Appendix III: ANALYSIS OF EAGLE LAKE FLOTATION SAMPLES

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Tables

Introduction

A total of 26 flotation samples (Table III-1 and III-2) were taken from Eagle Lake sites in the 1979 and 1983 seasons. Of these, 17 (Nos. 1-17) were from the Bear Lake site (EkSa 36), 3 (Nos. 26-28) from the Boyd site (EkSa 32), 4 (Nos. 29-32) from the Shields site (EkSa 13), one from Henry's Crossing, and one from Quad 19, Site 1.

Methodology

All the samples had been previously floated in 1983, except for the Henry's Crossing sample. A number of the samples were refloated either because of a large amount of mold encasing the sample or because the sample still was compacted clay. I was unable to find any information regarding where the samples were floated or how.

I passed the samples through four geological sieves, 4mm, 2mm, 0.5mm, and 0.15mm. The charcoal, bone, root material, and pebbles were only sorted out of the 4mm and 2mm mesh sizes and as a result, the weights given on Tables 1 and 2 are only a representative sample. The seeds were found in all four mesh sizes. Both 100% of the heavy and light fractions were sorted. The Henry's Crossing sample was taken from the middle of a hearth and was mainly composed of ash, therefore I sorted 25% of the sample without floating it.

I tried to identify all of the charred seeds. The identification was facilitated by examining the botanical forms (see Appendix IV for this and for plant names) from all the Eagle Lake sites to provide a base for the identification. The seed manuals of Martin and Barkley (1961) and Montgomery (1977) were used in identification although some of the seeds that were not represented within their books were found within the botanical collection in the UBC Laboratory of Archaeology. However, I could not find the seeds for many of the plants that were named on the Eagle Lake Archaeological Project botanical forms. In addition, it is very difficult to identify charred seeds as their morphology changes during the heating process depending on the temperature and duration.

Material Found

Quite a variety of material was found from all the sites. I have listed what was found and their weights in Tables III -1 and III-2. Tables III-3 and III-4 outline the number and types of charred and uncharred seeds found.

The charcoal was not identified as in most cases since the pieces were too small. However, each one of the samples had charcoal present. The burnt/unburned needles and burnt/unburned cone parts were mostly from lodgepole pine and spruce trees. The cone scales themselves can be easily identified.

I have labelled a category "tissues" as this was a type of material I could not identify. I assume that it could be either a resin or sap from the trees which has been burnt as in most cases, the material is quite shiny. Although Wollstonecroft (2000) identifies a berry meat as in her "tissues," the type I found did not look like hers.

In most samples, debitage was found in the form of pressure flakes. The materials were chert, basalt, granite, and a very ugly igneous other. A number of obsidian pieces were also found which were grey, green, and black. In one sample, I found a piece of what seems to be a quartz crystal fragment.

In a number of the samples, leaves were found. I did not include them in the charts. Soopalalie, kinnikinick, and pussytoes were the most common and abundant. This shows

(along with the number of uncharred seeds) that modern intrusions were more than just rodent feces for these samples.

The bones recovered from the samples were both mammalian and fish. In the flotation log, I have identified whether a sample had one or the other, but in most cases, it was both. The fish were identified with the help of the comparative collection in the Laboratory of Archaeology. I was able to discern both kokanee (land-locked salmon) and a trout (either rainbow or steelhead). The mammal bones, however, lacked distinguishing characteristics for identification. A number of pieces of larger mammalian teeth were found but none intact enough for identification purposes. Chunks of long bone were present as well as possibly pieces of rodent or bird long bones. The bone itself was an array of colors from white to blue to black. I assume that this is an indication of the intensity by which they were heated as well as how long they have been in the ground.

Because of the fragile nature of seeds, many that were found lacked all distinguishing characteristics and were labelled desiccated. I only included charred seeds in this category.

I have also included the category of "sclerotia." These come from the fungus genus Sclerotinia and are common with some plant fungal pathogens. These are roundish balls with corrugated surfaces either encased in very fragile material or protruding with hairs and vary in sizes. The sclerotia act like seeds and allow the fungus to survive for several years in the soil, however, what was found in these samples could be considered archaeological due to depth and time duration. I believe that through further study, the sclerotia can indicate what types of root crops were present or processed within features.

Identified Seeds

A total of 24 types of charred seeds were identified and 17 types of uncharred seeds. The scientific and common names are found in the botanical forms in Appendix IV.

The seeds that survived were generally those which had a very hard surface which included the berries but mostly the marshy plants such as the sedges and bulrush types.

I grouped a number of seeds together into families and genera at it was difficult to make a definite species level identification. The Chenopodiaceae family, in this case, consists of two types of plants whose seeds look alike, sea-blite and lambs quarters. Both were found in abundance in the area of each of the sites. Dandelions (Asteraceae) and grasses (Gramineae) were grouped into general families as well as the pea (Leguminoseae) and the buckwheat (Polygonum sp.). Most of the other seeds were defined down to a species level and a select few were specifically identified.

The Bear Lake Site: EkSa 36

Sample 18 from Feature I was not sorted as it was used for radiocarbon sample (Beta 148106). Sample 18 was from Feature I, a boat shaped hearth located in the centre of the inferred prehistoric house of the Eagle Lake Phase. Sample 19, a sample from the historic Feature J interior cachepit (Lulua Phase) was not sorted either since it has been previously disassembled for faunal analysis of its contents..

Sample 4 was divided into A and B as two samples were labelled 4 and a full record was present for only one, even though their material seems to show that they were not a single sample split into two. Sample 12 does not exist physically or in the records.

Seed No.	1	2	3	4a	4b	5	6	7	8	9	10	11	13	14	15	16	17
Burnt	15	13	1	2	1	0	3	18	12	2	24	5	3	5	6	10	6
UnBurnt	18	22	3	2	5	6	3	21	23	25	51	16	10	0	2	0	0
Dessicated	3	1	1	0	0	0	13	16	11	12	5	4	5	16	0	8	4
Sclerotia	8	46	30	22	34	27	34	35	79	54	60	7	2	6	1	22	7
Constituent																	
Charcoal	0.17	0.14	0.13	0.22	0.24	0.40	6.44	4.53	1.73	2.49	0.31	0.90	4.92	0.38	11.06	0.22	1.54
Bone Total	<.01	0.12	<.01			<.01	<.01	2.31	2.07	<.01	10.8	6.39	3.65	4.60	0.13	14.0	3.23
Root/OrgMat	1.42	1.03		0.1	1.95	0.85	0.82	1.68	1.60	1.19	1.12	2.45	0.76	2.63	0.47	0.10	4.24
Burnt Needle	0.03	0.02	<.01				<.01	0.04	<.01	<.01	<.01	0.03	0.04	<.01	<.01	<.01	<.01
Unburnt Nee			<.01		<.01	0.02		0.14	0.11	0.04	0.09	0.13		<.01	0.04		
Insect pts	<.01			<.01		<.01	<.01	0.25	<.01		<.01	0.08		<.01		<.01	
Peebles/FCR	99.06			143	376	317				59.4	18.0	23.9	1.35	81.9			2.43
Debitage	<.01		0.04	1.36		0.42		0.45	<.01	0.97	1.04	1.81	0.18	10.1	<.01	0.06	<.01
Unburnt cone				0.04	0.03	0.16			<.01	<.01			<.01				
Burned cone	0.08	0.06	<.01			0.10	<.01		<.01	0.19		<.01	0.24	<.01		0.08	<.01
Tissues													<.01				
Quartz Cry.		<.01															
Clay Pipe?		0.64															
Quartz/Mica		<.01						<.01		0.16							
Obsidian														0.25			<.01
Rodent Fec.										2	6	2	1			16	
SortedWeight																	
Light	10.9	13.2	0.90	2.03	14.7	7.20	16.0	68.9	11.7	6.31	8.87	16.3	6.90	12.6	18.0	3.68	1.23
Heavy	54.0	119.	70.4	0.0	196	325	26.5	186	35.0	158.	260.	109.	0.0	33.3	61.01	12.4	32.0

Table III-1. Constituents Parts of EkSa 36 Flotation Samples (in counts and grams)

Prehistoric Eagle Lake Phase Samples

Layer A, Feature E

Feature E was situated at the bottom of layer A and is the hearth feature which produced a date of 415 +/- 115 BP (BGS 2263). Sample 1 was taken from the middle of a black ring of soil that was located on top of Layer B, which was a yellowish matrix. Sample 2 was taken adjacent to 1. Quite a bit of FCR and roots were present as well as both charred and uncharred seeds. The most abundant charred seeds were wild strawberry, Rubus sp., Chenopodiaceae, and bristly stickseed.

Layer A2 Feature D (Roasting Pit)

Both sample 4s came from this layer. They had a high concentration of small pebbles and 4A had a very small amount of charcoal where as 4B had a high concentration. However, each had only one seed, a strawberry, and an elderberry.

Sample 5 also came from the roasting pit and is located beside sample 4. I think that sample 4B is adjacent to this sample, but not 4A. No charred seeds were present within this sample.

Sample 9 also came from this feature which had high amounts of charcoal and FAR. A carbonized pine nut was found within this feature. This sample is close to sterile and underneath it is a rock pavement. Only two charred seeds were found, Rubus sp. and mares tail. A number of uncharred grass seeds were also found.

Prehistoric Lodge (Feature I) related.

Sample 14 is from Unit 52, next to the Feature I hearth and had a black silty matrix with an abundance of bone. A charred bulrush seed and three strawberry seeds were found.

Sample 13 is also adjacent to the Feature I hearth, from Unit 44. An abundance of charcoal and bone were present within sample 13. Only three charred seeds were found, kinnikinick, Chenopodiaceae, and a buckwheat, in this sample. This sample most likely, but not certainly, includes spill from Feature I, as four pieces of debitage were present.

Historic Lulua Phase Samples

Historic Lodge (Feature B)

Sample 3 was taken from the rim/edge of the lodge (Unit 21) that was found to lie over burnt soil and a charcoal matrix. It could be possible roof fill material. The sample was a clayey/silty matrix with quite a bit of sand and small pebbles. Only one Chenopodiaceae seed was found in this sample.

Sample 6 was taken from Unit 23 beyond the north edge of the inferred lodge since this area had a small amount of charcoal present. Only 2 Chenopodiaceae seeds were found and one unidentified charred seed. Sample 15 is from Unit 56 on the northeast-edge of the lodge and contained 3 charred kinnikinick and one Sisymbrium seeds.

Sample 16 was also within Feature B, from Unit 39 at the southern edge of the lodge. This had small amounts of charcoal and burnt antler present as well as elderberry, kinnikinick, and salal seeds.

Sample 17 was from Unit 47 within Feature B and just northwest of the Feature G hearth. This was a bone concentration that was underlying the eastern end of a large carbon

concentration which might be spill from the hearth. Sample 17 only had six charred kinnikinick seeds present.

Feature G Hearth

Samples 7 and 8 come from Unit 24 and are from the edge what was later identified as Feature G, the main lodge hearth. These samples are adjacent to each other. Fish bone fragments were seen within this feature which consisted of a reddish brown matrix and charcoal. Both samples were full of both charcoal and fish and mammal bone. Thirty charred seeds in total came from this feature, including kinnikinick, Chenopodiaceae, fireweed, and mares tail.

Feature G proper, was an ash/bone hearth feature composed of two layers (B and B1). Sample 10 (Unit 25, Layer B) was an ashy matrix consisting of numerous bone fragments. I found what looks to be a fish cranial bone. This sample had to be refloated as the 1983 attempt resulted in a big clump of clay. Nine charred strawberry seeds were found and 8 "berries." These are seeds that look like small berries and I could not properly identify them. I included them in the master list as they were present both charred and uncharred in a large numbers (eight and six respectively).

Sample 11 was also from Feature G (Unit 26, Layer B1) and was ashy and full of bone. It had one Saskatoon berry seed and 3 kinnikinick seeds present. However, it had an abundance of bone and fish teeth as well as an abundance of burnt needles.

In addition to these samples, Sample 17, discussed above, may also contain material that was originally part of Feature G.

Feature J Cachepit

Feature J was the cachepit in Unit 53, within the historic lodge boundaries. Articulated fish remains were found within this feature. Sample 19 included fins, vertebrae, and a tail as well as the tissue connecting the vertebrae. This was a sample of hard compact clay/silt.

The Boyd Site: EkSa 32

Throughout both of the house pits of this PPT site, an abundance of artifacts and calcined bone was present.

House Pit 1, Layer B3

Sample 26 was taken from just above the living floor surface and large burnt antler pieces had been recovered from this area. It was a dark blackish matrix that contained charcoal. The fill above the sample area had a marked concentration of fire-altered rock. This sample was taken from two locations. Only two charred kinnikinick seeds were recovered.

House Pit 2, Feature A, Layer B3

Samples 27 and 28 were taken from Unit 3. Sample 27 was from the central part of the hearth feature A. Many roots of grass were noted and there was calcined bone throughout as well as a few flakes. Sample 28 was taken from outside the central portion of the hearth, but still within the burnt B3 layer which had calcined bone present. Nine seeds in total were

	EkSa 32				EkSa 13					Henrys	Quad 19
Seed No.	**26**	**27**	**28**		**29**	**30**	**31**	**32**		**Crossing**	**Site 1**
Burnt	2	2	7		5	2	16	1		1 frag	62
UnBurnt	1	3	0		0	8	9	0		0	4
Desiccated	2	0	0		0	7	3	1		0	13
Sclerotia	34	305	286		51	132	421	289		3	8
Constituents											
Charcoal	0.84	<.01			<.01	0.21	0.29	0.43		0.16	1.01
Bone	0.39	7.95	3.01		2.76	6.2	2.42	4.60		1.98	0.12
Root/OrgMat	0.78	1.72	1.93		2.8	0.63	0.50	13.01		n/a	0.23
BurntNeedle					<.01					<.01	0.01
Insect Pts.		<.01	<.01		<.01	<.01	<.01	<.01			
Peebles,etc.	81.75	87.10	102.2		611.9	742.0	18.26	197.8		3.57	4.09
Debitage	2.58	8.14	4.39		9.25	3.65	0.15	4.56			1.18
UnburntCone							<.01				
Burnt Cone	0.06						<.01			<.01	<.01
Tissues										0.92	<.01
Tool (?)		2.21									
Mica		<.01	<.01		<.01						
Obsidian	0.05	0.35	<.01		<.01		<.01				<.01
Ochre			0.54								
Land Snail					<.01						
AquaticShell						<.01					
MetallicMat.?	<.01		<.01								
RodentFeces							1				29
Sorted Wght											
Light	1.79	5.62	0.85		5.41	2.89	3.37	5.99		n/a	4.39
Heavy	48.48	103.86	111.68		26.29	742.0	18.46	58.40		n/a	20.78

Table III-2. Constituents Parts of EkSa 13, 32 and other Flotation Samples (in counts and grams)

found from within this hearth and they included wild strawberry, kinnikinnick, and a saskatoon berry seed.

The Shields Site: EkSa 13
House Pit 2, Feature B, Layer B1

Samples 29 and 30 were taken from the hearth Feature B that contained a large amount of fire-altered rock. Sample 29 was taken from the centre of the hearth (Unit 4) where lots of pebble gravel and root disturbances were present. In addition, a large number of in situ artifacts were found. Sample 30 (Unit 3) is from a part of the hearth where a large amount of ash, calcined bone, and flakes were present. Both samples only yielded seven charred seeds. These included four from the Chenopodiaceae family and a kinnikinick seed.

House Pit 2, Layer B1-g

Sample 31 was taken from this layer which was outside of the hearth area (Unit 3) and had a high concentration of calcined bone and fish fragments (quoted from the field notes). In the area of the sample, a large ant colony was present. Twelve Chenopodiaceae family seeds were found in this sample, which was the most abundant out of all the samples.

House Pit 2, Feature D, Layer BA

Sample 32 was taken from the hearth feature D that contained a large amount of fire-altered rock and calcined bone fragments. Bone and ash were concentrated in this area and a hard packed, cooked matrix surrounded the feature. Only one seed was found in this sample and it was a charred kinnikinick. The sample was full of small pieces of calcined bone leading to the conclusion that the feature resulted from a very high temperature fire which would have incinerated most seeds.

Quad 19, Site 1

Feature A

Quad 19 was classified as one large site composed of many differing types of depressions and lithic scatters. but a member of the PPT. Most depressions (14) were classified as cache pits and four were classified as roasting pits but the latter without the usual amounts of fire altered rock and charcoal as one would expect. Three of the pits were located on the terrace overlooking the Chilko River whereas Feature A was located deeper in the forest.

Feature A is a large pit with a well-defined rim located beside a lithic scatter. The diameter of the rim is approximately 2 meters and approximately 0.25 meters deep. This feature is inferred to be a roasting pit. Fire altered rock and traces of charcoal are present. In the field notes, there is mention of no evidence of ash within this feature yet the flotation sample was labelled Ash Feature and is full of ash. In the notes, small pockets of light grey soil are noted, maybe this is the interpretation of the ash deposits. Also, there is no mention of where the sample came from, in what area of the feature or at what depth.

This sample was collected in 1979 and floated in 1980. There is no indication as to where it was floated or how. There were three plastic bags containing material and I classified them as light fraction, heavy fraction, and debris according to weight and composition. The light and heavy fractions, however, contained the same types of material, so I am assuming that the actual light and heavy fractions had been combined and then split for an unknown

reason. The debris was a bag of silty, sandy, ashy material with clumps of that material. 100% of the sample was sorted.

In the field notes, there was no mention of rodent activity or any site/feature disturbances. Many pieces of what seems to be rodent feces was taken out of the sample. This would indicate a quite active rodent population. Therefore, the macrobotanical remains that have been recovered could also have been brought in or disturbed by the rodents. The field notes mention that a forest fire occurred in that area 80 years ago as well a historic burning was present on top of this feature. Therefore, the charred macrobotanical remains and fire-altered rock may have been products of these two events. Small amounts of debitage and a minute piece of obsidian were found which could be directly related to the lithic scatter beside the pit.

An abundance of both charred and uncharred seeds were found within this sample, far more than the other samples. The main kind of uncharred seeds were those that could blow into the area. The most abundant burnt seed was fireweed. Turner (1978) outlines that fireweed was a staple in the diet of an Interior Native. Moreover, fireweed was a commonly used wrapping material in roasting, indicating the use of this feature in roasting. Eleven kinnikinick seeds were found as well as 8 charred grass seeds.

Henry's Crossing East and North of Bridge

This sample was collected in 1983 from a then present day hearth to see what macrobotanical remains could be found. The sample was not floated as a large amount of fragile tissue was present throughout and would be destroyed if floated and the ash was easily screened out. What I labelled tissue is a very spongy, shiny black material that was both attached to some bone fragments and present in large clumps. I assume it is a resin from the burnt wood or more likely cellular material from fish or mammalian entrails or meat. This is a more likely possibility because of the presence of bone encased in this material.

Only one seed fragment was found and it is from the Chenopodiaceae family. A charred lodgepole pine bud was found but the remaining charcoal pieces are too small to make identification.

From the large amount of ash present within the sample, I am assuming that any plant or wood material would have been disintegrated and reduced to ash. The tissue may be present as a result of throwing the garbage material from cleaning the fish and/or mammal into the fire after the meat was cooked and eating completed.

Conclusions

Some of the features identified as hearths (Features E.G) appear to share some characteristics such as relative amounts of burnt vs. unburned material, relative amounts of charred Arctostaphylos sp. and Fragaria sp. seeds, although Feature G is high in charred Rubus sp. and in unidentified berries and Feature E is high Leguminoseae. Feature G of course contains a great number of bone fragments. Feature D, the other certain feature at Bear Lake, a roasting pit, is high in Aster and Gramineae but surprisingly low in relative amounts of burnt material not including charcoal. Feature D not surprisingly is the feature with the most amount of pebble/clay/FCR material, give the great quantity of large FCR that was excavated from it.

Analysis of flotation samples from the Eagle Lake project has provided additional

insights into site occupation and the functions of various features, particularly at the Bear Lake site. Most of these are in keeping with how the features were interpreted initially, although some of the "hearths" appear to be questionable. Given the shallow depths of the sites and post-depositional processes, such as cryoturbation, rodent activity, root action, and wild fires, the true significance of burnt vs. unburned material, the presence of various berries, grasses or other seeds, is difficult to determine. The current analysis, though, should serve for comparative services in future investigations in the interior of British Columbia.

	1	2	3	4a	4b	5	6	7	8	9	10	11	13	14	15	16	17	26	27	28	29	30	31	32	H	Q	T
Amelanchier alnifolia												1								2							3
Arctostaphylos uva-ursi	3	2						4	7		2	3	1		3	2	6	2	1	1	1			1		11	50
berries											8																8
Chenopodiaceae family	2	4	1				2	4	2		1		1			1					3	1	12		1	6	41
Cornus canadensis								1												1						4	6
Cyperus sp.								1																			1
Epilobium angustifolium								4		1	4												1			16	26
Euphorbia esula															1												1
Fragaria virginiana	4	2		1				1	1		9			3						2							23
Gramineae family																										8	8
Hippuris vulgaris								2															1				3
Helianthus sp. (?)																										2	2
Juniperus sp.														1													1
Lappula echinata		5							1																		6
Lathyrus ochroleucus																										2	2
Polygonum sp.																1											1
Ribes cerum																1											1
Rosa sp.																				1						1	
Rubus sp.	5								1	1												1					8
Sambucus racemosa					1			1								2			1								5
Scirpus sp.												1															1
Sisymbrium sp.													1														1
Solidago sp.																										3	3
Symphoricarpos albus																				1							1
Vaccinium sp.	1															2											3
Vicia sp.																										2	2
unidentified	0	0	0	1	0	0	1	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	2	0	0	8	16
TOTALS	15	13	1	2	1	0	3	18	12	2	24	5	3	5	6	10	6	2	2	7	5	2	16	1	1	62	224
sclerotia	8	46	30	22	34	27	34	35	79	54	60	7	2	6	1	22	7	34	305	286	51	132	421	289	3	8	1873

H Henrys Crossing
Q Quad 19, Site 1
T - Totals

Table III-3. Charred Seeds from All Samples (numbers present)

	1	2	3	4a	4b	5	6	7	8	9	10	11	13	14	15	16	17	26	27	28	29	30	31	32	H	Q	T
Arctostaphylos uva-ursi													2														2
Asteraceae fam.	3	3			1	2				6	8											1	2				26
berries											6																6
Bromus tectorum	1	1									1																3
Carex sp.	3							6															1				10
Eleocharis palustris		1																									1
Gramineae fam.								7	4	11	3								2				2				29
Lappula echinata	3	1								1																	5
Leguminoseae fam.		12	2	1	2	4	3	4	5	1	2	7															43
Lonicera sp.	1									2		1															4
Potentilla sp.										1	3	0															4
Ribes cerum											1																1
Rosa sp.	3		1					1	2		2												1				10
Rubus sp.					1					1	8																10
Scirpus sp.													2		2			1									5
Symphoricarpos albus												1															1
Vaccinium sp.	1										3		1														5
unidentified	3	4		1	1			3	12	2	14	7	5						1			7	3			4	67
Totals	18	22	3	2	5	6	3	21	23	25	51	16	10	0	2	0	0	1	3	0	0	8	9	0	0	4	232

H Henrys Crossing
Q Quad 19, Site 1
T - Totals

Table III-4. Uncharred Seeds from all Samples (numbers).

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