Archaeological Excavations at the Little John Site (KdVo-6), Southwest Yukon Territory, Canada - 2013

Submitted to
White River First Nation
Yukon Heritage Branch
Archaeological Survey of Canada (13-28ASR)
Yukon Research Centre of Yukon College

Norman Alexander Easton
Anthropologist
Yukon College
Whitehorse, Yukon Territory, Canada

Scottie Creek Borderlands Culture History Research Project Manuscript 2014-02
Yukon Research Centre, Yukon College, Whitehorse, Yukon
(Revised May 2015)

ACKNOWLEDGEMENTS

The 2013 activities of the Scottie Creek Borderlands Culture History Project were financially and logistically supported by the White River First Nation of Beaver Creek, School for Liberal Arts, Yukon College, credit and non-credit participants in Anthropology 225 – Field Methods in Subarctic Archaeology and Ethnography, Northway, Tetlin, and Tanacross Native Villages of Alaska, Tanana Chiefs Conference, Alaska, Westmark Hotel and 1202 Motor Inn of Beaver Creek, and me. Greg Hare, Christian Thomas, and Grant Zazula of the Yukon Heritage Branch continued to be supportive and valued academic colleagues.

Figure 1. Some of the 2013 Field Crew at Yukon College, June 2013.

Fieldworkers included:

- Credit Undergraduate students in ANTH 225-226: Katherine Brown (University of Calgary), Lisa Chatwin (Simon Fraser University), Colin Christiansen (Washington State University), Sarah Elsworthy (Trent University), Thomas Gregston (Colby College, Maine), Jonathan Lee (San Francisco), Jamie Pope (Yukon College), Kalista Sherbanuk (University of Calgary), Josh Varkel (University of California Berkley), Pawel Wojtowich (Yukon College), and Amanda Wong (University of Calgary).
- Graduate and Undergraduate Research Students with approval of their committees: Michael Grooms (PhD program, Dept of Anthropology, U of New Mexico, Supervisor Dr. E James Dixon) and Nicolena Virga (M.A. program, Department of Anthropology, U of Southern California – Fullerton, Supervisor Dr. Steven James), and Lauriane Bourgeon

(PhD Department of Anthropology, University of Montreal, Supervisor Dr. Ariane Burke).
- Research Interns / Volunteers: Bittany Tuffs, Research Assistant, Yukon College, Timothy Allen (Grant MacEwan College), Daniel Frim (Yale University), Members of the Junior Rangers, Norm Beebe coordinator.
- White River First Nation Youth: Chelsea Johnny, Dellamae Sam, Eldred Johnny, Eddie Johnny, Tamika Johnny, and cultural experts David and Ruth Johnny.
- Youth participants of the Northern Cultural Expressions Society summer healing program, led by Naomi Crey.
- Dr. David Yesner, University of Alaska, Anchorage.

The generosity and support extended by the inhabitants of the borderlands is greatly appreciated. In particular David and Ruth Johnny of the White River First Nation and Elder Joseph Tommy Johnny provided us enormous support. Other community members were generous with their time and companionship, in particular Bessie and Wilfred Chasse, Patrick and Jackie Johnny, Eldred Johnny, Sid Vandermeer Sr., and Dwayne Broeren. Sid Vandermeer, Jr. facilitated administrative relations with the White River First Nation. Bob Sattler of the Tanana Chiefs Conference hosted us at the David Site on the Yukon River. We regret to note the passing of Elder Joseph Tommy Johnny in August of 2013 – he was a wise and influential teacher of the *Dineh Way* and is deeply missed.

Ts'inni Cho.

Norman Alexander Easton / Ts'ogot Gaay

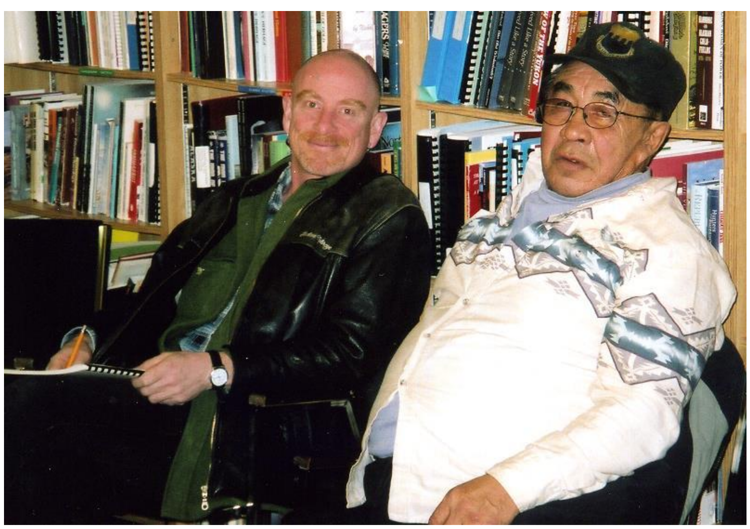


Figure 2. N. A. Easton and Joseph Tommy Johnny at the Yukon Native Language Center, 2007.

Cover Photo: Joseph Tommy Johnny Telling a Story at Little John, June, 2013.

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Excavations at the Little John Site (KdVo-6), Southwest Yukon Territory, Canada, 2013

SUMMARY OF ACTIVITIES

Figure 3. 2013 Field Students at the Yukon Beringia Center.

With the permission and support of the White River First Nation, archaeological and ethnographic research was undertaken under the direction of Norman Alexander Easton of Yukon College between 10th of June and 7th of August, 2013 at the Little John site (KdVo-6) and in the region about Beaver Creek, Yukon Territory.

Major Results of this fieldwork included:

- Training in archaeology and ethnography of thirteen credit and intern / volunteer students from Outside, three graduate students, and five local native youth.

- Excavation of 28 square meter units specified below: 6 on the West Lobe, 8 on the hilltop in the vicinity of the cabin, and 14 in the East Lobe; 23 of these were new units, while the remainder continued excavations in Units begun in previous seasons.

Table 1. 2013 Excavation Units at KdVo6.

Lobe	Size	Unit No.	Notes	Summary	Profiles
West Lobe	2 x 2 Unit	S00 W26	New 2 x 2 unit – completed excavation	Flake and Hammerstone in B	2013-18 S, 2013-19 W
		S00 W27	New 2 x 2 unit – completed excavation	No artifacts	2013-20 S
		N00 W26	New 2 x 2 unit – completed excavation	2 Flakes	2013-11 E, 2013-09 N, 2013-10 W
		N00 W27	New 2 x 2 unit – completed excavation	2 Flakes B (no ash), Complete Blade (broken) Loess	2013-01 W, N
	1 x 2 Unit	S04 W24	New 1 x 2 unit – completed excavation	Flake and Shatter in B1; 14 Flakes, 1 Microblade, Shatter in B2; 9 Flakes and Spall / Scraper, Microblade in Loess	2012-33 E, 2012-32 N, 2013-24 S
		S04 W25	New 1 x 2 unit – completed excavation	Multiple Flakes, 2 Microblades, End Scraper with Notch, FAR in B	2013-28 W, 2013-29 S, 2013-30 N
Hill Top Lobe	1 x 1	N03 E04	New unit – completed excavation	3 Flakes, 1 Manuport, 1 FAR in B2; 3 Flakes, Foliate Bipointed Biface in Loess	2013-25 E, 2013-24 S
	1 x 1	N03 W04	New unit – completed excavation	18 Flakes, 3 Microblades, Microblade Core Tablet, 1 Blade in B2	See field book
	1 x 3 Unit	N03 W11	New 1 x 3 Unit with Rangers – completed excavations	Split Pebble, EM Flake in B2	See field book
		N04 W11	New 1 x 3 Unit with Rangers – completed excavations	No artifacts	See field book
		N05 W11	New 1 x 3 Unit with Rangers – completed excavations	EM Flake in B2	See field book
	1 x 1	N04 E06	New unit – completed excavation	Razor Blade in OA; 1 Flake in B	2013-31 S
	1 x 1	N05 E01	New unit – completed excavation	1 Flake B1; 2 Flakes, 1 Shatter in B2; 1 Flake in Loess	2013-02 W

	1 x 1	N07 E06	New unit – completed excavation	16 Historic artifacts in OA; 1 Flake in B2 bottom; 1 Flake in Loess	2013-07 N, 2013-08 W
East Lobe	1 x 1	N13 E06	New unit – completed excavation	3 Historic Glass fragments in OA; 1 Flake in B2; 2 Flakes in B2 Base / Loess	2013-35 N, 2013-36 W
	2 x 2 Unit	N16 W18	New 2 x 2 unit – excavation ended at P3 To be continued.	1 Abrader, 2 FAR, 2 Pebbles in B Hearth; 1 Flake, 2 FAR, 1 Pebble, bone in PC2	2013-04 E, S
		N16 W19	New 2 x 2 unit – excavation ended at P3 To be continued.	5 Historic artifacts in OA/B1; Split Cobbles, Hammerstones, FAR in B Hearth; Flakes, Bone in PC Hearth	2013-03 S, W
		N17 W18	New 2 x 2 unit – excavation ended at P3 To be continued.	Historic in OA; Split Pebble, Cobbles in B Hearth; Hammerstone, Split Pebble, Bone in PC2 Hearth	2013-06 E, N
		N17 W19	New 2 x 2 unit – excavation ended at P3. To be continued.	Historic in OA; Cobbles and Pebbles in B Hearth; 2 Flakes, Split Cobble, Bone in PC2 Hearth	2013-05 N, W
	1 X 3 Unit	N17 W13	Continued from 2012 – excavation ended at P3? To be continued.	Split Cobble, Split Pebble, EM Flake, Biface in PC	2013-41 S, 2013-40 W
		N18 W13	Continued from 2012 – excavation ended at P3 / 4? To be continued.	No artifacts	2013-17 N, 2013-16 W, 2013-39 W
		N19 W13	Continued from 2012 – completed to loess below PC – may go further	No artifacts	2013-37 N, 2013-38 W
	1 x 2 Unit	N17 W16	Continued from 2012 – excavation ended at loess and colluvium below PC	Pebble associated with Bone in PC2	See 2012 profile and field book
		N18 W16	Continued from 2012 – excavation ended at loess and colluvium below PC	1 Flake, Cobble, and FAR in PC2	2013-23 E, 2013-22 N, 2013-21 W
	4 x 4 Unit	N25 W22	New 2 x 2 unit – excavated to c. 140 cm dbud – sterile clean loess with P stringers; complete	No artifacts	See 2013-26 N, 2013-27 E
		N25 W23	New 2 x 2 unit – excavated to c. 140 cm dbud – sterile clean loess with P stringers; complete	Historic Razor Blade in OA; Hammerstone in B	See 2013-26 N, 2013-27 E
		N26 W22	New 2 x 2 unit – excavated to c. 140 cm dbud – sterile clean loess with P stringers; complete	No artifacts	2013-26 N, 2013-27 E
		N26 W23	New 2 x 2 unit – excavated to c. 140 cm dbud – sterile clean loess with P stringers; complete	1 Flake in B	See 2013-26 N, 2013-27 E

- Nineteen of the Units were excavated to basal non-cultural deposits and backfilled; nine of the units were excavated to or through the culture-bearing paleosols and will be investigated further in 2014. Table 1 above and Figures 4 and 5 below summarize the location of these units and associated artifacts and profiles. Unit Field Books and excavation summaries related to each Unit excavations are presented in the printed and digital appendices to this report.
- 46 Unit Wall Profiles were documented, summarized in Table 2 and presented in the printed and digital appendices.

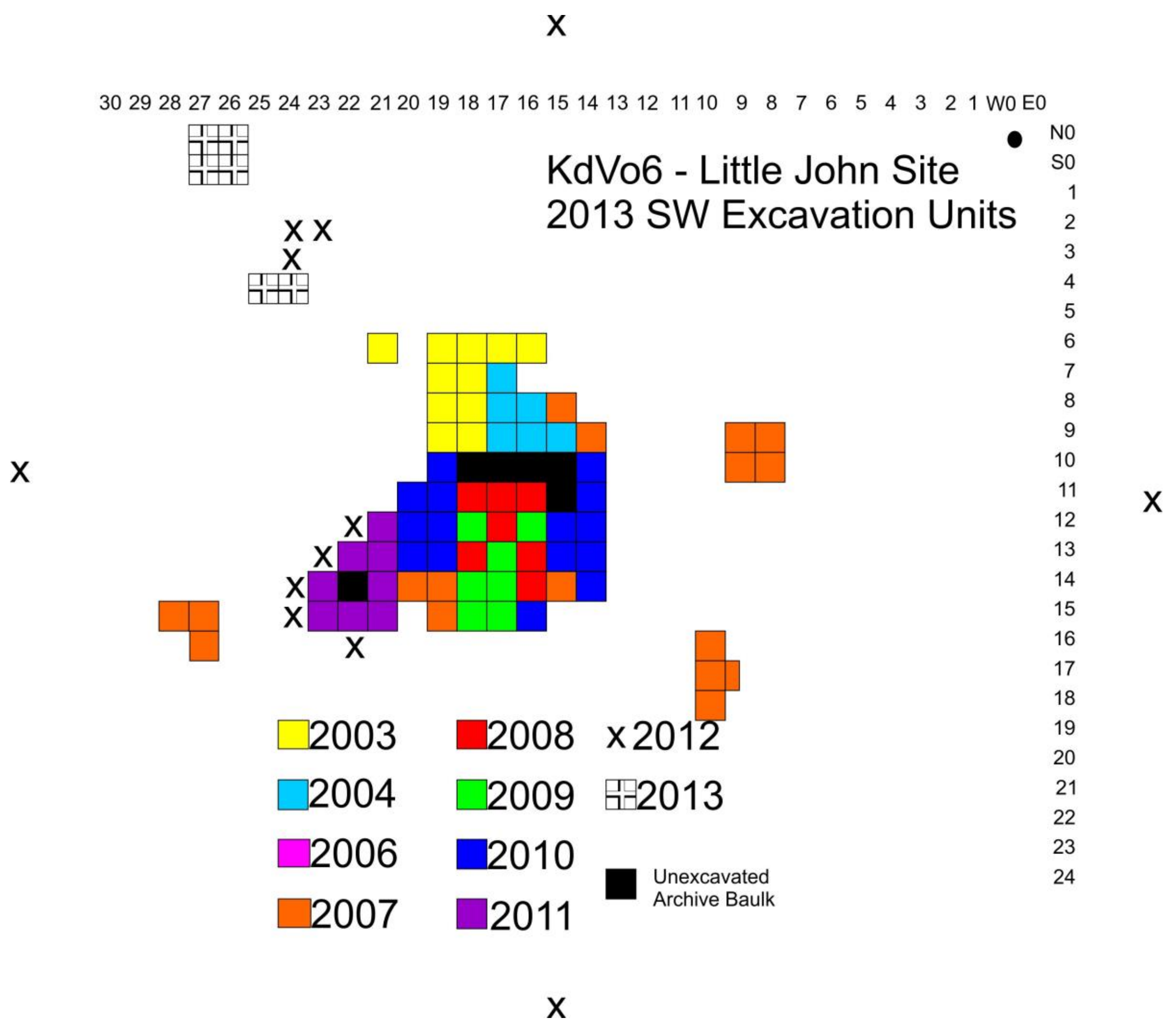


Figure 4. Excavated Units, KdVo6, West Lobe, 2003-2013

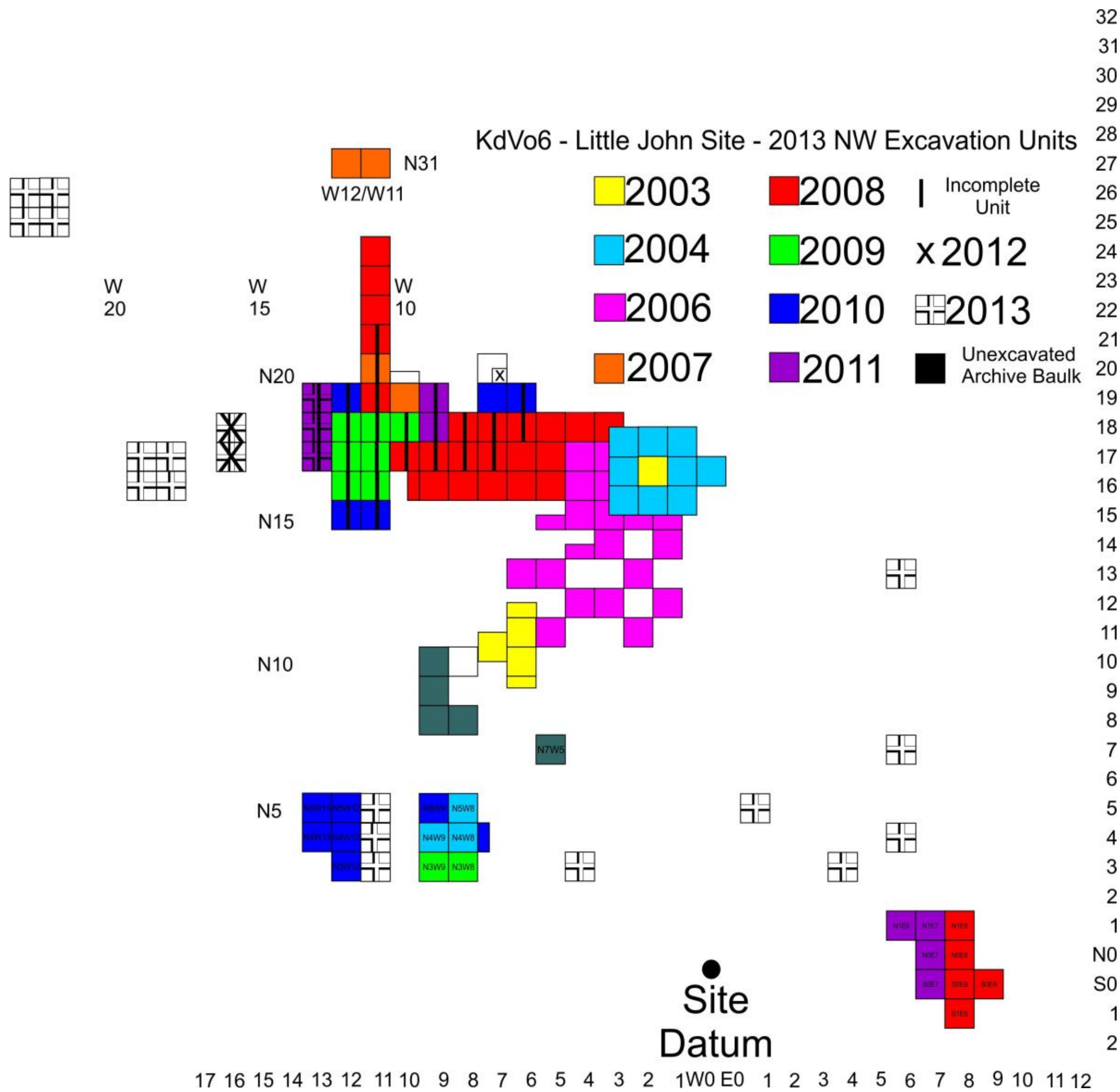


Figure 5. Excavated Units, KdVo6, East Lobe, 2003-2013

Table 2. Unit Profile Inventory, KdVo6 2013.

Log Number	Unit Number	Levels	Final Depth
P2013-01	N00 W27 – W/ N00 W27 –N	W- OA, Ash (Hearth?) B1, B2, Basal Loess / N- OA, B1 B2, Basal Loess	W-69 BUD – 39 BS/ N -61 BUD – 31 BS
P2013-02	N05 E01 –W	W- OA, B1, Ash, B2, Basal Loess	W- 76 BUD- 36 BS
P2013-03	N16 W19-W/ N16 W19 –S	W- OA, B1, Upper Loess, B2, P1, Loess, P2, P3, Basal Loess/ S- OA, B1, Upper Loess, B2, Loess, B3. Loess, P1, Loess, P2, Basal Loess	W- 122.5 BUD- 88 BS/ S- 109 BUD – 84 BS

P2013-04	N16 W18-E/ N16W18-S	E/S - OA, B1, Upper Loess, B2, Loess, B2,Colluvium, Loess, B2, P1, P2, Loess, P3, Colluvium	E/S - 100 BUD- 94 BS
P2013-05	N17 W19-W/ N17 W19-N	W- OA, B1, Colluvium, B2, Upper Loess, P1, P2, Loess, P3, P4(Brown), Basal Loess/ N- No B2 *Collapse around B1 and Colluvium levels in both walls	W- 115 BUD - 85 BS/ N- 117 BUD – 90 BS
P2013-06	N17 W18- N/ N17 W18- E	N- OA, B1.1, B1.2, Upper Loess, B2.1, B2.2, Loess, P1, Loess, P2, Basal Loess/ E-Duff, OA, B1, B2, Loess, B2.2, P1, Loess, P2, Basal Loess	N- 111 BUD – 97 BS/ E- 107 BUD – 100 BS
P2013-07	N07 W06- N	N- OA, B1, Ash, B1, B2, Basal Loess	N- 65 BUD- 50 BS
P2013-08	N07 W06- W	W- OA, B1, Ash, B1, B2, Regolith Material/Basal Loess	W- 67 BUD- 50 BS
P2013-09	N00 W26- N	N- OA, Ash, B1, B2, Loess, Morainal Till	N- 49.5 BUD- 30 BS
P2013-10	N00 W26- W	W- Charcoal, B1, Ash Pocket, Loess, B2, Morainal Till	W- 55 BUD- 29 BS
P2013-11	N00 W26- E	E- OA, B1, Ash Pockets, B2, Loess, Morainal Till	E- 45.5 BUD- 32.5 BS
P2013-12	N19 W11- E	E- Hearth Feature, Fine Loess, Coarse Loess, Colluvium	E- 129 BUD- 59 BS
P2013-13	N19 W11- N	N- Hearth Feature, Fine Loess, Rock 1, Coarse Loess, Ash Pockets, Colluvium	N- 131 BUD- 63 BS
P2013-14	S16 W21- E	E- A, B1, Ash, B2, Loess, Rocks	E- 32.5 BUD- 30 BS
P2013-15	S16 W21- W	W- A, B1, Ash, B2, Loess	W- 47.5 BUD- 21 BS
P2013-16	N18 W13- W	2011 Catalogue	
P2013-17	N18 W13- N	2011 Catalogue	
P2013-18	S00 W26- S	S- OA, Ash, B1, Loess	S- 55 BUD- 43.5 BS
P2013-19	S00 W26- W	W- Loess	W- 55.5 BUD- 16.5 BS
P2013-20	S00 W27- S	S- OA, B1, Ash, Loess	S- 75 BUD- 50.5 BS
P2013-21	N18 W16- W	W- OA, Upper Loess, B1, Ash Pockets,	W- 129 BUD- 116.5

		Colluvium, B2, Loess, P1, Loess, P2, Colluvium	BS
P2013-22	N18 W16- N	N- OA, B1, Loess, B2, Colluvium, Loess, P1, Loess, P2, Colluvium	N- 133 BUD- 130 BS
P2013-23	N18 W16- E	E- OA, B1, Colluvium, B2, Loess, B2, Loess, B2, P1, Loess, P2, P3, Colluvium	E- 156 BUD- 151.5 BS
P2013-24	N03 E04- S	S- OA, Ash, B2, Loess	S- 40 BUD- 42 BS
P2013-25	N03 E04- E	E- OA, Ash, B2, Loess	E- 52 BUD- 45 BS
P2013-26	N26 W22- N	N- OA, B1, Colluvium, Massive Loess (silt/sand)	N- 147.5 BUD- 132.5 BS
P2013-27	N26 W22- E	E- OA, B1, Colluvium, Massive Loess (silt/sand)	E- 143 BUD- 138 BS
P2013-28	S04 W25- W	W- OA, B1, Large Ash pockets within B1	W- 37 BUD- 22 BS
P2013-29	S04 W25- S	S- OA, B1, Ash pockets, B2, Loess	S- 35 BUD- 31 BS
P2013-30	S04 W25- N	N- OA, Ash pockets, B2, Loess	N- 41 BUD- 19 BS
P2013-31	N04 E06- S	S- OA, B1, Ash pockets, B2	S- 31 BUD- 20 BS
P2013-32	S04 W24- N	N- OA, Ash pocket, B1, Loess	N- 39 BUD- 39 BS
P2013-33	S04 W24- E	E- OA, B1, Ash, B2, Loess	E- 32 BUD- 42 BS
P2013-34	S04 W24- S	S- OA, Alternating B1 and Ash, Loess, B2, Basal Loess	S- 33 BUD- 43 BS
P2013-35	N13 E06- N	N- OA, Ash, B2, Loess, P1, Colluvial Loess	N- 80 BUD- 70 BS
P2013-36	N13 E06- W	W- OA, B1 pocket, Ash, B2, Loess, P1, Colluvial Loess	W- 81 BUD- 66 BS
P2013-37	N19 W13- N	N- Loess, P2, Loess, P3, Basal Loess	N- 113 BUD- 53 BS
P2013-38	N19 W13- W	W- Loess, P2, Loess, P3, Loess, P4, Basal Loess	N- 114.5 BUD- 57.5 BS
P2013-39	N18 W13- W	W- Loess, P1, Loess, P2, Loess, P3, Loess, Colluvium	W- 121 BUD- 66 BS
P2013-40	N17 W13- W	W- Loess, P1, Loess, P1, Loess, P2, P3, P4	W- 121 BUD- 68 BS
P2013-41	N17 W13- S	S- Loess, P1, Loess, P1, Loess, P2, P3, P4, Loess	S- 115 BUD- 64 BS

- Cataloguing of 424 additional artifacts from the Little John site, summarized in Tables 3 and 4 below; these were catalogued into 247 unique catalogue numbers (KdVo6:4070 through 4318 inclusive). Filemaker Files with and without photographs, and an Excel File providing provenience, metric, and qualitative data related to all recovered artifacts are presented in the Digital Appendix; an Excel table summary in the Print Appendix and a summary description of selected artifacts are presented below in this report.

Table 3. Summary of Recovered Artifacts, KdVo-6-2013 (n = 424).

2013 Final Artifact Catalogue Summary				
Artifact Type	**Total**	**% Total**	**% Lithic Tools**	**% Total Lithics**
Biface	3	0.7	5.0	1.5
Blade	2	0.5	3.3	1.0
Scraper	2	0.5	3.3	1.0
Burin Spall	1	0.2	1.7	0.5
Microblade	8	2.0	13.3	4.0
EMF	21	4.9	35.0	10.6
MCP	23	5.4	38.3	11.6
Total Lithic Tools	**60**	**14.1**	**99.9**	**30.2**
MB Core Tablet	1	0.2		0.5
Flake Core	1	0.2		0.5
Debitage	136	32.1		68.8
Total Lithics	**198**	**46.6**		**100**
Modified Bone	5	1.2		
CPA	130	30.6		
FAR	32	7.6		
Historic	59	13.9		
Total Catalogued	**424**	**100**		
EMF = Edge Modified Flake, MCP = Modified Cobble-Pebble, CPA = Cobble-Pebble in Association, FAR = Fire Altered Rock. Percentages are rounded up one decimal.				

- The 2013 catalogue includes 22 entries (KdVo6:4150 to 4170 inclusive and 4233) from Unit N03 W04 that were collected in 2010 but not included in that year's catalogue inventory. All these 2010 artifacts were from the B2 stratum. They consisted of 3 microblades, 1 microblade core tablet, 1 edge modified flake, and 59 pieces of flake debitage assigned to 22 unique catalogue numbers. These are included in the 2013 catalogued artifact and unit summaries presented in this report.

Table 4. Summary of Artifacts by Level and Type, KdVo6-2013.

2013 KdVo6 Catalogued Artifact Distribution by Type and Stratum												
Level Artifact Type	OA	B1	Ash	B2	B2 L	WL L	L a PC	PC 1 - P2	PC 2 – P3	L b PC 2	PC 3 - P4	Total
Biface					1				1	1		3
Blade						2						2
Scraper		1		1								2
Burin Spall				1								1
Microblade				5	2	1						8
EMF		1	1	10	2	5			1		1	21
MCP		8		10			1		3		1	23
MB Core Tablet				1								1
Flake Core				1								1
Debitage	1	4	4	97	7	12			11			136
CPA		59		28				1	40		2	130
FAR		19		3		1		3	4		2	32
Modified Bone									5			5
Historic	54	5										59
Totals	**55**	**97**	**5**	**157**	**12**	**21**	**1**	**4**	**65**	**1**	**6**	**424**

EMF = Edge Modified Flake, MCP = Modified Cobble-Pebble, CPA = Cobble-Pebble in Association, FAR = Fire Altered Rock.

Levels: OA = Surface/Humic, B1= Brunisol below Humic and Above Ash, Ash = White River Tephra, B2 = Brunisol below Ash, B2-L = Lowest B2 contact with Loess below, WL L = West Lobe Loess, L a PC = Massive Loess with Colluvium above the Paleosol Complex, East Lobe, P1 = Paleosol Stringer within L a PC above Paleosol Complex, PC 1 – P2 = 1st Paleosol within Paleosol Complex, PC2 – P3 = 2nd Paleosol within Paleosol Complex, L b PC 2 = Loess below PC2 and above PC3, PC3-P4 = 3rd Paleosol within Paleosol Complex.

- Processing and return of an additional five AMS Radio Carbon dates on three samples collected in 2011, two samples in 2012, and three from 2013. They are fully reported on in our discussion of dates at the site below. Here we will just note that combined the dates from Little John are beginning to suggest a clear patterned series of Chrono-Zones of occupation of the site from the most recent past to the Late Pleistocene.
- Recovery of 256 additional faunal samples summarized in Table 5 below. Full descriptions of recovered fauna are presented in Printed and Digital Appendices, while a summary discussion of selected fauna is presented below in this report. Five of these fauna specimens are cross inventoried as Artifacts and discussed in more detail below.

Table 5. Summary of Recovered Fauna, KdVo6-2013.

Common Name	B2	L	PC1 - P2	PC2 - P3	PC3 - P4	L b PC	Species Total	Species Percent
Bird		8					**8**	**3.35**
Bison						1	**1**	**0.42**
Wapiti			4	8			**12**	**5.02**
Cervid - Caribou?			3	25			**28**	**11.72**
Cervid					17		**17**	**7.11**
Large Mammal			1	7	11		**19**	**7.95**
						Subtotal Large Mammals	**(77)**	**(32.22)**
Med Mammal	2			21	49		**72**	**30.13**
Hare				6			**6**	**2.51**
Squirrel		18		12			**30**	**12.55**
Rodent		1			1		**2**	**0.84**
Small Mammal				2			**2**	**0.84**
						Subtotal Small Mammals	**(112)**	**(46.86)**
Mammal		2		19	21		**42**	**17.57**
Level Totals	**2**	**29**	**8**	**100**	**99**	**1**	**239**	
Level Percent	**0.84**	**12.13**	**3.35**	**41.84**	**41.42**	**0.42**		

- Continued taphonomic analysis of the Little John fauna by Lauriane Bourgeon, David Yesner, Vance Hutchinson, and Easton, the results of which are discussed more fully below.

Table 6. 2013 Feature Inventory, KdVo6.

Inventory of Recorded Features, KdVo6 - 2013							
Feature #	**Nature**	**Unit/Quad**	**Level**	**Depth BD cm**	**Date**	**Level Plan #**	**Comments**
Fe 2013-01	Wood Plank	N0W26 N0W27 S0W26 S0W27	O/A	20	18 June	L 2013-01	
Fe 2013-02	Historic Material	N07E06	O/A – B1	11 - 20	11 July	L 2013-21	
Fe 2013-03	Historic Material	N16W18 N16W19 N17W18 N17W19	O/A	10 - 30	15 June	L 2013-09	
Fe 2013-04	Hearth	N16W18 N16W19 N17W18 N17W19	B	20 - 40	19 June	L2013-11	
Fe 2013-05	Hearth	N18W13	PC2-P3	86 - 89	6 July	L 2013-17 & 18	
Fe 2013-06	Hearth	S04W25	B2	37 – 43	21 June	L 2013-26	
Fe 2013-07	Hearth	N17W13 N18W13	PC3-P4	80 – 85		See field book	Continues Fe 2011-14
Fe 2013-08	Hearth	N16W18 N16W19 N17W18 N17W19	PC3-P4	70 - 90	6 June 5 July	L 2013-15 & 16	

- Identification and mapping of 8 archaeological features, summarized in Table 6. Copies of these field maps are presented in Printed and Digital Appendices, while a summary discussion of these features is presented below in this report.

Table 7. 2013 KdVo6 Inventory of Level Plans.

2013 KdVo6 Inventory of Level Plans				
Level #	**Unit #**	**Level**	**Date**	**Comments**
L2013-01	N00W26 N00W27 S00W26 S00W27	A Horizon	18 June 2013	CAC, CMB, JCP, JL
L2013-02	N00W26 N00W27 S00W26 S00W27	B1 Horizon	19 June 2013	CAC, CMB, JCP, JL
L2013-03	N00W26 N00W27 S00W26 S0W27	B/ Loess/ till	26 June 2013	CAC, CMB, JCP, JL
L2013-04	N07E06	Basal Loess	10 July 2013	CMB, JCP
L2013-05	N05E01	C end of excavation	10 July 2013	TDG
L2013-06	N25W22	B Horizon	17 June 2013	grid
L2013-07	N25W22	Colluvium	18 June 2013	grid
L2013-08	N25W22	Loess-top	20 June 2013	Total station
L2013-09	N16W18 N16W19 N17W18 N17W19	Artifacts in O/A	15 June 2013	grid
L2013-10	N16W18 N16W19 N17W18 N17W19	B1	17 June 2013	grid
L2013-11	N16W18 N16W19 N17W18 N17W19	B/Colluvium +Artifacts	19 June 2013	grid
L2013-12	N16W18 N16W19 N17W18 N17W19	Loess-top	20 June 2013	Total station
L2013-13	N16W18 N16W19 N17W18 N17W19	B2/P1	24 June 2013	grid
L2013-14	N16W18 N16W19 N17W18 N17W19	P1	25 June 2013	grid
L2013-15	N16W18 N16W19 N17W18 N17W19	P2	26 June 2013	grid
L2013-16	N16W18 N16W19 N17W18 N17W19	P2/P3	5 July 2013	grid
L2013-17	N18W16	P2 + Hearth Feature	5 July 2013	grid
L2013-18	N18W16	P2 Hearth Floor	6 July 2013	grid
L2013-19	N18W16	P3	6 July 2013	grid
L2013-20	N18W16	Loess below P3	9 July 2013	grid
L2013-21	N07E07	C end of excavation	11 July 2013	CMB
L2013-22	N16W18 N16W19 N17W18 N17W19	P3/Loess below	11 July 2013	LKC
L2013-23	N04E06	C end of excavation	7 July 2013	PW
L2013-24	N13E06	Loess-top	11 July 2013	JMV
L2013-25	N13E06	C end of excavation	12 July 2013	AKW

L2013-26	S04W25	B2/Loess	21 June 2013	
L2013-27	N18W13	P2/Hearth	6 July 2013	

- Recovery of 23 potential radiocarbon samples, detailed in the Table below

Table 8. Inventory of Collected Radiocarbon Samples, KdVo6 2013..

Sample #	Unit #	Level	Quadrant	DBUD	Type	Comments
14CS2013-01	N00 W27	B	NE	32.5	Wood/ carbon	Spall was vertically inclined (45), charcoal horizontal
14CS2013-02	N18 W13	P 3/4	SW	86.0	Wood/ carbon	Assoc. with cobble feature-in between 4 cobbles
14CS2013-03	N18 W13	P 3/4	SE	87.0	Wood/ carbon	Assoc. with cobble feature-in between 4 cobbles
14CS2013-04A	N17 W13	P4	SW	89.0	Wood/ carbon	Hearth sample, assoc. with burnt bone and ancient basalt flake
14CS2013-04B	N17 W13	P4	SW	89.0	Wood/ carbon	Hearth sample, assoc. with burnt bone and ancient basalt flake
14CS2013-05	N26 W23	Sandy loess	NW	97.0	Wood/ carbon	Birch bark found in situ
14CS2013-06	N16 W18	P2	SE	69.0	Carbon	Charcoal from upper P2
14CS2013-07	N16 W18	Screen	SW	80.0	Wood	Wood slivers from P complex, assoc. with burnt squirrel mandible
14CS2013-08	N16 W18	P2	SE	84.0	Carbon	Charcoal from bottom of P2
14CS2013-09	N18 W16	P3	NE	86.5	Wood/ carbon	Large burnt wood sample from very black/burnt layer
14CS2013-10	N17 W13	P4	SW	93.0	Soils	Biface sample #1. Includes material from base of biface
14CS2013-11	N17 W13	P4	SW	98.5	Soils	Biface sample #2. Contains matrix from above and below brown soils. *Sample is poor and potentially not suitable for dating.
14CS2013-12	N17 W13	P4	SW	101 to 104	Soils	Biface sample #3. Sample directly from center of deposit, coherent, flakes entirely away from gray loess below. Large calcine deposit present.
14CS2013-13	N16 W19	P3	NW	102.0	Wood/ soils	Wood and surrounding soils, top of P3
14CS2013-14	N16 W19	P3	NE	102.0	Wood/ soils	Wood and surrounding soils, top of P3
14CS2013-15	N16 W19	P3	NE	104.0	Wood/ soils	Wood sample from large buck of soil
14CS2013-16	N16 W19	P3	SE	98.0	Wood/	

					soils	
14CS2013-17	N26 W23	Sandy loess	SE	139-142.5	Wood/ carbon	Floatation sample from entire quad, contains roots, rootlets, possible moss, leaves, insects
14CS2013-18	N16 W19	P2	SE	65.0	Carbon	Charcoal
14CS2013-19	N16 W19	P3	NW	88.0	Wood	
14CS2013-20	N16 W19	P3	SE	98.0	Wood	
14CS2013-21	N17 W13	P4	SW	91.5	Bone/ carbon	Long bone shaft fragment- Faunal catalogue F2013-34
14CS2013-22	N16 W19	P3	NW	103.0	Wood/ soils	
14CS2013-23	N17 W13	P3	NW	63-64	Wood/ soils	Same matrix as bone(F2013-31)

- Recovery of 14 sediment samples as detailed in the Table below.

Table 9. Inventory of Collected Sediment Samples, KdVo6 2013

Sample #	Unit #	Level	DBUD	Comments
SS2013-01	N26 W23	Sandy loess	142 to 147	Block sample of Orange/Brown Feature XXXXX
SS2013-02	N26 W22	B	22 to 40	Profile sediment sample
SS2013-03	N26 W22	Colluvium	40 to 77	Profile sediment sample
SS2013-04	N26 W22	Sandy loess	77 to 87	Profile sediment sample
SS2013-05	N26 W22	Sandy loess	87 to 97	Profile sediment sample
SS2013-06	N26 W22	Sandy loess	97 to 107	Profile sediment sample
SS2013-07	N26 W22	Sandy loess	107 to 117	Profile sediment sample
SS2013-08	N26 W22	Sandy loess	117 to 127	Profile sediment sample
SS2013-09	N26 W22	Sandy loess	127 to 137	Profile sediment sample
SS2013-10	N26 W22	Sandy loess	137 to 147	Profile sediment sample
SS2013-11	N26 W22	Sandy loess	147 to 157	Profile sediment sample
SS2013-12	N17 W19	A	42	Block sample of dark organic material
SS2013-13	N17 W13	P4	87.5 to 97.5	Soil sample in association with biface, orange
SS2013-14	N17 W13	P4	86 to 96	Soil Sample in association with basalt biface, brown silty,

- Construction of a storage shed for secure equipment lockup.
- While not part of this report, the primary field crew also assisted Robert Sattler, Archaeologist at the Tanana Chief's Conference of Fairbanks, Alaska in survey and excavations at the David Site at Calico Bluff on the Yukon River, south of Eagle, Alaska.

Figure 6. Excavations at the David Site, Yukon River, Alaska.

- From 3 – 7 of July we hosted 9 Youth and 4 counselors engaged in the Northern Cultural Expressions Society's summer cultural program for native youth at risk. We used a combination of field camp activities (excavation, artifact molding, cooking, camp maintenance, fishing, swimming, and taking in the spectacular view) a variety of art activities (beading, bark and wood working, painting, storytelling), and local Elder interaction as vectors of therapy for the children. A short video produced by one of the undergraduate students as her summer research project is included as part of the digital appendix.
- Two public presentations related to this project were delivered in the past year. A poster describing a variety of analytical approaches to the Little John data site was presented at the international Paleoamerican Odyssey conference in Sante Fe, NM in October (Easton, Grooms, Cubley, et al. 2013) and a paper was presented to the Alaska Anthropological Association meetings in Fairbanks (Easton, et al. 2014).
- No peer-reviewed publications were generated in the past year relating to this permitted activity.
- Following on her successful graduation from Simon Fraser University based on an undergraduate thesis on the pXRF characterization of balsaltic arifacts from the Little

John site (Handley 2013), Ms. Handley has been accepted into the Masters program of the Department of Anthropology of the University of British Columbia to pursue a thesis program related to the lithic collection of the Little John site under the supervision of Dr. David Pokotylo. Ms. Handley will be joining us for five or six weeks this summer to collect material related to her thesis topic.

- Michael Grooms (PhD candidate, University of New Mexico, Dr. E. James Dixon, Supervisor) has passed his examinations for candidacy and will be returning to work with us in 2014 to continue sedimentological and related sampling and analysis to support his doctoral dissertation on the geomorphology of the Little John site. He is planning to work with us for six to eight weeks this summer.
- Laurianne Bourgenon (PhD candidate, University of Montreal, Adriane Burke, Supervisor), spent four weeks at the site in support of her comparative research with the Blue Fish Cave fauna, during which she examined 2,246 faunal specimens, representing about 87% of the 2,583 specimens in the Little John faunal assemblage collected between 2003 and 2013 – 337 bones were not available for her study and are being examined in 2014 which will alter in some ways her preliminary conclusions presented here, since many of them are larger, more complete specimens.
- Nicolena Virga (M.A.candidate, Department of Anthropology, U of Southern California – Fullerton, Supervisor Dr. Steven James), who has worked us for five field seasons is applying to the University of Victoria with Dr. Quentin Mackie and the University of Fairbanks with Dr. Ben Potter, with a view towards completing her thesis work on an element of the Little John site or a related smaller site in the vicinity. She will return for three weeks of fieldwork this summer in 2014.

REGIONAL CONTEXT OF THE AREA OF STUDY

GLACIAL HISTORY AND PALEOECOLOGY OF THE STUDY REGION

Pleistocene glacial advances in the Mirror Creek and adjacent Tanana valleys were thin piedmont glaciers extending from the Nutzotin – Wrangell – St. Elias Mountain chain, which rise about forty kilometers to the southwest of the site. The Little John site lies at the edge of the maximum extent of the Mirror Creek glacial advance (corresponding to the central Yukon’s Reid and North American Illinoian glacial events), variously dated to the Late Illinoian – MIS 6, c. 14,000 BP (Bostock 1965; Krinsley 1965) or the Early Wisconsin – MIS 4, c. 70,000 BP (Denton 1974; Hughes et al. 1989).

However the Late Wisconsin advance of glacial ice, identified locally as the McCauley glacial advance (corresponding to the central Yukon's McConnell and the North American Wisconsin glacial periods), ended at McCauley Ridge, some fifty kilometers to the southeast, and began a rapid recession at about 13500 BP; by 11000 BP the region was ice-free to at least the White River, some 150 kilometers to the southeast (Rampton 1971).

Thus, the Little John Site lies within the ice free lands of Beringia. Paleontological data compliments the geological evidence. This includes a dated fragment of ivory from a scatter of this material found eroding from the hillside across the highway from the Little John site, which has been AMS dated to 38160 +/- 310 RCYBP; presumably it is from *Mammuthus*, although we have not undertaken any DNA analysis to confirm this.

Figure 7(a/b). Ivory Locality across the highway from Little John and detail of Recovered Fragments.

However, combined with the recovery of additional Pleistocene fauna in the area representing specimens of *Bison*, *Equus*, *Mammuthus*, *Rangifer*, and possibly *Saiga*, including an

Equus lambei specimen, recovered about two km from the site, which has been radiocarbon dated to 20660 +/- 100 RCYBP (Beta 70102; MacIntosh 1997:84), these non-cultural fauna confirm that the area about the Little John site supported a range of mega-fauna during the mid to late Wisconsin glacial period from at least 38,000 years ago.

Figure 8. Pleistocene Fauna collected at Little Scottie Creek Bridge;
***Equus lambei* dated to 20,660 rcybp (Greg Hare; Yukon Heritage Branch).**

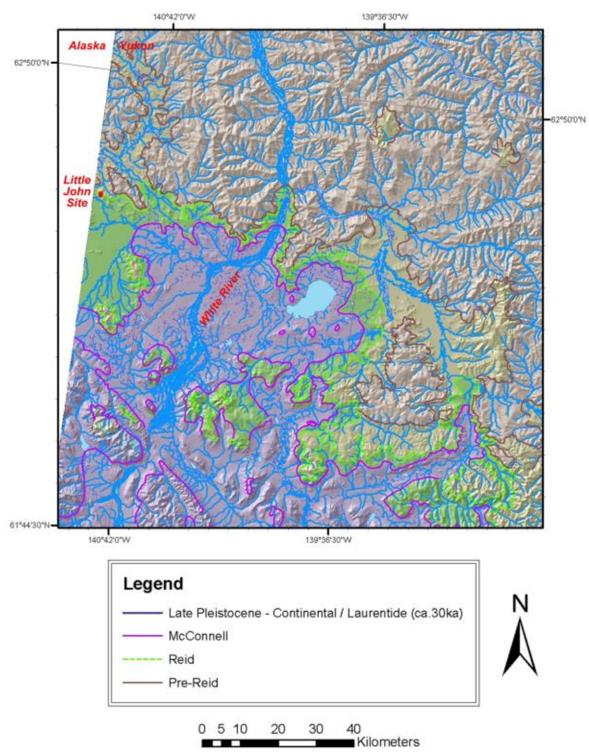


Figure 9. Pleistocene Glacial Limits of the Southwest Yukon (prepared by the Yukon Geological Survey based on most recent fieldwork in the region).

Several palaeo-ecological studies have been carried out in the region, which allow us to reconstruct the local post-glacial environmental history of the past 13,000 years or so. Rampton

(1971b) analyzed sediments from Antifreeze Pond, just south of Beaver Creek, while MacIntosh (1997) examined sediments from "Daylight Coming Out" Lake (Upper Tanana = *Yikahh Männ'*) just north of Beaver Creek and the uppermost lake on the Little Scottie Creek drainage, and "Island" Lake (Upper Tanana = *Cha'atx̱aa Männ'*), which lies just over the Alaska border and drains into Big Scottie Creek via Desper Creek. The results of these two studies were in general agreement, differing slightly in some aspects of dating and environmental indicators. In combination they present us with the following palaeo-environmental reconstruction:

<u>Herb-Tundra Steppe Zone</u>

The late glacial environment of between 13,500 to 11,000 years ago was dominated by grasses (*Gramineae*), sage (*Artemisia spp.)*, willow (*Salix spp.*) and sedges (*Cyperaceae*), equivalent to that of the predominantly herbaceous tundra steppe zone proposed for much of eastern Beringia at the end of the Wisconsin glaciation.[1] MacIntosh estimates minimum July temperatures of five degrees Celsius.

<u>Birch Rise</u>

The period between 11,000 and 8,000 years ago is marked by a significant (up to seventy-five percent of the pollen record) increase in birch (*Betula spp.* - predominantly dwarf birch - *Betula pumila* var. *glandulifera*), with a slow decline in the levels of *Artemisia*. These data suggest a continuing warming climate to at least a minimum mean July temperature of nine degrees Celsius. A rise in aquatic plants and algae is also noticeable in the pollen record, suggesting increased moisture and precipitation, as well as a general reduction in erosion and accompanying stabilization of the landscape.

<u>Spruce Rise</u>

This is a relatively short period, which is marked by the first appearance of spruce (*Picea spp.*) in the region. It is also one which different localities present different time depths. Rampton's estimates for Antifreeze Pond place the onset of spruce at about 8,700 years ago; MacIntosh's data from *Yihkah Männ'* place it at between 7,400 and 8,400 years ago. Birch and willows retain the high values of the previous period however, while other taxa are greatly reduced. The presence of spruce suggests a minimum mean July temperature of thirteen degrees Celsius.

---

[1] There is not unanimous agreement on Wisconsinan Beringian environments, but I follow the position set out by Guthrie (1990) on the matter, which argues for a productive "mammoth steppe".

Spruce Zone

After about 7,500 years ago, spruce becomes predominant within the pollen record in the region, with an accompanying dramatic decrease in the presence of birch and willow. Sphagnum pollen also rises noticeably, with a corresponding decrease in aquatic species. These data suggest at least maintenance of minimum mean July temperatures of thirteen degrees Celsius.

Alder Zone

A rise in alder (*Alnus spp.*) is found at about 5,400 years ago at *Yihkah Männ'*, and 5,600 at Antifreeze Pond; both suggest an increase in relative moisture in the region at about this time to about present levels. Both Rampton and MacIntosh interpret their data as indicating the onset of an environment generally similar to that of today, with the exception of a gradual rise in mean annual July temperatures to its contemporary level of about twelve degrees Celsius.

It was during this last period that the region experienced the ash fall from two major volcanic eruptions near Mounts Churchill / Bona, near the headwaters of the White River. The figure below shows the limits of the two ash falls.

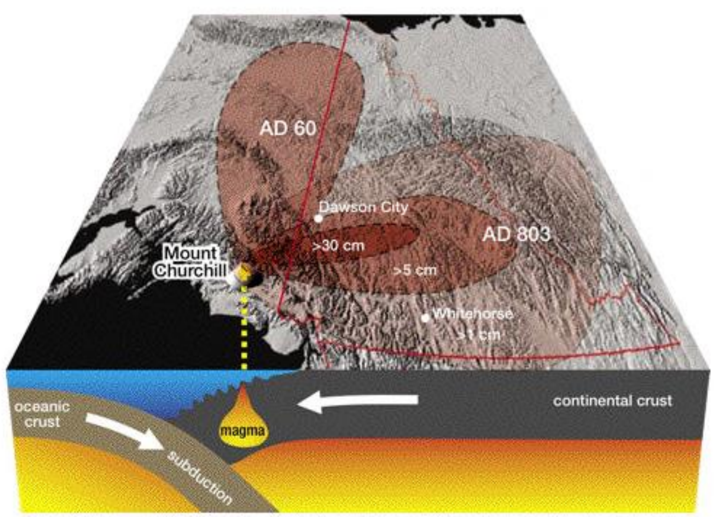


Figure 10. Distribution of the White River Ash fall, c. 1,900 and 1,250 years ago.

(from Smith et al. 2004:28)

The first, smaller eruption occurred at about 1,900 years ago; the majority of ash was deposited northward from the eruption. The second, larger, eruption occurred at about 1,250 years ago; the ash fall from this eruption was carried eastward to beyond the Yukon - Northwest Territory border (Lerbekmo et al. 1975); more recent analysis of peat deposits has extended its distribution as far east as the shores of Great Slave Lake, 1300 km from the source. This expanded distribution encompasses about 540,00 km^2, representing a tephra volume of 27 km^2 (Robinson 2001). The effect of these ash falls must have been significant for both the environment and the humans living in the region (Workman 1974). Moodie and Catchpole (1992), and others (Derry 1975, Ives 1990, 2003, Matson and Magne 2007), suggest that this may have been the impetus for the migration of the Athapaskan speaking ancestors of the Navaho and Apachean peoples into the American southwest desert lands. Ives (2003:267) notes that

> the clear recognition of two separate White River events enhances the tie between Athapaskan language history and volcanic history. The north lobe White River event (ca. 1900 B.P.) corresponds in time with the intermontane and coastal migrations of the Pacific Coast Athapaskans that Krauss and Golla (1981) felt took place before 1,500 B.P., while the east lobe event corresponds with the divergence of Canadian and Apachean Athapaskans after about 1,200 B.P. It seems unlikely that these two episodes of languag divergence, in their correspondence with two volcanic events of stupendous ecological moment, would arise purely as a matter of coincidence.

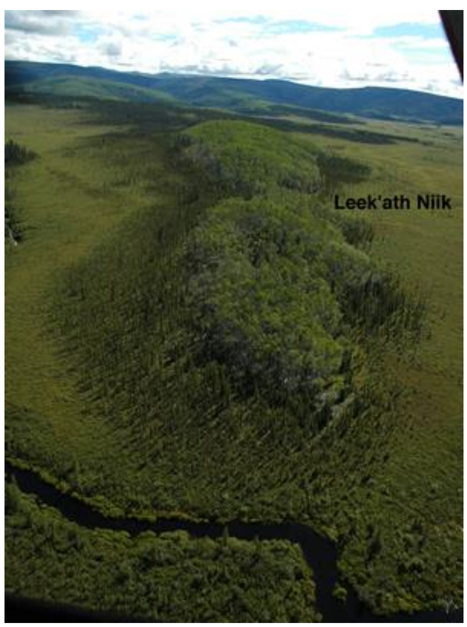


Figure 11. Leek'ath Niik Village, Middle Scottie Creek.

Interestingly, Easton was told by several Upper Tanana Elders that the traditional village site of *Łeek'ath Niik* / muddy water creek /, which lies on the eastern side of the middle Scottie Creek valley, was the location to which their ancestors retreated at the time of the eruption and subsequent ash fall - a time referred to in their oral history as the year of two winters.

After the last eruption about 1,200 years ago the region's environment has been relatively stable, although fluvial erosion and redeposition of sediments, as well as localized mass wasting of hillsides, continued.

CONTEMPORARY ENVIRONMENTAL ECOLOGY OF THE STUDY REGION

From a contemporary perspective, Oswald and Senyk's (1977) categorization of the eco-regions of the Yukon place the southwest Yukon and the adjacent Upper Tanana valley within the eastern portion of their "Wellesley Lake Eco-Region" (pp. 42-45; see also Smith et al. 2004).

The surface of the valley floors are characterized by extensive meandering streams across boggy, largely permafrost muskeg. Though technically discontinuous, permafrost is extensive and can reach as deep as thirty meters (Rampton 1980). Frozen ground features include fen polygons, stone nets, felsenmeer, solifluction lobes and stripes, and rock rivers.[2] Loess (wind blown) sediments and volcanic ash deposits, both of which can reach over 50 cm in depth, are also found throughout the region (Oswald and Senyk 1977).

Today the ground is covered with sphagnum mosses, sedges, blueberry, bearberry, Labrador tea, and is dotted with remnant oxbows and a plethora of small lakes ringed with willows. Black spruce bowers and scattered growth of dwarf birch, alder, and willow crowd any rise in the valley landscape, which are often elevated frost mounds, shading ground patches of cranberry and wild rose. The surrounding hillsides support alternating patches of white and black spruce, birch, alder, aspen, and poplar trees and a wide variety of shrubs, up to their low

---

[2] All of these surficial features are directly related to permafrost conditions:

- Fen polygons are peatlands with slowly moving water above or below the surface, commonly supporting grasses, sedges, cottongrass, bulrushes, and reeds, on patterned ground, roughly polygonal in shape.
- Stone nets are characterized by fine-grained soils in the centre and coarse-grained, stony materials found on the rim of patterned ground intermediate between sorted circles and sorted polygons.
- Felsenmeers are chaotic assemblages of fractured rocks resulting from intensive frost shattering of jointed bedrock.
- Solifluction lobes and stripes are two forms of surficial sediment deposits which have resulted from the slow, gravitational downslope movement of saturated, unfrozen sediments moving as a viscous mass over a surface of frozen material (Oswald and Senyk 1977).

summits. Due to the near surface presence of permafrost, north-facing hillsides are predominantly black spruce. Many of these plants were and continue to be used by *Dineh* of the region (see Easton 2004b).

Despite the abundance of water in the region, the humidity is low. This is because the lowland bogs are more a function of the low relief and summer solar thaw of the fifty or so centimeters of soil above the permafrost than of precipitation, which averages only about 30cm per year. Seasonal variation in temperatures is extreme, ranging from -57 degrees Celsius or greater in the winter to the low 30s in the summer. The mean low temperature is -31 degrees Celsius in January, the mean high temperature is 12 degrees Celsius in July, and the annual mean temperature is -6 degrees Celsius. (The lowest recorded temperature for North America was recorded at nearby Snag, Yukon on 3 February 1947 of -62.8 degrees Celsius (-81 degrees Fahrenheit). Cloud coverage is relatively high, averaging overcast for 27% and broken for 30% of the year (Wahl et al. 1987).

The low mean temperatures combined with the low solar values associated with the high cloud cover, result in long winters with lakes and streams frozen from October to mid-May (Hosley 1981a). And while the depth of snow is never very deep, it can come as early as September and remain on the ground until May. As a result, the seasons of spring and fall are short, while the difference between winter and summer might best be summed up as frozen or wet.

In the present, the basin supports a wide range of fish species, large and small mammals, and is an important component of the interior western continental flyway; in Alaska the lower Chisana River basin is completely within the Tetlin National Wildlife Refuge, while the upper portion lies in Wrangell-St.Elias National Park and Preserve.

Dominant large mammals include moose (*Alces alces*), black and brown (grizzly) bear (*Ursus americanus* and *Ursus arctos*), mountain sheep (*Ovis dalli*), and caribou *(Rangifer tarandus*) of the Chisana and Forty-Mile C aribou Herds.

Furbearers include wolf (*Canis lupus*), lynx (*Lynx canadensis*), wolverine (*Gulo gulo*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethica*), otter (*Lontra canadensis*), and the snowshoe hare (*Lepus americanus*).

Pre-eminent among the fish species are whitefish (*Coregonus sp.*), grayling (*Thymallus arcticus*), pike (*Esox lucius*), sucker (*Catostomus spp.*), and lingcod [burbot] (*Lota lota*). Salmon is also available to the region from fishing localities on the White and Yukon Rivers, as well as through reciprocity with relatives living in the Copper River watershed and in the Dawson region (see Friend, et al. 2007, for a comprehensive survey of traditional and contemporary subsistence fishing in the upper Tanana River basin).

Like the plants, most all animals were integrated into Upper Tanana culture. All retain an important social and spiritual relationship to people - the *Dineh* culturally categorize animals as non-human persons with cognitive and moral purpose - and many were important components of the aboriginal technology and subsistence systems (see Nadasdy 2007; Easton 2008a).

REGIONAL ARCHAELOGICAL SEQUENCES

The ancient Beringian environment which prevailed in the Borderlands during the last glacial maximum, some 27,000 to 12,000 years ago during the late Pleistocene geological epoch, and the general environmental changes which occurred in the region over the past 11,000 years of the subsequent Holocene epoch was presented above. There is widespread agreement on the presence of human societies occupying eastern Beringia during the final millennia of the Pleistocene and the early Holocene Epochs. Currently there are two regional schemes that prevail in our understanding. The first is one that was developed to account for the prehistory of glaciated Yukon; the second is one that was developed to account for the prehistory of unglaciated eastern Beringia (central Alaska and western Yukon). In order to provide a larger context to the material recovered from the Little John site, I present first the northwestern Canadian (glaciated Yukon) archaeological sequence,[3] followed by a presentation of the eastern Alaskan sequence, and then a comparative discussion of both archaeological sequences, which relates one to the other. Finally, I discuss specific archaeological sites within the local area of the Borderlands to contextualize the Little John site in a regional perspective.

From the pan-regional perspective of Northwestern North America, it is clear that there must be some technological and cultural relationship between the Alaskan and Yukon sequences.

[3] I am leaving aside discussion of the proposed early (20,000 years +) cultural tradition based on a bone tool technology proposed by Jaques Cinq-Mars, and Richard Morlan (Cinq-Mars and Morlan 1982) for unglaciated northeastern Beringia in the Old Crow River Basin of northern Yukon. The archaeological evidence for this early culture is equivocal at best and not generally accepted by the majority of archaeologists, including myself. The demonstrable late Pleistocene – early Holocene (circa 11,000 years ago) microblade and burin component of the Blue Fish Caves assemblage in the Old Crow basin is variously assigned to the Paleo-Arctic, Denali, Beringian, or Dyuktai archaeological traditions which are discussed below (c.f. Fagan 1987:122-127; Dixon 1999:58-61).

Indeed, the Little John site, along with others in the Borderlands area, are well placed geographically and chronologically to provide the archaeological data to link the two separate sequences, which to date have been geographically separated by hundreds of kilometers and nationalist driven definitions.[4]

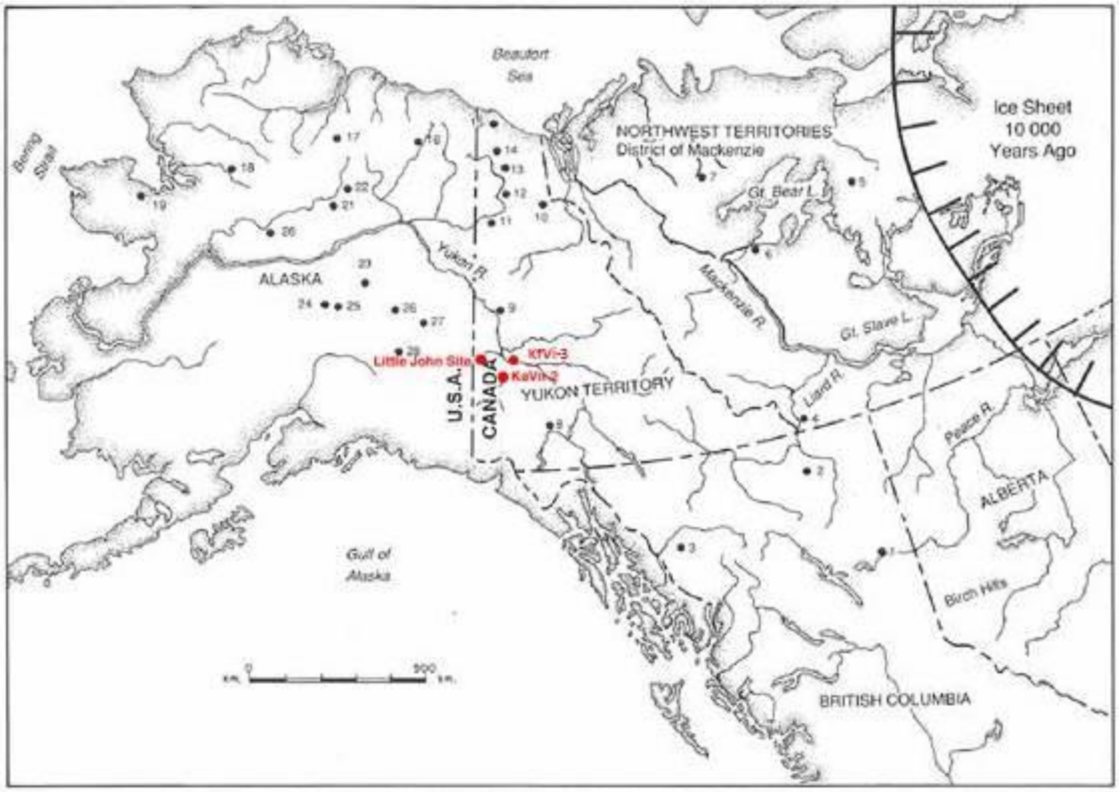
The map below shows the general location of most western subarctic archaeological sites of the late Pleistocene and early Holocene (from as early as 14,000 years ago at the Swan Point [next to # 26, Broken Mammoth] and Little John sites to about 8,000 years ago), and includes the approximate location of the newly announced 13,000 + year old site at the mouth of Britannia Creek (Guzman 2014). Based on current knowledge, the archaeological sequence for the glaciated Yukon first proposed by Workman (1978) has been refined by the recognition of a non-microblade Northern Cordilleran Tradition in the early Holocene (Clark 1983), a mid-Holocene "Annie Lake" technological complex of small, deeply concave-based lanceolate points (Greer 1993), and the combining of Workman's Aishihik and Bennett Lake phases into a Late Prehistoric period (Hare 1995). Each of these archaeological cultures is discussed in more detail below.

The Northwestern Canadian (Central Southwest Yukon) Archaeological Sequence

Northern Cordilleran Tradition

Lasting from at least 10,000 years ago to about 7,000 years ago, this tradition is characterized by large straight and round-based lanceolate point forms, large blades and flakes, and transverse notched burins. Significantly the assemblage lacks microblade technology (Clark 1983). The climate at this time shifted from the colder and dryer climate associated with the terminal glacial period to increasing warming throughout (from a mean July temperature of 5.5 to 7.2 degrees Celsius to 7.2 to 9.9 degrees Celsius), while the vegetation seems to have been dominated by shrub tundra. Representative site components of this tradition include the basal levels of the Canyon (JfVg-1) and Annie Lake (JcUr-3) sites, and the Moosehide (LaVk-2) site.

[4] Interestingly, Carlson (2007) goes even further, linking the early Borderlands archaeological culture with that of the early Northwest Coast.



Map 4. Ancient Sites in the Northwestern Area, 11 500 to 7 000 Years Ago The sites shown belong to Clovis Palaeo-Indian, Palaeo-Arctic, and early Northern Cordilleran peoples. Microblade people of the Palaeo-Arctic tradition became established in Alaska around 10 700 years ago, and expanded eastwards, probably absorbing or displacing earlier inhabitants of the Cordilleran region.

1 Charlie Lake Cave, P-I
2 Pink Mountain, P-I
3 Mount Edziza, obsidian source
4 Fisherman Lake & Pointed Mountain, NC, P-A, HR
5 Acasta Lake, NC
6 Franklin Tanks, Gt. Bear R., HR
7 Airport, NC
8 Canyon Creek, NC
9 Dawson placer mines, P-I & Moosehide
10 Rock River sites, NC
11 Bluefish Caves, P-I, P-A
12 Old Crow River Flats, P-I
13 Dog Creek, P-I
14 Kikavichik Ridge, P-I
15 Englgstiack, NC, HR
16 Putu, P-I
17 Mesa, NC
18 Onion Portage, P-A, HR
19 Trail Creek Caves, P-A
20 Batza Téna, obsidian source, P-I
21 Island, P-I, P-A
22 Girls' Hill, P-I
23 Campus, HR
24 Walker Road, P-I
25 Dry Creek, P-A
26 Broken Mammoth, P-A, NC
27 Healy Lake sites, NC, P-A
28 Tangle Lakes, P-A

Abbreviations
P-I: Palaeo-Indian
P-A: Palaeo-Arctic
NC: Northern Cordilleran group
HR: Siginificant in history of research

Figure 12. Late Pleistocene - Early Holocene Archaeological Sites of the Western Subarctic
(from Clark 1991a)

As discussed by Hare (1995), two possible sources for this tradition have been proposed. The first, following Clark (1983, 1992) is derived from populations of the Cordillera geophysical region, themselves derivative from late Paleoindian Plano peoples of the northern prairies, which co-existed with microblade making populations entering the Yukon from the northwest. However, Hare (1995:131) suggests that,

> "given the broad morphological similarities between blades from Annie Lake and those for the 11,000 BP Nenana Complex (discussed below and Goebel et al. 1991) and the apparent dissimilarities with the Early prehistoric period, Clovis-like blades of northern Alberta (see Le Blanc and Wright 1990), it is unlikely that the Northern Cordilleran

Tradition is derived from southern-based Plano influences. Instead, it is probable that the roots of Northern Cordilleran are to be found in the indigenous northwestern Paleoindian tradition"

– which I take to mean the northern Brooks Range assemblages such as those found at Mesa (Kunz et al. 2003), Putu, Bedwell and Hilltop sites, and Spein Mountain in the lower Kuskokwim River basin (Ackerman 2001), collectively grouped within the Mesa complex (Kunz and Reanier 1994; see also Hoffecker 2011).

Little Arm Phase or Northwest Microblade Tradition

Lasting from about 7,000 to 8,000 years ago to about 4,500 to 5,000 years ago, this tradition is characterized by composite tool production using small blades or microblades, multiple gravers and burins, round-based projectile points, and a variety of end and side scrapers (Workman 1978). The Little Arm site (JiVs-1) on Kluane Lake is the type site of this regional phase and sites of this type and period are found everywhere throughout the southwest Yukon, many of which might also include some notched points (although Workman, 1978, would disagree with including such sites on that basis). The climate during this time continued to become warmer than today's average temperatures, while the vegetation shifted from shrub tundra to a spruce forest ecosystem.

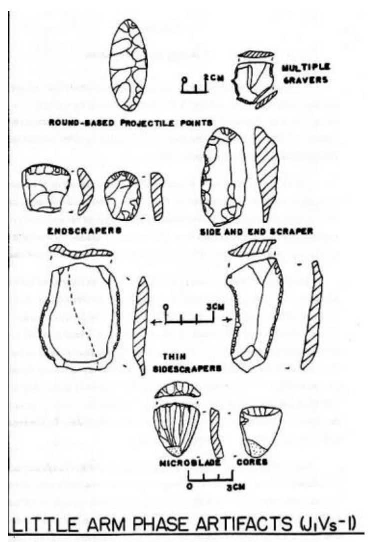


Figure 13. Little Arm Phase Artifacts

(from Workman 1978)

The Northwest Microblade Tradition (NWMt) as proposed by MacNeish (1964) included both wedge-shaped microblade cores and side notched points. It was seen by some as attempting to embrace far too many regional phases over too great a geographic area (from the Mackenzie River basin to Fairbanks) to have any great utility. More recently, its use has been resurrected by some in the Canadian northwest as representative of a merging of microblade technology diffused from Alaskan (and ultimately east Asian) origins and combined with the developing indigenous Yukon-Northwest Territories-based Northern Cordilleran tradition (Wright 1995; Clark et al. 1999). Clark et al. (1999:175) suggests that:

> The genesis of the Northwest Microblade Tradition, at least its microblade industry and possibly also its burins, lies in the spread of Denali culture to the Yukon about 7,000 or 8,000 years ago [after deglaciation] and its further, later, spread into the District of Mackenzie and adjacent areas of British Columbia and Alberta . . . . [that] resulted in considerable heterogeneity. . . . The Northwest Microblade Tradition should be viewed as a frontier culture [in the Cordillera] vis-à-vis the Denali focal region.

Annie Lake Complex

Lasting from about 6,900 to about 2,900 years ago, this complex is characterized by projectile points - called Annie Lake Points - which are relatively small (3.5 to 4.25 cm), basally thinned (or "deeply concaved lanceolate" in Greer's (1993) morphological description), and additional lithics which are “characterized by thin, well made tools of high quality raw materials, with a debitage suggesting extensive curation and maintenance of tools (Hare 1995:132).

Figure 14. Annie Lake Points

(N. A. Easton)

To date these points have been exclusively located in the Southern Lakes region around Whitehorse, Yukon. The Annie Lake Complex is found stratigraphically above microblade-bearing horizons of the NWMt and below Taye Lake Phase or Northern Archaic Tradition horizons. Temporally, however, it lies astride both the preceding and following tradition, leading

Hare (1995:121-2) to suggest that it may represent "a small colonizing population . . . or, and perhaps more likely, the Annie Lake complex represents diffusion of early Northern Archaic traits into an indigenous microlithic tradition."

Taye Lake Phase or Northern Archaic Tradition or Middle Prehistoric Period

Lasting from about 4,500 to 5,000 years ago to about 1,250 years ago, this archaeological culture is characterized by the introduction of a variety of side-notched and stemmed spear and atlatl points (Anderson 1968a, 1968b; Workman 1978), a range of scraper forms, net weights, and a notable increase in the recovery of bone artifacts of a variety of functions (although this last attribute may be a function of preservation, and the percentages of bone artifacts within the entire assemblage is less than that found in the subsequent Late Prehistoric period). At some sites microblades are found as well (c.f. Clark et al. 1999). A cooling and moister climate begins this period, with a neo-glacial period at about 2,600 years ago, followed by a drier climate at its terminus. Vegetation was similar to that of today.

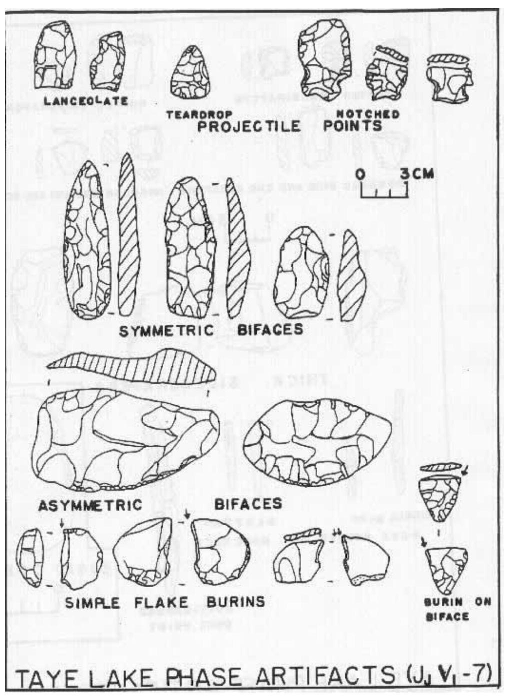


Figure 15. Taye Lake Phase Artifacts - Points, Bifaces, and Burins

(from Workman (1978)

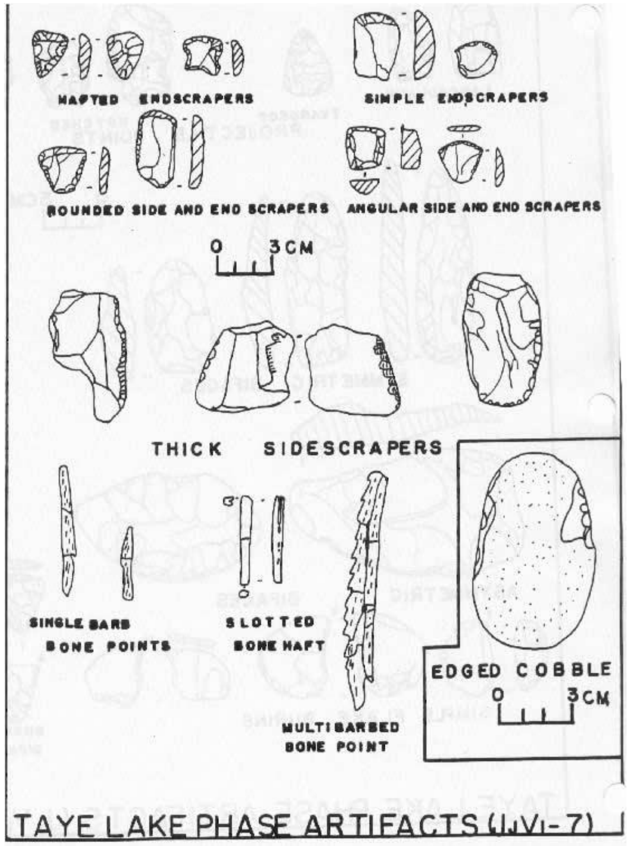


Figure 16. Taye Lake Phase Artifacts - Scrapers, Bone Points, and Net Weight.
(from Workman (1978)

Both Anderson and Workman noted that the lithic artifacts at this time become increasingly crude in their workmanship, with little retouch flaking and dominated by poor, coarse-grained materials. This fact, combined with the general expansion in the size and diversity of the overall toolkit, is interpreted to represent a population that has adapted and expanded its comfortable adaptation to the boreal forest landscape to include a wider variety of subsistence technology and resources, perhaps with an increased emphasis on bone technology and a reduction in lithic technology.

Aishihik Phase - Late Prehistoric Period

Lasting from about 1,250 to about 200 years ago, this archaeological culture (Workman 1978) is essentially Northern Archaic, but differentiated from the Taye Lake phase by its presence above the White River Volcanic ash fall - Taye Lake material is below the ash. It is characterized by increased use (or perhaps only archaeological recovery) of bone and antler tools, native copper implements, and small-stemmed projectile points (Kavik or Klo-kut points[5]). While initially cooling and moist, the climate became warmer at the end of this period and the vegetation was not significantly different from today.

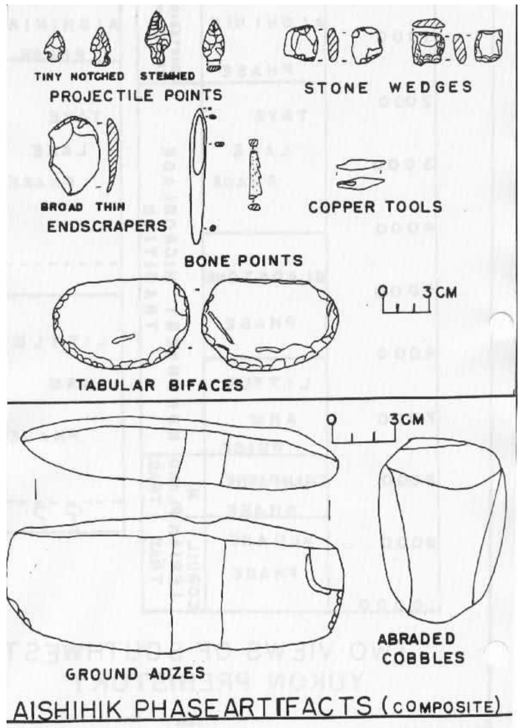


Figure 17. Aishihik Phase Artifacts.

(from Workman 1978)

Interestingly, recent dating of a large number of well-preserved atlatl darts and bow arrows found in melting ice patches in the southwest Yukon has revealed that the bow and arrow is exclusively an Aishihik Phase technology in the southwest Yukon (Farnell et al. 2005; Hare et al. 2004). Such a correlation between the second White River Volcanic ash fall and the introduction of the new bow and arrow technology replacing the longstanding atlatl is suggestive of a brief period of rapid population displacement and replacement, although undoubtedly of the same Athapaskan language family.

Bennett Lake Phase - Late Prehistoric

Lasting from about 200 years ago to this century, this archaeological culture (Workman 1978) is characterized by the introduction of European trade goods and their integration into aboriginal technology, and is prior to the full encapsulation and transformation of aboriginal technology into its modern form. Expedient lithic tools such as simple cobble scrapers (Upper Tanana = *thi-*

---

[5] These stemmed points may have tapered or shouldered bases; see Campbell 1968, Morlan 1972, Shinkwin 1978.

chos), choppers, bipolar flakes, scrapers made from bottle glass and strips of metal, fish-hooks made from nails, and bunting arrow points made from spent cartridges are common at sites such as those at Dawson-Tr'ochëk (Hammer 2001), Fort Selkirk (Easton and Gotthardt 1987, Gotthardt and Easton 1988), and the Scottie Creek valley (Easton 2002b).

Discussion of Southwest Yukon Sequence

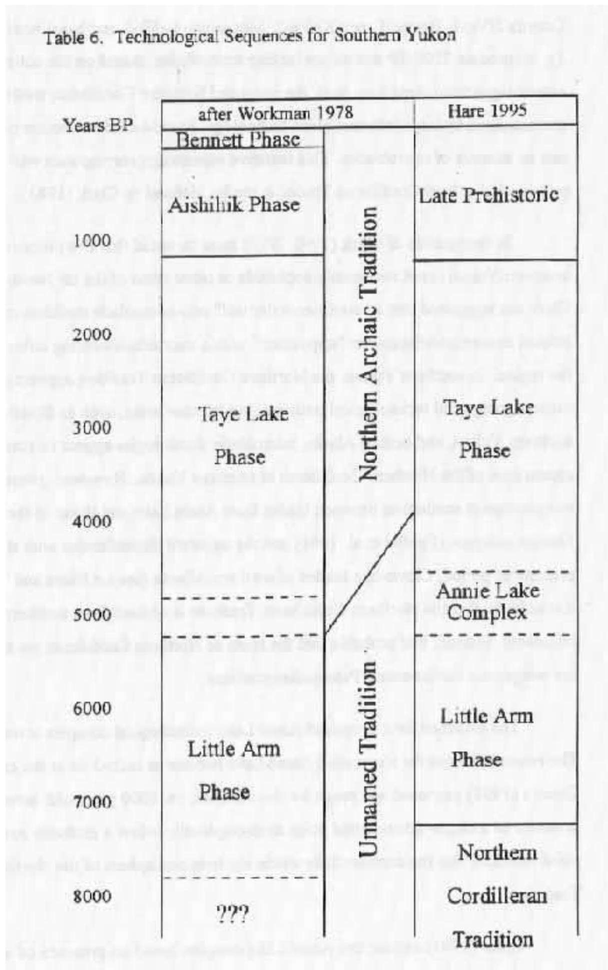


Figure 18. Technological Sequences for Southwest Yukon

(from Hare 1995)

The figure above presents a summary of the technological sequence of the southwest Yukon discussed in the previous section. There is no doubt that there is direct historic continuity between the contemporary inhabitants of the southwest Yukon and the people of the Bennett Lake phase. Similarly there is a direct connection between the people of the Bennett Lake phase and the preceding Aishihik, since the only defining difference is the introduction of European trade goods. This connection is reflected in contemporary archaeologists' movement away from the use of these phase names towards a more regional and generalized Late Prehistoric categorization with clear affiliations to modern Athapaskan groups (c.f. Greer 1983; Gotthardt 1990; Hare 1995:125).

The relationship between the Late Prehistoric period and the preceding periods is summed by Hare (1995:17):

> As outlined by Workman, most researchers agree that the Northern Archaic and Northwest Microblade traditions gradually evolved into the Late Prehistoric Athapaskan Tradition and while there was considerable regional variability there is evidence for continuity in terms of technology, settlement and subsistence patterns.

In years past, some archaeologists had suggested that the changes in technology between the Microblade and Northern Archaic periods reflected the migration of new culture-bearing people into the region (see especially Anderson 1968 and Workman 1978).

However, many archaeologists now favor models of population continuity in this period as well and suggest the possibility that the principal factor in these changes has been necessary adaptations to changes in the environment or the result of indigenous populations adapting diffused technological elements of neighbouring cultures (see, for example, Clark and Morlan 1982; Morrison 1987; Clark 1992; Hare 1995:16-17). Furthermore, Hare and Hammer (1997) have shown that the temporal range of microblades within the Yukon has more components outside the proposed range of the Northwest Microblade tradition than within it (see also Clark et al. 1999). Thus, for example, Morrison (1987) prefers the use of the term *Middle Prehistoric period* over that of the *Northern Archaic Tradition* in the Mackenzie and eastern cordilleran regions, while Clark and Morlan (1982:36) view the Northern Archaic as the later *phase* of the Northwest Microblade Tradition.

In other words, it can be argued that the changes in material culture in the archaeological record do not imply a physical replacement of the people in a region. Consider our own material culture changes from the introduction of new technology - the archaeological remains of my family or any of my neighbours 35 years ago would not have included a personal computer, diskettes, cd-roms, or videotapes. Today they do. To suggest, based on material remains alone, that the differences between the material remains of then and today reflects *the replacement of one resident population with another* is clearly wrong in this instance. It could be wrong in prehistory as well, and increasing numbers of archaeologists are considering this fact.

The notion of a Northern Cordilleran Tradition was first proposed by Clark (1983) in order to account for the presence of non-microblade archaeological components underlying microblade-bearing deposits throughout the Yukon. The application of this tradition is now generally accepted to account for early Holocene sites characterized by large straight and round-based lanceolate point forms, large blades and flakes, and transverse notched burins, but which lack microblades. However, even this tradition is increasingly regarded as having direct continuity with the subsequent Northwest Microblade Tradition (Wright 1995; Clark et al. 1999).

The Archaeological Sequence of Eastern Beringia (Central Alaska and Northwest Yukon)

For some years the archaeological sequence of F. H. West and his collaborators (West 1996c) dominated the prehistory of Alaska; this generally agreed with the Yukon sequence of technology but favors earlier dates, based on sites within unglaciated eastern Beringia, and a slightly different terminology. The principal exception to this generalization is that the earliest components are variously classified as belonging to the Chindadn / Nenana Complex, the Denali Complex, or the Eastern Beringian Tradition. More recently Holmes (2008) and Hoeffecker (2008) have proposed new complexes or phases for the late Pleistocene technologies of interior Alaska.

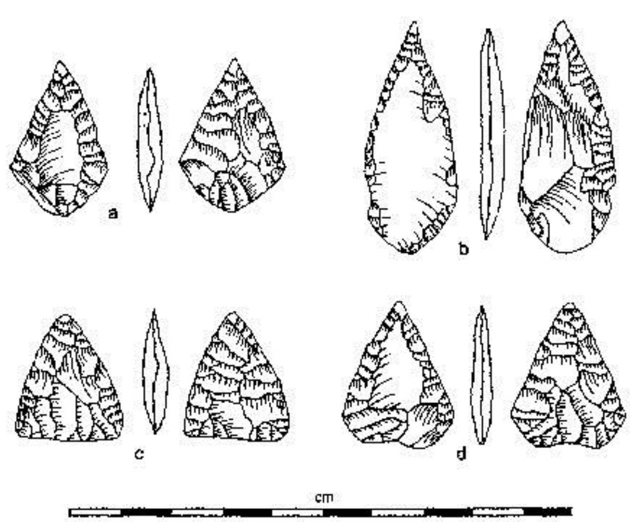


Figure 19. Chindadn ("Ancestor") points from Healy Lake.

(from West 1996c)

Chindadn Complex / Nenana Complex and Swan Point Dyuktai

The relationship between the Chindadn and Nenana complexes is currently under debate. Many of the sites in this period share similar sedimentary contexts. Located on buried paleosols below wind-blown glacial silts (loess sediments), some of these sites have exceptional organic preservation of bone, antler, and mammoth ivory, the latter presumably scavenged from earlier Pleistocene deposits exposed along river banks, which has revealed in some detail the diet of these culture carriers (Dilley 1998). Besides the expected remains of larger game – bison, wapiti, and sheep - their diet clearly included significant proportions of small mammals, migratory waterfowl and their eggs, and fish (Yesner et al. 1992, Yesner 1996, Yesner et al. 2011).

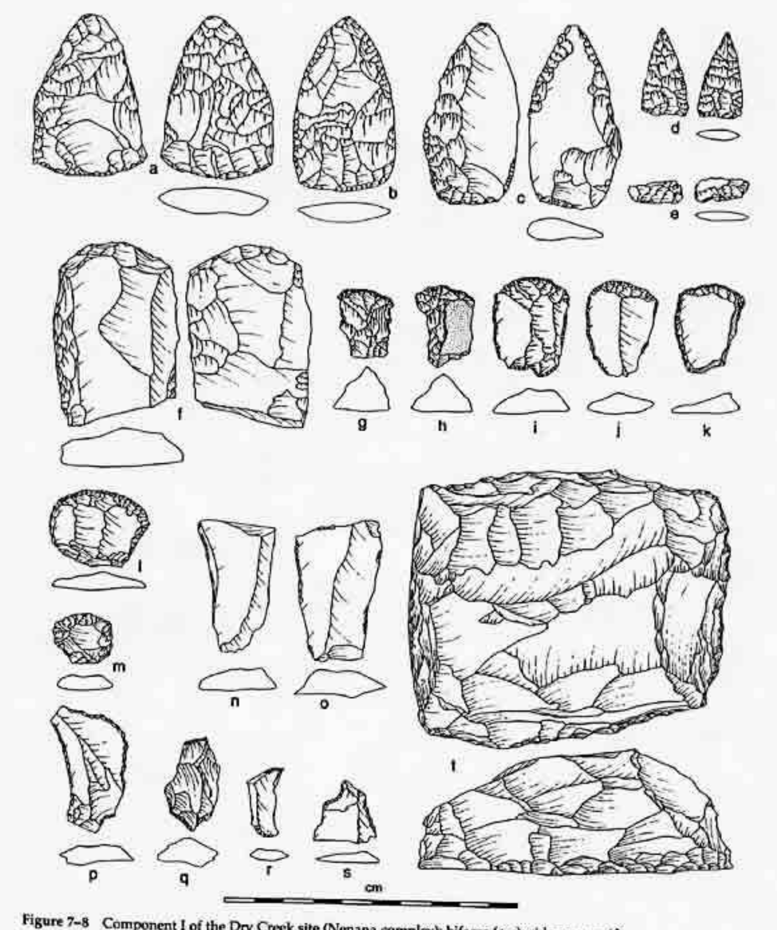


Figure 7-8 Component I of the Dry Creek site (Nenana complex): bifaces (*a–e*); side scraper (*f*); end scrapers (*g–m*); bilaterally retouched blades (*n, o*); retouched flakes (*p–s*); quadrilateral uniface or plane (*t*).

Figure 20. Dry Creek, Component I, Nenana Complex

(from West 1996c)

The Dry Creek, Walker Road, and Moose Creek sites in the Nenana valley provided the basis for the construction of the Nenana complex (Powers and Hoffecker 1989; Hoeffecker, et al. 1993). Dated to between 13 and 13.6 thousand years ago in the Nenana valley,[6] it is characterized by an emphasis on bifacial technology on blades and flakes, triangular and tear-dropped shaped (Chindadn) projectile points and / or knives (Cook 1969, 1996; Holmes 2001), straight and concave-based lanceolate projectile points, perforators (including bone needles), endscrapers and sidescrapers, but is lacking microblades.

The Nenana complex appellation was subsequently extended to include a series of site components along the Tanana River proper, including Healy Lake, Broken Mammoth, and Swan Point (Goebel and Slobodin 1999; Hamilton and Goebel 1999). In earlier reports on Little John, I and my collaborators have also designated the Western lobe loess stratum component at the Little John site, which includes Chindadn bifaces, straight-based lanceolate projectile points or knives, large ovate bifaces, bifacial blade and flake technology, endscrapers, and burins, but lacking microblade technology, as a Nenana assemblage (Easton 2007c; Easton and MacKay 2008).

Based on geographical, temporal, and technological differences, Holmes (2001) has for some time argued that we should recognize these late Pleistocene Nenana valley and Tanana valley components as separate complexes – the Nenana complex for the former and Chindadn complex for the latter. Geographically their separation is of enough distance to warrant this. Temporally the dated Chindadn complex components in the Tanana valley are all younger than those in the Nenana valley: Cultural Zone 3 at Broken Mammoth is dated to between 12.6 and 12 thousand calendar years ago (Yesner et al. 1992; Yesner 1996), Cultural Zone 3 at Swan Point is dated to between 12.5 and 11.5 thousand calendar years ago (Holmes et al. 1996; Holmes 2008, 2011), and the basal levels of Healy Lake are dated to between 9.1 and 13.3 thousand calendar years ago, with an average of c. 11 thousand calendar years ago (Cook 1969, 1996).

Technologically, all three assemblages of these Chindadn complex components at all three sites contain Chindadn bifaces along with some evidence of microblade technology:

[6] Dry Creek, Component I is dated at 11,120 +/- 85 radiocarbon years – 13,025 +/- calibrated calendar years (Hoffecker et al. 1996). The Nenana component at Walker Road has several dates averaging 11,208 +/- 92 radiocarbon years – 13,100 calibrated calendar years (Goebel et al. 1996; Goebel 2008). The Nenana component at Moose Creek is dated between 11,730 +/- 250 radiocarbon years – 13,681 +/- 316 calibrated calendar years (Hoffecker 1996) - and 11,190 +/- 60 – 13,091 +/- 117 calibrated calendar years (Pearson 1999).

microblades are found in small numbers at Swan Point CZ3 (34) and 44 are reported for Broken Mammoth (Krasinski 2005:46); however no microblade cores have been recovered from CZ 3 at either site. The presence of microblades negates inclusion of the Broken Mammoth and Swan Point CZ 3 assemblages in the Nenana complex. . . . Assignment of CZ 3 to the Chindadn complex is a better fit and has precedence over the Nenana complex, especially in the Tanana Valley. I place this group of components (Healy Lake Chindadn, Broken Mammoth CZ 3, and Swan Point CZ 3) in the EBt [East Beringian tradition] Phase II, and it may be possible to include the Nenana complex as well (Holmes 2008:6).

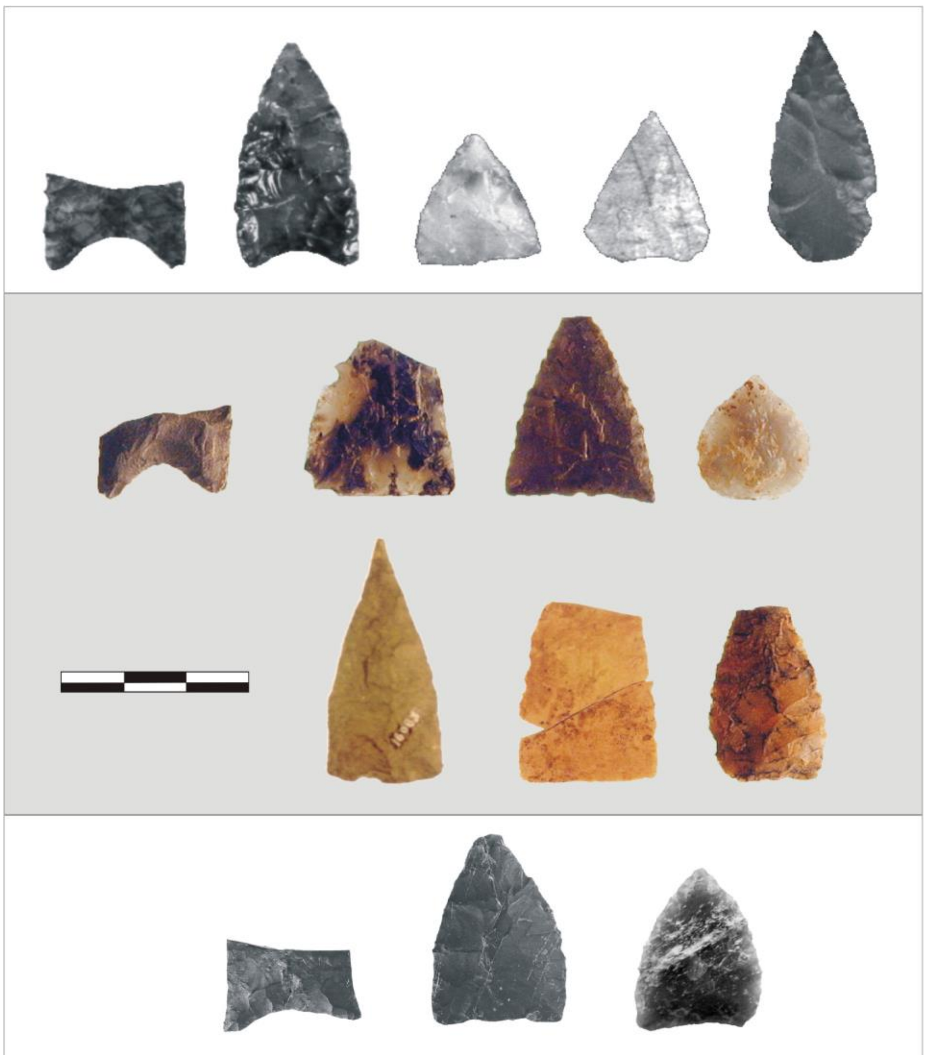


Figure 21. Chindadn Bifaces of the Tanana Valley: Top - Healy Lake Chindadn, Middle - Swan Point CZ 3, Bottom - Broken Mammoth CZ 3

(Holmes 2008)

Holmes' identification of a Phase II, which includes both Chindadn and Nenana complexes, within an "East Beringian tradition" is made in order to account for the earlier, distinct occupation at Swan Point at c. 14,000 calendar years ago, that is characterized by what he calls the Dyuktai microblade production technique, which "is based on preparing a biface (or less common, a blade or flake) preform, producing a platform by removing spalls from the lateral edge, and then detaching microblades" (Holmes 2008:5). He sees this form of microblade production as directly derivative from the Dyuktai and Yubetsu traditions of eastern Siberia, northern China, northern Korea, and Northern Japan and distinctively different from the "Campus" or "Denali" microblade production technique.

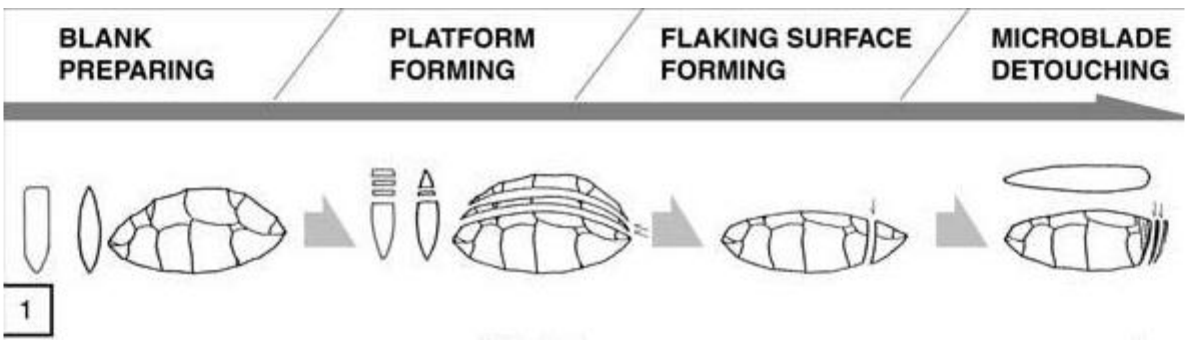


Figure 22. Yubetsu Microblade Core Production on a Biface

(from Nakazawa 2005)

> The best way to distinguish between the two techniques is to compare the core platforms. Dyuktai core platforms were created and maintained by spall removal along the entire core length. Campus core platforms were created by extensive retouch followed by core tablet removal, and maintained by subsequent platform retouching necessary to detach another core tablet. The core tablets often hinged out so that some of the platform preparation trimming scars were retained. I see this as a significant difference between Beringian microblade technology, based on the Dyuktai technique, and the later Alaskan technologies of the American Paleoarctic tradition and Denali Complex, which may have been influenced by Dyuktai culture, but became an Alaskan prodigy (Holmes 2008:5).

In addition to the practice of Dyuktai microblade core preparation technique, Holmes' notes that the 14 thousand year old Swan Point Cultural Zone 4 includes transverse and dihedral burins, hammer stones, possible anvil stones, utilized flakes, and, "as minor elements", blades and blade-like flakes. No complete formed bifaces, other than those prepared for microblade production, have yet been recovered from Swan Point CZ 4, though several biface fragments and thinning flakes indicate "thin biface production . . . but the finished form of these . . . is unknown" (Holmes 2008:6). A summary of Holmes' schema is presented in the figure below (see also Holmes 2011).

Based on these arguments and the evidence from Swan Point I am now inclined to agree with Holmes that the Upper Tanana valley components should be separated from the Nenana complex and designated as belonging to the separate Chindadn complex, which would include its expression at Little John as well. Some implications of this shift in terminology is explored further in Easton et al. (2011).

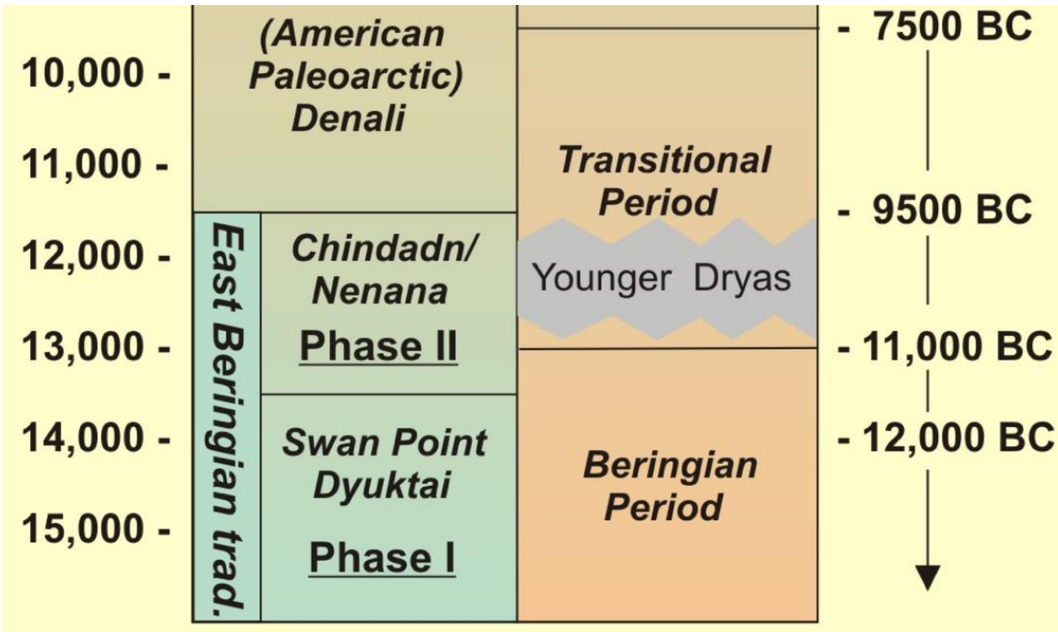


Figure 23. Late Pleistocene - Early Holocene Culture History of Interior Alaska Proposed by Holmes (2008)

(from Holmes 2008)

Denali Complex (American Paleo-Arctic Tradition / Beringian Tradition)

This archaeological culture is found from about 11,000 years ago to about 9,500 years ago and is characterized by the presence of microblades, wedge-shaped microblade cores, and burins. The American Paleoarctic Tradition was originally defined by Anderson (1970a, 1970b) on the basis of excavations at the Akmak and Onion Portage sites of northwest Alaska near the Brooks Range. It has subsequently been applied to a great number of assemblages within a wide variety of environmental contexts (maritime, transitional, interior, montane, northern, central, and coastal Alaska and Yukon). West (1981, 1996) subsumes these assemblages into an even wider Beringian Tradition that extends geographically into eastern Siberia / western Beringia, and would include the Nenana complex assemblages as well, on the basis that the lack of microblades is explained by site function – they are not found where they are not used.

350 *Part 2* ARCHAEOLOGICAL EVIDENCE: EASTERN BERINGIA

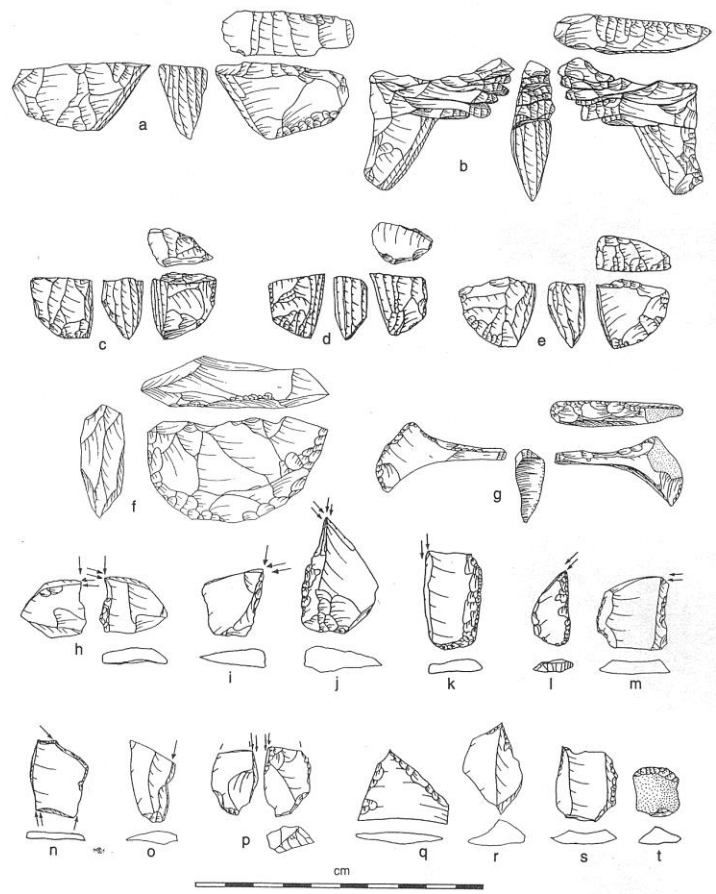


Figure 7–9 Component II of the Dry Creek site (Denali complex): wedge-shaped microblade cores (*a–e*, *b* with attaching core parts); wedge-shaped core preform (*f*); wedge-shaped core tablet (*g*); dihedral burins (*h–j*); angle burin (*k*); transverse burins (*l*, *m*); burins-on-a-snap (*n–p*); retouched flakes (*q–s*); end scraper (*t*).

Figure 24. Microblade Technology from Component II (Denali Complex), Dry Creek Site.

(from West 1996c)

The presence of wedge-shaped microblade cores (one of a number of alternative core forms from which microblades can be struck) is the common element, which unifies the designation. Some archaeologists (e.g. Dixon 1999, and myself), find the inclusion of such a variety of assemblages to reduce the utility of both constructs to little more than some indication of relationship between them; a more useful construct for the Tanana River valley is West's earlier defined Denali complex.

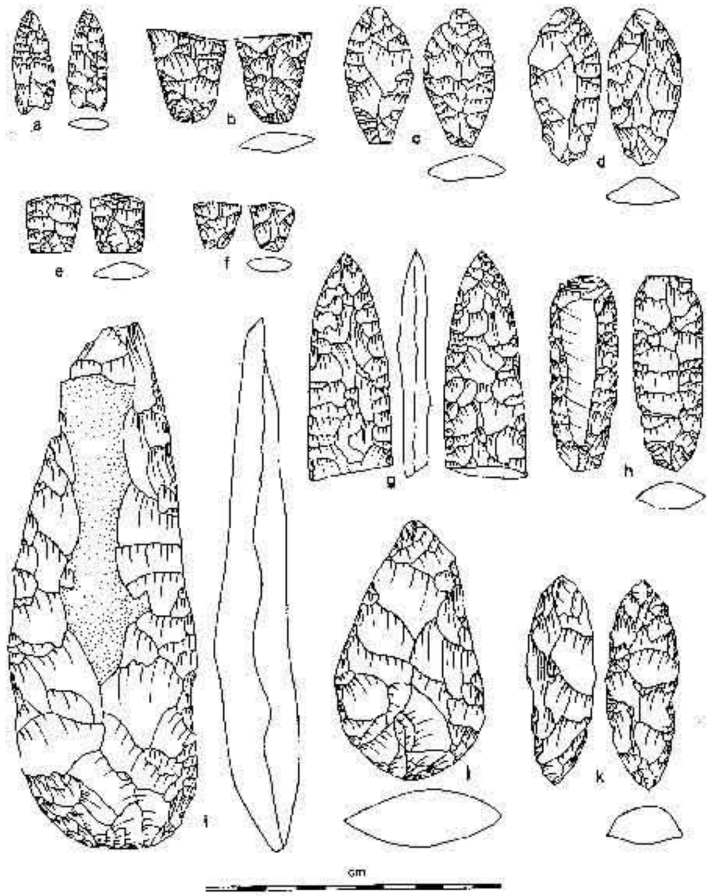


Figure 7–10 Bifaces from Component II of the Dry Creek site: complete projectile point and base fragments (*a, b, e, f*); biface knives and preforms (*c, d, g–k*).

Figure 25. Bifaces from Component II (Denali Complex), Dry Creek site.
(from West 1996c)

Northern Archaic Tradition

I have described the main features of this archaeological culture earlier. Esdale (2008) is the most recent comprehensive account of its expression in Alaska, noting that nearly 70% of dated Northern Archaic sites fall between 6,000 and 3,000 years ago in Alaska, but is expressed as recently as 500 years ago in some Late Holocene assemblages. Her review also reveals a close association between side notched and oblanceolate points, small end-scrapers, burins, and microblade technology during this period; interestingly, notched pebble net weights, commonly cited as a feature of the Northern Archaic, is found in only 4% of the examined assemblages.

Late Denali Complex

The presence of wedge-shaped “Denali” microblade cores at the Campus site, as well as other undated sites in the Tanana valley (Nelson 1935, 1937; West 1975), which have been subsequently radiocarbon dated to the late Holocene, led to the notion of a “Late Denali complex,” circa 3,500 to 1,500 years ago (West 1967, 1975; Moberly 1991). It is characterized by the presence (reappearance?) of microblades and burins, in components which otherwise are similar to the Northern Archaic (i.e., containing side-notched points, etc.).

The Campus site has been excavated on eight occasions between 1933 and 1995 (University of Alaska 1934, Rainey 1939, Moberly 1991, Pearson and Powers 2001). The initial recovery of wedge-shaped microblade cores at this site led Nels C. Nelson of the American Museum of Natural History, who examined the collection in 1935, to note: "the cores and the small endscrapers . . . are identical in several respects with . . . specimens found in the Gobi desert [and] furnish the first clear evidence we have of early migration to the American continent. . . . possibly 7,000 to 10,000 years ago" (Nelson 1935:356). Moberly’s (1991) analysis of the site concluded that the assemblage dated to c. 3,500 years ago, and represented a Late Denali complex. Pearson and Powers’ (2001) analysis of undisturbed strata provided them a date for the microblade component of c. 6,850 years ago, arguing that the site represents an early to mid-Holocene occupation of the Denali complex proper or early Northern Archaic that included microblade technology, rejecting the construct of a Late Denali complex as untenable. I am in agreement with them; there is no need for a Late Denali complex archaeological culture to account for continuity of microblade technology in the middle and late Holocene Northern Archaic.

Athapaskan Tradition

This archaeological culture is found from about 1,500 years ago to about 150 years ago and is characterized by a shift to the introduction of copper technology, stemmed projectile points, and the increased use of bone and antler arrowheads (although it is likely that this is largely a function of better preservation of more recent organic material).

Euroamerican Tradition

This archaeological culture began about 150 years ago and is characterized by the introduction of European manufactured goods and materials

Comparative Discussion of the Interior Southeastern Beringian Archaeological Sequence

As can be seen, there are several direct correspondences to be made between the Alaskan and Yukon chronologies. For all intents and purposes the Euroamerican Tradition is equivalent to the Bennett Lake Phase and the Athapaskan Tradition is equivalent to the Aishihik Phase. In combination, these Alaskan traditions and Yukon phases fit within the the Yukon's Late Prehistoric Tradition. There is also a direct correspondence between the two regions' Northern Archaic Traditions.

I see no need for a "Late Denali Complex" within the time of the Northern Archaic. More recent analyses of the temporal range of microblade technology in the Yukon have suggested that in many local areas this method has persisted up until quite recent times (Hare and Hammer 1997; Clark et al. 1999), a fact subsequently demonstrated for Alaska as well (Esdale 2008). Grouping together both microblade and non-microblade sites with the more embracing Middle Prehistoric Period (Morrison 1987), or altering our definition of the Northern Archaic to include the presence of microblades (Esdale 2009), is called for.

The distinguishing feature between the Denali Complex (c. 11,000 to 9,500 years ago) and the Northwest Microblade Tradition (c. 7-8,000 to 4,500-5,000 years ago) is time. Yet most researchers agree that the latter represents the migration of this technology eastward over space through this time from Alaska into the Yukon and western Northwest Territories (MacNeish 1964, Clark, Gotthardt, and Hare 1999, Magne and Fedje 2008).

Finally, there does seem to be some correspondence between the Nenana and Chindadn complexes and Northern Cordilleran Tradition with their emphasis on bifacially worked tools, the presence of blades, and, in the case of the Nenana complex, the lack of microblades. However, we can also see distinctive differences including the presence of Chindadn type and basally thinned points in the Alaskan complexes and, in the case of the Chindadn complex the presence of microblades, and the absence of these artifact types in the Northern Cordilleran Tradition.

Recent comparisons of the components associated with the Nenana and Denali Complexes has led some to suggest that these may all belong to a single over-arching tradition, which West has named the (Eastern) Beringian Tradition. West has put the case most strongly:

> There is no unique Nenana artifact. Every Nenana artifact form can be duplicated in Denali. The absence of microblades surely has simpler explanations than . . . calling upon another culture - and one without antecedents at that. This certainly suggests that Nenana is, at best, a Denali variant (West 2000:4, quoted in Heffner 2002:26).

Resolution of this question may well hinge on archaeological evidence within the Borderlands region. Heffner's (2002) excavation and analysis of the KaVn-2 site, 55 kilometers southeast of the Little John site, brought to light an early component dated between 10,670 and 10,130 radiocarbon years before present (12,023 – 11,598 and 12,731 – 12,520 Cal YBP respectively), which was occupied within a few hundred years of deglaciation in the area. Heffner argues that the, "assemblage can be seen as intermediary between the Nenana Complex or Northern Cordilleran Tradition and the Denali Complex or American Paleo-Arctic Tradition" (Heffner 2002:119). He goes on to argue that this fact lends support to the Eastern Beringian Tradition as the most appropriate cultural historical classification for early sites in interior northwestern North America. As noted earlier, the Eastern Beringian Tradition posits that the Nenana and Denali Complexes of Central Alaska, and by extension the Northern Cordilleran Tradition and American Paleo-Arctic Traditions as well, are technologically related and that assemblage differences in early archaeological sites can be better explained by site location, site function, and site seasonality (Heffner 2002:120).

At this point, based on the emergent evidence from the Little John and Swan Point sites, we take an alternative view which maintains the separation of the Denali and Nenana / Chindadn complexes along the lines proposed by Holmes (2008, 2011). Indeed, we have most recently proposed the separation of the Nenana and Chindadn complexes themselves, based on geographical and chronological distance, suggesting that the former be restricted to sites within the Nenana valley while the latter be applied to the late Pleistocene of the Tanana valley proper with Chindadn Points and associated technology (Easton et al. 2011).

Several important new additions to the Late Pleistocene archaeology of the region have been recently published that bear on our work at Little John. The first is the publication of a multi-authored assessment and examination of the implications the hypothesized genealogical relationship between the Siberian Yeniseian language Family as represented by the Ket language and the Na-Dene language Phylum, which consists of the Athapaskan, Eyak, and Tlingit languages. The emergent consensus among linguists is that if not proven the hypothesis put forward by Edward Vayda (2010a and 2010b) is certainly robust and the best (perhaps only) evidence of a shared linguistic heritage between a New World and Old World population. The archaeological implications of this possibility is explored by Potter (2010) and critiqued by Dummond (2010).

The second is Potter, et al. (2001) who report on the recovery of cremated juvenile human remains in a burial pit - hearth feature within a house structure at the Upward Sun River site on the south bank of the Tanana River south of Big Delta Junction in Alaska. The remains are dated to c. 11.5 thousand calendar years, just after the end of the Younger Dryas, and the house feature is evidenced by post holes around a semi-subterranean concavity feature. Besides its inherent importance in its own right, we can note the identification of concentrations of wood within the Pleistocene levels at Little John that may represent an occupational feature that full 3-dimensional mapping being undertaken by Easton and Grooms in 2014 will clarify.

The third is the important discovery in 2013 within the White River First Nations Traditional Territory of 13,000 year plus cultural deposits at KfVi-3 on a terrace overlooking the confluence of Britannia Creek with the Yukon River about 110 kilometers East-North-East of the Little John site (Guzman 2014, Altimira Consulting 2014). We discuss its potential relationship with the Little John site later in this report.

Archaeological Sites within the Borderlands Region

Prior to the initiation of the Scottie Creek Culture History Project by Easton in the mid-1990s, the Borderlands area had received limited archaeological attention.

Frederick Johnson first conducted survey efforts in the area in 1944 and 1948, after the construction of the Alaska Highway, but he did not record any archaeological sites beyond Duke Meadow immediately south of the Duke River crossing north of Burwash Village and thus outside of our area of interest, broadly defined as west of the White River (Johnson 1946, Johnson and Raup 1964). A number of archaeological survey efforts passed through the area during environmental impact assessments for the Foothills natural gas pipeline project in the late 1970s and early 1980s and they are summarized in Damp and Van Dyke (1982). Only one site was recorded within our area of concern. Tests at KaVn-1, 3 kilometers southwest of the Little John site, recovered a small collection of debitage flakes. Walde (1991) conducted survey along the Alaska Highway right-of-way in 1991 from the border to the White River, returning to undertake mitigation excavation at Borden sites KaVn-2, KbVo-1, KbVo-2, and KdVo-3 (Walde 1994). Easton conducted some survey in the area of Beaver Creek in 1994 (Easton 2002a). In 1999, Ty Heffner revisited KaVn-2 to complete the excavation and analysis of this site, as well as survey a number of localities around Tchawsahmon Lake (Heffner 2000, 2002). Easton has conducted additional surveys of the middle reach of Scottie Creek in 2001 and 2002 (Easton 2002), and the northern Mirror Creek drainage in 2003, 2004, 2006, and 2007 (Easton 2007c, 2008b). In 2002 and 2003, Glen MacKay undertook additional excavations at the Nii-ii hunting lookout site (KdVo6) which formed the basis for his Master's Thesis at the University of Victoria under Dr. Quentin Mackie (MacKay 2008). Just across the border in Alaska, a series of site surveys of historic native settlements and graveyards has been undertaken by the Bureau of Indian Affairs (BIA) on the upper Chisana and Nabesna Rivers. While several of these sites are presumed to hold additional evidence of prehistoric occupation, limited subsurface excavation undertaken in the course of the surveys did not uncover any artifacts and so do not bear directly on this current discussion (BIA 1993a, 1993b, 1995a, 1995b, 1996a, 1996b). William Sheppard undertook archaeological survey work at several localities in Alaska, recovering middle and late Holocene components along lower Scottie Creek, Deadman Lake, and in the Tok Juntion area (Sheppard 1999 and 2001, Sheppard et al. 1991)[7]. Bob Satler and Tom Gillespie of the Tanana Chiefs Conference, and Easton conducted limited archaeological survey of several sites in the area about Northway and Tok, Alaska in 2006; two sites were discovered near the border, one of which, at the mouth of Mirror Creek where it meets the Chisana River, bears a similar stratigraphic profile to that found at the Little John site and consequently may be related, although no artifacts were recovered in the single test pit excavated there (Gillespie 2006). In collaboration with Tanana Chiefs Conference and Northway Village Inc. and Northway Village Council, Easton undertook testing at a number of sites in the Northway region in 2009, identifying occupations along the shores of Hidden and Deadman Lakes; the latter included recovery of a complete projectile point in a Late Pleistocene stratigraphic context and bears further investigation and dating (Easton 2009).

Table 9, below, presents summary information on the principal archaeological sites recorded to date on the Canadian side of the border eastward to about the White River along the Highway corridor. With the exception of KaVn-2, these sites reveal a culture history pattern similar to that of the regional archaeological sequences to the east of our study area.

In addition to archaeological remains related to the prehistoric occupation of humans, the Mirror Creek, Little Scottie Creek, and Big Scottie Creek basins have been the location of the recovery of Pleistocene-age paleontological remains, including mammoth, bison, caribou, horse, saiga, and an unidentified feline spp. Several associated fragments of *Equus lambei* recovered during highway reconstruction in 1996 have been dated to 20,660 +/- 100 BP. Three juvenile mammoth tusks were found close to each other in the middle Little Scottie Creek basin (MacIntosh 1997, Easton et al. 2009). Both the horse and juvenile mammoth tusks were recovered less than two km from the Little John site.

Finally, we note the important discovery in 2013 within the White River First Nations Traditional Territory of 13,000 year plus cultural deposits at KfVi-3 on a terrace

---

[7] Bill Sheppard passed on in 2006; several of his colleagues and I are currently working on analyzing the last of his collections held at Northern Land Use Planning, Fairbanks at the request of Ken Pratt.

overlooking the confluence of Britannia Creek with the Yukon River about 110 kilometers East-North-East of the Little John site (Guzman 2014, Altimira Consulting 2014). We look forward to a more detailed comparison with Little John when more details become available.

Table 10. Canadian Archaeological Sites of the Yukon - Alaska Borderlands.	
KaVn-1	S of Sanpete Creek and E of Ak. Hwy, S of a knob located between creek bottom and Horsecamp Hill. Original find was two dark silicified siltstone-like flakes on surface. Test pits yielded 53 blue-grey flakes of various sizes. As no prehistoric sites had been previously recorded in this region of S. Yukon, the site is considered inherently valuable.
KaVn-2	Moose Lake. On a sand ridge on E side of Ak. Hwy at NW base of Horsecamp Hill overlooking Moose Lake. Archaeological site excavated during Alaska Highway realignment. The basal component is dated to be about 10,400 years RCy BP, making this the third oldest known site in southwest Yukon (Walde 1991, 1994; Heffner 2002)
KbVo-1	Km 1918.550, N side of Ak. Hwy on a knoll on the top of a ridge at the edge of the highway cutbank, overlooking Enger Lakes to SE. Scatter of lithic debitage, artifacts and burnt bone. Second excavation uncovered unformed tools projectile points, microblade core fragment, hide scrapers, hammerstone and eight pieces of copper. Dated at approx. 1800 years before present.
KbVo-2	N side of Ak. Hwy, km 1918.5, on top of ridge at edge of the highway cutbank overlooking Enger Lake. Initial test pits included obsidian flakes, basalt flakes and burned bone fragments. 1993 investigation included lithics and faunal material.
KbVo-3	About 320 m east of KbVo-2 on n side of Ak. Hwy. Large burnt mammal bones collected.
KcVo-1	*Taatsan Tôh* / Raven's Nest - Red Hill. On W side of Ak. Hwy, N of Beaver Creek, km 1983. Historic lookout site of the WRFN. Five lithic scatters identified; subsurface testing recovered material related to Late Prehistoric, Northern Archaic, and microblades possibly related with Workman's Little Arm phase / NWMt.
KcVo-2	*Owl's Skull Lookout* - hunting lookout northwest of middle Snag Creek. Late Prehistoric and Northern Archaic occupations indicated by debitage above the White River Ash and microblades within the B2 below the ash. Associated AMS radiocarbon date of 1770 +/- 40 BP (2 Sigma Cal BP 1810 – 1570; Beta 245517). The presence of blade technology suggests an earlier occupation as well.
KcVo-3	*Taatsan* - Raven village - Traditional village site on the upper reach of Snag Creek near the international border, containing Historic, Late Prehistoric / Archaic components, based on limited testing in 2006. A similar stratigraphy with that of KdVo-6 suggests that earlier components may be present.
KdVo-1	Along Little Scottie Creek trail, ca. 1 km east of Ak. Hwy, on E side of Sourdough Hill. Prehistoric scatter.
KdVo-2	East side of Ak. Hwy, km 1949.3, approx. 150 m east of highway on the north shore of a small lake. Probably a prehistoric campsite.
KdVo-3	S side of Ak. Hwy, km 1950 at an YTG rock quarrying location. Near Mirror Creek. Prehistoric scatter of tools and bones. Dated at 810 +/- 80 BP.
KdVo-5	*Nii-ii* / [to] Look Away From – Sourdough village - Hunting Lookout associated with nearby traditional village site. Late Prehistoric and Northern Archaic occupations reported by Easton (2002a) and MacKay (2004); RC date 920 +/- 40 – 2 Sigma Cal BP 930 – 740; Beta 231793.
KdVo-6	Large multi-component site containing stratified components of the Historic, Later Prehistoric, Northern Archaic, Denali / NWMt, and Nenana complexes. Strata sequence ranges from several cc to c 2 m across the site. Basal cultural date RC 12020 +/- 70 on butchered Bison vertebrae – 2 Sigma Cal BP14050 – 13720 and multiple other dates; see this Report below for extended discussion.

KdVo-7	Small multi-component hunting lookout on the Mirror Creek plain 2 km to the south of KdVo-6. Side-notched points of the Northern Archaic and round-based lanceloate point within loess similar to the Nenana stratum at KdVo-6 (Easton, et al. 2004).
KdVo-8	*Thee Tsaa K'eet* / Rock Cache Place - a hunting lookout and cache on the southeast point of Starvation Mountain, overlooking lower Big Scottie Creek. Limited test units recovered obsidian point fragment characteristic of the Northern Archaic culture.
KdV0-9	*Taiy Ch'ii* / Little Point of Hill Village - on the southwest edge of Starvation Mountain. Historic features include cabins, foundations, gravesites, and assorted late 19th and 20th century detritus. Burial site of *Gaandiniklion*, maternal grandmother of Bessie John.
KdVo-10	Alaska Highway Military Dump - Mile 1212. Historic dump related to the building of the Alaska Highway, c. 1942-1944.
KeVo-1	*Naagat Káiy* / Fox Den village. Traditional village site on middle reach of Scottie Creek containing Historic, Late Prehistoric, Archaic (RC date of 2010 +/- 40 -2 Sigma Cal BP 2050 – 1880; Beta 173826), and possibly an earlier occupation within buried paleosols located in test pits 80 cm + below surface dated to RC 6210 +/- 70 – 2 Sigma Cal BP 7270 – 6900; Beta 173827 (Easton 2002b).
KeVo-2	Contemporary trapline cabin of Mr. Joseph Tommy Johnny and traditional campsite of his great-grandfather, *Tsay Suul*. Early Historic remains include musket balls and beads, and undiagnostic, presumably Late Prehistoric flakes and debitage (Easton 2002b).
KeVo-3	*Ta' ah* - Historic hunting lookout containing modified flakes, hammerstone, and flake core (Easton 2002b); associated AMS radiocarbon date of 2220 +/- 50 BP (2 Sigma Cal BP 2340 – 2120; Beta 245514).
KeVo-4	Historic hunting lookout containing microblades and flakes (Easton 2002b).
KeVo-5	*Rupe Sha* / Rupe's Cabin - location of William (Bill) Rupe's cabin and trade post on upper Big Scottie Creek, on the west side of Paper Lake. The cabin remains can be seen from the air.
KeVo-6	*Kelt'unduun Mann'* - Paper or Pepper Lake Village - large village on the east side of the lake by the same name; occupied into the middle of the 20th century. Untested for prehistoric remains.
Table data adapted, with modification and additions from additional fieldwork by Easton, from Dobrowolsky (1997).	

Having set the larger archaeological context of the region, we now turn to a detailed discussion of our work at the Little John site in 2013.

2013 INVESTIGATIONS AT THE LITTLE JOHN SITE (KdVo-6)

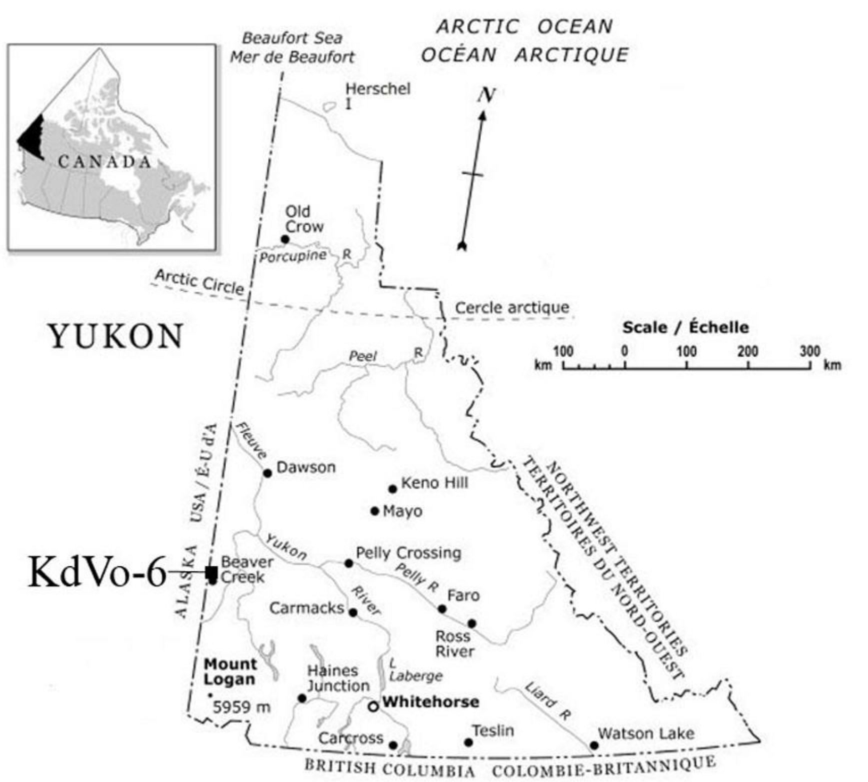


Figure 26. General Location of the Little John Site, Yukon Territory, Canada

LOCATION OF THE LITTLE JOHN SITE

The Little John site is located just off the Alaska Highway, twelve kilometers north of the village of Beaver Creek, Yukon, about two kilometers due East from the international border with Alaska. It occupies most of the higher surface of a knoll overlooking the upper reach of Mirror Creek, known as *Cheejil Niik* / Grayling Creek / in the local Upper Tanana Athapaskan language. It overlooks the basin of the creek below from the north and lies within the most western extension of the Tanana River drainage; Snag Creek crosses the valley about seven kilometers east of the site, marking the watershed division between the Tanana and Yukon River drainage basins.

Figure 27. Aerial view of the Little John Site from the South.
KdVo-6 on left, KdVo-7 on right. Mirror Creek can be seen in the foreground, the Alaska Highway running across the centre, and Little Scottie Creek valley behind.

Figure 28. Aerial view of the Little John site from the West.

Figure 29. Aerial view of the Little John site from the Southwest

HISTORY AND METHODS OF INVESTIGATIONS AT THE LITTLE JOHN SITE

Although the Little John site lies within the Alaska Highway corridor its archaeological deposits were not discovered until 2002, during regional survey efforts associated with Easton's long term Scottie Creek Culture History Project. In that year, plans to work further up the Scottie Creek valley were delayed and several test pits were dug at the location on the recommendation of Upper Tanana Elder Joseph Tommy Johnny.[8] The results of these tests indicated mid-holocene (Northern Archaic) to historic occupation of the site. In 2003, an additional 61 test pits were dug across the hillside and 22 m^2 of the site were excavated by natural levels by the Yukon College Field School in Subarctic Archaeology and Ethnography.[9] Thirteen of these units were in the West lobe, four in the Rockfall lobe, one in the East lobe, and the remainder scattered along the periphery of the site. These efforts recovered Chindadn complex artifacts from the West lobe, underlying

[8] Directed by Easton, crew members consisted of Glen MacKay, Ken Hermanson, Duncan Armitage, and Joseph Tommy Johnny.
[9] Directed by Easton, crew members consisted of Glen MacKay, Ken Hermanson, Christopher Baker, Jolene Johnny, Terrance Sam, Peter Schnurr, Nicole Schiffart, Michael Nieman, Mellissa Winters, Eldred Johnny, and Vance Hutchinson.

a microblade bearing horizon, identified the presence of a paleosol containing fauna and artifacts in the East lobe, expanded the assemblage related to the mid-Holocene Northern Archaic, and identified a military presence on the site, likely during the building of the Alaska highway.

Figures 4 and 5 (above) show the location of excavation units on the site through 2013. Easton (2007a:14-18) provides details on test and excavation units prior to 2007. In 2004, nine m^2 were excavated contiguous to the first unit in the East lobe, while an additional six m^2 were excavated in the West lobe; a five meter trench was also begun in the Permafrost lobe of the site.[10] In 2006, with support of the White River First Nation and the Tanana Chief's Conference, 14 m^2 were excavated in the East lobe.[11] In 2007, in collaboration with Dr. David Yesner and the Department of Anthropology of the University of Alaska-Anchorage forty-nine m^2 units were exposed;[12] twenty-two of these remained to be fully excavated.

In 2008, again in collaboration with Yesner and the UA-Anchorage field school, nine of these units were completed to basal regolith and all were profiled and twenty-seven new units were excavated, including eight new 1 m units completed in the SW site quadrant, fourteen new 1 m units excavated to the Loess below Paleosol stratum in the NW site quadrant, and five new 1 m units completed in the NE and SE site quadrants.[13] Due to the age and nature of the Loess below Paleosol stratum it was decided to stop excavation of the majority of units at this level in order to undertake wide area excavation in 2009. Finally, in 2008 an eight-meter trench was mechanically exposed in the Swale

---

[10] Directed by Easton, crew members consisted of Glen MacKay, Arthur McMaster, Paul Nadasdy, Eldred Johnny, and Joseph Graham.

[11] Directed by Easton, crew members consisted of Patricia Young, Camille Sanford, Glen MacKay, Eldred Johnny, Derrick Peters, David Johnny jr., Nicolas Sam, Peter Schnurr, Kathy Lowe, and Patrick Johnny.

[12] Directed by Easton and David Yesner, participants included Patricia Young and Camille Sanford of Tetlin Village, Nicolas Sam of Northway, Jordan Vandermeer, Eldred Johnny, and Derrick Peters of White River First Nation, Arthur McMaster of Yukon College, Joseph Easton, and members of the University of Alaska Anchorage - Yukon College Field School in Archaeology: Dan Stone, Lorraine Alfen, Kris Crossen, Kay Toye, Katie Herrera, Jessica Jayne, Susan Savage, Kenzie Olman, Douglas Blevins, Jessie Petersen, Nicki Dwyer, Adriana Campany, Dio Glentis, Merideth Wismer, Adam Bathe, Sam Hutchinson, and Rita Eagle.

[13] Directed by Easton and Yesner, crew members consisted of Patrick Daley, Christopher Baker, Polly Hyslop and Nicolas Sam of Northway Village, AK, Camille Sanford of Tetlin Village, AK, Eldred Johnny and Jordan Vandermeer of White River First Nation, Yukon, Vance Hutchinson, Katie Herrera, and Amanda Janssens, Joseph Easton and Gary Pflugradt, and members of the University of Alaska Anchorage - Yukon College Field School in Archaeology: Elidh Lucas, Dan Stone, Lorraine Alfen, Mary Gladkowski, Brooke Nall, Joel Lennen, Brian Geyer, Caitlin Hanson, and Owen Marcotte.

lobe in the far NW of the site that exposed a buried two deeply buried Paleosols dating to the Wisconsin Interstadial, c. 44,000 years old (Easton et al. 2009). The exposed strata were profiled and column sampled for further detailed analysis (sediment, pollen, etc.) at a later date when resources permit; it is expected they will be included in Michael Grooms' geoarchaeological analysis of the site currently in progress (Easton 2009a).

In 2009 sixteen units were excavated. Seven of these were in the West Lobe, two at the apex of the hill near the cabin, and seven in the East Lobe (Easton 2009b, 2010).[14]

In 2010 thirty-two units were either fully or partially excavated. Fifteen of these were in the West Lobe, eight at the apex of the hill near the cabin, and nine in the East Lobe. Most of the East Lobe units were excavated to the loess deposits just below the main paleosol complex with a view towards undertaking an area excavation of these loess sediments in 2011 (Easton 2011).[15]

In 2011 eight new one meter units were excavated on the West Lobe, as well as four on the hilltop to the east of the cabin. We continued excavation of thirteen units initiated previously in 2009 and 2010 in the East Lobe Pleistocene sediments. We also dug a series of 25 cm square tests in the Northwestern quadrant of the site that were profiled and sampled in support of Michael Grooms continued geomorphological studies of the site (Easton 2012a, 2012c, 2012d).[16]

In 2012 twenty-three one meter units were worked: eight on the West Lobe, nine on the hilltop in the vicinity of the cabin, and six in the East Lobe; fourteen of these were

---

[14] Directed by Easton, crew members consisted of Camille Sanford (Tetlin Village and University of Alaska Anchorage), Katie Hannigan Toye (Arizona), Emily Youatt (Reed College), Jessica Pepe (Tulane University), Ian MacDonald (Yukon College and Champagne Aishihik First Nation), Phillip Sabelli (Boston), Annalisa Heppner (U of Tennessee), Karen and Bob Rogers (Washington State), Joseph Easton (Burnaby, B.C.), Keith Jacob (Australia), Chelsea Johnny, Eddie Johnny, and Trudy Brown (Beaver Creek, Yukon), Margo MacKay, Kat Cronk, and Kate Menzel (Anchorage), Jim Guy (Victoria), Kate Crosmer (Lycoming College), and Dr. David Yesner and Danny Yesner

[15] Directed by Easton, crewmembers in 2010 included John Grieve, Amy Krull, MacKenzie Erskine, Sarah Huq, Christopher MacMillan, Pawel Wojtowicz, Robert Hoskins, Alyssa Money, Gladis Rubio, Michael Grooms, Nicolena Virga, Robert Power, Margo MacKay, Brooke Nall, Owen Marcotte, Nick Jarmain, Vance Hutchinson, and David Yesner.

[16] Directed by Easton, crewmembers in 2011 included Julie Thomas, Katie Fittingoff, Ally Zeiger, Jordan Handley, Tia Marie Ray, Sarah Rickett, Pawel Wojowitz, Michael Grooms, Nicolena Virga, Mark Young, Josesph Easton, Hillary Wong, Margo acKay, Nick Jarmain, Peter and Lucy Schnurr, Chelsea Johnny, Trudy Brown, Eldred Johnny, Eddie Johnny, Tamika Johnny, and David Yesner.

new units, while the remainder completed unexcavated sediments from previous seasons (Easton 2014a).[17]

In 2013, 28 square meters were investigated: 6 on the West Lobe, 8 on the hilltop in the vicinity of the cabin, and 14 in the upper East Lobe. Twenty-three of these were new units, while the remainder continued excavations begun in previous seasons. Nineteen of the Units were excavated to basal non-cultural deposits and backfilled; nine of the units were excavated to or through the culture bearing paleosol complex levels and will be investigated further in 2014. Table 1 and Figures 4 and 5 above summarize the location of these units and associated artifacts and profiles (Easton, this report).[18]

All excavation units were excavated by trowel within unit quadrants by the natural layers identified in the site stratigraphy. Completed excavation units had at least one side profiled; many excavation units had two or more profiled (see Table in Summary above). Recovered artifacts and fauna were recorded by three-dimensional provenience to the surface datum of the unit, unless they were recovered in the excavation screen, in which case their provenience was recorded by natural level and unit quadrant. Unit Datums in turn were tied into the principal site Datum to facilitate a comprehensive site map of recovered finds. The Digital Appendices provide comprehensive catalogues of recovered artifacts and fauna, while this report provides a summary of their metrics, context, and description of selected samples. Photographs of representative strata, features, and artifacts *in situ* were regularly taken. A representative selection of these photographs is presented in this report and digital copies in large and small formats of all photos are provided in the Digital Appendix. Finally, representative sediment samples and potential radiocarbon samples were collected on a regular basis and archived for future analysis when resources permit; they are summarized in a set of Tables above.

Subsequent to field recovery, artifacts and faunal remains have been curated at the Faculty of Liberal Arts at Yukon College and catalogued by unique site numbers, along

[17] Directed by Easton, crewmembers in 2012 consisted of Kendra Vaughn, Alina Aquino, Geoffery Homel, Keith Saunders, Rachelle Mathews, Michael Grooms, Nicolena Virga, Jordan Handley, Laurianne Bourgenon, Mark Young, Anne Marie Lapointe, Dianna Marion, White River First Nation Youth: Chelsea Johnny, Eldred Johnny, Eddie Johnny, Tamika Johnny, and cultural experts David and Ruth Johnny, Youth participants from the Northern Cultural Expressions Society led by Naomi Crey, and Dr. David Yesner .
[18] Directed by Easton, 2013 participants are listed at the beginning of this report.

with recovery provenience and additional descriptive characteristics. Formed artifacts and modified flakes and other material have received metric and character (form, raw material, flake or modification location, among others) descriptions, using the categories established by the Yukon Heritage Branch artifact database forms which use the FileMaker computer program. All artifacts have been photographed and major formed artifacts are being drawn. Unmodified flakes and manuports have also been described more basically; smaller, unmodified flakes and fire altered rocks are often described by lot, for example. The Digital Appendices provide a full listing of these derived data, while summaries are provided in the artifact class descriptions below.

In addition to basic cataloguing, faunal material has been identified to genus and species to the extent possible through comparison with known skeletal remains held by a variety of sources, including Dr. David Yesner of the Department of Anthropology, University of Alaska - Anchorage, the Yukon Heritage Branch, standard published skeletal guides, and consultations with colleagues.[19] Dr. Vance Hutchinson, a biological anthropologist in Whitehorse, has also undertaken microscopic examination of the faunal material with a view identifying cutmarks or other signs of cultural modification. Laurianne Bougeon carried out her own analysis of about 90% of the fauna collection in 2012 and 2013; her initial analysis is included in this report's Appendix and summarized in our discussion of Fauna below. A Digital Appendix and Print Appendix provide a photographic catalogue of collected fauna in 2013; a major analytical paper on the entire faunal collection is in preparation.

Detailed distributional analysis of several representative units has been undertaken, while more limited distributional analysis of recovered artifacts has been undertaken across the site, based on recovered level, raw material, and artifact type. A first draft of an ARCVIEW GIS representation of the artifact and faunal distribution at the Little John site was begun in 2010 and is continuing under Michael Grooms and Easton. A detailed analysis of Obsidian Sources in the Little John collection through 2006 was undertaken by Natalia Slobodin and Jeff Speakman and presented in our 2007 report (Easton 2007a); additional analysis of subsequently collected obsidian has been

[19] Over the years these colleagues have included Vance Hutchinson, David Yesner, Scott Gilbert, David Mossop, Greg Hare, Susan Crockford, Paul Mateus, Grant Zazula, and Lauriane Bourgeon.

undertaken by Jeff Rasic and will be summarized in an upcoming publication. The general trends identified in our 2007 report are sustained, i.e. 90% plus of obsidian at Little John are derived from the Wiki Peak source.

A series of conference and published presentations of work at the Little John site has allowed for broader public education and more focused peer review of the excavations to date. These have included an eight-part series in the Yukon News covering the 2003 excavations (Easton 2003), presentations at meetings of the Alaska Anthropology Association, the Arctic Sciences Conference of the American Association for the Advancement of Science, the University of Alaska Fairbanks - Yukon College Symposium on the History of Alaska-Yukon Communications, a major symposium on Beringia at the Society for American Archaeology meeting, and the 2012 Glacier Archaeology Conference held in Whitehorse (Easton, et al. 2004, Easton 2005, Easton, et al. 2007, Hutchinson, et al. 2007, Easton and Hyslop 2008, Easton, et al. 2008a, Easton et al. 2008b, Yesner et al. 2008a, Easton et al. 2012, Yesner et al. 2012, Easton 2013a, Easton et al. 2013, Grooms and Easton 2013, Easton et al. 2014).

Jordan Handley completed her Undergraduate Honours Thesis at the Department of Archaeology at Simon Fraser University in 2013 examining pXRF characteristics of non-vitreous artifacts from Little John under the supervision of Dr. Rudy Reimer Yumks (Handley 2013). Ms. Handley has recently been accepted to the Master's program at the University of British Columbia under the direction of Dr. David Pokotylo, an established scholar in lithic technology and analysis, with whom she will be developing an analytical thesis based on a yet undetermined aspect of the Little John Paleolithic collection. Michael Grooms has recently advanced to candidacy in the Doctoral program at the Department of Anthropology at the University of New Mexico under the supervision of Dr. E. James Dixon and continues analysis and research related to the geo-archaeological context of the Little John site. Niki Virga is planning on applying to the University of Victoria in order to take up a Master's program under the direction of Dr. Quentin Mackie, who has provisionally agreed to act as her supervisor. Ms. Virga may focus on the fine grained analysis of one of the smaller known sites identified by Easton and others in the past in the area, similar to the work of Glen MacKay at the *Nii-ii* hunting stand (KdVo5; see MacKay 2008). Lauriane Bourgeon of the Doctoral program at the

University of Montreal continues to develop her dissertation focusing on the Blue Fish Caves fauna under the direction of Dr. Adrian Burke; following Dr. Burke's suggestion and our enthusiastic support, Ms. Bourgeon has examined about 90% of the Little John fauna to provide her with a known culturally derived comparative collection.

Archaeological publications generated as a result of ongoing analyses include the journal *Current Research in the Pleistocene* (Easton, et al. 2007b, Easton et al. 2009), an invited contribution to a volume on projectile point sequences in the North American northwest edited by Roy Carlson and Martin Magne (Easton and MacKay 2008), and a new volume on lithic industries of Beringia edited by Ted Goebels and Ian Buvit (Easton, et al. 2011, Yesner et al. 2011).

Ethnographic publications arising from research on the borderland include an ethno-historical account of the government survey of the Yukon - Alaska border (Easton 2007b), an essay documenting contemporary hunter-gatherer values embedded in the *Dineh* Way (Easton 2007c), a multi-disciplinary study of the contemporary subsistence fishery in the Upper Tanana River Watershed (Friend, et al. 2007; Friend, Holton, and Easton 2007), and an examination of contemporary conflicts between *Dineh* and Game Management views of animals (Easton 2008a). Based on her fieldwork participation in 2009 and subsequent field interviews in January 2010, Emily Youatt and Easton presented a paper on contemporary Borderland *Dineh* Identity at the 2010 meetings of the Alaska Anthropology Association (Youatt and Easton 2010). Ms. Youatt also completed and successfully defended her Undergraduate Honours Thesis on the topic at Reed College, Oregon in May of 2011 (Youatt 2011). A large format public interpretation poster was prepared by Easton for the White River First Nation and the Beaver Creek Visitors Center in 2008 (Easton 2008c).

As a result of this exposure, the significance of the Little John site is being recognized within the discipline. A description of the site is included in the recent summaries and discussions of Beringian prehistory (Dixon 2013, Potter et al. 2013, Ives et al. 2013, Hoeffecker and Elias 2007). Collaborative field schools were held with the University of Alaska Anchorage and Yukon College in 2007 and 2008, and Dr. David Yesner of that institution has continued to collaborate with us in the excavation, analysis, and interpretation of the site.

Financial and In-Kind support of continued fieldwork and analysis of our Yukon Alaska borderlands research in 2013 was received from the White River First Nation, the School of Liberal Arts, Yukon College, and myself.

Research plans for 2014 include continued limited excavations at the Little John site and additional archaeological survey in the region as opportunity allows. Since we will not delivering an Undergraduate training program in 2014 we intend to concentrate our efforts on ensuring graduate student participants will obtain the data sets they require in order to complete their individual theses and contribute to a series of jointly authored scholarly publications. This will involve a complete review of the artifacts recovered from the Little John site in order to ensure the database is coherent and robust across all years, continued work on the digitization of site mapping within a GIS framework supported by Total Station measurements, further analysis of geo-archaeological samples, and additional analytical statistics.

Several major academic publications are being pursued this year as well: a paper on obsidian sourcing with Dr. Jeff Rasic, a paper with Ms. Handley and Dr. Rudy Reimer summarizing her pXRF analysis, a paper on the fauna of the Little John site collected through 2013 in collaboration with Yesner, Hutchinson, Bourgeon, and others, and an ethnographic paper on *Dineh* concepts of borders and the role of anthropology in redefining these notions in the 20th century. In collaboration with Dr. Joel Cubley and Mary Samolczyk of Yukon College preliminary analysis is underway on the nature of sedimentary deposits at Little John through thin sections and pXRF technologies. Easton is also preparing an analytical paper summarizing accumulated radio-carbon dates through 2014 and their implications to the understanding of the Little John site chronology of cultural occupation and use of the site.

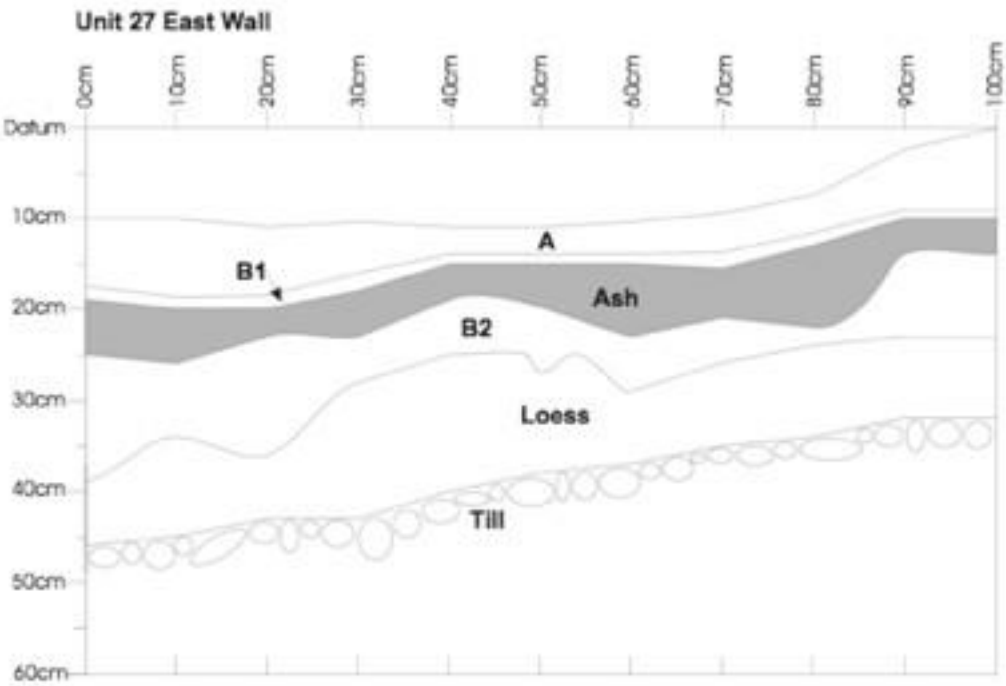


Figure 30. Representative Stratigraphic Profile, West Lobe.

In general terms the geological stratigraphy of the site consists of a basal regolith comprised of a volcanic dyke (Reger, pers. com 2009), overlaid with sparse glacial till representing a glacial maximum known locally as the Mirror Creek glacial advance, variously dated to the Late Illinoian - MIS 6, c. 140000 BP (Bostock, 1965; Krinsley, 1965) or the Early Wisconsin – MIS 4, c. 70000 BP (Denton 1974; Hughes et al., 1989). Above this are found loess sediments laid down during the post-glacial, principally during the Younger Dryas Climatic Event, circa 12.8 and 11.5 thousand years ago (Reger pers. com. 2009). These deposits vary in thickness from a few centimeters to a meter or more. Above this loess deposit are ten to twenty centimeters of Brunisols typical of the boreal forest in the region. In some areas this B horizon is intersected by a volcanic ash layer of up to several centimeters which radio-carbon dates suggest is a tephra deposit of the second White River volcanic eruption, c. 1200 BP (West and Donaldson 2002;

Lerbekmo and Westgate, 1975); in 2014 we are undertaking elemental and thin section analysis of this tephra to confirm this characterization. A thin (1 – 2 cm) O/A horizon caps the sequence.

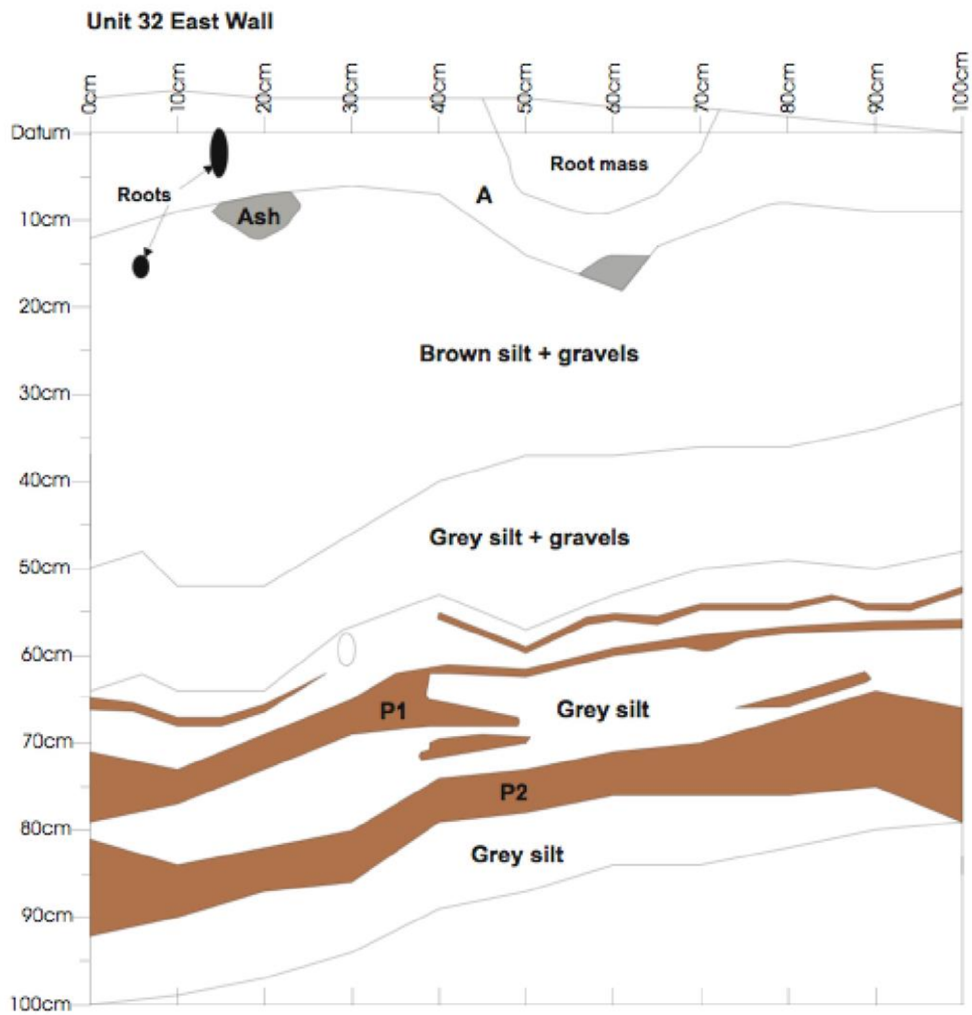


Figure 31. Representative Stratigraphic Profile, East Lobe.

The discontinuous depth of these strata is accounted for by the undulating topography of the site, which ranges from deep basins to eroding hillsides. Electrical resistivity measurements taken in the fall of 2013 by Dr. Joel Cubley and Mary Samolczyk of Yukon College indicate that the “Swale Lobe” may be capped by as much as 50 or 60 feet of sediment above bedrock. Discontinuous permafrost is also indicated in the three lines measured in 2013. We plan to collect additional data in 2014 in order to develop a more accurate 3-dimensional representation of sedimentary structures across the site. The stratigraphy is also complicated by the action of both ancient and contemporary permafrost, solifluction, and what seems to be a mass wasting event (probably a series of colluvial deposits originating from the higher ground to the North) over a portion of the site (Reger pers. com. 2009). Because of this differentiation in depth and nature of strata we have divided the site into five zones or lobes (see Figure, below).

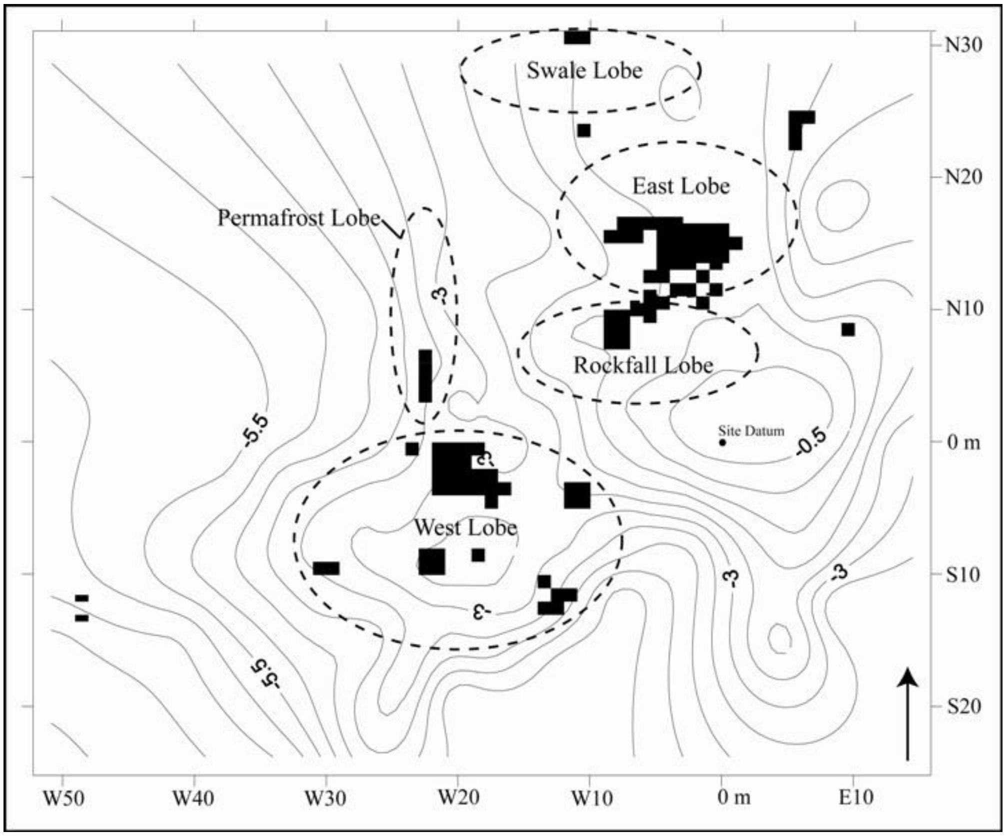


Figure 32. Stratigraphic "Zones" of KdVo-6.

The West Lobe, where the strata are most shallow, occupies the southwestern hillside on which deposits range from five to thirty centimeters. The Permafrost Lobe, where frozen ground is encountered mere centimeters from the surface, occupies the north-facing slope of the knoll. The Rockfall lobe, where large boulders lie through the brunisol and loess deposits, runs roughly through the centre of the site on a north – south axis. The East Lobe, a large basin that troughs east from the site, and which contains the deep sedimentary deposits of one hundred centimeters and more and series of paleosol strata near the bottom of the sequence. Capped by forty to sixty centimeters of loess below the B horizon, this paleosol complex contains a well preserved, culturally deposited faunal assemblage, in direct association with lithic artifacts. Test excavations in 2007 revealed that the basal bedrock dips sharply North of the East lobe into what I now designate as the Swale lobe; Unit N31W11 was excavated to a depth of nearly 5 meters through loess before it was abandoned due to safety concerns.

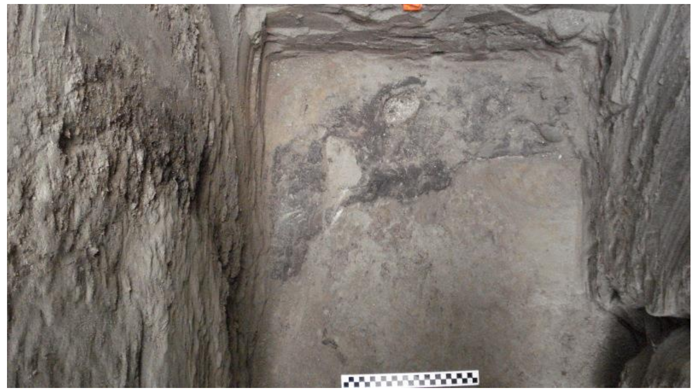


Figure 33. The Road Trench from the South and Detail of Wisconsin Interstadial Paleosol complex at the North end of the Road Trench

Figure 34. Detail of Wisconsin Interstadial paleosol below massive loess, north end of Road Trench.

In 2008 a mechanical excavator run by Walter Dyke of Beaver Creek exposed a trench through this area, revealing massive loess deposition above organic paleosols subsequently dated to between 42,000 and greater than 46,000 years old, representing a depositional episode during the last Wisconsin Interstadial or perhaps earlier (Easton et al. 2008).

Excavations in 2009 in the East Lobe revealed an apparent trend for greater separation of the paleosol complex into increasingly distinct strata as we exposed Units to the North and West of our previous excavations, a trend that has continued in our excavations since. This is well illustrated in the exposure of the West Wall of Unit N17W11, shown below. Previous AMS dates on bones within these strata have provided a series of dates between 10 to 12 thousand calendar years. A date on charcoal in contact with a Bison bone modified for use as a beamer or scraper returned a calibrated calendar date of 11,390 – 11,230 Cal BP at the 2 sigma level.

.

Figure 35. Unit N17W11 SW showing separation of Paleosol Complex strata; associated Calendar date on carbon from beneath the bone = 11,390 – 11,230 at 2 sigma.

Similar to our work in 2008 and 2009, as we moved further North in our East Lobe area excavation in 2010 we encountered increasing macro-organic detritus in the lower Paleosol and Loess below Paleosol strata, characterized by wood flakes, fleks, and slivers and chunks of carbonized wood. An example of this is seen in Unit N18W11, illustrated below. We suspect, although cannot demonstrate, this higher macro organic content is a function of the level's proximity to the permafrost. In any event, samples of materials encountered were taken as potential AMS dating and identification of wood species when resources allowed.


Figure 36. Wood Fragments in N18 W11. L: SW Corner of Unit. R: Detail of Wood Fragments.


Figure 37. Wood feature, Unit N18W13, 92 cm Below Unit Datum, c. 12,840 Calendar Years

Excavations in 2011 in the Eastern Lobe continued through lower paleosol complex levels and into the Loess below Paleosol stratum to a variety of depths in the 11 square meter area excavation we had been working down over the previous two field seasons. Within this Loess below Paleosol stratum we have identified at least two further paleosol strata of mercurial integrity tentatively labeled P5 and P6. In addition the P5 stratum holds a patchwork of additional decaying wood features, one of which was AMS radiocarbon dated to 10,840 +/- 50 which has a single intercept on the calibration curve at 12,840, with a 2 sigma probability between 12880 – 12810 Cal BP; significantly this date turns out to be very close to a date on a wapiti inominate from the same level in Unit N13 W02 (UCI-88769: RC age = 10,960 +/- 30 / Cal BP 12,905 – 11,715 at 2 sigma).

Excavations in 2012 and 2013 continued to expose paleosol strata containing organic wood remains, culturally modified bone, principally bison, concentrations of unmodified cobbles and pebbles that are being interpreted as cultural features distinct from clearly colluvially deposited sediments from the hillside north of the site, and a small but indisputable assemblage of culturally modified flakes, hammerstones, and formed tools. These features and remains are more fully described our 2012 permit report and below.

Figure 38. Bison Bone and Edge Modified Flake in situ, KdVo6 N18W13 SE, Bottom of Paleosol Complex – AMS Date on associated wood, 9560-9477 Cal BP.

In the fall of 2013 Joel Cubley and Mary Samolczyk of Yukon College collected Electrical Resistivity measurements in order to determine the depth and nature of sedimentation over the basal bedrock of the knoll on which the site lies and pXRF data from the site in order to see if it is possible to recognize unique sedimentological signatures that may facilitate the linking of strata across the site. The latter will be combined with the work of Michael Grooms, who is examining the stratigraphy and chronology at the Little John site, Yukon Territory, in order to interpret depositional and environmental differences between the Late Pleistocene Chindadn (non-microblade) and Denali (microblade) complexes, combined with sediment micromorphology, and OSL and AMS radiocarbon dating methods.

Initial electrical resistivity measurements along three transects have suggested that the East – Swale Lobe sections of the site may hold as much as 20 meters of sediment above the basal bedrock, intersected with two major permafrost facies; additional transects are planned in the fall of 2014 to increase the resolution of this model. Dip and strike measurements and gross mineralogy confirms Reger's earlier field observation that the bedrock of the Little John site is a lithological contact feature distinct from the exposed bedrock to the north of the site across the Alaska highway. Additional analysis of this basal morphology will be undertaken through 2014-15.

Figure 39. Measuring Electrical Resistivity and pXRF of KdVo-6 Sediments.

New Dates from the Little John Site (2013)

Five new radio-carbon dates were obtained over the past year that has contributed to the further refinement of the chronology of human occupation at the Little John site; they are presented in the table below and their formal associated reports presented in the Print and Digital Appendices. The entire suite of acceptable dates at the site consists of 24 AMS measured dates ranging from the most recent past to the Wisconsin Interstadial c. 42,000 plus years ago. The earliest cultural material at the site is dated to c. 14,000 years before present.

Table 11. New Radio-Carbon Dates from KdVo-6, 2013.

Lab #	RCYBP	2 S CALBP	Intercept BP	1 S CALBP	Level	Unit	DBS CM	Material	Comments / Associations
Beta 383732 KdVo6 12-10	2100 +/-30	2150 – 1995 *(2146 – 1996)*	2105 2085 2065	2120 – 2035 2025 – 2005	B2	S3W23	26.5	Charred Material	AMS / from Fe2012-14 Hearth assoc with microblade (3929)
Beta 355049 KdVo6 12-06	2169 +/- 30	2300 - 2240 and 2180 - 2110 and 2080 – 2060 *(2308 – 2219 [0.501639] & 2212 – 2105 [0.46917] & 2083 – 2065 [0.029192]*	2150	2300 - 2270 and 2160 - 2120	B	N17W16	22.5	Wood fragments	AMS / large late prehistoric hearth F2012-6/7 in N17W16 and N18W16 in B level (no WRA present)
Beta 355051 KdVo6 13-12	9790 +/- 50	11260 – 11170 *(11275 – 11125)*	11220	11240 - 11200	PC3-P4	N17W13	91 - 94	Charred Material	AMS on plant material below biface (4219) in SW corner wall
Beta 382328 KdVo6 Fa2013-XX	9970 +/- 40	11610 – 11520 and 11510 – 11255 *(11509 – 11259 [0.788213]*	11390 and 11380 and 11355	11405 - 11290	LbPC3-P4	N17W13	101.5	Bone collagen, mammal	AMS on bone Fa2013- below biface (4219)
Beta 382339 KdVo6 Fa2013-051	10110 +/- 30	11915 – 11910 and 11825 – 11610 and 11520 – 11510 (11841 – 11602 [0.836095]	11775	11770 – 11700 and 11670 - 11645	LbPC3-P4	N17W19	88.5	Bone collagen, Bison, naviculo cuboid	AMS on sample from specimen (Fa2013-051)

Table Notes: Primary Dates are those provided by Beta Analytic in their report on results. Paranthetical ( ) Dates are those generated by the CALIB calibration program as reported in the accompanying appendix. Square [ ] brackets enclose the statistical probability for different calibrations based on multiple intercepts at the 2 sigma confidence level on the calibration curve. In this and the following table we provide all these data. In subsequent tables in this section we use the CALIB calibrations rounded up to the nearest ten and for multiple intercepts that with the highest degree of confidence above 0.7500 or all if they are below 0.7500.

Placing the New Dates In Context

The Table below shows the 27 dates we have accumulated to date on material from the Little John site. Three of these dates we have rejected for a variety of reasons. Of the rejected dates, one (Beta 1814885) is clearly of wood killed in the past 50 years. Another (Beta 245516) was on charred material from below what we have been interpreting as the White River tephra and too young to belong below the tephra – the date of 100 +/- 40 radio-carbon years also has five intercepts on the calibration curve ranging from 240 to 0 calendar years before present.[20] The third (Beta 245515) is similarly problematic. Retrieved from very shallow deposits on the southeast corner of the overlook in the southwest portion of the site, the sample returned a radio-carbon date of 250 +/- 40 years and four intercepts on the calibration curve ranging between 430 and 0 years before present and is impossible to relate with any confidence to the cultural materials from this level, which quite likely consist of mixed components.

There are twenty-four dates we consider applicable to the cultural occupation of the site; also included in the table are seven other dates from Yukon sites in the immediate region and major Late Pleistocene / Holocene climatic events that may have affected human occupation and technology in the region.

We should also note that a fragment of ivory from a scatter of this material found eroding from the hillside across the highway from the Little John site produced a date of 38160 +/- 310 RCYBP (Beta 231794); we presume it is from *Mammuthus*. Combined with the recovery of additional Pleistocene fauna in the area representing specimens of *Bison*, *Equus*, *Mammuthus*, *Rangifer*, and possibly *Saiga*, including an *Equus lambei* specimen, recovered about two km from the site, which has been radiocarbon dated to 20660 +/- 100 RCYBP (Beta 70102; MacIntosh 1997:84), these fauna confirm that the area about the Little John site was capable of supporting a range of mega-fauna during the mid to late Wisconsin glacial period from at least 38,000 years ago. Subsequently, it is clear that this region holds considerable potential for the recovery of additional paleontological remains related to the Beringian prehistory of the Yukon.

---

[20] Work is currently underway to examining thin-sections of the Little John tephra in an attempt to determine whether it represents the first or second ash-fall.

Radio Carbon Dates for Yukon Borderlands									
Lab #	**RCBP**	**2 S CALBP**	**Intercept BP**	**1 S CALBP**	**Level**	**Unit**	**DBS CM**	**Material**	**Comments / Associations**
Beta 181485 KdVo6 2003-20 - REJECTED	130.44 +/- 0.86 pMC				B2 - L			Wood	Radiometric Result indicates material was living post 1950
Beta 245516 KdVo6 07-05 REJECTED	100 +/- 40	280 - 180 and 150 - 10, 0 - 0	240, 240, 60, 40, 0	260 - 220 and 140 - 20 and 0	B2	S16W18	15	Charred material	AMS reject due to location below Ash - burned root?
Beta 245515 KdVo6 07-04	250 +/- 40	430 - 370 and 320 - 270, 180 - 150 and 10 – 0 *436 – 350 [0.248423] & 333 – 267 [0.447658] & 215 – 145 [0.248423] & 17 – 1 [0.045231]*	300	310 - 280	B1	S19W9	19	Charred material	AMS / small foliate and basally thinned bifaces (Art #s 1345, 1386, 1485-86); note shallow deposit on deflationary surface and multiple intercepts include BP 1 - 17, may NOT date artifacts
600 – 150 Little Ice Age Cooler									
KdVo3 *Mirror Creek Rock Quarry*	810 +/- 80	732 – 694 *920 – 652 [0.997185] & 577 – 574 [0.002815]*		729 - 704	B	?	?	?	associated with tools, bone, and flakes at km 1950 AH (Walde 1994)
Beta 231793 KdV05*Nii-ii* S07-01	920 +/-40	930 – 740 *924 – 758 [0.980897] & 753 – 745 [0.019103]*	900 and 870 and 800	920 - 780	B2	Unit B	c. 15	Charred material	AMS from charcoal, anomalous with WRA above – root burn?
Second (East Lobe) White River Ash Fall – circa 1,250 years ago									
Beta 231795 KdVo6	1620 +/- 40	1600 to 1410 *1605 – 1578 [-.056006] & 1574- 1409 [0.943994]*	1530	1550 - 1510 and 1460 - 1430	B2	N14W4		Charred material	
1,450 – 1,200 Medieval Neoglacial									
Beta 182799 KdVo6 2003-11	1740 +/- 40	1725 – 1545 *1774 – 1759 [0.012482] & 1738 – 1551 [0.987518]*	1685, 1660, 1625	1705 – 1585	B2	S10W17 (U5NE)	11.5	Charred material	AMS – below ash date 2nd (c. 1200 BP) WR tephra on site
Beta 245517 KcVo-2 07-10 *Owl's Skull*	1770 +/- 40	1810 – 1570 *1815 – 1598 [0.97926] & 1583 – 1571 [0.02074]*	1700	1720 - 1680 and 1670 - 1620	B2	Test Unit N2	17 - 18	Charred Material	AMS / blade core / biface (wedge?)
First (North Lobe) White River Ash Fall - circa 1900 years ago									
Beta 245518 KdVo6 07-11	1950 +/- 40	**1990 – 1820** ***1989 – 1822 [1.0]***	1890	1940 - 1870	B2	N9W8	40 - 45	Charred material	AMS / medial biface fragment (Art # 2112)
Beta 173826 KeVo-1 *Fox Den*	2010 +/- 40	**2050 – 1880** ***2102 – 2088 [0.01543] & 2061 – 1875 [0.98457]***	1960	2000 - 1900	B2	S7W20 (TR2 - TP3)	12.5	Charred material	Standard date / basally thinned point and assoc. tools
Beta 383732 KdVo6 12-10	**2100 +/-30**	**2150 – 1995** ***2146 – 1996 [1.0]***	**2105 2085**	**2120 – 2035 2025 – 2005**	**B2**	**S3W23**	**26.5**	**Charred Material**	**AMS / from Fe2012-14 Hearth assoc with microblade (3929)**

			2065						
Beta 355049 KdVo6 12-06	**2169 +/- 30**	**2300 - 2240 and 2180 - 2110 and 2080 – 2060** ***2308 – 2219 [0.501639] & 2212 – 2105 [0.46917] & 2083 – 2065 [0.029192]***	**2150**	**2300 - 2270 and 2160 - 2120**	**B**	**N17W16**	**22.5**	**Wood fragments**	**AMS / large late prehistoric hearth F2012-6/7 in N17W16 and N18W16 in B level (no WRA present)**
Beta 245514 KeVo-3-01 Ta’ah Naakeeg	2220 +/- 50	2340 – 2120 *2342 – 2124 [1.0]*	2300, 2240 and 2180	2330 - 2150	B2	TPG-6	12	Charred Material	AMS from hearth feature / core and modified blade
Beta 75867 KaVn-2	4740 +/- 60	5592 - 5322 *5589 – 5439 [0.664269] & 5419 – 5322 [0.335731]*		5582 - 5504	CZ 2 B2 Top		7	Charcoal	Top bracket date on CZ 2 B2
Beta 173827 KeVo-1 Fox Den	6210 +/- 70	7270 – 6900 *7269 – 6938 [1.0]*	7170	7240 - 7000	P2	N-21-B3	32 - 34	Organic sediment - bulk	Standard analysis on sediment - dates 2nd paleosol below brunisols – No Current Cultural Association
8,500 – 8000 Younger Younger Dryas Cooler Mesoglacial - Glacial advances									
Beta 68509 KaVn-2	7810 +/- 80	**8979 - 8412** ***8973 – 8914 [0.042812] & 8897 – 8884 [0.008913] & 8865 – 8829 [0,030855] & 8791 – 8417 [0.917421]***		8659 - 8506	CZ 2 B2 Bottom		12	Charcoal	Bottom bracket date on CZ 2 B2
Beta 323239 KdVo6	8560 +/- 40	**9550 – 9490** ***9581 – 9574 [0.007768] & 9560 – 9477 [0.992232]***	9540	9540 - 9530	LowerPC	N18W13	75	Wood	AMS / Fa11-79 and Fa11-80 (bison) and modified flake, Fe11-12
Beta 355050 KdVo6 12-09	8860 +/- 40	**10170 - 9760 and 9750 – 9750** ***10164 – 9774 [1.0]***	10110, 10100, 9920	10150 - 10060 and 10040 - 9990 and 9960 - 9900	bottom of P2	N17W16	65	Charred material	AMS / medial biface fragment KdVo6:4057 N17W16 P2 Z=63
Beta 182798 KdVo6 2003 Fa03-01	8890 +/- 50	**10190 – 9865 and 9855 – 9780** ***10190 – 9883 [0.92972] & 9878 – 9861 [0.014936] & 9849 – 9785 [0.055792]***	10130, 10060, 9945	10160 – 9910	Lower Paleosol	N16W1 (U20SE)	67	Bone collagen, caribou?	AMS / on long bone shaft fragment, Fa03-01
10,000 – 9000 Milankovitch Thermal Maximum Warmer, Moister - Spread of forests									
Beta 217279 KdVo6 06-04	9530 +/- 40	11090 – 10930 and 10880 – 10690 *11083 – 10924 [0.475311] & 10884 –*	10750	11060 – 10950 and 10780 – 10720	Upper Paleosol	N17W2 (U 32)	70	Bone collagen, caribou	AMS 6/30/06 – assoc bipointed bifaces (KdVo6: 140/531 and 530a/530b)

		10694 [0.524689]							
Beta 218235 KdVo6 Fa06-04	9550 +/- 50	11120 – 10690 *11100 – 10705 [1.0]*	11050, 10970, 10760	11080 – 10940 and 10870 – 10720	Paleosol	N15W3 (31)	54.5	Bone collagen, swan femur	AMS 8/03/06 - assoc bipointed bifaces (KdVo6: 140/531 and 530a/530b)
Beta 241522 KdVo6 Fa07-17	9580 +/- 60	11170 – 10700 *11152 – 10723 [1.0]*	11070, 10960, 10860, 10840, 10810	11100 - 10750	Paleosol	N16W8	98	Bone collagen, bison radius	AMS 3/11/08
Beta 355051 KdVo6 13-12	**9790 +/- 50**	**11260 – 11170** ***11275 – 11125 [1.0]***	**11220**	**11240 - 11200**	**PC3-P4**	**N17W13**	**91 - 94**	**Charred Material**	**AMS on burned plant material below biface (4219) in SW corner wall**
Beta 323238 KdVo6 12-03	9860 +/- 40	11320 – 11210 *11341 – 11201 [1.0]*	11240	11260 - 11230	PC - PC2	N19W11	72	Charred Material	AMS / directly beneath burned squirrel mandible
Beta 323237 KdVo6 12-02	9890 +/- 40	11390 - 11380 and 11350 – 11230 *11392 – 11371 [0.42831] & 11368 – 11220 [0.957169]*	11260	11300 – 11290 and 11290 - 11240	PC - PC2	N18W11	84	Charred Material	AMS / direct bone beamer and hearth
Beta 382328 KdVo6 2014	**9970 +/- 40**	**11610 – 11520 and 11510 – 11255** ***11611 – 11518 [0.211787] 11509 – 11259 [0.788213]***	**11390 and 11380 and 11355**	**11405 - 11290**	**LbPC3-P4**	**N17W13**	**101.5**	**Bone collagn, mammal**	**AMS on bone below biface (4219)**
Beta 241525 KdVo6 Fa 07-30	10000 +/- 60	11760 to 11250 *11749 – 11733 [0.011921] & 11723 – 11263 [0.988079]*			Paleosol	N17W7	84	Bone collagen, wapiti phalanx	AMS 3/11/08
Beta 382339 KdVo6 12-04	**10110 +/- 30**	**11915 – 11910 and 11825 – 11610 and 11520 – 11510** ***11988 – 11860 [0.130662] & 11841 – 11602 [0.836095] & 11528 – 11498 [0.026633] & 11427 – 11413 [0.00661]***	**11775**	**11770 – 11700 and 11670 - 11645**	**LbPC3-P4**	**N17W19**	**88.5**	**Bone collagen, bison, naviculo cuboid**	**AMS on sample from specimen (Fa2012-51)**
Beta 75868 KaVn-2	10130 +/- 50	12275 - 11343 *12023 – 11598 [0.92966] & 11554 – 11475 [0.053856] & 11437 – 11408 [0.016878]*	n/a	11947-11874	CZ 1	n/a	30	Charcoal	terminal date of CZ1
Wk-7841 KaVn-2	10670 +/- 80	12974 - 12338 *12731 – 12520 [0.945038] & 12478 – 12428 [0.054962]*	n/a	12694 – 12575	CZ 1	n/a	29	Charcoal	basal date of CZ 1

Beta 303043 KdVo6 11-01	10840 +/- 50	12880 – 12810 *12801 – 12682 [1.0]*	12840	12880-12810	PC - PC3?	N18W13	92	Wood	AMS / wood below bison bone at 75 bs (see Beta 323239, above)
12,800 – 11,500 Younger Dryas Colder, Dryer - Artemesia									
UCI 88769 KdVo6 Fa06-41	10960 +/- 30	12905 – 12715 *12905 – 12715 [1.0]*	n/a	12905-12715	LbP	N13W02	52.5	bone collagen, wapiti innominate	AMS / Fa 2006-41 bone with cutmarks
14,000 – 12,800 Allerod Warmer - Shrub tundra									
Beta 241523 KdVo6 Fa07-20	12020 +/- 70	14077 to 13730 *14077 – 13730 [1.0]*	13850	13990 -13770	LbP	N17W4	85	Bone collagen, bison vertebra	AMS / bone with cutmarks
14,200 – 14,000 Older Dryas Colder - Herb tundra									
Beta 231794 KdVo6 Ivory	38160 +/- 310	*42768 – 41894 [1.0]*			surface		0	Bone collagen, mammuthus?	fragment from hillside across road from KdVo6, non-cultural
Beta 246741 KdVo6 08-02	42480 +/- 1460	*48808 – 43236 [1.0]*	n/a	*47237 – 44434 [1.0]*	Swale Paleosol	N end of Trench	280	Wood	AMS dates Wisconsin Interstadial Paleosol, non-cultural
Beta 246711 KdVo6 08-04	N/A	> 46000	n/a	n/a	Swale Paleosol	N end of Trench	250	Wood	AMS dates Wisconsin Interstadial Paleosol, non-cultural

Notes:

1. Table Notes: Primary Dates are those provided by Beta Analytic in their report on results. Paranthetical ( ) Dates are those generated by the CALIB 7.02 calibration program which is based on IntCal13 (Reimer et al. 2013). The entire results of this calibration is reported in an accompanying appendix. Square [ ] brackets enclose the statistical probability for different calibrations based on multiple intercepts at the 2 sigma confidence level on the calibration curve. In this and the following table we provide all these data. In subsequent tables in this section we use the CALIB calibrations rounded up to the nearest ten and for multiple intercepts that with the highest degree of confidence above 0.7500 or all if they are below 0.7500.
2. Dates for major climate events are derived from Potter (2013) and Coffman and Potter (2011).
3. Dates for KaVn-2 are from Heffner 2002, while those for KdVo-3 are from Walde (1994), recalibrated using the above source.
4. All other dates in the table are derived from samples submitted by Easton. Except where noted they were derived from the Accelerated Mass Spectrometric technique.

Figure 40.Naviculo Cuboid, Bison, from LbPC3-P4, N17W19, KdVo6 Fa13-51 c. 12 – 11.6 CAL BP.

Figure 41. Culturally modified Bison spp. verterbrae remains in situ, loess below paleosol stratum, dated to 12020 radiocarbon years or c. 14,000 CAL BP.

Most significantly a radio-carbon sample on a vertebrae with cut marks (KdVo6 Fa07-20, shown above) identified by Dr. David Yesner as *Bison spp*. (most likely *B. priscus*) which was recovered from the loess below the main Paleosol complex strata in the East lobe returned a date of 12020 +/- 70 radio-carbon years, calibrating to a calendar date of between 14050 - 13720 years BP.

Figure 42. Proximal Innominate (ilium) of Wapiti dated to 10960 +/_ 30 RCYBP (12,905 - 11715 Cal YBP at 2 sigma) from Loess below Paleosol, N13W02 – Fa 2006-41 (number in photo is field #).

Another sample from a *Cervus spp*. proximal innominate fragment (shown above) identified by Yesner and Richard Harrington as most likely Wapiti (*C. canadensis*) from this same level was dated in 2010 and returned a date of 10960 +/- 30 radio-carbon years, calibrating to a calendar date of 12,905-12715 CAL BP (UCI 88769). A third early date is present on wood identified as *Betula spp*. (dwarf birch?) (Hawes and Croes 2013); Beta 303043 returned a date of 10840 radio-carbon years, which calibrates to a two sigma probability of 12,880 – 12810 CAL BP. A check of statistical significance[21] determined that these three or any two in combination are all statistically different at the 95% confidence interval, suggesting that there was at least intermittent but regular occupation of the Little John site between about 14 and 12.7 Kya BP. Thus, the East lobe of the Little John site may contain one of the oldest human occupations known in Eastern Beringia (the basal cultural level at the Swan Point site has been dated by multiple radio-carbon dates to circa 14,100) and certainly one of the oldest prehistoric sites in contemporary Canadian geography.

Indeed, these results, buttressed by the slightly older dates at Swan Point (Holmes 2011) and slightly younger dates at the recently discovered Britannia Creek site dated to circa 13,000 Kya CAL BP (Altimara Consulting 2014, Guzman 2014) towards the northwest and northeast respectively, increases the veracity of these early dates at the Little John site, which lies along a natural corridor between the two. My own ethnographic work has documented a traditional aboriginal trail network connecting these two sites that passes through the Little John site.

The implications of this connecting of the dots is both clear and enigmatic, since it connects the Tanana River corridor with the Yukon River corridor as arenas of early human occupation of the central western Subarctic. Were they a single population traveling up the Tanana River basin and passing through Little John and down the Snag drainage and across to the Yukon River? Or were they a single population that travelled in the opposite direction, up the Yukon River to the fringes of the Wisconsin ice sheets who then headed south and west through Little John and into the Tanana drainage? Or were they a single population that travelled up the Yukon River corridor (or over a

[21] Tests of statistical significance between radio-carbon dates were run within the CALIB radio-carbon calibration program Rev 7.0.2 (Stuiver and Reimer 1993). A summary of these tests showing links between the various dates reported above is presented in Tables below.

coastal pass from the west) and, for reasons opaque to us, split at the mouth of the Tanana River, with some continuing up the Yukon and some heading up the Tanana Rivers? Or were they two separate streams of hunting bands, close but never near enough that each took different paths into what we now call the Yukon Territory?

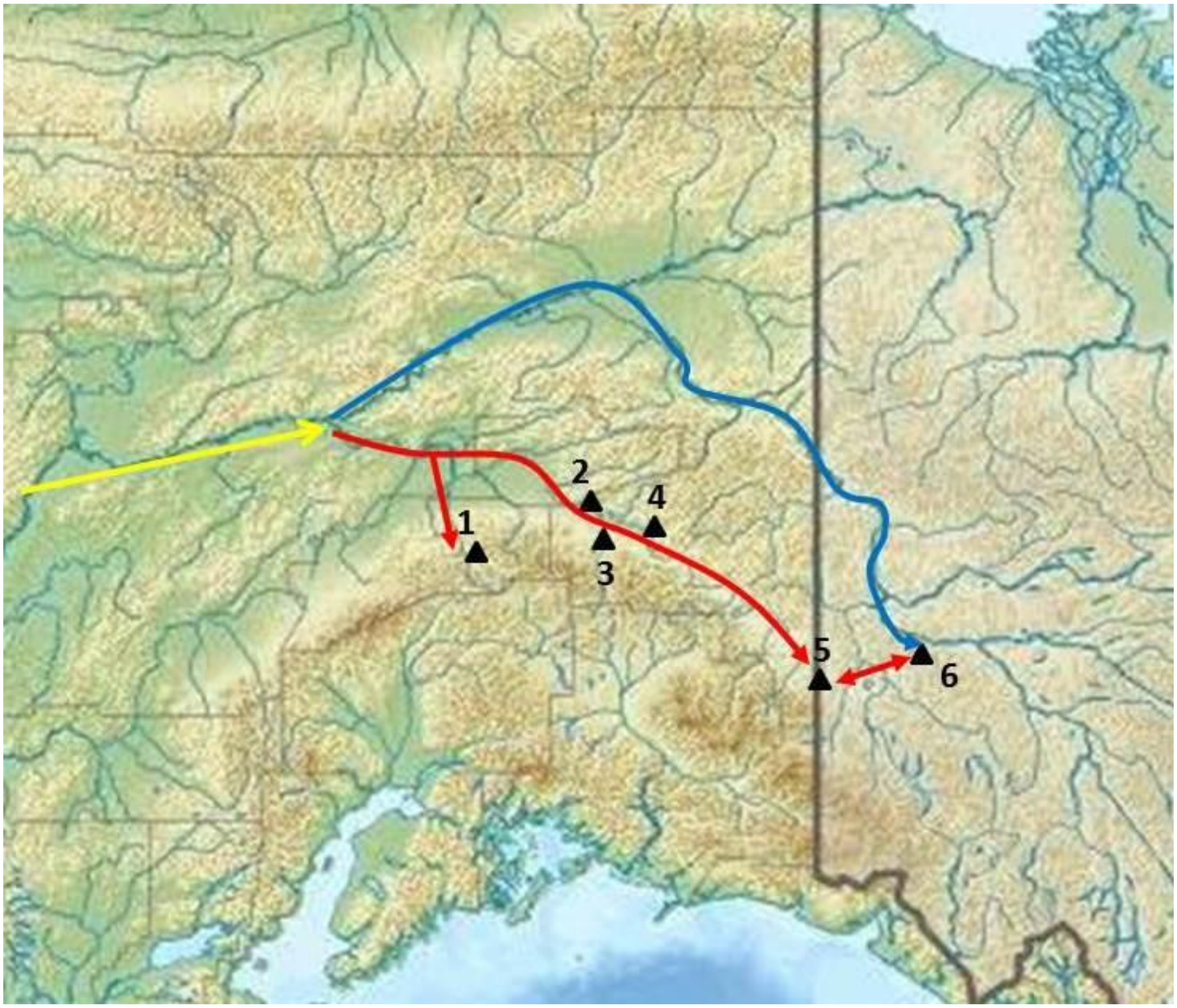


Figure 43. Alternative Migration Corridors to Early Southeastern Beringian Archaeological Sites.
1. Nenana Valley Sites (Walker Road, Moose Creek, Owl Ridge). 2. Shaw Creek Sites (Swan Point, Mead, Broken Mammoth). 3. Upward Sun River. 4. Healy Lake Sites (Village, Garden, Linda's Point). 5. Borderland Sites (Little John, Moose Lake). 6. Britannia Creek Site.

And might these differences be somehow connected to the continuing material confusion of our archaeological datasets that find us with Late Pleistocene settlements or camps variously defined as holding Chindadn, Denali, or Nenana technologies? And what are we to make of the fact that the trail towards Britannia Creek from Little John intersects with a major traditional trail up the Dry and Beaver Creeks to the principal source of obsidian in the region at Wiki Peak, which was also accessed by the earliest occupants of the Broken Mammoth, Walker Road, and Moose Creek sites c. 13,000 plus years ago (Reuther et al. 2011; Potter 2008)? I am exploring these questions and others in more detail in a paper in preparation, but suffice to say here that the Little John site is emerging as a nexus that is tying together the culture history of Alaska and the Yukon.

Implications of Statistical Tests of Significance

More locally, as shown in the Tables below, tests of statistical significance between radio-carbon dates from the Little John site and with others in the area are of interest. Considering only the Late Pleistocene – Early Holocene dates in the first of these Tables, the basal date of CZ-1 at KaVn-2 (WK-7841 – 10670 RCY) can be tied chronologically with KdVo-6 (Beta 303043 – 10840 RCY), which together provide a pooled calibrated date of between 12,752 and `12,663 CAL BP. Likewise the upper bracketing date of CZ-1 at KaVn-2 (Beta 75868 – 10130 RCY) is statistically contemporaneous with two early dates at Little John; one on a complete naviculo cuboid bison bone (Beta 382339 – 10110 RCY), and another on a wapiti phalanx (Beta 241525 – 10000 RCY). Together these three dates provide a pooled calibrated date of between 11,824 and 11,601 CAL BP. The correspondence of these dates suggests that both sites may have been occupied during these times by the same - or at least - a closely related population.

The remaining dates in the Table below are all from the Early Holocene. Tests of significant difference between them supports a more or less continuous statistical occupation and concurrent heavier use of the site between about 10,000 and 9,500 RCY ago (c. 11800 – 10700 CAL BP), with two more discrete occupations over the following 500 years.

Table 12. Tests of Statistical Difference of Late Pleistocene – Early Holocene Radio-Carbon Dates from KdVo6 and Other Local Yukon Sites

<table>
<tr><th>Sample # & Site</th><th>RC Year</th><th>Level</th><th>Sig 95%</th><th>Sig 95%</th><th>Sig 95%</th><th>Sig 95%</th><th>Sig 95%</th><th>Sig 95%</th></tr>
<tr><td>Beta 323239
KdVo6</td><td>8560</td><td>L b PC3</td><td></td><td rowspan="2">DIFFERENT
TEST 1C</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 355050
KdVo6 12-09</td><td>8860</td><td>bottom of P2</td><td rowspan="2">SAME
POOLED CAL
BP VAR 2
10171-9887
(0.97149)
TEST 1</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 182798
KdVo6</td><td>8890</td><td>Lower Paleosol</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 217279
KdVo6 06-04</td><td>9530</td><td>Upper Paleosol</td><td rowspan="3">SAME
POOLED CAL
BP VAR 2
11078-10942
(0.532664)
10877-10720
(0.467336)
TEST 2</td><td rowspan="2">SAME POOLED
CAL BP VAR 2
11077-10709
TEST 32</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 218235
KdVo6</td><td>9550</td><td>Paleosol</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 241522
KdVo6 Fa07-17</td><td>9580</td><td>Paleosol</td><td rowspan="2">DIFFERENT
TEST 5</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 355051
KdVo6 13-12</td><td>9790</td><td>PC3-P4</td><td rowspan="2">SAME
POOLED CAL
BP VAR2
11269 -
11199 TEST 6</td><td rowspan="3">SAME POOLED
CAL BP VAR 2
11269 - 11199
TEST 7</td><td></td><td rowspan="4">DIFFERENT
TEST 8B</td><td></td></tr>
<tr><td>Beta 323238
KdVo6 12-03</td><td>9860</td><td>PC - PC2</td><td></td><td rowspan="3">SAME
POOLED CAL
BP VAR2
11356 - 11240
TEST 11</td><td rowspan="4">SAME
POOLED CAL
BP VAR 2
11405 - 11248
(0.922961)
TEST 14</td></tr>
<tr><td>Beta 323237
KdVo6 12-02</td><td>9890</td><td>PC - PC2</td><td rowspan="2">SAME
POOLED CAL
BP VAR2
11398 -
11245 TEST
10</td><td rowspan="4">DIFFERENT
TEST 15</td></tr>
<tr><td>Beta 382328
KdVo6 2014</td><td>9970</td><td>LbPC3-P4</td><td rowspan="3">DIFFERENT
TEST 16</td></tr>
<tr><td>Beta 241525
KdVo6 Fa 07-30</td><td>10000</td><td>Paleosol</td><td rowspan="2">SAME
POOLED CAL
BP VAR2
11841 -
11602
(0.836095)
TEST 17</td><td rowspan="3">SAME
POOLED CAL
BP VAR 2
11824-11601
(0.90984)
TEST 29</td><td></td></tr>
<tr><td>Beta 382339
KdVo6 12-04</td><td>10110</td><td>LbPC3-P4</td><td></td><td></td></tr>
<tr><td>Beta 75868
KaVn-2</td><td>10130</td><td>CZ 1</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Wk-7841
KaVn-2</td><td>10670</td><td>CZ 1</td><td></td><td rowspan="2">SAME
POOLED CAL
BP VAR2
12752-12663
TEST 30</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 303043
KdVo6 11-01</td><td>10840</td><td>PC - PC3?</td><td rowspan="2">DIFFERENT
TEST 3</td><td></td><td></td><td></td><td></td></tr>
<tr><td>UCI 88769
KdVo-6</td><td>10960</td><td>LbP</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 241523
KdVo6 Fa07-20</td><td>12020</td><td>LbP</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Consideration of similar measures of significant difference between later Holocene radio-carbon dates from KdVo-6 and other local sites is presented in the Table below.

Table 13. Tests of Statistical Difference of Later Holocene Radio-Carbon Dates from KdVo6 and Other Local Yukon Sites

<table>
<tr><th>Sample # & Site</th><th>RC Year</th><th>Level</th><th>Sig 95%</th><th>Sig 95%</th><th>Sig 95%</th><th>Sig 95%</th></tr>
<tr><td>Beta 245515
KdVo6 07-04</td><td>250</td><td>B1</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 231793
KdVo4
Nii-ii S07-01</td><td>920</td><td>B2</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 231795
KdVo6</td><td>1620</td><td>B2</td><td rowspan="2">DIFFERENT
TEST 19</td><td></td><td></td><td></td></tr>
<tr><td>Beta 182799
KdVo-6</td><td>1740</td><td>B2</td><td rowspan="2">SAME POOLED
CAL BP VAR 2
1730-1569
TEST 26</td><td></td><td></td></tr>
<tr><td>Beta 245517
KcVo-2 07-10
Owl's Skull</td><td>1770</td><td>B2</td><td></td><td></td><td></td></tr>
<tr><td>Beta 245518
KdVo6 07-11</td><td>1950</td><td>B2</td><td rowspan="2">SAME POOLED
CAL BP VAR 2
1991-1878
TEST 21</td><td rowspan="3">DIFFERENT
TEST 22</td><td></td><td></td></tr>
<tr><td>Beta 173826
KeVo-1 Naagat Kaiy - Fox Den</td><td>2010</td><td>B2</td><td rowspan="2">SAME POOLED
CAL BP VAR 2
2118-1986
(0.969399)
TEST 23</td><td rowspan="3">DIFFERE
NT TEST
24</td></tr>
<tr><td>Beta 383732
KdVo6 12-10</td><td>2100</td><td>B2</td><td rowspan="2">SAME POOLED
CAL BP VAR 2
2156-2040
(0.907033)
TEST 25</td></tr>
<tr><td>Beta 355049
KdVo6 12-06</td><td>2169</td><td>B</td><td rowspan="2">SAME POOLED
CAL BP VAR 2
2210-22123
2308-2222
TEST 28</td><td></td></tr>
<tr><td>Beta 245514
KeVo-3-01
Ta'ah Nakeeg</td><td>2220</td><td>B2</td><td></td><td></td><td></td></tr>
<tr><td>Beta 75867
KaVn-2</td><td>4740</td><td>CZ 2 B2 Top</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 173827
KeVo-1</td><td>6210</td><td>P2
non-
cultural</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Beta 68509
KaVn-2</td><td>7810</td><td>CZ 2 B2
Bottom</td><td></td><td></td><td></td><td></td></tr>
</table>

Perhaps the most interesting observation to be made on the later Holocene data is the statistical similarity in occupation at the Little John site and three of the other five sites included in the table. Occupations at the *Ta'ah Nakeeg* (hunting lookout) at the southwestern end of Big Scottie Creek, the *Naagat Kaiy* (Fox Den) village site on the middle reach of Big Scottie Creek, and *Owl's Skull Nakeeg* on the northwestern reach of Snag Creek were all occupied during periods of occupation at the Little John site as well.

Also of note is the fact that the pooled calibrated date for the *Naagat Kaiy* – Little John occupation at 1991 – 1878 CAL BP encloses the date of the first White River Ash fall c. 1900 CAL BP and may explain why artifacts are found in Ash at both sites (see Easton 2002b)

Sum Probability Distribution of Radio-Carbon Dates and Proposed Chrono-Zones for the Little John Occupational Sequence

Additional insight into the occupational sequence at Little John can be gained by an examination of the sum probability distribution of radio-carbon dates at the site, which suggests discrete temporal occupations at the Little John site. We have grouped and color coded these tentative chrono-zones in the Figure below to reflect this emergent patterning.

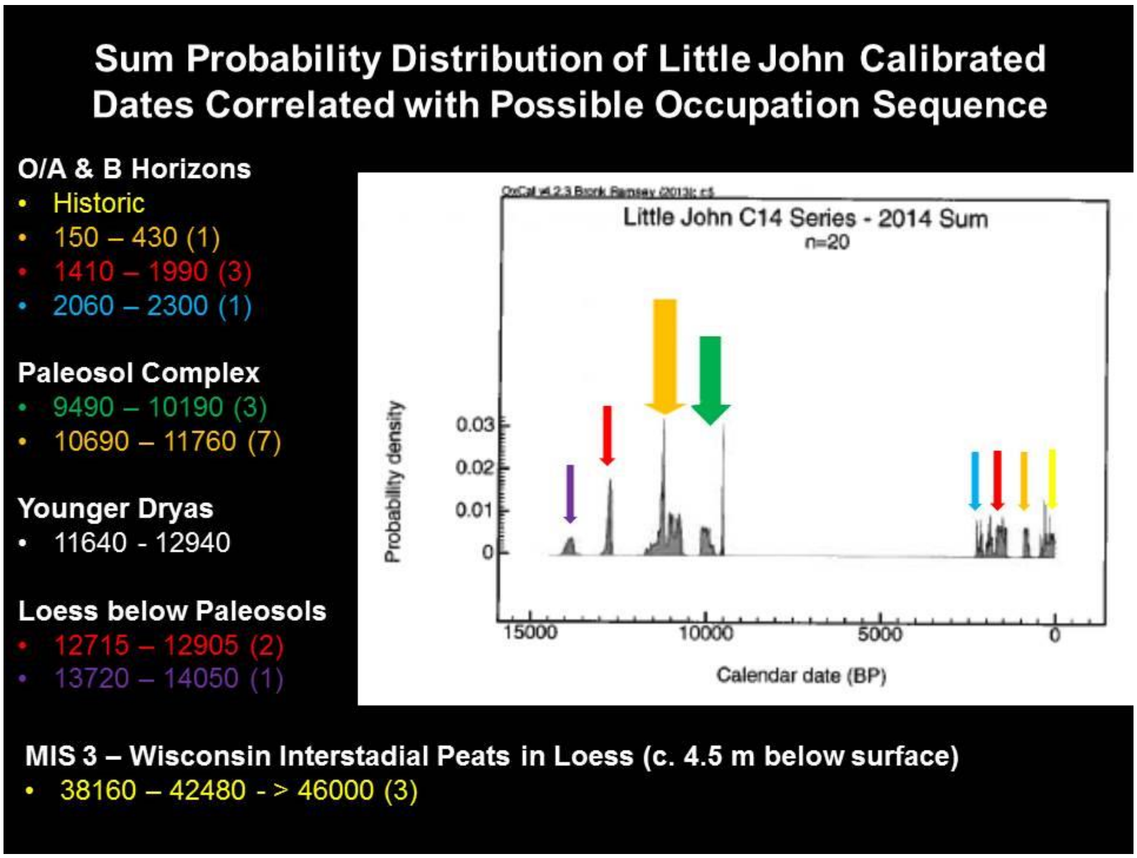


Figure 44. Sum Probability Distribution of Cultural Dates at the Little John Site.

Based on all of these data derived from the radio-carbon dating sequence at the Little John site, including reference to the first Table in this section correlating calibrated dates with major climatic events, we can make several observations. The first relates to the late Holocene dates which suggest the site was occupied for at least several hundreds of years prior to the first White River eruption, c. 1900 years ago, and reoccupied shortly thereafter up to just prior to the second White River eruption, c. 1200 years ago, and reoccupied again but some 500 years later. The hiatus between c. 700 and 1200 years ago may be a sampling artifact however; further radio-carbon dates from the Holocene B2 stratum is needed to resolve this.

The second is that the Late Pleistocene – Early Holocene dates seem to form four possible periods of occupation. The earliest occupation begins at the end of the Older Dryas cooling event and the onset of the Allerod warming event c. 14,000 years ago. Whether there was continued occupation during the interim is not determined, however there is a clear documentation of a second occupation at the end of the Allerod c. 13 thousand years ago and lasting into the first several hundred years of the Younger Dryas cooling period at c. 12.8 thousand years ago. It may be significant that there is no current indication of occupation during the height of the Younger Dryas at Little John between about 12.6 and 11.8 thousand years ago, but it is abundantly evident that the Little John site was being intensively used again towards the end of the Younger Dryas after 11.7 thousand years ago. Regionally, a recently published summation of Late Pleistocene dates from the Tanana River basin lists only four components (of 44 in total) that exhibit unequivocal cultural occupation during the height of the Younger Dryas climate event years ago: Owl Ridge – C2, Broken Mammoth – CZ3, Mead – CZ3, and Moose Creek – C2 (Potter et al. 2013:83). It is notable that the two early dates from KaVn-2 by themselves both lie within the Younger Dryas, at between 12731 – 12520 and 12023 – 11598 CAL BP, although Heffner notes that these are enclosing, not defining dates (Heffner 2002:44).

Based on these data Easton has developed a proposed Cultural Chronology for the Little John site that links together the radio-carbon, calibrated and pooled sample dates, and stratigraphy from the site to form nine Chrono-Zones, relating these to local vegetation history and large scale climatic events and tied in the fauna and artifact assemblages within six major Archaeological Components at the site. The Table below summarizes the current state of this effort.

Table 14. Proposed Chrono-Zones and Cultural Components at the Little John Site (July 2014).

Little John Dates RCY	Little John CAL BP1	Little John CAL BP2	Little John Pooled Samples CAL BP and Associated Dated Technology			Little John Crono-Zones	Yikahh Mann Vegetation History	Climate Events	Little John Archaeological Components	Little John Stratigraphic Zones
			Historic artifacts related to the early contact fur trade through to the 1940s, military issue artifacts from the 1940s, material remains related to continued use and occupation of the site by local Dineh until the present			CZ 1 - 150 - present			LJ AC I-A Historic - Contemporary LJ AC I-B Historic - Alaska Highway Occupation LJ AC I-C Historic - Contact Traditional	O / A Across Entire Site
250 + 40 charred mat	436	145	Notched and basily thinned diminutive bifaces, small endscrapers, burins, large hearths with cobbles			CZ 2 - 1240 - 150		Little Ice Age c. 600 - 150		B1 Across Entire Site
KdVo-3 810 + 40 charred mat	920	652							LJ AC II Late Prehistoric- Aishihik Phase	
KdVo-5 920 + 40 charred mat	924	758						Second (East Lobe) White River Ash Fall c. 1240		
1,620 + 40 charred mat	1,574	1,409			side notched & lanceolate bifaces, microblades made on conical & tabular cores, large and small endscrapers and side scrapers, burins, large hearths with cobbles	CZ 3 - 1240 - 1900	Alder Zone 6.2 Kya - present		LJ AC III-A Middle Prehistoric Northern Archaic	White River Tephra
1,740 + 40 charred mat	1,738	1,551	1,730 - 1,570							West Lobe Upper and Middle B2 - East Lobe B2
KcVo-2 1770 + 40 charred mat	1815	1598								
1,950 + 40 charred mat	1,989	1,822	1,990 - 1880					First (North Lobe) White River Ash Fall c. 1900		
KeVo-1 2010 + 40 charred mat	2061	1875		2,120 - 1990		CZ 4 - 2,500 - 1900			LJ AC III-B Middle Prehistoric - Northern Archaic	
2,100 + 30 charred mat	2,146	1,996	2,060 - 2,140							
2,169 + 30 wood frags	2,308	2,105		2.156 - 2,040						
KeVo-3 2220 + 50 charred mat	2342	2124								

							Spruce Zone 8.3 - 6.2 Kya			
							Spruce Rise 9.4 - 8.2 Kya			
8,560 + 40 wood	9,560	9,480		medial lanceolate biface Denali? Chindadn Type 4? caribou		CZ 5 - 10,190 - 9480		Milankovich Thermal Maximum 10,000 - 9,000	LJ AC - IV-A Early Holocene Component	Loess Above Paleosol, Paleosol 1 (P1) West Lobe Lower B2
8,860 + 40 charred mat	10,170	9,780	10,170 - 9,890							
8,890 + 50 caribou bone	10,190	9,890								
9,530 + 40 caribou bone	11,090	10,690	11,080 - 10,950	Denali style bipoints (2) microblades caribou, swan, bison		CZ 6 - 11,170 10,690			LJ AC – IV-B Denali Complex	Paleosol Complex 1 (PC1-P2) and West Lobe Lower B2
9,550 + 50 swan bone	11,120	10,690								
9,580 + 60 bison bone	11,170	10,700								
9,790 + 50 charred mat	11,260	11,170	11,270 - 11,200	large oblate biface, bison		CZ 7 12,000 - 11,200	Birch Rise 12.9 - 9.0 Kya dwarf birch, decline in sage, rise in aquatic plants		LJ AC – V Chindadn Complex (Type 1 and 2) East Beringian Tradition (Phase II)	Paleosol Complex 2 and 3 (PC2-P3 and PC3-P4) and West Lobe Loess
9,860 + 40 charred mat	11,320	11,210		Chindadn Type 2 biface						
9,890 + 40 charred mat	11,370	11,390		11,400 – 11,250	bone beamer (bison)					
9,970 + 40 large mammal bone	11,510	11,260	11,505 - 11,270		11,830 - 11.270 bison, wapiti, caribou, squirrel			Younger Dryas 12.8 – 11.5 Kya		
10,000 + 60 wapiti bone	11,760	11,250		11,830 - 11,600						
10,110 + 30 bison bone	11,840	11,600								
KaVn-2 10,130 + 50 charred mat	12,030	11,600								
KaVn-2 10,670 + 80 charred mat	12,730	12,520		butchered bison and wapiti, edge modified flakes, split cobble choppers, hammerstones		CZ 8 12,910 - 12,663				Loess below Paleosol Complex (P5?) West Lobe Loess?
10,840 + 50 wood	12,880	12,810	12,752 - 12,663							
10,960 + 30 wapiti bone	12,910	12,720								
							Herb-Tundra Steppe 16 - 13 Kya - grasses, sage, willow, sedges	Bolling-Allerod 14.7 - 12.9 Kya	LJ AC - VI Little John Dyuktai? East Beringian Tradition (Phase I)	
			butchered bison and wapiti, edge modified flakes, steep edged scrapers on split pebble, split cobble choppers, hammerstones							Loess below Paleosol Complex (P6?) West Lobe Loess?
12,020 + 70 bison bone	14,080	13730				CZ 9 c. 14,000				

Table Note. The Table represents my effort to build a Cultural Chronology for the Little John site as of July 2014. Ten new radio-carbon dates are expected in early September 2014 and may lead to revision of this Table.

SUMMARY OF RECOVERED FAUNA FROM THE LITTLE JOHN SITE, 2013

Recovered fauna from 2013 is detailed in the accompanying faunal databases in both Filemaker (with photographs) and Excel formats and summarized below. An analytical summary of recovered fauna through 2009 is presented in Yesner et al. (2011), while the entire faunal assemblage has received an initial analysis in terms of its taphonomic distribution and demonstration of site integrity within a periglacial sedimentary context (Yesner et al. 2012). Additional analysis of this material continues with the collaboration of Vance Hutchinson and David Yesner. In the summer of 2012 Laurianne Bourgeon, a PhD student in taphonomy at the University of Montreal joined us at Little John in order to assess the possibility of using the Little John fauna collection in the context of her thesis work. We are pleased to note that she undertook additional examination of the Little John fauna in the summer of 2013 and has provided an initial assessment of her data which I summarize in the next section below.

Table 15. Summary of Recovered Fauna by Level, KdVo6-2013

Common Name	B2	L	PC1 - P2	PC2 - P3	PC3 - P4	L b PC	Species Total	Species Percent
Bird		8					**8**	**3.35**
Bison						1	**1**	**0.42**
Wapiti			4	8			**12**	**5.02**
Cervid - Caribou?			3	25			**28**	**11.72**
Cervid					17		**17**	**7.11**
Large Mammal			1	7	11		**19**	**7.95**
						Subtotal Large Mammals	**(77)**	**(32.22)**
Med Mammal	2			21	49		**72**	**30.13**
Hare				6			**6**	**2.51**
Squirrel		18		12			**30**	**12.55**
Rodent		1			1		**2**	**0.84**
Small Mammal				2			**2**	**0.84**
						Subtotal Small Mammals	**(112)**	**(46.86)**
Mammal		2		19	21		**42**	**17.57**
Level Totals	**2**	**29**	**8**	**100**	**99**	**1**	**239**	
Level Percent	**0.84**	**12.13**	**3.35**	**41.84**	**41.42**	**0.42**		

Two hundred and thirty-nine faunal elements recovered in 2013 have been examined within 90 catalogue entries; five lots were discarded after closer examination determined they were not bone, and ten elements recorded in the field are missing from the laboratory collection.

Fauna from the Late Pleistocene Paleosol Complex and intersecting Loess strata made up the majority of recovered fauna in 2013 (n = 208 or 87.03%), while fauna from the upper Late Holocene levels (B2 n = 2) account for less than 1% of fauna recovered in 2013. About 12% of the fauna came from with the massive loess deposit encountered in the two by two unit N25 W22/23 – N26 W22/23; consisting of 8 bird bones and 21 small mammal bones, 18 of which can be attributed to a single squirrel, these specimens had no direct cultural associations and quite likely are Wisconsin in age.

As seen in the Table below, 104 of the 239 specimens representing 43.51% of the 2013 collection were teeth fragments; 76 of these have been classified as large or medium mammal and 35 of these are identified as Cervidae. Mandibular fragments (Fa13-44) found along with some of these teeth are of a size that suggests Caribou, or a younger, smaller Wapiti.

Table 16. Counts of Identified Faunal Elements, KdVo6-2013.

Common Name	Cranial	Cranial/ Dental	Dental	Post Cranial	Vert	Pectoral	Limb	InD	Total
Bird				1			7		8
Bison							1		1
Wapiti					3	8	1		12
Cervid			17						17
Cervid - Caribou?	10		18						28
Large Mammal			11			2	6		19
Med Mammal		4	30	5	1	13	13	6	72
Hare			5				1		6
Squirrel	4		12	8			6		30
Rodent			1				1		2
Small Mammal							2		2
Mammal			10	2			1	29	42
Total	**14**	**4**	**104**	**16**	**4**	**23**	**39**	**35**	**239**

Figure 45. Right Naviculo Cuboid, Bison, from LbPC3-P4, N17W19, KdVo6 Fa13-51.

Post-cranial specimens numbered 115 or 48% of the 2013 collection. Of the post-cranial remains, which include 29 indeterminate specimens, the majority (n = 39) are limb shaft fragments, the most common recovered bone at Little John by both mass and volume over the years. The assignment of limb remains to species or taxon depends on their completeness. A complete right naviculo cuboid can be confidently assigned to Bison, while a nearly complete humeral head (Fa13-08) and associated scapula remains (e.g. Fa13-81 and 82) to Wapiti, while a variety of smaller bones represent Hare and Squirrel. The remaining bones can only be assigned as Bird or Mammal of different size classes.

Figure 46. Refit Wapiti Remains, KdVo6 2013; Glenoid Fossa, Scapula Spine, Humeral Head and Vertebrae Fragments.

A series of specimens can be refit to form the medial portion of a scapula, including the glenoid fossa and portions of the scapula spine, a portion of the humeral head, and a section of vertebra. All of these are Cervid in origin and, based on comparison with the Heritage Branch collection, have been designated Wapiti. Additional similar bone fragments in association with these remains are likely from the same animal but are too fragmented to assign to element.

A full listing of Provenience, Species, and Element assignment is presented in the Table below.

Table 17. Provenience and Skeletal Elements of Recovered Fauna, KdVo6 2013.

Catalogue Number	Unit	Quad	Lev	DBS	Common Name	#	Gross Element	Specific Element	Element Section
Fa13-027	N26 W22	NW	ML	132	Bird	1	Limb	Humerus	Distal
Fa13-026	N26 W22	NW	ML	132	Bird	1	Limb	Ulna	Complete
Fa13-025	N26 W22	NE	ML	132	Bird	5	Limb	Tibiotarsus, other	Complete
Fa13-028	N26 W22	SW	ML	142-144	Bird	1	Post Cranial	Caracoid	Complete
Fa13-051	N17 W19	SW	L b PC	88.5	Bison	1	Limb	Naviculo cuboid	Complete
Fa13-105	N16 W18	NW	PC3 - P4	91	Cervid	1	Dental	Tooth frag	Occlusal
Fa13-106	N16 W18	NW	PC3 - P4	90	Cervid	1	Dental	Tooth frag	Occlusal
Fa13-113	N16 W18	NW	PC3 - P4	94.5	Cervid	1	Dental	Tooth frag	Medial
Fa13-119	N16 W18	NW	PC3 - P4	93	Cervid	1	Dental	Tooth frag	Occlusal
Fa13-126	N16 W18		PC3 - P4		Cervid	1	Dental	Tooth frag	Occlusal
Fa13-098	N17 W18	SW	PC3 - P4	92	Cervid	4	Dental	Tooth frag	Medial
Fa13-099	N17 W18	SW	PC3 - P4	91	Cervid	1	Dental	Tooth frag	Medial
Fa13-100	N17 W18	SW	PC3 - P4	91	Cervid	5	Dental	Tooth frag	Medial
Fa13-116	N17 W18	SW	PC3 - P4	92.5	Cervid	1	Dental	Tooth frag	Occlusal
Fa13-122	N17 W18	SW	PC3 - P4	93-95	Cervid	1	Dental	Tooth frag	Medial
Fa13-044	N17 W19	NE	PC1 - P2	66	Cervid - Caribou?	2	Cranial	Mandible	Lingual
Fa13-056	N17 W18	NE	PC1 - P2	64.5	Cervid - Caribou?	1	Cranial	Mandibular Condyle?	Anterior
Fa13-053	N17	SW	PC2	73	Cervid -	7	Cranial	Mandibular	Proximal

	W18		- P3		Caribou?			corpus	
Fa13-054	N17 W18	SW	PC2 - P3	72.5	Cervid - Caribou?	2	Dental	Tooth frag	Occlusal
Fa13-055	N17 W18	SW	PC2 - P3	73	Cervid - Caribou?	1	Dental	Tooth frag	Occlusal
Fa13-057	N17 W18		PC2 - P3		Cervid - Caribou?	10	Dental	Tooth frag	Occlusal
Fa13-045	N17 W19	SW	PC2 - P3	66	Cervid - Caribou?	5	Dental	Tooth frag	Occlusal
Fa13-103	N17 W18	SW	PC2 - P3	85.5	Hare	5	Dental	Tooth frag	Occlusal / Medial
Fa13-080	N17 W19	SW	PC2 - P3	80	Hare		Limb	Humerus	Proximal
Fa13-014	N18 W16	NW	PC2 - P3	82	Large Mammal	1	Dental	Tooth	Labial
Fa13-118	N17 W18	SW	PC3 - P4	92- 93	Large Mammal	10	Dental	Tooth frag	Various
Fa13-021	N18 W16	NW	PC2 - P3	89.5	Large Mammal	1	Limb	Indeterminate	Medial
Fa13-032 / A# 4301	N17 W13	SW	PC2 - P3	64	Large Mammal	1	Limb	Long bone shaft	Medial
Fa13-034	N17 W13	SW	PC3 - P4	101. 5	Large Mammal		Limb	Long bone shaft	Medial
Fa13-041	N17 W19	SE	PC1 - P2	68	Large Mammal	1	Limb	Long bone shaft frag	Medial
Fa13-031 / A# 4300	N17 W13	NW	PC2 - P3	63	Large Mammal	1	Limb	Metatarsal	Medial
Fa13-012	N16 W18	NW	PC2 - P3	80	Large Mammal	1	Limb	Tibia	Distal
Fa13-011	N16 W18	SW	PC2 - P3	78	Large Mammal	1	Thoracic	Rib fragment	Medial
Fa13-015	N18 W16	SE	PC2 - P3	80	Large Mammal	1	Thoracic	Rib fragment	Medial
Fa13-115	N16 W18	NW	PC3 - P4	91	Mammal	10	Dental	Tooth frag	Medial
Fa13-064	N17 W13	SW	PC2 - P3	64	Mammal	5	Indeterm inate	Calcined nodules	Indeterminate
Fa13-065	N17 W13	SW	PC2 - P3	64	Mammal	14	Indeterm inate	Calcined nodules	Indeterminate
Fa13-120	N16 W18	NW	PC3 - P4	92- 95	Mammal	10	Indeterm inate	Indeterminate	Indeterminate
Fa13-063	N25 W22	SW	ML	43	Mammal	1	Limb	Ulna	Proximal
Fa13-029	N25 W22	NE	ML	104	Mammal	1	Post Cranial	Indeterminate	Medial
Fa13-114	N16 W18	NW	PC3 - P4	92	Mammal	1	Post Cranial	Indeterminate	Medial
Fa13-048	N17 W19	SW	PC2 - P3	75	Med Mammal	4	Cranial/D ental	Ramus?, Tooth frag	Medial
Fa13-096	N17 W18	SW	PC3 - P4	91	Med Mammal	30	Dental	Tooth frag	Occlusal
Fa13-003	N16	NW	PC2	78	Med	1	Indeterm	Indeterminate	Indeterminate

	W18		- P3		Mammal		inate		
Fa13-004	N16 W18	NW	PC2 - P3	75	Med Mammal	1	Indeterm inate	Indeterminate	Medial
Fa13-038	N13 E06	NE	B2	23	Med Mammal	1	Indeterm inate	Indeterminate	Medial
Fa13-039	N13 E06	NE	B2	25	Med Mammal	1	Indeterm inate	Indeterminate	Medial
Fa13-090	N16 W19	SE	PC2 - P3	80	Med Mammal	1	Indeterm inate	Indeterminate	Medial
Fa13-097	N17 W18	SW	PC3 - P4	92	Med Mammal	1	Indeterm inate	Indeterminate	Indeterminate
Fa13-109	N17 W19	SE	PC2 - P3	88	Med Mammal	1	Limb	Long bone shaft frag	Medial
Fa13-125	N16 W18	SW	PC3 - P4	88	Med Mammal	12	Limb	Long bone shaft frag	Medial
Fa13-047	N17 W19	SE	PC2 - P3	75	Med Mammal	1	Post Cranial	Indeterminate	Medial
Fa13-049	N17 W19	SW	PC2 - P3		Med Mammal	1	Post Cranial	Indeterminate	Medial
Fa13-050	N17 W19	NW	PC2 - P3		Med Mammal	1	Post Cranial	Indeterminate	Medial
Fa13-102	N17 W18	SW	PC2 - P3	83	Med Mammal	1	Post Cranial	Long bone shaft frag	Medial
Fa13-112	N16 W19	NE	PC3 - P4	97	Med Mammal	1	Post Cranial	Long bone shaft frag	Medial
Fa13-016 / A# 4299	N18 W16	SW	PC2 - P3	85.5	Med Mammal	2	Thoracic	Rib fragment	Medial
Fa13-005	N16 W18	NW	PC2 - P3	75	Med Mammal	1	Thoracic	Rib fragment	Indeterminate
Fa13-091	N16 W19	SE	PC2 - P3	80	Med Mammal	1	Thoracic	Rib fragment	Medial
Fa13-017	N18 W16	NE	PC2 - P3	87	Med Mammal	1	Thoracic	Rib fragment	Medial
Fa13-020	N18 W16	NW	PC2 - P3	89	Med Mammal	1	Thoracic	Rib fragment	Medial
Fa13-018	N18 W16	NE	PC2 - P3	87.5	Med Mammal	3	Thoracic	Rib fragment	Medial
Fa13-001	N17 W13	SW	PC3 - P4	79	Med Mammal	4	Thoracic	Rib fragment	Medial
Fa13-033	N17 W13	SW	PC3 - P4	83	Med Mammal		Vertebral	Vertebrae frag	Medial
Fa13-101	N17 W18	SW	PC3 - P4	91	Rodent	1	Dental	Maxillary incisor	Complete
Fa13-024	N26 W22	SW	ML	130-132	Rodent	1	Limb	Tibia	Complete
Fa13-019	N18 W16	NW	PC2 - P3	90	Small Mammal	2	Limb	Humerus	Distal
Fa13-030	N25 W22	NE	ML	112	Squirrel	2	Cranial	Mandible	Complete
Fa13-010	N16 W18	SW	PC2 - P3	81	Squirrel	2	Cranial	Mandible	Complete
Fa13-111	N17	SW	PC2	93.5	Squirrel	10	Dental	Incisor, Tooth	Complete, frag

	W18		- P3					frag	
Fa13-002	N26 W23	SW	ML	50.5	Squirrel	2	Dental	Tooth fragment	Occlusal
Fa13-061	N25 W22	SE	ML	136	Squirrel	1	Limb	Ulna	Distal
Fa13-059	N25W 22	SW	ML	128-130	Squirrel	1	Limb	Ulna	Distal
Fa13-023	N26 W22	SE	ML	130-132	Squirrel	1	Limb	Humerus	Proximal
Fa13-060	N25 W22	NW	ML	133.5	Squirrel	1	Cranial/Dental	L. mandibular corpus w/ 2 teeth	Medial
Fa13-058	N25 W22	SE	ML	134	Squirrel	1	Limb	Metacarpal/ tarsal	Complete
Fa13-062	N25 W22	NW	ML	133.5	Squirrel	1	Limb	Metacarpal/ tarsal	Complete
Fa13-022	N26 W22	SE	ML	130-132	Squirrel	8	Post Cranial	Limbs, Vertebrae	Complete, frag
Fa13-008	N16 W18	SW	PC2 - P3	72	Wapiti	1	Limb	Humerus Cap	Proximal
Fa13-040	N17 W19	SE	PC1 - P2	64.5	Wapiti	1	Pectoral	Scapula	Proximal
Fa13-042	N17 W19	SE	PC1 - P2	64	Wapiti	1	Pectoral	Scapula	Medial
Fa13-043	N17 W19	SE	PC1 - P2	57	Wapiti	1	Pectoral	Scapula	Medial
Fa13-082	N17 W19	SE	PC2 - P3	85-86.5	Wapiti	1	Pectoral	Scapula	Proximal
Fa13-081	N17 W18	SW	PC1 - P2	81	Wapiti	1	Pectoral	Scapula frag	Proximal
Fa13-052	N17 W18	SW	PC2 - P3	64	Wapiti	1	Pectoral	Scapula frag	Medial
Fa13-046	N17 W19	SE	PC2 - P3	screen	Wapiti	2	Pectoral	Scapula frag	Medial
Fa13-006	N16 W18	NE	PC2 - P3	69	Wapiti	1	Vertebral	Vertebrae	Ventral Cranial
Fa13-007	N16 W18	SE	PC2 - P3	70	Wapiti	1	Vertebral	Vertebrae	Ventral Cranial
Fa13-013	N16 W18	NE	PC2 - P3	86	Wapiti	1	Vertebral	Vertebrae	Medial
						46			

As seen in the Table above several units contained a considerable number of skeletal remains of the same species and likely representing a single individual. These included the 2 x 2 meter Unit N25/N26-W22/23 in which identified Squirrel specimens or Rodent remains of similar size and condition were recovered within the massive loess deposits typical of the northern portion of the site at between 130 and 136 cm below surface datum (see Figure below).

Figure 47. Squirrel Remains (Fa2012-022), N26W22 - Massive Loess, 130-132 cm bsd.

Another was the 2 x 2 meter unit N16/17 – W18/19 in which a set of bone fragments are attributable to the upper front limb of Wapiti (*Cervus canadensis*) within the PC2-P3 stratum at between about 60 and 84 cm below unit datum (c. 50-74 cm below surface); some of these remains are illustrated above.

2012-2013 TAPHANOMIC ANALYSIS OF THE LITTLE JOHN FAUNA

Taphonomic analysis of the Little John faunal assemblage has been ongoing since the beginning of excavations. However, the approach to this aspect of analysis has varied through time as new collaborators have brought their skills to bear on the material. Easton and MacKay undertook the initial assessment in the early years and their work was admittedly limited in scope and prone to error, neither of them being experts in this sub-discipline. The involvement of Dr. David Yesner of the University of Alaska – Anchorage and Dr. Vance Hutchinson of Whitehorse from 2006 forward has greatly enhanced our accuracy in the identification of taxa, species, and skeletal elements, as well as additional taphonomic details such as impact and spiral fracture signatures.

We have used a blind assessment approach in this analysis. Each of us undertake our own assessment of the material and record our observations. Subsequently, Easton compares the observations and record the majority opinion in the faunal data base, while retaining disagreement in the comments section of the specimens concerned. Every year or so when opportunity allows Yesner, Hutchinson, and Easton will re-examine specimens and discuss differences in an attempt to reach a consensus in our assessment. Ultimately, Easton is responsible for the final assessment of any particular specimen, and his colleagues should not be blamed for any egregious errors.

In 2012 Lauriane Bourgeon, a PhD graduate student at the University of Montreal, joined our faunal assessment team. Ms. Bourgeon has previous experience analyzing Paleolithic fauna in Europe and was beginning doctoral studies under the supervision of Dr. Ariane Burke; her dissertation research is focused on the important outstanding taphonomic assessment of the entire extant Blue Fish Caves fauna from the northern Yukon. Since Ms. Bourgeon had no northern North American archaeological experience, Dr. Burke asked if I might allow Ms. Bourgeon to participate in our field program in order to get a feel for subarctic archaeology and, more importantly, apply her taphonomic analysis to the Little John assemblage in order to test its efficacy and obtain a baseline data set on an assemblage with a strong cultural association. Over the course of the next two years in 2012 and 2013 Ms. Bourgeon examined 2,246 faunal specimens, representing about 87% of the 2,583 specimens in the Little John faunal assemblage collected between 2003 and 2013 – 337 bones were not available for her study and are being examined in 2014 which will alter in some ways her preliminary conclusions presented here.

Besides taxonomical and skeletal element classification, her analysis included sorting the collection into size classes in order to measure degree of fragmentation, measurement of shaft circumference following Bunn (1983), assessment of fracture freshness following Outram (2001), examination of elements greater than 30 mm for evidence of cut marks, scraping marks, polish, and burning attributable to human behavior, and presence and degree of weathering, abrasion, black deposits, gnawing marks, and root etching. The integration of Bourgeon’s analysis with that undertaken previously by Yesner, Hutchinson, and Easton is underway but not yet complete, however it can be said that while there is some evident disagreement on specific specimens in terms of taxonomic status or burned versus “black deposits”, we are in agreement with the overall thrust of her statistical results. Here I present a short summary of Bourgeon's major findings, along with some of my own observations.

Table 18. Completeness Index of Sampled Fauna, KdVo6 (after Bourgeon 2013)

Completeness	Number	%
1 = 0 to 1/4	2155	95.9
2 = 1/4 to 1/2	46	2.0
3 = 1/2 to 3/4	22	1.0
4 = 3/4 to 1	13	0.6
5 = no damage	10	0.4
Total	**2246**	**100**

The Completeness Index presented above measured the degree of fragmentation of the specimens by 25% increments – over 95% of the specimens examined were fragmented to less than ¼ of the entire element. This high degree of fragmentation is further illustrated by the classification of the size of the specimens presented in the table below, in which 87% of the material is smaller than 30 mm.

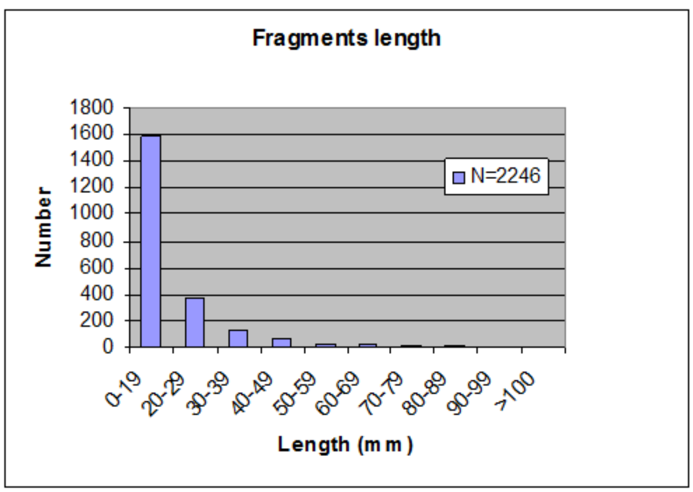


Figure 48. Maximum Length of Sampled Fauna, KdVo6 (after Bourgeon 2013)

Although I am in agreement with the overall trend represented in these figures I would note that the fragment lengths are somewhat skewed due to the inclusion of smaller elements which are by their nature short in length, such as teeth and small mammal remains. Further refinement of this data set is underway. Nevertheless, it is clear that the assemblage is highly fragmented. The potential cause of this is variable, including weathering, trampling, or sediment movement, but could also reflect human reduction of the elements for exploitation of grease and marrow (Bunn 1983).

Table 19. Shaft Circumference Index of Sampled Fauna, KdVo6 (after Bourgeon 2013)

Shaft Circumference	Number	%
<1/2	69	98.6
>1/2	0	0
Complete	1	1.4
Total	**70**	**100**

This is further reflected in the Shaft Circumference Index presented in the table above, in which long bone specimens greater than 30 mm were categorized into classes of less than one half of the circumference of the shaft present, more than one half, and complete. Of the 70 fragments examined, 69 had less than one half of the shaft present and only one is complete. Inclusion of the remaining unexamined specimens will change these results since a number of them also have complete shafts present but, again, the overall trend will be sustained. Bunn (1983) has argued that a high level of diaphyseal fragmentation is attributable to human action since carnivore damage to long bone shafts is typically minimal, usually leaving the long bone either complete or with more than half of the circumference present.

Bourgeon also calculated a Freshness Fracture Index for shaft fragments greater than 30 mm following Outram (2001). The table below shows the results of her observations on sixty-five specimens in which scores of 0 – 2 are fresh fractures, 4 – 6 are dry fractures, and 3 present both fresh and dry fractures.

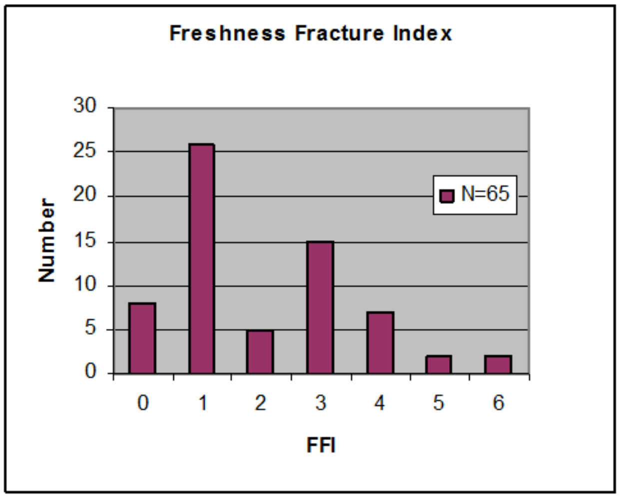


Figure 49. Freshness Fracture Index of Sampled Fauna, KdVo6 (after Bourgeon 2013)

The majority (60%) of the bones exhibited fresh fractures only; this rises to 83% when Class 3, representing both fresh and dry fracture evident, is included. Alternatively, 17% of the sample exhibited only dry fracture, which rises to 40% when the Class 3 specimens are included. Generally speaking, high levels of freshly fractured long bones are associated with human breakage for marrow extraction; while these data generally point towards this conclusion the sample is small and the dry fracture percentages are not negligible. We might interpret these data as indicating both human fracturing of fresh long bones for marrow extraction or tool production and then subsequent dry fracturing of the broken bones by other post-depositional taphonomic processes.

Bourgeon examined all specimens greater than 30 mm in length under a stereomicroscope (4x-1,6x), recording weathering, abrasion, black deposits, and gnawing marks on 285 specimens; her results are presented in the table below. Once again cautioning that her observations are not entirely in agreement with previous assessments by Yesner, Hutchinson, and Easton (nor, I would point out, are these three in entire agreement either), we do agree on the general trends. Our most significant disagreement with these data is the degree of burning evident in the assemblage; Bourgeon assesses this much lower than previous analysts, choosing instead to assign many to her category of "black deposits", although she herself admits that "for the most affected fragments, it is difficult to distinguish between black deposits and burnt bone, which could only be resolved through chemical analysis" (Bourgeon 2013:4).

Table 20. Observed Taphonomy of Sampled Fauna, KdVo6 (after Bourgeon 2013)

Taphonomic Process	Observed Degree	Number	Percent
Weathering	0	13	4.71
Scale of 0	1	107	38.77
(none) to 5	2	95	34.42
(highly)	3	61	22.10
	Total	276	100.00
Roots	0	208	72.98
0= None 1=< ¼	1	33	11.58
2=1/4-1/2	2	12	4.21
3=1/2-3/4	3	24	8.42
4=3/4-<1	4	7	2.46
5=complete	5	1	0.35
	Total	285	100.00
Abrasion	0	87	30.53
0=No	1	198	69.47
1=Yes	Total	285	100.00
Black deposit	0	23	8.07
0=None	1	65	22.81
1=< ¼	2	145	50.88
2=1/4-1/2	3	49	17.19
3=1/2-3/4	4	3	1.05
4=3/4-<1	5	0	0.00
5=complete	Total	285	100.00
Rodents	0	284	99.65
0=No	1	1	0.35
1=Yes	Total	285	100.00
Gnawing	No	207	72.63
	Maybe	61	21.40
	Yes	17	5.96
	Total	285	100.00

With this in mind, Bourgeon observed that 95% of 278 specimens exhibited a low to medium degree of Weathering and 5% no evidence of Weathering at all. Of 285 specimens, 73% did not exhibit Root Etching, and of those that did only 11% held root marks over more than ¼ of their surface. Bourgeon's measurement of Abrasion was simply Present or Absent, and her orientation was to attribute this characteristic to trampling; our previous measurements of this feature is orientated to viewing it as a proxy for exposure to blowing loess and snow. Both reflect time at surface prior to sedimentary deposition however, as do the degrees of weathering and root etching. Bourgeon observed some degree of Abrasion on 69% of 285 specimens and no apparent abrasion on the remaining 31%.

Using these three taphonomic characteristics as a proxy measurement of surface exposure prior to being buried[22] the data seems to suggest that most of the assemblage was buried fairly quickly after their deposit upon the surface; weathering is present but not extreme, root etching from lying on the surface mat is low, and abrasion, while present and high, could be accounted for by blowing loess or snow.[23] This suggestion is further buttressed by low taphonomic indications of gnawing, which Bourgeon separated into rodent (1 specimen of 285) and non-human carnivore damage. Only 17 (6%) of the 285 specimens examined exhibited clear carnivore gnawing, while a further 61 (21%) had marks that might be attributed to carnivore gnawing, however no indication of carnivore chewing was observed on the vast majority of the specimens examined (n=207 / 73%). Altogether the evidence suggests fairly rapid entrainment within sediments for the majority of the assemblage.

As previously mentioned, Bourgeon's assessment of "burnt" bone versus bone with "black deposits" is an approach that results in a different assessment of the burnt nature of the assemblage. Her assessment of 1,268 examined specimens is presented in the table below which maintains that nearly 95% of the examined assemblage was not burned. On this matter I disagree and Hutchinson and Easton, in consultation with both Bourgeon and Yesner, are re-examining the assemblage to resolve this disagreement.

[22] Although we are aware that both indicators of weathering and abrasion may also be caused by geochemical erosion after burial – a subject we will take up in more detail after further analysis of the assemblage.

[23] Dick Reger helpfully brought to my attention that the hardness of ice increases inversely as the air tempeture drops; at freezing it has a Moh's hardness of 2, at -40° a hardness of 4, and at -50° + a hardness of 6 (see Blackwelder 1940).

Table 21. Evidence of Burning of Sampled Fauna, KdVo6 (after Bourgeon)

Burning	Number	Percent
0 (not burnt)	1197	94.4
1	1	0.1
2	40	3.2
3 (carbonized)	8	0.6
4	2	0.2
5	6	0.5
6 (calcined)	14	1.1
Total	**1268**	**100.0**

On the other hand all analysts agree that traces of human activity on the assemblage in the form of cutting or scraping marks are rare. Bourgeon's examination of 1,348 specimens found that only 17 (1.3%) showed definitive evidence of human modification in the form of cut marks, scraping marks, or polished use wear as a tool. Importantly, some of the specimens not included in her analysis do bear cultural evidence, including most of the bone tools recognized by previous analysts; however, their inclusion will not change her results in any statistically significant fashion.

Table 22. Observed Cultural Modification of Sampled Fauna, KdVo6 (after Bourgeon 2013)

Cultural	NR	NR%
Cutmarks	9	0.7
Scraping	2	0.1
Industry	6	0.4
Total	**17**	1.3
N=	1348	100,0

Bourgeon notes that experienced butchers leave few traces of their de-fleshing on bones, a position I concur with having examined numerous moose bones after their de-fleshing ethnographically.

An interesting additional ethnographic note should be made here. When apprised of the taphonomic work being undertaken on the assemblage in the field in the summer of 2012, local Upper Tanana cultural expert David Johnny noted that when he was young he often saw his father and others gnaw on the epiphyses of bones to extract the grease of the spongy bone. Given this fact, teeth marks attributed to other-than-human carnivores could conceivably be caused by human carnivores and might also account for the high number of small pieces of cancellous bones in the assemblage.

Bourgeon concludes her 2013 analysis with the observation that while culturally derived markings on the examined fauna remains is rare this is not an entirely unexpected condition given highly experienced butchers. Furthermore, the assemblage shows indications of cultural modification in terms of long bone shaft fragmentation and fresh fracture indices following Bunn (1983) and Outram (2001). She also observed a high degree of fragmentation of cancellous bone also attributable to breakage and boiling by humans to extract grease and marrow.

This assessment is confounded by additional taphonomic processes that may mask or erase cultural signatures, including weathering that has affected most of the assemblage and abrasion due to geochemical and sedimentary transport processes. Despite these factors she notes that based on her preliminary examination of other assemblages, the Little John assemblage is more like that found at the cultural levels of the Broken Mammoth and Mead sites and less like that of the Blue Fish Caves.

SUMMARY OF FEATURES FROM THE LITTLE JOHN SITE, 2013

Table 23. Inventory of Recorded Features and Associations, KdVo6 – 2013

Inventory of Recorded Features and Associations, KdVo6 - 2013							
Feature #	**Nature**	**Unit/Quad**	**Level**	**Depth BD cm**	**Date**	**Level Plan #**	**Comments**
Fe 2013-01	Wood Plank	N0W26 N0W27 S0W26 S0W27	O/A	20		L 2013-01	Plank discarded
Fe 2013-02	Historic Material	N07E06	O/A – B1	11 - 20		L 2013-21	A#s 4178-92, Backfilled Test Pit in S Quads
Fe 2013-03	Historic Material	N16W18 N16W19 N17W18 N17W19	O/A	10 - 30	15/06	L 2013-09	A#s 4208-12, 4220, 4225-27
Fe 2013-04	Hearth	N16W18 N16W19 N17W18 N17W19	B	20 - 40	19/06	L2013-11	100 CPA/FAR, abrader, split cobbles, hammer stones
Fe 2013-05	Hearth	N17W13 18W13	PC2-P3	86 - 89	6/07	L 2013-17 & 18	Biface, Flake, Bone Fragments
Fe 2013-06	Hearth	S04W25	B2	37 – 43		??	Multiple flakes, flake core, microblade
Fe 2013-07	Hearth	N17W16 N18W16	PC3-P4	80 – 85		L 2013-??	Continues Fe 2011-14
Fe 2013-08	Hearth	N16W18 N16W19 N17W18 N17W19	PC3-P4	70 - 90		L 2013-15 & 16	36 CPA/FAR, Multiple Bone Fragments

Fourteen archaeological features were recorded in the course of excavations in 2013; they are summarized in the Table above. Here we provide examples of several of these features; a full Inventory, Level Plans, and photographs of recorded features is provided in the print and electronic appendices.

Figure 50. Burned Paper with Mechanical Type, Feature 2013-02, KdVo6 2013.

Feature 2013-02 is a concentration of Historic artifacts recovered from the O/A-B1 strata of Unit N07E06; field unit notes and level plans erroneously identify a hearth feature in the southern quads of this unit when it was in fact a backfilled Test Pit #31 from 2003.

Table 24. Historic Artifacts Associated with Feature 2013-02, KdVo6 2013.

Historic Artifact Concentration Associated with Feature 2013-02, N07E06, KdVo6 2013.			
Artefact Number	**Label**	**Segment**	**Total**
4178	historic - glass fragment	melted	1
4179	historic - nail, round	complete	5
4180	historic - tin can fragments	broken	4
4181	**historic - trunk corner gusset**	**complete**	**1**
4182	historic - bottle cap	complete	2
4183	historic - glass fragment	melted	1
4184	**historic - trunk hasp**	**complete**	**2**
4185	historic - glass fragment	melted	1
4186	**historic - trunk hasp**	**complete**	**1**
4187	**historic - metal rivet**	**complete**	
4188	**historic - trunk corner gusset**	**complete**	**1**
4189	historic - nail, round	complete	1
4190	**historic - small punched disk**	**complete**	**1**
4191	**historic - burned fabric**	**broken**	**4**
4192	**historic - burned wood fragments**	**broken**	**6**
4298	**historic - trunk hasp**	**complete**	**1**

Figure 51. KdVo6:4184a & b, Trunk or Suitcase Hasp, N07E06 - O/A.

As highlighted in the Table above, at least nine of the fifteen artifacts are from the burned remains of a small steamer trunk or suitcase, as evidenced by the metal hasps, lock, and gussets. The three melted glass fragments may be related to this incident as well. Fabric covered steamer trunks were purchased by Yukon and Alaskan natives for storage of personal items and were often burned with their contents after the death of their owner. On the other hand, the remains may be related to our posited short term occupation of the site by military or civilian personnel during the building of the Alaska Highway in 1942-43.

Figure 52. KdVo6:4181, Trunk or Suitcase Gusset; KdVo6:4191, Burned Fabric, N07E06 - O/A.

Figure 53. Historic Steamer Trunk; note hasp and lock structure.

Table 25. Historic Artifact Concentration Associated with Feature 2013-03, N16 W18/W19-N17 W18/W19, KdVo6 2013.

Historic Artifact Concentration Associated with Feature 2013-03, N16 W18/W19-N17 W18/W19, KdVo6 2013.			
Artefact Number	**Label**	**Segment**	**Total**
4208	bottle cap – Molson Canadian logo	complete	1
4209	tire valve cover	complete	1
4210	bottle cap	complete	1
4211	negative film strip	complete	2
4212	bottle cap	broken	1

4220	bottle cap	complete	1
4225	bottle cap	complete	1
4226	bottle cap – Coca Cola logo	complete	1
4227	bottle cap	complete	1

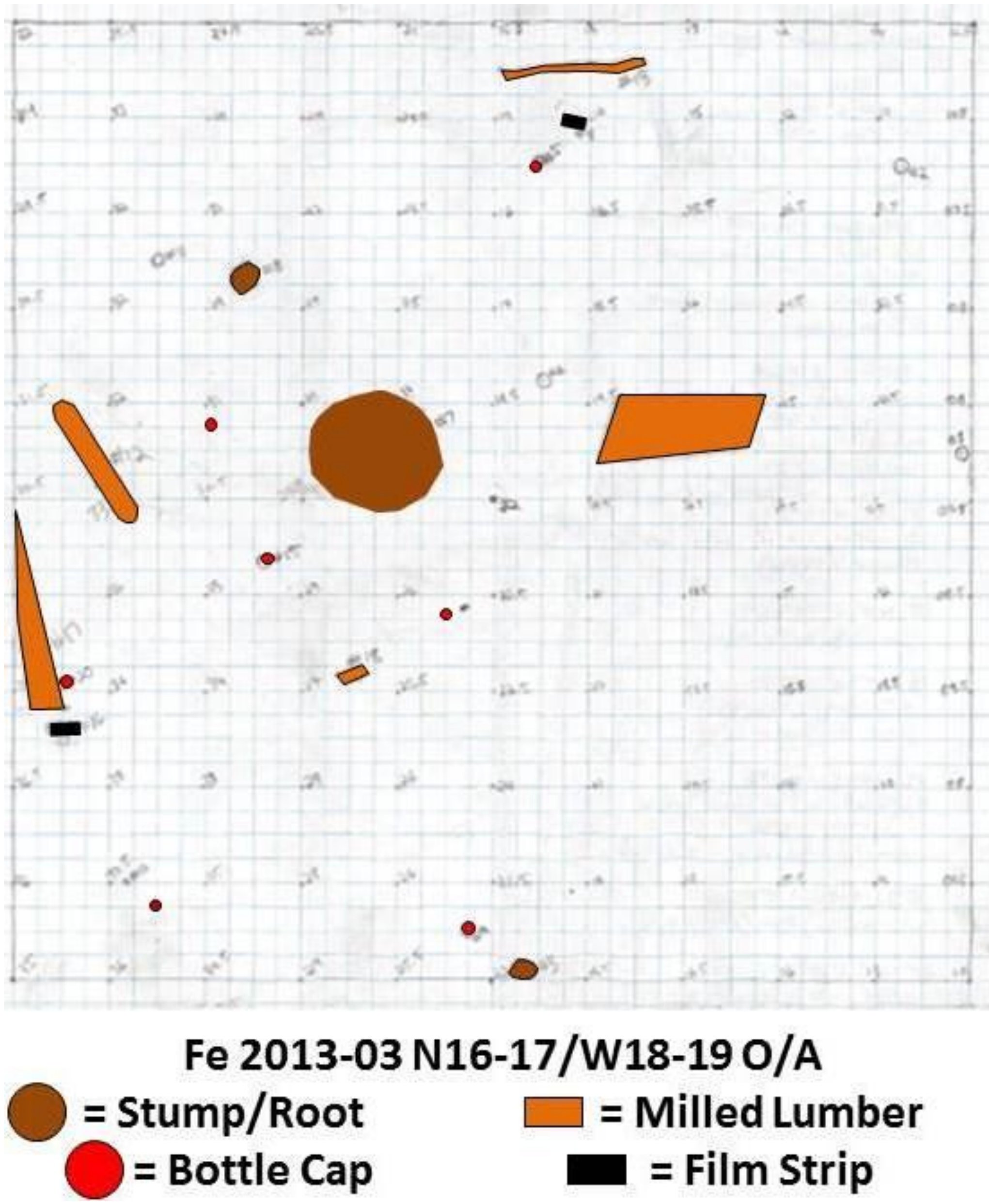


Figure 54. Level Plan, Feature 2013-03, Concentration of Historic Remains, KdVo6 2013.

A second concentration of Historic materials defines **Feature 2013-03** in the upper O/A levels of the two by two Units N16 W18/W19 and N17 W18/19 as detailed in the Table above. The presence of the bottle caps of both Molson's Canadian and Coca Cola brands suggests a relatively recent occupation episode**.** The tire valve cover is of a size congruent with a bicycle tire. Elder David Johnny recalls that both William Peters and Jimmy Enoch had bicycles in the 1950s and early 1960s and that they would use them to ride from Snag to the borderlands along the highway. Unfortunately the negative film strip holds no residual image.

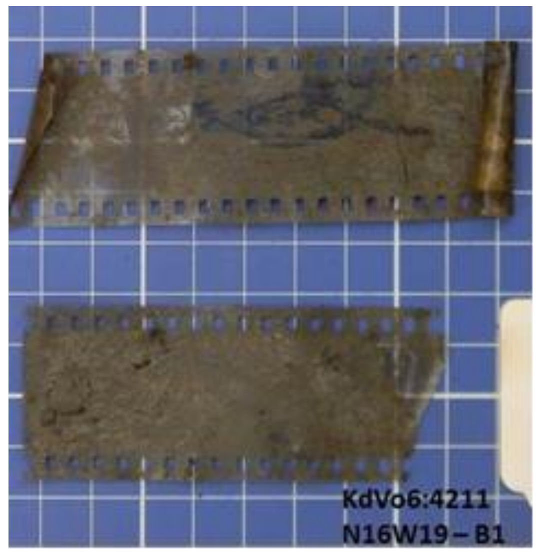


Figure 55. KdVo6:4209 (Bicycle?) Tire Valve Cover & KdVo6:4211, 35 mm Film Strips, Feature 2013-03.

Two later Holocene prehistoric Hearth Features were documented at KdVo6 in 2013. One of these, **Feature 2013-04** is possibly an extension or at least a contemporary of the large B stratum hearth previously documented as **Features 2012-06 – 07** in our 2012 Site Report which lay a meter to the northeast. As discussed above, this 2012 feature has been dated by AMS at circa 2,260 (+/- 240) calibrated years before present. As summarized in the Table above, a large amount of Cobbles, Pebbles, and Fire Altered Rock (n = 60, discussed in more detail below), five Hammer Stones, four Edge Modified Split Cobbles, and an Abrading stone are found in association with the feature; no bones were found associated with the feature.

Figure 56. Feature 2013-04, Hearth with Associated Cobbles, Pebbles, & Fire Altered Rocks and Artifacts, Units N16-W18/19 and N17-W18/19. L: Top of Feature. R: Bottom of Feature. View to North.

Table 26. Artifacts Associated with Feature 2013-04, B Hearth, N16 W18/W19 – N17 W18/W19, KdVo6 2013.

Artifacts Associated with Feature 2013-04, B Hearth, N16 W18/W19 – N17 W18/W19, KdVo6 2013							
A #	Sum Type	Unit	Level	DBD cm	DBS cm	Level	Total
4252	CPA	N16 W18	B1			B1	8
4253	CPA	N16 W18	B1			B1	10
4254	FAR	N16 W18	B1			B1	4
4255	FAR	N16 W18	B1			B1	1
4251	Scraper-abrader	N16 W18	B1			B1	1
4243	CPA	N16 W19	B/Colluvium			B1	2
4244	FAR	N16 W19	B/Colluvium			B1	4
4245	FAR	N16 W19	loess	37.5	15.5	B1	1
4236	MCP-SC	N16 W19	B1			B1	1
4242	MCP-SC	N16 W19	B1/Colluvium			B1	2
4237	CPA	N16 W19	B2	65	43	B2	14
4240	CPA	N16 W19	B2	65	43	B2	7
4241	CPA	N16 W19	B2	38	16	B2	3
4238	MCP-HS	N16 W19	B2	65	43	B2	1
4239	MCP-HS	N16 W19	B2	62	43	B2	1
4249	MCP-HS	N16 W19	B2	67	45	B2	1
4250	MCP-SC	N16 W19	B2	63	41	B2	1
4263	CPA	N17 W18	B1	22	5	B1	3
4264	CPA	N17 W18	B1			B1	3
4223	MCP-HS	N17 W18	B1/Loess			B1	1
4259	MCP-HS	N17 W18	B1	27	5	B1	1
						Total	70

Feature 2013-06 is a portion of a diffuse Hearth Feature in the B1 stratum in the Western Quadrants of Unit S04W25. Four Fire Altered Rocks, an Edge Modified Flake, and several pieces of Debitage are associated with what appears to be a Late Prehistoric occurrence.

Figure 57. Surface of Feature 2013-06, Diffuse Hearth Area, S04W25 - B1.

SUMMARY DESCRIPTION OF SELECTED LITHIC ARTIFACTS FROM THE LITTLE JOHN SITE, 2013

Table 27. Summary of Recovered Artifacts and Percentile Distribution KdVo6 - 2013.

2013 Summary of Recovered Artifacts				
Artifact Type	**Total**	**% Total**	**% Lithic Tools**	**% Total Lithics**
Biface	3	0.7	5.0	1.5
Blade	2	0.5	3.3	1.0
Scraper	2	0.5	3.3	1.0
Burin Spall	1	0.2	1.7	0.5
Microblade	8	2.0	13.3	4.0
EMF	21	4.9	35.0	10.6
MCP	23	5.4	38.3	11.6
Total Lithic Tools	**60**	**14.1**	**99.9**	**30.2**
MB Core Tablet	1	0.2		0.5
Flake Core	1	0.2		0.5
Debitage	136	32.1		68.8
Total Lithics	**198**	**46.6**		**100**
Modified Bone	5	1.2		
CPA	130	30.6		
FAR	32	7.6		
Historic	59	13.9		
Total Catalogued	**424**	**100**		
EMF = Edge Modified Flake, MCP = Modified Cobble-Pebble, CPA = Cobble-Pebble in Association, FAR = Fire Altered Rock. Percentages are rounded up one decimal.				

This section provides summary descriptions of a selection of the major formed artifacts recovered at the Little John site in 2013. A total of 360 artefacts were recovered in 2013 and ordered into 225 new Catalogue Numbers. An uncatalogued bag of 64 artifacts from Unit N03W04 excavated in 2010 organized into 22 new catalogue numbers (KdVo6:4150 to 4170 inclusive and 4233) is also included in our 2013 Catalogue, accounting for a total of 247 new KdVo-6 catalogue numbers containing 424 new artifacts (KdVo6:4070 through 4318 inclusive). The previously overlooked artifacts are included in our more detailed artifact descriptions and summaries below and the attached Print and Electronic Artifact Appendices.

The majority of the recovered artifacts represent prehistoric aboriginal technology; Historic artifacts were only 14% (n = 59) of the assemblage. Lithic Tools made up 14% (n = 60) of the total, while associated Debitage related to the creation or curation of these tools accounted for nearly 47% (n = 138) of the assemblage. Five Bones, all from the Late Pleistocene 2nd Paleosol of the Paleosol Complex, have been given artifact numbers based on the observation of indicators of additional use beyond butchering and consumption (discussed below). One hundred and thirty cobbles and pebbles (c. 31%) were collected in direct association with other bones, artifacts, hearth features, or concentrations; although they bear little or no indication of direct cultural modification on their surfaces, their associations and concentration indicate human transport and use in the course of occupation of the stratum they were found in. Fire Altered or Fire Cracked Rock make up the remainder of the 2013 assemblage (n = 32 - 7.6%).

Table 28. Summary of Recovered Artifacts by Type and Stratum, KdVo6-2013

2013 KdVo6 Catalogued Artifact Distribution by Type and Stratum												
Level / **Artifact Type**	**OA**	**B1**	**Ash**	**B2**	**B2 L**	**WL L**	**L a PC**	**PC 1 - P2**	**PC 2 – P3**	**L b PC 2**	**PC 3 - P4**	**Total**
Biface					1				1	1		3
Blade						2						2
Scraper		1		1								2
Burin Spall				1								1
Microblade				5	2	1						8
EMF		1	1	10	2	5			1		1	21
MCP		8		10			1		3		1	23
MB Core Tablet				1								1
Flake Core				1								1
Debitage	1	4	4	97	7	12			11			136
CPA		59		28				1	40		2	130
FAR		19		3		1		3	4		2	32
Modified Bone									5			5
Historic	54	5										59
Totals	**55**	**97**	**5**	**157**	**12**	**21**	**1**	**4**	**65**	**1**	**6**	**424**
Percentage	**13**	**23**	**1.2**	**37**	**3**	**5**	**.25**	**1**	**15**	**.25**	**1.4**	**100.1**

EMF = Edge Modified Flake, MCP = Modified Cobble-Pebble, CPA = Cobble-Pebble in Association, FAR = Fire Altered Rock.

Levels: OA = Surface/Humic, B1= Brunisol below Humic and Above Ash, Ash = White River Tephra, B2 = Brunisol below Ash, B2-L = Lowest B2 contact with Loess below, WL L = West Lobe Loess, L a PC = Massive Loess with Colluvium above the Paleosol Complex, East Lobe, P1 = Paleosol Stringer within L a PC above Paleosol Complex, PC 1 – P2 = 1st Paleosol within Paleosol

Complex, PC2 – P3 = 2nd Paleosol within Paleosol Complex, L b PC 2 = Loess below PC2 and above PC3, PC3-P4 = 3rd Paleosol within Paleosol Complex.

The Table above provides a summary of recovered artifacts by type and stratum. Late Prehistoric material (post 1200 ybp) make up 24% (n = 102) of the assemblage, while Middle Prehistoric / Northern Archaic materials represent the largest component accounting for 37% (n = 157) of the 2013 assemblage. In the West Lobe, early Holocene / Late Pleistocene strata (B2/L and WL L combined), 33 artifacts (8% of the total assemblage) were recovered, including a complete leaf-shaped Bipoint and a large Chert Blade. In the East Lobe, 76 artifacts (18% of the total assemblage) were recovered from the Late Pleistocene Paleosol Complex, with 65 of these coming from the well-defined 2nd Paleosol of the Paleosol Complex (also designated P3 based on the presence of a isolated Paleosol stringer (P1) above the Paleosol Complex proper. The majority of this material were comprised of concentrated cobbles, pebbles, and fire altered rock (n = 44); their cultural designation is buttressed by their association with the remaining artifacts (which included a complete large Biface, small Biface fragment, a variety of Flakes, five pieces of modified bone and other bone fragments).

Raw Material Analysis - Visual Morphology of the 2013 Collection

A variety of lithic raw materials were used in the manufacture of the recovered artifacts. The Table below provides the distribution of lithic raw material by major stratigraphic levels present at the site from which the artifacts were recovered. The table does not include cobbles and pebbles collected because of their association with other cultural material or fire altered or fire cracked rock – the raw material of these artifact classes are presented in a separate table below in their sectional descriptions.

Considering the data in the Table below, Balsaltic material make up 60% (n = 120) of the artifacts, Cherts 25% (n = 48), Obsidian 14% (n = 28), with Quartz and Sandstone each accounting for 0.5% or 1 artifact each.

Ninety percent of the Basaltic material (50% the total lithics, n = 99) is classified as Grey in colour and, based on Jordan Handley's portable X-Ray Fluorescence analysis discussed below and elsewhere (Handley 2013, Handley et al. n.d.), it seems likely that the majority of this material will prove to be within the Andesite class of Basalts. The two Brown Balsaltics are more accurately classified as Ryolite, while the remaining 19 Black Basaltics are likely true Basalts.

Table 29. Distribution of Raw Material of Total Lithics by Level, KdVo6 2013.

Distribution of Raw Material of Total Lithics by Level, KdVo6 2013

Does Not Include Cobbles and Pebbles in Association or Fire Altered Rock

Level RM/C	OA	B1	Ash	B2	B2 L	WL L	L a PC	PC 2 - P3	L b PC 2	PC 3 - P4	Tot	%
BaBl		1	2	9		5		1	1		**19**	**9.6**
BaBr				1	1						**2**	**1.01**
BaGy		11	2	69	6	4	1	4		2	**99**	**50.00**
ChBl				7		1					**8**	**4.04**
ChGrn				2							**2**	**1.01**
ChGy				20	1	4		1			**26**	**13.13**
ChGyGrn				1							**1**	**0.50**
ChGyRd						5					**5**	**2.52**
JaOr				1							**1**	**0.50**
JaRd				1							**1**	**0.50**
JaRdBr				2	2						**4**	**2.02**
ObBl		2		6	2			9			**19**	**9.59**
ObGy	1			6		1					**8**	**4.04**
ObGyGrn				1							**1**	**0.50**
QuWh				1							**1**	**0.50**
SaGy								1			**1**	**0.50**
Total	**1**	**14**	**4**	**127**	**12**	**20**	**1**	**16**	**1**	**2**	**198**	**99.96**
%	**0.50**	**7.07**	**2.02**	**64.14**	**6.06**	**10.10**	**0.50**	**8.08**	**0.50**	**1.01**		**99.98**

Raw Material Codes - Ba = Basaltic / C = Chert / Grn = Greenstone / J = Jasper / Ob = Obsidian

Colour Codes - Bl = Black / Br = Brown / Gr = Green / Gy = Grey / GyB = Banded Grey and Black / Or = Orange / Rd = Red / W = White / Yl = Yellow

The majority of Balsaltic artifacts consisted of Debitage (n = 88 of 120; 74 probable Andesite and 18 probable Basalt). The remaining Basaltic assemblage consists of 22 Modified Cobbles or Pebbles (21 made on probable Andesite and 1 on Basalt), 4 Edge Modified Flakes (2 each on probable Andesite and Basalt), 2 Bifaces (1 Basalt and 1 on Ryolite), 1 Scraper made on probable Andesite, and a Burin Spall and a Microblade, both made on probable Basalt. Not included in the Table are Basaltic Cobbles or Pebbles in Association with Cultural Material (CPA, n = 11), and Fire Altered Rock (n = 10).

Sixteen of these were of the probable Andesite subcategory, two of Basalt, and three of Ryolite.

The Chert category accounts for 25% of the Total Lithics and is dominated by a Grey Chert (26 of the 48 Chert specimens and 13% of the Total Lithics). Its highest occurrence is within the B2 stratum (n = 20). Tools made on this material from this stratum include four microblades (KdVo6:4162-64 and 4145), a Microblade Core Tablet (KdVo6:4170), and one Edge Modified Flake (KdVo6:4091); the remaining 11 pieces are Debitage. It is also present in the lower Early Holocene / Late Pleistocene levels as well (n = 6), including the large Blade recovered in N00W27 (KdVo6:4110 & 4111) and the Edge Modified Split Pebble from Unit N17W18 in the PC2-P3 stratum. Of the remaining 22 variously coloured Chert pieces, 14 are from the B2 stratum (one Microblade, two Edge Modified Flakes, and 11 pieces of Debitage) and 8 are from the Early Holocene / Late Pleistocene levels (B2 L (n = 2, both Microblades), WL L (n = 6, four Edge Modified Flakes and 2 pieces of Debitage). Curiously, similar to the 2012 catalogued material, it is not present in the Late Holocene levels, although integration with the entire Little John catalogue should be done to confirm this pattern across the entire site, an effort we hope to accomplish during our work in 2014-15.

Twenty-eight of the recovered artifacts were of obsidian; 23 pieces were Debitage, 4 were Edge Modified Flakes, and 1 was a Biface Fragment from the Late Pleistocene PC2-P3 stratum in Unit N16W19. Besides the Biface Fragment, another 8 pieces of Obsidian Debitage were recovered from this level in the adjoining units of this 2 x 2 meter excavation unit. Four Edge Modified Flakes are made on Obsidian, three from the B2 stratum and one from the B2/L interface in the West Lobe. The remaining Obsidian material consists of Debitage: three Late Prehistoric pieces in the O/A-B1 strata, 10 in the Middle Holocene B2 stratum, and two in the West Lobe Early Holocene / Late Pleistocene B2/L and WL L strata.

Finally, one Flake Fragment of Debitage made on Quartz was recovered in the B2 stratum and one of the Split Cobble Tools (KdVo6:4309) recovered from the PC 2- P3 stratum was made on Sandstone.

Spectral Elemental Analysis of Basaltic Materials from KdVo6

The technological analysis of lithic raw material used at the Little John site has been enhanced by Jordan Handley's undergraduate thesis work with Dr. Rudy Reimer/Yūmks at Simon Fraser University; we presented a copy of her 2013 thesis as an Appendix (Handley 2013) in our 2012 report submitted previously and will summarize and comment on this work here.

Basalt-like artifacts excavated from two 2 by 2 meter units and two 1 by 2 meter units from the East Lobe and the West Lobe of the site were chosen to provide a sample of 259 artifacts for analysis.[24] An additional 23 basaltic formed tools from across the site were included in the analysis. The sample was first categorized visually using three morphological attributes: grain size, texture, and Munsell colour, and then their geochemical signatures reflecting major and trace element composition were measured using portable X-ray fluorescence (pXRF) spectrometry using a Bruker AXS Tracer III-V portable XRF analyzer.

For this analysis, the instrument was equipped with a rhodium X-ray tube and silicon-based (SiPIN) detector. Analyses for this study utilized the instruments power setting of 40 keV and 15 UA with a 0.76 millimeter copper filter and a 0.0305 millimeter aluminum filter. Samples were emitted to the X-ray path for a 180 second live time count. Ten elements from the periodic table were measured and quantified; Manganese (Mn), Iron (Fe), Zinc (Zn) Gallium (Ga), Thorium (Th), Rubidium (Rb), Strontium (Sr), Yttrium (Yr), Zirconium (Zr), and Niobium (Nb). Peak intensities for these elements were calculated as ratios and converted to parts per million.

Shackley's (2001) protocols for reliable application and results were utilized. Only samples larger than 2.0 mm were included and smooth flat surfaces were utilized to the greatest degree possible to minimize surface effects. Many of the samples were prepared in an ultrasonic washing machine to remove patination and residual sediment prior to application of pXRF. The standards utilized for this analysis include, basalt (BAMAP01), rhyolite (PER01), and andesite (CHA01) held at the Simon Fraser University Archaeology Lab.

---

[24] Units used in Handley's analysis can be found in the accompanying Excel spreadsheet along with additional related data such as Artifact Numbers and Provenience by stratigraphic level.

Table 30. Visually Distinct Morphology of Analyzed Samples.

Visual Type	n=	Grain Size	Texture	Munsell Colour Code	Munsell Colour Name	Visually Determined Raw Material
1	94	F	A	5Y 2.5/1	Black	Basalt
2	111	F	A	5Y 2.5/1	Black	Basalt
3	6	M	A	5Y 2.5/1	Black	Basalt
4	9	VF	A	5Y 2.5/1	Black	Dacite
5	2	F	A	5Y 2.5/1	Black	Basalt
6	24	VF	A	5Y 2.5/1	Black	Basalt
7	7	VF	A	5Y 3/1	Dark Grey	Dacite
8	12	F	A	5Y 5/1	Grey	Basalt
9	34	F	A	5Y 4/1	Dark Grey	Basalt
10	6	M	A	2.5Y 4/1-4/2	Dark Grey to Dark Greyish Brown	Basalt
10.1	1	C	P	2.5Y 4/1-4/2	Dark Grey to Dark Greyish Brown	Gabbro
11	10	M	A	5Y 5/1-5/2	Grey-Olive Grey	Basalt
12	2	VF	A	5Y 3/2	Dark Olive Grey	?
13	4	F	A	5Y 4/2-5/2	Olive Grey	Basalt
14	6	VF	A	2.5 YR 2.5/1-4/1	Reddish Black-Dark Reddish Grey	?
15	1	VF	A	5YR 4/1	Dark Grey/Reddish Grey	?
16	1	M	A	2.5Y 5/2	Grey	Andesite
17	1	M	A	5Y 4/1 with 10R 4/2	Dark Grey with Weak Red	Basalt
18	1	VF	A	5Y 4/1	Dark Grey	Dacite
	332					
Grain Size Codes: VF = Very Fine / F = Fine / M = Medium / C = Coarse Texture Codes: A = Aphanitic / Ph = Phaneritic						

Visual analysis of sample morphology suggested 18 distinct source materials in the principal 263 Artifact Number sample assemblage, some which embraced two or more specimens catalogued as single lots (see the Table above). This was two times as many source distinctions than that generated by the pXRF analysis, suggesting that visual morphology alone is insufficient to classify non-vitreous igneous materials; i.e, the visual morphology of a specific source includes a range of visually discrete attributes that should be grouped together, rather than to separate them. A visual characteristic such as colour, for example, may suggest multiple groups, masking a more homogenous elemental structure among the source samples. The visual distinction of similarly sourced specimens might also be effected by the degree of patination and weathering of the sample. Finally, the samples underwent ultrasonic washing following the visual classification; methodologically this process should have preceded visual classification and might have resulted in fewer visual distinctions.

Despite these problems the visual classification did act as a reference for validity of the distinctiveness of the final group designations, which proved stronger for some source groups than others with several potentially discrete source materials identified in the pXRF analysis having some degree of visual uniformity. Four such groups are illustrated and described below.

1. Andesite Group A - visually characterized as a fine-grained, black andesite containing very small phenocrysts of quartz or feldspar plagioclase. This group had the most visually consistent and most distinctive pXRF signature. Formed artifacts made on this material include Type 1 and Type 2 Chindadn Points and large bifaces from the basal loess stratum of the West Lobe (c. 11,000 plus YBP) and later Holocene notched points of the Northern Archaic.

Figure 58. Formed Artifacts of Andesite Group A.

2. Basalt Group B – visually characterized as a fine-grained, dark grey-black basalt. Formed artifacts made on this material include later Holocene notched points and unifacial scrapers of the Northern Archaic.

Figure 59. Formed Artifacts of Basalt Group B.

Figure 60. Formed Artifacts of Basalt Group D.

3. Basalt Group D – visually characterized as a very fine-grained, black-dark grey basalt that is both visually and statistically distinctive. Formed artifacts made on

this material include microblade technology and a medial portion of a lanceolate biface from the Holocene B2 stratum and a large Blade tool from the West Lobe Loess stratum.

4. Rhyolite Group A – visually characterized as a very fine-grained dark grey to grey rhyolite. Formed artifacts made on this material include a Chindadn Type 2 triangular point associated with three radiocarbon dates that average c. 11,200 YBP and microblade technology.

5. **Figure 61. Formed Artifacts of Rhyolite Group A.**

Spectral data generated by the pXRF analyses was converted to parts per million for the 10 chosen elements[25] and Group delineation determined by Principal Component Analysis and explored by the aid of Bi-plots and Scatterplot matrices. More complete data related to these analyses can be found in Handley (2013); the figures below illustrate the primary grouping along with the eight proposed lithic groups.

[25] The ten elements were: Manganese (Mn), Iron (Fe), Zinc (Zn) Gallium (Ga), Thorium (Th), Rubidium (Rb), Strontium (Sr), Yttrium (Yr), Zirconium (Zr), and Niobium (Nb).

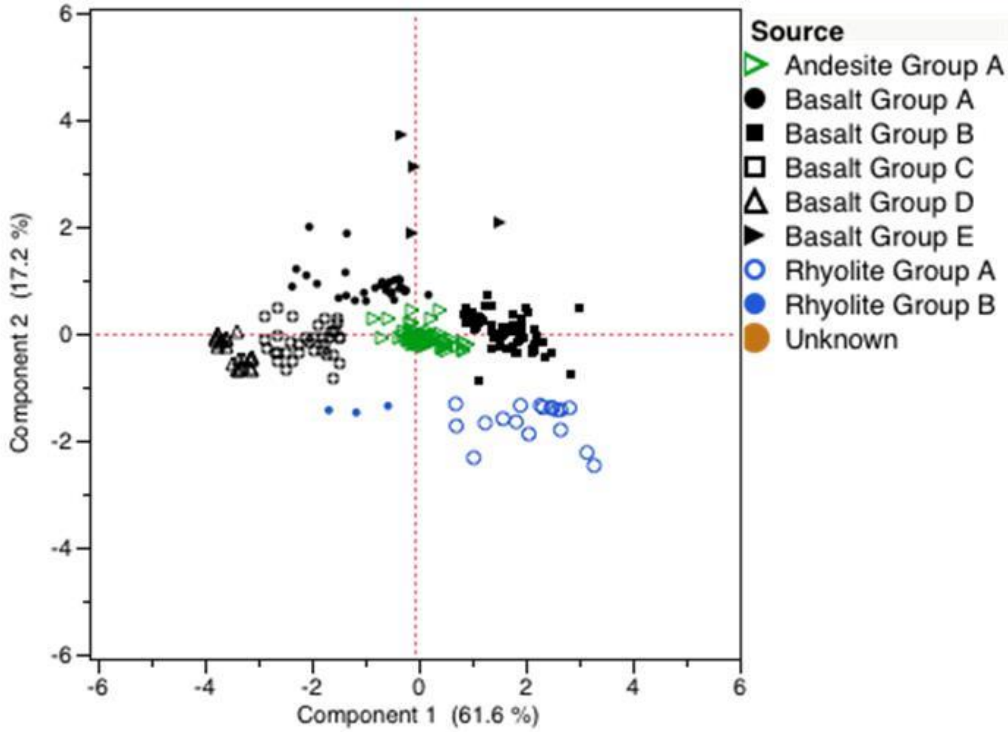


Figure 62. Principal Component Analysis Exhibiting Proposed Lithic Groups from Handley (2013:17).

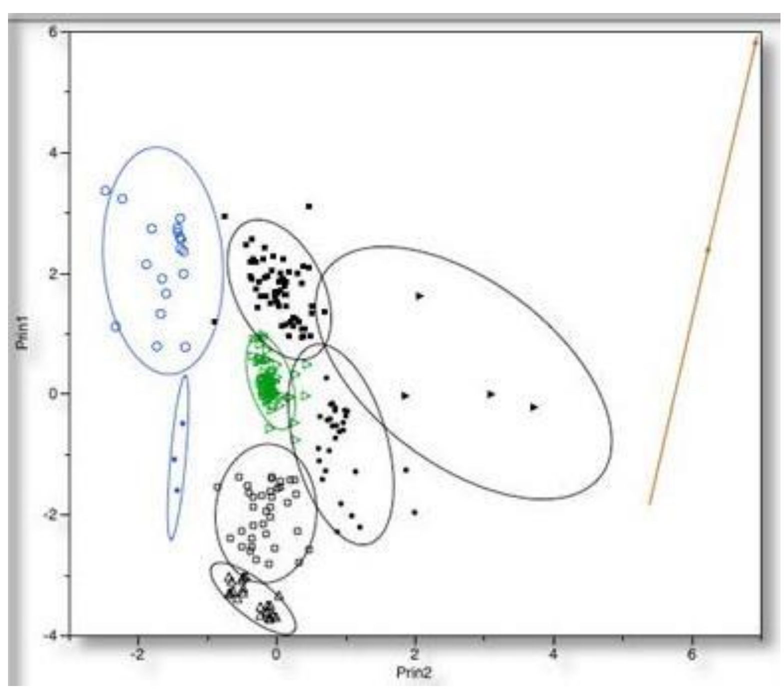


Figure 63. Bi-plot Demonstrating the Relationship between PC-1 and PC-2, from Handley (2013:20).

Andesite Group A is the most tightly clustered lithic group and is the most visually consistent group as well. It is a fine-grained, black andesite containing very small phenocrysts of quartz or feldspar plagioclase, and may be a basalt or basaltic-andesite; its designation as an andesite was based on mineralogical standards held at the Simon Fraser University Laboratory of Archaeology. As shown in the Table below, by most measures, it is also the most common group represented in the sample specimens reported on here, representing 36% of Flakes, 30% of the Formal Tools, and 36% of the total sample.[26] While there is nothing exceptional about the ratio of flakes to formal tools within this group, when its distribution through stratigraphic levels (roughly approximating Early, Middle, and Late Period occupations) is considered some interesting trends appear. The first is that of the 83 specimens assigned to the West Lobe Loess and Paleosol Complex strata (see Table below), 19 (23%) are assigned to Andesite Group A. In addition, 4 of the 7 formal tools made on this material were recovered in the Late Pleistocene horizons of the site, suggesting it may represent an important source material during the initial phases of occupation in the region (along with Basalt Group C, discussed below). Finally, and contrary to Basalt Group C, Andesite Group A continues, perhaps expanding, in importance at KdVo-6 into the Middle Prehistoric period. At n=78, it represents 38.6% of the 202 analyzed specimens within the B2 stratum.

Basalt Group A comprises about 12% (n=30) of the overall sample analyzed and, although described as a fine-grained, dark grey-black basalt, it has the highest degree of visual variation. The visual inconsistency may be due to variation in chemical weathering. In addition, this group could possibly be better classified as an andesitic basalt or a weathered andesite. Certainly, the repetitive overlap between Andesite Group A and Basalt Group A suggests that their differing geochemical signatures may be because they are the products of two volcanic flows from the same eruptive center, or even the same flow but subjected to different cooling rates or processes.

[26] Handley's data can be represented metrically in a number of ways since there was variation in total specimens depending on the particular analytical technique being applied and numbers of specimens within a debitage lot assigned a single Artifact Number. In this discussion we use the counts of the data set contained in *Chapter Four – Results* of Handley (2013).

Table 31. Counts, Percentages, and Standardized Residuals for Source Group and Artifact Type for a Selected Sample of Basaltics from KdVo6 (modified after Handley 2013:29).

Counts and Standardized Residuals for Source Group and Artifact Type					
			Artifact Type		
			Flake	**Formal Tool**	**Total**
Source Group	Andesite Group A	Count	100 / 36.1%	7 / 30.4%	**107 / 35.7%**
		Std. Residual	0.1	-0.4	
	Basalt Group A	Count	31 / 11.2%	3 / 13.0%	**34 / 11.3%**
		Std. Residual	0	0.2	
	Basalt Group B	Count	73 / 26.4%	9 / 39.1%	**82 / 27.3**
		Std. Residual	-0.3	1.1	
	Basalt Group C	Count	36 / 13.0%	0 / 0%	**36 / 12.0%**
		Std. Residual	0.5	-1.7	
	Basalt Group D	Count	16 / 5.8%	3 / 13.0%	**19 / 6.3%**
		Std. Residual	-0.4	1.3	
	Basalt Group E	Count	4 / 1.4%	0 / 0%	**4 / 1.3%**
		Std. Residual	0.2	-0.6	
	Rhyolite Group A	Count	17 / 6.1%	1 / 4.3%	**18 / 6.0%**
		Std. Residual	0.1	-0.3	
		Total Count	**277**	**23**	**300**
Note: Percentages are for Column Totals					

Basalt Group B is the second most frequent type within the sample, accounting for 82 of the 300 sample specimens (27.3%). It is a fine-grained, dark grey-black basalt with exceptional visual consistency. Twenty-six percent of the flakes sampled (n=73/277) and 39% of the analyzed formal tools (n=9/23) were made on this material. This material is fairly equally distributed across the site, but reaches its highest levels within the Middle Holocene B2 stratum.

Basalt Group C is the third most frequent type within the sample, accounting for 36 of the 300 sample specimens (12%). Visually it is a dark-grey, fine-grained basalt with multiple examples of olive gray samples, suggesting a high olivine content. All specimens within this group are flakes, none are formal tools, and most of the specimens occur in the East Lobe. Additionally contra Balsalt Group B there is a dramatic decrease in the occurrence of this material through time; 25 of the 36 specimens were recovered from the early West Lobe Loess and Paleosol levels and only 11 from the later Holocene B2 stratum.

Basalt Group D is a very fine-grained, black-dark grey basalt which is of high flaking quality in comparison with the other basaltics and was used to make a variety of formal tools, including microblades, macroblades, and bifaces. It is both visually and statistically distinctive from the rest of the proposed groups. It's most frequent occurrence is within the B2 stratum.

Table 32. Counts and Standardized Residuals for Basaltic Source Groups and Stratigraphic Level, KdVo6 (after Handley 2013).

Counts and Standardized Residuals for Source Group and Stratigraphic Level								
			Level					
			B1	B2	WL Loess	Paleosol Complex	WL L & PComplex	Total
Source Group	Andesite Group A	Count	2	***78***	***6***	13	19	99
		Std. Residual	-1.3	***1.4***	***-2.8***	1.1		
	Basalt Group A	Count	3	22	10	2	12	37
		Std. Residual	0.8	-0.6	1.3	-0.8		
	Basalt Group B	Count	3	63	11	3	14	80
		Std. Residual	-0.5	1.2	-0.9	-1.7		
	Basalt Group C	Count	4	***11***	***20***	5	25	40
		Std. Residual	1.4	***-3.1***	***4.8***	0.6		
	Basalt Group D	Count	2	14	2	2	4	20
		Std. Residual	1	0.1	-0.8	0		
	Basalt Group E	Count	1	1	***3***	1	4	6
		Std. Residual	1.3	-1.5	***1.8***	0.6		
	Rhyolite Group A	Count	0	13	2	3	5	18
		Std. Residual	-0.9	0.3	-0.7	1		
		Total Count	15	202	54	29		300
			Late Prehistoric	Middle Prehistoric	Late Pleistocene – Early Holocene		83	300
		Total Count	15	202	54	29		300

Basalt Group E is represented by only four specimens and its identification as a distinct group is tentative at best. Visually the specimens are quite variable; two are fined grained black, one is an olive grey and medium grained, and the final sample is very fine-grained and reddish grey.

As can be seen in the PCA and Bi-Plot figures above, **Rhyolite Groups A and B** present quite distinctive PCA signatures. Group A consists of 19 samples and is a very fine-grained, grey-dark to grey rhyolite, while Group B consists of only 3 samples and is a fine-grained, dark grey rhyolite. Its low occurrence at the site may well be a function of our sampling procedure that focused on visually choosing samples that held basaltic characteristics; it is notable to observe that its highest abundance is within the B2, low within the Early strata, and absent entirely in the late prehistoric period.

At present there is limited information on the geochemistry of basaltic flows in the borderlands region and so it is not possible to extend any of these data outside of the Little John site itself. Two prominent Basaltic exposures have been identified as potential sources for this material, one of which was explicitly identified as a source of “rock for old time tools” to Easton during ethnohistoric work in the region (Easton n.d.). We hope to be able to gain the resources and opportunity to visit and sample these potential sources in the future, although this will require financing for helicopter transport. In the meantime, Handley’s work has demonstrated the utility of the application of geochemical analyses to distinguish basaltic materials and identified a number of significant trends across the site and through time that bear further study.

Bifaces

Table 33. Raw Material and Metric Attributes of Bifaces, KdVo6-2013

Raw Material and Metric Attributes of Bifaces, KdVo6-2013									
Artefact Number	**Artifact Type**	**Unit**	**Sum Level**	**DBS cm**	**Sum RMC**	**Length mm**	**Width mm**	**Thick mm**	**Wght gm**
4131	point - bipoint / leaf-shaped	N03E04	B2 L	1316	BaBr	87	35	32	38
4214	biface fragment, expanding	N16 W19	PC 2 - P3	64	ObBl	10	19	3	0.5
4219	biface – knife	N17 W13	L b PC 2	84	BaBl	97	59.5	18.5	113

Two complete formed Bifaces and one Biface fragment were recovered at Little John in 2013. Their location and metrics are summarized in the Table above, while photographs and general descriptions follow.

Figure 64. KdVo6:4131, Leaf-shaped Biface, N03W04, B2/L.

\

Figure 65. KdVo6:4131 in situ, N03W04.

KdVo6: 4131 is a leaf-shaped bipointed Biface made on a thick rhyolite flake; the flake platform is prominent near the middle of the right lateral margin; the opposite margin is more heavily retouched, suggesting this was the working edge of a knife-like implement. It was recovered from Unit N03E04 on the high point of the site near the top of the contact between the base of the B2 and top of the Loess strata at about 25 cm below unit datum. Two edge modified flakes of grey chert (KdVo6:4130 and 4128, described below), and two pieces of debitage were recovered from the loess strata in this unit as well.

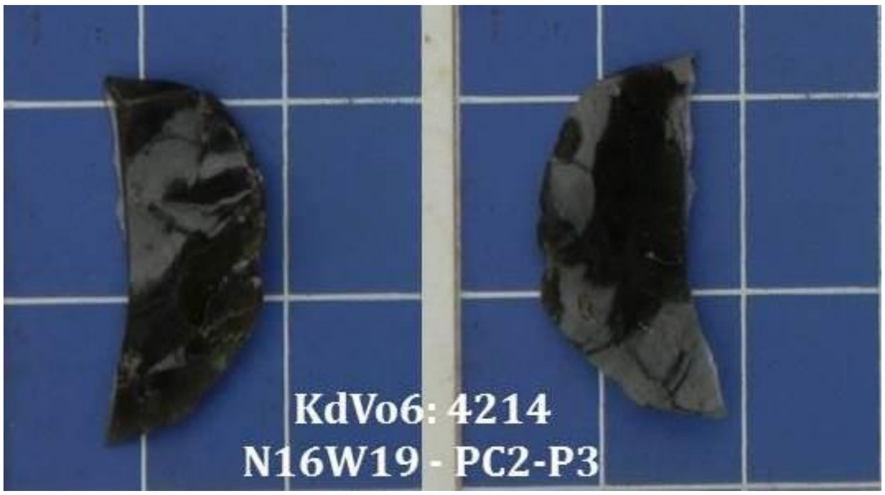


Figure 66. KdVo6:4214, Biface Fragment, N16W19 - PC2-P3.

KdVo6:4214 is a small (10 mm long and 19 mm wide) bifacially flaked piece of obsidian that may represent the broken edge or tip of a larger Biface Knife or Scraper tool. It was recovered from Unit N16W19 in the 2nd Paleosol of the Paleosol Complex (PC2 – P3) at a depth of 86 cm below unit datum (64 cm below surface).

KdVo6:4219 is a complete or nearly complete Biface made on a large flake of fine grained black basalt recovered from the Paleosol Complex along the southern margin of Unit N17W13 at a depth below surface of 84 cm. It was recovered from the base of a loess stratum below the second major paleosol (P2) and just above what appears to be the next paleosol (P3).

Figure 67. KdVo6:4219, Large Biface, P2/P3, N17W13.

The piece is broken transversely across one end but its overall shape suggests an ovate outline; we plan to excavate the contiguous units N16W13 and N17W14 in order to expose this level further and look for the missing portion. Flaking is invasive on the dorsal surface, with many of the fractures exhibiting step and hinge fracturing created in the course of attempting to thin the piece, while the ventral surface shows minimal invasive flaking. Unifacial retouch is present along most of the dorsal margins. Given its thickness it might be considered an Unfinished Blank, but its association with butchered fauna suggests its use as a cleaver or knife edge. Bracketing dates above (72 cm below surface on charred material of 9860 +/- 40 RCY) and below the biface (101 below surface on bone of 9970 +/- 40 RCY) and a third from an adjacent unit (84 cm below surface on charred material of 9890 +/- 40) showed no statistical difference and together provide a pooled mean date of 9918 +/- 21.5 RCY – 11,360 to 11,246 CAL BP.

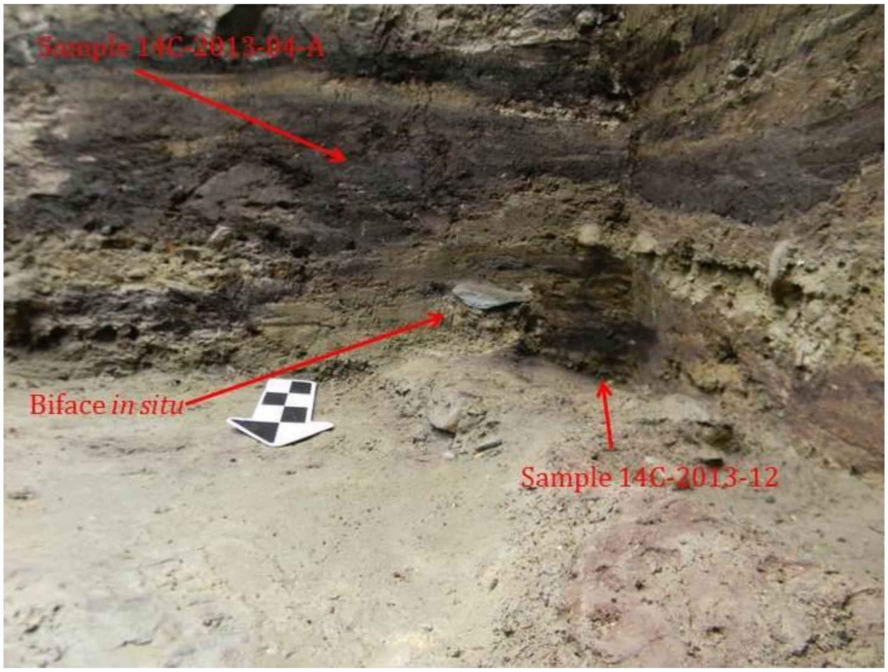


Figure 68. KdVo6: 4219 *in situ* with Radio-carbon Sample Locations, N17W13

Large Blades

Figure 69. KdVo6:4110 and 4111, N0027 - WL L.

Table 34. Raw Material and Metric Attributes of Blade Technology, KdVo6-2013.

Raw Material and Metric Attributes of Blade Technology, KdVo6-2013								
A #	**Artifact Type**	**Unit**	**Sum Level**	**Raw Mat**	**Leng**	**Wid**	**Thick**	**Wgt**
4110	Blade – distal – unifacial retouch	N00 W27	WL L	Chert - Grey	87.92	43.64	9.31	19.3
4111	Blade – proximal – unifacial retouch	N00 W27	B2 L	Chert - Grey	25.47	27.39	7.73	5.2

KdVo6:4110 and **KdVo6:4111** are distal and proximal Blade fragments made on Grey Chert that refit to form a complete broken Blade with one central arris. Both were recovered from Unit N00W27 about 10 cm from each other and are assigned to the West Lobe Loess level. The table above provides metric and other attributes of these specimens. Combined, the blade is edge modified along both margins and at the tip, more heavily along the right margin which has at least 4 dorsal retouch scars.

Figure 70. KdVo6:4110, Chert Blade Fragment in situ, N00W27 - B2 L. Note vertical inclination into B2.

Figure 71. KdVo6:2011 (L) and 2010 (R) showing proximity to each other and surrounding West Lobe Loess; N00W27 – B2 L.

The larger piece (KdVo6:4110) was recovered at N87 E30; it was vertically inclined along its left margin, extending from 36 to 40 cm below unit datum (16 to 20 cm below surface) in the B stratum, about 1 cm above the interface of the B stratum with the underlying Loess stratum. Its dorsal surface is heavily patinated. The smaller proximal piece was recovered at N83.5 E 10.5 at 47.5 cm below unit datum (27.5 cm below surface), partially in the West Lobe Loess and partially in the base of the overlying B2. It too was vertically inclined, though not as sharply as the larger piece. The fact that it bears no patina whatsoever suggests that it is in its original buried context. The recovery of four edge modified flakes (described below) made on similar grey chert from the West Lobe Loess stratum supports the assignment of this artifact to the West Lobe Loess stratum as well.

Scraper Technology

A #	Sum Type	Unit	Lev	DBD cm	DBS cm	Raw Mat	L	W	Th	Wgt
4138	End Scraper and Notch	S04W25	WL L	58	38	ChGy	36	17	7	3.1
4251	Abrader	N16W18	B2			BaBr	77	46	24	160.8

Two artifacts recovered at KdVo6 in 2013 can be placed into this tool category. The table above provides metric and other attributes of these specimens.

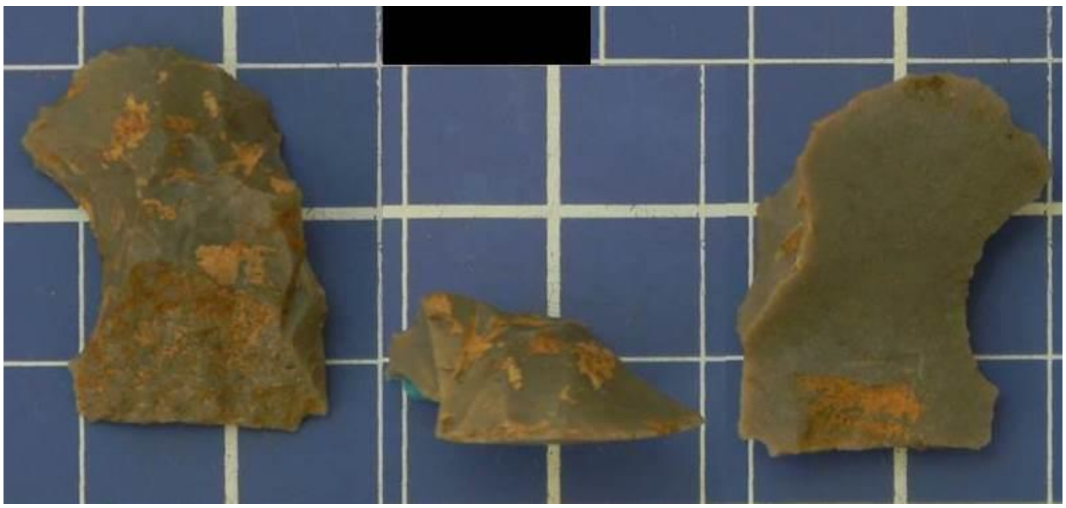


Figure 72. KdVo6:4138, End Scraper with Notch, S04W25 - B2.

KdVo6:4138 is a small End Scraper with a Notch made on a thick, keeled, light grey chert flake recovered from Unit S04W25 at 58 cm below unit datum (38 cm below surface) in the West Lobe Loess stratum. The chert is similar to that used to make the large Blade described above. stratum. It is 36 mm long, 17 mm wide, 7 mm thick, and weighs 3.1 grams. The notch on the left margin bears steep retouch and use wear while the distal end is acutely angled with retouch and use wear.

KdVo6:4251 is a large basaltic pebble Abrader recovered from Unit N16W18 in the B2 stratum. It is 77 mm long, 46 mm wide, 24 mm thick, and weighs 160.8 grams. The concavities along each margin bear cortex similar to the rest of the piece and thus are not the result of human shaping through pecking or grinding. The indented margins are typical of Late Prehistoric fishnet weights but the distal and proximal ends and one side are heavily abraded to a smooth finish presumably through extensive use as a hide working tool.

Figure 73. KdVo6:4241, Balsaltic Abrader, N16W18-B2

Burin Technology

A single retouched Burin Spall, presumably used as an engraving tool was recovered from our excavations at the Little John site in 2013.

Figure 74. KdVo6:4120, S04W25, B2

KdVo6:4120 is a Burin Spall made on fine grained basalt recovered from Unit S04W25 in the B2 stratum 25 cm below the surface. It is 12.73 mm long, 5.04 mm wide, 1.29 mm thick, and weighs 20.1 grams. Triangular in cross section, with a central arris that bifurcates at the distal end, it is retouched on this sharply angled distal margin and is edge modified along both margins (c.f Giddings 1956, Plate 3, p. 235).

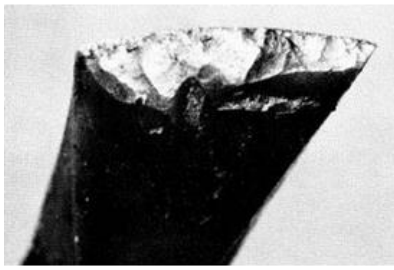


Figure 75. Worked End of Burin Spall, from Giddings 1956.

Microblade Technology

Table 35. Raw Material and Metric Attributes of Microblade Technology, KdVo6-2013

Art #	Segment	Unit	DBD cm	Level	Raw Material	Location of Mod	L mm	W mm	T mm	Wgt Gm
4162	proximal	N03W04	15	B2	ChGyGrn	RM-EM	16	4	1	0.01
4163	medial	N03W04	15	B2	ChGyGrn	RM-EM	11	4	1	0.01
4164	medial	N03W04	15	B2	ChGyGrn	LM-EM	11	4	1	0.01
4080	medial	S04W24		WL L	BaBl	BM-EM	11.1	7.79	1.41	0.2
4072	proximal	S04W24		B2 L	JaRdBr	RM-EM	15.12	4.24	2.26	0.3
4079	medial	S04W24		B2 L	JaRdBr	BM-EM	20.72	6.71	1.2	0.2
4119	proximal	S04W25		B2	ChBl	RM-EM	14.23	19.02	1.9	0.31
4145	proximal	S04W25	54	B2	ChGy	AM-EM	14	10.5	1.7	0.2

Raw Mat Code: Ch = Chert, Ba = Basaltic, Ja = Jasper, Gy = Grey, Grn = Green, Rd = Red, Br = Brown, Bl = Black
Modification Code: RM = Right Margin, LM = Left Margin, BM = Both Margins, AM = All Margins

Eight Microblades were recovered at KdVo6 in 2013. Five were recovered from the B2 stratum, two from the B2 – Loess interface and one from the Loess strata in the West lobe. Microblades comprise 13.3% of total lithic tools (n=8/60) and 4.0% of total lithics including debitage (n= 8/198).

None of the specimens were complete; four were proximal and four were medial sections. All microblades showed signs of edge retouch or use (edge modification). Raw material consisted of Chert (5), Jasper (2), and Basalt (1). Their metric attributes are provided in the Table above.

Chert Microblades

Figure 76. Chert Microblade Fragments, N03W04 - B2; KdVo6:4162 & 4163 (L) and 4164 (R).

Three grey-green chert Microblade fragments that were recovered from Unit N03W04 in 2010 were not catalogued until 2013; all were found in the screen from the same depth of 15 cm below surface in the B2 stratum. One proximal (**KdVo6:4162**) and one medial (**KdVo6:4163**) portion join together, as shown in the Figure above. The remaining medial fragment (**KdVo6:4164**) is of the same material and size; undoubtedly all were struck from the same core during the same event.

The two other chert microblades were recovered from Unit S04W25 from the B2 stratum. **KdVo6:4119** is a proximal fragment bearing 3 arrises made on Black Chert with edge modification along the right lateral margin. **KdVo6:4145** is a proximal fragment with 2 arrises made on Grey Chert and edge modification along all margins, although heaviest at the distal end.

Figure 77. KdVo6: 4119 & 4145, Chert Microblades, S04W25 - B2.

Jasper and Basalt Microblades

Three Microblade fragments were recovered from Unit S04W24. Two made on jasper were recovered at the interface of the B2 and Loess strata in the West Lobe, while a single basalt piece came from within the Loess stratum proper.

Figure 78. Jasper Microblade Fragments, S04W24, WL B2/L.

KdVo6:4072 is a proximal Microblade fragment on jasper. It has a two arrises and is edge modified along the right margin. **KdVo6:4079** is a medial Microblade section on jasper with edge modification on both margins, much heavier on the right than the left. **KdVo6:4080** is a medial Microblade fragment made on basalt; it is edge modified along both margins and bears heavy patination.

Figure 79. KdVo6:4080, Medial Microblade Fragment on Basalt, S04W24 - WL-L.

A single Microblade Core Tablet made on grey chert was recovered at the Little John site in 2013. **KdVo6:4170** was found in Unit N03W04 in the B2 stratum. It is 24 mm in length, 12 mm wide, 3 mm thick, and weighs about 1 gram. The piece bears 7, perhaps 8, parallel arrises along the right margin; the regularity in the size of the intervening flake scars suggest microblade removal rather than steep retouch.

Figure 80. KdVo6:4170, Grey Chert Microblade Core Tablet, N03W04 - B2.

Edge Modified – Retouched – Utilized Flakes and Flake Cores

Table 36. Raw Material and Metric Attributes of Modified Flakes, KdVo6 - 2013.

Raw Material and Metric Attributes of Modified Flakes, KdVo6 - 2013										
Art #	**Type**	**Unit**	**DBS cm**	**Level**	**Raw Mat**	**Type/Loc Of Mod**	**L Mm**	**W Mm**	**T Mm**	**Wgt gr**
4107	MF – C	N00W26	16.5	B2	ChBl	EM LM	33.79	54.14	15.05	15.2
4308	MF – C	N02W11	-	B2	JaYl	EM RM D	39.5	36.8	3.5	5.3
4130	MF – C	N03E04		B2 L	ChGy	EM AM	22	17	3	0.8
4128	MF - B	N03E04	21	WL L	ChGy	UVR BM	17	16	2	0.6
4150	RF – C	N03W04		B2	ObBl	EM BM	29	23	4	3.6
4170	MF – C	N03W04		B2	ChGy	EM RM	24	12	3	1
4218	MF – C	N17W13	84	P3/4	BaGy	EM D	22.5	17	4.5	1.4
4290	MF - C	N17W18	84	P2	ChGy	UDR LM	28	31	11	8.6
4296	MF – C	N3W11		B2	BaGy	EM RM D	27	17	4	1.3
4297	MF – C	N5W11	43	B2	ChGrn	EM BM	53	32	5	4.9
4081	MF – C	S04E24		B2	ObGyGrn	EM RM	7.44	8.42	1.81	<.01
4070	MF - B	S04W24		B1	BaBl	EM RM	29.16	19.92	2.25	1.5
4088	MF – C	S04W24	8	B2	ObBl	EM	12.67	9.45	2.52	0.3
4091	MF - B	S04W24	17	B2	ChGy	UDR AM	13.55	10.7	1.39	0.2
4092	MF – C	S04W24	23	B2	BaBl	EM AM	26.36	16.74	2.43	0.8
4090	MF – C	S04W24		B2 L	ObBl	EM BM	15.13	12.92	1.91	0.2
4093	MF – C	S04W24		WL L	ChGyRd	EM P	12.24	10.3	1.34	<.01
4094	MF – C	S04W24		WL L	ChGyRd	EM RM D	8.9	8.16	1.8	<.01
4100	MF – C	S04W24		WL L	ChGyRd	EM BM	14.32	11.89	3.64	0.4
4101	MF – C	S04W24		WL L	ChGyRd	EM LM D	10.01	9.53	1.62	0.2
4113	RF - C	S04W25	18	B2	ChGyGrn	UVR RM	60.65	37.95	6.35	15.3
4143	MF – C	S04W25	33	B2	JaRdBr	EM RM D	27.5	18	5	2.3
Type Codes – MF = Modified (retouched/utilized) Flake / RF = Retouched Flake / C= Complete / D = Distal / P = Proximal / B = Broken										
Level Codes – T = Top / M = Middle / B = Bottom										
Raw Material (Raw Mat) Codes – Ba = Basaltic / Ch = Chert / Ob = Obsidian / Ja = Jasper / C = Coarse / F = Fine / Gy = Grey / B – Black / Rd = Red / Yl = Yellow										
Type / Location of Modification (Type/Loc Mod) Codes – EM = edge modified/utilized / FC = Flake Core / D = Distal / LM = Left Margin / RM = Right Margin / BM = Both Margins / AM = All Margins										

This class of artifact is ubiquitous throughout the site through all levels. Twenty-one specimens were collected in 2013: 2 came from the B1/Ash (Late Holocene), 10 from the B2 (Mid Holocene), 2 from the B2/L (Early Holocene), 5 from the West Lobe Loess (Late Pleistocene), and 2 from the East Lobe Paleosol Complex (Late Pleistocene). Comprising 35% of Total Lithic Tools (n=21/60) and 10.6% of Total Lithics including debitage (n= 21/198), this artifact class is the highest among tool types and second highest among all lithics.

Modified Flakes usually consist of larger secondary waste flakes produced in the manufacture of more formal tools that have been subsequently utilized, producing characteristic irregular flake scars along one or more edges during their expedient use as slicing, cutting, or scraping implements. Less often they exhibit deliberate secondary modification in the form of semi - to regular retouch along one or more edges to facilitate more specific use, although the two categories of edge modification cross-grade into each other making it sometimes difficult to determine whether the modification was the product of utilization or deliberate retouching (Andrefsky 2001). Twenty-one definitive Edge Modified Flakes recovered in 2013 at KdVo6 are summarized in the table above and several examples are presented in more detail below.

Figure 81. KdVo6:4308 Edge Modified Flake on Heat Treated Jasper, N02W11 - B2.

KdVo6:4308 is a Yellow Jasper Utilized Flake recovered in the B2 stratum of Unit N02W11. It's colour is a result of heat treatment, common among Middle Prehistoric sites throughout the southwest Yukon.

Figure 82. Left: KdVo6:4107, EM Flake on Black Chert, Left Margin, N00W26-B2; Right: KdVo6:4150, EM Flake on Obsidian, Both Margins, N03W04 - B2

KdVo6:4107 is a large, thick grey chert Flake with multiple flake scars on its dorsal surface and possible retouch along its left margin. Its pointed distal end could be used as a punch or awl but there is no definitive evidence of such use. **KdVo6:4150** is a blade-like Retouched Flake with parallel sides made on black obsidian, although it lacks a central arris typical of blades. It bears irregular and short alternate pressure retouch flake scars on the left dorsal and right ventral surfaces and use flakes along both margins.

Figure 83. Left: KdVo6:4128, EM Flake, Utilized and Ventral Retouch, Both Margins N03W04-WL Loess; Right: KdVo6:4130, EM Flake, All Margins, N03W04, WL B2-Loess.

Figure 84. Left: KdVo6:4094 EM Flake, Right and Distal Margins; Right: KdVo6:4100 EM Flake, Both Margins. Both from S04W24-WL Loess.

Four small Edge Modified Flakes made on similar grey chert were recovered from the Late Pleistocene / Early Holocene of the West Lobe Loess stratum; two were from Unit N03E04 near the apex of the site and two were from Unit S04W24 down below on the overlook of the west margin of the site. It bears noting the material is similar to that used to make the large Blade (**KdVo6:4110 / 4111**) from Unit N00W27 described above, increasing our confidence in its assignment to this level as well.

KdVo6:4128 is a Broken Flake with irregular flake scars indicating use wear along both lateral margins. In addition, the right margin is snapped near the distal end, forming a concavity. **KdVo6:4130** is a Complete Flake bearing multiple dorsal flake scars with irregular flake scars along all margins. Both were recovered from Unit N03E04.

KdVo6:4094 is a small (8.9 by 8.16 mm) Complete Flake bearing four arrises rising to an apex at the proximal dorsal surface with irregular flake scars along the right and distal margins. The extreme left distal corner is snapped off. **KdVo6:4100** is another smaller Complete Flake with three dorsal arrises and irregular flake scars along the right and left margins. Both of these flakes were recovered from S04W24.

Figure 85. KdVo6:4113, EM Flake, Ventral Retouch, Right Margin, S04W25 – Ash.

KdVo6:4113 is an unusual Complete Flake recovered from Unit S04W25 in a mixed Ash and B(2) sediment. Cortex covers the entire dorsal surface while the ventral surface bears multiple invasive but irregular flake scars along the entire right and proximal margins. The right margin also shows smaller irregular flake scars indicating use. It is large enough to be considered a small Cobble Spall tool, although the flaking pattern is too sharp to be considered a classic *Thi* Cho or hide working tool. **KdVo6:4143**

is a small Flake made on Jasper with edge modification along the right and distal margins recovered from the same unit and level.

Figure 86. KdVo6:4143, EM Flake, Right and Distal Margins, S04W25 - B2.

Two larger Reduction Flakes made on similar grey basalt were recovered from the B2 stratum in Units N03W11 and N05W11, two nearby units close to the apex of the site. **KdVo6:4296** is made of two refitting pieces with a central bifurcating arris and extensive edge modification along the right and distal margins. **KdVo6:4297** is larger (nearly 5 cm) triangular shaped Complete Flake with two flake facets on its dorsal surface, one of which forms a shallow but sharp concavity along the proximal right margin. Both lateral margins bear edge modification in the form of irregular shallow flaking. Right and Distal points of this triangular shaped flake would be suitable for piercing or drilling, although there is no evident use of it as such. Both flakes are heavily patinated over portions of their surfaces.

Figure 87. Left: KdVo6:4296, EM Flake, Right and Distal Margins, N3W11; Right: KdVo6:4297 EM Flake, Both Margins, N03W11. Both on Basalt and from B2.

Two Edge Modified Flakes were recovered from the lower Late Pleistocene Paleosol levels in the West Lobe in 2013. **KdVo6:4218** is small (2 cm) Complete Flake made on black basalt with a bifurcating arris on its dorsal surface running from the right to left margin. It bears irregular shallow flaking along its distal margin. It was recovered in Unit N17W13 in the 3rd Paleosol Complex (PC3-P4) at 84 cm below surface.

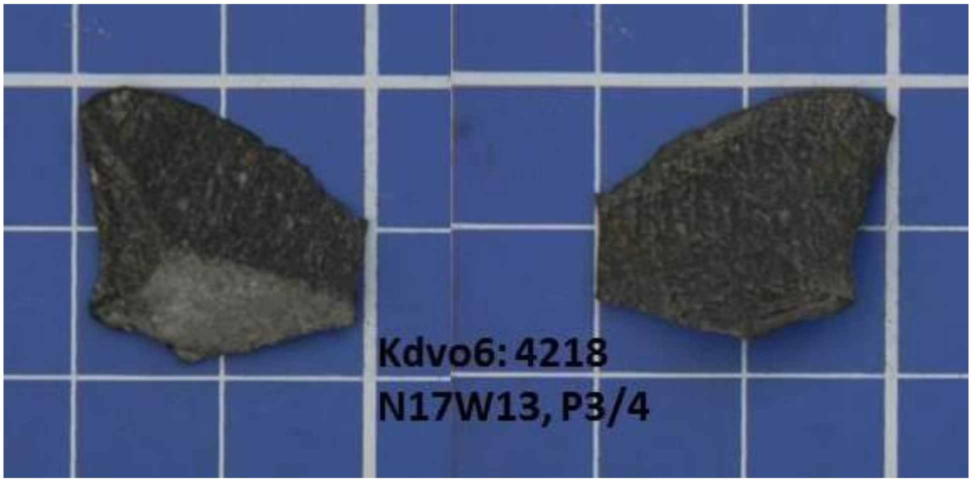


Figure 88. KdVo6:4218, EM Flake Distal Margin, N17W13 - P3.

KdVo6:4290 is a bulky (1.1 cm thick) Complete Flake that could as well be categorized as a Split Pebble. It is derived from a grey chert with white veins found in low levels across the site. The right margin bears a number of flake scars from earlier reduction blows and at least three steep retouch scars. Its unusual form might suggest that it is a geofact but a number of similar artifacts have been recovered from these lower levels in previous seasons, such as **KdVo6:1983** and **KdVo6: 1984** recovered in 2008 from the Paleosol levels in the East Lobe as well (shown below).

Figure 89. KdVo6:4290, Edge Modified Flake / Split Pebble, N17W18 - PC2-P3.

Figure 90. KdVo6:1983, Edge Modified Flake / Split Pebble, N22W11 - L b PC.

Figure 91. KdVo6:1983, Detail of Marginal Retouch.

Figure 92. KdVo6:1984, Edge Modified Flake / Split Pebble, N16W07 - PC2 P3.

The use of these small chert pebbles during the early period of occupation of the Little John site is interesting and merits further comparison with other early Tanana valley sites.

Modified Pebble / Cobble Artifacts – Hammer Stones, Choppers, Split Pebbles, Anvils, Scraper Planes

Figure 93. KdVo6:4137, Hammer Stone, S00W26 - B1.

Twenty-three Modified Cobble or Pebble artifacts were recovered at the Little John site in 2013, together comprising 38.3% of total lithic tools (n=23/60) and 11.6% of total lithics including debitage (n= 23/198). Their full morphology (including photographs) is described in the accompanying Filemaker and Excel inventories. The table below provides a summary of their provenience and metrics and several examples are presented below. This class of artifact is generally ubiquitous across the Little John site, consisting of cortical pebbles and cobbles with battered or punctate surfaces, presumably used for shaping or flaking other stone and breaking bone for marrow extraction or producing bone slivers for further working into a variety of tools (n = 12), split cobbles and pebbles for chopping wood and bone and other expedient cutting or scraping use (n = 11), and flat-sided or split cobbles for use as a stable anvil base for preparing stone or breaking bone or planing wood and bone (n = 0).

Hammer Stones are recognized on the basis of morphological characteristics of a crushed and / or punctate surface along the margin or one surface and a size and shape to be held comfortably in the hand; nine are identified in the 2013 collection. Split Cobble Tools might be used as a Chopper or as a primary hide scraping tool (the Thii Cho); four were collected in 2013. Split Pebbles are generally produced by Bipolar Percussion, resulting in a sharp cutting edge along the circumference of the artifact and percussive crushing at either end; one was identified in 2013. Anvils are large dense cobbles with one flat surface that can be buried level with the ground surface and serve as a stable solid platform for percussive flaking of other stones. Scraper planes are large cobbles split to produce a flat surface at one end of which will be found steep unifacial retouch in order to provide a planning edge to flatten wood or bone;. The strength of their designation as artifacts is further supported by their close association with unequivocal artifacts, flake debitage, spirally fractured bone, or other features (Andrefsky 2005, Kooyman 2000, Odell 2003).

Table 37. Metric Summary of Modified Cobble Artifacts, KdVo6-2013.

Raw Material and Metrics of Modified Cobbles and Pebbles, KdVo6 2013										
A #	Sum Type	Unit	Lev	Typ/Loc Mod	L mm	W mm	T mm	W gm	RM	% Cortex
4109	MCP-SC	N00W27	B2	EM RL D	86.88	70.71	19.71	36	BaGy	50
4307	MCP-SP	N02W11	B2	BP BE	62.5	26.4	35.6	83.8	BaGy	50
4306	MCP-HS	N03W11	B1	BP D	73	39.1	22.1	94.1	BaGy	100
4309	MCP-SC	N16W18	PC 2-P3	EM D	53.4	32.6	28.5	64.5	SaGy	75
4236	MCP-HS	N16W19	B1	BP BS	92	63	51	232.3	BaGy	50
4242	MCP-SC (2)	N16W19	B1	EM D	66-72	5358	1920	200	BaGy	50
4238	MCP-HS	N16W19	B2	BP BS	57	48	40.5	130.6	BaGy	100
4239	MCP-HS	N16W19	B2	BP OS	122	58	58	621.6	BaGy	100
4249	MCP-HS	N16W19	B2	BP D	72.5	62	39	308.8	BaGy	75
4250	MCP-SC	N16W19	B2	EM D	88	67	22	167.1	BaGy	25
4292	MCP-SC	N16W19	PC 2-P3	EM LM D	86	59	43	239	BaGy	75
4291	MCP-SC	N16W19	PC 3-P4	EM LM	100	82	51	463	BaGy	75
4217	MCP-SC	N17W13	B2	EM RM D	56.5	46	14	44.5	BaGy	50
4223	MCP-HS	N17W18	B1	BP AM	43	44	43	331.4	BaGy	100
4259	MCP-HS	N17W18	B1	BP OS	63	56	29	167.5	BaGy	100
4261	MCP-HS	N17W18	B2	BP OS	80.5	77	52	430.9	BaBr	75
4258	MCP-SC	N17W18	L a PC	EM LM D	75	56	24	111.2	BaGy	75
4289	MCP-HS	N17W18	PC 2-P3	BP D	73	43.5	26	87.2	BaGy	100
4272	MCP-HS	N17W19	B1	BP OS	87	50.5	37	246.4	BaGy	75
4230	MCP-HS	N25W23	B2	BP OS	50	48	38	119.5	BaGy	100
4137	MCP-HS	S00W26	B1	BP AM	55	39.5	29.5	71.8	BaGy	100
4173	MCP-SP	S04W25	B2	EM D	19	12	3	1.2	BaGy	25
Codes: MCP = Modified Cobble/Pebble, SC = Split Cobble, SP = Split Pebble, HS = Hammer Stone EM = Edge Modified, BP = Battered/Punctated, RM = Right Margin, LM = Left Margin, AM = All Margins, D = Distal, OS = One Side, BS = Both Sides, BE = Both Ends, Ba = Basaltic, Br = Brown, Gy = Grey										

Figure 94. KdVo6:4230, Hammer Stone, N25W23 - B1.

These artifacts are common throughout all Paleolithic assemblages, but are generally found at higher rates within Late Prehistoric and mid-Holocene assemblages that are thought to have used higher percentages of bone projectiles within their tool kit (Workman 1978). They are often found in clusters that can be described as work station features. At the Little John site they are found through all levels.

Figure 95. KdVo6:4238, Battered Hammer Stone, and KdVo6:4250, Split Cobble with Edge Modification; both from N16W19 – B2.

Unit N16W19 illustrates this, with two hammer stones and a split cobble in association in the B2 stratum; one of each form is illustrated above. We note, but do not illustrate, additional similar material is present in Unit N17W18, contiguous to the northeast, as detailed in the Table above.

Perhaps not surprisingly, this class of artifact is well represented in the lower Paleosol Complex in the East Lobe. These Late Pleistocene paleosols in this area represent secondary processing and cooking of a variety of large and small mammal (as detailed in our earlier discussions on faunal remains from these levels in this report and elsewhere; c.f. Yesner, et al. 2001, Yesner et al. 2012). Four such specimens were recovered in 2013 from the 2 by 2 meter unit comprised of N16W18 and W19 and N17W18 and W19. A Hammer Stone and two Split Cobble tools were from the 2nd Paleosol of the Paleosol Complex (PC2-P3), while the fourth Modified Cobble, a Split Cobble tool, was recovered from the 3rd Paleosol of the Paleosol Complex (PC3-P4). Each is illustrated and described in more detail below.

Figure 96. KdVo6:4289, Battered Balsaltic Hammer Stone, N17W18 - PC2-P3.

KdVo6:4289 is a Hammer Stone made on a basaltic cobble, recovered from the P2 stratum of Unit N17W18 at a depth of 85 cm below surface. It is heavily battered and punctate on one side, particularly at either end of the piece. It is associated with a variety of other artifacts described at this level in the two by two meter area excavation comprised of this unit and Units N17W19, N16W19, and N16W18, described as **Feature 2013-08** earlier in this report.

One of these associated artifacts is **KdVo6:4292**, a Split Cobble tool made on basalt. It has a flaked distal edge to form a chopping edge that exhibits use modification along the distal margin found in Unit N16W19 in the same PC2-P3 level, and illustrated below. Two flake scars are also present on the proximal left margin.

Figure 97. KdVo6:4292, Split Cobble Tool (Chopper) on Basalt, N16W19 - PC2-P3.

KdVo6:4309 is a second Split Cobble tool made on light grey sandstone from the same level in the contiguous Unit N16W18. It is split longitudinally and what we are orientating as the distal end bears several additional flake scars. The remaining cortex surface at this distal end is moderately battered suggesting the possible use of the piece as a Hammer Stone that fractured early in its use?

Figure 98. KdVo6:4309, Split Cobble Tool, N16W18 - PC2-P3.

KdVo6:4291 is another Split Cobble tool made on basalt from Unit N16W19, but from the next Paleosol Complex level PC3-P4 at a depth of 92 cm below the surface. It has three flake scars and bears edge modification from use along the left and distal margins.

Figure 99. KdVo6:4291, Split Cobble Tool (Chopper) on Basalt, EM Left Margin, N16W19 - PC3-P4.

Debitage

This class of artifact contains all apparent lithic debris generated in the course of manufacture, use, and discard of formal and informal stone tools. In general they are usually the most prevalent lithic form found on Paleolithic sites; at KdVo6 debitage made up 68.8% of collected lithics in 2013 (n=136/198). Analysis of debitage type, raw material, and distribution can contribute to our understanding of site use, inter-site relationships, external procurement and trade relationships, and prehistoric technological organization (Andrefsky 2001, 2005). Here we provide only an initial summary of debitage collected in 2013; a fuller treatment awaits detailed future analysis.

The table below presents the distribution of debitage collected in 2013 by Flake Type categories through stratigraphic levels at KdVo6. Debitage type generally reflects the stage of lithic manufacture being practiced; high levels of Cortical flakes suggest earlier stages, high levels of thinning and sharpening flakes suggest late stage of manufacture and artifact maintenance. Biface thinning and Sharpening Flakes account for 14.7 and 6.6 percent of debitage collected in 2013 respectively, or 21.3 percent combined, while only 4.4 percent of Debitage consists of Cortical Flakes.

Table 38. Debitage Distribution by Flake Type and Level, KdVo6 2013

Debitage Distribution by Flake Type and Level, KdVo6 2013										
Label / Flake Type	O/A	B1	Ash	B2	B2 L	WL L	P1	P2	Totals	Row %
complete		1	1	23	1	4	1	5	36	26.5
biface thinning	1			7	6	5		1	20	14.7
sharpening		1		6		1		1	9	6.6
broken		0	2	3					5	3.7
spall								1	1	0.7
cortical				4		1		1	6	4.4
fragment				4	1		1		6	4.4
shatter		1	1	3				0	5	3.7
flakes - lot				46					46	33.8
split pebble				2					2	1.5
Totals	1	3	4	98	8	11	2	9	136	
Column %	0.7	2.2	2.9	72	5.9	8.1	1.5	6.6		100
Combined Column %	5.8			72	14		1.5	6.6		
Period - Appx. Date (see Radiocarbon Dating discussion, above)	Late Prehistoric c. 1,900 – 150 ybp			Middle Prehistoric c. 3,000 – 2,000 ybp	Early Holocene Late Pleistocene 9,000 – 12,000 ybp		Early Holocene 9,400 – 10,100 ybp	Late Pleistocene 10,700 – 11,700 ybp		

Numerical and Percentile distribution through Levels will generally reflect intensity of use through time within the excavated units. Using the Period / Date correlations with Levels presented in the Table above the highest intensity of use is the Middle Prehistoric period prior to the White River Ash fall c. 1,900 years ago (72%), followed by the Early Holocene occupation represented by materials recovered at the interface between the bottom of the B2 and top of the Loess strata in the West Lobe of the site (14%). However, we must bear in mind that recovery bias based on intra-site location can effect these numbers and will make more sense when integrated with the larger debitage database from previous field seasons.

Raw Material type and distribution may contribute to our understanding of inter- and intra-site relationships (see discussion above, as well). The Raw Material Type of 391 pieces of debitage is compiled in the Table below. Unsurprisingly, Basaltics make up 69% of this sample, while various coloured Cherts comprise about 18%, and Obsidian about 13% of the sample. Obsidian samples are being analyzed by XRF technology to identify their volcanic source by Jeff Rasic and will be reported on when completed.

Table 39. Debitage Distribution by Flake Raw Material Type and Level, KdVo6 2013

Distribution of Debitage Raw Material by Level, KdVo6 2013									
Level RMC	OA	B1	Ash	B2	B2 L	WL L	PC 2 - P3	Row Total	Row %
BaBl			2	7		4	1	**14**	**10.29**
BaGy		2	2	58	6	4	2	**74**	**54.41**
ChBl				5		1		**6**	**4.41**
ChGrn				1				**1**	**0.73**
ChGy				13		1		**14**	**10.29**
ChGyRd						1		**1**	**0.73**
JaRd				1				**1**	**0.73**
JaRdBr				1				**1**	**0.73**
ObBl		2		4	1		8	**15**	**11.03**
ObGy	1			6		1		**8**	**5.88**
QuWh				1				**1**	**0.73**
Column Total	**1**	**4**	**4**	**97**	**7**	**12**	**11**	**136**	**99.96**
Column %	**0.73**	**2.94**	**2.94**	**71.32**	**5.15**	**8.82**	**8.09**	**99.99**	
Raw Material Codes - Ba = Basaltic / C = Chert / Grn = Greenstone / J = Jasper / Ob = Obsidian									
Colour Codes - D= Dark / L = Light / B = Black / Br = Brown / Gr = Green / Gy = Grey / GyB = Banded Grey and Black / Or = Orange / Rd = Red / W = White									

Hearth / Boiling Stones – Fire Altered Rock (CPA/FAR)

Figure 100. KdVo6:4237, Lot of Pebbles and Cobbles in Association with Hearth Feature 2013-04.

This class of artifacts includes large pebble to cobble sized cortical stones, mostly basaltics, transported to and concentrated at Hearth Features or otherwise associated with concentrations of other cultural artifacts. They may or may not show signs of burning, such as potlid fractures, charcoal deposition, or irregular heat fracturing (Fire Cracked or Fire Altered Rock); less often they may have a greasy, dark brown, organic deposit on their surface. It is assumed that these stones were used as heat traps in the hearth and as boiling stones, although distinguishing one from the other, or whether they were used for both, is often impossible to say. Some of these may also grade towards the Culturally Modified Cobble/Pebble category as well. The first Table below provides metric details of these CPA/FAR by Artifact Number while the second Table shows their distribution by Unit and Level.

Table 40. Metric Attributes of Cobbles, Pebbles, and Fire Altered Rock in Association, KdVo6 2013.

Metric Attributes of Cobbles, Pebbles, and Fire Altered Rock in Association, KdVo6 2013										
A #	Type	Unit	Level	Tot Lot	L mm	W mm	Th mm	Wgt gm	RMC	Cortex
4252	CPA	N16 W18	B1	8	43-75	30-53	23-41	925	Var	100%
4253	CPA	N16 W18	B1	10	39-105	33-60	20-32	837	Var	100%
4254	FAR	N16 W18	B1	4	44-68	23-51	18-47	375	Var	75%
4255	FAR	N16 W18	B1	1	58	39	24	84	BaGy	75%
4243	CPA	N16 W19	B1	2	81-86	42-65	33-35	376	Var	50%
4244	FAR	N16 W19	B1	4	44-61	30-55	24-28	332	Var	75%
4245	FAR	N16 W19	B1	1	142	93	72	1460	BaBr	75%
4263	CPA	N17 W18	B1	3	91-57	62-40	31-28	595	Var	100
4264	CPA	N17 W18	B1	3	70-83	38-42	13-21	324	Var	100%
4274	CPA	N17 W19	B1	14	29-955	25-625	9-41	1476	Var	75%
4275	CPA	N17 W19	B1	11	32-131	20-695	15-47	1631	Var	100%
4276	CPA	N17 W19	B1	8	53-122	46-865	34-55	2590	Var	75%
4273	FAR	N17 W19	B1	4	80-591	53-577	35-47	1382	Var	25%
4115	FAR	S04W25	B1	2	37-21	23-10	6-4	6	Var	75%
4116	FAR	S04W25	B1	1	28	32	13	17	BaGy	75%
4117	FAR	S04W25	B1	1	32	11	8	4	BaGy	25%
4142	FAR	S04W25	B1	1	80	28	11	49	ScGy	0
4108	FAR	N00W26	B2	1	59	40	21	7	BaGy	25%
4265	CPA	N03 E04	B2	1	172	138	45	1648	SaGy	100%
4266	FAR	N03 E04	B2	2	4067	3544	1018	240	BaRdBr	25%
4237	CPA	N16 W19	B2	14	3969	2649	2137	1381	Var	100%
4240	CPA	N16 W19	B2	7	2147	1629	1023	199	Var	75%
4241	CPA	N16 W19	B2	3	43-5675	33-49	21-45	416	Var	100%
4260	CPA	N17 W18	B2	3	59-155	59-110	28-70	2415	Var	100%

4246	CPA	N16 W19	PC 1 - P2	1	106	95	52	650	BaGy	100%
4247	FAR	N16 W19	PC 1 - P2	1	84	65	45	365	Var	100%
4248	FAR	N16 W19	PC 1 - P2	2	41-61	37-53	26-26	177	Var	75%
4256	CPA	N16 W18	PC 2 - P3	11	35-76	24-39	21-32	860	Var	75%
4281	CPA	N16 W18	PC 2 - P3	1	53	40	32	101	Var	75%
4310	CPA	N16 W18	PC 2 - P3	1	61	39	19	50	BaGy	25%
4311	CPA	N16 W18	PC 2 - P3	1	69	40	32	104	BaGy	100%
4316	CPA	N16 W18	PC 2 - P3	1	43	37	22	53	BaGy	100%
4257	FAR	N16 W18	PC 2 - P3	1	68	67	41	269	BaGy	100%
4293	CPA	N16 W19	PC 2 - P3	1	62	58	52	257	SaGy	75%
4287	CPA	N17 W16	PC 2 - P3	1	63	41	24	87	Var	100%
4262	CPA	N17 W18	PC 2 - P3	4	53-98	40-44	13-22	203	Var	75%
4312	CPA	N17 W18	PC 2 - P3	1	65	52	30	137	Var	50%
4313	CPA	N17 W18	PC 2 - P3	1	83	49	28	127	Var	100%
4314	CPA	N17 W18	PC 2 - P3	1	46	26	17	27	Var	50%
4315	CPA	N17 W18	PC 2 - P3	1	42	27	18	22	BaGy	75%
4317	CPA	N17 W18	PC 2 - P3	1	46	26	23	35	BaGy	75%
4267	CPA	N17 W19	PC 2 - P3	1	60	82	28	146	BaGy	50%
4268	CPA	N17 W19	PC 2 - P3	1	67	56	22	125	BaGy	100%
4269	CPA	N17 W19	PC 2 - P3	1	83	47	27	196	Var	50%
4270	CPA	N17 W19	PC 2 - P3	1	100	67	52	484	BaGy	75%
4271	CPA	N17 W19	PC 2 - P3	5	33-72	21-40	12-32	335	Var	100%
4318	CPA	N17 W19	PC 2 - P3	1	65	43	28	102	Var	50%
4278	CPA	N18 W16	PC 2 - P3	1	71	44	31	102	Var	100%
4279	CPA	N18 W16	PC 2 - P3	1	79	57	35	217	Var	100%
4283	CPA	N18 W16	PC 2 - P3	1	47	38	26	59	Var	50%
4284	CPA	N18 W16	PC 2 - P3	1	53	45	31	78	GrnGrn	75%
4277	FAR	N18 W16	PC 2 - P3	1	72	64	56	321	BaGy	75%
4280	FAR	N18 W16	PC 2 - P3	1	67	46	32	111	Var	25%
4282	FAR	N18 W16	PC 2 - P3	1	76	53	35	125	SaGy	50%
4234	CPA	N17 W13	PC 3 - P4	1	30	20	17	17	BaBl	100%
4235	CPA	N17 W13	PC 3 - P4	1	49	29	10	33	BaGy	50%
4285	FAR	N18 W16	PC 3 - P4	1	82	57	33	164	Var	25%
4286	FAR	N18 W16	PC 3 - P4	1	89	60	40	275	Var	25%
4103	FAR	S04W24	WL L	1	32	15	6	20	BaBl	50%
			Total Number	**162**		**Total Weight**		**25.203 Kg**		

Of the 162 specimens collected in this category, only one has no cortex and a further eight less than 50% cortex; the remaining 153 specimens have 50% or more cortical surface (94% of the total). Altogether the collected specimens weigh 25.2 kilograms.

Reference to the second Table below shows the association between the majority of the specimens with two identified features, both found in the 2 by 2 meter excavation of Units N16-W18/19 and N17-W18/19. The first, Feature 2013-04 found in the B stratum, accounts for 100 of the 162 pieces (62%), while the second, Feature 2013-07 found in the second Paleosol of the Paleosol Complex (PC2-P3), accounts for a further 36 pieces (22%) of the total. The remaining 22 pieces are distributed in numbers from one to seven throughout the site.

Table 41. Catalogued Cobbles, Pebbles, and Fire Altered Rock in Association by Level, KdVo6 2013.

Catalogued Cobbles, Pebbles, and Fire Altered Rock in Association by Level, KdVo6 2013							
Unit	**B1**	**B2**	**WL L**	**PC 1 - P2**	**PC 2 - P3**	**PC 3 - P4**	**Row Totals**
N00W26		1					**1**
N03 E04		3					**3**
N16 W18	**23**				**16**		**39**
N16 W19	**7**	**24**		4	**1**		**36**
N17 W18	**6**	**3**			**9**		**18**
N17 W19	**37**				**10**		**47**
Subtotals	73	27		4	**36**	-	**140**
N17 W16					1		**1**
N18 W16					7	2	**9**
N17 W13						2	**2**
S04W24			1				**1**
S04W25	5						**5**
Column Totals	**78**	**31**	**1**	**4**	**44**	**4**	**162**

Historic Remains

Figure 101. KdVo6:4204, Melted Broken Glass Fragments, N13E06 - O/A, KdVo6 2013.

Fifty-nine Historic Remains which are catalogued within 32 Artifact Numbers were recovered at the Little John site in 2013. As discussed above and highlighted in the Table below, 46 of the 59 artifacts (78%) were recovered in two concentrations in two units that received Feature Numbers. Feature 2013-02 in Unit N07E06 held 35 of these artifacts while Feature 2013-3 in Unit N1619 held eleven. Their nature and interpretation, along with illustrations, are presented in the discussion of these Features above.

The only other concentration of historic material was found in N13W06, consisting of ten small pieces of melted broken glass; 5 of these were White, 4 Green, and 1 Red in colour. Of the remaining four historic artifacts, two were recovered in the southwest (a razor blade and a bottle cap) and two (another razor blade and a tin oil lamp from the 1990s) in the northwest quadrants of the site in separate units.

Table 42. Historic Remains Recovered at KdVo6, 2013

Art #	Type	Unit	Level	L mm	W mm	T mm	W gm	Raw Mat	Total
4222	tin oil lamp	Hearth	O/A	106	53	53	44.03	metal	1
4200	razor blade	N04E06	B2	39.5	19.5	2	4.4	metal	1
4178	glass fragment	N07E06	O/A	20	7	7	0.9	Glass	1
4179	round nails	N07E06	O/A	43-55	57	23	7.7	metal	5
4180	tin can fragments	N07E06	O/A	36-150	17-52	2-16	32.1	metal	4
4181	trunk corner reinforcement	N07E06	O/A	55	45.5	21	8.4	metal	1
4182	bottle cap	N07E06	O/A	30	30	8	4.5	metal	2
4183	glass fragment	N07E06	O/A	17	7	8	0.5	glass	1
4184	trunk hasp	N07E06	O/A	62	41	9	18.8	metal	2
4185	glass fragment	N07E06	O/A	22	11	7	1.4	Glass	1
4186	suitcase hasp	N07E06	O/A	72	52	14	21.6	metal	1
4187	metal rivet (jeans?)	N07E06	O/A	14	10	10	2.1	metal	1
4188	trunk corner reinforcement	N07E06	O/A	50	51	22	7.4	metal	1
4189	nail	N07E06	O/A	65	7	3	3.3	metal	1
4190	small punched disk	N07E06	O/A	30	30	2	1.7	metal	1
4191	burned fabric	N07E06	O/A	41-54	11-18	23	1.1	fabric	4
4192	burned wood fragments	N07E06	O/A	38-43	30-35	7-10	4.5	wood	6
4298	trunk hasp	N07E06	O/A	85	72	11	57.8	metal	2
4202	glass -melted	N13E06	O/A	9-12	14	2	0.6	glass	3
4203	glass – melted	N13E06	O/A	3-11	2-11	5-12	0.2	glass	2
4204	glass - melted	N13E06	O/A	4-18	3-13	2-6	3.8	glass	5
4210	bottle cap	N16W19	B1	30	30	8	5.4	metal	1
4211	negative film strip	N16W19	B1	8.5	7.5	0	1	plastic	2
4212	bottle cap	N16W19	B1	28	28	7	3	metal	2
4208	bottle cap	N16W19	O/A	30	30	8	3	metal	1
4209	tire valve cover	N16W19	O/A	12	11	11	5.2	metal	1
4220	bottle cap	N17W18	O/A	30	30	8	2.9	metal	1
4225	bottle cap	N17W19	O/A	29	29	8	2.7	metal	1

4226	bottle cap	N17W19	O/A	30	27	7	2.5	metal	1
4227	bottle cap	N17W19	O/A	30	28	8	2.7	metal	1
4231	razor blade	N25W23	O/A	40	20	5	5.2	metal	1
4105	bottle cap	S04W24	O/A	30	30	9	2.1	metal	1
Total Historic Remains 59									

CONCLUDING REMARKS

The 2013 field excavations at the Little John site and associated analytical work over the past 18 months has further refined our understanding of this important site and simultaneously presented us with both new and continuing questions which we hope to address through subsequent field work and laboratory analysis.

Jordan Handley's undergraduate thesis work with Dr. Rudy Reimer of Simon Fraser University in identifying distinct elemental signatures on a sample of the Little John basaltics has demonstrated at least 7 different sources, including a highly distinctive Andesite or Andesitic Basalt on which most of the formal tools made on basaltics in the Late Pleistocene levels were made. This material may represent the primary source material during the initial phases of occupation in the region. Two prominent Basaltic exposures have been identified as potential sources for this material and we hope to be able to gain the resources and opportunity to visit and sample them in the future, although this will require financing for helicopter transport. Ms. Handley will begin her Masters program at the University of British Columbia in the fall of 2014 during which she will be examining in more detail some aspect of the Little John lithic materials under the direction of Dr. David Pokotylo, a leading expert in Lithic Analysis.

Laurianne Bourgeon's faunal analysis, combined with those of Dr. David Yesner, Dr. Vance Hutchinson, and myself, has led to a clearer understanding of the taphonomy of the Little John faunal remains. This work has increased our confidence in the cultural nature of the vast majority of these remains. The Little John fauna will also provide an important comparative collection for Ms. Bourgeon's continued Doctoral dissertation analysis of the Blue Fish Cave fauna through the University of Montreal under the guidance of Dr. Ariane Burke, which may resolve longstanding questions on their taphonomic nature.

Michael Groom's geoarchaeological work at the Little John site will continue in the fall of 2014 after a hiatus during which he completed his Doctoral Dissertation

Proposal, passed his Comprehensive Examinations, and advanced to Candidacy at the University of New Mexico under the supervision of Dr. E. James Dixon. In support of this we have begun a comprehensive re-inventory of sediment samples collected over the years in order to identify selections to include in his sedimentological analysis and will be undertaking a thorough review of the extent artifact collection this coming summer.

New AMS radio-carbon dates obtained over the past 18 months have resulted in an emergent pattern that seems to suggest the chronological parameters of distinctive occupational periods at the Little John site. Four of these *Cultural Chronozones* are suggested for the Late Pleistocene: one prior to the Younger Dryas during the Bolling-Allerod Interstadial, one at the onset of the Younger Dryas followed by abandonment of the site during the height of this cooling Stadial period, and a third beginning at the tail end of the Younger Dryas. The suggested fourth period of Late Pleistocene occupation might also simply be a continuation of the third, with their current separation a sampling artifact. Expanding our radio-carbon dating sample size should allow us to assess these proposed Cultural Chronozones with greater confidence.

Within the Holocene proper we have suggestions of another four Cultural Chronozones. The oldest of these precedes the First White River Ash Fall of c. 1900 years ago; the second begins immediately thereafter and lasts until just before the Second White River Ash Fall of c. 1200 years ago. Our limited current dates relating to the Late Holocene are suggesting an 800 year period of abandonment of the site until the Late Prehistoric phase about 400 years ago. The final cultural period documented at the site is that of the Historic period of the last 150 years. Similar to the suggestive Pleistocene periods, more dates are needed to increase our confidence in this.

Beyond the recovery of bones of a variety of species that have been culturally modified our unequivocal artifacts from the earliest dated levels between 13,000 and 14,000 years ago remain sparse. It is our hope in the next few years to continue to expose these lower levels as we search for the locus of human activity that produced these faunal remains and trace further the web of evidence that demonstrates that the Little John site represents one of the earliest camps of Canada’s First Peoples.

Figure 102. One of the Thank-you Cards prepared by the 2013 students for our *Dineh* Hosts.

REFERENCES

Ackerman, R.E.
2001 Spein Mountain: A Mesa Complex Site in Southwestern Alaska. *Arctic Anthropology*, 38(2):81-97.

Alexander, H.L.
1987 *Putu: A Fluted Point Site in Alaska*. Department of Archaeology, Simon Fraser University Publication No. 17. SFU Press, Burnaby.

Altimara Consulting
2014 Western Copper And Gold Corporation Casino Project - Archaeological Resources Mitigation: Kdvi-1, Kevi-6, Kfvi-2, Kfvi-3, Kfvi-4, And Kfvi-5. Report submitted to the Yukon Heritage Resources Unit (Archaeological Sites Regulations Permit 13-06asr). Whitehorse, Yukon.

Anderson, D. D.
1968a A Stone Age Campsite at the Gateway to America. *Scientific American,* 218(6), 24-33.
1968b *Early Notched Point and Related Assemblages in the Western American Arctic*. Paper presented at the 67th Annual Meeting of the American Anthropological Association, Seattle, WA. Typesrcipt.
1970a *Akmak: An Early Archeological Assemblage from Onion Portage, Northwest Alaska*. Acta Arctica Fasc. 16.
1970b Microblade Traditions in Northwestern Alaska. *Arctic Anthropology,* 7(2), 2-16.

Andrefsky, W.
2001 *Lithic Debitage: Context, Form, Meaning*. University of Utah Press, Salt Lake City, Utah.
2005 *Lithics: Macroscopic Approaches to Analysis* (2nd Edition). Cambridge Manuals in Archaeology. Cambridge University Press, Cambridge.

Bever, M.R.
2001 Stone Tool Technology and the Mesa Complex: Developing a Framework of Alaska Paleoindian Prehistory. *Arctic Anthropology*, 38(2):98-118.
2006 Too Little, Too Late? The Radiocarbon Chronology of Alaska and the Peopling of the New World. *American Antiquity* 71:595-620.

Bigelow, N.H. and W.T. Powers
1994 New AMS dates from the Dry Creek Paleoindian Site, Central Alaska. *Current Research in the Pleistocene* 11:114-116.

Blackwelder, E.
1940 The Hardness of Ice. *American Journal of Science*. No. 238:61-62.

Bostock H. S.
1965 Notes on Glaciation in Central Yukon Territory. *Geological Survey of Canada, Paper 65-36*. Queen's Printer, Ottawa.

Bunn, H. T. (1983), Comparative analysis of modern bone assemblages from a San hunter-gatherer camp in the Kalahari Desert, Botswana, and from a spotted hyena den near Nairobi, Kenya, in Animals and archaeology, 143-148.

Bureau of Indian Affairs [BIA].
1993a *Report of Investigation for Nach'etay Cheeg*. BLM AA-11784A. Ahtna, Inc. Anchorage: BIA ANCSA Office.
1993b *Report of Investigation for Chisana Native Graves*. Ahna, Inc. BLM AA-11715. Anchorage: BIA ANCSA Office.
1995a *Report of Investigation for Camp Creek*. BLM AA-10714H. Ahtna, Inc. Anchorage: BIA ANCSA Office.
1995b *Report of Investigation for Dit'aan Cheeg*. Ahtna, Inc. BLM AA-11783B. Anchorage: BIA ANCSA Office.
1996a *Report of Investigation for Tthiixaa' Cheeg*. BLM F-22390A. Ahtna, Inc. Anchorage: BIA ANCSA Office.
1996b *Report of Investigation for Nabesna Bar*. Ahtna Inc. BLM AA-10714I. Anchorage: BIA ANCSA Office.

Campbell, J. M.
1968 The Kavik Site of Anaktuvuk Pass, Arctic Alaska. Anthropological Papers of the University of Alaska 14:32-42. Fairbanks: UAF Press.

Carlson, C. C.
1979 The Early Component at the Bear Cove Site, BC. *Canadian Journal of Archaeology* 3:177-94.

Carlson, R.L.
1996a Introduction to Early Human Occupation in British Columbia. In *Early Human Occupation in British Columbia*, edited by R.L. Carlson and L. Dalla Bona, UBC Press, pp. 3-10.
1996b Early Namu. In *Early Human Occupation in British Columbia*, edited by R.L. Carlson and L. Dalla Bona, UBC Press, pp. 83-102.
2004 The Northwest Coast Pre-Microblade Horizon and the Nenana Complex. Paper Presented at the 31st Meeting of the Alaska Anthropological Association, Whitehorse.
2008 The Rise and Fall of Native Northwest Coast Cultures. *Journal of North Pacific Prehistory* Vol. II edited by Jim Cassidy. Pp: 93-121.

Cinq-Mars, J. & R. E. Morlan
1982 Ancient Beringians: Human Occupations in the Late Pleistocene of Alaska and the Yukon Territory. In D. M. Hopkins, J. V. Matthews Jr., C. E. Schweger, & S. B. Young (Eds.), *Paleoecology of Beringia*. New York: Academic Press.

Clark, D. W.
1983 Is There a Northern Cordilleran Tradition? *Canadian Journal of Archaeology*, 7, 23-48.
1991a *Western Subarctic Prehistory*. Ottawa: Canadian Museum of Civilization.

1991b The Northern (Alaska-Yukon) Fluted Points. In Robson Bonnichsen & Karen Turnmire (Eds.), *Clovis: Origins and Adaptations* (pp.35-48). Centre for the Study of the First Americans: Corvallis, OR.
1992 The Archaic in the Extreme Northwest of North America. *Revista de Arqueologia Americana*, 5, 74-99.

Clark, D. W., R. M. Gotthardt, & P. G. Hare
1999 *Microblade Complexes and Traditions in the Interior Northwest as Seen from the Kelly Creek Site, West-Central Yukon*. Whitehorse: Heritage Branch, Government of Yukon.

Clark, D. W. & R. E. Morlan
1982 Western Subarctic Prehistory: Twenty Years Later. *Canadian Journal of Archaeology*, 6, 79-83

Coffman, S.C. 2011 Archaeology at Teklanika West (HEA-001): An Upland Archaeological Site, Central Alaska. Masters Thesis. Department of Anthropology, University of Alaska – Fairbanks. Fairbanks, Alaska.

Coffman, S.C. and B. A. Potter
2011 Recent Excavations at Teklanika West: A Late Pleistocene Multicomponent Site in Denali National Park and Preserve, Central Alaska. *Current Research in the Pleistocene*. 28:29-32.

Coffman, S. C. and J. T Rasic
2013 Rhyolite Sourcing in Central Alaska – Preliminary Results. Poster presented to the Alaska Anthropology Association Annual Meeting, Fairbanks, Alaska.

Cook, J.P.
1969 Early Prehistory of Healy Lake, Alaska. Ph.D. dissertation. Department of Anthropology, University of Wisconsin - Madison.
1996 Healy Lake. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West, University of Chicago Press, pp. 323-327.

Cinq-Mars, J. and R. Gotthardt
1998 Extending the geographical and implicative ranges of the Nenana Complex. Notes on recent finds from Poulton Station, north-western Ogilvie Mountains, Yukon. Paper presented at the 1998 meetings of the Canadian Archaeological Association, Victoria, British Columbia.

Crossen, K. D.R. Yesner, and N. A. Easton
2010 Geoarchaeological And Zooarchaeological Correlates Of Eastern Beringian Lithic Assemblages. In Ted Goebel and Ian Buvit (eds.), *From the Yenisei to the Yukon: Interpreting Lithic Assemblage Variability in Late Pleistocene/Early Holocene Beringia*. Center for the Study of the First Americans, Texas A&M University Press, College Station, Texas. Pp: 308-322.

Davis, Neil
2001 *Permafrost: A Guide to Frozen Ground*. Fairbanks: University of Alaska Press.

Denton, G. H.
1974 Quaternary Glaciations of the White River Valley, Alaska, with a Regional Synthesis for the Northern St. Elias Mountains, Alaska and Yukon Territory. Geological Society of America Bulletin Vol. 85:871-892.

Derry, D. E.
1975 Later Athapaskan Prehistory: a migration hypothesis. *The Western Canadian Journal of Anthropology*. 5(3-4):134-147.

Dilley, T. E.
1998 Late Quaternary Loess *Stratigraphy, Soils, and Environments of the Shaw Creek Flats Paleoindian Sites, Tanana Valley, Alaska*. Ph.D. Dissertation, Department of Geosciences, University of Arizona.

Dixon, E. J.
1999 *Bones, Boats, and Bison: Archeology and the First Colonization of Western North American Albu*. Albuquerque: University of New Mexico Press.
2013 Arrows and Atl Atls: A Guide to the Archaeology of Beringia. Washington, D.C.: National Parks Service.

Dobrowolsky, H.
1997 White River First Nation Land Use and Occupancy Study. Final Report to the White River First Nation, September 1997.

Dummond, D.
2010 The Dene Arrival in Alaska. In J. Kari and B.A. Potter (eds), The Dene-Yeniseian Connection. *Anthropological Papers of the University of Alaska*. Volume 5 New Series, Numbers 1-2, pp. 335-346.

Easton, N. A.
2002a *Final Report on Archaeological Investigations within the White River First Nation's Territory (1994 & 2001)*. Submitted to the White River First Nation, Yukon Heritage Branch, and Archaeological Survey of Canada (Archaeological Survey of Canada Permit # 94-4ASR [1994] and Yukon - Canada Archaeological Sites Regulation Permit # 01-15ASR [2001]).
2002b Final Report on Archaeological Investigations within the White River First Nation's Territory - 2002. Submitted to the White River First Nation and Yukon Heritage Branch.
2003 Eight Part Series on 2003 Field School in the Yukon News:"Unearthing Culture: A Field Guide", 9 June, p. 3; "Anthropology Students Get Their Hands Dirty", 20 June, p. 22; "Potlatch Serves as Initiation Ceremony for Student Anthropologists", 25 June, p. 20; "Ultimately, Archaeologists Have to Dig a Hole", 27 June, p. 25; "Tall Tales and Truth With Joseph Tommy Johnny", 9 July, p. 16-17, "Site Selection is a Science", 11 July, p. 20-21, "Students Travel in Recent Past", 8 Sept, p. 16, "The Present Sheds Light on the Past", 22 Sept, p. 10-11.

2004 Upper Tanana Plant Names and Cultural Notes Database. Research Manuscript. Northern Research Institute.

2005 "2004 Excavations at KdVo-6, a Nenana Complex Site of the Yukon - Alaska Borderlands." Paper delivered at the 32nd Annual General Meeting of the Alaska Anthropological Association. Anchorage, Alaska, 11 March 2005.

2007a "King George Got Diarrhea": The Yukon – Alaska Boundary Survey, Bill Rupe, and the Scottie Screek *Dineh. Alaska Journal of Anthropology*. Vol. 5, No. 1:95-118.

2007b The contributions of Richard Lee to the anthropological understanding of the really 'Real' western Subarctic Dineh culture in the twentieth century and the really 'Real' Richard Lee and me. *Before Farming* [online version] 2007/3 article 1.

2007c Excavations at the Little John Site (KdVo-6). Report to the White River First Nation, Yukon Heritage Branch, and Archaeological Survey of Canada. Whitehorse: Northern Research Institute.

2008a "It's Hard Enough to Control Yourself; It's Ridiculous to Think You Can Control Animals: Competing Views on the Bush in Contemporary Yukon." *The Northern Review*, No. 29 (Fall): 21-38.

2008b 2007 Archaeological Excavations at KdVo-6 and Regional Survey about Beaver Creek, Yukon Territory, Canada. Report to the White River First Nation, Yukon Heritage Branch, and Archaeological Survey of Canada. Whitehorse: Northern Research Institute.

2008c The Little John Site: 14,000 Years of Aboriginal Occupations in Southwest Yukon, Canada. Interpretive Poster. Whitehorse: Northern Research Institute.

2009a Archaeological Excavations at the Little John Site (KdVo6), Southwest Yukon Territory, Canada – 2008. Scottie Creek Culture History Project Research Manuscript 2009-01. Report to the White River First Nation, Yukon Heritage Branch, and Archaeological Survey of Canada. Whitehorse: Northern Research Institute.

2009b Scottie Creek Culture History Project – 2009 Field Summary. Scottie Creek Culture History Project Research Manuscript 2009-03. Whitehorse: Northern Research Institute.

2010 Archaeological Excavations at the Little John Site (KdVo6) Southwest Yukon Territory, Canada - 2009. Report to the White River First Nation, Yukon Heritage Branch, Archaeological Survey of Canada, and Northern Research Institute of Yukon College. Scottie Creek Culture History Project Research Manuscript 2010-01. Whitehorse: Northern Research Institute.

2011 Archaeological Excavations at the Little John Site (KdVo-6), Southwest Yukon Territory, Canada – 2010. Report to the White River First Nation, Yukon Heritage Branch, Archaeological Survey of Canada, and Northern Research Institute of Yukon College. Whitehorse: Northern Research Institute

2012 Archaeological Excavations at the Little John Site (KdVo-6), Southwest Yukon Territory, Canada – 2011. Report to the White River First Nation, Yukon Heritage Branch, Archaeological Survey of Canada, and Northern Research Institute of Yukon College. Scottie Creek Culture History Project Research Manuscript 2012-01. Whitehorse: Northern Research Institute.

2012a Yukon College Anthropology 225 Field Methods in Subarctic Archaeology and Anthropology 2012 Fieldwork Summary, 6 June – 9 August 2012. Report

submitted to Yukon College, White River First Nation, and Yukon Heritage Branch.
2012b Report on a Pedestrian Survey in the Vicinity of the Confluence of Coffee Creek and the Yukon River, Yukon Territory, Canada – 1 – 3 August 2012. Report submitted to White River First Nation and Yukon Heritage Branch.
2012c Report on the 2012 Art and Archaeology Initiative - A Collaboration between Yukon College Field School in Archaeology, The Northern Cultural Expression Society and Members of the White River First Nation of Beaver Creek Yukon. Report submitted to the Northern Cultural Expression Society and Yukon College. 10 August 2012.
2013a The Biface Sequence from the Little John Site (KdVo-6), Yukon Territory, Canada: More of the Same But Different. A Symposium in Honor of Roy and Maureen Carlson. Paper delivered to the Canadian Archaeological Association Meetings, Whistler, B.C., 16 May 2013.
2013b Yukon College's Field School in Subarctic Archaeology and Ethnography: A Multi-Disciplinary Introduction to Anthropological Research for Undergraduates & First Nation Youth. Poster presented to the Canadian Archaeological Association Meetings, Whistler, B.C., 16 May 2013.
nd. Upper Tanana Fieldnotes. 1992 - 2014.

Easton, N. A., G. MacKay, C. Baker, K. Hermanson, and P. Schnurr.
2004. "Nenana in Canada - 2003 Excavation of a Multi-Component Site (KdVo-6) in the Mirror Creek Valley, Yukon Territory, Canada" Paper delivered at the 31st Annual General Meeting of the Alaska Anthropological Association. Whitehorse, Yukon, 10 April 2004.

Easton, N. A., G. MacKay, and P. B. Young.
2007 "Archaeological Survey and Excavations of the Yukon - Alaska Borderlands, 2006." Paper delivered at the 34th Annual General Meeting of the Alaska Anthropological Association. Fairbanks, Alaska, March 2007.

Easton, N. A., G. R. MacKay, P. Schnurr, P. B. Young, and C. Baker.
2007 The Little John Site (KdVo-6): A Late Glacial Multi-Component (Nenana - Denali Complex) Site in the Far Southwest of Yukon Territory, Canada. *Current Research in the Pleistocene*. Vol 24:82-84.

Easton, N. A. and G. MacKay.
2008 Early Bifacial Points from the Little John Site (KdVo-6), Yukon Territory, Canada. In R. L. Carlson and M.P.R. Magne (eds.), *Projectile Point Sequences in Northwestern North America*. Burnaby, B.C.: Simon Fraser University Press. Pp. 263-282.

Easton, N. A., D. R. Yesner, V. Hutchinson, P. Schnurr and C. Baker.
2009 Wisconsin Interstadial(?), Terminal-Pleistocene, and Early-Holocene Radiocarbon Dates from the Little John Site, Southwest Yukon Territory, Canada. *Current Research in the Pleistocene*. Vol. 26: 47-50.

Easton, N. A., G. R. MacKay, P.B. Young, P. Schnurr, and D. Yesner
2011 Chindadn In Canada? Emergent Evidence of the Pleistocene Transition in Southeast Beringia as Revealed by the Little John Site, Yukon. In Ted Goebel and Ian Buvit (eds.), *From Yenisei to the Yukon: Explaining Lithic Variability in Late Pleistocene / Early Holocene Beringia*. College Station: Texas A&M University. Pp. 289 – 307.

Easton, N.A., M. Grooms, and J. Handley
2012 2011 Excavations at the Little John Site (KdVo6), Yukon Territory, Canada. Paper delivered to the 39th Annual Meetings of the Alaska Anthropological Association, Seattle, Washington, 1 March 2012.

Easton, N. A., M. Grooms, J. Handley, V. Hutchinson, and D.R. Yesner.
2013a Analytical Developments in Interpreting the Little John Site, 2013 Update. Poster presented to the Canadian Archaeological Association Meetings, Whistler, B.C., 16 May 2013.

Easton, N. A., D. Kennedy, and R. Bouchard.
2013 White River First Nation Traditional Territory: A Consideration of the Northern Boundary. Report to the White River First Nation.

Easton, N. A., M. Grooms, J. Cubley, M. Samolczyk, L. Bourgeon, J. Handley, N. Virga, V. Hutchinson, D. Yesner.
2013 Analytical Approaches to Interpreting the Little John Site (KdVo6), a Late Pleistocene Occupation in Yukon's Beringia. Poster presented at the Paleoamerican Odyssey Conference, Santa Fe, New Mexico. 18 October, 2013.

Easton, N. A., M. Grooms, J. Cubley, M. Samolczyk, L. Bourgeon, J. Handley, N. Virga, V. Hutchinson, D. Yesner.
2014 Excavations and Analysis of the Little John Site (KdVo-6), Yukon Territory, Canada, 2013. Paper presented to the Annual Meetings of the Alaska Anthropology Association, Fairbanks, AK, 6 March 2014.

Easton, N. A., V. Hutchinson, D. Yesner, A. Janssens, K. Herrera, L. Bourgeon
2014 An Electronic Database of Fauna from the Little John Site (KdVo-6). Research Database housed at Yukon College.

Esdale, J.A.
2008 A Current Synthesis of the Northern Archaic. *Arctic Anthropology*, 45(2):3-38.
2009 Lithic Production Sequences and Toolkit Variability: Examples from the Middle Holocene, Northwest Alaska. Ph.D. Dissertation. Department of Anthropology, Brown University. Providence, Rhode Island.

Fagan, B. M.
1987 *The Great Journey: The Peopling of Ancient America*. London: Thames & Hudson.

Farnell, R., P. G. Hare, E. Blake, V. Bowyer, C. Schweger, S. Greer, & R. Gotthardt.
2005. Multidisciplinary investigations of alpine ice patches in southwest Yukon, Canada: Paleoenvironmental and paleobiological investigations. *Arctic*, 57(3), 247-259.

Fedje, D.W., M.P.R. Magne, and T. Christensen
2005. Test Excavations at Raised Beach Sites in Southern Haida Gwaii and their significance to Northwest Coast archaeology. In *Haida Gwaii: Human history and environment from the time of Loon to the time of the Iron People*, edited by D. Fedje and R. Mathewes. UBC Press, pp. 204-241.

Friend, C., G. Holton and N. A. Easton
2007 "An American-Canadian Traditional Ecological Knowledge Study of the Upper Tanana River Fisheries." *Proceedings of Alaska Park Science Symposium 2006 - Park Science in Central Alaska: Crossing Boundaries in a Changing Environment*. Alaska Park Science. Vo. 6, Issue 2, (Dec) 2007: 78-82.

Friend, C. G. Holton, C. Brown, N. A. Easton, and M. Koskey
2007 Upper Tanana Subsistence Fisheries Traditional Ecological Knowledge Study, Final Report No. FIS 04-253. U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Management Program. Fairbanks, Alaska.

Giddings, J.L.
1956 The Burin Spall Artifact. *Arctic*, 9(4), 229-237.

Goebel, T. W.R. Powers and N. H. Bigelow.
1991. The Nenana Complex of Alaska and Clovis Origins. In *Clovis: Origins and Adaptations*, edited by R. Bonnichsen and K.L. Tunmire. Centre for Study of First Americans.

Goebel, T. and L. Pontti.
1992. The Chindadn Point: A New Type Fossil for the Beringian Paleolithic. Paper presented at the 21st Arctic Workshop, Fairbanks, Alaska.

Goebel, T. and N.H. Bigelow
1996. Panguingue Creek. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West. University of Chicago Press, pp. 366-370.

Goebel, T., W.R. Powers, N.H. Bigelow and A.S. Higgs
1996. Walker Road. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West. University of Chicago Press, pp. 356-362.

Goebel, T. & S. B. Slobodin.
1999. The Colonization of Western Beringia: Technology, Ecology, and Adaptations. In R. Bonnichsen and K. L. Turnmire (Eds.), *Ice Age People of North America: Environments, Origins, and Adaptation* (pp. 104-155). Centre for the Study of the First Americans, Corvallis: Oregon State University Press.

Greer, S. C.
1993. Annie Lake: A Southern Yukon Mid-Holocene Cultural Complex. *Canadian Journal of Archaeology*, 17, 26-42.

Grooms, M. and N. A. Easton
2013 Stratigraphy and Chronology at the Little John Site, Yukon Territory, Canada. Poster presentation to the 40th Annual Meetings of the Alaska Anthropology Association, Anchorage, AK, 15 March 2013.

Gotthardt, R.
1987. Selkirk Indian Band: Culture and Land Use Study. Mss. Selkirk Indian Band.
1990. The Archaeological Sequence in the Northern Cordillera: A Consideration of Typology and Traditions. Occasional Papers in Archaeology No. 1. Heritage Branch, Government of Yukon.

Grooms, M. and N. A. Easton
2012 Stratigraphy and Chronology at the Little John Site, Yukon Territory, Canada. Poster presentation to the Alaska Anthropology Association conference. Anchorage, AK.

Guzman, M.
2014 13,000 Years of Occupation at the Britannia Yukon Hill Site: Results of Exploratory Excavations at KfVi-3. Paper presented to the Alaska Anthropology Association Meetings, Fairbanks, Alaska, 8 March 2014.

Guthrie, R. D.
1990. *Frozen Fauna of the Mammoth Steppe*. Chicago: University of Chicago Press.

Hamilton, T.D and T. Goebel
1999. Late Pleistocene Peopling of Alaska. In *Ice Age Peoples of North America: Enivironments, Origins, and Adaptations of the First Americans*, edited by R. Bonnichsen and K.L. Turnmire. Centre for the Study of First Americans.

Hammer, T. J. and H. Dobrowolsky
2001 Tr’ochëk – the Archaeology and History of a Han Fish Camp. Dawson: Tr’ondëk Hwëchin.

Handley, J.D.
2013 An Exploratory pXRF Analysis of Non-Vitreous Igneous Artifacts At the Little John Site, Yukon Territory. Undergraduate Thesis for the Department of Archaeology, Simon Fraser University.

Handley, J. D., N. A. Easton, and R. Reimer.
2014 Elemental Analysis of Basaltic Materials from the Little John Site (KdVo6), Yukon Territory, Canada. Mss submitted to ARCTIC,

Hare, P.G.
1995. *Holocene Occupations in the Southern Yukon: New Perspectives from the Annie Lake Site*. Whitehorse: Heritage Branch, Government of the Yukon.

Hare, P. G., S. Greer, R. Gotthardt, R. Farnell, V. Bowyer, C. Schweger, & D. Strand.
2004. Ethnographic and Archaeological Investigations of Alpine Ice Patches in Southwest Yukon, Canada. *Arctic*, 57(3), 260-272.

Hare, P. G. & T.J. Hammer.
1997. *New Data for a Late Persistence of Microblades in the Yukon*. Paper presented at the 24th Annual Meetings of the Alaska Anthropological Association, Whitehorse, Yukon.

Heffner, T..
2000. *Final Report for Permit #99-4ASR*. Submitted to White River First Nation and Yukon Heritage Branch.
2002. *KaVn-2: An Eastern Beringian Tradition Archaeological Site in West-Central Yukon Territory, Canada*. Whitehorse: Heritage Branch, Government of the Yukon.

Hoffecker, J.F.
1996. Moose Creek. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West. University of Chicago Press, pp. 363-365.
2011 Assemblage Variability in Beringia: The Mesa Factor. In Ted Goebel and Ian Buvit (eds.), *From Yenisei to the Yukon: Explaining Lithic Variability in Late Pleistocene / Early Holocene Beringia*. College Station: Texas A&M University. Pp. 165-178.

Hoffecker, J.F., W.R. Powers and T. Goebel
1993. The Colonization of Beringia and the Peopling of the New World. Science 259:46-53.

Hoffecker, J.F, W. R. Powers, and N. Bigelow
1996. Dry Creek. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West, University of Chicago Press, pp. 343-352.

Hoffecker, J.F. and S.A. Elias
2007. *Human Ecology of Beringia*. Columbia University Press.

Holmes, C.E.
1996. Broken Mammoth. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West, University of Chicago Press, pp. 312-318.
1998 New Data Pertaining to Swan Point, the Oldest Microblade Site Known in Alaska. *Current Research in the Pleistocene*, 15:21-22.
2001. Tanana River Valley Archaeology Circa 14,000 to 9000 BP. Arctic Anthropology 38(2): 154-170.
2008 The Taiga Period: Holocene Archaeology of the Northern Boreal Forest, Alaska. *Alaska Journal of Anthropology*, 6(1-2):68-81.

2011 The Beringian and Transitional Periods in Alaska: Technology of the East Beringian Tradition as Viewed from Swan Point. In Ted Goebel and Ian Buvit (eds.), *From Yenisei to the Yukon: Explaining Lithic Variability in Late Pleistocene / Early Holocene Beringia*. College Station: Texas A&M University. Pp. 179-191.

Holmes, C.E., R. VanderHoek, and T. E. Dilley
1996. Swan Point. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West, University of Chicago Press, pp. 319-323.

Hosley, E. H.
1981a. Environment and Culture in the Alaska Plateau. In June Helm (Ed.), *Handbook of the North American Indian, Vol. 6, Subarctic* (pp. 533-545).Washington: Smithsonian Institution.
1981b. Intercultural Relations and Cultural Change in the Alaska Plateau. In June Helm (Ed.), *Handbook of the North American Indian, Vol. 6, Subarctic* (pp. 546-555).Washington: Smithsonian Institution.

Hughes, O. L., N. W. Rutter and J. J. Clague
1989. Yukon Territory. In Chapter One of *Quaternary Geology of Canada and Greenland*, edited by R. J. Fulton. Geological Survey of Canada, Geology of Canada, No. 1:58-62.

Hutchinson, V., N.A. Easton, G. MacKay, P.B. Young
2007. Faunal Remains From the Little John Site (KdVo-6): An Early Holocene Assemblage from the Yukon - Alaska Borderlands. Paper presented to the Alaska Anthropology Association, Fairbanks, Alaska.

Ives, J. W.
1990 *A Theory of Northern Athapaskan Prehistory*. Calgary: University of Calgary Press.
2003 Alberta, Athapaskans and Apachean Origins. In J. W. Brink and J. F. Dormaar (Eds.), Archaeology in Alberta: A View from the New Millenium. Medicine Hat: Archaeological Society of Alberta, pp. 256-289.

Ives, J. W., D. Froese, K. Supernant, and G. Yanicki
2013 Vectors, Vestiges, and Valhallas – Rethinking the Corridor. In *Paleoamerican Odyssey*, edited by K. E. Graf, C. V. Ketron, and M. R. Waters. College Station: Center for the Study of the First Americans, pp. 149-169.

Johnson, F.
1946. An Archeological Survey Along the Alaska Highway, 1944. *American Antiquity*, 11, 183-186.

Johnson, F. & H. M. Raup.
1964. *Investigations in the Southwest Yukon: Geobotanical and Archeological Reconnaissance*. Arctic Institute of North America [Technical Paper No. 11].

Kari, J. and B. A. Potter
2010 The Dene-Yeniseian Connection. *Anthropological Papers of the University of Alaska. New Series, Vol. 5 (1-2)*. Fairbanks.

Krinsley, D. B.
1965. Pleistocene Geology of the Southwest Yukon Territory, Canada. *Journal of Glaciology* Vol. 5:385-397.

Kooyman, B. P.
2000 *Understanding Stone Tools and Archaeological Sites*. University of Calgary Press, Calgary.

Kunz, M.L., M. Bever, and C. Adkins
2003 The Mesa Site: Paleoindians above the Arctic Circle. BLM-Alaska Open File Report 86. http://www.blm.gov/pgdata/etc/medialib/blm/ak/aktest/ofr.Par.6519.File.dat/ofr86.pdf

Kunz, M.L. and R.E. Reanier
1994 Paleoindians in Beringia: Evidence from Arctic Alaska. Science 263:660-662.
1996 The Mesa Site, Iteriak Creek. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West. University of Chicago Press, pp. 497-504.

Leblanc R. J. & M. J. Wright.
1990. Microblade Technology in the Peace River Region of Northwestern Alberta. *Canadian Journal of Archeology*, 14, 1-11.

Lively, R.A.
1996. Chugwater. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West. University of Chicago Press, pp. 308-311.

Lerbekmo, J. F. and J. A. Westgate
1975. New Data on the Character and History of the White River Volcanic Eruption, Alaska. In *Quaternary Studies*, edited by R. P. Suggate and M. M. Cresswell, pp. 203-209.

Lewis, D. W. & D. McConchie.
1994a. *Practical Sedimentology*. Chapman and Hall, New York.
1994b. *Analytical Sedimentology*. Chapman and Hall, New York.

MacNeish, R. S.
1962 Recent Finds in the Yukon Territory of Canada. In Prehistoric Cultural Relations between the Arctic and Temperate Zones of North America. *Arctic Institute of North America Technical Paper No. 11*, 20-26.
1964. *Investigations in Southwest Yukon*. Robert S. Peabody Foundation for Archeological Excavations, Comparisons, and Speculations, Andover, MA: Phillips Academy.

Magne, M. P. R.
2012 Modelling Athapaskan Migrations. In From the Land of Ever Winter to the American Southwest: Athapaskan Migrations, Mobility, and Ethnogenesis, edited by D. J. Seymour. Salt Lake City: University of Utah Press, pp. 356-376.

Magne, M. P. R. and D. Fedje
2007 The Origin and Spread of Microblade Technology in Northern Asia and North America, ed. Y. V. Kuzmin, S. G. Keates, and C. Shen. Burnaby, British Columbia: Simon Fraser University Archaeology Press, pp. 171-188.

Matrix Research
2012 Heritage Resources Impact Assessment of the Kaminak Gold Coffee Project Conducted Under Permit 11-03ASR. Report submitted to Yukon Heritage Resources Unit, Whitehorse, Yukon.

Matson, R.G.
1996. The Old Cordilleran Component at the Glenrose Cannery Site. In *Early Human Occupation in British Columbia*, edited by R.L. Carlson and L. Dalla Bona, pp. 111-122.

Matson, R.G. and M.P.R. Magne
2007 Athapaskan Migrations: The Archaeology of Eagle Lake, British Columbia. Tucson: University of Arizona Press.

MacIntosh, G.
1997. Paleoecology of the Scottie Creek District, Beaver Creek, Yukon. Masters of Science Thesis. Department of Geology. University of Alaska – Fairbanks.

Mitchell, D. and D.L. Pokotylo
1996 Early Period Components at the Milliken Site. In *Early Human Occupation in British Columbia*, edited by R.L. Carlson and L. Dalla Bona, UBC Press, pp. 65-82.

Moberly, C.M.
1991 *The Campus Site: A Prehistoric Camp at Fairbanks, Alaska*. University of Alaska Press.

Moodie, D.W. & A. J. W. Catchpole.
1992 Northern Athapaskan Oral Traditions and the White River Volcano. *Ethnohistory*, 39, 2, 148-171.

Morlan, R.E.
1973 *The Later Prehistory of the Middle Porcupine Drainage, Northern Yukon Territory*. National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 11. Ottawa: Queen's Printer.

Morlan R. & J. Cinq-Mars.
1982 Ancient Beringians: Human Occupation in the Late Pleistocene of Alaska and the Yukon Territory. In Hopkins D., J. Matthews, C. Schweger, & S. Young (Eds.), *Paleoecology of Beringia*, (pp. 353-381). New York: Academic Press.

Morrison, D. A.
1987 The Middle Prehistoric Period and the Archaic Concept in the Mackenzie Valley. *Canadian Journal of Archaeology*, 11, 49-74.

Nadasdy, P.
2007 The Gift in the Animal: The Ontology of Hunting and Human-Animal Sociality. American Ethnologist, 34, 1, 25-43.

Nakazawa, J.
2005 Refitted Material and Consideration of Lithic Reduction Sequence among Microblade Assemblages: A View from the Okushirataki-1 Site, Hokkaido, Northern Japan. Asian Perspectives, Vol. 49, No. 2: 332-347.

Odell, G. H.
2003 *Lithic Analysis*. Manuals in Archaeological Method, Theory, and Technique. Springer Press, New York.

Oswald, E. T. & J. P. Senyk.
1977 *Ecoregions of Yukon Territory*. Canadian Forest Service, Pacific Forestry Research Centre, Report BC-X-164. Vancouver: Fisheries and Environment Canada.

Outram, A. K. (2001), A new approach to identifying bone marrow and grease exploitation: why the "indeterminate" fragments should not be ignored, Journal of Archaeological Science, 28(4), 401-410.

Pearson, G.A.
1999. Early Occupations and Cultural Sequence at Moose Creek: A Late Pleistocene Site in Central Alaska. *Arctic* 52:332-345.

Pewe, T. L.
1975. Quaternary geology of Alaska: US Geological Survey Professional Paper 835.

Pewe, T. L. & R. D. Reger (eds.).
1983. Guidebook to permafrost and Quaternary geology along the Richardson and Glenn Highways between Fairbanks and Anchorage. Guidebook 1. Fourth International Permafrost Conference. Fairbanks. Alaska Division of Geological and Geophysical Surveys.

Potter, B.A.
2005. Site Structure and Organization in Central Alaska: Archaeological Investigations at Gerstle River. Ph.D. Thesis, Department of Anthropology, University of Alaska - Fairbanks.

2010 Archaeological Patterning in Northeast Asia and Northwest North America: An Examination of the Dene-Yeniseian Hypothesis. In J. Kari and B.A. Potter (eds), The Dene-Yeniseian Connection. *Anthropological Papers of the University of Alaska*. Volume 5 New Series, Numbers 1-2, pp. 138-167.

Potter, B.A., J.D. Irish, J.D. Reuther, C. Gelvin-Reymiller and V.T. Holliday
2011 A Terminal Pleistocene Child Cremation and Residential Structure from Eastern Beringia. Science. Vol. 331 (25 Feb): 1058-1062 and Supporting Online Materials.

Potter, B. A., C. E. Holmes, D. R. Yesner
2013 Technology and Economy among the Earliest Prehistoric Foragers in Interior Eastern Beringia. In *Paleoamerican Odyssey*, edited by K. E. Graf, C. V. Ketron, and M. R. Waters. College Station: Center for the Study of the First Americans, pp. 81-103.

Powers, W. R. and J. F. Hoffecker.
1989 Late Pleistocene Settlement in the Nenana Valley, Central Alaska. *American Antiquity* 54:263-87.

Rampton, V.
1971a Late Pleistocene Glaciations of the Snag-Klutlan Area, Yukon Territory. *Arctic* Vol. 24:277-300.
1971b Late Quaternary Vegetational and Climatic History of the Snag-Klutlan Area, Southwestern Yukon Territory, Canada. *Geological Survey of America, Bulletin* 82: 859-978.

Reimer PJ, Bard E, Bayliss A, Beck JW, Blackwell PG, Bronk Ramsey C, Buck CE, Cheng H, Edwards RL, Friedrich M, Grootes PM, Guilderson TP, Haflidason H, Hajdas I, Hatté C, Heaton TJ, Hogg AG, Hughen KA, Kaiser KF, Kromer B, Manning SW, Niu M, Reimer RW, Richards DA, Scott EM, Southon JR, Turney CSM, van der Plicht J.
2013 IntCal13 and MARINE13 radiocarbon age calibration curves 0-50000 years calBP. *Radiocarbon* 55(4). DOI: 10.2458/azu_js_rc.55.16947

Reuther, J.D., N. Slobodina, J. Rasic, J.P. Cook, and R.J. Speakman.
2011 Gaining Momentum: Late Pleistocene and Early Holocene Obsidian Source Studies in Interior and Eastern Beringia. In Ted Goebel and Ian Buvit (eds.), *From Yenisei to the Yukon: Explaining Lithic Variability in Late Pleistocene / Early Holocene Beringia*. College Station: Texas A&M University. Pp.

Slobodina, N. S. and R.J. Speakman
2008. Source Determination of Obsidian Artifacts from KdVo-6, KeVo-1, and *Taatsaan* Sites. Manuscript Report submitted to N. A. Easton, Yukon College, Whitehorse.

Smith, C.A.S., J.C. Meikle & C.F. Roots. (Eds.).
2004 *Ecoregions of the Yukon Territory – Biophysical Properties of a Yukon Landscape.* [PARC Technical Bulletin]. Ottawa: Agriculture and Agri-Food Canada.

Stiner, M. C. et al. (1995), Differential burning, recrystallization, and fragmentation of archaeological bone, Journal of Archaeological Science, 22, 223-237.

Stryd, A.R. and M.K. Rousseau.
1996 The Early Prehistory of the Mid Fraser-Thompson River Area. In *Early Human Occupation in British Columbia*, edited by R.L. Carlson and L. Dalla Bona, UBC Press, pp. 177-204.

Shinkwin, A.D.
1979 *Dakah de nin's Village and the Dixthada Site: A Contribution to Northern Athapaskan Prehistory*. National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 91. Ottawa: Queen's Printer.

Vajda, E.J.
2010a A Siberian Link with Na-Dene Languages. In J. Kari and B.A. Potter (eds), The Dene-Yeniseian Connection. *Anthropological Papers of the University of Alaska*. Volume 5 New Series, Numbers 1-2, pp. 138-167.
2010b Yeniseian, Na-Dene, and Historical Linguistics. In J. Kari and B.A. Potter (eds), The Dene-Yeniseian Connection. *Anthropological Papers of the University of Alaska*. Volume 5 New Series, Numbers 1-2, pp. 138-167.

Wahl, H. E., D. B. Fraser, R. C. Harvey, and J. B. Maxwell.
1987 Climate of the Yukon. Climatological Studies Number 40. Atmospheric Environment Service, Environment Canada. Ottawa: Canadian Government Publishing Centre.

Walde, K.
1991. *Archeological Assessment of the Shakwak Highway Upgrading Project, km 1910 to km 1969*. Whitehorse: Yukon Heritage Branch.
1994. *Archeological Salvage Program at KaVn-2, KbVo-1, KbVo-2, and KdVo-3, Alaska Highway, Shakwak Project, Segments 16A, 17A, and 18B, Beaver Creek Area, S.W. Yukon*. Whitehorse: Yukon Heritage Branch.

West, F.H.
1967 The Donnelly Ridge Site and the Definition of an Early Core and Blade Complex in Central Alaska. *American Antiquity* 32:360-382.
1981 *The Archeology of Beringia*. New York: Columbia University Press.
1996a The Archaeological Evidence. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West. University of Chicago Press, pp. 537-564.
1996b Teklanika West. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by F.H. West. University of Chicago Press, pp. 332-342.
1996c Editor. *American Beginnings: The Prehistory and Paleoecology of Beringia* Chicago: University of Chicago Press.

West, K.D. and J.A. Donaldson.
2002. Resedimentation of the late Holocene White River tephra, Yukon Territory and Alaska. In *Yukon Exploration and Geology*, edited by D.S. Edmond, L.H. Weston and L.L. Lewis. Exploration and Geological Service Division, Yukon Region, Indian and Northern Affairs, Canada, pp. 239-247.

Wisner, G.
2010 The Little John Site: Rewarding Archaeologists and Yukon Natives. Mammoth Trumpet, 25 (3):8-12.

Workman, W. B.
1974. First Dated Traces of Early Holocene Man in Southwest Yukon Territory, Canada. *Arctic Anthropology,* 11 (supplemental), 94-103.
1978. *Prehistory of the Aishihik – Kluane Area, Southwest Yukon Territory*. Ottawa: National Museums of Canada.

Wright, J. V.
1995. A History of the Native People of Canada. *Canadian Museum of Civilization Mercury Series, Archaeological Survey of Canada Paper, Volume I* (No. 152). Ottawa: Canadian Museum of Civilization.

Yesner, D. R.
1996. Human Adaptations at the Pleistocene – Holocene Boundary (circa 13,000 to 8,000 B.P.) in Eastern Beringia. In L. G. Straus, B. V. Eriksen, J. M. Erlandson, & D. R. Yesner (Eds.), *Humans at the End of the Ice Age: The Archaeology of the Pleistocene-Holocene Transition* (pp. 255-257). New York: Plenum Press.

Yesner, D.R., C.E. Holmes, and K.J. Crossen.
1992. Archaeology and Paleoecology of the Broken Mammoth Site, Central Tanana Valley, Interior Alaska. *Current Research in the Pleistocene* 9:53-57.

Yesner, D.R. and G. Pearson.
2002. Microblades and Migrations: Ethnic and Economic Models in the Peopling of the Americas. In *Thinking Small: Global Perspectives on Microlithization*, edited by Robert G. Elston and Steven L. Kuhn. Archaeological Papers of the American Anthropological Association No.12 , Pp. 133-161.

Yesner, D. R., K. J. Crossen, and Norm A. Easton
2008 "Permafrost is no excuse": Geoarchaeology and Zooarchaeology of the Little John Paleoindian Site, Alaska/Yukon Borderlands. In *Proceedings of the Ninth International Conference on Permafrost,* University of Alaska Fairbanks, Vol. 2, editied by D. L. Kane and K. M. Hinkel, pp. 1993–1996.Institute of Northern Engineering, University of Alaska Fairbanks, Fairbanks.

Yesner, D.R., K. Crossen, R. Eagle, and N. A. Easton.
2011 Geoarchaeological And Zooarchaeological Correlates Of Eastern Beringian Assemblages: Insights from the Little John Site, Yukon. In Ted Goebel and Ian Buvit (eds.), *From Yenisei to the Yukon: Explaining Lithic Variability in Late*

Pleistocene / Early Holocene Beringia. College Station: Texas A&M University. Pp. 308-322.

Yesner, D. R., N.A. Easton, K.J. Crossen
2012 Effects of Permafrost and Other Cryological Phenomena on the Structure of Faunal Assemblages in Late Pleistocene - Early Holocene Beringian Sites. Paper presented to "Frozen Pasts" – 3rd International Glacial Archaeology Conference. Whitehorse, Yukon Territory, Canada, 4 June 2012.

Youatt, E.
2010 Becoming Native Again: Cultural Revitalization of the White River First Nation in the Yukon/Alaska Borderlands. Undergraduate Honours Thesis, Division of History and Social Sciences, Reed College.

Youatt, E. and N. A. Easton
2010 "The Reports of My Death Have Been Greatly Exaggerated" – Cultural Continuity of the Yukon – Alaska Borderland *Dineh*." Paper presented to the 37th Annual Meetings of the Alaska Anthropological Association, Anchorage, Alaska, 26 March 2010

Figure 103. Greg Hare Shows Ice Patch Artifacts to the 2013 Field Crew.

Figure 104. Laying Out a Unit with Yukon Junior Rangers.

Figure 105. Niki Virga, David Yesner, and Kris Crossen at Little John, 2013.

Figure 106. 2013 Field Crew and Art and Archaeology Participants.