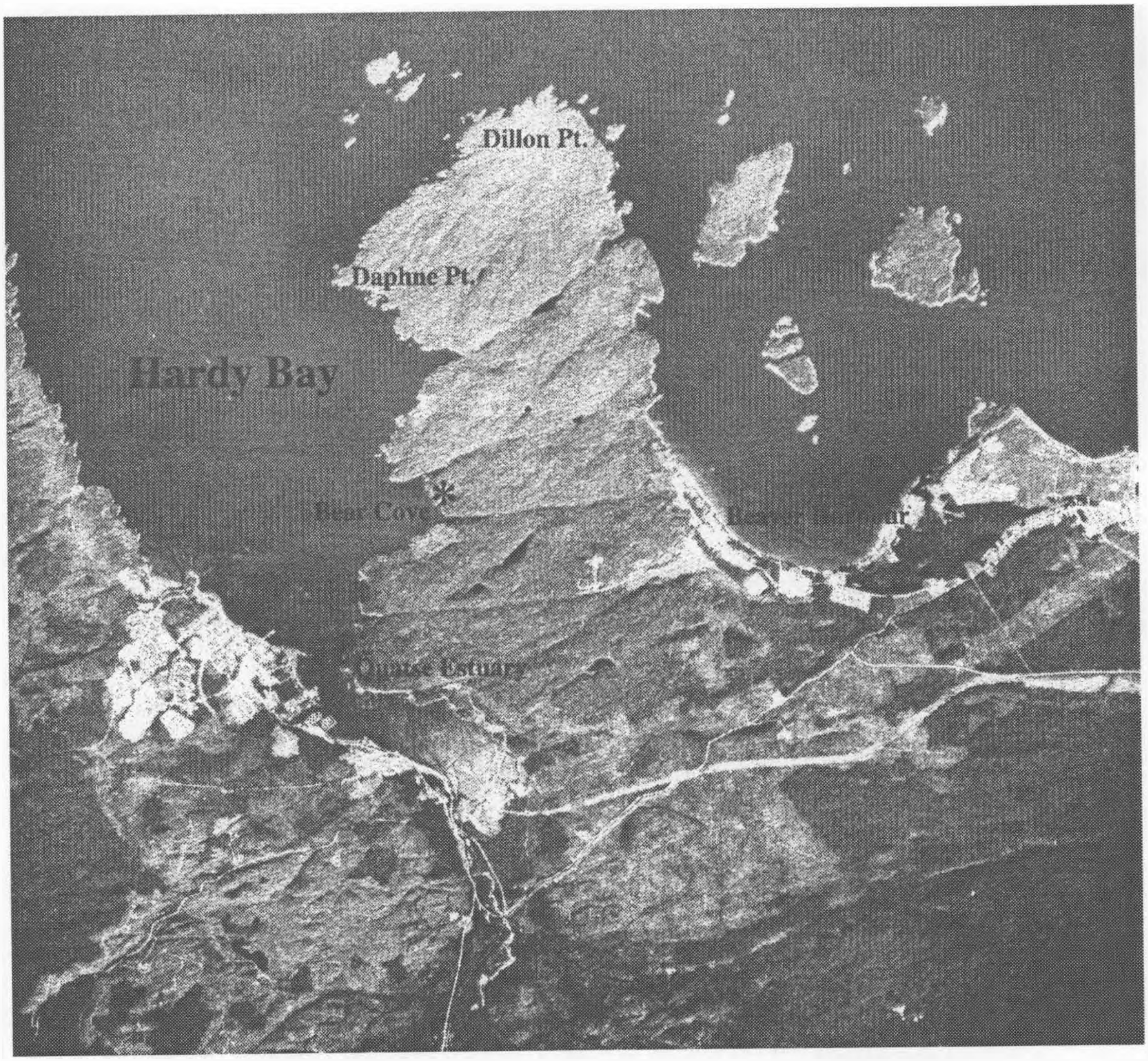

***Figure 7:2.* Aerial Photograph Showing Hardy Bay, Bear Cove, Daphne-Dillon Points Peninsula, the Quatse Estuary, and Beaver Harbour, depicting the protected environmental Setting of Bear Cove (BC77114 No 184, Sept. 10, 1977).**

located 30 m above sea level behind the archaeological site, indicates that the peninsula was deglaciated and vegetated by 13,630 [cal 16,300] BP. According to Hebda (1983) this area of Vancouver Is. is the earliest known part to have been deglaciated,, and would have provided habitable land for early human populations migrating along the coast. For early peoples traveling south along the coastline, Hardy Bay would have provided the first protected harbour after crossing the open, treacherous Queen Charlotte Sound. One of the oldest members of the Fort Rupert Band, Bob Wilson (pers. com. 1978), did not recall any use of the Bear Cove site during his lifetime (about 90 years), and no historic period remains were found there (Figure 7:3). All together the evidence supports the locality as "a place of origins".

The excavations at Bear Cove revealed an intact shell midden underlain by non-shell culture-bearing strata, with an early uncalibrated radiocarbon date of 8020±110 [cal 8900] BP (WSU- 2141) (Figure 7:4). The early component contained stone tool assemblages typical of the B.C. coast "Pebble Tool Tradition" as defined by R. Carlson (1990) (Figures 7:5, 7:6). The later shell midden contained stone and bone tool assemblages (Figure 7:7, 7:8) assignable to Fladmark's (1982) "Developmental Period," or "the Obsidian Culture Type" of the Queen Charlotte Strait (Mitchell 1990).

Due to the layers of midden-shell which neutralize otherwise acid forest soils, thousands of mammal, fish, and bird bones were well preserved in the site deposits, including faunal samples from two underlying non-shell strata.

Figure 7:3. **Bear Cove site from the Water, to the right of the Boat. The two small islands are visible in the Cove, and the dense coastal rain forest (C.C. photo).**

The faunal remains, consist of almost 30,000 identifiable bones, and were identified by the author at the British Columbia Provincial Museum between 1978 and 1980. Preliminary results of the faunal analysis from the early Pebble Tool Tradition component have previously been presented (C. Carlson 1979, 1979a).

The faunal material from the Bear Cove site is important for addressing issues of long-term resource utilization in the central, or classic core area, of the Pacific Northwest Coast Culture Area. Archaeological fauna from stratified sites, representing long-term coastal village occupations, provide a valuable source of material evidence pertaining to the long-term use of coastal resources, usually in greater detail than that of ethnographic accounts. This paper will compare the identified fauna from the earliest site Component I to the latest post-4300 [cal 4900] BP Component III in order to document trends in faunal use. In particular, questions about the antiquity of use of marine resources in the context of understanding early coastal subsistence patterns are the focus of discussion. Whether the initial occupants of the coast were marine-adapted peoples from the outset, or were instead inland game hunters who later learned proficiency at harvesting marine resources to become truly "maritime adapted" in the late periods of prehistory, remains a subject of inquiry.

Site Description and Excavation Methodology

Auger testing at the site prior to the 1978 excavations characterized it as a medium-sized, 1.5 m in depth, shell midden that ran parallel to the shore for about 70 meters, and extended inland

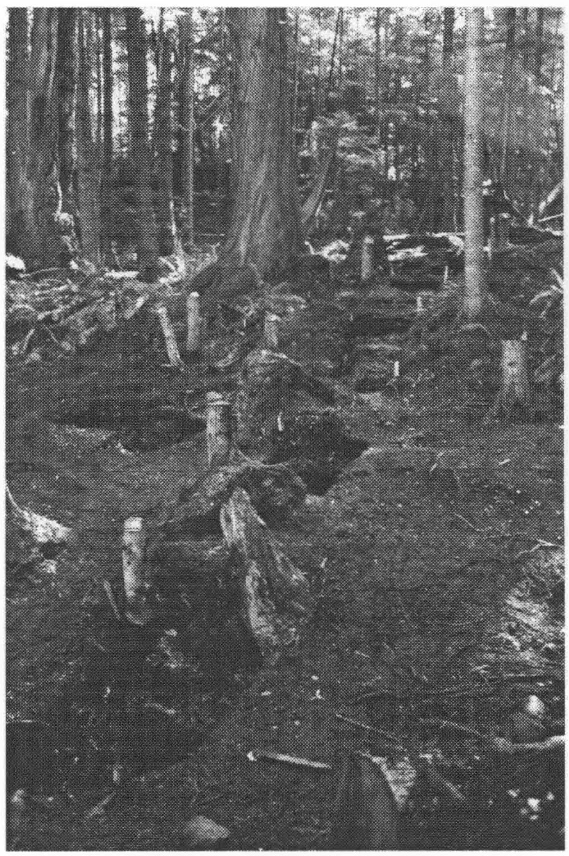

Figure 7:4. **The 1978 Excavations at Bear Cove. Alternate excavation unit transects were employed in the dense forest of the site. Area 1 is in the foreground and Area 2 in the background. (C.C. photo 1978).**

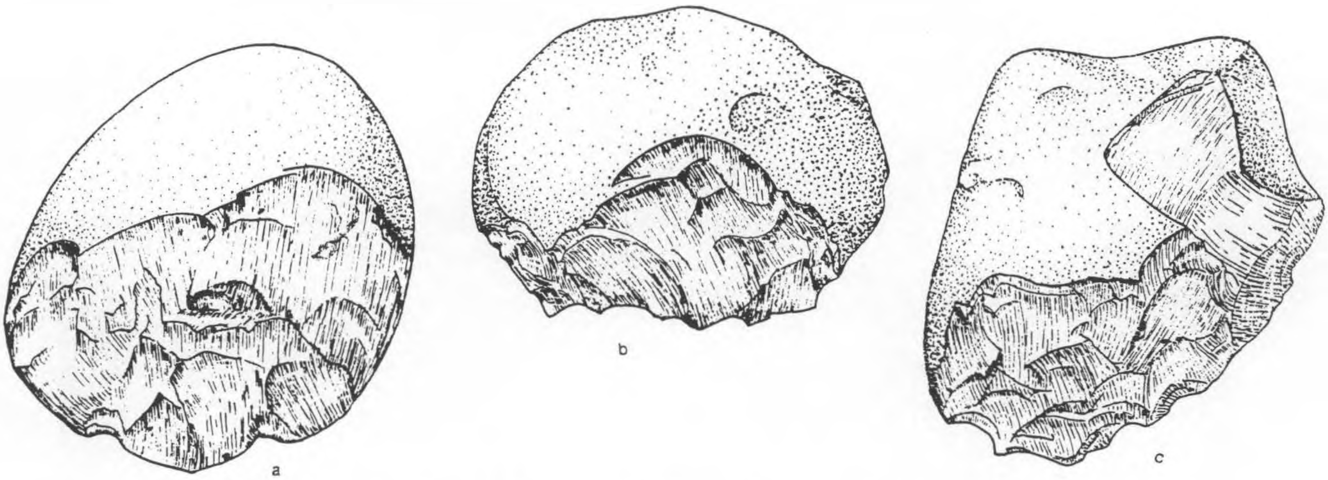

Figure 7:5. **Selected Bear Cove Pebble Tools, Component I (half-size).**

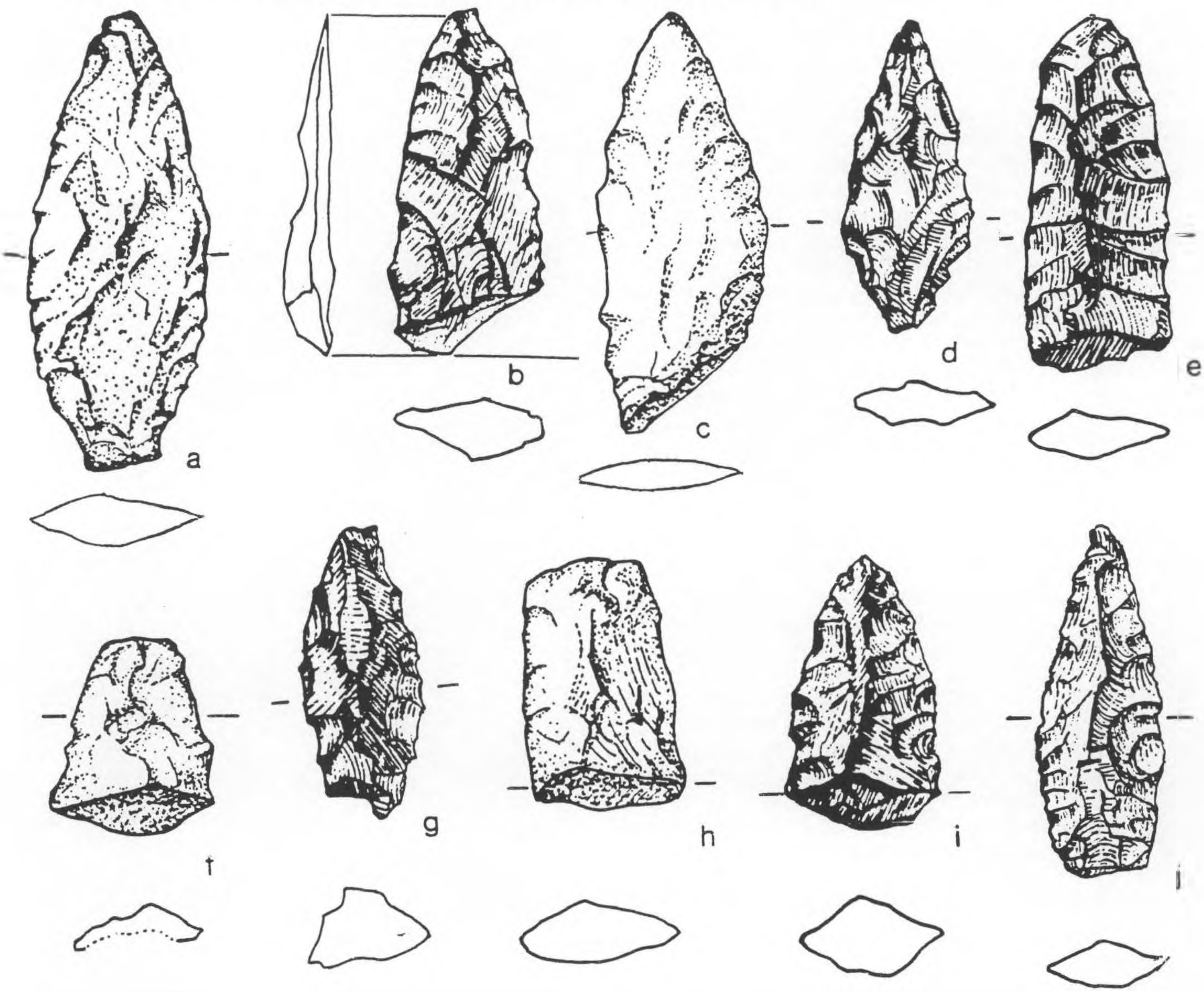

Figure 7:6. **Bear Cove Projectile Points and Biface Fragments, Component I (actual size).**

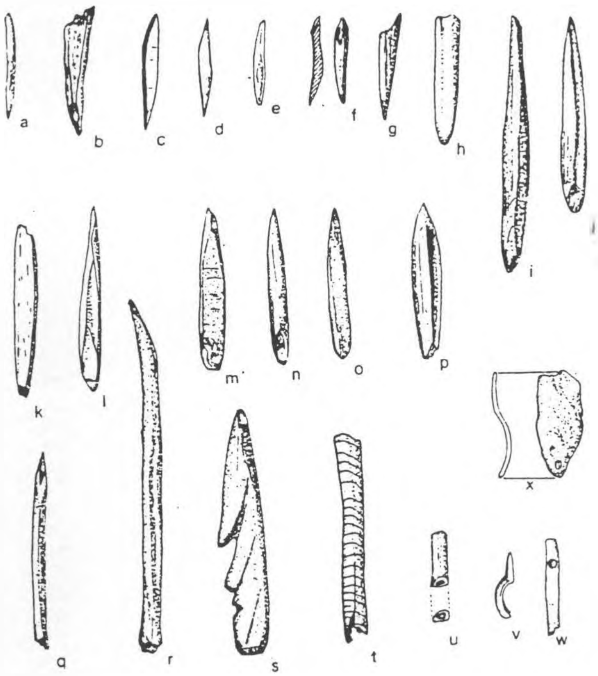

Figure 7:7. **Bear Cove Bone Points, Harpoon points, Needles, and Miscellaneous Bone Artifacts, Component III (half-size).**

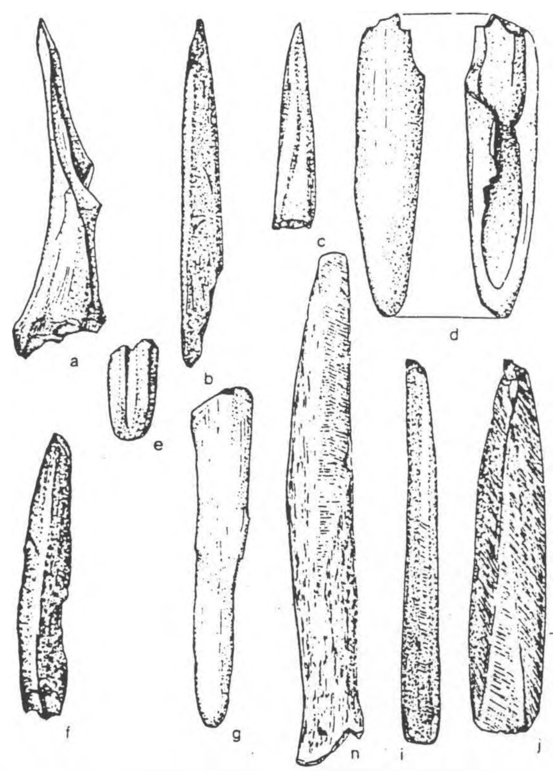

Figure 7:8. **Bear Cove Bone Awls, Chisels, and Points, Component III (half-size).**

from the beach about 35 meters (Chisholm and Duff 1977). The dense forest of western hemlock, red cedar, and Sitka spruce covering the site (Figure 7:4) made excavation and photography difficult.

An intermittent creek flowed through the middle of the site. The creek today is not a salmon spawning stream; however, the salmon-bearing Quatse River is nearby at the southern end of Hardy Bay. The lack of a salmon-spawning stream suggests that the site was probably not a summer salmon-fishing village. Two small tidal bedrock islands are located off the beach, and harbor a great diversity of intertidal resources. These islands and the indented shoreline of the cove provide a sheltered setting that protects the site and beach from wind and water erosion.

George Dawson (1887: 66) remarked:

> Low shores well adapted for the landing and beaching of canoes have usually been selected for the more important villages, especially where such a shore is contiguous to some rocky point or promontory or small high rocky island.

Topographically the site (Figure 7:9) exhibits both a low elevation midden terrace close to the beach (7-8 m above mean sea level), and an upper midden terrace at the back of the site (20 m from the beach, with a surface elevation between 9-11 m above sea level). The low terrace site area south of the creek was designated Area 1, the upper terrace south of the creek Area 2, and the area north of the creek as Area 3.

The judgmental excavation plan for locating sampling units was chosen to maximize both temporal and spatial coverage across the site for addressing questions of site chronology and structure, since the site was destined for complete destruction. Recovery of faunal samples that would represent the complete range of species utilized by the pre-Contact peoples, for understanding questions of subsistence and seasonality, was also reflected in the areal coverage and sampling methodology that used a combination of 1/8-inch mesh (3.2mm) on-site water screens and column samples. Interval-transect excavation units were employed. Four transects (A–D) were excavated in 2 m x 1 m intervals; one parallel to the beach at the front of the midden in Areas 1 and 3 (transect A); two crossingp this transect at right intervals in the south (Area 1) and north (Area 3) areas of the site (transects B and D); and a fourth running parallel to the beach on the upper terrace of the south area (Area 3) of the site (transect C) (Figure 7:9). The transects were arbitrarily placed in areas of least interference from large trees. The horizontal

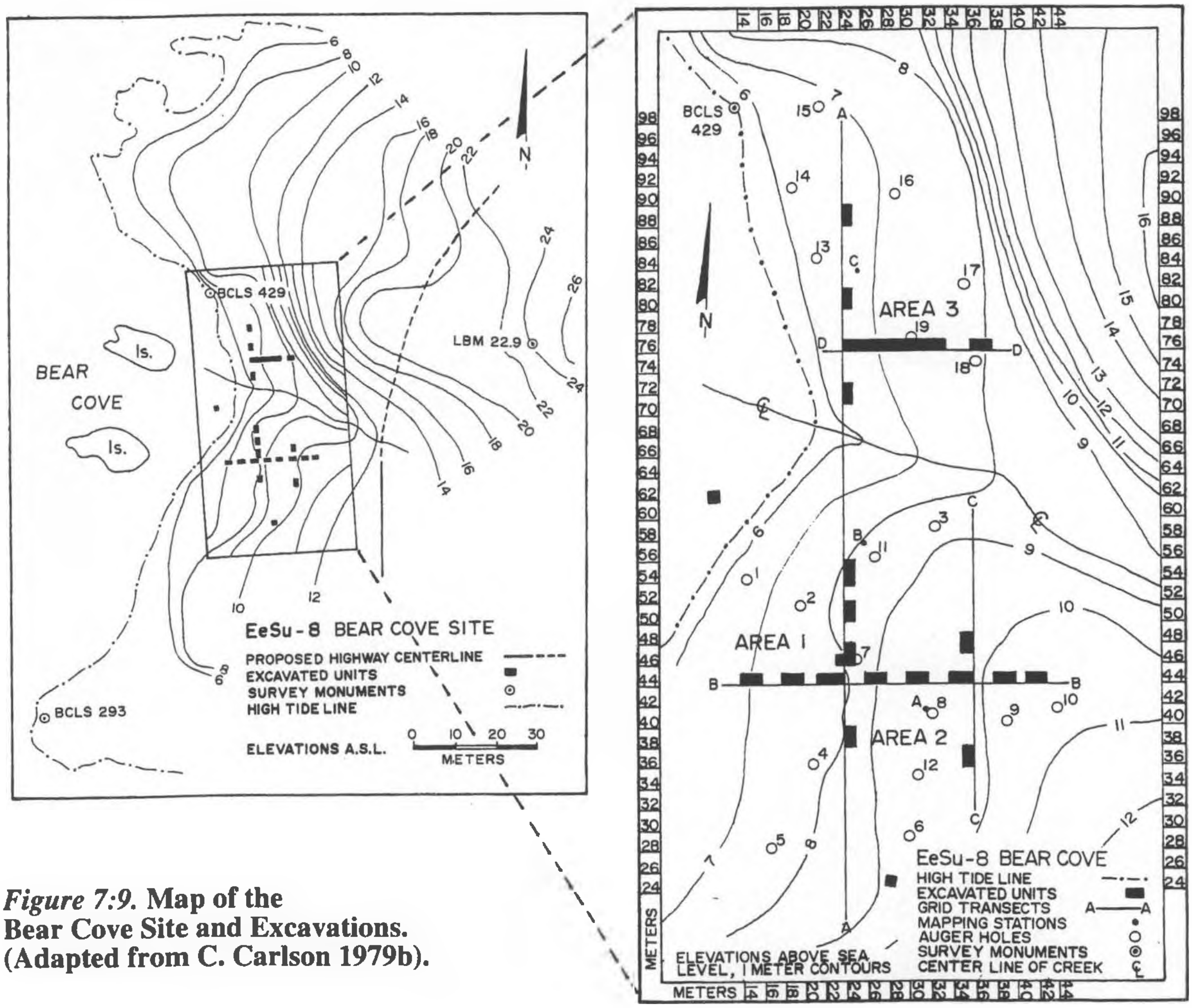

***Figure 7:9.* Map of the Bear Cove Site and Excavations. (Adapted from C. Carlson 1979b).**

datum was a survey marker (BCLS 429) that has since been removed, and vertical datum was mean sea level, with all four corners of each excavation unit mapped according to elevation above mean sea level. A total of 25 2 m x 1m units were excavated; depths ranged from 0.6 to two m (63 cubic m of deposits). Units were excavated in 10 cm levels, and all deposits were water-screened through 1/8-inch (3.2 mm) mesh. Two column samples (10 cm x 10 cm) were taken from the east wall of each unit for sediment, micro-faunal, and floral analysis.

Stratigraphy and Dates

There were two major divisions in the site stratigraphy: (1) the upper shell midden deposits in Areas 1, 2 and 3 (called Component III), and (2) the lower non-shell deposits (called Component I in Area 2, and Component II in Areas 1 and 3). In general, and typical of coastal shell middens, the micro-stratification was complex, varied from one area of the site to another, and layers were often not continuous even across excavation units. The shell midden deposits (Component III) in Area 1 and 3 on the lower terrace closest to the beach, were underlain by a stratum of black organic sediment (Component II) that, in turn, lay directly over sterile olive (5Y 4/4) beach sands similar to the modern beach. In Area 2, the upper terrace, the shell midden (Component III), was underlain by different non-shell deposits (Component I), which were deeper and more stratigraphically complex than the Component II non-shell deposits on the lower terrace in Areas 1 and 3 (Figure 7:10).

Component I (Area 2) Stratigraphy

This component was located in Area 2, the upper back terrace of the site, below the shell midden (Figures 7:11, 7:12). The deposit consisted of horizontal bands of silt, sand, clayey-silt, pebbles and gravel, of about one meter in depth. Sediment colour varied from black to olive, to red, and reddish-brown; several of the bands were very greasy in texture, probably reflecting high organic content. The sediments in the back units of Transect B were very compacted.

In the most seaward unit (N44-45/E30-32) at the front face of the upper terrace, the overlying shell midden was the deepest for Area 2 (150 cm). Component I in this unit consisted only of a shallow 20 cm thick layer of olive beach sand. A piece of sea lion bone was found in this layer, 5 cm below the shell deposit at 155 cm below surface that was submitted for AMS dating (Beta-157416, Table 1) (discussion of dates below).

The excavation unit in the middle of Transect B (N44-45/E34-36) (Figure 7:12), and the north excavation unit of Transect D (N47-49/E35-36) were excavated in the deepest and most stratigraphically complex portion of Component I deposits. The Transect B unit stratigraphy is composed of eight bands of sediment within a 90 cm span; the Transect D unit stratigraphy is composed of ten bands of sediment within a 100 cm span. The top band in each unit is black silt with pebbles approximately 20 cm deep. Below that are thin bands of olive sand, greasy red and black silt, sand and gravel, red-brown clay, black silt and pebbles, fine greasy black, and brown and olive sand. The only dateable charcoal sample (WSU-2140) from these two units came from N44-45/E34-36 at 10 cm below the shell in the black silt. However, flecks of shell were identified in the sample and so it probably dates the bottom of the overlying Component III shell midden, and not the terminal deposition of Component I (Table 7:1, Figure 7:12).

In the two back (landward) units, Component I consisted of more compacted greasy black silt and reddish-brown,"oxidated," sandy clay silts with gravel. The upper layers of the Component were often more black (organic) in appearance, and with a pH of 7.4-7.2, had better bone preservation than the lower olive and reddish deposits (pH of 6.8-5.6). The underlying sterile deposits consisted of olive sand and gravel in the more shoreward units, and of olive sand, reddish-brown silt, and weathered bedrock in two units at the back of the site. The weathered bedrock, sand, and gravel that lay below the Component I cultural deposits suggest a raised beach and higher sea level (by 7-9 meters above modern mean sea level) at the initial occupation of the site.

Component 1(Area 2) Radiocarbon Dates

A charcoal sample recovered from near the bottom of the Area 2, Component I deposits, about 20 cm above the sterile sands and gravel, and 70 cm below the bottom of the shell midden produced the oldest date at the site of 8020±110 [cal 9000] BP (WSU-2141) (Table 7:1). A more recently obtained date (Beta-157416) on a sea lion mandible from 5 cm below the shell midden dated 4470±60 BP, which calibrated to two sigma is 5310 to 4870 BP (Table 7:1). This bone sample came from an olive sand and pebble matrix 30 cm above the bottom of the excavation unit at 155 cm below surface, from the most shoreward excavation unit in Area 2 (N 44-45/E 30-32). The Beta date suggests that Component I terminated around 5000 years ago, and that the sea lion belonged to the terminal occupation of the early Component I. Another recently obtained date, NUTA-3786, on a sample of fur seal bone, from 45 cm below the shell midden in orange-brown silt, produced a date of 4576±30 [cal 5300] (Table 7:1).

Component II (Areas 1 and 3) Stratigraphy

Component II consisted of a stratum of "greasy" organic black silt, ranging in thickness from 5 cm to 65 cm. It occurred below the shell midden deposits in both Areas 1 and 3 on the lower terraces. This component lay directly over sterile olive (5Y 4/4) beach sands and gravel similar to the modern beach (Figures 7:10, 7:13 and 7:14). The presence of a black shell-free component or stratum underlying shell midden deposits is not unique to Bear Cove. For the Namu site, Roy Carlson (1993:19-20, 1998:25) suggested that the black shell-free deposit under the shell midden there might be the result of shoreward erosion of earlier middens. If this is the case, the black non-shell layers are remnants of the "back" of the midden, possibly under house floors. If this applies also to Bear Cove, then Component II relates depositionally and culturally to the Component III shell midden. In support of this interpretation is that in one of the excavation units from the back of the lower terrace in Area 1, along Transect A (N46-48/E24-25), two probable house-post holes were identified in Component II. They were visible at the contact with the overlying shell midden, and extend into Component II; one was 10 cm in diameter and25 cm deep, the other was 20 cm in diameter and 45 cm deep, and extended through Component II into the sterile beach gravel.

Area 1

In Area 1 (south of the creek), in the excavation unit furthest back from the shore (Transect B, N44-45/E26-28), at the very back of the lower terrace, Component II was only 5 cm thick, and occurred 140-145 cm below surface. From there

Table 7:1. Bear Cove Radiocarbon Dates.

Lab sample/ Date of Sample	Material/ Excavation Unit	14C Age B.P. uncalibrated	Sample Context
WSU-2137/1978	Charcoal sample 2 N44-45/E14-16	1035 ± 80	*Component III* (upper section), *Area 1*, in shell deposit, 40 cm below surface
WSU-2138/1978	Charcoal sample 6 N44-45/E34-36	4360 ± 90 [cal 5000]	*Component III* (middle-lower section), *Area 2*, in shell deposit, 76 cm b.s.
WSU-2142/1978	Charcoal sample 16 N80-82/E24-25	2075 ± 80	*Component III* (bottom section), *Area 3*, at bottom of shell, 130 cm b.s.
WSU-2140/1978	Charcoal sample 9 N44-45/E34-36	4180 ± 90 2 sigma range: 5310 -4870	*Component III* (bottom section), *Area 2*, 10 cm below shell, in black silt, flecks shell, with associated hearth, 114 cm b.s
WSU-2139/1978	Charcoal sample 8 N44-45/E14-16	2430 ± 90	*Component II* (middle section), *Area 1*, 20 cm below shell, in silt & gravel, 140 cm b.s.
BETA-157416/2001	Sea Lion bone sample 1 N44-45/E30-32	4470 ± 60 [cal 5000]	*Component I* (top section), *Area 2*, 5 cm below shell, in olive sand & pebbles, 30 cm above bottom of the shoreward unit, 155 cm b.s.
NUTA-3786/2002	Fur Seal bone sample 3 N44-45/E38-40	4576 ± 39 [cal 5300]	*Component I* (middle section), *Area 2*, 45 cm below shell, 45 cm above bottom of unit, in orange-brown silt & gravel, 145 cm b.s.
WSU-2141/1978	Charcoal sample 11 N44-45/E38-40	8020 ± 110 [cal 9000]	*Component I* (bottom section), *Area 2*, 70 cm below shell at bottom of black silt, 180 cm b.s.

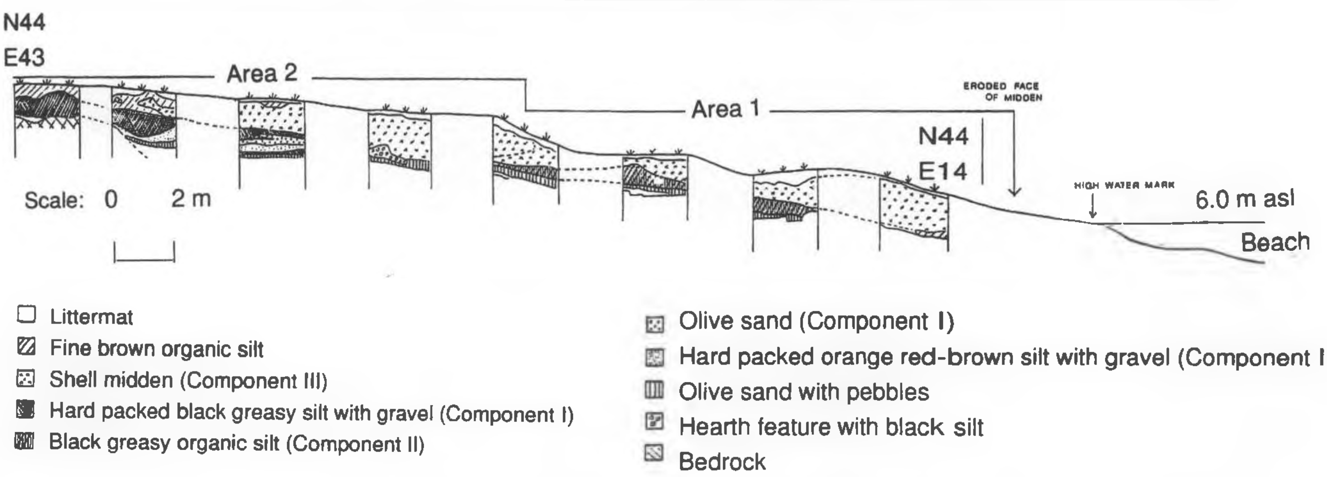

Figure 7:10. **East-West Transect indicating general stratigraphic Relationships between Excavated Units in Area 1 (low terrace) and Area 2 (upper terrace).**

shoreward the Component increased in thickness to 65 cm in unit N44-45/E22-24, at 8 meters from the front face of the midden, where the bottom of the stratum was at 100 – 120 cm below surface. Along Transect B, from the back of the lower terrace to the front of the midden, the component graded from a black greasy silt, to a black gravelly silt, to completely disappearing in the front (shoreward) excavation unit. The surface topography of Component II was undulating at the contact with the overlying shell midden (Figures 7:13, 7:14, 7:15).

Area 3

Component II in Area 3 (north of the creek) was present under the shell midden from the front to the back of the terrace. Along Transect D it was thinnest (10 cm) at the front excavation unit, with maximum thickness (50 cm) in the center units. The Component graded from black or-

Figure 7:11. **North Wall Stratigraphy Unit N44-45/E 34-36, Area 2 (C.C. photo. 1978).**

ganic silt in the back units to black organic silt and gravel towards the shore. The bottom of the Component was 120 cm below surface. It was underlain by olive (5Y 4/4) beach gravel in the two shoreward units of Transect D and three units of Transect A, and by olive to yellowish brown (10YR 5/4) gravelly sand in the back units of Transect D.

Component II (Areas 1 and 3) Radiocarbon Dates

A single radiocarbon date was obtained on this stratigraphic component, from Area 1 (Table 7:1). The date of 2430±90 (WSU-2139) provides an age on the mid-point of the stratigraphic unit, suggesting that the initial occupation on the lower beach terrace post-dates 3000 years ago.

Component III (Areas 1 – 3) Stratigraphy

Component III consisted of shell midden from all site areas on both the upper and lower terraces. The age of the shell midden on the upper terrace is older than that of the midden on the lower terraces (see below). Culturally the shell midden represents the Late or "Developmental" period of Northwest Coast prehistory, i.e., the semi-sedentary village settlement pattern.

Area 1

The shell midden stratigraphy consisted of banded layers of black silt, crushed shell, and ash, with lenses or pockets of whole and large fragments of shell. Clam and barnacle were the visually dominant shellfish types. The maximum depth (150 cm) was at the front of midden, and the minimum depth (95 cm) in the central area. The midden was also deep (130 cm) at the back of the lower terrace where midden from the upper terrace had spilled over its front sloping face (Figures 7:10, 7:13, 7:14, 7:15).

Area 2

The midden in Area 2 was 12 meters in width from the front to the back of the upper terrace (Figure 7:10). The midden extended inland as far as excavation unit N44-45/E 38-40, that is, 29 meters from the front face of the lower midden at the beach. The furthest back unit of Transect B contained no shell midden, but did contain non-shell deposits of Component I. The shell midden was thickest at the front (150 cm), tapering to 35 cm in thickness at the back of the terrace, and 110 cm deep in the middle excavation units along Transect B. The midden was multi-layered and pocketed with whole and crushed shell, ash and dark silt. Clam, mussel, and barnacle were visually predominant (Figures 7:11 and 7:12).

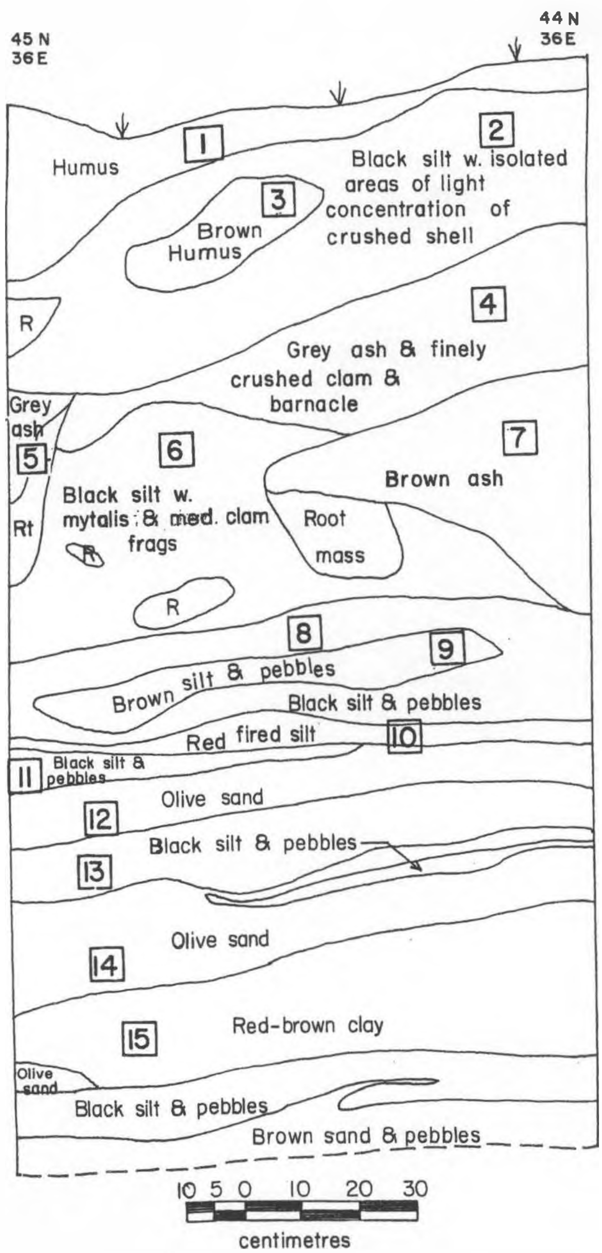

Figure 7:12. **East Wall Stratigraphy of Unit N44-45/E 34-36, Area 2 (Transect B) with numbered locations of Soil Samples. Samples 8-15 are Component I.**

Area 3

The midden was deepest in the front excavation units (100 cm), tapering to only 20 cm in unit N76-77/E32-24 of Transect D. The furthest back unit of Transect D contained no shell midden, and hence the midden width from front to back was 13 m. The shell midden consisted mostly of large and medium fragments of loose clamshell with some barnacle and mussel and pockets of finely crushed shell and ash.

Component III (Areas 1 – 3) Radiocarbon Dates

At the bottom of Component III in Area 2 was a 20 cm layer of dark greasy loam with pebbles, sand, and weathered stone. A charcoal sample from a hearth feature in this layer, at the contact with the overlying shell midden, at 114 cm below surface, was dated at 4180 ± 90 BP. (WSU-2140) (Table 7:1). This date, however, is potentially too young because another sample (WSU-2138) from the same excavation unit, but above it stratigraphically at 76 cm below surface, midway through theshell midden deposit, was dated at 4369±90 BP (Table 7:1).

The lower terrace shell midden in Area 3 is dated at the base of the shell at 2075±80 BP. (WSU-2142) (Table 7:1). Another date of 1035±80 BP was obtained from near the top of the shell midden in Area 1 at 40 cm below surface. These two dates plus the date on Component II from Area 1, indicate that the shell midden on the lower terrace is at least 2000 years younger than the shell midden on the upper terrace.

Modern Hardy Bay Fauna

Modern species diversity provided the background context for the archaeological faunal identification. Recent biological surveys identi fied 18 species of land mammals and 21 sea mammals that inhabit the northern Vancouver Island region (Tera 1978). Of these, Boas (1909) recorded the use of five land mammals (deer, wolf, black bear, river otter, and beaver), and six sea mammals (northern fur seal, northern sea lion, harbour seal, sea otter, harbour porpoise, and Dall porpoise) by the Kwakiutl peoples. There are also upwards of 185 species of birds (both aquatic and terrestrial) that were available for human use in the Hardy Bay region (Tera 1978). A survey of the intertidal zone in Bear Cove by the 1978 field crew identified barnacles and 20 species of molluscs, including clams, cockles, mussels, limpets, abalone, and whelks.

The major freshwater system in Hardy Bay (Figure 7:2) is the Quatse River, containing spawning and rearing habitat for sockeye, coho, chum, and pink salmon, steelhead, and Dolly Varden char. In addition, the Tsulquate and Glenlion rivers entering the west side of the bay support runs of coho, chum, pink and steelhead. The fish resources available in Hardy Bay and Queen Charlotte Sound are vast, and include 37 species of rockfish, ratfish, several greenlings, herring, 40 species of sculpins, dogfish, halibut and other flatfish, four cods, lingcod, five species of salmon, four skates, several perch, sablefish, and plainfin midshipman.

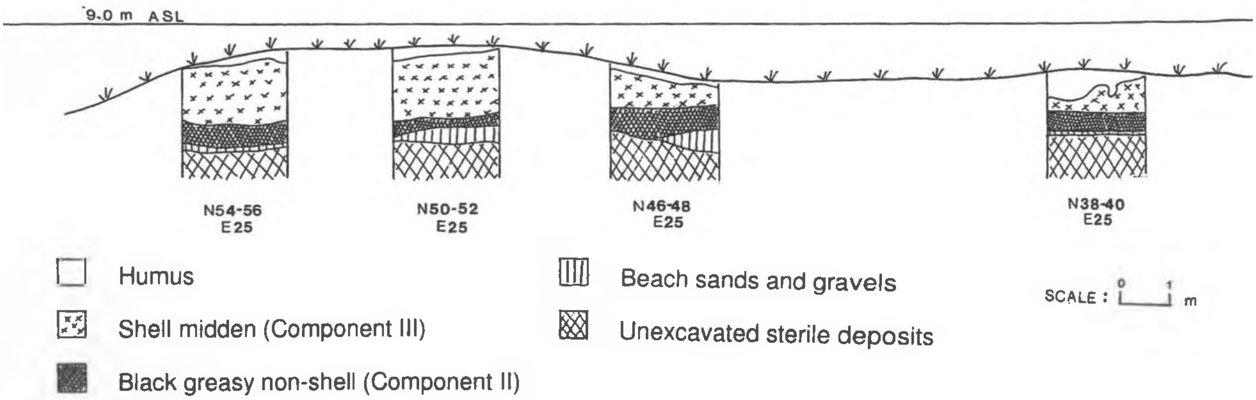

Figure 7:13. **North-South Transect Indicating General Stratigraphic Relationships Between Excavated Units in Area 1 (low terrace).**

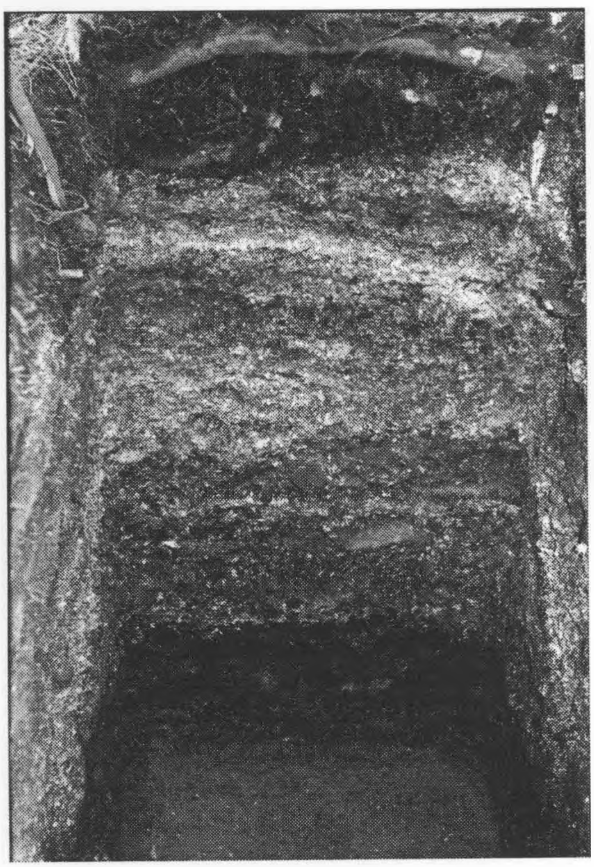

Figure 7:14. **Stratigraphy in Unit N44-45/E26-28, east wall (E28), 150 cm below surface, Area 1, back unit of lower terrace Showing Black Layer (Component II) under the shell midden. (C.C. photo 1978).**

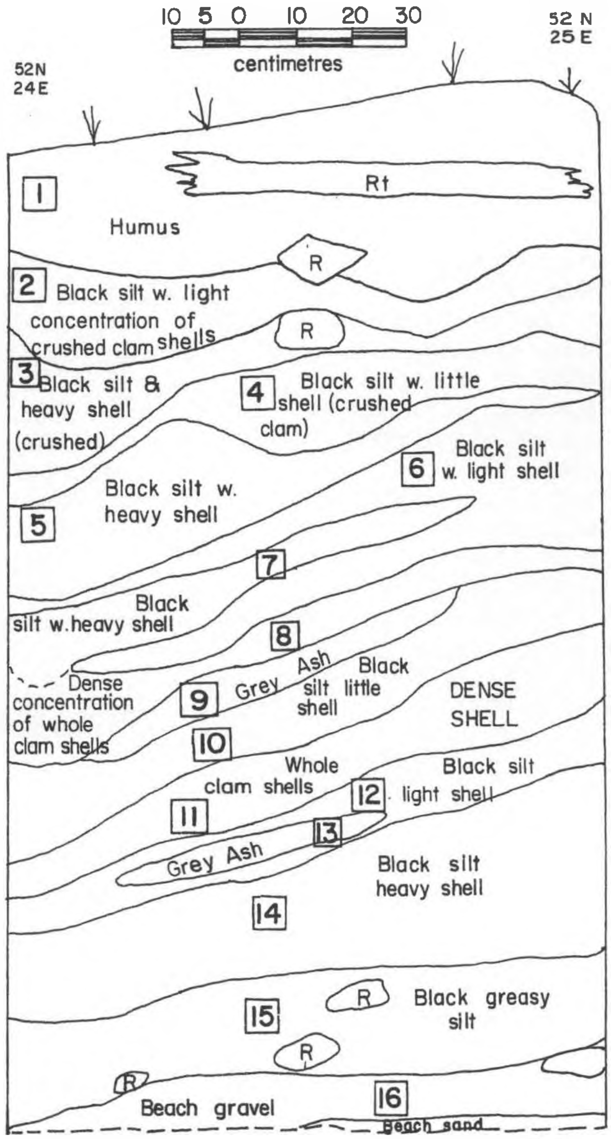

Figure 7:15. **East Wall Stratigraphy of Unit N 44-45/E 14-16, Area 1 (Transect A) with numbered locations of Soil Samples. Sample 15 is Component II.**

Bear Cove Archaeological Fauna

The faunal remains from the excavation units and column samples were identified to the lowest taxonomic level possible through comparison to skeletal collections at the British Columbia Provincial Museum (now the Royal BC Museum). The identified bone and shell were quantified by fragment counts (NISP), by minimum number of individuals (MNI), and by weight (gm). A total site sample of 29,888 bones weighing 7,432 gm was identified to species, representing a minimum of 1,543 individuals. Of this, by MNI, 77% were fish, 13 % were mammal, and 10% were bird (Table 7:2). The faunal sample sizes were comparatively evenly distributed between each of the three site areas with producing 38 % from Area 1, 32 % from Area 2, and 29% from Area 3 of the total sample by MNI (Table 7:2). Between Components, however, there is a marked sample size difference; the oldest Component I produced only 7 5.5 % of the sample by NISP/MNI; Component II produced 11 % (MNI & NISP); and the shell midden Component III produced the largest sample size at 81-83% by NISP/MNI (Table 7:2).

Twenty-six genera or species of fish in total were identified from the Bear Cove site (rockfish and ratfish were the most common, followed by greenling and herring) (Table 7:3); eleven land mammals were identified (deer, elk, canid, black bear, beaver, river otter, raccoon, mink, marten, vole, and squirrel), and six species of sea mammals (northern sea lion, northern fur seal, harbour seal, sea otter, harbour porpoise, and a small whale of uncertain species) (Table 7:4); and twenty-two genera or species of birds (mostly aquatic birds such as ducks, geese, loons, cormorants, heron and grebes) (Table 7:5). The analysis of 37,335 gm of column sample shell identified 23 species of molluscs (butter clam and littleneck clam are most abundant), as well as a large amount of barnacle (Table 7:6).

Faunal Trends/Component Comparisons

The faunal species relative percentages are compared between the earliest non-shell Component I (dated from 8020 to 4300 [8900-4900] BP in Area 2), and the latest shell midden Component III (dated from 4300 to 1035 [4900-900] BP in all areas) to suggest trends over time in subsistence practices. Component I by MNI, consists of 46 % fish, 25 % bird, and 29 % mammal. Of the mammal, by MNI, 76 % are species of sea mammal (harbour porpoise and unidentifiable *Delphinidae* sp., northern sea lion, northern fur seal and sea otter), and 30 % are land mammal (deer, canid, black bear and river otter). In contrast the shell midden, (Component III, by MNI, consists of 78 % fish, 13 % mammal, and 9 % bird; of the mammal, 40 % is sea mammal and 60 % is land mammal

Table 7:2. Summary of the Bear Cove Vertebrate Sample.

Vertebrate Sample by Class	NISP	NISP %	MNI	MNI %
FISH	26004	87	1185	77
MAMMAL	3268	11	208	13
BIRD	616	2	150	10
TOTAL	29888	100	1543	100
Vertebrate Sample by Component				
COMP. I	2136	7	85	5.5
COMP.II	3451	11	178	11.5
COMP.III	24301	81	1280	83
TOTAL	29888	100	1543	100
Vertebrate Sample by Site Area				
AREA 1	12612	42	591	38
AREA 2	10862	36	500	32
AREA 3	6414	22	452	29
TOTAL	29888	100	1543	100

The data indicate that Component I has a 36 % higher percentage of sea mammal, a 32 % lower percentage of fish, and a 16 % higher percentage of bird than Component III. The noticeably higher utilization of sea mammals than land mammals in Component I suggests a greater emphasis on the sea for subsistence in the earliest occupations of the site than in the later occupations. The contrast between the higher amounts of sea mammal in Component I is also reflected in the higher amount for site Area 2 in general, which contained the oldest deposits, including the oldest shell midden which deposits in the site (Figure 7:16). The lesser amount of fish in Component I compared with Component III may reflect the taphonomic bone. Rockfishes are the dominant species in allprocesses inherent in older non-shell deposits where fish may not survive as well as mammal the site components, and are fish that are easily procured by angling from boats close to shore. The higher amount of codfishes, however, in Component I may also indicate that a more open-ocean fishing pattern, complementary to an

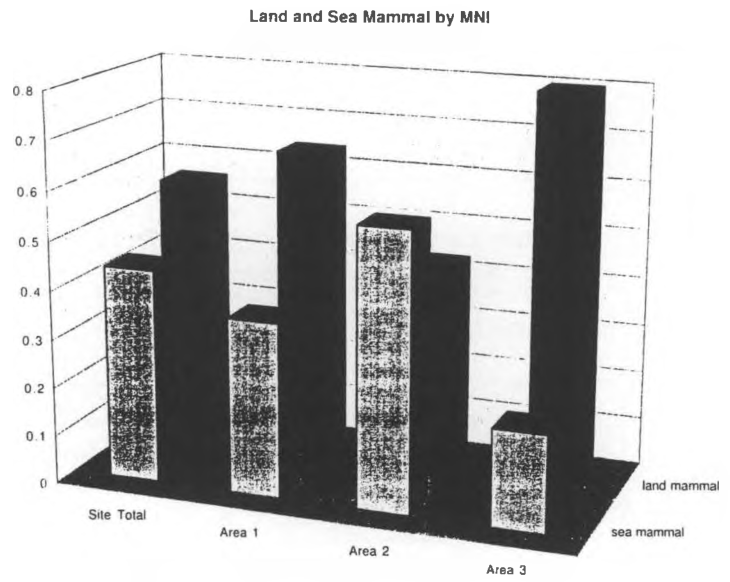

Figure 7:16. **Graph Showing Comparison of Frequency of Sea Mammal and Land Mammal by Site Areas. Area 2 has the oldest components, Area 3 the most recent.**

Open ocean sea mammal hunting pattern, may also have existed in the early occupation. The higher frequencies of birds in Component I, the majority of which are sea birds, also suggest a subsistence focus on the open ocean that was greater than that of the later occupation.

Also noteworthy in regards to fishing is that although salmon has been identified in all components of the site, it is not abundant (the site average is 3%). Several explanations for the low abundance of salmon are possible. First, in this area of the coast, rockfishes, ratfishes, flatfishes, and herring may be more abundant in the local environment than salmon, and/or easier to catch. Second, this site may have been occupied outside the salmon fishing season where preserved salmon without backbones could have been eaten. Third, salmon was consumed at other locations, such as at sites along the salmon spawning rivers. Despite the low abundance of salmon—a fish that is frequently considered to be the signature resource of the ethnographic Northwest Coast, fish bone nevertheless represents as much as 78 % of the identified sample by MNI. With 26 genera and/or species of fish identified for the site, it must be concluded that ocean fishing was an important subsistence occupation. The tendency to only focus on salmonas a critical marine resource is probably reflected in the biases that are imposed by the ethnographic accounts (Hobler 1983; Ford 1989).

Seasonality

One of the research methods employed was to investigate seasonality indicators in the fauna. Interpretations of seasonality were based on a study of the growth rings of clamshells, and the migratory schedules, life cycle patterns, and age classes of the vertebrates. Following the methodology of Ham and Irvine (1975) and Ham (1976), 126 clam shell valves of two species (little neck and butter clam) were sectioned and polished to measure the last growth ring to determine in which growth season it was harvested. Of the 126 valves, only 19 had intact edges that were considered readable. Of these, 74% showed that they were gathered during the period when the winter check-ring was being formed, or during the initial stages of post-winter growth; 16% showed late summer growth; and 10% late fall. Despite the small sample size, this distribution suggests that clams were most heavily harvested during the winter, with some harvesting in the late summer or fall, in the post-4300 [cal 4900]BP shell midden Component of the site (although subsequent to this study in 1978, several methodological problems have become recognized (see Maxwell, this volume).

Bird migratory patterns indicate that of the total species identified, 7 species are migratory into Hardy Bay only during winter, 11 species are available year-round, and one species, the Rhinoceros auklet, represented by a single specimen, is a spring-migrant only, with nesting colonies on Pine Island in Queen Charlotte Sound (Godfrey 1979:202-203). These data indicate that birding was part of at least a winter-to-spring activity, and could have been accomplished year-round with certain species.

Table 7:3. Bear Cove Fish.

	Component I				Component II				Component III			
SPECIES	NISP	NISP %	MNI	MNI %	NISP	NISP %	MNI	MNI %	NISP	NISP %	MNI	MNI %
Sebastes spp. rockfish	266	73	18	46.0	640	52	27	18	6429	61	284	28.4
Sebastes ruberrimus yelloweye rockfish									4	+	2	0.2
Hydrolagus colliei ratfish	11	3	5	13.0	136	11	44	30	772	7	229	23
Hexagrammos spp. greenling	1	+	1	2.5	85	7	13	9	1041	10	101	10
Clupea harengus pallasi herring	18	5	1	2.5	26	2	9	6	478	4.5	87	8.7
Cottidae spp. sculpin	2	+	2	5.0	26	2	7	5	307	3	42	4
Hemilepidotus hemilepidous red irish lord					1	+	1	0.6	55	0.5	11	1
Myoxocephalus polyacanthocephalus									6	+	2	0.2
Leptocottus armatus staghorn sculpin					1	+	1	0.6	1	+	1	0.1
Enophrys bison buffalo sculpin									1	+	1	0.1
Scorpaenichthys marmoratus cabazon									2	+	1	0.1
Squalus acanthias dogfish	7	2	2	5.0	59	4.8	7	5	163	1.5	41	4
Flatfish sp.	2	+	1	2.5	54	4.4	9	6	241	2.3	35	3.5
Hippoglossus stenolepis halibut									3	+	3	0.3
Platichthys stellatus starry flounder									1	+	1	0.1
Atheresthes stomias arrowtooth flounder									1	+	1	0.1
Lepidopsetta bilineata rock sole									4	+	2	0.2
Gadus macrocephalus Pacific cod	7	2	2	5.0	8	0.6	4	3	133	1.2	38	4
Theragra chalcogramma pollock					10	0.8	3	2	79	0.7	21	2
Merluccius productus hake					1	+	1	0.6	3	+	2	0.2
Microgadus proximus tomcod					1	+	1	0.6				
Gadidae sp. codfish	42	11.5	4	10	97	8	9	6	402	4	34	3
Ophiodon elongatus ling-cod	1	+	1	2.5	16	1.3	3	2	22	0.2	10	1
Oncorhynchus sp. salmon	6	2	2	5.0	58	4.7	5	3	343	3.2	35	3.5
Anoplopoma fimbria sablefish									2	+	2	0.2
Embiotocidae sp. surf perches												
Rhacochilus vacca pile perch									3	+	3	0.3
Embiotoca lateralis striped sea perch									5	+	4	0.4
Raja sp. skate					3	0.2	2	1.3	6	+	6	0.6
Porichthys notatus midshipman									1	+	1	0.1
Total *identifiable* fish	363		39		1222		146		10508		1000	
Unidentifiable fish	1317	78			1901	61			10693	50		
Total fish	1680				3123				21201			

Table 7:4. Bear Cove Mammal.

SPECIES	Component I NISP	NISP %	MNI	MNI %	Component II NISP	NISP %	MNI	MNI %	Component III NISP	NISP %	MNI	MNI %
Odocoileus hemionus deer	35	31	4	16	26	70	7	44	227	41	53	32
Cervus elaphus wapiti					1	3	1	6	1	+	1	0.5
Cervidae spp. deer/elk									42	8		
Canis spp. canids					1	3	1	6	32	6	17	10
Ursus americanus black bear									5	1	4	2
Castor canadensis beaver	2	2	1	4	2	5	2	12	7	1	6	3.5
Mustelid spp. weasel/minks									10	2	6	3.5
Procyon lotor racoon									10	2	6	3.5
Lontra canadensis river otter	2	2	1	4					4	1	4	2
Microtus spp. voles					1	3	1	6				
Martes americana marten									1	+	1	0.5
Tamiascurus spp. red squirrels									1	+	1	0.5
Delphinidae spp. dolphin/porpoises	48	42	8	32	4	10	2	12	113	20	15	9
Phocoena vomeinra harbour porpoise	1	1	1	4					7	1	3	2
Callorhinus ursinus northern fur seal	11	10	2	8					18	3	11	6.5
Eumatopias jubata northern sea lion	9	8	6	24					12	2	10	6
Phoca vitulina harbour seal									26	5	13	8
Pinniped sp. seal/sea lion									6	1		
Enhydra lutris sea otter	5	4	2	8	2	5	2	12	16	3	12	7
Ziphidae spp. beaked whales									8	1	4	2
Total identifiable mammal	113		25		37		16		546		167	
Unidentifiable land mammal	48				51				660			
Unidentifiable sea mammal	44				3				166			
Unidentifiable mammal	163				175				1262			
Total unidentifiable mammal	255	69			232	86			2088	79		
Total mammal	368				266				2634			

Table 7:5. Bear Cove Bird.

	Component I				Component II				Component III			
SPECIES	NISP	NISP %	MNI	MNI %	NISP	NISP %	MNI	MNI %	NISP	NISP %	MNI	MNI %
Anas/ Aytha spp. duck *Melanitta* spp. scoter *Bucephala clangula* common goldeneye	11	38	6	28	5	21	4	25	89	51	53	47
Goose spp. *Branta canadensis* Canada goose					1	4	1	6	2	1	2	2
Larus spp. gull	4	14	3	14					17	10	11	10
Gavia spp. loon *Gavia immer* common loon *Gavia stellata* red throated loon	9	31	7	33					11	6	11	10
Grebe spp. grebe *Podiceps auritus* horned grebe *Podiceps grisegna* red-necked grebe *Podiceps caspicus* eared grebe *Aechmophorus occidenttalis* western grebe					1	4	1	6	12	7	9	8
Phalacrocorax spp. cormorant *P. penicillatus* Brandt's cormorant *P. pelagicus* pelagic cormorant *P. auritus* double-crested cormorant	1	3	1	5	1	4	1	6	7	4	7	6
Ardea herodias great blue heron	1	3	1	5								
Auklet spp. *Cerorhinca monocerata* rhinoceros auklet *Ptychoramphus aleuticus* Cassin's auklet					11	46	5	31	5	3	3	2.5
Brachyramphus marmoratum marbled murrelet									4	2	2	2
Murre sp. *Uria aalge* common murre	1	3	1	5	1	4	1	6	7	4	5	4
Megaceryle alcyon belted kingfisher									1	0.5	1	1
Haliaeetus leucocephalus bald eagle	1	3	1	5	1	4	1	6	14	8	6	5
Corvus spp. *Corvus corax* raven *Corvus caurinus* crow	1	3	1	5					4	2	3	2.5
Cyanacitta stelleri Steller's jay					1	4	1	6				
Passerine sp. perching bird					2	8	1	6				
Total identifiable bird	29		21		24		16		173		113	
Unidentifiable bird	59	67			38	61			293	63		
Total bird	88				62				466			

Rockfishes, ratfishes, and greenling—the most abundant fishes identified—are year-round residents that are easily caught by angling close to shore (Carl 1971). They are thus a reliable resource even in winter when weather conditions are more hazardous for fishing. Late winter and early spring is prime herring catching season in the kelp beds close to shore (Carl 1971:22).

Age class was recorded during identification for the mammalian fauna as an indicator of seasonality. The presence and/or absence of immature individuals are used as evidence for spring/summer hunting. In the shell Component III of Area 1, bones of three juvenile *Canis* sp., one juvenile and one foetal/newborn *Callorhinus ursinus* (Northern fur seal), one juvenile *Phoca vitulina* (Harbour seal), one juvenile *Enhydra lutris* (Sea otter), one juvenile *Eumetopias jubata* (Northern sea-lion), and one juvenile *Odocoileus hemionus* (Coast deer) were identified. While this represents a minimum number of only nine individuals, their presence suggests that spring/ summer hunting, particularly for the sea mammals, was part of the subsistence pattern in the late occupation of the site. Whether or not this seasonal hunting pattern is one that had its origins in the initial occupation of the site is not known.

The presence or absence of certain sea mammals can also be used for seasonality estimates (Stewart and Stewart 1976). In particular, the northern fur seal migrate from Bering Sea to California and back in fall and spring, with many spending the winter in Queen Charlotte Sound. The Northern sea lion is commonly found close inshore in bays and river estuaries during the winter (Cowan and Guiguet 1978:346-349).

In sum, it seems reasonable to suggest that the Bear Cove site represents minimally a winter-spring village for the late period occupation, based on the faunal seasonality information. This agrees with the geographical location of the site in a protected cove buffered by intertidal islands, situated on a non-salmon stream. The accumulation of shell midden deposits reflects semi-sedentism in the settlement pattern during the late period of occupation. Seasonality evidence for the Early Period (Component I) is sparser; however, the presence of adult northern fur seal and northern sea lion may also support a winter-spring occupation.

Discussion

There are differing interpretations about the nature and evolution of early subsistence patterns on the Northwest coast of British Columbia. Some (R. Carlson 1990, 1995; Moss 1998; Dixon 1999) have argued that the Pebble Tool and Northern Microblade cultures of the coast are ultimately derived from northern *coastal* traditions, while others have argued for an *inland*-big-game hunting derivation (Matson and Coupland 1995; Matson 1996; Coupland 1998; Ames and Maschner 1999). Faunal data contribute significantly to this debate, especially the faunal assemblages from five early sites along the British Columbia and Alaska coastlines: (1) Chuck Lake (Ackerman et. al 1985, 1989); (2) Namu (Conover 1978; Cannon 1991, 1996); (3) Glenrose (Imamoto 1975; Casteel 1976; Matson and Coupland 1995; Matson 1980, 1996); (4) Bear Cove (C. Carlson 1979); and (5) Kilgii Gwaay (Fedje et al. 2001). Other important early sites such as Tsini Tsini (Hobler 2000) unfortunately lack faunal remains, probably because they do not underlie later shell middens.

The faunal remains at Glenrose consist of land mammal (elk, deer, *Canis* sp., beaver), sea mammal (harbour seal), fish (salmon, sturgeon, flatfish, eulachon, stickleback), and shellfish (mussel), which have led Matson (1996) and Matson and Coupland (1995) to suggest that the origins of Northwest Coast culture lay in inland big game hunting traditions of the Plateau. They credit the Plateau Old Cordilleran Culture (see Butler 1961) as the probable ancestor to the early Pebble Tool complexes on the southern and central Northwest Coast. The sample sizes from the Old Cordilleran component at Glenrose, however, are very small for the mammal bones, with an MNI of 4 elk, 2 deer, and 2 seal (Imamoto 1976). The larger number of identified bones for marine fishes (Casteel 1976) and shellfish than mammal, thus suggests that the interpretation of an inland instead of a marine subsistence focus is tenuous. Also, Matson and Coupland (1995:74) have pointed out that "Unfortunately the units with the majority of the faunal remains were not radiocarbon dated. In the absence of direct dates, the only surety is that the faunal and seasonality information is older than 5000 [cal 5700] BP."

The earliest dated faunal remains from another early central coast site, the Namu site, are dated to approximately 6000 [cal 6800] BP in the Period 2 deposits. A preponderance of fish, sea-mammals, and marine waterfowl in the early period occupations suggest to Cannon (1996:117) "the establishment of a broad-based marine economy" by that time period. There is much less salmon in the Period 2 occupation than in later occupations, and harbour seal was the most abundant of the early mammals. Cannon (1996:119) notes, however, that while dolphins, porpoises, northern fur seal, and northern sea lion are present in the sea mammals identified, they are not a major part of the assemblage.

For the central coast, Coupland has argued, "maritime adaptations evolved on the central Northwest Coast between 5000 and 4500 [cal 5700-5100] BP." (1998:50), and that "Although marine resources were probably utilized on the central coast from the time of earliest human occupation at the end of the Pleistocene, a developed maritime adaptation did not become widespread in the region until about 4500 [cal 5100] BP, and characterizes the early coastal assemblages as "pre-maritime" Coupland (1998:36-39) He calls Bear Cove a "coastal Old Cordilleran" site, where "evidence of a developed maritime adaptation is equivocal," and that the site probably represents a seasonal occupation on the coast. In other words, "Coastal Old Cordilleran sites, including Glenrose...and Bear Cove reflect a movement — possibly a seasonal one at first — to a coastal environment." Coupland argues that early coastal peoples were descended from Clovis inland big-game hunting cultures because of "the presence of Clovis at the eastern margin of the central coast" (1998:39), by which he refers to the Wenatchee site in central Washington state (Mehringer and Foit 1990).

The case for a southern inland cultural origin of the early coastal traditions of the southern and central coast is very tenuous for several reasons. The first is that the Clovis Wenatchee site is locatedeast of the Cascade/Coast Mountain range in the central Plateau of Washington, not on the "margin of the central coast." The Cascade/Coast Mountains present a formidable geographical and cultural barrier to coastal-inland population movements and shared resource adaptations. To link the Wenatchee site to the early coast occupation seems improbable on topographical issues alone, notwithstanding the major differences in artifact technology between that and the Pebble Tool assemblages. Second, the probability that people may have traveled on a seasonal basis to the northern end of Vancouver Island (BearCove), or to the mouth of the Fraser River (Glenrose), from the inland Plateau across the highest mountain ranges on the continent, and then across the coastal waterways by boat, only to return at the end of "the season" seems highly improbable. Third, Coupland's (1998:36) argument that peoples were initially terrestrially adapted is logically inconsistent when he notes that, "the mountainous, heavily forested [coastal] terrain is not ideally suited to a terrestrial foraging way of life." Finally, the definition

Table. 7:6. Bear Cove Component III Shellfish.

SPECIES	Weight (gm)	Weight %
Saxidomus giganteus butter clam	11457.6	33
Protothaca staminea little neck clam	9293.1	27
Clinocardium nuttalli cockle	223.4	0.6
Tresus capax horseclam	152.2	0.4
Macoma spp. bent nose clam	50.0	+
Mytilus californianus sea mussel	617.2	1.7
Mytilus edulis bay mussel	56.3	+
Pecten caurinus Pacific scallop	1.6	+
Hiatella gillicana Gallic saxicave	0.2	+
Thais lamellosa wrinkled purple whelk	586.1	1.6
Thais emarginata short-spired purple whelk	1.5	+
Thais canaliculata channeled purple whelk	6.2	+
Thais sp. whelk	570.9	1.6
Searlesia dira spindle shell	15.1	+
Littorina sitkana Sitka littorine snail	30.8	+
Ceratostoma foliata leafy hornmouth	5.3	+
Calliostoma ligatum blue top-shell snail	8.0	+
Balanus cariosus acorn barnacle	11570.3	33
Amphineura sp. chiton	3.2	+
Katharina tunicata leather chiton	58.4	+
Cryptochiton stelleri gumboot chiton	18.5	+
Acmaeidae sp. limpet	26.6	+
Haliotis kamtschatkana northern abalone	2.3	+
Strongylocentrotus sp. sea urchin	0.4	+
Cancer sp. crab	0.1	+
Marine snail sp.	2.2	+
Land/fresh water snail sp.	1.0	+
Total identifiable shell	34755.9	93
Unidentifiable shell	2579.2	7
Total shell	37335.0	

of the coastal Pebble Tool Tradition as a "coastal variant" (Matson 1976) of the inland Old Cordilleran Tradition of the Plateau has no supportable ethnographic analogy.

Ames and Maschner (1999) also argue against a maritime-based subsistence pattern for early coastal occupations, referring to faunal data from Chuck Lake, Glenrose, and Bear Cove. They state that because of the preponderance of sea mammal bones, only the Bear Cove site is "a major sticking point for our model" (1999:26), but nevertheless dismiss the assemblage as evidence supporting a maritime economy due to "questions about porpoise behavior and the dating of the site" (1999:26). One is left to wonder what the questions are about porpoise behavior that negates a model for a maritime economy. The dating concerns the actual age of the Component I bones, which date to its terminal occupation (clearly a taphonomic preservation issue not unique to Bear Cove). They fail to point out however, that the same problems of dating are evident at the Glenrose site where the age of the fauna there is an unspecified "older than 5000 B.P." (Matson and Coupland 1995:74). In addition, Ames and Maschner (1991) give no explanation as to why they chose to ignore the early faunal data from the Namu site that Cannon clearly categorizes as a "broad-based marine economy" (1996:117).

In summary, to explain early coastal Pebble Tool sites such as Bear Cove, Glenrose, and, by inference, Namu, as both "seasonal" occupations and "coastal variants" of an inland big-game Plateau tradition called the Old Cordilleran (as defined by Butler 1961) ignores several fundamental issues. These issues include coastal site location, mountainous topographical barriers between the coast and the interior, different natural resource bases and the technology necessary to harvest them, and faunal analyses that indicates extensive use of sea fishes, sea mammals, and sea birds in the early occupation levels on the coast; all infer maritime-based adaptations. These data more logically support the idea of separate inland and coastal traditions from the beginning of Northwest Pacific occupation. To deny the Northwest Coast tradition its maritime heritage is similar to the problem of the "Great White Race" theory of the Mississippian Mound cultures where credit was not given to the local Indians for having built the mounds, but to an earlier more sophisticated race (—in this case the Clovis culture).

Hildebrant and Jones (1992), Colten and Arnold (1998), and Erlandson et al. (1998) address the significance of sea mammal hunting in the origins and evolution of maritime adaptations. This issue is of relevance to the Bear Cove fauna because of the relatively high percentages of sea mammal bones compared with land mammal bones from Component I. Hildebrant and Jones (1992) discuss the role of sea mammal hunting in the evolution of social complexity in coastal sites on the southern Northwest Coast (Oregon and California). They argue that after an initial elimination of easily caught seals and sea lions at rookeries in the early periods of occupation, people subsequently developed boats and the organized hunting of more difficult prey such as harbour seals and sea otters; this activity, in turn, led to technological and social organizational changes. Erlandson et al. (1998) and Colten and Arnold (1998) have critiqued this model, arguing instead that the faunal evidence indicates a shift to increased fishing activities in the later periods of prehistory on the southern coast, and that it was fishing, and not sea mammal hunting that eventually lead to maritime social complexity. Neither of these critiques, however, negates the important role of sea mammal hunting and the focus on the sea to the earliest marine occupations of the southern coast, but both suggest that its role in explaining the evolution of cultural complexity has been exaggerated by Hildebrant and Jones (1992). Erlandson et al. (1998), for example, discuss the faunal evidence from the early components at the Tahkenitch Lake site (8000 [cal 8900] BP) and Duncan's Point Cave site (8600 [cal 9600] BP), both of which are dominated by marine species in their early levels (i.e., by marine fish, sea birds, harbour seals, and unidentified sea mammals, as well as some land mammal [1998:11]). They suggest that sea mammals were one component of a diversified marine diet, although pinnipeds (seals and sea lions) "may have played a central economic role at some sites located near major rookeries" (1998:14). Likewise, Colten and Arnold (1998) re-interpret early period assemblages from Channel Island sites in California by converting bone counts to meat weights, reporting that the earliest faunal remains (7500-2600 [cal 8400-2600] BP) are dominated by shellfish and sea mammals. However, as noted by McCartney et al. (1998:5), "certain accomplishments of maritime peoples—for example, boat construction, seamanship, and the hunting of large and dangerous sea mammals far from shore—must rank among the impressive cultural achievements of cultural evolution."

Since the earliest initial colonization of North America, people have probably lived all along the coastlines of the Northwest Coast culture area from Alaska to Oregon. Highly mobile, traveling in watercraft, small groups of people fished and hunted the coast for sea fishes, sea mammals, and sea birds, in addition to some land hunting for fur-bearing animals, leaving a spotty record of their presence on the land as evidenced by the few sites with radiocarbon ages greater than 5000 [cal 5700] BP. They probably originated from northern maritime peoples of Northeast Asia and Beringia during the Late Pleistocene. Tabarev (2001:512) reports that the earliest sites in the Pacific maritime region of the Russian Far East fall in the 15-14,000 [cal 17,900-16,700] BP. age, and they are microblade and core assemblages. In addition, "incontrovertible evidence from the western Pacific (Japan, Australia) indicates that seaworthy boats capable of ocean crossings were in the cultural repertoire of at least some late Pleistocene hunter-gatherers" (McCartney et al. 1998:2). Recently, Dixon (1999:251) has suggested that the Clovis weapon system may have been derived from an earlier coastal harpoon technology associated with marine mammal hunting. He speculates that if people first entered the North American continent via the coast, later moving inland to hunt large terrestrial game, then "the Clovis weapon system may have its origins in coastal marine mammal hunting weapons technology, which was subsequently adapted to hunting large terrestrial mammals" (1999:251). Dixon's (1991) overview of all archaeological data pertaining to the question of human origins in North America supports a model of the earliest colonizers being marine-adapted peoples. The research at Bear Cove would thus support a general statement that the search for pre-Clovis must lie in Pacific Northwest coastal archaeology.

The "coastal migration route" hypothesis, first proposed by Fladmark (1979), has generally been considered more controversial or problematic than the hypothesized inland ice-free corridor route of entry. This is partly due to the effect of sea-level rise that has drowned the earliest part of the coastal archaeological record, but also to the perception that the coast of Alaska during the Late Pleistocene would have presented an impassable glaciated barrier to travel from Beringia. Yesner (1998:206-207) has recently reviewed the geological literature, which indicates that icebergs were no longer present in the Gulf of Alaska after 13,000 [cal 15,600] BP, and that on the Alaska Peninsula deglaciation was well underway by 11,500 [cal 13,500] BP. Other geological and paleoecological studies support the interpretation of major ice-free areas along the coast of British Columbia by 13,000 [cal 15,600] BP (Hebda 1983, Blaise et al. 1990; Josenhans et al. 1995, 1997). The finding of Black Bear bones on the Queen Charlotte Islands between 9800 and 9400 [cal 11,200-10,600] years ago (Fedje et al. 2001) may also support the idea of Late Pleistocene coastal refugia. Another possibility, argued on the basis of artifact similarity, but not subsistence pattern (although there is some evidence of salmonid use), is that the early coastal traditions had their roots in the inland Nenana complex of central Alaska, which later developed a coastal adaptation as an *in situ* North American feature during the early Holocene (R. Carlson 1998: 30-31). In either scenario, a maritime subsistence pattern is present with initial occupation of the coast, which is derived from northern (i.e. Beringian), populations — not from the southern inland Plateau or Plains. The recent questioning of the timing and accessibility of the inland ice-free corridor (Mandryk et al. 2001; Mandryk 2001) may finally put to rest the hesitancy to accept the coast as a route of early migration for people into the New World.

Along the Northwest Coast there is a truncated archaeological record of early settlements, unquestionably due to sea level rise. However, enough is intact from a few site components of the 10,000 - 5000 B.P. time period to understand what was fundamental to the subsistence pattern of the first occupation of the coast. That it was distinctively different from the inland Paleoindian cultures of Clovis, Protowestern, and/or Old Cordilleran that focused on hunting of terrestrial big game is apparent. It is different not only in the distinctiveness of the artifact assemblages, but also in the faunal remains (Carlson 1995). Roy Carlson states, for example, that "it is apparent that Matson and Coupland (1994) have never examined the collections on which the concept of the Protowestern is based" (1995:13), that the "Protowestern construct ignores significant differences in the lithics of sequent assemblages" (1995:13), and that "artifact assemblages typified by pebble tools and foliate bifaces... are earlier on the Coast and later in the Interior" (1995:14). In regards to faunal data, he (1995:14) also notes that "Quite a lot of data would need to be explained away if one were to accept a general land mammal hunting orientation as the primary subsistence base" on the Coast before 4500 [cal 5100] BP.

The faunal remains at Bear Cove, and other early assemblages such as Chuck Lake, Namu, Kilgii Gwaay, and Glenrose, indicate a subsistence pattern based on the harvesting of sea fishes, sea mammals, sea birds, some shellfish, and some land mammals. It is surprising that the use of both salmon and shellfish, long considered the signature species of the Northwest

Coast, appear to have a variable record of use in early sites. Namu, for example, sees a heavy dependence on salmon (89% of fish in early levels), with no shellfish (Cannon 1996, 1998); Glenrose has small amounts of salmon and some shellfish (Matson 1996); Bear Cove has very small amounts of salmon (3%) and no shellfish; Chuck Lake has small amounts of salmon (3.5%) and a definite shell midden (Ackerman et al. 1985 in Moss 1998:103); and Kilgii Gwaay has only a single salmon vertebra (Fedje et al. 2001). The lack of shellfish in the black zone underlying later shell midden deposits at both Bear Cove (Component II) and Namu may be a function of shoreward erosion of earlier middens (for which the black non-shell layers are remnants of the "back" of the midden under possible house floors), rather than lack of shellfish utilization (R. Carlson 1993:19-20, 1998:25). There are good fossil records of molluscs from near-shore glacial marine deposits of the late Pleistocene and early Holocene that indicate an abundance of important food resources such as butter clams, littleneck clams, and bay mussel (Wagner 1959; Hebda and Frederick 1990:327).

What is characteristically "maritime" about these early faunal assemblages are not salmon and shellfish, but the prevalence of sea fishes, sea mammals, and sea birds, all of which probably required some type of watercraft for harvesting. It could also be argued that shellfish do not represent "maritime adaptations" *per se* because they are essentially a *land-gathered* resource. Similarly, other than the few incidentals caught in trolling for sea fishes, salmon is essentially not marine-harvested either; it is a riverine or estuarine resource. Despite a maritime focus, the hunting of land mammals was also practiced if for no other reasons than providing furs for clothing and bones for tools.

The issue of cultural developments on the Northwest Coast should be re-focused to look not at the evolution and increasing complexity of maritime adaptations from the Early to the Late Periods, but at an evolution from Early maritime to Late terrestrial subsistence patterns. In this model, an initially seafaring, mobile, maritime fishing and hunting pattern (of sea fishes and sea mammals) of the initial colonizers, became one of people becoming more settled on the land after 5000 [cal 5700] BP, learning how to harvest riverine and estuarine resources (salmon, eulachon), using land-based technology of weirs, but also gathering inter-tidal (littoral) terrestrial shellfish, and hunting coastal forest game animals. Early maritime adaptations gave way to the inclusion of more terrestrial adaptations, including the technology of weirs and a more sedentary settlement pattern, becoming land-focused to the rivers, to the intertidal land, and to the forest resources, after the initial colonization phase of small mobile ocean-oriented fisher-hunters. This re-orientation towards the land after the Early Period eventually led to an over-production of river-caught salmon in more efficient fishing weirs, which provided the catalyst for the development of preservation and storage technologies (cache pits initially) (see R. Carlson 1998, Moss et al. 1990; Moss 1998; Moss and Erlandson 1998). A comparison of the percentages of sea mammal versus land mammal between the oldest components in Area 2 at Bear Cove with that of the later components in Areas 1 and 3 (Figure 7:18) shows the increasing emphasis on land mammals in later periods, supporting a model for a shift from marine to terrestrial resources over time.

Another important issue regarding resource utilization on the coast is that once cedar forests reached climax growth around 3000 [cal 3200] years ago (Hebda and Matthewes 1984), the raw materials for making planks became available. That, with a new woodworking technology of wedges and mauls, produced planks large enough to be made into huge storage features. Although not usually categorized this way, the Northwest Coast plank house was essentially a food storage and preservation facility that was also conveniently usable as a residential structure. If this were not so, there would be no reason to put so much labour into building these large houses with enormous high rafters. They could not have been built for residential comfort since they were probably drafty, smoky, and cold, but instead were built as warehouses that were ideal for storing vast quantities of salmon in a very wet environment. The smoke from the residential fires had the added benefit of keeping smoked fish preserved longer. The high rafters were hung with the season's produce, and the vast wall space provided storage areas for boxes of foodstuffs, including vats of eulachon oil and dried plants. This is not unlike the Pueblo cultures of the American Southwest where people eventually came to store their surplus agricultural production in large above-ground pueblo storage facilities that also functioned as residential buildings (an evolution from earlier non-agricultural pithouse dwellers).

Such large structures necessitated communal building skills, and such a large space may have led to or encouraged multiple family occupations that gave rise to amalgamations of families into extended kin networks, or lineages and clans, within houses. The improvements on storage of surplus food with the building of plank houses led to increases in population, ceremonialism (feasting), and competition between houses for resources. Competition over resources created disputes that ultimately led to the formalization of resource ownership rights. Ownership rights, in turn, created status differentiation between lineages or houses, and led to the creation of crest art. Status was affirmed by potlatching and redistribution between houses and, eventually, between villages. Import of exotic goods also served to affirm status, which necessitated travel outside of one's resource sphere, and led to a technology for producing large ocean-going trade canoes (huge dugouts of cedar made with adzes), and to the development of extensive trade networks up and down the coast. Any potential crashes in the salmon resource would put a damper on affluence if people weren't being fed. This may have been the case in the Fraser Delta during the Gulf of Georgia phase when there is an apparent decline in status differentiation following Marpole, possibly related to rock slides in the Fraser canyon that blocked salmon runs, that also effected interior pithouse villages (see Hayden and Ryder 1991). Europeans eventually arrived with new exotic goods that re-energized the system with increased potlatching as affirmation of status, later abated by missionaries and de-population due to disease.

In summary, the focus on salmon as a preservable, storable food surplus, with the resultant changes in social organization and settlement pattern, has its roots in the earlier *fishing* of marine fish and hunting of sea mammals. The initial subsistence focus on fish and aquatic resources is what led to the intensification of the salmon fishery. The idea of early coastal peoples initially being specialized terrestrial big-game hunters, and later becoming maritime adapted, appears unlikely. In ethnographic accounts of other aboriginal hunter-gatherers who engage in minimal fishing, such as the Sekani peoples of the northern Rocky Mountains, it is written that "even to this day they retain the scorn of true hunters for fishermen, and speak contemptuously of the Carrier as "Fisheaters" (Jenness 1932:379). The origins of maritime cultures on the Northwest Coast must logically be viewed in the context of late Pleistocene maritime cultures to the north as far as the shores of Beringia or perhaps beyond, which may have undergone an even earlier maritime adaptation.

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