

APPENDIX B

Namu Periodization and C-14 Chronology

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Dates from 38 radiocarbon samples (Table B-1) from Namu provide a chronological framework spanning 9700 C-14 years before the present, which is equal to perhaps 11,000 calendar years ago. Four horizontally separate parts of the Namu site (Fig. B-1) have been dated by C-14 and are designated as follows: the Main Excavation or Main Trench (Hester and Nelson 1978, Fig. 13 FS 1-9; R. Carlson 1979, Fig. 2); the Rivermouth Pits or Trench (R. Carlson 1979, Fig. 2); Test Pits 1-5 (R. Carlson 1979, Fig. 2); and the Front Trench (Hester and Nelson 1978, Fig. 13 FS 10,12). Other excavation units shown in Figure B-1 have not yielded sufficient information to justify dating.

Namu has been subjected to three episodes of C-14 dating. The first consisted of 14 dates run by the Gakushuin Laboratory (Gak) in 1969-70 for the University of Colorado Bella Bella Prehistory Project (Hester and Nelson 1978, Table 3 and Figs. 77, 78) on samples excavated at that time. All of the Gakushuin Laboratory dates listed in Table B-1 are from this episode. The second episode of dating took place on samples excavated in 1977 and 1978 as part of the Simon Fraser University Namu Project (R. Carlson 1979). The 1977 samples were dated by the Washington State University Laboratory (WSU) in Pullman, and the 1978 samples by either the University of Waterloo Laboratory (WAT), or the new Simon Fraser University Laboratory (SFU). The third dating episode took place in 1982 when bone samples were selected from seven previously excavated human skeletons as part of a study of the Namu skeletal remains (Curtin 1984) with some of the dates from the Saskatchewan Laboratory (S) and some from SFU. All of the dates on bone samples in Table 1 are from this study. The dates from the Main Trench and Rivermouth excavations are plotted on the profile drawings in Figures B-2 and B-3.

There has been considerable recent progress in correcting C-14 dates by calibrating them with tree ring dates. Both uncalibrated and calibrated dates for Namu are given in Table B-1. The calibrated dates are based on the computer program provided by the Quaternary Isotope Laboratory at the University of Washington (Stuiver and Reimer 1987). In those instances in which the computer program gave several possible calibrated dates, those dates have been averaged to give the single calibrated date listed in Table B-1. Since this program does not extend beyond the 7800±200 B.P. C-14 date, the four oldest dates (8570±90 through 9720±140) have been calibrated using the following calibration formula: Calibrated B.P. Age = (C-14 B.P. Age × 1.05) ± 470 years (Stuiver et al. 1986:969-979). Calibration of the oldest date (9720±140 B.P.) using uranium-thorium calibrations (Bard et al. 1990: Table 1) would actually make this date older than the 10,676 date obtained using the formula, and place it about 11,090 cal. years B.P. Hence, the beginning of Period 1 at 11,000 B.P. is not without justification. Overall when combined with the stratigraphic data from the site, a sequence of six chronological periods emerges from the data.

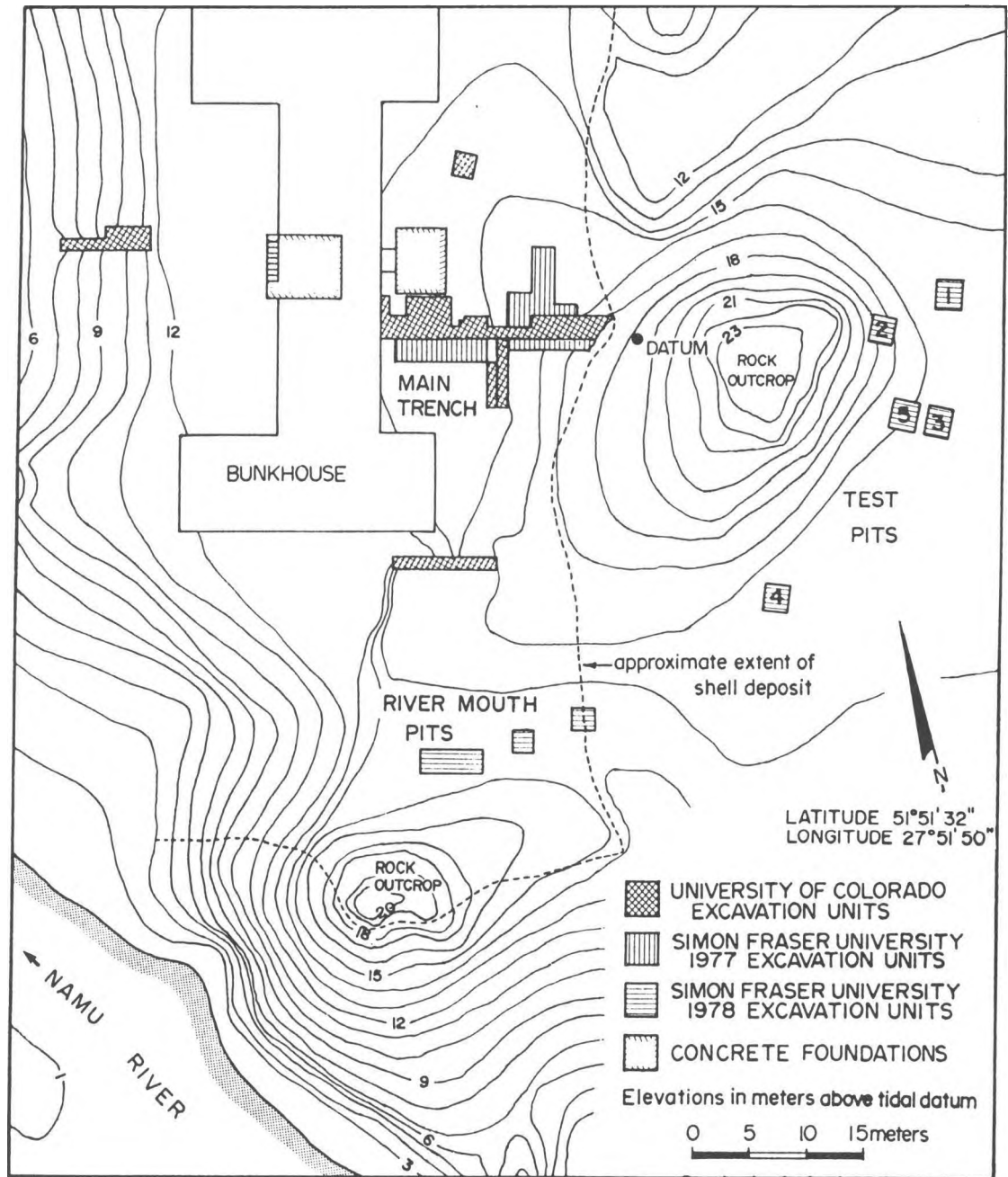


Figure B-1. Map of the Namu Excavations.

Period 1 - 11,000 to 7000 B.P.

Two dates of this period, 9140 ± 200 and 7800 ± 200 , are from the very back of the Main Trench East (Hester and Nelson 1978, Fig. 78, dates nos. 3 and 4) where deposits rest against a bedrock outcrop (Fig. B-2). A number of non-shell humus layers dating to different time periods converge toward the eastern end of this trench. In the original analysis the lowermost of the converging strata was called the "black matrix" or Stratum II and its entire content was considered to extend backward to the time of these two dates (Hester and Nelson 1978, Figs. 74, 75), even though both dates were at the far eastern margin of the deposit. Subsequent analysis and dating of samples excavated in 1977 indicated that these two dates came from an attenuated portion of the "black matrix" in which there were a few artifacts, but no faunal remains. This earliest part of the "black matrix" was subsequently designated as Stratum IIa; it is 60 cm. thick at its maximum, rests on glacial till, runs 110 cm. east-west and no more than 2 m. north-south (Fig. B-2). A similar situation exists in the Rivermouth Trench in which the lowermost deposit, Stratum IIa, is devoid of faunal remains.

The remaining four dates for Period 1 are all from the Rivermouth Trench (Table B-1, Fig. B-3). The oldest date, 9720 ± 140 , is from the margin of the underlying sub-soil and the earliest cultural layer, Stratum IIa, at a surface depth of 390 to 395 cm. in association with flakes from the Period 1 artifact assemblage. The 9000 ± 140 date is from a surface depth of 370 to 380 cm., and the 8750 ± 90 date from below a large sandstone slab at a surface depth of 340 to 350 cm. The final dated sample of this period, 6550 ± 90 , was taken from the wall profile of the excavation toward the top of Stratum IIa at a surface depth of 330-340 cm. specifically for dating the end of the pre-shell occupation. Shellfish remains and some bones do occur in pits and pockets at lower surface depths, but these occurrences are intrusive from the overlying shell bearing layers. Stratum IIa is black to brown in color, runs throughout the Rivermouth Trench directly over glacial till, varies from 20 to 70 cm. in thickness, and contains a large number of disintegrating sandstone slabs. There is no clear stratigraphic break between Stratum IIa and IIb other than for the locations of elongate thin lenses of disintegrated shell which mark the beginning of the deposits assigned to the next period.

The absence of bone artifacts and faunal remains in the Period 1 deposits is related to soil acidity. This acidity is much reduced later because of the alkaline content of mollusc shells which first appear in Period 2. The artifactual remains of this period are mostly lithic workshop debris from cobble reduction, but do include finished as well as unfinished tools. Microblade technology based mostly on imported obsidian is added to the cultural inventory at about the middle of Period 1.

Period 2 - 7000 to 6000 B.P.

The deposits of Period 2 are differentiated from those of Period 1 by observable color differences, and by the appearance of seashells, bone faunal remains and bone tools in both the Main Trench and the Rivermouth Trench. Stratum IIb is the field stratum designation for deposits of this period.

In the Main Trench bands of a red/brown iron deposit are found and appear to have formed in situ; they do not represent depositional events. Stratum IIb extends 11 m. west from the bedrock outcrop at the eastern end of the excavation and is present throughout the north-south extent of the excavation; it reaches a maximum of 70 cm. in thickness, and rests on glacial till except at its far eastern end where it covers Stratum IIa. Ash laminae, rock concentrations suggesting hearths, and burials occur in the deposit. Bone occurs throughout this deposit, but shell is limited to small lenses of mussel most closely associated with the 5340 ± 90 date. Five dates (Table B-1, Fig. B-2) were obtained on samples from Stratum IIb in the Main Trench: 6060 ± 100 , 5740 ± 100 , 5370 ± 170 , and 5240 ± 90 were from separate charcoal concentrations, and one date, 5590 ± 100 , was on Burial 1.11B.1 (Curtin 1984:159). This burial had previously been dated tentatively to 4540 C-14 years B.P.

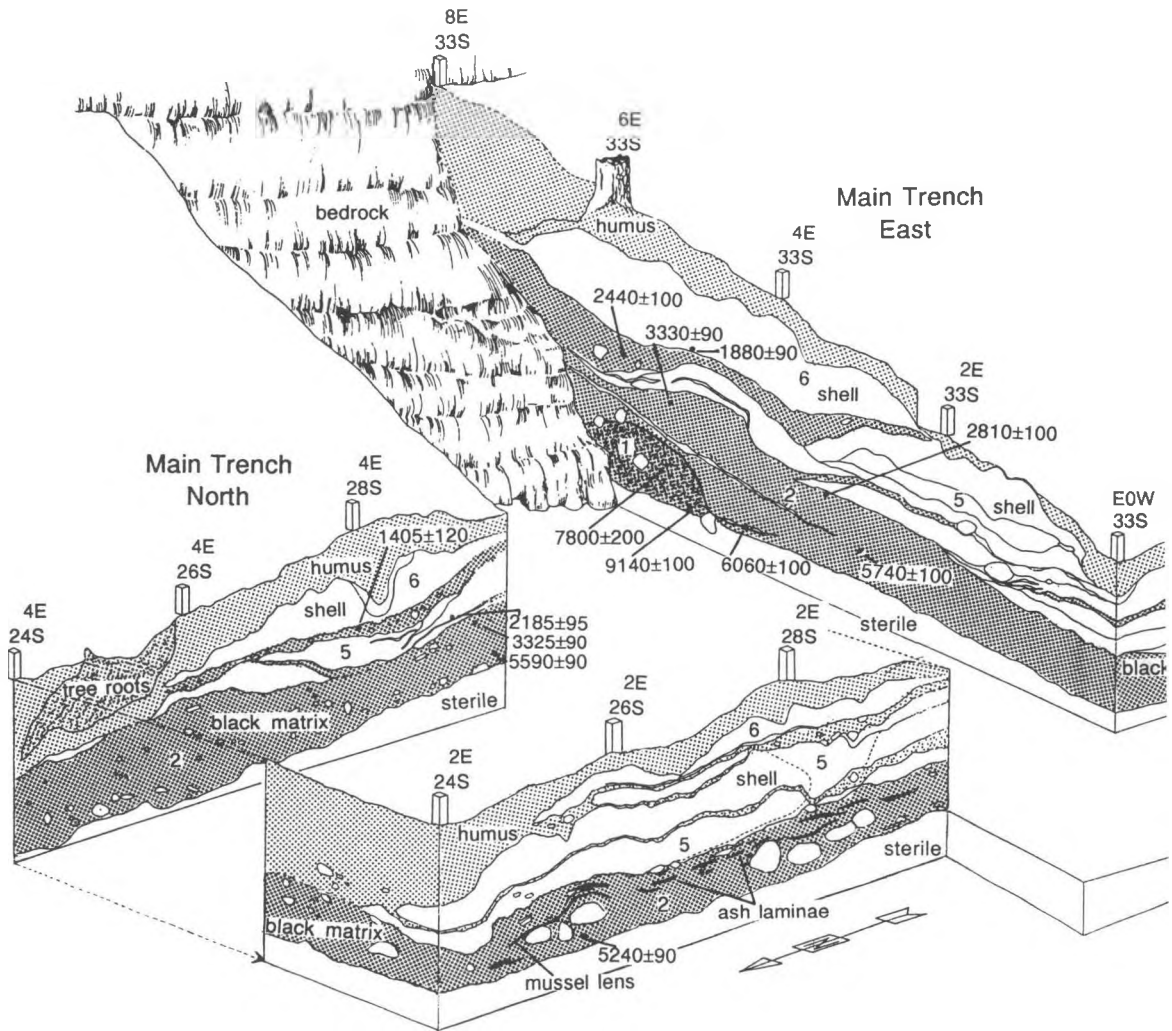
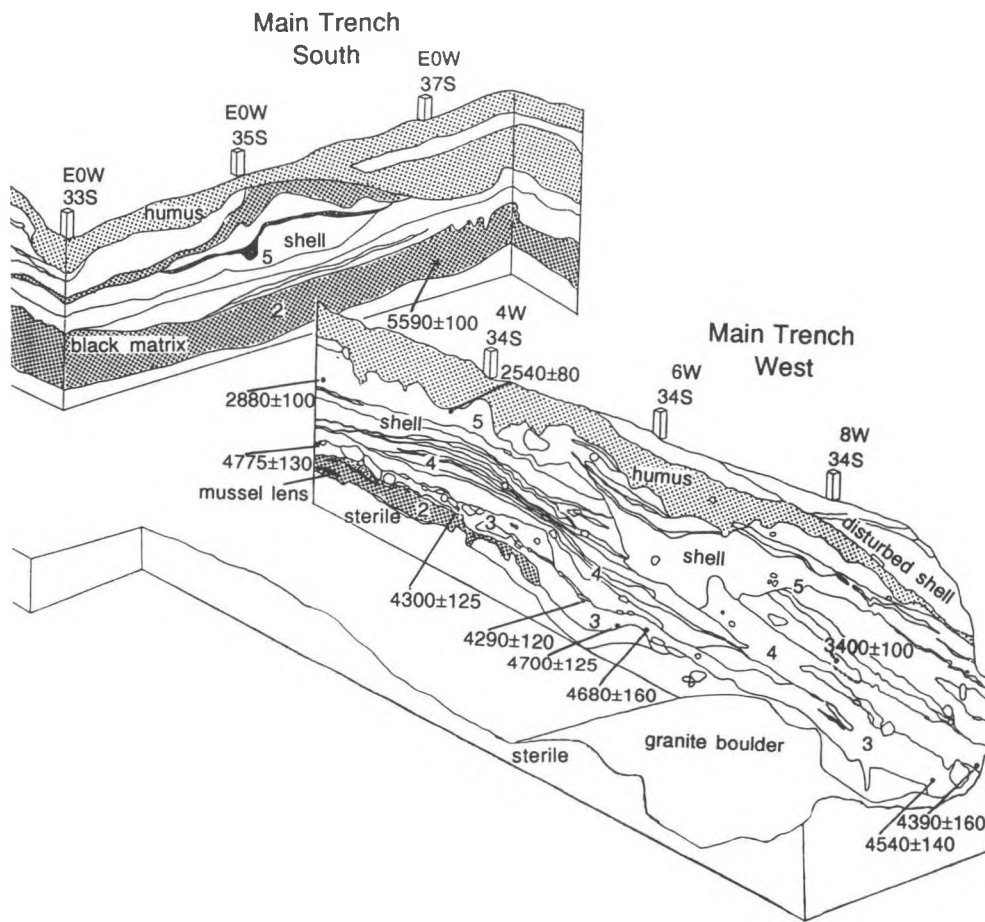


Figure B-2. Stratigraphy and C-14 dates in the Main Trench. Numbers 1-6 refer to the time periods to which the various strata have been assigned on the basis of associated C-14 dates and superposition. The profile at 2E, 24-30S has been displaced in order to show both walls of the excavation unit. The sterile layer underlying the cultural deposit is glacial till.



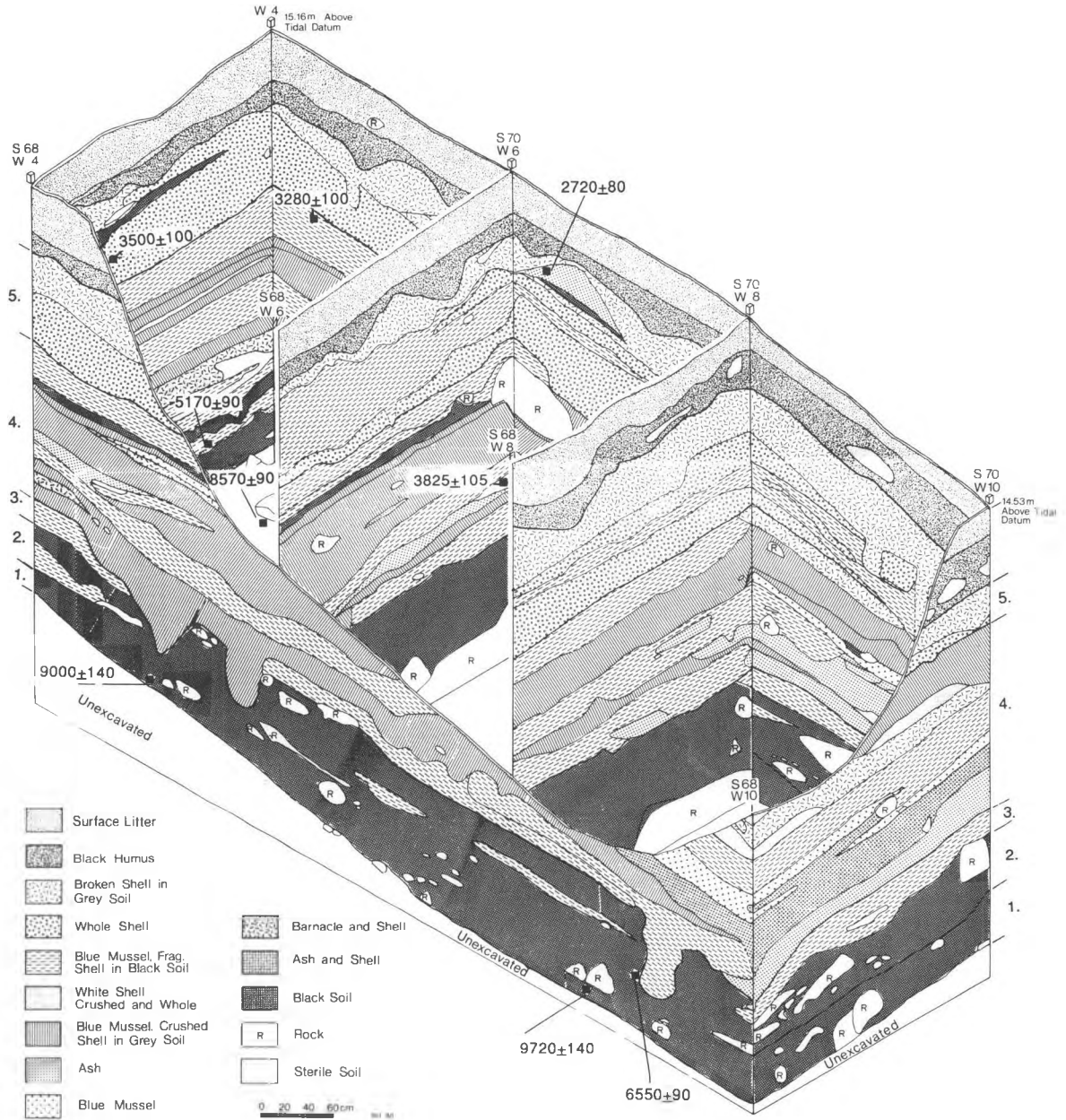


Figure B-3. Stratigraphy and C-14 dates in the Rivermouth Trench. Numbers 1 - 5 refer to the time periods to which the various strata have been assigned on the basis of associated C-14 dates and superposition. The lowermost part of the cultural deposit rests on sterile glacial till about 6 meters above present highest high tide.

(Hester and Nelson 1978:32) following a policy of dating burials to the overlying layer rather than to the deposit in which they were found. The 5740 ± 100 sample was directly associated with flakes and hearth stones.

The only date on the deposit in the Test Pits belongs to Period 2. The 5700 ± 360 date came from a small charcoal sample at the bottom of the cultural layer in Test Pit 2 at a surface depth of 88 cm. Stratification in all of the test pits at the back of the site (Fig. B-1) was uniform with glacial till succeeded by a black implementiferous layer with a few fire cracked rocks, followed by a sterile humus layer and the forest surface. No shell or bone was found in the Test Pits, and the charcoal sample dated was the only one large enough to date given the dating technology available at the time. This single date plus the appearance of the cultural layer and its artifact content indicate that the material from the Test Pits all belongs to Period 2. The absence of shell in the test pits tends to corroborate the general rule of thumb that the greater the distance from the shoreline, the less the probability of shell deposition.

Stratum IIb in the Rivermouth Trench is black, up to 40 cm. in thickness, and contains a number of long thin lenses of shell. The laminae are clearly shell, but are so soft and mushy that individual shells cannot be identified. The single date of this period from this excavation unit, 5170 ± 90 , came from scattered bits of charcoal in the lowermost shell lens at a surface depth of 310 to 320 cm.

The lithic industries of Period 1 including microblades continue throughout Period 2.

Period 3 - 6000 to 5000 B.P.

Deposits dating to Period 3 are not well represented. All Period 3 radiocarbon dates are on samples from the Main Trench West (Fig. B-2). The three oldest dates, 4775 ± 130 (Burial SFU 77-2) and 4700 ± 125 (Burial 4G8) and 4680 ± 160 (Burial 4G2), are all from the western portion of the Main Trench. All are from multiple burials in what was clearly a designated burial area if not actually a burial house at this time period. These dates place these burials and their associated grave goods 500 to 1000 years earlier than previously estimated. The fourth date, 4540 ± 140 , is on charcoal from the lowest shell layer in this same part of the excavation. The deposits themselves are variable; humus and fragmented shell with lenses of mussels and clams is the most common matrix, but there is also a layer of barnacles and clams over some of the burials. More deposits were probably present west of the Main Excavation before the Bunk House was built.

There are no Period 3 C-14 dates from the Rivermouth Trench. The only deposit which falls stratigraphically in this period is a 10 to 20 cm. thick layer of blue mussel and gray soil which is found throughout the Rivermouth Trench at a surface depth of approximately 280 to 290 cm. between the strata belonging to Periods 2 and 4.

Period 4 - 5000 to 4000 B.P.

Deposits of this period make up almost half of the cultural layers from the Rivermouth Trench, but they are only weakly represented in the Main Trench.

Two of the dates of this period, 4390 ± 160 and 4300 ± 125 , are on burials from the western portion of the Main Trench; they represent continued use of the circumscribed burial area which began in the previous period. The third date, 4290 ± 120 , came from charcoal in the deposit near these same burials (Fig. B-3). The deposits consist mostly of matrices of humus and fragmented shell alternating with layers of clams and barnacles. There is no clear separation from Period 3 deposits, and arbitrary levels have been used as a boundary. From 2 to 6 meters west two dark bands of humus mark the boundary with the succeeding deposits of Period 5.

Table B-1. Radiocarbon Dates from the Site of Namu (EISx-1).

Period	C-14 Date B.P.	Tree-Ring Calibrated Date B.P.	Material	Lab. No.
contact				
6	480±80	(521)	Charcoal	Gak 3121
	680±90	(668)	Charcoal	Gak 3122
	980±100	(927)	Charcoal	Gak 3123
	1405±120	(1308)	Charcoal	WSU 1942
	1470±80	(1361)	Charcoal	Gak 3125
	1840±80	(1769)	Charcoal	Gak 3124
	1880±90	(1850)	Shell	Gak 3118a
2000 B.P.				
5	2185±85	(2226)	Charcoal	WSU 1939
	2440±100	(2527)	Charcoal	Gak 3119
	2530±160	(2650)	Bone	SFU 341
	2540±80	(2672)	Charcoal	WSU 1938
	2720±80	(2818)	Charcoal	SFU 10
	2810±100	(2922)	Charcoal	Gak 2714
	2880±100	(3013)	Charcoal	Gak 2713
	3280±100	(3516)	Charcoal	SFU 17
	3330±90	(3608)	Charcoal	WSU 1944
	3400±100	(3660)	Charcoal	Gak 2715
3500±100	(3774)	Charcoal	SFU 19	
4000 B.P.				
4	3825±105	(4218)	Charcoal	SFU 1
	4290±120	(4862)	Charcoal	Gak 2717
	4300±125	(4864)	Bone	S2327
	4390±160	(4928)	Bone	SFU 343
5000 B.P.				
3	4540±140	(5200)	Charcoal	Gak 2716
	4680±160	(5381)	Bone	SFU 342
	4700±125	(5380)	Bone	S2328
	4775±130	(5525)	Bone	S2326
6000 B.P.				
2	5170±90	(5940)	Charcoal	WAT 451
	5240±90	(5969)	Charcoal	WSU 1943
	5590±90	(6375)	Charcoal	WSU 1947
	5590±100	(6375)	Bone	SFU 344
	5700±360	(6480)	Charcoal	WAT 456
	5740±100	(6506)	Charcoal	WSU 1940
	6060±100	(6921)	Charcoal	WSU 1941
7000 B.P.				
1	6550±90	(7431)	Charcoal	WAT 517
	7800±200	(8559)	Charcoal	Gak 3120
	8570±90	(9468)	Charcoal	WAT 516
	9000±140	(9920)	Charcoal	WAT 519
	9140±200	(10067)	Charcoal	Gak 3244
	9720±140	(10676)	Charcoal	WAT 452
11000 B.P.				

In the Rivermouth Trench the strata of this period consist of broken and scattered shell in a gray humic matrix with lenses and bands of blue mussel, ash and fire cracked rock, and crushed clam shell. It reaches a maximum thickness of 140 cm. The one dated carbon sample gave a date of 3825 ± 105 . This sample came from Field Stratum IIIa at a depth of 280 to 285 cm. below the surface and was taken in order to date the beginning of the major shell accumulation in this excavation unit. This deposition terminates with Stratum IV, a layer of whole shell, which belongs to the next period.

Period 5 - 4000 to 2000 B.P.

The deposits (Field Strata 5 and 6) of Period 5 in the Main Trench achieve their maximum thickness of 120 cm. at the western end of the excavation. They consist of matrices of humus and shell fragments with layers of mussel, barnacles, clams and ash. A layer of humus with no shell at the eastern end of the Main Trench also belongs in this period. There are seven stratigraphically consistent dates from Period 5. The earliest date, 3400 ± 100 , is on Field Stratum Vb. The next youngest date, 3330 ± 90 , on Field Stratum Vc was obtained on a sample taken in an attempt to differentiate Stratum II from Vc at the far eastern end of the Main Trench where the convoluted strata thin and merge (Fig. B-2); a date of 2810 ± 100 from a sample taken two meters to the west at about the same depth (Hester and Nelson 1978, Fig. 78, sample #5) also indicates that the upper part of the black matrix belongs with this period rather than earlier. The date of 2540 ± 80 on charcoal from the uppermost layer of shell below the humus marks the termination of cultural deposition in the Main Trench West. Two dates, 2440 ± 100 and 2185 ± 95 , mark deposits of Period 5 in the eastern and northern parts of the Main Trench.

The deposits of this period in the Rivermouth Trench are primarily layers of whole shell and lenses of whole shell within a matrix of gray humus and broken shell. There are also bands of blue mussel, ash, and fire cracked rock. The maximum thickness of this deposit is 140 cm. Four samples from the Rivermouth Trench (Fig. B-3, Table B-1) date to this period. The earliest, 3500 ± 100 , was obtained on scattered charcoal from Stratum IV, a layer of whole shell, at the eastern end of the excavation unit. The next youngest date, 3280 ± 100 , came from immediately below it in Stratum III d. These two dates seem to constitute a slight stratigraphic reversal, but since there was only 10 cm. difference in depth between the samples, and there is only a 20 year gap between the outer limits of their standard deviations, this reversal is insignificant; averaging these two dates would probably produce the most valid date. The next sequent date, 2720 ± 80 , was on concentrated charcoal from near the top of Field Stratum IVb. The final date, 2530 ± 160 , was obtained from burial 78-1 which was also in the top of Stratum IV. The succeeding thick humus deposit, Stratum V, was sterile of cultural material except for some shell lenses which are probably borrow material from interring Burial 78-1.

Period 6 - 2000 B.P. to Contact

Cultural deposits dating to Period 6 are present only in the Front Trench and in the eastern and northern portions of the Main Trench (Fig. 2). No work was done in the area of the Front Trench in 1977-78.

In the eastern portion of the Main Trench the deposits consist of clam and mussel shell in a humic mix; burials are found in these shell deposits. Several depositional episodes are indicated by intercalated humus layers with differing C-14 dates. The 1405 ± 120 B.P. charcoal sample came from Field Stratum 7, a black, shell-free, fine humus layer underlying Burials 77-10 and 77-11, which were covered with the shell midden of Field Stratum 8 at the very back of the excavation. The 1880 ± 90 date (Fig. B-2; Hester and Nelson, Fig. 78, date no. 2) apparently belongs to a slightly earlier shell deposition in the same part of the site, although both deposits were considered to be part of Stratum 8 during the field investigation and both do date to Period 6.

Table B-2. Radiocarbon Dates by Main Excavation Unit and Period.

	Front Trench	Main Trench	Rivermouth	Test Pits
contact				
	480±80 (521) 680±90 (668) 980±100 (927)			
6	1470±80 (1361) 1840±80 (1769)	1405±120(FS 7) (1308)		
2000 B.P.		1880±90(FS 8) (1850)		
		2185±85(FS 6) (2226) 2440±100(FS 7) (2527) 2530±160(B78-1) (2650) 2540±80(FS 5d) (2672)		
5		2810±100(FS 5) (2922) 2880±100(FS 6a) (3013)	2720±80(FS 4b) (2818)	
		3330±90(FS 5c) (3608) 3400±100(FS 5b) (3660)	3280±100(FS 3d) (3516)	
4000 B.P.			3500±100(FS 4a) (3774)	
			3825±105(FS 3a) (4218)	
4		4290±120(FS 4b) (4862) 4300±125(B 212E1) (4864) 4390±160(B 4J1) (4928)		
5000 B.P.				
3		4540±140(FS 4a) (5200) 4680±160(B 4G2B1) (5381) 4700±125(B 4G8) (5455) 4775±130(B 77-2) (5525)		
6000 B.P.				
			5170±90(FS 2b) (5940)	
2		5240±90(FS 2b) (5969) 5590±90(FS 2b) (6375) 5590±100(B 1.11B.1) (6375)		5700±360(FS 2b) (6480)
		5740±100(FS 2b) (6506) 6060±100(FS 2b) (6921)		
7000 B.P.				
			6550±90(FS 2a) (7431)	
1		7800±200(FS 2a) (8559)	8570±90(FS 2a) (9468) 9000±140(FS 2a) (9920)	
		9140±200(FS 2a) (10067)	9720±140(FS 2a) (10676) 1	
1100 B.P.				

FS = Field Stratum B = Burial Number () = Tree Ring Calibrated Date

Five carbon samples from the Front Trench yielded ages ranging from 1840 ± 80 to 480 ± 80 B.P. (Hester and Nelson 1978, Figs. 21, 77) and indicate build-up of three vertical meters of deposit in this part of the site during this period. There is a slight reversal of dates in the lower part of this excavation unit, but it does not alter the overall placement of all the material from the Front Trench in Period 6. Deposits dating to Period 6 are not present in the area between the Front Trench and the eastern part of the Main Excavation. The uppermost humus layer in the Main Excavation West caps Stratum 6 deposits belonging to Period 5, and the remaining part of the intervening area is covered by the Bunkhouse (Fig. B-1). It is probable that deposits of this period were present in this intervening area, but were removed as part of levelling for the building of the large bunkhouse.

Although no deposits with European trade goods dating to the contact period were discovered in the excavation, the youngest C-14 date, 480 ± 80 B.P., is barely prehistoric. The ethnographic evidence indicates that the site was used in the historic period. Evelyn Windsor and Jennifer Carpenter of the Waglisla Cultural Center brought Alex Campbell, the eldest Bella Bella with traditional ties to Namu, to the excavations in 1977. According to Mr. Campbell, Namu was the site of the village of Mah'was. According to Neville Lincoln of the SFU linguistics department, the name Mah'was translates as "loading place." Mrs. Windsor ventured the possibility that the name Namu came from Lake Na'wamu which is about a kilometer inland and whose outlet, the Namu River, is at the site.

Other Radiocarbon Dates

Two dates are inconsistent with those cited above and have been discounted in building the preceding chronology. The first (WSU 1945) dated 108.4% modern, and the second (WSU 1946) dated 1640 ± 130 B.P. Both samples were from Stratum IIb and should have dated in the 5000 to 6000 B.P. range. Both samples were taken in 1977 from locations very close to the margins of the earlier 1969-70 excavations, and contamination with modern carbon may have occurred during the intervening period.

The preceding chronology demonstrates that in terms of present knowledge Namu is the longest occupied site in British Columbia. The dating also indicates the complexities of shell midden stratification when sites are occupied for very long periods.

