



**ARCHAEOLOGICAL INVESTIGATIONS  
PGT-PG&E PIPELINE EXPANSION PROJECT  
IDAHO, WASHINGTON, OREGON, AND CALIFORNIA**

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General Editor

**Volume V  
TECHNICAL STUDIES**

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**Pacific Gas Transmission Company**  
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in partial fulfillment of:

**Subcontract No. 20822-SC-41**

March 1995

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## APPENDIX C RESULTS OF OBSIDIAN STUDIES

Compiled by Craig E. Skinner\*

This appendix presents the results of various obsidian studies performed in conjunction with the PGT-PG&E Pipeline Expansion Project (PEP) and is divided into five sections. PEP obsidian characterization and hydration studies are discussed in Chapters 4 and 5.

Obsidian sourcing and provenience information for all characterized samples from the Northwest are presented in Section C.1 and all characterized samples from California are presented in Section C.2. These tables provide a record of all trace element (XRF) and visual obsidian characterization studies. They also show trace element concentrations, analytical uncertainties, and the identified geologic source of the sample.

Sections C.3 and C.4 provide summary results of all obsidian hydration and characterization studies for PEP samples from the Northwest and California respectively. These tables includes the mean values of measurable hydration rims, sample provenience information, and brief comments. Also included is geological source of the artifact. In contrast to the source attributions presented in Sections C.1 and C.2, Sections C.3 and C.4 identify the Grasshopper Flat/Lost Iron Wells/Red Switchback and East Medicine Lake sources based on their zirconium value (see Chapter 4), refining the all inclusive "Grasshopper Group" attributions.

Obsidian sources identified during the x-ray fluorescence (XRF) characterization studies conducted for the PEP are presented in Section C.5.

Categories of information used in Sections C.1, C.2, C.3, and C.4 are defined below.

**Site.** Site trinomial or PEP site number, if no trinomial was assigned.

**Specimen.** Lot number, specimen number, and item number.

**Artifact Source/Chemical Type.** In most cases, the chemical group or source to which the sample was assigned is based on the trace element composition of the item. Because of the limited space available, some sources occasionally were abbreviated when only undifferentiated chemical source groups (e.g., Little Bear Cr./Whitewater R./Juniper Sp. 1) were identifiable:

Juniper Sp. 1 = Juniper Spring 1

Juniper Sp. 2 = Juniper Spring 2

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\*INFOTEC Research, Inc.

Little Bear Cr. = Little Bear Creek  
Whitewater R. = Whitewater Ridge

A “?” immediately following a source indicates a provisional source assignment (e.g., Newberry Volcano?); for these samples, trace element values fell very close to the known range of geochemical values determined for the geologic source. Any sample whose source was visually assigned without trace element data is noted in the Artifact Source/Chemical Type column—the source ascription of the artifact is immediately followed in the column by a (V) or (MV) notation. Samples characterized on the basis of megascopic visual characteristics received the (V) designation; these were all from California sites investigated by BioSystems Analysis (n=352). Artifacts characterized on the basis of microscopic petrographic attributes are followed by (MV); these were all from the Oregon Site 35-JE-49 (n=49).

**Unknown Sources.** Chemical groups for which no known geologic source could be identified are denoted by a letter immediately following the unknown designation (e.g., Unknown A, Unknown B, etc.). *The letter suffixes following the Unknown designations have no significance other than temporarily differentiating among unknown obsidian sources* and are assigned simply on the basis of the order of the catalog number of the artifact. These unknown group designations are *specific to every site*, that is, Unknown A at one site has no genetic relationship with an Unknown A source at any other site.

The following category appears only in Sections C.1 and C.2:

**Trace Element Concentrations.** Trace element abundances (Zn, Ga, Rb, Sr, Y, Zr, Nb, Ti, Mn, and Ba) and analytical uncertainties ( $\pm$ ) are reported in parts per million (ppm).  $\text{Fe}_2\text{O}_3$  concentrations are reported as weight percent oxide; uncertainty is reported in percent. The iron-manganese ratio is reported by Richard Hughes as a standard ratio; the ratios are presented by BioSystems Analysis only as uncorrected counts.

These categories are pertinent to Sections C.3 and C.4 only:

**Unit.** Test or excavation unit type and location.

**Depth.** Top and bottom of unit (cm below surface).

**CLA.** Classification of sample:

BIF	Biface
COR	Core
DEB	Debitage
EXS	Exotic Stone
FLB	Flaked Blank (BioSystems 1991 only)
PFT	Patterned Flaked Tool
PPT	Projectile Point
UFT	Unpatterned Flaked Tool
UNF	Unifacial Tool (BioSystems 1991 only)



**Hydration Rims.** Average obsidian hydration rim. The uncertainty ( $\pm$ ) presented after each measurement represent one standard deviation of the multiple rim measurements. Standard deviations of less than 0.049 are reported as 0.0.

DH = Diffuse hydration (hydration rim not measurable)

NVB = No visible band found after preparation

NM = Not measured; sample was not prepared for obsidian hydration measurement

NO = Not obsidian

NR = Not readable; sample was prepared but rim could not be measured

VW = Variable width band

**Comments.** Brief comments regarding the individual sample. OH is used as an abbreviation for obsidian hydration.

Appendix C.1 Results of Northwest Obsidian Characterization Studies.

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
10-BY-444	134	2	A	50 ± 6	10 ± 3	141 ± 4	109 ± 3	75 ± 2	122 ± 5	29 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
10-BY-444	135	2	A	93 ± 6	23 ± 3	263 ± 4	2 ± 3	90 ± 2	175 ± 5	45 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliff, Wyoming
35-CR-626	3	1	A	49 ± 6	16 ± 3	139 ± 4	60 ± 3	44 ± 2	280 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	4	1	A	77 ± 5	23 ± 3	140 ± 4	62 ± 3	45 ± 2	191 ± 5	7 ± 3	1011 ± 25	344 ± 20	NM ± NM	1.75 ± 0.08	NM ± NM	McKay Butte
35-CR-626	4	1	B	60 ± 6	19 ± 3	138 ± 4	68 ± 3	42 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	4	1	C	65 ± 6	18 ± 3	140 ± 4	64 ± 3	44 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	4	1	D	80 ± 6	20 ± 3	147 ± 4	63 ± 3	47 ± 2	190 ± 5	7 ± 3	881 ± 28	349 ± 20	NM ± NM	1.72 ± 0.08	NM ± NM	McKay Butte
35-CR-626	4	1	E	82 ± 5	22 ± 3	137 ± 4	61 ± 3	42 ± 2	183 ± 5	7 ± 3	781 ± 26	355 ± 20	NM ± NM	1.65 ± 0.08	NM ± NM	Quartz Mountain/McKay Butte
35-CR-626	4	1	F	84 ± 7	21 ± 4	150 ± 5	66 ± 3	49 ± 2	194 ± 5	7 ± 3	831 ± 29	338 ± 20	NM ± NM	1.73 ± 0.08	NM ± NM	McKay Butte
35-CR-626	4	1	G	68 ± 6	19 ± 3	136 ± 4	62 ± 3	44 ± 2	180 ± 5	6 ± 3	771 ± 27	338 ± 20	NM ± NM	1.67 ± 0.08	NM ± NM	Quartz Mountain/McKay Butte
35-CR-626	4	1	H	77 ± 6	29 ± 3	151 ± 5	74 ± 3	46 ± 2	299 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	4	1	I	45 ± 6	19 ± 3	136 ± 4	63 ± 3	42 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	4	1	J	68 ± 6	20 ± 3	137 ± 4	59 ± 3	45 ± 2	185 ± 5	7 ± 3	1278 ± 34	356 ± 20	NM ± NM	1.91 ± 0.08	NM ± NM	McKay Butte
35-CR-626	5	1	A	61 ± 6	22 ± 3	145 ± 4	64 ± 3	49 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	5	1	B	74 ± 6	20 ± 3	142 ± 4	65 ± 3	46 ± 2	181 ± 5	6 ± 3	801 ± 30	314 ± 20	NM ± NM	1.54 ± 0.08	NM ± NM	Quartz Mountain/McKay Butte
35-CR-626	5	1	C	65 ± 6	21 ± 3	129 ± 4	57 ± 3	43 ± 2	176 ± 5	8 ± 3	761 ± 26	341 ± 20	NM ± NM	1.65 ± 0.08	NM ± NM	Quartz Mountain/McKay Butte
35-CR-626	5	1	D	77 ± 6	20 ± 3	139 ± 4	62 ± 3	46 ± 2	182 ± 5	8 ± 3	853 ± 28	334 ± 20	NM ± NM	1.68 ± 0.08	NM ± NM	McKay Butte
35-CR-626	6	1	A	59 ± 6	17 ± 4	142 ± 4	62 ± 3	42 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	6	1	B	49 ± 6	16 ± 4	133 ± 4	57 ± 3	44 ± 2	283 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	6	1	C	71 ± 6	16 ± 3	130 ± 4	59 ± 3	44 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	6	1	D	50 ± 6	22 ± 3	130 ± 4	57 ± 3	45 ± 2	281 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	6	1	E	58 ± 6	19 ± 3	138 ± 4	59 ± 3	43 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-1

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-CR-626	7	1	A	53 ± 6	22 ± 3	144 ± 4	61 ± 3	47 ± 2	291 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	7	1	B	60 ± 7	19 ± 4	150 ± 5	64 ± 3	48 ± 2	299 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	7	1	C	69 ± 7	17 ± 4	152 ± 5	67 ± 3	47 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	7	1	D	68 ± 6	18 ± 3	152 ± 4	64 ± 3	45 ± 2	291 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	7	1	E	46 ± 6	15 ± 3	82 ± 4	110 ± 3	18 ± 2	100 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-CR-626	7	1	F	58 ± 6	18 ± 3	154 ± 4	62 ± 3	45 ± 2	296 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	7	1	G	59 ± 6	17 ± 3	89 ± 4	116 ± 3	16 ± 2	98 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-CR-626	8	1	A	56 ± 6	17 ± 3	135 ± 4	56 ± 3	45 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	B	62 ± 6	21 ± 3	150 ± 4	59 ± 3	44 ± 2	284 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	C	52 ± 5	17 ± 3	127 ± 4	54 ± 3	41 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	D	54 ± 6	17 ± 3	133 ± 4	60 ± 3	42 ± 2	283 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	E	62 ± 6	23 ± 3	145 ± 4	61 ± 3	45 ± 2	285 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	F	58 ± 6	15 ± 3	142 ± 4	61 ± 3	48 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	G	55 ± 6	16 ± 3	134 ± 4	56 ± 3	44 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	H	67 ± 6	21 ± 3	147 ± 4	63 ± 3	49 ± 2	291 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	I	52 ± 6	21 ± 3	139 ± 4	58 ± 3	47 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	J	61 ± 5	15 ± 3	135 ± 4	62 ± 3	46 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	K	56 ± 6	18 ± 3	142 ± 4	62 ± 3	44 ± 2	278 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	8	1	L	55 ± 6	16 ± 3	139 ± 4	58 ± 3	42 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	9	1	A	71 ± 6	19 ± 3	135 ± 4	58 ± 3	47 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	34	1	A	76 ± 7	20 ± 4	158 ± 5	73 ± 3	45 ± 2	297 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	49	1	A	63 ± 6	15 ± 4	146 ± 4	62 ± 3	43 ± 2	290 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-2

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-CR-626	68	1	A	67 ± 7	15 ± 4	143 ± 5	62 ± 3	43 ± 2	280 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	69	1	A	56 ± 6	17 ± 4	143 ± 4	59 ± 3	43 ± 2	286 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	78	1	A	60 ± 6	16 ± 3	133 ± 4	61 ± 3	45 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	131	1	A	59 ± 6	22 ± 3	136 ± 4	61 ± 3	43 ± 2	279 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	132	1	A	48 ± 5	18 ± 3	124 ± 4	54 ± 3	43 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	132	1	B	61 ± 6	17 ± 3	135 ± 4	59 ± 3	42 ± 2	282 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	132	1	C	58 ± 6	22 ± 3	136 ± 4	61 ± 3	43 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	132	1	D	51 ± 6	20 ± 3	123 ± 4	50 ± 3	41 ± 2	239 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?
35-CR-626	132	1	E	59 ± 6	21 ± 3	133 ± 4	55 ± 3	43 ± 2	272 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	133	1	A	60 ± 6	22 ± 3	138 ± 4	62 ± 3	45 ± 2	274 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	133	1	B	108 ± 7	19 ± 4	151 ± 5	60 ± 3	45 ± 2	281 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	133	1	C	52 ± 5	16 ± 3	128 ± 4	55 ± 3	39 ± 2	262 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	133	1	D	66 ± 6	20 ± 3	148 ± 4	63 ± 3	47 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	133	1	E	86 ± 6	20 ± 4	152 ± 5	61 ± 3	46 ± 2	287 ± 5	23 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	133	1	F	70 ± 6	23 ± 3	166 ± 5	67 ± 3	47 ± 2	301 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	134	1	—	65 ± 6	18 ± 4	129 ± 4	57 ± 3	43 ± 2	269 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	134	2	A	56 ± 6	15 ± 3	142 ± 4	59 ± 3	43 ± 2	278 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	134	2	B	61 ± 6	21 ± 3	139 ± 4	60 ± 3	44 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	135	1	A	80 ± 7	25 ± 4	162 ± 5	66 ± 3	45 ± 2	290 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	143	1	A	50 ± 6	15 ± 3	88 ± 4	112 ± 3	15 ± 2	102 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-CR-626	144	1	A	81 ± 7	19 ± 4	151 ± 5	63 ± 3	45 ± 2	183 ± 5	11 ± 3	716 ± 36	299 ± 21	NM ± NM	1.45 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-CR-626	147	1	A	71 ± 7	27 ± 3	154 ± 5	66 ± 3	48 ± 2	293 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-3

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-CR-626	155	1	A	48 ± 5	19 ± 3	134 ± 4	58 ± 3	44 ± 2	271 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	155	1	B	68 ± 6	19 ± 3	146 ± 4	59 ± 3	43 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	155	1	C	57 ± 6	17 ± 3	131 ± 4	58 ± 3	43 ± 2	274 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	157	1	A	57 ± 6	20 ± 3	143 ± 4	62 ± 3	47 ± 2	286 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	157	1	B	46 ± 6	17 ± 3	125 ± 4	58 ± 3	43 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	157	1	C	49 ± 6	19 ± 3	130 ± 4	55 ± 3	44 ± 2	270 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	157	1	D	54 ± 5	16 ± 3	127 ± 4	56 ± 3	42 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	157	3	—	47 ± 5	19 ± 3	122 ± 4	53 ± 3	38 ± 2	250 ± 5	14 ± 3	1229 ± 33	422 ± 20	NM ± NM	1.97 ± 0.08	NM	Newberry Volcano	
35-CR-626	158	1	A	59 ± 6	19 ± 3	136 ± 4	62 ± 3	50 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	158	1	B	62 ± 7	21 ± 4	154 ± 5	66 ± 3	46 ± 2	293 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	159	1	—	54 ± 6	15 ± 3	120 ± 4	55 ± 3	39 ± 2	163 ± 5	6 ± 3	688 ± 32	354 ± 20	NM ± NM	1.70 ± 0.08	NM	Quartz Mountain	
35-CR-626	159	2	A	51 ± 6	21 ± 3	138 ± 4	60 ± 3	46 ± 2	278 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	159	2	B	67 ± 6	15 ± 3	143 ± 4	60 ± 3	48 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	159	2	C	65 ± 6	13 ± 4	144 ± 4	58 ± 3	48 ± 2	285 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	160	1	—	60 ± 6	18 ± 3	144 ± 4	59 ± 3	47 ± 2	277 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	161	1	A	67 ± 6	21 ± 3	155 ± 4	65 ± 3	44 ± 2	294 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	161	1	B	62 ± 5	24 ± 3	147 ± 4	60 ± 3	44 ± 2	280 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	161	1	C	53 ± 5	17 ± 3	139 ± 4	59 ± 3	45 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	161	1	D	62 ± 6	21 ± 3	128 ± 4	56 ± 3	42 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	161	1	E	61 ± 6	19 ± 3	149 ± 4	64 ± 3	45 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	162	1	A	63 ± 6	19 ± 3	135 ± 4	56 ± 3	45 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-CR-626	162	1	B	69 ± 6	18 ± 4	147 ± 5	62 ± 3	47 ± 2	285 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.14

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-CR-626	162	1	C	67 ± 6	20 ± 3	148 ± 4	64 ± 3	46 ± 2	285 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	163	1	A	69 ± 6	22 ± 3	145 ± 4	62 ± 3	46 ± 2	285 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	163	1	B	62 ± 6	22 ± 3	144 ± 4	61 ± 3	43 ± 2	281 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	165	1	A	47 ± 6	17 ± 3	140 ± 4	59 ± 3	45 ± 2	281 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	167	1	A	61 ± 6	17 ± 3	139 ± 4	61 ± 3	44 ± 2	278 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	175	1	A	80 ± 6	18 ± 4	147 ± 4	60 ± 3	43 ± 2	287 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	176	1	—	53 ± 6	17 ± 3	142 ± 4	62 ± 3	43 ± 2	286 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	177	1	A	52 ± 5	18 ± 3	135 ± 4	59 ± 3	46 ± 2	279 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	177	1	B	63 ± 6	20 ± 3	142 ± 4	61 ± 3	40 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	179	1	A	61 ± 6	16 ± 3	139 ± 4	58 ± 3	44 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	179	1	B	59 ± 6	16 ± 3	144 ± 4	63 ± 3	47 ± 2	289 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	179	1	C	68 ± 6	23 ± 3	145 ± 4	65 ± 3	45 ± 2	285 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	181	1	—	51 ± 6	15 ± 3	128 ± 4	59 ± 3	43 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	181	2	A	57 ± 5	18 ± 3	131 ± 4	59 ± 3	43 ± 2	270 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	181	2	B	35 ± 5	19 ± 3	117 ± 4	53 ± 3	39 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	181	2	C	57 ± 5	21 ± 3	135 ± 4	59 ± 3	46 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-CR-626	187	1	A	101 ± 7	25 ± 4	160 ± 5	68 ± 3	48 ± 2	198 ± 5	9 ± 3	580 ± 35	326 ± 21	NM ± NM	1.52 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-CR-626	188	1	A	89 ± 6	24 ± 3	149 ± 4	68 ± 3	49 ± 2	194 ± 5	10 ± 3	788 ± 32	341 ± 20	NM ± NM	1.64 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-CR-627	5	1	A	82 ± 8	26 ± 4	131 ± 5	33 ± 3	36 ± 2	200 ± 5	15 ± 3	1241 ± 24	607 ± 20	659 ± 15	1.17 ± 0.08	NM ± NM	NM ± NM	Unknown A
35-CR-627	6	1	—	61 ± 7	25 ± 4	153 ± 4	62 ± 3	44 ± 2	300 ± 5	21 ± 3	1413 ± 25	375 ± 20	974 ± 14	1.92 ± 0.08	NM ± NM	NM ± NM	Newberry Volcano
35-CR-627	8	3	—	45 ± 5	20 ± 3	127 ± 4	56 ± 3	38 ± 2	193 ± 5	8 ± 3	1383 ± 23	358 ± 19	1070 ± 14	1.93 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-CR-627	106	1	—	37 ± 5	16 ± 3	77 ± 4	101 ± 3	15 ± 2	95 ± 4	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs

C.1-5

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-33	1	1	—	88 ± 6	15 ± 4	115 ± 4	10 ± 3	50 ± 2	321 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-33	2	1	—	52 ± 7	23 ± 4	101 ± 5	43 ± 3	24 ± 2	119 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-DS-33	4	1	—	70 ± 6	21 ± 3	146 ± 4	65 ± 3	46 ± 2	289 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	87	5	—	50 ± 6	19 ± 3	135 ± 4	56 ± 3	45 ± 2	268 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	182	1	A	53 ± 6	20 ± 3	139 ± 5	60 ± 3	43 ± 2	278 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	182	1	B	71 ± 6	19 ± 4	153 ± 5	62 ± 3	47 ± 2	301 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	182	1	C	57 ± 6	21 ± 3	143 ± 4	62 ± 3	44 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	182	1	D	81 ± 6	22 ± 4	145 ± 5	64 ± 3	41 ± 2	286 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	182	1	E	65 ± 6	26 ± 3	153 ± 5	64 ± 3	48 ± 2	292 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	183	1	A	60 ± 6	21 ± 3	141 ± 4	65 ± 3	40 ± 2	285 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	183	1	B	67 ± 6	22 ± 3	156 ± 5	65 ± 3	48 ± 2	300 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	184	1	A	57 ± 6	17 ± 3	132 ± 4	64 ± 3	45 ± 2	247 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	184	1	B	62 ± 7	18 ± 4	148 ± 5	64 ± 3	46 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	210	3	—	63 ± 6	21 ± 3	146 ± 4	60 ± 3	44 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	267	1	—	56 ± 6	16 ± 3	131 ± 4	59 ± 3	42 ± 2	282 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	331	1	A	65 ± 6	16 ± 3	121 ± 4	72 ± 3	44 ± 2	248 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	331	1	B	52 ± 5	18 ± 3	133 ± 4	59 ± 3	43 ± 2	278 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	331	1	C	56 ± 6	19 ± 3	128 ± 4	76 ± 3	41 ± 2	256 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	331	1	D	54 ± 6	18 ± 3	129 ± 4	65 ± 3	43 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	331	1	E	53 ± 6	20 ± 3	135 ± 4	65 ± 3	46 ± 2	276 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	331	1	F	49 ± 6	16 ± 3	131 ± 4	56 ± 3	44 ± 2	270 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	331	1	G	69 ± 7	19 ± 4	154 ± 5	68 ± 3	46 ± 2	200 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-6

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	331	1	H	74 ± 7	17 ± 4	152 ± 5	61 ± 3	44 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	331	1	I	79 ± 7	27 ± 4	155 ± 5	70 ± 3	47 ± 2	302 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	337	1	—	56 ± 6	15 ± 4	142 ± 5	63 ± 3	45 ± 2	283 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	419	1	—	68 ± 6	18 ± 4	143 ± 5	61 ± 3	44 ± 2	294 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	617	3	—	50 ± 6	17 ± 3	130 ± 4	55 ± 3	41 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	628	3	—	56 ± 6	18 ± 3	133 ± 4	55 ± 3	43 ± 2	276 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	834	2	A	98 ± 6	17 ± 4	138 ± 5	70 ± 3	43 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	834	2	B	82 ± 7	21 ± 4	148 ± 5	69 ± 3	43 ± 2	279 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	835	1	A	66 ± 6	16 ± 3	135 ± 4	68 ± 3	43 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	835	1	B	72 ± 6	17 ± 3	130 ± 4	64 ± 3	44 ± 2	269 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	835	1	C	66 ± 6	20 ± 3	137 ± 5	63 ± 3	44 ± 2	271 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	835	1	D	71 ± 7	20 ± 4	147 ± 5	66 ± 3	46 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	836	1	A	56 ± 6	20 ± 3	139 ± 4	62 ± 3	45 ± 2	279 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	A	52 ± 6	12 ± 4	127 ± 4	57 ± 3	41 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	B	64 ± 6	18 ± 4	144 ± 5	60 ± 3	46 ± 2	286 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	C	58 ± 6	16 ± 3	134 ± 4	61 ± 3	43 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	D	32 ± 6	15 ± 3	80 ± 4	105 ± 3	17 ± 2	94 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	1104	2	E	48 ± 6	17 ± 3	137 ± 4	65 ± 3	44 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	F	55 ± 6	16 ± 3	140 ± 4	60 ± 3	44 ± 2	272 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	G	67 ± 6	19 ± 3	141 ± 4	65 ± 3	46 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	H	65 ± 6	22 ± 3	159 ± 5	67 ± 3	50 ± 2	303 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	I	69 ± 6	19 ± 3	151 ± 5	67 ± 3	48 ± 2	290 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-7



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	1104	2	J	73 ± 7	25 ± 4	157 ± 5	67 ± 3	48 ± 2	300 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1104	2	K	54 ± 6	19 ± 3	138 ± 4	64 ± 3	47 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1105	2	A	47 ± 6	19 ± 3	132 ± 4	55 ± 3	41 ± 2	274 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1105	2	B	60 ± 6	20 ± 3	144 ± 4	59 ± 3	46 ± 2	289 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1105	2	C	64 ± 6	16 ± 4	145 ± 4	63 ± 3	47 ± 2	298 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1105	2	D	73 ± 6	22 ± 3	149 ± 5	66 ± 3	48 ± 2	289 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1160	3	—	50 ± 6	21 ± 3	129 ± 4	58 ± 3	40 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1163	3	—	53 ± 5	19 ± 3	130 ± 4	58 ± 3	42 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1179	3	—	60 ± 8	23 ± 4	131 ± 5	57 ± 3	46 ± 2	276 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	A	56 ± 6	19 ± 3	138 ± 4	63 ± 3	46 ± 2	288 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	B	57 ± 6	20 ± 3	139 ± 4	62 ± 3	46 ± 2	291 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	C	64 ± 6	22 ± 3	147 ± 4	64 ± 3	48 ± 2	296 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	D	50 ± 6	20 ± 3	131 ± 4	56 ± 3	41 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	E	65 ± 6	18 ± 3	152 ± 5	65 ± 3	47 ± 2	300 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	F	52 ± 6	17 ± 3	133 ± 4	56 ± 3	43 ± 2	273 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	G	58 ± 6	16 ± 4	151 ± 5	63 ± 3	49 ± 2	300 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	H	74 ± 6	19 ± 3	152 ± 4	66 ± 3	45 ± 2	304 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	2	I	65 ± 7	20 ± 4	144 ± 5	68 ± 3	48 ± 2	293 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	3	—	56 ± 5	19 ± 3	136 ± 4	59 ± 3	43 ± 2	282 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1182	4	—	76 ± 6	20 ± 3	65 ± 4	180 ± 4	41 ± 2	343 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A
35-DS-33	1183	2	A	73 ± 6	19 ± 3	150 ± 5	70 ± 3	51 ± 2	309 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1183	2	B	56 ± 6	19 ± 3	151 ± 4	62 ± 3	48 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-8

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-33	1183	2	C	71 ± 6	17 ± 4	151 ± 5	66 ± 3	47 ± 2	299 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1183	2	D	60 ± 6	20 ± 3	145 ± 4	60 ± 3	41 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1183	5	—	53 ± 6	21 ± 3	141 ± 4	62 ± 3	46 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1184	4	—	52 ± 5	13 ± 3	129 ± 4	60 ± 3	45 ± 2	269 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	A	60 ± 6	21 ± 3	151 ± 5	64 ± 3	46 ± 2	293 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	B	65 ± 6	25 ± 3	147 ± 5	59 ± 3	44 ± 2	289 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	C	65 ± 6	22 ± 3	160 ± 5	65 ± 3	50 ± 2	301 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	D	48 ± 6	19 ± 3	132 ± 4	59 ± 3	42 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	E	55 ± 5	16 ± 3	127 ± 4	54 ± 3	42 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	F	61 ± 6	15 ± 3	147 ± 4	62 ± 3	45 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	G	52 ± 5	21 ± 3	132 ± 4	58 ± 3	40 ± 2	273 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	H	55 ± 6	21 ± 3	143 ± 4	60 ± 3	43 ± 2	283 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	I	60 ± 6	19 ± 3	146 ± 4	60 ± 3	49 ± 2	280 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	J	54 ± 6	19 ± 3	134 ± 4	60 ± 3	45 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	K	51 ± 6	19 ± 3	136 ± 4	58 ± 3	44 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	L	60 ± 6	22 ± 3	144 ± 4	61 ± 3	47 ± 2	291 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	2	M	69 ± 6	18 ± 4	153 ± 5	64 ± 3	48 ± 2	301 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	3	—	55 ± 6	17 ± 3	125 ± 4	54 ± 3	46 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	4	—	84 ± 6	17 ± 4	133 ± 5	58 ± 3	43 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1202	5	—	40 ± 6	16 ± 3	128 ± 4	59 ± 3	41 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1203	3	—	47 ± 6	16 ± 3	128 ± 4	56 ± 3	41 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	1204	3	—	56 ± 6	23 ± 3	131 ± 4	57 ± 3	43 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-9

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	1204	4	—	57 ± 5	19 ± 3	135 ± 4	58 ± 3	44 ± 2	281 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	A	70 ± 6	20 ± 3	135 ± 4	59 ± 3	46 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	B	79 ± 6	17 ± 3	141 ± 4	62 ± 3	44 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	C	94 ± 7	21 ± 4	170 ± 5	71 ± 3	50 ± 2	302 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	D	63 ± 6	15 ± 4	140 ± 4	61 ± 3	46 ± 2	286 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	E	82 ± 6	19 ± 3	150 ± 4	67 ± 3	45 ± 2	292 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	F	71 ± 6	17 ± 3	117 ± 4	65 ± 3	42 ± 2	246 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	G	68 ± 7	16 ± 4	141 ± 5	62 ± 3	45 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	H	117 ± 9	28 ± 5	164 ± 5	70 ± 4	48 ± 2	311 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	I	69 ± 6	16 ± 3	125 ± 4	63 ± 3	40 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	J	56 ± 6	21 ± 3	137 ± 4	60 ± 3	43 ± 2	277 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	K	66 ± 6	21 ± 3	148 ± 5	65 ± 3	46 ± 2	293 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	L	77 ± 6	17 ± 4	159 ± 5	70 ± 3	49 ± 2	299 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	M	70 ± 6	16 ± 3	145 ± 5	60 ± 3	45 ± 2	291 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	N	94 ± 7	23 ± 4	155 ± 5	73 ± 3	46 ± 2	288 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	1	O	81 ± 7	20 ± 4	159 ± 5	66 ± 3	48 ± 2	302 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1224	4	—	49 ± 5	19 ± 3	129 ± 4	57 ± 3	41 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1225	4	—	49 ± 6	14 ± 3	136 ± 4	57 ± 3	45 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1225	5	—	56 ± 6	18 ± 3	132 ± 4	56 ± 3	47 ± 2	271 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1225	6	—	44 ± 6	16 ± 3	127 ± 4	54 ± 3	42 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1226	4	—	49 ± 6	19 ± 3	135 ± 4	57 ± 3	44 ± 2	276 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	1237	1	A	63 ± 6	21 ± 3	132 ± 4	57 ± 3	40 ± 2	173 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain

C.1-10

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-33	1237	1	B	48 ± 6	14 ± 3	131 ± 4	55 ± 3	42 ± 2	270 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1237	1	C	52 ± 5	21 ± 3	137 ± 4	59 ± 3	45 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1237	1	D	57 ± 6	16 ± 3	137 ± 4	57 ± 3	47 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1237	1	E	63 ± 6	19 ± 3	145 ± 5	60 ± 3	45 ± 2	284 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1237	1	F	57 ± 5	14 ± 3	125 ± 4	53 ± 3	40 ± 2	265 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1237	1	G	63 ± 6	24 ± 3	136 ± 4	60 ± 3	46 ± 2	179 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte	
35-DS-33	1237	1	H	72 ± 6	20 ± 3	146 ± 4	63 ± 3	45 ± 2	294 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1237	1	I	52 ± 5	14 ± 3	133 ± 4	59 ± 3	40 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1238	1	A	75 ± 6	22 ± 4	152 ± 5	65 ± 3	48 ± 2	307 ± 5	23 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1238	1	B	52 ± 5	19 ± 3	135 ± 4	61 ± 3	41 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1238	1	C	53 ± 7	17 ± 4	145 ± 5	62 ± 3	46 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1238	1	D	50 ± 6	15 ± 3	123 ± 4	55 ± 3	40 ± 2	266 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1238	1	E	70 ± 5	22 ± 3	137 ± 4	61 ± 3	44 ± 2	176 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte	
35-DS-33	1238	1	F	49 ± 5	17 ± 3	127 ± 4	55 ± 3	42 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1259	1	—	47 ± 6	18 ± 3	133 ± 4	57 ± 3	45 ± 2	282 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1374	2	—	48 ± 6	19 ± 3	129 ± 4	56 ± 3	40 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1393	1	—	60 ± 6	17 ± 3	127 ± 4	74 ± 3	40 ± 2	244 ± 5	13 ± 3	2069 ± 36	469 ± 20	NM ± NM	2.41 ± 0.08	NM	Unknown X?		
35-DS-33	1396	2	—	48 ± 6	17 ± 3	126 ± 4	56 ± 3	40 ± 2	270 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1517	1	—	35 ± 6	14 ± 3	91 ± 4	64 ± 3	22 ± 2	66 ± 5	9 ± 3	410 ± 22	486 ± 20	NM ± NM	0.63 ± 0.08	NM	Unknown B		
35-DS-33	1521	2	—	56 ± 6	19 ± 3	139 ± 4	60 ± 3	41 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1533	2	—	54 ± 6	21 ± 3	127 ± 4	57 ± 3	41 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	1695	1	—	46 ± 5	22 ± 3	125 ± 4	57 ± 3	39 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	1698	2	—	49 ± 5	11 ± 3	123 ± 4	53 ± 3	40 ± 2	260 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	1760	4	—	50 ± 6	18 ± 3	127 ± 4	58 ± 3	40 ± 2	269 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	1770	2	—	47 ± 5	14 ± 3	75 ± 4	96 ± 3	16 ± 2	91 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-DS-33	1796	2	—	45 ± 6	18 ± 3	115 ± 4	67 ± 3	40 ± 2	240 ± 5	8 ± 3	1397 ± 31	436 ± 20	NM ± NM	2.19 ± 0.08	NM ± NM	Unknown X?	
35-DS-33	1799	3	—	47 ± 5	15 ± 3	122 ± 4	50 ± 3	38 ± 2	186 ± 5	7 ± 3	1140 ± 29	361 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	McKay Butte	
35-DS-33	1826	2	—	53 ± 6	15 ± 4	124 ± 4	59 ± 3	42 ± 2	259 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	1881	2	—	44 ± 6	16 ± 3	126 ± 4	61 ± 3	42 ± 2	270 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	1918	2	—	54 ± 6	18 ± 4	122 ± 4	57 ± 3	43 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	1958	2	—	56 ± 6	16 ± 3	131 ± 4	57 ± 3	40 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	1968	2	—	48 ± 5	18 ± 3	123 ± 4	55 ± 3	41 ± 2	261 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2007	4	—	55 ± 6	13 ± 4	139 ± 4	61 ± 3	44 ± 2	290 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2008	3	—	48 ± 7	17 ± 4	75 ± 4	102 ± 3	17 ± 2	97 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-DS-33	2008	4	—	58 ± 6	17 ± 3	131 ± 4	58 ± 3	41 ± 2	271 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2010	4	—	51 ± 6	16 ± 3	121 ± 4	53 ± 3	42 ± 2	262 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2010	5	—	46 ± 6	14 ± 3	129 ± 4	52 ± 3	39 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2011	1	—	49 ± 6	17 ± 3	128 ± 4	53 ± 3	42 ± 2	262 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2012	4	—	56 ± 6	18 ± 3	139 ± 4	62 ± 3	43 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2041	2	—	54 ± 5	16 ± 3	125 ± 4	54 ± 3	40 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2042	3	—	48 ± 6	18 ± 3	125 ± 4	54 ± 3	42 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2044	1	A	45 ± 6	19 ± 3	125 ± 4	53 ± 3	40 ± 2	252 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2044	1	B	55 ± 6	19 ± 3	123 ± 4	54 ± 3	39 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2044	1	C	42 ± 6	16 ± 3	120 ± 4	52 ± 3	37 ± 2	253 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	

C.1-12

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2044	1	D	55 ± 5	13 ± 3	119 ± 4	53 ± 3	39 ± 2	256 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2044	1	E	62 ± 6	20 ± 3	148 ± 4	63 ± 3	45 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2044	1	F	57 ± 6	21 ± 3	136 ± 4	59 ± 3	48 ± 2	278 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2044	1	G	62 ± 6	18 ± 3	134 ± 4	58 ± 3	41 ± 2	283 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2045	1	A	49 ± 6	18 ± 3	130 ± 4	55 ± 3	39 ± 2	260 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2045	1	B	60 ± 6	15 ± 3	139 ± 4	60 ± 3	46 ± 2	287 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2045	1	C	50 ± 6	22 ± 3	128 ± 4	54 ± 3	40 ± 2	275 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2045	1	D	73 ± 6	21 ± 3	137 ± 4	60 ± 3	46 ± 2	283 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2046	1	A	44 ± 6	16 ± 3	126 ± 4	56 ± 3	42 ± 2	259 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2046	1	B	45 ± 6	18 ± 3	128 ± 4	58 ± 3	42 ± 2	265 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2046	1	C	50 ± 6	19 ± 3	131 ± 4	55 ± 3	42 ± 2	273 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2046	1	D	50 ± 6	16 ± 3	131 ± 4	57 ± 3	42 ± 2	274 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2046	1	E	54 ± 6	16 ± 3	125 ± 4	55 ± 3	41 ± 2	259 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2046	1	F	50 ± 6	17 ± 3	131 ± 4	58 ± 3	41 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2047	1	A	49 ± 6	15 ± 3	122 ± 4	53 ± 3	37 ± 2	254 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2047	1	B	58 ± 6	17 ± 3	133 ± 4	61 ± 3	43 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2047	1	C	45 ± 6	17 ± 3	130 ± 4	55 ± 3	42 ± 2	269 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2047	1	D	38 ± 6	14 ± 3	117 ± 4	52 ± 3	38 ± 2	251 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2047	1	E	46 ± 6	19 ± 3	128 ± 4	56 ± 3	43 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2047	2	—	54 ± 6	21 ± 3	127 ± 4	56 ± 3	41 ± 2	259 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2048	1	A	44 ± 6	20 ± 3	122 ± 4	53 ± 3	41 ± 2	257 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2048	1	B	47 ± 6	15 ± 3	121 ± 4	54 ± 3	41 ± 2	255 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-13

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-33	2048	1	C	57 ± 6	19 ± 4	137 ± 4	56 ± 3	43 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2048	1	D	56 ± 6	24 ± 3	138 ± 4	59 ± 3	48 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2048	1	E	51 ± 6	18 ± 3	134 ± 4	57 ± 3	41 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2048	2	—	92 ± 7	17 ± 4	116 ± 4	11 ± 3	52 ± 2	322 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-33	2048	3	—	52 ± 5	15 ± 3	125 ± 4	54 ± 3	39 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2049	1	A	56 ± 6	15 ± 3	127 ± 4	57 ± 3	43 ± 2	268 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2049	1	B	56 ± 7	28 ± 3	148 ± 5	66 ± 3	42 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2049	1	C	54 ± 6	13 ± 4	131 ± 4	57 ± 3	44 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2049	1	D	61 ± 6	22 ± 3	130 ± 4	53 ± 3	41 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2049	1	E	69 ± 6	18 ± 4	139 ± 4	59 ± 3	46 ± 2	283 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2050	1	A	46 ± 6	15 ± 3	123 ± 4	55 ± 3	38 ± 2	257 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2050	1	B	47 ± 5	15 ± 3	123 ± 4	56 ± 3	40 ± 2	256 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2050	1	C	59 ± 6	16 ± 3	126 ± 4	58 ± 3	41 ± 2	261 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2050	1	D	52 ± 6	15 ± 3	124 ± 4	54 ± 3	41 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2050	1	E	57 ± 6	17 ± 3	132 ± 4	60 ± 3	42 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2051	1	A	50 ± 6	15 ± 3	134 ± 4	60 ± 3	43 ± 2	276 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2051	1	B	48 ± 6	17 ± 3	132 ± 4	56 ± 3	45 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2051	1	C	55 ± 6	17 ± 3	126 ± 4	55 ± 3	39 ± 2	255 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2051	1	D	60 ± 6	21 ± 3	144 ± 4	63 ± 3	45 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2051	1	E	56 ± 6	20 ± 3	136 ± 4	59 ± 3	45 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2052	1	A	64 ± 6	21 ± 3	140 ± 4	63 ± 3	47 ± 2	286 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2052	1	B	50 ± 5	20 ± 3	123 ± 4	56 ± 3	42 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-14

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-33	2052	1	C	65 ± 6	21 ± 3	153 ± 4	67 ± 3	49 ± 2	297 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2052	1	D	64 ± 6	20 ± 3	151 ± 5	64 ± 3	45 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2052	1	E	67 ± 7	20 ± 4	161 ± 5	68 ± 3	45 ± 2	300 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2052	3	—	47 ± 6	18 ± 3	129 ± 4	58 ± 3	42 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2053	1	A	49 ± 5	18 ± 3	127 ± 4	57 ± 3	40 ± 2	265 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2053	1	B	71 ± 6	19 ± 4	142 ± 5	59 ± 3	45 ± 2	290 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2054	1	A	47 ± 6	16 ± 3	126 ± 4	57 ± 3	41 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2054	1	B	62 ± 6	18 ± 3	133 ± 4	58 ± 3	41 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2054	1	C	55 ± 6	20 ± 3	131 ± 4	60 ± 3	44 ± 2	274 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2054	1	D	63 ± 6	17 ± 3	134 ± 4	60 ± 3	42 ± 2	270 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2054	1	E	55 ± 7	25 ± 3	134 ± 5	58 ± 3	40 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2055	1	A	45 ± 6	17 ± 3	124 ± 4	51 ± 3	43 ± 2	254 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2055	1	B	65 ± 6	21 ± 3	153 ± 4	64 ± 3	47 ± 2	297 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2055	1	C	61 ± 6	22 ± 3	143 ± 4	62 ± 3	44 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2055	1	D	61 ± 6	21 ± 3	146 ± 4	64 ± 3	45 ± 2	293 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2055	1	E	55 ± 6	15 ± 4	145 ± 4	64 ± 3	44 ± 2	296 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2056	1	A	39 ± 6	18 ± 3	120 ± 4	52 ± 3	40 ± 2	259 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2056	1	B	58 ± 5	17 ± 3	137 ± 4	57 ± 3	41 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2056	1	C	51 ± 6	22 ± 3	128 ± 4	56 ± 3	43 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2056	1	D	49 ± 6	17 ± 3	134 ± 4	58 ± 3	42 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2056	1	E	48 ± 5	19 ± 3	130 ± 4	55 ± 3	42 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2056	1	F	52 ± 6	16 ± 3	137 ± 4	60 ± 3	44 ± 2	276 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-15



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2056	1	G	48 ± 6	19 ± 3	126 ± 4	58 ± 3	42 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2056	2	—	47 ± 6	16 ± 3	124 ± 4	54 ± 3	41 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2057	1	A	54 ± 6	18 ± 3	126 ± 4	59 ± 3	44 ± 2	269 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2057	1	B	46 ± 5	16 ± 3	118 ± 4	52 ± 3	40 ± 2	251 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2057	1	C	48 ± 6	14 ± 3	121 ± 4	53 ± 3	40 ± 2	259 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2057	1	D	54 ± 6	19 ± 3	142 ± 4	60 ± 3	45 ± 2	291 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2058	1	A	50 ± 6	15 ± 3	133 ± 4	58 ± 3	39 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2058	1	B	48 ± 6	21 ± 3	126 ± 4	55 ± 3	47 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2058	1	C	47 ± 5	15 ± 3	123 ± 4	52 ± 3	39 ± 2	255 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2058	1	D	53 ± 6	18 ± 3	133 ± 4	57 ± 3	44 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2058	1	E	55 ± 6	17 ± 3	131 ± 4	58 ± 3	48 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2058	1	F	57 ± 6	16 ± 3	129 ± 4	56 ± 3	41 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2058	1	G	64 ± 6	20 ± 3	144 ± 4	61 ± 3	45 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2059	1	A	52 ± 6	18 ± 3	128 ± 4	53 ± 3	42 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2059	1	B	57 ± 6	22 ± 3	141 ± 4	63 ± 3	47 ± 2	287 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2059	1	C	48 ± 6	16 ± 3	127 ± 4	54 ± 3	40 ± 2	270 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2060	1	A	56 ± 6	17 ± 3	124 ± 4	53 ± 3	43 ± 2	257 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2060	1	B	54 ± 6	20 ± 3	133 ± 4	58 ± 3	46 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2060	1	C	59 ± 6	17 ± 3	124 ± 4	53 ± 3	42 ± 2	269 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2060	1	D	59 ± 6	15 ± 3	135 ± 4	57 ± 3	43 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2061	1	A	48 ± 6	22 ± 3	127 ± 4	56 ± 3	41 ± 2	263 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2061	1	B	64 ± 6	20 ± 3	151 ± 5	62 ± 3	49 ± 2	291 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-16

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-33	2062	1	A	58 ± 6	17 ± 3	130 ± 4	56 ± 3	45 ± 2	269 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2062	1	B	44 ± 6	18 ± 3	130 ± 4	58 ± 3	42 ± 2	265 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2062	1	C	47 ± 6	21 ± 3	129 ± 4	54 ± 3	41 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2062	1	D	57 ± 6	18 ± 3	134 ± 4	59 ± 3	42 ± 2	283 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2062	1	E	48 ± 6	18 ± 3	128 ± 4	53 ± 3	40 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2064	1	A	51 ± 5	19 ± 3	128 ± 4	57 ± 3	43 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2064	1	B	89 ± 7	29 ± 4	159 ± 5	67 ± 3	50 ± 2	312 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?
35-DS-33	2064	1	C	45 ± 7	16 ± 4	140 ± 4	63 ± 3	47 ± 2	286 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2064	1	D	54 ± 6	22 ± 3	134 ± 4	58 ± 3	44 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2065	1	A	57 ± 6	18 ± 3	145 ± 4	60 ± 3	44 ± 2	284 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2065	1	B	60 ± 6	19 ± 3	140 ± 4	56 ± 3	44 ± 2	287 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2065	1	C	57 ± 7	21 ± 4	145 ± 5	60 ± 3	44 ± 2	290 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2065	1	D	51 ± 6	21 ± 3	135 ± 4	58 ± 3	44 ± 2	281 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2066	1	A	54 ± 5	15 ± 3	120 ± 4	54 ± 3	42 ± 2	259 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2066	1	B	47 ± 6	15 ± 3	123 ± 4	53 ± 3	40 ± 2	256 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2066	1	C	51 ± 5	19 ± 3	120 ± 4	51 ± 3	41 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2066	1	D	61 ± 6	20 ± 3	132 ± 4	58 ± 3	42 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2066	1	E	49 ± 6	15 ± 3	126 ± 4	55 ± 3	39 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2067	1	A	42 ± 6	15 ± 3	118 ± 4	52 ± 3	38 ± 2	251 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2067	1	B	42 ± 6	17 ± 3	121 ± 4	53 ± 3	42 ± 2	259 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2067	1	C	72 ± 6	21 ± 3	144 ± 4	58 ± 3	42 ± 2	287 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2067	2	—	81 ± 6	13 ± 4	111 ± 4	5 ± 3	51 ± 2	309 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh

C.1-17

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2069	1	A	38 ± 6	19 ± 3	114 ± 4	48 ± 3	41 ± 2	245 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X?
35-DS-33	2069	1	B	48 ± 6	21 ± 3	121 ± 4	51 ± 3	39 ± 2	257 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2069	1	C	51 ± 5	12 ± 3	127 ± 4	57 ± 3	41 ± 2	262 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2069	1	D	44 ± 6	14 ± 3	113 ± 4	51 ± 3	40 ± 2	250 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X?
35-DS-33	2069	1	E	51 ± 6	20 ± 3	127 ± 4	56 ± 3	41 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2069	1	F	47 ± 6	17 ± 3	123 ± 4	52 ± 3	40 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2069	1	G	42 ± 6	18 ± 3	125 ± 4	55 ± 3	41 ± 2	263 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2069	2	—	50 ± 6	16 ± 3	122 ± 4	57 ± 3	42 ± 2	264 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2070	1	A	71 ± 6	17 ± 3	146 ± 4	63 ± 3	46 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2070	1	B	194 ± 7	21 ± 3	139 ± 4	58 ± 3	47 ± 2	290 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2071	1	A	54 ± 6	18 ± 3	137 ± 4	56 ± 3	41 ± 2	273 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2071	1	B	395 ± 9	13 ± 4	127 ± 4	52 ± 3	42 ± 2	253 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2071	1	C	327 ± 8	15 ± 3	132 ± 4	55 ± 3	40 ± 2	273 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2071	1	D	659 ± 9	9 ± 4	121 ± 4	52 ± 3	39 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2071	1	E	70 ± 6	18 ± 3	145 ± 4	63 ± 3	47 ± 2	291 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2071	1	F	42 ± 6	15 ± 3	130 ± 4	55 ± 3	42 ± 2	266 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2072	1	A	266 ± 7	18 ± 3	134 ± 4	57 ± 3	45 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2072	1	B	475 ± 9	17 ± 3	128 ± 4	53 ± 3	41 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2072	1	C	50 ± 6	19 ± 3	128 ± 4	56 ± 3	42 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2072	1	D	44 ± 6	18 ± 3	132 ± 4	58 ± 3	43 ± 2	270 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2072	1	E	268 ± 7	17 ± 3	126 ± 4	53 ± 3	41 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2072	1	F	82 ± 6	23 ± 3	147 ± 4	61 ± 3	43 ± 2	274 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-18

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2073	1	A	329 ± 7	15 ± 3	124 ± 4	53 ± 3	41 ± 2	259 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2073	1	B	58 ± 6	16 ± 3	141 ± 4	59 ± 3	43 ± 2	293 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2073	1	C	50 ± 6	13 ± 3	131 ± 4	58 ± 3	42 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2073	1	D	52 ± 6	20 ± 3	134 ± 4	56 ± 3	42 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2073	1	E	61 ± 6	18 ± 4	131 ± 4	56 ± 3	42 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2073	1	F	59 ± 6	17 ± 3	141 ± 4	60 ± 3	42 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2073	1	G	58 ± 6	19 ± 3	141 ± 4	62 ± 3	47 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2074	1	A	59 ± 6	19 ± 3	144 ± 4	62 ± 3	47 ± 2	292 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2074	1	B	57 ± 6	23 ± 4	143 ± 5	60 ± 3	45 ± 2	293 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2074	1	C	58 ± 6	19 ± 3	138 ± 4	60 ± 3	47 ± 2	275 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2074	1	D	56 ± 6	19 ± 3	139 ± 4	59 ± 3	44 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2083	1	—	51 ± 6	16 ± 3	121 ± 4	54 ± 3	43 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2084	2	—	58 ± 6	17 ± 3	131 ± 4	58 ± 3	43 ± 2	267 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2093	2	—	51 ± 6	16 ± 3	121 ± 4	57 ± 3	43 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2097	2	—	45 ± 6	14 ± 3	118 ± 4	51 ± 3	40 ± 2	253 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2101	2	—	49 ± 5	17 ± 3	129 ± 4	56 ± 3	40 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2107	1	A	237 ± 7	14 ± 3	133 ± 4	63 ± 3	46 ± 2	286 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2107	1	B	218 ± 7	19 ± 3	128 ± 4	58 ± 3	42 ± 2	259 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2107	1	C	278 ± 7	12 ± 3	67 ± 4	91 ± 3	14 ± 2	86 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-33	2107	1	D	144 ± 6	11 ± 4	130 ± 4	56 ± 3	42 ± 2	268 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2107	1	E	51 ± 6	13 ± 3	139 ± 4	60 ± 3	43 ± 2	277 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2107	1	F	62 ± 6	21 ± 3	146 ± 4	64 ± 3	45 ± 2	290 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-19

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2107	1	G	48 ± 6	18 ± 3	133 ± 4	58 ± 3	39 ± 2	200 ± 5	11 ± 3	1167 ± 27	349 ± 20	NM ± NM	1.75 ± 0.08	NM NM	McKay Butte	
35-DS-33	2107	1	H	53 ± 6	13 ± 4	126 ± 4	54 ± 3	40 ± 2	255 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2107	3	—	59 ± 6	17 ± 3	112 ± 4	53 ± 3	43 ± 2	330 ± 5	19 ± 3	1858 ± 37	558 ± 21	NM ± NM	2.59 ± 0.08	NM NM	Big Obsidian Flow	
35-DS-33	2108	1	A	45 ± 7	18 ± 4	124 ± 4	57 ± 3	39 ± 2	255 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2108	1	B	57 ± 6	20 ± 4	142 ± 4	68 ± 3	45 ± 2	288 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2108	1	C	69 ± 7	20 ± 4	153 ± 5	63 ± 3	47 ± 2	302 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2108	1	D	58 ± 6	17 ± 3	129 ± 4	62 ± 3	42 ± 2	282 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2109	1	A	59 ± 6	17 ± 3	138 ± 4	57 ± 3	45 ± 2	277 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2109	1	B	41 ± 6	19 ± 3	128 ± 4	56 ± 3	44 ± 2	263 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2109	1	C	54 ± 6	15 ± 3	136 ± 4	63 ± 3	43 ± 2	279 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2109	1	D	66 ± 6	21 ± 3	149 ± 4	66 ± 3	48 ± 2	302 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2109	1	E	60 ± 6	17 ± 3	136 ± 4	66 ± 3	45 ± 2	288 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2109	3	—	50 ± 6	18 ± 3	138 ± 4	60 ± 3	44 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2110	1	A	55 ± 6	18 ± 3	127 ± 4	60 ± 3	41 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2110	1	B	47 ± 6	17 ± 3	120 ± 4	56 ± 3	42 ± 2	253 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2110	1	C	57 ± 6	18 ± 3	144 ± 4	66 ± 3	44 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2110	1	D	53 ± 6	18 ± 3	136 ± 4	65 ± 3	44 ± 2	288 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2111	1	A	53 ± 6	16 ± 3	131 ± 4	55 ± 3	44 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2111	1	B	54 ± 5	17 ± 3	128 ± 4	56 ± 3	41 ± 2	267 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2111	1	C	55 ± 6	18 ± 3	134 ± 4	62 ± 3	43 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2111	1	E	59 ± 6	14 ± 3	128 ± 4	56 ± 3	42 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2111	1	F	56 ± 6	17 ± 3	136 ± 4	62 ± 3	42 ± 2	271 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

C.1-20

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-33	2111	3	—	44 ± 6	14 ± 3	126 ± 4	57 ± 3	41 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2112	1	A	56 ± 6	12 ± 4	136 ± 4	65 ± 3	46 ± 2	286 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2112	1	B	66 ± 6	15 ± 4	140 ± 4	65 ± 3	42 ± 2	287 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2112	1	C	62 ± 6	18 ± 3	137 ± 4	66 ± 3	44 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2113	1	A	46 ± 6	16 ± 3	120 ± 4	57 ± 3	40 ± 2	260 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2113	1	B	52 ± 6	15 ± 3	127 ± 4	62 ± 3	40 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2113	1	C	53 ± 6	20 ± 3	143 ± 4	63 ± 3	45 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2113	1	D	57 ± 6	17 ± 4	128 ± 4	62 ± 3	40 ± 2	282 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2113	1	E	48 ± 6	17 ± 3	143 ± 4	63 ± 3	43 ± 2	287 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2113	1	F	68 ± 6	19 ± 4	146 ± 5	66 ± 3	42 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2114	1	A	54 ± 7	18 ± 4	134 ± 5	64 ± 3	39 ± 2	284 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2114	1	B	49 ± 7	24 ± 3	137 ± 4	64 ± 3	45 ± 2	289 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2114	1	C	55 ± 6	19 ± 3	139 ± 4	67 ± 3	47 ± 2	291 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2114	1	D	56 ± 6	19 ± 3	125 ± 4	60 ± 3	44 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2115	1	A	47 ± 6	21 ± 3	133 ± 4	60 ± 3	41 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2115	1	B	51 ± 5	20 ± 3	120 ± 4	56 ± 3	40 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2115	1	C	44 ± 6	13 ± 3	130 ± 4	55 ± 3	41 ± 2	264 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2115	1	D	41 ± 7	20 ± 3	130 ± 4	60 ± 3	42 ± 2	264 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2115	1	E	77 ± 6	18 ± 4	156 ± 5	73 ± 3	46 ± 2	297 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2115	1	F	61 ± 7	24 ± 4	148 ± 5	68 ± 3	42 ± 2	296 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2115	1	G	67 ± 6	15 ± 4	137 ± 4	63 ± 3	42 ± 2	290 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2115	1	H	62 ± 6	21 ± 3	148 ± 4	72 ± 3	44 ± 2	298 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

C.1-21

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2115	1	I	59 ± 6	21 ± 3	137 ± 4	63 ± 3	45 ± 2	287 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2115	1	J	46 ± 6	21 ± 3	130 ± 4	60 ± 3	43 ± 2	275 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	A	48 ± 6	17 ± 3	128 ± 4	54 ± 3	44 ± 2	266 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	B	56 ± 6	12 ± 3	134 ± 4	57 ± 3	44 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	C	52 ± 6	19 ± 3	132 ± 4	56 ± 3	45 ± 2	266 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	D	65 ± 6	19 ± 3	138 ± 4	63 ± 3	46 ± 2	283 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	E	53 ± 6	17 ± 3	131 ± 4	56 ± 3	41 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	F	54 ± 6	20 ± 3	138 ± 4	69 ± 3	46 ± 2	290 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	G	60 ± 6	18 ± 3	141 ± 4	56 ± 3	43 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	H	64 ± 6	15 ± 4	133 ± 4	61 ± 3	47 ± 2	289 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	I	53 ± 6	18 ± 3	136 ± 4	58 ± 3	45 ± 2	283 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2117	1	J	67 ± 7	18 ± 4	152 ± 5	65 ± 3	49 ± 2	309 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	A	55 ± 6	20 ± 3	135 ± 4	54 ± 3	42 ± 2	264 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	B	48 ± 6	14 ± 3	124 ± 4	58 ± 3	43 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	C	45 ± 6	16 ± 3	126 ± 4	52 ± 3	40 ± 2	254 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	D	50 ± 6	16 ± 3	122 ± 4	53 ± 3	41 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	E	50 ± 6	19 ± 3	133 ± 4	64 ± 3	42 ± 2	274 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	F	54 ± 6	20 ± 3	85 ± 4	113 ± 3	18 ± 2	102 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	2118	1	G	51 ± 6	16 ± 3	143 ± 4	58 ± 3	43 ± 2	289 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	H	64 ± 6	18 ± 3	143 ± 4	61 ± 3	44 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	I	51 ± 6	17 ± 3	138 ± 4	66 ± 3	47 ± 2	293 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2118	1	J	60 ± 6	19 ± 3	140 ± 4	60 ± 3	44 ± 2	280 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-22

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-33	2119	1	A	40 ± 6	12 ± 3	73 ± 4	95 ± 3	18 ± 2	89 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	2119	1	B	46 ± 6	19 ± 3	130 ± 4	60 ± 3	42 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2119	1	C	46 ± 6	19 ± 3	130 ± 4	55 ± 3	42 ± 2	263 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2119	1	D	52 ± 6	18 ± 3	133 ± 4	63 ± 3	44 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2119	1	E	63 ± 6	19 ± 3	149 ± 4	62 ± 3	42 ± 2	293 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2119	1	F	69 ± 7	25 ± 4	163 ± 5	71 ± 3	48 ± 2	311 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2119	1	G	60 ± 6	19 ± 3	90 ± 4	113 ± 3	17 ± 2	99 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	2119	1	H	71 ± 7	21 ± 4	160 ± 5	67 ± 3	48 ± 2	305 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?
35-DS-33	2119	1	I	65 ± 6	17 ± 4	136 ± 4	67 ± 3	46 ± 2	300 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2119	1	J	39 ± 6	20 ± 3	82 ± 4	110 ± 3	15 ± 2	96 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	2119	2	—	46 ± 6	16 ± 3	124 ± 4	56 ± 3	42 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	A	48 ± 6	19 ± 3	127 ± 4	54 ± 3	43 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	B	49 ± 6	17 ± 3	133 ± 4	59 ± 3	47 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	C	49 ± 6	18 ± 3	127 ± 4	61 ± 3	43 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	D	54 ± 6	21 ± 3	137 ± 4	60 ± 3	44 ± 2	282 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	E	50 ± 6	19 ± 3	135 ± 4	59 ± 3	43 ± 2	271 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	F	59 ± 6	15 ± 3	133 ± 4	63 ± 3	43 ± 2	280 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	G	51 ± 6	22 ± 3	130 ± 4	53 ± 3	41 ± 2	269 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	H	61 ± 6	25 ± 3	151 ± 4	66 ± 3	48 ± 2	295 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	I	51 ± 6	16 ± 3	133 ± 4	59 ± 3	43 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2120	1	J	47 ± 6	10 ± 4	82 ± 4	109 ± 3	17 ± 2	94 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	2120	1	K	50 ± 6	16 ± 4	82 ± 4	114 ± 3	17 ± 2	101 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs

C.1-23



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-33	2120	1	L	47 ± 6	22 ± 3	92 ± 4	113 ± 3	16 ± 2	101 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-33	2120	1	M	53 ± 6	17 ± 3	143 ± 4	60 ± 3	45 ± 2	284 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2120	2	—	58 ± 6	18 ± 3	137 ± 4	58 ± 3	44 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2120	3	—	33 ± 6	18 ± 3	95 ± 4	65 ± 3	27 ± 2	99 ± 5	5 ± 3	770 ± 30	370 ± 20	NM ± NM	0.99 ± 0.08	NM ± NM	Juniper Spring 1
35-DS-33	2121	1	A	56 ± 6	16 ± 3	138 ± 4	58 ± 3	46 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2121	1	B	51 ± 6	17 ± 3	133 ± 4	63 ± 3	43 ± 2	279 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2121	1	C	42 ± 6	17 ± 3	78 ± 4	103 ± 3	15 ± 2	96 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-33	2121	1	D	56 ± 6	19 ± 3	141 ± 4	63 ± 3	43 ± 2	283 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2121	1	E	60 ± 6	21 ± 3	132 ± 4	61 ± 3	42 ± 2	279 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2121	1	F	51 ± 6	16 ± 3	124 ± 4	52 ± 3	40 ± 2	251 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2129	3	—	53 ± 6	18 ± 3	133 ± 4	61 ± 3	43 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2129	4	—	41 ± 6	18 ± 3	122 ± 4	54 ± 3	40 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2129	5	—	46 ± 6	13 ± 3	129 ± 4	55 ± 3	43 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2144	2	—	48 ± 5	17 ± 3	122 ± 4	53 ± 3	39 ± 2	263 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2154	2	—	44 ± 6	18 ± 3	76 ± 4	102 ± 3	19 ± 2	97 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-33	2155	1	—	40 ± 6	14 ± 3	72 ± 4	97 ± 3	14 ± 2	88 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-33	2174	2	—	57 ± 5	17 ± 3	127 ± 4	53 ± 3	38 ± 2	263 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2176	1	A	49 ± 6	19 ± 3	138 ± 4	60 ± 3	45 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2176	1	B	47 ± 6	13 ± 3	124 ± 4	57 ± 3	42 ± 2	257 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2176	1	C	46 ± 6	18 ± 3	123 ± 4	60 ± 3	39 ± 2	261 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2176	1	D	51 ± 5	16 ± 3	122 ± 4	52 ± 3	41 ± 2	262 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2176	1	E	47 ± 6	15 ± 3	131 ± 4	56 ± 3	43 ± 2	267 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-24

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-33	2176	1	F	42 ± 6	14 ± 3	121 ± 4	51 ± 3	38 ± 2	258 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2177	1	A	55 ± 6	20 ± 3	139 ± 4	59 ± 3	44 ± 2	278 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2177	1	B	67 ± 7	23 ± 4	153 ± 5	65 ± 3	47 ± 2	300 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2177	1	C	57 ± 6	15 ± 3	130 ± 4	54 ± 3	40 ± 2	252 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2177	1	D	64 ± 7	21 ± 4	147 ± 5	69 ± 3	50 ± 2	296 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2178	1	A	48 ± 6	19 ± 3	128 ± 4	58 ± 3	43 ± 2	270 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2178	1	B	49 ± 5	13 ± 3	130 ± 4	58 ± 3	42 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2178	1	C	56 ± 6	15 ± 3	129 ± 4	59 ± 3	38 ± 2	258 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2178	1	D	49 ± 6	21 ± 3	140 ± 4	60 ± 3	46 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2178	1	E	58 ± 6	23 ± 3	149 ± 4	62 ± 3	47 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2178	1	F	54 ± 5	16 ± 3	128 ± 4	59 ± 3	39 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2178	2	—	52 ± 6	19 ± 3	134 ± 4	62 ± 3	44 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2178	3	—	40 ± 6	18 ± 3	123 ± 4	54 ± 3	39 ± 2	258 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2179	1	A	52 ± 6	17 ± 4	128 ± 4	55 ± 3	42 ± 2	255 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2179	1	B	47 ± 7	21 ± 4	140 ± 4	62 ± 3	42 ± 2	293 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2179	1	C	64 ± 7	20 ± 4	143 ± 5	61 ± 3	44 ± 2	292 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2179	1	D	66 ± 6	25 ± 3	146 ± 5	67 ± 3	46 ± 2	297 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2180	1	A	56 ± 6	15 ± 3	129 ± 4	56 ± 3	43 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2180	1	B	52 ± 6	19 ± 3	135 ± 4	59 ± 3	43 ± 2	278 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2180	1	C	69 ± 6	12 ± 4	136 ± 4	61 ± 3	45 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2180	1	D	46 ± 6	14 ± 3	135 ± 4	57 ± 3	41 ± 2	194 ± 5	11 ± 3	1164 ± 26	357 ± 20	NM ± NM	1.71 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-33	2180	1	E	64 ± 6	19 ± 3	136 ± 4	61 ± 3	48 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-25

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2180	1	F	52 ± 6	17 ± 3	131 ± 4	57 ± 3	43 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2180	2	—	50 ± 6	17 ± 3	123 ± 4	56 ± 3	40 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2181	1	A	53 ± 6	19 ± 3	129 ± 4	60 ± 3	44 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2181	1	B	72 ± 7	19 ± 4	154 ± 5	66 ± 3	47 ± 2	302 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2181	1	C	55 ± 6	20 ± 3	143 ± 5	60 ± 3	44 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2181	1	D	62 ± 6	20 ± 4	139 ± 5	61 ± 3	49 ± 2	295 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2182	1	A	55 ± 6	19 ± 3	136 ± 4	57 ± 3	41 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2182	1	B	58 ± 6	15 ± 3	134 ± 4	66 ± 3	44 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2182	1	C	59 ± 6	18 ± 4	145 ± 4	63 ± 3	47 ± 2	293 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2182	1	D	62 ± 6	21 ± 3	145 ± 4	69 ± 3	42 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2182	1	E	48 ± 6	18 ± 3	130 ± 4	61 ± 3	45 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2183	1	A	54 ± 6	17 ± 3	121 ± 4	54 ± 3	40 ± 2	259 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2183	1	B	51 ± 6	18 ± 3	126 ± 4	60 ± 3	42 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2183	1	C	53 ± 6	18 ± 3	138 ± 4	60 ± 3	42 ± 2	286 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2183	1	D	55 ± 6	18 ± 4	144 ± 4	64 ± 3	45 ± 2	280 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2183	1	E	66 ± 6	17 ± 4	149 ± 5	60 ± 3	42 ± 2	293 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2184	3	—	50 ± 6	17 ± 3	124 ± 4	59 ± 3	41 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2186	3	—	43 ± 6	18 ± 3	123 ± 4	56 ± 3	40 ± 2	261 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2188	1	A	45 ± 6	15 ± 3	127 ± 4	52 ± 3	33 ± 2	180 ± 5	8 ± 3	1334 ± 28	449 ± 20	NM ± NM	1.88 ± 0.08	NM	McKay Butte	
35-DS-33	2188	1	B	53 ± 6	13 ± 3	125 ± 4	59 ± 3	41 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2188	1	C	45 ± 6	19 ± 3	128 ± 4	58 ± 3	41 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2188	1	D	65 ± 6	17 ± 4	152 ± 4	62 ± 3	48 ± 2	296 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-26

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2188	1	E	62 ± 6	19 ± 3	134 ± 4	60 ± 3	43 ± 2	275 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2188	1	F	63 ± 7	25 ± 3	154 ± 5	64 ± 3	45 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2188	1	G	53 ± 6	18 ± 3	126 ± 4	56 ± 3	42 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2188	1	H	66 ± 6	19 ± 3	140 ± 4	63 ± 3	43 ± 2	291 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2188	1	I	47 ± 6	14 ± 3	126 ± 4	59 ± 3	36 ± 2	195 ± 5	7 ± 3	1392 ± 28	391 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte	
35-DS-33	2188	1	J	63 ± 6	17 ± 4	137 ± 4	60 ± 3	46 ± 2	282 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2188	1	K	75 ± 7	20 ± 4	161 ± 5	68 ± 3	48 ± 2	309 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?
35-DS-33	2188	1	L	56 ± 6	16 ± 3	137 ± 4	58 ± 3	41 ± 2	278 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	A	46 ± 6	20 ± 3	133 ± 4	58 ± 3	41 ± 2	268 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	B	40 ± 6	19 ± 3	125 ± 4	57 ± 3	42 ± 2	266 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	C	56 ± 6	14 ± 3	134 ± 4	61 ± 3	44 ± 2	276 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	D	48 ± 6	16 ± 3	125 ± 4	57 ± 3	39 ± 2	257 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	E	53 ± 6	20 ± 3	138 ± 4	58 ± 3	40 ± 2	265 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	F	50 ± 6	16 ± 3	123 ± 4	54 ± 3	43 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	G	49 ± 6	21 ± 3	126 ± 4	56 ± 3	43 ± 2	259 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	H	47 ± 6	14 ± 3	127 ± 4	57 ± 3	39 ± 2	252 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	1	I	58 ± 6	17 ± 3	138 ± 4	60 ± 3	45 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	4	—	44 ± 6	20 ± 3	127 ± 4	63 ± 3	39 ± 2	259 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X
35-DS-33	2189	5	—	51 ± 6	21 ± 3	121 ± 4	57 ± 3	40 ± 2	248 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?
35-DS-33	2189	6	—	50 ± 6	14 ± 3	124 ± 4	58 ± 3	43 ± 2	266 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2189	7	—	88 ± 6	18 ± 3	76 ± 4	35 ± 3	59 ± 2	412 ± 5	18 ± 3	1133 ± 31	574 ± 20	NM ± NM	2.38 ± 0.08	NM	Brooks Canyon?	
35-DS-33	2189	8	—	66 ± 6	15 ± 3	132 ± 4	56 ± 3	43 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-27

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-33	2190	1	A	52 ± 6	19 ± 3	127 ± 4	57 ± 3	41 ± 2	262 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2190	1	B	57 ± 6	22 ± 3	141 ± 4	60 ± 3	43 ± 2	269 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2190	1	C	45 ± 6	17 ± 3	135 ± 4	59 ± 3	42 ± 2	272 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2190	1	D	72 ± 6	19 ± 3	147 ± 4	64 ± 3	46 ± 2	295 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2190	1	E	56 ± 6	22 ± 3	147 ± 4	64 ± 3	47 ± 2	296 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2190	1	F	45 ± 7	21 ± 3	139 ± 4	61 ± 3	47 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2190	1	G	56 ± 6	24 ± 3	148 ± 5	65 ± 3	46 ± 2	298 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2190	1	H	48 ± 6	18 ± 3	138 ± 4	60 ± 3	42 ± 2	283 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2190	1	I	61 ± 7	21 ± 4	146 ± 5	62 ± 3	47 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2191	1	A	53 ± 6	22 ± 3	139 ± 4	60 ± 3	46 ± 2	284 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2191	1	B	54 ± 6	18 ± 3	131 ± 4	63 ± 3	40 ± 2	273 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2191	1	C	55 ± 6	18 ± 3	130 ± 4	58 ± 3	43 ± 2	273 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2191	1	D	54 ± 6	17 ± 3	141 ± 4	61 ± 3	43 ± 2	285 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2191	1	E	57 ± 6	16 ± 3	127 ± 4	54 ± 3	41 ± 2	267 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2191	1	F	66 ± 7	22 ± 4	152 ± 5	65 ± 3	47 ± 2	300 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?	
35-DS-33	2191	1	G	53 ± 6	15 ± 4	126 ± 4	54 ± 3	39 ± 2	264 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2191	1	H	61 ± 6	17 ± 3	138 ± 4	64 ± 3	44 ± 2	285 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2192	1	A	54 ± 6	17 ± 3	144 ± 4	67 ± 3	46 ± 2	299 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2194	1	A	62 ± 6	18 ± 4	142 ± 5	62 ± 3	42 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2194	1	B	65 ± 6	14 ± 4	148 ± 5	66 ± 3	44 ± 2	292 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2194	1	C	45 ± 7	22 ± 3	128 ± 4	58 ± 3	43 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2194	1	D	69 ± 7	13 ± 4	154 ± 5	65 ± 3	45 ± 2	298 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

C.1-28

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2194	1	E	54 ± 7	17 ± 4	142 ± 5	62 ± 3	46 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2202	2	—	36 ± 6	16 ± 3	123 ± 4	54 ± 3	40 ± 2	262 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2206	1	—	44 ± 6	14 ± 3	119 ± 4	51 ± 3	41 ± 2	259 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2208	1	A	49 ± 6	17 ± 3	118 ± 4	57 ± 3	39 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2208	1	B	55 ± 6	17 ± 3	127 ± 4	56 ± 3	42 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2208	1	C	41 ± 6	18 ± 3	136 ± 4	62 ± 3	40 ± 2	277 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2208	1	D	55 ± 6	19 ± 3	122 ± 4	51 ± 3	43 ± 2	251 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2208	1	E	45 ± 6	13 ± 4	137 ± 4	59 ± 3	44 ± 2	281 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2208	1	F	50 ± 5	18 ± 3	121 ± 4	60 ± 3	38 ± 2	262 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2209	1	A	64 ± 7	24 ± 4	148 ± 5	67 ± 3	50 ± 2	309 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2209	1	B	53 ± 6	17 ± 3	141 ± 4	63 ± 3	41 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2209	1	C	58 ± 7	21 ± 3	141 ± 4	61 ± 3	42 ± 2	283 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2209	1	D	47 ± 6	18 ± 3	130 ± 4	61 ± 3	40 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2209	1	E	54 ± 6	18 ± 3	119 ± 4	59 ± 3	39 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2210	1	A	53 ± 6	17 ± 3	135 ± 4	64 ± 3	46 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2210	1	B	54 ± 6	16 ± 3	139 ± 4	58 ± 3	45 ± 2	270 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2210	1	C	54 ± 6	18 ± 3	134 ± 4	59 ± 3	42 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2210	1	D	63 ± 6	21 ± 4	149 ± 5	65 ± 3	47 ± 2	293 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2210	1	E	52 ± 6	19 ± 3	137 ± 4	60 ± 3	43 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2211	1	A	55 ± 6	16 ± 3	127 ± 4	59 ± 3	40 ± 2	267 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2211	1	B	57 ± 6	15 ± 3	126 ± 4	58 ± 3	43 ± 2	263 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2211	1	C	52 ± 6	19 ± 3	132 ± 4	56 ± 3	43 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-29

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-33	2211	1	D	62	13	134	59	42	267	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2211	1	E	60	18	138	59	43	288	18	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2212	1	A	50	22	133	65	45	279	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2212	1	B	48	13	118	56	41	258	14	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2212	1	C	50	16	128	58	42	275	18	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2212	1	D	51	18	130	59	42	273	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2212	1	E	48	15	125	55	40	254	11	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2213	2	—	51	21	137	62	46	289	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	A	53	14	127	60	43	263	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	B	54	19	126	58	42	271	18	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	C	43	15	117	57	42	262	14	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	D	49	19	130	60	43	279	14	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	E	51	19	142	63	40	279	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	F	51	18	123	57	42	272	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	G	53	20	133	58	45	276	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	H	44	11	122	54	41	261	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	I	50	17	135	59	45	285	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2214	1	J	60	17	138	56	40	278	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2215	1	A	46	21	130	56	42	274	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2215	1	B	37	18	122	51	40	254	12	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2215	1	C	52	15	125	61	43	267	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-DS-33	2215	1	D	60	17	138	60	41	287	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	

C.1-30

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2215	1	E	50 ± 6	18 ± 3	132 ± 4	56 ± 3	40 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2216	1	A	37 ± 6	16 ± 3	74 ± 4	97 ± 3	14 ± 2	88 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	2216	1	B	52 ± 6	16 ± 3	128 ± 4	61 ± 3	41 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2216	1	C	52 ± 6	15 ± 3	134 ± 4	57 ± 3	42 ± 2	276 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2216	1	D	51 ± 6	18 ± 3	126 ± 4	61 ± 3	43 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2216	1	E	54 ± 6	17 ± 3	126 ± 4	58 ± 3	41 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2217	1	A	48 ± 5	16 ± 3	129 ± 4	57 ± 3	41 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2217	1	B	57 ± 6	13 ± 3	121 ± 4	59 ± 3	41 ± 2	261 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2217	1	C	60 ± 6	20 ± 3	136 ± 4	60 ± 3	44 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2217	1	D	54 ± 6	23 ± 3	149 ± 4	63 ± 3	49 ± 2	294 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2221	3	—	54 ± 6	18 ± 3	130 ± 4	62 ± 3	42 ± 2	271 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2222	2	—	48 ± 6	17 ± 3	129 ± 4	56 ± 3	42 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2223	2	—	49 ± 6	17 ± 3	133 ± 4	60 ± 3	41 ± 2	271 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2227	3	—	44 ± 6	14 ± 3	126 ± 4	54 ± 3	42 ± 2	262 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2234	2	—	49 ± 6	17 ± 3	127 ± 4	58 ± 3	41 ± 2	264 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2241	2	—	54 ± 6	14 ± 3	131 ± 4	56 ± 3	42 ± 2	274 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2244	2	—	60 ± 6	14 ± 4	132 ± 4	58 ± 3	43 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2247	1	A	66 ± 6	19 ± 3	148 ± 4	65 ± 3	48 ± 2	301 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2247	1	B	51 ± 6	18 ± 3	130 ± 4	60 ± 3	44 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2247	1	C	74 ± 6	20 ± 3	148 ± 4	60 ± 3	45 ± 2	293 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2247	1	D	48 ± 6	20 ± 3	141 ± 4	63 ± 3	46 ± 2	283 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2247	1	E	65 ± 6	23 ± 3	158 ± 5	66 ± 3	48 ± 2	300 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?

C.1-31



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-33	2247	1	F	48 ± 6	14 ± 3	127 ± 4	56 ± 3	39 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2247	1	G	44 ± 6	18 ± 3	113 ± 4	49 ± 3	41 ± 2	245 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano/Unknown X?	
35-DS-33	2247	1	H	49 ± 5	16 ± 3	124 ± 4	52 ± 3	41 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2247	1	I	65 ± 6	16 ± 3	144 ± 4	62 ± 3	41 ± 2	272 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2247	1	J	45 ± 6	9 ± 4	119 ± 4	51 ± 3	41 ± 2	251 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano/Unknown X?	
35-DS-33	2248	1	A	38 ± 6	16 ± 3	116 ± 4	50 ± 3	41 ± 2	248 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano/Unknown X?	
35-DS-33	2248	1	B	49 ± 6	19 ± 3	131 ± 4	56 ± 3	36 ± 2	194 ± 5	10 ± 3	1163 ± 26	357 ± 20	NM ± NM	1.81 ± 0.08	NM	NM	McKay Butte	
35-DS-33	2248	1	C	45 ± 5	12 ± 3	118 ± 4	49 ± 3	35 ± 2	181 ± 5	9 ± 3	1117 ± 26	352 ± 20	NM ± NM	1.79 ± 0.08	NM	NM	McKay Butte	
35-DS-33	2248	1	D	44 ± 5	13 ± 3	130 ± 4	51 ± 3	37 ± 2	191 ± 5	10 ± 3	1127 ± 25	351 ± 20	NM ± NM	1.80 ± 0.08	NM	NM	McKay Butte	
35-DS-33	2248	1	E	58 ± 6	22 ± 3	141 ± 4	59 ± 3	42 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	1	F	45 ± 6	19 ± 3	124 ± 4	60 ± 3	40 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	1	G	38 ± 6	16 ± 3	72 ± 4	96 ± 3	15 ± 2	91 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-DS-33	2248	1	H	58 ± 6	21 ± 3	137 ± 4	57 ± 3	43 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	1	I	59 ± 6	18 ± 3	140 ± 4	59 ± 3	44 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	1	J	59 ± 6	20 ± 3	137 ± 4	60 ± 3	41 ± 2	287 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	1	K	58 ± 6	22 ± 3	138 ± 4	59 ± 3	42 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	5	—	43 ± 6	15 ± 3	130 ± 4	54 ± 3	44 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	6	—	50 ± 6	17 ± 3	129 ± 4	55 ± 3	43 ± 2	272 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	7	—	58 ± 6	15 ± 4	127 ± 4	65 ± 3	42 ± 2	286 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	8	—	45 ± 5	16 ± 3	116 ± 4	58 ± 3	42 ± 2	257 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-33	2248	9	—	40 ± 6	17 ± 3	78 ± 4	101 ± 3	16 ± 2	91 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-DS-33	2249	1	A	46 ± 6	21 ± 3	127 ± 4	55 ± 3	37 ± 2	184 ± 5	7 ± 3	1090 ± 26	343 ± 20	NM ± NM	1.77 ± 0.08	NM	NM	McKay Butte	

C.1-32

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-33	2249	1	B	46 ± 6	17 ± 3	123 ± 4	52 ± 3	41 ± 2	258 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2249	1	C	44 ± 5	11 ± 3	130 ± 4	58 ± 3	40 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2249	1	D	67 ± 5	16 ± 3	128 ± 4	57 ± 3	45 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2249	1	E	73 ± 6	17 ± 3	127 ± 4	56 ± 3	41 ± 2	265 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2249	1	F	51 ± 6	22 ± 3	141 ± 4	57 ± 3	46 ± 2	290 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2249	1	G	58 ± 6	22 ± 3	140 ± 4	59 ± 3	46 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2249	1	H	65 ± 6	21 ± 3	123 ± 4	52 ± 3	47 ± 2	355 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-DS-33	2249	1	I	65 ± 6	19 ± 3	140 ± 4	58 ± 3	39 ± 2	205 ± 5	7 ± 3	1045 ± 27	353 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte
35-DS-33	2249	1	J	62 ± 6	25 ± 3	142 ± 4	62 ± 3	46 ± 2	285 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2249	6	—	47 ± 5	19 ± 3	125 ± 4	56 ± 3	42 ± 2	263 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2250	1	A	54 ± 6	17 ± 3	136 ± 4	54 ± 3	39 ± 2	196 ± 5	11 ± 3	1126 ± 26	363 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte
35-DS-33	2250	1	B	49 ± 6	21 ± 3	132 ± 4	53 ± 3	44 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2250	1	C	64 ± 6	18 ± 3	138 ± 4	56 ± 3	44 ± 2	263 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2250	1	D	56 ± 6	22 ± 3	127 ± 4	57 ± 3	44 ± 2	272 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2250	1	E	40 ± 6	16 ± 3	124 ± 4	49 ± 3	39 ± 2	254 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2250	1	F	54 ± 6	20 ± 3	135 ± 4	58 ± 3	41 ± 2	271 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2250	1	G	60 ± 6	17 ± 3	140 ± 4	59 ± 3	45 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2250	1	H	54 ± 6	18 ± 3	125 ± 4	54 ± 3	41 ± 2	186 ± 5	12 ± 3	1157 ± 25	349 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte
35-DS-33	2250	1	I	52 ± 6	15 ± 3	129 ± 4	59 ± 3	42 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2250	1	J	61 ± 6	16 ± 3	135 ± 4	60 ± 3	43 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2251	1	A	50 ± 6	15 ± 3	122 ± 4	53 ± 3	39 ± 2	251 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2251	1	B	72 ± 6	18 ± 3	143 ± 4	62 ± 3	45 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-33

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-33	2251	1 C	56 ± 6	15 ± 3	130 ± 4	55 ± 3	39 ± 2	194 ± 5	8 ± 3	1133 ± 26	396 ± 20	NM ± NM	1.77 ± 0.08	NM NM	McKay Butte		
35-DS-33	2251	1 D	61 ± 6	19 ± 3	137 ± 4	59 ± 3	41 ± 2	200 ± 5	9 ± 3	1112 ± 26	351 ± 20	NM ± NM	1.74 ± 0.08	NM NM	McKay Butte		
35-DS-33	2251	1 E	72 ± 6	14 ± 3	130 ± 4	57 ± 3	42 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2251	1 F	58 ± 6	15 ± 3	135 ± 4	57 ± 3	40 ± 2	199 ± 5	9 ± 3	1127 ± 26	353 ± 20	NM ± NM	1.76 ± 0.08	NM NM	McKay Butte		
35-DS-33	2251	1 G	51 ± 6	18 ± 3	115 ± 4	49 ± 3	38 ± 2	246 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano/Unknown X?		
35-DS-33	2251	1 H	45 ± 6	17 ± 3	128 ± 4	53 ± 3	40 ± 2	260 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2251	1 I	43 ± 6	14 ± 3	120 ± 4	51 ± 3	40 ± 2	249 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2252	3 —	41 ± 6	13 ± 3	116 ± 4	48 ± 3	36 ± 2	253 ± 5	15 ± 3	1462 ± 32	441 ± 20	NM ± NM	2.09 ± 0.08	NM NM	Newberry Volcano/Unknown X?		
35-DS-33	2256	1 —	62 ± 6	18 ± 3	135 ± 4	60 ± 3	44 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2265	1 A	44 ± 6	19 ± 3	123 ± 4	56 ± 3	39 ± 2	258 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2265	1 B	61 ± 6	20 ± 3	141 ± 4	66 ± 3	44 ± 2	291 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2265	1 C	57 ± 6	17 ± 3	128 ± 4	55 ± 3	42 ± 2	255 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2265	1 D	60 ± 6	16 ± 3	134 ± 4	56 ± 3	39 ± 2	193 ± 5	7 ± 3	1139 ± 28	371 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte		
35-DS-33	2265	1 E	61 ± 6	19 ± 3	136 ± 4	58 ± 3	44 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2265	1 F	48 ± 6	18 ± 3	128 ± 4	56 ± 3	40 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2265	1 G	54 ± 6	22 ± 3	136 ± 4	60 ± 3	40 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2265	1 H	52 ± 5	19 ± 3	130 ± 4	57 ± 3	44 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2265	1 I	49 ± 6	14 ± 3	128 ± 4	61 ± 3	41 ± 2	280 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2266	1 —	73 ± 6	16 ± 3	115 ± 4	3 ± 3	52 ± 2	309 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Silver Lake/Sycan Marsh		
35-DS-33	2268	1 A	50 ± 6	13 ± 4	129 ± 4	57 ± 3	43 ± 2	272 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2268	1 B	65 ± 6	19 ± 3	135 ± 4	59 ± 3	42 ± 2	277 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		
35-DS-33	2268	1 C	50 ± 6	17 ± 3	128 ± 4	55 ± 3	39 ± 2	259 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano		

C.1-34

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-33	2268	1	D	51 ± 6	15 ± 3	132 ± 4	59 ± 3	40 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	E	61 ± 5	18 ± 3	127 ± 4	55 ± 3	43 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	F	43 ± 6	20 ± 3	131 ± 4	54 ± 3	43 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	G	45 ± 5	15 ± 3	120 ± 4	49 ± 3	41 ± 2	259 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	H	44 ± 6	18 ± 3	125 ± 4	55 ± 3	39 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	I	54 ± 6	17 ± 3	137 ± 4	57 ± 3	41 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	J	49 ± 6	17 ± 3	133 ± 4	63 ± 3	46 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	K	54 ± 6	20 ± 3	140 ± 4	65 ± 3	46 ± 2	283 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	L	73 ± 6	23 ± 3	146 ± 4	61 ± 3	43 ± 2	296 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	M	53 ± 6	17 ± 3	128 ± 4	56 ± 3	43 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	N	54 ± 6	21 ± 3	138 ± 4	62 ± 3	44 ± 2	290 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	O	73 ± 6	23 ± 3	122 ± 4	54 ± 3	45 ± 2	357 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-DS-33	2268	1	P	57 ± 6	18 ± 3	132 ± 4	61 ± 3	44 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	Q	56 ± 6	18 ± 3	131 ± 4	60 ± 3	41 ± 2	262 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	R	49 ± 6	14 ± 3	120 ± 4	54 ± 3	40 ± 2	256 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	S	47 ± 6	15 ± 3	135 ± 4	58 ± 3	43 ± 2	273 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	1	T	58 ± 6	17 ± 3	132 ± 4	64 ± 3	41 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	4	—	54 ± 6	15 ± 3	125 ± 4	58 ± 3	41 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	5	—	48 ± 5	15 ± 3	133 ± 4	59 ± 3	41 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	6	—	48 ± 5	16 ± 3	121 ± 4	54 ± 3	39 ± 2	259 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2268	8	—	47 ± 5	16 ± 3	73 ± 4	98 ± 3	14 ± 2	91 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-33	2269	1	A	57 ± 6	23 ± 3	136 ± 4	60 ± 3	45 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-35

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Fe/Mn	Ratio	Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>			
35-DS-33	2269	1	B	55 ± 6	19 ± 4	128 ± 4	64 ± 3	40 ± 2	287 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2269	1	C	61 ± 6	18 ± 4	142 ± 4	64 ± 3	44 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2269	1	D	56 ± 6	19 ± 3	123 ± 4	51 ± 3	48 ± 2	354 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-DS-33	2269	1	E	47 ± 6	13 ± 3	129 ± 4	57 ± 3	42 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2269	1	F	58 ± 6	20 ± 3	144 ± 4	62 ± 3	49 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2269	1	G	42 ± 6	17 ± 3	122 ± 4	57 ± 3	39 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2269	1	H	50 ± 6	17 ± 3	130 ± 4	56 ± 3	42 ± 2	263 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	1	A	58 ± 6	19 ± 3	143 ± 4	62 ± 3	43 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	1	B	58 ± 6	17 ± 3	120 ± 4	51 ± 3	40 ± 2	256 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	1	C	54 ± 6	21 ± 3	127 ± 4	53 ± 3	43 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	1	D	53 ± 6	15 ± 3	128 ± 4	57 ± 3	39 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	1	E	45 ± 6	15 ± 3	132 ± 4	57 ± 3	45 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	1	F	49 ± 6	15 ± 3	128 ± 4	55 ± 3	39 ± 2	263 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	1	G	41 ± 6	15 ± 3	124 ± 4	58 ± 3	42 ± 2	269 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	1	H	48 ± 5	20 ± 3	121 ± 4	54 ± 3	38 ± 2	256 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2270	5	—	63 ± 5	17 ± 3	124 ± 4	54 ± 3	42 ± 2	169 ± 5	6 ± 3	865 ± 29	375 ± 20	NM ± NM	1.74 ± 0.08	NM	Quartz Mountain	
35-DS-33	2270	6	—	46 ± 5	13 ± 3	74 ± 4	99 ± 3	18 ± 2	90 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-DS-33	2271	1	—	55 ± 6	19 ± 3	130 ± 4	54 ± 3	43 ± 2	261 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2272	1	A	51 ± 6	16 ± 4	122 ± 4	52 ± 3	37 ± 2	248 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?	
35-DS-33	2272	1	B	49 ± 5	17 ± 3	125 ± 4	55 ± 3	41 ± 2	257 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2272	1	C	49 ± 6	16 ± 3	124 ± 4	54 ± 3	39 ± 2	262 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2272	1	D	43 ± 5	17 ± 3	116 ± 4	50 ± 3	41 ± 2	256 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

C.1-36

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2272	1	E	39 ± 6	16 ± 3	120 ± 4	52 ± 3	39 ± 2	257 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2272	1	F	42 ± 6	15 ± 3	124 ± 4	55 ± 3	39 ± 2	262 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2272	1	G	45 ± 6	18 ± 3	130 ± 4	57 ± 3	42 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2272	1	H	52 ± 6	14 ± 3	121 ± 4	54 ± 3	39 ± 2	262 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2272	3	—	45 ± 6	19 ± 3	124 ± 4	54 ± 3	42 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2273	1	A	52 ± 6	27 ± 3	134 ± 4	60 ± 3	43 ± 2	277 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2273	1	B	55 ± 6	20 ± 3	146 ± 4	63 ± 3	43 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2273	1	C	75 ± 6	19 ± 3	127 ± 4	55 ± 3	48 ± 2	362 ± 5	23 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-DS-33	2273	1	D	54 ± 6	21 ± 3	138 ± 4	61 ± 3	43 ± 2	283 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2273	1	E	48 ± 6	18 ± 3	135 ± 4	61 ± 3	40 ± 2	268 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2273	1	F	46 ± 6	19 ± 3	132 ± 4	55 ± 3	40 ± 2	269 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2273	1	G	48 ± 6	18 ± 3	128 ± 4	55 ± 3	37 ± 2	263 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2273	1	H	53 ± 6	17 ± 3	128 ± 4	58 ± 3	44 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2275	1	A	55 ± 6	16 ± 3	136 ± 4	60 ± 3	42 ± 2	277 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2275	1	B	58 ± 6	17 ± 3	140 ± 4	63 ± 3	44 ± 2	286 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2275	1	C	53 ± 5	19 ± 3	129 ± 4	55 ± 3	42 ± 2	274 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2275	1	D	55 ± 6	15 ± 3	144 ± 4	61 ± 3	46 ± 2	287 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2276	1	A	61 ± 7	19 ± 4	145 ± 5	62 ± 3	45 ± 2	296 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2277	2	—	57 ± 6	18 ± 3	122 ± 4	55 ± 3	39 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2281	3	—	53 ± 6	18 ± 3	138 ± 4	59 ± 3	44 ± 2	280 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2281	4	—	59 ± 6	24 ± 3	130 ± 4	56 ± 3	42 ± 2	168 ± 5	5 ± 3	709 ± 28	363 ± 20	NM ± NM	1.74 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-DS-33	2282	5	—	41 ± 6	19 ± 3	121 ± 4	55 ± 3	39 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-37

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2297	1	A	54 ± 6	14 ± 3	121 ± 4	54 ± 3	41 ± 2	255 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2297	1	B	47 ± 6	17 ± 3	129 ± 4	65 ± 3	42 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2297	1	C	47 ± 6	14 ± 3	126 ± 4	54 ± 3	40 ± 2	266 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2297	1	D	53 ± 6	14 ± 3	130 ± 4	57 ± 3	42 ± 2	266 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2297	1	E	51 ± 6	18 ± 3	127 ± 4	63 ± 3	41 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2298	1	A	50 ± 6	17 ± 3	132 ± 4	52 ± 3	41 ± 2	262 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2298	1	B	55 ± 7	22 ± 3	141 ± 4	65 ± 3	45 ± 2	299 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2298	1	C	84 ± 6	21 ± 4	133 ± 4	56 ± 3	49 ± 2	366 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-DS-33	2298	1	D	50 ± 6	17 ± 3	128 ± 4	56 ± 3	44 ± 2	259 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2298	1	E	43 ± 6	15 ± 3	132 ± 4	59 ± 3	41 ± 2	271 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2299	1	A	45 ± 6	17 ± 3	126 ± 4	53 ± 3	40 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2299	1	B	55 ± 6	21 ± 3	131 ± 4	58 ± 3	44 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2299	1	C	45 ± 6	15 ± 3	130 ± 4	57 ± 3	41 ± 2	269 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2299	1	D	42 ± 6	19 ± 3	120 ± 4	54 ± 3	39 ± 2	258 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2299	1	E	53 ± 6	21 ± 3	136 ± 4	59 ± 3	41 ± 2	272 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2299	1	F	36 ± 6	15 ± 3	118 ± 4	49 ± 3	37 ± 2	249 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-DS-33	2299	1	G	53 ± 6	20 ± 3	136 ± 4	60 ± 3	44 ± 2	279 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2299	1	H	53 ± 6	20 ± 3	138 ± 4	61 ± 3	45 ± 2	285 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2300	1	A	64 ± 6	23 ± 3	147 ± 4	64 ± 3	46 ± 2	289 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2300	1	B	40 ± 6	19 ± 3	122 ± 4	53 ± 3	41 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2300	1	C	46 ± 6	18 ± 3	139 ± 4	59 ± 3	45 ± 2	278 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2300	1	D	56 ± 6	22 ± 3	132 ± 4	62 ± 3	44 ± 2	278 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-38

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2300	1	E	47 ± 6	16 ± 3	130 ± 4	56 ± 3	42 ± 2	266 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2300	1	F	44 ± 6	18 ± 3	114 ± 4	53 ± 3	37 ± 2	251 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-DS-33	2301	1	A	52 ± 6	18 ± 3	129 ± 4	54 ± 3	45 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	1	B	49 ± 6	14 ± 3	133 ± 4	57 ± 3	38 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	1	C	46 ± 6	15 ± 3	118 ± 4	54 ± 3	39 ± 2	257 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	1	D	51 ± 5	19 ± 3	126 ± 4	55 ± 3	40 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	1	E	48 ± 5	15 ± 3	126 ± 4	56 ± 3	42 ± 2	267 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	1	F	46 ± 6	17 ± 3	120 ± 4	53 ± 3	41 ± 2	254 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	1	G	47 ± 6	15 ± 3	110 ± 4	46 ± 3	37 ± 2	238 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-DS-33	2301	1	H	53 ± 6	18 ± 3	133 ± 4	58 ± 3	44 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	1	I	56 ± 5	14 ± 3	130 ± 4	57 ± 3	39 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	1	J	48 ± 6	20 ± 3	131 ± 4	56 ± 3	43 ± 2	271 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2301	2	—	47 ± 5	17 ± 3	134 ± 4	58 ± 3	40 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2302	1	A	52 ± 6	14 ± 3	135 ± 4	61 ± 3	41 ± 2	286 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2302	1	B	50 ± 6	22 ± 3	131 ± 4	59 ± 3	42 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2302	1	C	52 ± 6	15 ± 3	133 ± 4	59 ± 3	43 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2302	1	D	53 ± 6	17 ± 3	129 ± 4	58 ± 3	41 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2302	1	E	50 ± 6	20 ± 3	128 ± 4	56 ± 3	43 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2303	1	A	52 ± 6	16 ± 3	137 ± 4	59 ± 3	43 ± 2	287 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2303	1	B	44 ± 6	17 ± 3	127 ± 4	54 ± 3	40 ± 2	265 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2303	1	C	48 ± 6	14 ± 3	127 ± 4	54 ± 3	43 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2303	1	D	45 ± 5	17 ± 3	122 ± 4	51 ± 3	40 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-39



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-33	2303	1	E	43 ± 6	20 ± 3	129 ± 4	55 ± 3	42 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2304	1	A	42 ± 6	14 ± 3	116 ± 4	52 ± 3	39 ± 2	250 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano/Unknown X?
35-DS-33	2304	1	B	52 ± 6	14 ± 3	118 ± 4	53 ± 3	42 ± 2	258 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2304	1	C	47 ± 6	14 ± 3	118 ± 4	56 ± 3	39 ± 2	257 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2304	1	D	56 ± 6	19 ± 3	117 ± 4	53 ± 3	37 ± 2	251 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano/Unknown X?
35-DS-33	2304	1	E	55 ± 6	15 ± 3	136 ± 4	64 ± 3	45 ± 2	283 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2305	1	A	46 ± 6	17 ± 3	129 ± 4	59 ± 3	40 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2305	1	B	54 ± 6	20 ± 3	128 ± 4	58 ± 3	42 ± 2	262 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2305	1	C	47 ± 6	14 ± 3	131 ± 4	56 ± 3	42 ± 2	271 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2305	1	D	53 ± 5	14 ± 3	127 ± 4	56 ± 3	41 ± 2	262 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2305	1	E	49 ± 6	11 ± 4	127 ± 4	56 ± 3	37 ± 2	259 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2306	1	A	61 ± 6	22 ± 3	136 ± 4	54 ± 3	40 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2306	1	B	43 ± 6	16 ± 3	126 ± 4	53 ± 3	40 ± 2	252 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2306	1	C	44 ± 6	18 ± 3	133 ± 4	59 ± 3	44 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2306	1	D	48 ± 6	15 ± 3	123 ± 4	52 ± 3	40 ± 2	262 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2306	1	E	54 ± 6	17 ± 3	127 ± 4	57 ± 3	40 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2306	1	F	62 ± 6	15 ± 3	125 ± 4	55 ± 3	43 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2307	1	A	62 ± 6	20 ± 3	140 ± 4	63 ± 3	45 ± 2	285 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2307	1	B	51 ± 6	15 ± 3	135 ± 4	59 ± 3	42 ± 2	272 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2307	1	C	57 ± 6	15 ± 3	134 ± 4	56 ± 3	40 ± 2	271 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2308	1	A	59 ± 6	17 ± 3	134 ± 4	64 ± 3	43 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2308	1	B	60 ± 6	20 ± 3	139 ± 4	62 ± 3	47 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-40

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2308	1	C	53 ± 6	16 ± 3	129 ± 4	58 ± 3	40 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2310	1	A	62 ± 6	20 ± 4	144 ± 4	63 ± 3	44 ± 2	288 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2310	1	B	59 ± 6	15 ± 3	138 ± 4	60 ± 3	45 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2310	1	C	46 ± 6	12 ± 3	125 ± 4	55 ± 3	40 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2310	2	—	54 ± 6	16 ± 3	129 ± 4	57 ± 3	42 ± 2	260 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2324	2	—	49 ± 6	16 ± 3	125 ± 4	57 ± 3	42 ± 2	257 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2334	2	—	61 ± 6	19 ± 4	129 ± 4	57 ± 3	47 ± 2	277 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2335	3	—	49 ± 6	20 ± 4	139 ± 5	65 ± 3	31 ± 2	182 ± 5	10 ± 3	1358 ± 35	311 ± 20	NM ± NM	1.33 ± 0.08	NM	McKay Butte	
35-DS-33	2336	3	—	49 ± 6	15 ± 3	120 ± 4	53 ± 3	43 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2341	2	—	66 ± 6	13 ± 3	120 ± 4	54 ± 3	38 ± 2	255 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2341	3	—	73 ± 6	25 ± 3	121 ± 4	55 ± 3	41 ± 2	168 ± 5	8 ± 3	1146 ± 33	398 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte	
35-DS-33	2341	4	—	55 ± 6	18 ± 3	117 ± 4	56 ± 3	34 ± 2	176 ± 5	7 ± 3	1980 ± 39	444 ± 21	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-33	2342	3	—	55 ± 6	16 ± 3	131 ± 4	56 ± 3	43 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2347	5	—	49 ± 6	16 ± 3	127 ± 4	57 ± 3	38 ± 2	268 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2347	6	—	55 ± 6	19 ± 3	133 ± 4	58 ± 3	44 ± 2	276 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2347	7	—	46 ± 6	14 ± 3	111 ± 4	68 ± 3	37 ± 2	228 ± 5	8 ± 3	1411 ± 31	437 ± 20	NM ± NM	2.15 ± 0.08	NM	Unknown X?	
35-DS-33	2347	8	—	50 ± 6	20 ± 3	132 ± 4	52 ± 3	41 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2348	1	—	76 ± 6	20 ± 3	108 ± 4	8 ± 3	50 ± 2	313 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-DS-33	2349	1	—	48 ± 5	17 ± 3	121 ± 4	59 ± 3	41 ± 2	264 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2351	5	—	50 ± 6	15 ± 3	128 ± 4	50 ± 3	39 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2351	6	—	49 ± 6	16 ± 3	126 ± 4	56 ± 3	39 ± 2	264 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2351	7	—	40 ± 6	18 ± 3	125 ± 4	55 ± 3	40 ± 2	265 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

C.1-41

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-33	2351	9	—	58 ± 6	18 ± 3	136 ± 4	57 ± 3	42 ± 2	277 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2351	10	—	55 ± 6	15 ± 4	129 ± 4	52 ± 3	41 ± 2	265 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2352	1	—	51 ± 6	21 ± 3	120 ± 4	55 ± 3	41 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2353	1	—	48 ± 5	16 ± 3	128 ± 4	54 ± 3	41 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2354	3	—	47 ± 5	19 ± 3	119 ± 4	52 ± 3	37 ± 2	256 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2364	4	—	52 ± 6	18 ± 3	134 ± 4	57 ± 3	42 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2366	2	—	55 ± 6	17 ± 3	125 ± 4	54 ± 3	43 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2366	3	—	58 ± 6	18 ± 3	101 ± 4	41 ± 3	24 ± 2	117 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-DS-33	2367	1	—	46 ± 5	17 ± 3	124 ± 4	54 ± 3	40 ± 2	261 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2368	4	—	43 ± 6	12 ± 3	123 ± 4	54 ± 3	39 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2368	5	—	37 ± 6	16 ± 3	71 ± 4	92 ± 3	14 ± 2	87 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	2370	4	—	46 ± 6	15 ± 3	124 ± 4	55 ± 3	40 ± 2	262 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2370	5	—	49 ± 6	19 ± 3	132 ± 4	58 ± 3	40 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2370	6	—	60 ± 6	18 ± 3	134 ± 4	61 ± 3	43 ± 2	274 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2370	7	—	63 ± 6	21 ± 3	130 ± 4	60 ± 3	45 ± 2	181 ± 5	7 ± 3	763 ± 29	356 ± 20	NM ± NM	1.70 ± 0.08	NM ± NM	NM	Quartz Mountain
35-DS-33	2371	1	—	48 ± 6	18 ± 3	120 ± 4	52 ± 3	42 ± 2	255 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2372	3	—	49 ± 6	21 ± 3	124 ± 4	58 ± 3	44 ± 2	259 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2383	1	—	41 ± 6	20 ± 3	68 ± 4	87 ± 3	14 ± 2	82 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-33	2390	1	—	49 ± 5	18 ± 3	121 ± 4	54 ± 3	43 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2393	1	—	90 ± 6	18 ± 3	117 ± 4	11 ± 3	49 ± 2	325 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-33	2429	1	—	70 ± 7	23 ± 3	139 ± 5	63 ± 3	43 ± 2	208 ± 5	11 ± 3	1070 ± 33	360 ± 20	NM ± NM	1.66 ± 0.08	NM ± NM	NM	McKay Butte
35-DS-33	2430	1	—	53 ± 6	17 ± 3	124 ± 4	60 ± 3	41 ± 2	266 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-42

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2430	2	—	41 ± 6	15 ± 3	129 ± 4	57 ± 3	41 ± 2	270 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2432	1	—	50 ± 6	18 ± 3	126 ± 4	57 ± 3	42 ± 2	255 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2442	3	—	60 ± 6	17 ± 3	127 ± 4	53 ± 3	42 ± 2	255 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2442	4	—	44 ± 6	17 ± 3	130 ± 4	54 ± 3	40 ± 2	265 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2465	1	A	50 ± 5	17 ± 3	130 ± 4	55 ± 3	41 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2465	1	B	68 ± 6	20 ± 3	146 ± 4	63 ± 3	47 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2465	1	C	67 ± 7	18 ± 4	152 ± 5	61 ± 3	43 ± 2	297 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2465	1	D	67 ± 6	16 ± 4	145 ± 4	64 ± 3	47 ± 2	292 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2465	1	E	66 ± 6	24 ± 3	148 ± 4	62 ± 3	42 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2465	1	F	77 ± 6	16 ± 3	149 ± 4	62 ± 3	44 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2465	1	G	76 ± 6	13 ± 4	152 ± 4	65 ± 3	42 ± 2	288 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2465	1	H	54 ± 7	19 ± 4	153 ± 5	65 ± 3	49 ± 2	305 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	A	49 ± 6	19 ± 3	137 ± 4	59 ± 3	42 ± 2	279 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	B	52 ± 6	18 ± 3	130 ± 4	55 ± 3	40 ± 2	263 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	C	49 ± 6	16 ± 3	135 ± 4	60 ± 3	40 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	D	50 ± 6	18 ± 3	124 ± 4	56 ± 3	43 ± 2	261 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	E	57 ± 6	19 ± 3	134 ± 4	57 ± 3	43 ± 2	276 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	F	49 ± 6	16 ± 3	127 ± 4	58 ± 3	41 ± 2	262 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	G	50 ± 6	17 ± 3	129 ± 4	56 ± 3	41 ± 2	260 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	H	58 ± 6	20 ± 3	141 ± 4	60 ± 3	48 ± 2	291 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	I	59 ± 6	19 ± 3	143 ± 4	64 ± 3	44 ± 2	283 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2466	1	J	54 ± 6	23 ± 3	139 ± 4	60 ± 3	42 ± 2	282 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2467	2	—	64 ± 6	19 ± 3	125 ± 4	53 ± 3	37 ± 2	188 ± 5	10 ± 3	1289 ± 31	409 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-33	2467	2	A	63 ± 6	16 ± 3	136 ± 4	58 ± 3	44 ± 2	275 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	B	48 ± 6	19 ± 3	144 ± 4	61 ± 3	43 ± 2	287 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	C	46 ± 6	14 ± 3	126 ± 4	52 ± 3	40 ± 2	258 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	D	45 ± 6	19 ± 3	125 ± 4	53 ± 3	40 ± 2	267 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	E	41 ± 6	16 ± 3	124 ± 4	55 ± 3	44 ± 2	256 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	F	51 ± 5	16 ± 3	121 ± 4	52 ± 3	42 ± 2	263 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	G	58 ± 6	21 ± 3	141 ± 4	63 ± 3	47 ± 2	286 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	H	59 ± 6	17 ± 3	127 ± 4	56 ± 3	40 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	I	48 ± 6	22 ± 3	132 ± 4	58 ± 3	40 ± 2	274 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2467	2	J	50 ± 6	16 ± 4	139 ± 4	62 ± 3	44 ± 2	290 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	A	48 ± 6	19 ± 3	127 ± 4	59 ± 3	40 ± 2	271 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	B	44 ± 6	14 ± 3	123 ± 4	53 ± 3	41 ± 2	256 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	C	44 ± 6	16 ± 3	119 ± 4	54 ± 3	40 ± 2	256 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	D	50 ± 6	11 ± 4	124 ± 4	58 ± 3	36 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	E	43 ± 6	15 ± 3	126 ± 4	57 ± 3	42 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	F	49 ± 6	19 ± 3	132 ± 4	58 ± 3	42 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	G	38 ± 6	16 ± 3	122 ± 4	54 ± 3	40 ± 2	256 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	H	44 ± 6	23 ± 3	128 ± 4	54 ± 3	39 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	I	58 ± 6	15 ± 3	130 ± 4	57 ± 3	41 ± 2	267 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	1	J	46 ± 6	19 ± 3	134 ± 4	57 ± 3	41 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-33	2468	3	—	53 ± 6	19 ± 3	124 ± 4	55 ± 3	40 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

C.1-44

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-33	2469	1	A	51 ± 6	17 ± 3	129 ± 4	63 ± 3	43 ± 2	276 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2469	1	B	47 ± 6	23 ± 3	127 ± 4	55 ± 3	41 ± 2	269 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2476	1	—	51 ± 6	20 ± 3	129 ± 4	57 ± 3	44 ± 2	260 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2476	2	—	48 ± 5	15 ± 3	114 ± 4	55 ± 3	40 ± 2	251 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano/Unknown X?	
35-DS-33	2486	2	—	45 ± 7	16 ± 3	134 ± 4	61 ± 3	42 ± 2	283 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2488	4	—	49 ± 6	19 ± 3	127 ± 4	54 ± 3	41 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2491	1	—	48 ± 6	21 ± 3	127 ± 4	57 ± 3	43 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2505	2	—	49 ± 6	19 ± 3	128 ± 4	56 ± 3	41 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2505	3	—	39 ± 6	12 ± 4	78 ± 4	99 ± 3	15 ± 2	93 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-DS-33	2509	2	—	51 ± 6	16 ± 3	132 ± 4	57 ± 3	42 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2512	4	—	50 ± 6	17 ± 3	130 ± 4	57 ± 3	45 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2513	4	—	63 ± 6	17 ± 3	131 ± 4	58 ± 3	43 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2517	4	—	43 ± 6	16 ± 3	121 ± 4	54 ± 3	43 ± 2	255 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2520	1	—	48 ± 6	20 ± 3	128 ± 4	55 ± 3	42 ± 2	270 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2534	4	—	36 ± 6	17 ± 3	119 ± 4	51 ± 3	39 ± 2	181 ± 5	8 ± 3	1019 ± 30	350 ± 20	NM ± NM	1.71 ± 0.08	NM ± NM	McKay Butte	
35-DS-33	2538	1	—	50 ± 6	18 ± 3	133 ± 4	55 ± 3	41 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2539	5	—	59 ± 6	17 ± 3	134 ± 4	55 ± 3	44 ± 2	273 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2540	5	—	64 ± 6	19 ± 3	125 ± 4	58 ± 3	40 ± 2	171 ± 5	10 ± 3	993 ± 34	366 ± 20	NM ± NM	1.68 ± 0.08	NM ± NM	McKay Butte	
35-DS-33	2540	6	—	36 ± 6	15 ± 3	80 ± 4	100 ± 3	15 ± 2	93 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-DS-33	2542	2	—	45 ± 6	16 ± 3	126 ± 4	53 ± 3	40 ± 2	260 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2554	1	—	63 ± 7	19 ± 4	137 ± 5	61 ± 3	43 ± 2	285 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-33	2555	1	—	40 ± 6	14 ± 3	121 ± 4	54 ± 3	43 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	

C.1-45

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations <sup>a</sup>											Ratio	
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-33	2560	1 —	50 ± 6	16 ± 3	123 ± 4	53 ± 3	39 ± 2	257 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2561	1 —	46 ± 6	18 ± 3	126 ± 4	52 ± 3	41 ± 2	257 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 A	49 ± 6	16 ± 3	136 ± 4	57 ± 3	42 ± 2	278 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 B	49 ± 6	21 ± 3	130 ± 4	55 ± 3	43 ± 2	268 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 C	51 ± 6	17 ± 3	126 ± 4	53 ± 3	41 ± 2	258 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 D	52 ± 6	20 ± 3	125 ± 4	54 ± 3	42 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 E	45 ± 6	12 ± 4	122 ± 4	53 ± 3	41 ± 2	254 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 F	51 ± 6	23 ± 3	130 ± 4	58 ± 3	40 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 G	56 ± 6	15 ± 3	131 ± 4	61 ± 3	44 ± 2	278 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 H	65 ± 6	22 ± 3	136 ± 4	59 ± 3	43 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 I	60 ± 6	17 ± 3	129 ± 4	55 ± 3	42 ± 2	255 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 J	67 ± 6	15 ± 4	141 ± 4	63 ± 3	45 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 K	53 ± 6	15 ± 3	130 ± 4	57 ± 3	38 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2563	1 L	60 ± 6	19 ± 3	139 ± 4	60 ± 3	47 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2565	1 A	59 ± 5	15 ± 3	127 ± 4	56 ± 3	40 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2565	1 B	53 ± 6	15 ± 3	133 ± 4	57 ± 3	43 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2565	1 C	52 ± 6	14 ± 3	135 ± 4	57 ± 3	45 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2565	1 D	43 ± 6	17 ± 3	119 ± 4	50 ± 3	41 ± 2	251 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2565	1 E	49 ± 6	17 ± 3	126 ± 4	56 ± 3	40 ± 2	257 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2565	1 F	46 ± 6	19 ± 3	119 ± 4	55 ± 3	38 ± 2	253 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2565	1 G	44 ± 6	15 ± 3	128 ± 4	56 ± 3	39 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-33	2565	1 H	47 ± 6	14 ± 3	127 ± 4	53 ± 3	40 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-46

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2565	1	I	47 ± 6	19 ± 3	126 ± 4	54 ± 3	37 ± 2	257 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	J	48 ± 6	14 ± 3	126 ± 4	53 ± 3	40 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	K	56 ± 6	17 ± 3	125 ± 4	52 ± 3	40 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	L	42 ± 6	21 ± 3	113 ± 4	51 ± 3	41 ± 2	252 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-DS-33	2565	1	M	55 ± 6	19 ± 3	126 ± 4	56 ± 3	39 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	N	46 ± 6	17 ± 3	129 ± 4	56 ± 3	42 ± 2	267 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	O	45 ± 6	17 ± 3	131 ± 4	59 ± 3	43 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	P	54 ± 5	13 ± 3	113 ± 4	53 ± 3	37 ± 2	247 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-DS-33	2565	1	Q	45 ± 6	15 ± 3	124 ± 4	60 ± 3	41 ± 2	265 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	R	45 ± 6	19 ± 3	127 ± 4	57 ± 3	44 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	S	42 ± 6	20 ± 3	122 ± 4	54 ± 3	40 ± 2	253 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	T	57 ± 6	23 ± 3	144 ± 4	66 ± 3	44 ± 2	288 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	U	51 ± 6	18 ± 3	143 ± 4	61 ± 3	41 ± 2	282 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2565	1	V	50 ± 6	18 ± 3	126 ± 4	62 ± 3	41 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2567	1	A	38 ± 6	13 ± 3	122 ± 4	53 ± 3	39 ± 2	248 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-DS-33	2567	1	B	45 ± 6	18 ± 3	113 ± 4	66 ± 3	39 ± 2	237 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X?
35-DS-33	2567	1	C	50 ± 6	14 ± 3	128 ± 4	53 ± 3	38 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2567	1	D	47 ± 6	17 ± 3	128 ± 4	55 ± 3	41 ± 2	267 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2567	1	E	47 ± 6	17 ± 3	132 ± 4	55 ± 3	42 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2567	1	F	56 ± 6	16 ± 3	137 ± 4	61 ± 3	44 ± 2	281 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2569	1	—	41 ± 6	16 ± 3	120 ± 4	53 ± 3	41 ± 2	258 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2570	1	A	70 ± 6	20 ± 3	129 ± 4	57 ± 3	41 ± 2	170 ± 5	8 ± 3	900 ± 24	380 ± 20	NM ± NM	1.78 ± 0.08	NM ± NM	NM	McKay Butte

C.1-47



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-33	2570	1	B	45 ± 6	17 ± 3	124 ± 4	54 ± 3	41 ± 2	258 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2570	1	C	46 ± 6	14 ± 3	133 ± 4	56 ± 3	40 ± 2	268 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2570	1	D	53 ± 6	18 ± 3	128 ± 4	55 ± 3	41 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-33	2570	3	—	70 ± 6	20 ± 3	127 ± 4	56 ± 3	46 ± 2	178 ± 5	10 ± 3	624 ± 27	359 ± 20	NM ± NM	1.68 ± 0.08	NM	Quartz Mountain	
35-DS-33	2571	1	A	50 ± 6	16 ± 3	129 ± 4	57 ± 3	42 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2571	1	B	41 ± 5	18 ± 3	118 ± 4	49 ± 3	34 ± 2	179 ± 5	10 ± 3	996 ± 25	354 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte	
35-DS-33	2571	1	C	51 ± 6	18 ± 3	128 ± 4	54 ± 3	40 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2571	1	D	44 ± 6	14 ± 3	125 ± 4	58 ± 3	41 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2571	1	E	56 ± 6	15 ± 4	143 ± 4	61 ± 3	46 ± 2	290 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2575	1	A	50 ± 6	17 ± 3	122 ± 4	54 ± 3	38 ± 2	254 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2576	1	A	47 ± 6	15 ± 3	122 ± 4	55 ± 3	41 ± 2	254 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2576	1	B	51 ± 6	20 ± 3	134 ± 4	66 ± 3	42 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2578	1	A	60 ± 6	18 ± 3	130 ± 4	59 ± 3	43 ± 2	269 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2578	1	B	54 ± 7	18 ± 4	141 ± 5	61 ± 3	43 ± 2	279 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2579	1	A	47 ± 6	11 ± 4	128 ± 4	57 ± 3	42 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2580	1	A	81 ± 7	22 ± 4	146 ± 4	69 ± 3	47 ± 2	195 ± 5	9 ± 3	882 ± 25	369 ± 20	NM ± NM	1.63 ± 0.08	NM	McKay Butte	
35-DS-33	2582	1	A	35 ± 7	24 ± 3	132 ± 4	60 ± 3	42 ± 2	274 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2584	1	A	47 ± 6	14 ± 3	126 ± 4	62 ± 3	41 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2586	2	—	65 ± 7	18 ± 4	137 ± 5	59 ± 3	43 ± 2	286 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2590	2	—	52 ± 6	18 ± 3	129 ± 4	55 ± 3	44 ± 2	263 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-33	2600	2	—	57 ± 5	19 ± 3	118 ± 4	55 ± 3	38 ± 2	168 ± 5	8 ± 3	726 ± 28	372 ± 20	NM ± NM	1.76 ± 0.08	NM	Quartz Mountain	
35-DS-33	2601	2	—	60 ± 7	17 ± 4	131 ± 5	57 ± 3	42 ± 2	279 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

C.1-48

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-33	2605	1	—	82 ± 6	18 ± 3	115 ± 4	12 ± 3	54 ± 2	321 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-33	2612	3	—	43 ± 6	16 ± 3	127 ± 4	54 ± 3	43 ± 2	270 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2710	1	A	47 ± 6	14 ± 3	136 ± 4	59 ± 3	41 ± 2	270 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2716	1	A	59 ± 6	17 ± 4	140 ± 4	63 ± 3	48 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2719	1	A	50 ± 6	21 ± 3	135 ± 4	56 ± 3	41 ± 2	276 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2719	1	B	66 ± 6	21 ± 3	140 ± 4	63 ± 3	45 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2722	1	A	62 ± 7	21 ± 3	148 ± 5	66 ± 3	46 ± 2	293 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2722	1	B	66 ± 6	21 ± 3	156 ± 5	71 ± 3	47 ± 2	296 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2725	1	A	49 ± 6	18 ± 3	129 ± 4	58 ± 3	44 ± 2	266 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2725	1	B	57 ± 6	19 ± 3	141 ± 4	63 ± 3	41 ± 2	283 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2725	1	C	47 ± 6	17 ± 3	123 ± 4	58 ± 3	43 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2725	1	D	49 ± 6	17 ± 3	138 ± 4	60 ± 3	45 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2728	1	A	48 ± 6	17 ± 3	136 ± 4	57 ± 3	43 ± 2	270 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2728	1	B	55 ± 6	16 ± 3	135 ± 4	58 ± 3	45 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2728	1	C	49 ± 6	22 ± 3	138 ± 4	65 ± 3	44 ± 2	291 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2728	1	D	53 ± 6	16 ± 3	136 ± 4	60 ± 3	44 ± 2	285 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2728	1	E	57 ± 6	17 ± 3	134 ± 4	60 ± 3	45 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-33	2731	1	A	58 ± 6	16 ± 3	137 ± 4	61 ± 3	35 ± 2	193 ± 5	9 ± 3	1040 ± 27	363 ± 20	NM ± NM	1.77 ± 0.08	NM	NM	McKay Butte
35-DS-116	1	1	A	48 ± 6	17 ± 3	126 ± 4	60 ± 3	41 ± 2	267 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-116	1	1	B	54 ± 6	17 ± 3	134 ± 4	58 ± 3	40 ± 2	275 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-116	1	1	C	53 ± 6	18 ± 3	136 ± 4	60 ± 3	45 ± 2	274 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-DS-116	1	1	D	57 ± 6	17 ± 3	145 ± 4	64 ± 3	45 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano

C.1-49

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-116	1	1	E	48 ± 5	20 ± 3	126 ± 4	56 ± 3	44 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	F	63 ± 7	20 ± 4	145 ± 5	63 ± 3	45 ± 2	293 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	G	61 ± 7	18 ± 4	142 ± 5	64 ± 3	46 ± 2	292 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	H	69 ± 7	20 ± 4	145 ± 5	66 ± 3	52 ± 2	295 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	I	77 ± 7	20 ± 4	158 ± 5	74 ± 3	43 ± 2	293 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	J	59 ± 6	18 ± 3	145 ± 5	63 ± 3	46 ± 2	295 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	K	71 ± 6	17 ± 4	149 ± 5	63 ± 3	45 ± 2	295 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	L	67 ± 7	20 ± 4	147 ± 5	66 ± 3	46 ± 2	301 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	M	53 ± 6	20 ± 3	131 ± 4	65 ± 3	44 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	1	1	N	71 ± 6	20 ± 3	148 ± 4	66 ± 3	43 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	3	1	—	41 ± 5	20 ± 3	75 ± 4	101 ± 3	18 ± 2	94 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-116	4	1	—	42 ± 5	17 ± 3	76 ± 4	100 ± 3	16 ± 2	93 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-116	5	1	—	56 ± 5	16 ± 3	132 ± 4	57 ± 3	41 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	6	1	—	53 ± 5	17 ± 3	126 ± 4	57 ± 3	40 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	346	1	A	65 ± 6	13 ± 4	136 ± 5	71 ± 3	41 ± 2	283 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	346	1	B	61 ± 6	22 ± 3	138 ± 4	60 ± 3	41 ± 2	276 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	352	3	—	49 ± 6	12 ± 3	126 ± 4	56 ± 3	41 ± 2	261 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	355	1	A	51 ± 6	15 ± 3	131 ± 4	60 ± 3	43 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	355	1	B	66 ± 7	21 ± 4	145 ± 5	64 ± 3	43 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	355	1	C	62 ± 6	17 ± 3	141 ± 4	67 ± 3	46 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	355	1	D	69 ± 7	21 ± 4	148 ± 5	66 ± 3	47 ± 2	298 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	355	1	E	66 ± 6	18 ± 3	135 ± 4	65 ± 3	45 ± 2	288 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-50

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-116	372	1	A	59 ± 6	22 ± 3	147 ± 4	60 ± 3	45 ± 2	284 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-116	372	1	B	64 ± 6	21 ± 3	144 ± 5	63 ± 3	45 ± 2	291 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	372	1	C	60 ± 6	16 ± 3	150 ± 4	64 ± 3	47 ± 2	294 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	372	1	D	58 ± 6	18 ± 3	136 ± 4	61 ± 3	45 ± 2	289 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	372	1	E	61 ± 6	20 ± 3	145 ± 5	61 ± 3	45 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	372	1	F	57 ± 5	20 ± 3	131 ± 4	59 ± 3	43 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	372	1	G	68 ± 6	16 ± 4	138 ± 5	61 ± 3	44 ± 2	269 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	373	1	A	59 ± 6	19 ± 3	142 ± 4	62 ± 3	44 ± 2	284 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	373	1	B	53 ± 6	23 ± 3	142 ± 4	60 ± 3	47 ± 2	288 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	373	1	C	52 ± 6	17 ± 3	135 ± 4	60 ± 3	42 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	373	1	D	54 ± 7	18 ± 4	140 ± 5	60 ± 3	44 ± 2	293 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	373	1	E	65 ± 6	16 ± 4	145 ± 5	63 ± 3	46 ± 2	293 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	373	1	F	87 ± 7	25 ± 4	150 ± 5	70 ± 3	48 ± 2	302 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	373	1	G	63 ± 7	19 ± 4	144 ± 5	62 ± 3	49 ± 2	296 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	420	1	—	42 ± 6	15 ± 3	101 ± 4	40 ± 3	24 ± 2	112 ± 5	10 ± 3	896 ± 23	712 ± 20	NM ± NM	1.06 ± 0.08	NM	Spodue Mountain	
35-DS-116	536	1	—	74 ± 6	22 ± 3	144 ± 4	64 ± 3	49 ± 2	193 ± 5	6 ± 3	727 ± 25	339 ± 20	NM ± NM	1.64 ± 0.08	NM	Quartz Mountain	
35-DS-116	737	2	—	51 ± 6	20 ± 3	126 ± 4	55 ± 3	41 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-116	765	2	—	48 ± 6	19 ± 3	127 ± 4	56 ± 3	43 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	21	1	—	51 ± 6	15 ± 3	85 ± 4	108 ± 3	18 ± 2	102 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-DS-263	59	1	—	77 ± 6	17 ± 3	87 ± 4	39 ± 3	54 ± 2	124 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain	
35-DS-263	106	1	A	63 ± 6	13 ± 4	135 ± 4	62 ± 3	46 ± 2	293 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	106	1	B	67 ± 8	18 ± 5	147 ± 5	65 ± 3	48 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

C.1-51

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations*												Ratio	
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-263	106	1 C	59 ± 6	22 ± 3	136 ± 4	59 ± 3	43 ± 2	276 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 D	48 ± 6	18 ± 3	138 ± 4	59 ± 3	46 ± 2	278 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 E	57 ± 7	15 ± 4	135 ± 5	62 ± 3	45 ± 2	281 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 F	63 ± 7	16 ± 4	153 ± 5	66 ± 3	45 ± 2	300 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 G	69 ± 6	15 ± 4	145 ± 5	67 ± 3	46 ± 2	295 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 H	49 ± 6	17 ± 3	133 ± 4	61 ± 3	45 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 I	52 ± 6	19 ± 3	133 ± 4	63 ± 3	40 ± 2	271 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 J	58 ± 6	18 ± 3	135 ± 4	63 ± 3	41 ± 2	273 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 K	55 ± 6	21 ± 3	126 ± 4	59 ± 3	42 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 L	52 ± 5	16 ± 3	123 ± 4	57 ± 3	40 ± 2	267 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 M	57 ± 6	19 ± 3	127 ± 4	60 ± 3	41 ± 2	265 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 N	58 ± 6	19 ± 3	137 ± 4	66 ± 3	40 ± 2	285 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	106	1 O	60 ± 6	21 ± 3	139 ± 4	64 ± 3	44 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	110	1 A	47 ± 5	14 ± 3	126 ± 4	56 ± 3	38 ± 2	192 ± 5	9 ± 3	1246 ± 29	353 ± 20	NM ± NM	1.88 ± 0.08	NM	McKay Butte	
35-DS-263	110	1 B	51 ± 6	16 ± 3	138 ± 4	61 ± 3	42 ± 2	207 ± 5	11 ± 3	1256 ± 31	343 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-263	110	1 C	71 ± 6	19 ± 3	129 ± 4	78 ± 3	41 ± 2	269 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	110	1 D	56 ± 6	18 ± 3	139 ± 4	61 ± 3	42 ± 2	205 ± 5	9 ± 3	1172 ± 31	354 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-263	110	1 E	52 ± 6	17 ± 3	124 ± 4	74 ± 3	38 ± 2	250 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	110	1 F	64 ± 6	19 ± 3	124 ± 4	39 ± 3	44 ± 2	259 ± 5	13 ± 3	1519 ± 31	398 ± 20	NM ± NM	2.00 ± 0.08	NM	Unknown A	
35-DS-263	110	1 G	49 ± 6	21 ± 3	137 ± 4	65 ± 3	40 ± 2	204 ± 5	12 ± 3	1546 ± 32	356 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte	
35-DS-263	110	1 H	42 ± 6	17 ± 3	126 ± 4	56 ± 3	39 ± 2	192 ± 5	9 ± 3	1531 ± 31	396 ± 20	NM ± NM	2.01 ± 0.08	NM	McKay Butte	
35-DS-263	110	1 I	43 ± 6	18 ± 3	134 ± 4	61 ± 3	40 ± 2	200 ± 5	9 ± 3	1517 ± 32	382 ± 20	NM ± NM	1.98 ± 0.08	NM	McKay Butte	

C.1-52

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	110	1	J	47 ± 6	17 ± 3	125 ± 4	60 ± 3	36 ± 2	193 ± 5	10 ± 3	1883 ± 34	365 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte	
35-DS-263	110	1	K	50 ± 6	17 ± 3	130 ± 4	59 ± 3	36 ± 2	185 ± 5	8 ± 3	1547 ± 36	387 ± 20	NM ± NM	1.93 ± 0.08	NM	McKay Butte	
35-DS-263	110	1	L	45 ± 5	16 ± 3	122 ± 4	59 ± 3	37 ± 2	189 ± 5	9 ± 3	1386 ± 36	393 ± 20	NM ± NM	2.00 ± 0.08	NM	McKay Butte	
35-DS-263	110	1	M	57 ± 6	14 ± 3	119 ± 4	64 ± 3	35 ± 2	190 ± 5	7 ± 3	1512 ± 33	368 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-DS-263	110	1	N	61 ± 5	18 ± 3	128 ± 4	58 ± 3	39 ± 2	198 ± 5	7 ± 3	1732 ± 31	333 ± 20	NM ± NM	1.90 ± 0.08	NM	McKay Butte	
35-DS-263	110	1	O	55 ± 6	17 ± 3	142 ± 4	65 ± 3	43 ± 2	209 ± 5	9 ± 3	1415 ± 34	353 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte	
35-DS-263	113	1	A	60 ± 7	20 ± 4	143 ± 5	65 ± 3	42 ± 2	217 ± 5	13 ± 3	1159 ± 34	351 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte	
35-DS-263	113	1	B	58 ± 6	14 ± 4	139 ± 5	69 ± 3	46 ± 2	290 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	113	1	C	60 ± 6	20 ± 3	138 ± 4	61 ± 3	43 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	113	1	D	54 ± 6	18 ± 3	140 ± 4	63 ± 3	45 ± 2	291 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	113	1	E	61 ± 6	21 ± 3	152 ± 5	65 ± 3	44 ± 2	298 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	113	1	F	54 ± 5	17 ± 3	129 ± 4	64 ± 3	38 ± 2	263 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	113	1	G	57 ± 6	21 ± 3	131 ± 4	64 ± 3	45 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	114	1	A	49 ± 6	18 ± 3	121 ± 4	63 ± 3	39 ± 2	270 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	114	1	B	55 ± 6	20 ± 3	127 ± 4	69 ± 3	39 ± 2	265 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	114	1	C	65 ± 6	15 ± 4	140 ± 5	67 ± 3	47 ± 2	296 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	114	1	D	67 ± 6	16 ± 3	131 ± 4	62 ± 3	44 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	114	1	E	62 ± 6	19 ± 3	138 ± 5	72 ± 3	46 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	114	1	F	75 ± 7	22 ± 4	148 ± 5	70 ± 3	44 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	115	1	A	64 ± 6	18 ± 4	136 ± 5	69 ± 3	44 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	115	1	B	46 ± 6	16 ± 3	125 ± 4	63 ± 3	39 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	115	1	C	52 ± 6	18 ± 3	134 ± 4	61 ± 3	42 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

C.1-53

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	115	1	D	67 ± 6	16 ± 3	137 ± 4	65 ± 3	40 ± 2	203 ± 5	9 ± 3	1213 ± 33	356 ± 20	NM ± NM	1.75 ± 0.08	NM NM	McKay Butte	
35-DS-263	115	1	E	67 ± 5	16 ± 3	136 ± 4	66 ± 3	41 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	115	1	F	59 ± 6	21 ± 3	145 ± 5	63 ± 3	42 ± 2	207 ± 5	8 ± 3	1254 ± 32	342 ± 20	NM ± NM	1.80 ± 0.08	NM NM	McKay Butte	
35-DS-263	115	1	G	48 ± 6	20 ± 3	142 ± 5	63 ± 3	40 ± 2	209 ± 5	7 ± 3	1302 ± 34	326 ± 20	NM ± NM	1.72 ± 0.08	NM NM	McKay Butte	
35-DS-263	116	1	A	53 ± 6	16 ± 3	125 ± 4	56 ± 3	43 ± 2	266 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	116	1	B	69 ± 7	21 ± 4	163 ± 5	69 ± 3	48 ± 2	305 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	116	1	C	60 ± 6	22 ± 4	155 ± 5	72 ± 3	48 ± 2	303 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	116	1	D	67 ± 6	20 ± 3	148 ± 5	71 ± 3	50 ± 2	302 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	116	1	E	53 ± 6	17 ± 3	127 ± 4	61 ± 3	38 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	116	1	F	63 ± 7	23 ± 3	153 ± 5	71 ± 3	44 ± 2	301 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	116	1	G	65 ± 6	19 ± 3	140 ± 4	70 ± 3	45 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	116	1	H	47 ± 6	19 ± 3	125 ± 4	65 ± 3	39 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-263	851	1	A	47 ± 6	17 ± 3	120 ± 4	69 ± 3	41 ± 2	244 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-263	851	1	B	55 ± 5	16 ± 3	117 ± 4	69 ± 3	39 ± 2	245 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-263	851	1	C	55 ± 6	21 ± 3	123 ± 4	72 ± 3	42 ± 2	245 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-263	851	1	D	45 ± 6	17 ± 3	116 ± 4	69 ± 3	39 ± 2	237 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-263	851	1	E	53 ± 6	18 ± 3	123 ± 4	71 ± 3	41 ± 2	245 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-263	851	1	F	52 ± 5	14 ± 3	110 ± 4	67 ± 3	39 ± 2	232 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-263	851	1	G	52 ± 5	16 ± 3	113 ± 4	65 ± 3	39 ± 2	236 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-263	851	1	H	58 ± 6	17 ± 3	120 ± 4	70 ± 3	42 ± 2	242 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-263	851	1	I	101 ± 6	21 ± 3	51 ± 4	450 ± 5	31 ± 2	187 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-DS-263	851	1	J	62 ± 6	17 ± 3	127 ± 4	75 ± 3	44 ± 2	265 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

C.1-54

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-263	851	1	K	76 ± 7	17 ± 4	140 ± 5	80 ± 3	50 ± 2	273 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-263	851	1	L	68 ± 6	21 ± 3	131 ± 4	78 ± 3	45 ± 2	268 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-263	851	1	M	67 ± 6	21 ± 3	132 ± 4	78 ± 3	45 ± 2	260 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-263	851	1	N	54 ± 6	20 ± 3	126 ± 4	75 ± 3	41 ± 2	258 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-263	851	1	O	54 ± 6	20 ± 3	147 ± 4	65 ± 3	44 ± 2	215 ± 5	13 ± 3	1164 ± 30	335 ± 20	NM ± NM	1.77 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	902	2	A	52 ± 6	15 ± 4	122 ± 4	70 ± 3	42 ± 2	245 ± 5	12 ± 3	1509 ± 33	439 ± 20	NM ± NM	2.28 ± 0.08	NM ± NM	NM ± NM	Unknown X
35-DS-263	902	2	B	45 ± 6	14 ± 3	127 ± 4	55 ± 3	38 ± 2	195 ± 5	10 ± 3	1203 ± 29	367 ± 20	NM ± NM	1.85 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	903	1	A	64 ± 6	19 ± 3	119 ± 4	70 ± 3	41 ± 2	245 ± 5	12 ± 3	1295 ± 30	405 ± 20	NM ± NM	2.02 ± 0.08	NM ± NM	NM ± NM	Unknown X
35-DS-263	903	3	A	36 ± 6	17 ± 3	129 ± 4	53 ± 3	39 ± 2	186 ± 5	8 ± 3	1412 ± 31	376 ± 20	NM ± NM	1.90 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	903	7	—	45 ± 6	18 ± 3	128 ± 4	58 ± 3	38 ± 2	195 ± 5	11 ± 3	1217 ± 30	363 ± 20	NM ± NM	1.92 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	904	1	A	47 ± 6	20 ± 3	115 ± 4	51 ± 3	39 ± 2	176 ± 5	8 ± 3	1054 ± 34	341 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	904	4	A	56 ± 6	18 ± 3	121 ± 4	71 ± 3	40 ± 2	249 ± 5	9 ± 3	1353 ± 29	427 ± 20	NM ± NM	2.02 ± 0.08	NM ± NM	NM ± NM	Unknown X
35-DS-263	904	5	—	56 ± 5	20 ± 3	118 ± 4	71 ± 3	41 ± 2	239 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-263	905	4	A	40 ± 6	16 ± 3	114 ± 4	52 ± 3	36 ± 2	180 ± 5	9 ± 3	1176 ± 30	366 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	905	4	B	52 ± 6	16 ± 3	132 ± 4	58 ± 3	40 ± 2	199 ± 5	8 ± 3	1149 ± 29	319 ± 20	NM ± NM	1.68 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	906	1	—	57 ± 5	18 ± 3	117 ± 4	69 ± 3	40 ± 2	241 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-263	907	7	—	51 ± 6	17 ± 3	109 ± 4	62 ± 3	38 ± 2	223 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-263	907	8	—	50 ± 5	20 ± 3	131 ± 4	56 ± 3	38 ± 2	195 ± 5	8 ± 3	1251 ± 29	359 ± 20	NM ± NM	1.85 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	907	9	—	50 ± 5	16 ± 3	128 ± 4	58 ± 3	39 ± 2	193 ± 5	10 ± 3	1187 ± 30	374 ± 20	NM ± NM	1.88 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	908	1	A	65 ± 6	23 ± 3	118 ± 4	72 ± 3	42 ± 2	246 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-263	908	1	B	56 ± 6	15 ± 3	142 ± 4	61 ± 3	45 ± 2	210 ± 5	8 ± 3	1216 ± 31	358 ± 20	NM ± NM	1.78 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-263	908	1	C	60 ± 6	20 ± 3	153 ± 5	63 ± 3	40 ± 2	211 ± 5	9 ± 3	1093 ± 33	323 ± 20	NM ± NM	1.70 ± 0.08	NM ± NM	NM ± NM	McKay Butte

C.1-55



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-263	908	1	D	65 ± 6	19 ± 3	144 ± 5	63 ± 3	46 ± 2	215 ± 5	13 ± 3	1114 ± 35	403 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-263	908	1	E	49 ± 6	19 ± 3	133 ± 4	57 ± 3	39 ± 2	199 ± 5	10 ± 3	1323 ± 31	332 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte	
35-DS-263	908	1	F	56 ± 6	21 ± 3	120 ± 4	72 ± 3	44 ± 2	251 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-DS-263	908	1	G	45 ± 6	15 ± 3	128 ± 4	56 ± 3	36 ± 2	193 ± 5	8 ± 3	1998 ± 37	348 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte	
35-DS-263	908	1	H	51 ± 6	15 ± 3	129 ± 4	55 ± 3	37 ± 2	198 ± 5	6 ± 3	1116 ± 29	369 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-263	908	1	I	57 ± 5	19 ± 3	132 ± 4	60 ± 3	40 ± 2	201 ± 5	12 ± 3	1092 ± 28	324 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-DS-263	908	1	J	53 ± 6	17 ± 3	132 ± 4	57 ± 3	39 ± 2	203 ± 5	9 ± 3	1399 ± 32	688 ± 20	NM ± NM	2.00 ± 0.08	NM	McKay Butte	
35-DS-263	908	1	K	57 ± 5	14 ± 3	122 ± 4	73 ± 3	43 ± 2	251 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-DS-263	908	1	L	43 ± 6	19 ± 3	133 ± 4	58 ± 3	38 ± 2	197 ± 5	8 ± 3	1204 ± 30	366 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-263	908	1	M	65 ± 5	19 ± 3	120 ± 4	71 ± 3	42 ± 2	247 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X		
35-DS-263	908	1	N	45 ± 5	15 ± 3	127 ± 4	59 ± 3	39 ± 2	198 ± 5	7 ± 3	1117 ± 29	329 ± 20	NM ± NM	1.71 ± 0.08	NM	McKay Butte	
35-DS-263	908	1	O	47 ± 6	16 ± 3	131 ± 4	56 ± 3	39 ± 2	194 ± 5	9 ± 3	1235 ± 31	378 ± 20	NM ± NM	1.91 ± 0.08	NM	McKay Butte	
35-DS-263	909	1	A	44 ± 6	19 ± 3	127 ± 4	53 ± 3	38 ± 2	189 ± 5	9 ± 3	1266 ± 31	391 ± 20	NM ± NM	1.90 ± 0.08	NM	McKay Butte	
35-DS-263	909	1	B	50 ± 6	18 ± 3	133 ± 4	55 ± 3	42 ± 2	203 ± 5	11 ± 3	1077 ± 28	333 ± 20	NM ± NM	1.65 ± 0.08	NM	McKay Butte	
35-DS-263	909	1	C	47 ± 6	19 ± 3	123 ± 4	55 ± 3	39 ± 2	197 ± 5	7 ± 3	1116 ± 29	360 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-DS-263	910	1	A	60 ± 6	18 ± 3	120 ± 4	51 ± 3	34 ± 2	189 ± 5	7 ± 3	1288 ± 30	517 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-263	910	1	B	36 ± 6	17 ± 3	116 ± 4	52 ± 3	36 ± 2	179 ± 5	6 ± 3	1167 ± 33	350 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-263	910	4	A	57 ± 6	17 ± 3	135 ± 4	61 ± 3	42 ± 2	201 ± 5	10 ± 3	1410 ± 31	360 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte	
35-DS-263	910	4	B	43 ± 6	18 ± 3	122 ± 4	52 ± 3	36 ± 2	184 ± 5	9 ± 3	1181 ± 30	360 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-263	910	5	—	42 ± 6	16 ± 3	123 ± 4	50 ± 3	40 ± 2	183 ± 5	5 ± 3	1122 ± 30	346 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-263	936	1	A	61 ± 6	19 ± 3	127 ± 4	78 ± 3	43 ± 2	259 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-DS-263	936	1	B	63 ± 6	19 ± 3	136 ± 4	82 ± 3	46 ± 2	268 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		

C.1-56

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	936	1 C	48 ± 6	18 ± 3	121 ± 4	75 ± 3	43 ± 2	251 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X
35-DS-263	936	1 D	58 ± 6	20 ± 3	119 ± 4	71 ± 3	44 ± 2	253 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X
35-DS-263	936	1 E	71 ± 7	22 ± 4	145 ± 5	82 ± 3	47 ± 2	276 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	936	1 F	46 ± 6	14 ± 3	129 ± 4	56 ± 3	38 ± 2	194 ± 5	9 ± 3	1134 ± 30	381 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-263	936	1 G	69 ± 6	19 ± 3	126 ± 4	70 ± 3	39 ± 2	257 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	936	1 H	78 ± 6	18 ± 3	129 ± 4	76 ± 3	40 ± 2	256 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	936	1 I	55 ± 5	16 ± 3	121 ± 4	76 ± 3	41 ± 2	249 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	936	1 J	72 ± 6	25 ± 4	142 ± 5	82 ± 3	46 ± 2	275 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	936	1 K	45 ± 6	18 ± 3	117 ± 4	68 ± 3	41 ± 2	243 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-263	936	1 L	44 ± 6	18 ± 3	133 ± 4	56 ± 3	40 ± 2	197 ± 5	8 ± 3	1209 ± 31	338 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte	
35-DS-263	936	1 M	43 ± 6	18 ± 3	117 ± 4	71 ± 3	41 ± 2	246 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-263	936	1 N	51 ± 6	13 ± 4	113 ± 4	68 ± 3	42 ± 2	238 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-263	936	1 O	50 ± 6	16 ± 3	121 ± 4	70 ± 3	37 ± 2	246 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-263	1093	1 A	54 ± 7	22 ± 4	122 ± 5	75 ± 3	43 ± 2	262 ± 5	13 ± 3	1558 ± 36	386 ± 20	NM ± NM	2.09 ± 0.08	NM	Newberry Volcano	
35-DS-263	1093	1 B	80 ± 7	21 ± 4	118 ± 5	46 ± 3	54 ± 2	359 ± 5	13 ± 3	1174 ± 35	493 ± 21	NM ± NM	2.19 ± 0.08	NM	Big Obsidian Flow	
35-DS-263	1094	1 A	55 ± 6	19 ± 3	120 ± 4	73 ± 3	41 ± 2	243 ± 5	8 ± 3	1615 ± 32	479 ± 20	NM ± NM	2.40 ± 0.08	NM	Unknown X	
35-DS-263	1094	1 B	48 ± 6	16 ± 3	116 ± 4	70 ± 3	39 ± 2	233 ± 5	11 ± 3	1393 ± 34	452 ± 20	NM ± NM	2.23 ± 0.08	NM	Unknown X	
35-DS-263	1094	1 C	46 ± 5	19 ± 3	103 ± 4	63 ± 3	36 ± 2	224 ± 5	8 ± 3	1331 ± 30	416 ± 20	NM ± NM	2.07 ± 0.08	NM	Unknown X	
35-DS-263	1094	1 D	53 ± 5	16 ± 3	117 ± 4	71 ± 3	38 ± 2	243 ± 5	10 ± 3	1395 ± 30	432 ± 20	NM ± NM	2.20 ± 0.08	NM	Unknown X	
35-DS-263	1094	1 E	59 ± 6	18 ± 3	126 ± 4	73 ± 3	42 ± 2	251 ± 5	10 ± 3	1353 ± 31	428 ± 20	NM ± NM	2.15 ± 0.08	NM	Newberry Volcano?	
35-DS-263	1094	1 F	63 ± 6	14 ± 4	118 ± 4	69 ± 3	38 ± 2	236 ± 5	9 ± 3	1437 ± 33	435 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X	
35-DS-263	1094	1 G	84 ± 7	14 ± 4	110 ± 4	44 ± 3	55 ± 2	363 ± 5	16 ± 3	1435 ± 34	513 ± 20	NM ± NM	2.29 ± 0.08	NM	Big Obsidian Flow	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-263	1094	1	H	54 ± 7	16 ± 4	128 ± 4	74 ± 3	43 ± 2	261 ± 5	11 ± 3	1522 ± 35	383 ± 20	NM ± NM	2.05 ± 0.08	NM NM	Newberry Volcano
35-DS-263	1094	1	I	57 ± 6	19 ± 3	121 ± 4	73 ± 3	41 ± 2	248 ± 5	10 ± 3	1259 ± 29	393 ± 20	NM ± NM	1.97 ± 0.08	NM NM	Unknown X
35-DS-263	1094	1	J	66 ± 6	19 ± 3	125 ± 4	74 ± 3	45 ± 2	256 ± 5	13 ± 3	1365 ± 31	422 ± 20	NM ± NM	2.08 ± 0.08	NM NM	Newberry Volcano
35-DS-263	1094	1	K	62 ± 6	20 ± 3	120 ± 4	75 ± 3	41 ± 2	248 ± 5	9 ± 3	1425 ± 31	426 ± 20	NM ± NM	2.07 ± 0.08	NM NM	Unknown X
35-DS-263	1094	1	L	58 ± 6	18 ± 3	124 ± 4	74 ± 3	40 ± 2	253 ± 5	11 ± 3	1330 ± 31	411 ± 20	NM ± NM	2.05 ± 0.08	NM NM	Newberry Volcano?
35-DS-263	1094	1	M	55 ± 6	20 ± 3	124 ± 4	74 ± 3	43 ± 2	249 ± 5	9 ± 3	1273 ± 32	417 ± 20	NM ± NM	2.00 ± 0.08	NM NM	Unknown X?
35-DS-263	1095	2	A	44 ± 6	16 ± 3	112 ± 4	65 ± 3	41 ± 2	236 ± 5	5 ± 3	1454 ± 31	456 ± 20	NM ± NM	2.21 ± 0.08	NM NM	Unknown X
35-DS-263	1095	2	B	47 ± 6	17 ± 3	110 ± 4	65 ± 3	37 ± 2	225 ± 5	12 ± 3	1403 ± 31	430 ± 20	NM ± NM	2.16 ± 0.08	NM NM	Unknown X
35-DS-263	1095	2	C	49 ± 6	16 ± 3	113 ± 4	67 ± 3	37 ± 2	235 ± 5	9 ± 3	1396 ± 31	421 ± 20	NM ± NM	2.14 ± 0.08	NM NM	Unknown X
35-DS-263	1095	2	D	56 ± 6	18 ± 3	120 ± 4	72 ± 3	40 ± 2	248 ± 5	9 ± 3	1868 ± 33	453 ± 20	NM ± NM	2.43 ± 0.08	NM NM	Unknown X?
35-DS-263	1095	2	E	45 ± 6	21 ± 3	114 ± 4	69 ± 3	40 ± 2	241 ± 5	8 ± 3	1441 ± 31	434 ± 20	NM ± NM	2.17 ± 0.08	NM NM	Unknown X
35-DS-263	1095	2	F	60 ± 6	18 ± 3	126 ± 4	79 ± 3	41 ± 2	260 ± 5	10 ± 3	1418 ± 31	425 ± 20	NM ± NM	2.09 ± 0.08	NM NM	Newberry Volcano
35-DS-263	1095	2	G	78 ± 6	20 ± 3	126 ± 4	46 ± 3	57 ± 2	375 ± 5	18 ± 3	1328 ± 31	522 ± 20	NM ± NM	2.31 ± 0.08	NM NM	Big Obsidian Flow
35-DS-263	1095	2	H	64 ± 7	22 ± 3	151 ± 5	65 ± 3	44 ± 2	215 ± 5	10 ± 3	1268 ± 33	365 ± 20	NM ± NM	1.76 ± 0.08	NM NM	Unknown X?
35-DS-263	1095	2	I	78 ± 7	23 ± 3	123 ± 4	46 ± 3	57 ± 2	367 ± 5	19 ± 3	1210 ± 33	507 ± 20	NM ± NM	2.27 ± 0.08	NM NM	Big Obsidian Flow
35-DS-263	1096	1	A	61 ± 7	22 ± 4	119 ± 4	74 ± 3	42 ± 2	257 ± 5	12 ± 3	1407 ± 34	396 ± 20	NM ± NM	1.97 ± 0.08	NM NM	Newberry Volcano
35-DS-263	1104	1	A	40 ± 6	17 ± 3	124 ± 4	56 ± 3	36 ± 2	187 ± 5	7 ± 3	1157 ± 30	350 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte
35-DS-263	1104	1	B	51 ± 5	18 ± 3	112 ± 4	67 ± 3	39 ± 2	231 ± 5	10 ± 3	1382 ± 31	437 ± 20	NM ± NM	2.14 ± 0.08	NM NM	Unknown X
35-DS-263	1104	1	C	59 ± 6	28 ± 3	124 ± 4	75 ± 3	46 ± 2	265 ± 5	10 ± 3	1125 ± 31	376 ± 20	NM ± NM	1.87 ± 0.08	NM NM	Newberry Volcano
35-DS-263	1105	1	A	72 ± 6	19 ± 4	134 ± 5	83 ± 3	42 ± 2	266 ± 5	13 ± 3	1374 ± 33	419 ± 20	NM ± NM	2.05 ± 0.08	NM NM	Newberry Volcano
35-DS-263	1106	1	A	49 ± 6	17 ± 3	113 ± 4	68 ± 3	40 ± 2	235 ± 5	11 ± 3	1495 ± 32	461 ± 20	NM ± NM	2.18 ± 0.08	NM NM	Unknown X
35-DS-263	1106	1	B	56 ± 6	14 ± 3	107 ± 4	66 ± 3	40 ± 2	225 ± 5	9 ± 3	1247 ± 31	414 ± 20	NM ± NM	2.00 ± 0.08	NM NM	Unknown X

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	1106	1	C	53 ± 6	16 ± 3	116 ± 4	70 ± 3	39 ± 2	237 ± 5	9 ± 3	1395 ± 30	449 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X	
35-DS-263	1106	1	D	66 ± 6	21 ± 3	116 ± 4	70 ± 3	37 ± 2	241 ± 5	11 ± 3	1481 ± 31	486 ± 20	NM ± NM	2.11 ± 0.08	NM	Unknown X	
35-DS-263	1106	1	E	52 ± 6	18 ± 3	111 ± 4	68 ± 3	42 ± 2	239 ± 5	10 ± 3	1371 ± 33	456 ± 20	NM ± NM	2.15 ± 0.08	NM	Unknown X	
35-DS-263	1106	1	F	63 ± 6	22 ± 3	116 ± 4	70 ± 3	40 ± 2	245 ± 5	12 ± 3	1360 ± 31	412 ± 20	NM ± NM	2.08 ± 0.08	NM	Unknown X	
35-DS-263	1106	3	—	46 ± 6	17 ± 3	105 ± 4	65 ± 3	38 ± 2	223 ± 5	6 ± 3	1354 ± 31	440 ± 20	NM ± NM	2.10 ± 0.08	NM	Unknown X	
35-DS-263	1106	4	—	57 ± 6	13 ± 4	107 ± 4	67 ± 3	34 ± 2	229 ± 5	10 ± 3	1317 ± 33	451 ± 20	NM ± NM	2.09 ± 0.08	NM	Unknown X	
35-DS-263	1107	1	A	52 ± 6	15 ± 3	115 ± 4	70 ± 3	36 ± 2	235 ± 5	9 ± 3	1470 ± 32	458 ± 20	NM ± NM	2.22 ± 0.08	NM	Unknown X	
35-DS-263	1107	1	B	53 ± 6	15 ± 3	112 ± 4	70 ± 3	40 ± 2	243 ± 5	11 ± 3	1255 ± 31	401 ± 20	NM ± NM	1.95 ± 0.08	NM	Unknown X	
35-DS-263	1107	1	C	67 ± 6	19 ± 3	127 ± 4	76 ± 3	42 ± 2	261 ± 5	12 ± 3	1421 ± 33	425 ± 20	NM ± NM	2.07 ± 0.08	NM	Newberry Volcano	
35-DS-263	1108	1	A	40 ± 6	14 ± 3	124 ± 4	55 ± 3	37 ± 2	185 ± 5	9 ± 3	1166 ± 32	373 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-263	1108	1	B	46 ± 6	16 ± 3	115 ± 4	67 ± 3	37 ± 2	233 ± 5	6 ± 3	1453 ± 33	463 ± 20	NM ± NM	2.21 ± 0.08	NM	Unknown X	
35-DS-263	1108	1	C	84 ± 7	18 ± 4	125 ± 4	48 ± 3	55 ± 2	382 ± 5	16 ± 3	1368 ± 31	516 ± 20	NM ± NM	2.32 ± 0.08	NM	Big Obsidian Flow	
35-DS-263	1108	2	—	42 ± 6	16 ± 3	106 ± 4	63 ± 3	38 ± 2	224 ± 5	8 ± 3	1227 ± 31	437 ± 20	NM ± NM	2.03 ± 0.08	NM	Unknown X	
35-DS-263	1108	3	—	49 ± 6	16 ± 3	109 ± 4	64 ± 3	34 ± 2	225 ± 5	9 ± 3	1518 ± 35	458 ± 20	NM ± NM	2.19 ± 0.08	NM	Unknown X	
35-DS-263	1109	1	A	52 ± 6	14 ± 3	115 ± 4	68 ± 3	41 ± 2	236 ± 5	9 ± 3	1476 ± 32	450 ± 20	NM ± NM	2.18 ± 0.08	NM	Unknown X	
35-DS-263	1109	1	B	51 ± 6	17 ± 3	134 ± 4	58 ± 3	39 ± 2	198 ± 5	10 ± 3	1167 ± 29	376 ± 20	NM ± NM	1.75 ± 0.08	NM	Unknown X	
35-DS-263	1109	1	C	75 ± 7	19 ± 4	121 ± 4	45 ± 3	56 ± 2	356 ± 5	17 ± 3	1090 ± 33	497 ± 20	NM ± NM	2.16 ± 0.08	NM	Big Obsidian Flow	
35-DS-263	1110	1	A	46 ± 6	16 ± 3	115 ± 4	67 ± 3	40 ± 2	236 ± 5	10 ± 3	1343 ± 31	451 ± 20	NM ± NM	2.16 ± 0.08	NM	Unknown X	
35-DS-263	1110	1	B	41 ± 6	17 ± 3	112 ± 4	65 ± 3	37 ± 2	229 ± 5	10 ± 3	1371 ± 32	448 ± 20	NM ± NM	2.17 ± 0.08	NM	Unknown X	
35-DS-263	1110	1	C	62 ± 6	10 ± 4	119 ± 4	73 ± 3	43 ± 2	246 ± 5	8 ± 3	1272 ± 31	408 ± 20	NM ± NM	2.00 ± 0.08	NM	Unknown X	
35-DS-263	1110	1	D	67 ± 6	20 ± 3	117 ± 4	75 ± 3	41 ± 2	249 ± 5	9 ± 3	1414 ± 32	531 ± 20	NM ± NM	2.07 ± 0.08	NM	Unknown X	
35-DS-263	1111	1	A	66 ± 6	12 ± 4	116 ± 4	68 ± 3	39 ± 2	239 ± 5	9 ± 3	1373 ± 31	432 ± 20	NM ± NM	2.08 ± 0.08	NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-263	1111	1	B	52 ± 6	12 ± 4	116 ± 4	70 ± 3	40 ± 2	247 ± 5	9 ± 3	1274 ± 30	443 ± 20	NM ± NM	1.91 ± 0.08	NM	Unknown X	
35-DS-263	1117	2	—	62 ± 6	16 ± 3	106 ± 4	43 ± 3	54 ± 2	342 ± 5	15 ± 3	1175 ± 30	523 ± 20	NM ± NM	2.11 ± 0.08	NM	Big Obsidian Flow	
35-DS-263	1117	3	—	42 ± 6	19 ± 3	121 ± 4	51 ± 3	34 ± 2	180 ± 5	9 ± 3	1063 ± 31	403 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte	
35-DS-263	1127	1	A	51 ± 6	19 ± 4	112 ± 4	69 ± 3	41 ± 2	234 ± 5	11 ± 3	1454 ± 32	432 ± 20	NM ± NM	2.21 ± 0.08	NM	Unknown X	
35-DS-263	1129	1	A	59 ± 6	20 ± 3	118 ± 4	71 ± 3	36 ± 2	245 ± 5	6 ± 3	1514 ± 30	442 ± 20	NM ± NM	2.20 ± 0.08	NM	Unknown X	
35-DS-263	1129	1	B	53 ± 6	14 ± 4	112 ± 4	70 ± 3	37 ± 2	234 ± 5	10 ± 3	1672 ± 36	433 ± 20	NM ± NM	2.22 ± 0.08	NM	Unknown X	
35-DS-263	1129	1	C	48 ± 6	17 ± 3	111 ± 4	63 ± 3	37 ± 2	229 ± 5	9 ± 3	1424 ± 32	422 ± 20	NM ± NM	2.18 ± 0.08	NM	Unknown X	
35-DS-263	1129	1	D	57 ± 6	17 ± 3	115 ± 4	66 ± 3	40 ± 2	241 ± 5	10 ± 3	1470 ± 29	424 ± 20	NM ± NM	2.16 ± 0.08	NM	Unknown X	
35-DS-263	1129	1	E	43 ± 6	20 ± 3	125 ± 4	52 ± 3	34 ± 2	185 ± 5	9 ± 3	1439 ± 30	346 ± 20	NM ± NM	1.88 ± 0.08	NM	McKay Butte	
35-DS-263	1129	1	F	61 ± 7	11 ± 4	142 ± 5	61 ± 3	42 ± 2	214 ± 5	10 ± 3	1177 ± 32	307 ± 20	NM ± NM	1.65 ± 0.08	NM	McKay Butte	
35-DS-263	1129	1	G	54 ± 6	19 ± 3	118 ± 4	71 ± 3	40 ± 2	246 ± 5	9 ± 3	1385 ± 30	430 ± 20	NM ± NM	2.09 ± 0.08	NM	Unknown X	
35-DS-263	1129	1	H	58 ± 6	16 ± 3	122 ± 4	74 ± 3	41 ± 2	247 ± 5	10 ± 3	1318 ± 31	405 ± 20	NM ± NM	2.03 ± 0.08	NM	Unknown X	
35-DS-263	1129	1	I	62 ± 6	20 ± 4	150 ± 5	63 ± 3	40 ± 2	213 ± 5	10 ± 3	1209 ± 33	344 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-DS-263	1129	1	J	68 ± 6	16 ± 3	131 ± 4	77 ± 3	42 ± 2	264 ± 5	8 ± 3	1502 ± 32	439 ± 20	NM ± NM	2.14 ± 0.08	NM	Newberry Volcano	
35-DS-263	1130	1	A	44 ± 6	18 ± 3	108 ± 4	66 ± 3	39 ± 2	226 ± 5	7 ± 3	1380 ± 30	414 ± 20	NM ± NM	2.12 ± 0.08	NM	Unknown X	
35-DS-263	1130	1	B	51 ± 6	18 ± 3	114 ± 4	67 ± 3	38 ± 2	233 ± 5	9 ± 3	1412 ± 31	441 ± 20	NM ± NM	2.18 ± 0.08	NM	Unknown X	
35-DS-263	1130	1	C	55 ± 6	17 ± 3	117 ± 4	69 ± 3	39 ± 2	240 ± 5	10 ± 3	1393 ± 31	437 ± 20	NM ± NM	2.16 ± 0.08	NM	Unknown X	
35-DS-263	1130	1	D	54 ± 6	17 ± 3	109 ± 4	65 ± 3	37 ± 2	226 ± 5	11 ± 3	1381 ± 32	437 ± 20	NM ± NM	2.16 ± 0.08	NM	Unknown X	
35-DS-263	1130	1	E	54 ± 6	16 ± 3	113 ± 4	66 ± 3	40 ± 2	240 ± 5	11 ± 3	1337 ± 29	437 ± 20	NM ± NM	2.04 ± 0.08	NM	Unknown X	
35-DS-263	1130	1	F	63 ± 6	18 ± 3	121 ± 4	72 ± 3	41 ± 2	254 ± 5	10 ± 3	1473 ± 30	410 ± 20	NM ± NM	2.11 ± 0.08	NM	Newberry Volcano?	
35-DS-263	1130	1	G	60 ± 6	17 ± 3	124 ± 4	73 ± 3	40 ± 2	260 ± 5	11 ± 3	1427 ± 31	422 ± 20	NM ± NM	2.08 ± 0.08	NM	Newberry Volcano	
35-DS-263	1130	1	H	50 ± 6	17 ± 3	124 ± 4	75 ± 3	42 ± 2	261 ± 5	12 ± 3	1330 ± 31	414 ± 20	NM ± NM	2.03 ± 0.08	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-263	1130	1	I	53 ± 6	18 ± 3	136 ± 4	59 ± 3	41 ± 2	205 ± 5	9 ± 3	1150 ± 31	356 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte	
35-DS-263	1130	1	J	66 ± 7	19 ± 4	162 ± 5	67 ± 3	44 ± 2	215 ± 5	12 ± 3	1005 ± 33	334 ± 20	NM ± NM	1.64 ± 0.08	NM	McKay Butte	
35-DS-263	1131	1	A	46 ± 6	17 ± 3	111 ± 4	65 ± 3	39 ± 2	229 ± 5	8 ± 3	1407 ± 32	433 ± 20	NM ± NM	2.16 ± 0.08	NM	Unknown X	
35-DS-263	1131	1	B	57 ± 6	17 ± 3	115 ± 4	71 ± 3	42 ± 2	240 ± 5	11 ± 3	1288 ± 29	400 ± 20	NM ± NM	2.02 ± 0.08	NM	Unknown X	
35-DS-263	1131	1	C	53 ± 7	18 ± 4	126 ± 4	81 ± 3	42 ± 2	263 ± 5	9 ± 3	1339 ± 31	481 ± 20	NM ± NM	2.03 ± 0.08	NM	Newberry Volcano	
35-DS-263	1131	1	D	48 ± 6	16 ± 3	117 ± 4	70 ± 3	41 ± 2	236 ± 5	9 ± 3	1374 ± 31	430 ± 20	NM ± NM	2.12 ± 0.08	NM	Unknown X	
35-DS-263	1148	2	—	44 ± 6	16 ± 3	110 ± 4	65 ± 3	39 ± 2	232 ± 5	8 ± 3	1387 ± 32	457 ± 20	NM ± NM	2.13 ± 0.08	NM	Unknown X	
35-DS-263	1151	1	A	40 ± 6	15 ± 3	122 ± 4	53 ± 3	38 ± 2	188 ± 5	8 ± 3	1299 ± 31	361 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte	
35-DS-263	1152	1	A	45 ± 6	15 ± 3	107 ± 4	65 ± 3	38 ± 2	227 ± 5	10 ± 3	1330 ± 31	425 ± 20	NM ± NM	2.11 ± 0.08	NM	Unknown X	
35-DS-263	1152	1	B	51 ± 5	19 ± 3	109 ± 4	66 ± 3	36 ± 2	232 ± 5	9 ± 3	1324 ± 30	430 ± 20	NM ± NM	2.12 ± 0.08	NM	Unknown X	
35-DS-263	1152	1	C	37 ± 6	19 ± 3	107 ± 4	64 ± 3	38 ± 2	228 ± 5	7 ± 3	1356 ± 30	438 ± 20	NM ± NM	2.10 ± 0.08	NM	Unknown X	
35-DS-263	1152	1	D	70 ± 6	18 ± 3	123 ± 4	73 ± 3	43 ± 2	259 ± 5	8 ± 3	1336 ± 32	400 ± 20	NM ± NM	2.05 ± 0.08	NM	Newberry Volcano	
35-DS-263	1152	1	E	62 ± 6	22 ± 3	128 ± 4	76 ± 3	43 ± 2	255 ± 5	12 ± 3	1217 ± 32	433 ± 20	NM ± NM	2.08 ± 0.08	NM	Newberry Volcano	
35-DS-263	1153	1	A	44 ± 6	17 ± 3	112 ± 4	67 ± 3	37 ± 2	230 ± 5	11 ± 3	1386 ± 34	440 ± 20	NM ± NM	2.12 ± 0.08	NM	Unknown X	
35-DS-263	1153	1	B	48 ± 6	19 ± 3	120 ± 4	71 ± 3	41 ± 2	244 ± 5	10 ± 3	1424 ± 31	458 ± 20	NM ± NM	2.16 ± 0.08	NM	Unknown X	
35-DS-263	1153	1	C	52 ± 6	18 ± 3	111 ± 4	62 ± 3	38 ± 2	238 ± 5	12 ± 3	1369 ± 32	443 ± 20	NM ± NM	2.17 ± 0.08	NM	Unknown X	
35-DS-263	1153	1	D	61 ± 6	17 ± 3	119 ± 4	69 ± 3	40 ± 2	246 ± 5	10 ± 3	1169 ± 31	421 ± 20	NM ± NM	1.94 ± 0.08	NM	Unknown X	
35-DS-263	1153	1	E	55 ± 6	15 ± 3	132 ± 4	58 ± 3	35 ± 2	198 ± 5	9 ± 3	1109 ± 30	386 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte	
35-DS-263	1154	1	A	57 ± 6	21 ± 3	127 ± 4	73 ± 3	44 ± 2	258 ± 5	12 ± 3	1302 ± 29	423 ± 20	NM ± NM	2.00 ± 0.08	NM	Newberry Volcano	
35-DS-263	1154	1	B	43 ± 6	17 ± 3	112 ± 4	67 ± 3	40 ± 2	230 ± 5	11 ± 3	1291 ± 30	433 ± 20	NM ± NM	2.07 ± 0.08	NM	Unknown X	
35-DS-263	1154	1	C	56 ± 6	22 ± 3	117 ± 4	71 ± 3	40 ± 2	238 ± 5	9 ± 3	1285 ± 33	443 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X	
35-DS-263	1154	1	D	55 ± 6	16 ± 3	119 ± 4	71 ± 3	39 ± 2	246 ± 5	10 ± 3	1172 ± 29	385 ± 20	NM ± NM	1.88 ± 0.08	NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	1154	1	E	46 ± 6	15 ± 3	111 ± 4	63 ± 3	34 ± 2	225 ± 5	9 ± 3	1264 ± 30	420 ± 20	NM ± NM	2.03 ± 0.08	NM NM	Unknown X	
35-DS-263	1154	1	F	44 ± 6	14 ± 4	115 ± 4	66 ± 3	37 ± 2	241 ± 5	10 ± 3	1067 ± 30	398 ± 20	NM ± NM	1.84 ± 0.08	NM NM	Unknown X	
35-DS-263	1154	1	G	62 ± 6	19 ± 3	118 ± 4	71 ± 3	40 ± 2	250 ± 5	7 ± 3	1287 ± 31	442 ± 20	NM ± NM	1.97 ± 0.08	NM NM	Unknown X	
35-DS-263	1154	1	H	46 ± 6	16 ± 3	108 ± 4	64 ± 3	38 ± 2	230 ± 5	11 ± 3	1211 ± 31	468 ± 20	NM ± NM	1.95 ± 0.08	NM NM	Unknown X	
35-DS-263	1154	1	I	57 ± 6	13 ± 4	107 ± 4	63 ± 3	36 ± 2	222 ± 5	8 ± 3	1264 ± 34	419 ± 20	NM ± NM	1.96 ± 0.08	NM NM	Unknown X	
35-DS-263	1154	1	J	53 ± 6	19 ± 3	112 ± 4	71 ± 3	36 ± 2	234 ± 5	10 ± 3	1373 ± 32	438 ± 20	NM ± NM	2.03 ± 0.08	NM NM	Unknown X	
35-DS-263	1154	1	K	75 ± 7	12 ± 4	148 ± 5	61 ± 3	46 ± 2	210 ± 5	11 ± 3	1144 ± 33	456 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-DS-263	1155	1	A	63 ± 6	19 ± 3	129 ± 4	55 ± 3	38 ± 2	199 ± 5	5 ± 3	999 ± 31	339 ± 20	NM ± NM	1.63 ± 0.08	NM NM	McKay Butte	
35-DS-263	1155	1	B	66 ± 6	18 ± 4	115 ± 4	71 ± 3	40 ± 2	243 ± 5	9 ± 3	1245 ± 33	421 ± 20	NM ± NM	1.93 ± 0.08	NM NM	Unknown X	
35-DS-263	1155	1	C	56 ± 6	17 ± 4	119 ± 4	71 ± 3	39 ± 2	245 ± 5	11 ± 3	1318 ± 33	387 ± 20	NM ± NM	1.90 ± 0.08	NM NM	Unknown X	
35-DS-263	1170	1	A	50 ± 6	12 ± 4	105 ± 4	63 ± 3	36 ± 2	222 ± 5	8 ± 3	1354 ± 31	420 ± 20	NM ± NM	2.03 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	1	A	56 ± 5	16 ± 3	108 ± 4	65 ± 3	40 ± 2	229 ± 5	11 ± 3	1189 ± 30	433 ± 20	NM ± NM	2.03 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	1	B	49 ± 6	14 ± 3	108 ± 4	65 ± 3	35 ± 2	227 ± 5	10 ± 3	1201 ± 32	428 ± 20	NM ± NM	2.01 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	1	C	48 ± 6	18 ± 3	113 ± 4	66 ± 3	37 ± 2	233 ± 5	8 ± 3	1257 ± 31	449 ± 20	NM ± NM	2.09 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	1	D	48 ± 6	16 ± 3	110 ± 4	66 ± 3	40 ± 2	230 ± 5	11 ± 3	1357 ± 32	463 ± 20	NM ± NM	2.14 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	1	E	59 ± 6	17 ± 3	116 ± 4	68 ± 3	40 ± 2	247 ± 5	9 ± 3	1160 ± 30	416 ± 20	NM ± NM	1.89 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	1	F	64 ± 6	21 ± 3	124 ± 4	75 ± 3	45 ± 2	255 ± 5	10 ± 3	1278 ± 32	441 ± 20	NM ± NM	2.04 ± 0.08	NM NM	Newberry Volcano	
35-DS-263	1171	1	G	58 ± 6	13 ± 3	111 ± 4	65 ± 3	39 ± 2	228 ± 5	9 ± 3	1175 ± 30	412 ± 20	NM ± NM	1.95 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	1	H	59 ± 6	18 ± 3	119 ± 4	71 ± 3	40 ± 2	244 ± 5	10 ± 3	1146 ± 31	385 ± 20	NM ± NM	1.85 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	1	I	48 ± 7	20 ± 3	141 ± 5	63 ± 3	39 ± 2	209 ± 5	12 ± 3	1014 ± 32	348 ± 20	NM ± NM	1.60 ± 0.08	NM NM	McKay Butte	
35-DS-263	1171	1	J	54 ± 6	22 ± 3	122 ± 4	72 ± 3	40 ± 2	251 ± 5	5 ± 3	1281 ± 31	413 ± 20	NM ± NM	1.92 ± 0.08	NM NM	Unknown X	
35-DS-263	1171	3	—	58 ± 7	16 ± 4	120 ± 4	69 ± 3	41 ± 2	252 ± 5	12 ± 3	1545 ± 35	409 ± 20	NM ± NM	2.02 ± 0.08	NM NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-263	1173	1	—	44	15	105	61	37	221	11	1299	422	NM	2.05	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 32	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	A	47	18	108	65	38	229	11	1179	427	NM	2.01	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 29	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	B	43	19	127	53	39	194	9	943	360	NM	1.56	NM	McKay Butte	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 28	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	C	61	17	108	63	38	225	10	1167	453	NM	1.95	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 31	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	D	42	16	109	67	37	230	9	1243	414	NM	1.96	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 29	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	E	57	17	117	72	41	250	9	1219	430	NM	1.93	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	F	58	13	118	70	43	246	13	1162	434	NM	1.88	NM	Unknown X	
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	G	51	17	135	61	38	201	10	1084	384	NM	1.68	NM	McKay Butte	
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± 32	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	H	59	13	130	58	39	201	7	891	338	NM	1.55	NM	McKay Butte	
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	I	55	11	120	72	38	244	9	1196	417	NM	1.94	NM	Unknown X	
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	NM		
35-DS-263	1173	2	J	54	21	112	66	39	236	11	1153	422	NM	1.91	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 29	± 20	± NM	± 0.08	NM		
35-DS-263	1174	1	A	50	18	116	68	40	229	10	1307	463	NM	2.13	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 32	± 20	± NM	± 0.08	NM		
35-DS-263	1174	1	B	46	17	109	64	38	223	11	1233	472	NM	2.01	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 32	± 20	± NM	± 0.08	NM		
35-DS-263	1174	1	C	60	20	119	71	40	243	10	1272	457	NM	2.01	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	NM		
35-DS-263	1174	1	D	68	14	117	70	38	239	10	1514	390	NM	2.02	NM	Unknown X	
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± 34	± 20	± NM	± 0.08	NM		
35-DS-263	1185	1	A	51	19	119	68	41	249	10	1085	417	NM	1.86	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	NM		
35-DS-263	1185	1	B	48	16	122	54	39	184	8	1031	351	NM	1.71	NM	McKay Butte	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 29	± 20	± NM	± 0.08	NM		
35-DS-263	1186	1	A	45	15	107	64	38	230	11	1243	447	NM	2.06	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 31	± 20	± NM	± 0.08	NM		
35-DS-263	1186	1	B	42	17	107	64	36	224	9	1328	451	NM	2.11	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 32	± 20	± NM	± 0.08	NM		
35-DS-263	1186	1	C	44	14	109	65	38	220	9	1349	427	NM	2.08	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 32	± 20	± NM	± 0.08	NM		
35-DS-263	1186	1	D	49	14	114	67	41	239	8	1380	463	NM	2.13	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 31	± 20	± NM	± 0.08	NM		
35-DS-263	1186	1	E	46	18	111	68	36	227	10	1433	501	NM	2.14	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 32	± 20	± NM	± 0.08	NM		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-263	1186	1	F	56 ± 6	21 ± 3	118 ± 4	69 ± 3	39 ± 2	246 ± 5	10 ± 3	1217 ± 33	410 ± 20	NM ± NM	1.89 ± 0.08	NM	Unknown X	
35-DS-263	1186	1	G	52 ± 7	15 ± 4	125 ± 4	70 ± 3	38 ± 2	248 ± 5	10 ± 3	1225 ± 33	401 ± 20	NM ± NM	1.91 ± 0.08	NM	Unknown X	
35-DS-263	1186	1	H	42 ± 6	14 ± 3	118 ± 4	51 ± 3	32 ± 2	181 ± 5	9 ± 3	1216 ± 31	373 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte	
35-DS-263	1186	1	I	58 ± 6	17 ± 4	119 ± 4	73 ± 3	40 ± 2	251 ± 5	9 ± 3	1348 ± 34	466 ± 20	NM ± NM	2.00 ± 0.08	NM	Unknown X	
35-DS-263	1186	1	J	59 ± 6	17 ± 4	119 ± 4	72 ± 3	41 ± 2	247 ± 5	11 ± 3	1461 ± 35	478 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X	
35-DS-263	1186	2	—	49 ± 6	18 ± 3	115 ± 4	62 ± 3	37 ± 2	228 ± 5	10 ± 3	1449 ± 34	483 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	A	48 ± 6	14 ± 3	109 ± 4	64 ± 3	37 ± 2	226 ± 5	9 ± 3	1298 ± 32	452 ± 20	NM ± NM	2.12 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	B	44 ± 6	20 ± 3	109 ± 4	66 ± 3	36 ± 2	228 ± 5	12 ± 3	1256 ± 30	427 ± 20	NM ± NM	2.04 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	C	56 ± 6	17 ± 3	115 ± 4	68 ± 3	43 ± 2	238 ± 5	9 ± 3	1348 ± 31	424 ± 20	NM ± NM	2.04 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	D	56 ± 6	16 ± 3	117 ± 4	69 ± 3	38 ± 2	247 ± 5	8 ± 3	1196 ± 30	413 ± 20	NM ± NM	1.90 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	E	52 ± 6	20 ± 3	118 ± 4	69 ± 3	41 ± 2	242 ± 5	10 ± 3	1181 ± 30	420 ± 20	NM ± NM	1.86 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	F	56 ± 6	17 ± 3	120 ± 4	71 ± 3	39 ± 2	242 ± 5	11 ± 3	1188 ± 31	426 ± 20	NM ± NM	1.99 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	G	57 ± 6	22 ± 3	120 ± 4	72 ± 3	39 ± 2	243 ± 5	9 ± 3	1252 ± 31	442 ± 20	NM ± NM	2.00 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	H	54 ± 6	19 ± 3	109 ± 4	67 ± 3	36 ± 2	229 ± 5	9 ± 3	1151 ± 32	394 ± 20	NM ± NM	1.82 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	I	62 ± 7	17 ± 4	127 ± 4	70 ± 3	41 ± 2	250 ± 5	12 ± 3	1229 ± 33	421 ± 20	NM ± NM	1.93 ± 0.08	NM	Unknown X	
35-DS-263	1187	1	J	51 ± 8	18 ± 4	141 ± 5	66 ± 3	41 ± 2	207 ± 5	10 ± 3	1404 ± 35	544 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte	
35-DS-263	1188	1	A	46 ± 6	13 ± 3	107 ± 4	62 ± 3	35 ± 2	223 ± 5	10 ± 3	1355 ± 32	458 ± 20	NM ± NM	2.06 ± 0.08	NM	Unknown X	
35-DS-263	1188	1	B	51 ± 8	19 ± 4	113 ± 5	71 ± 3	39 ± 2	234 ± 5	9 ± 3	1421 ± 47	469 ± 21	NM ± NM	2.10 ± 0.08	NM	Unknown X	
35-DS-263	1188	1	C	56 ± 7	13 ± 4	111 ± 4	70 ± 3	37 ± 2	236 ± 5	6 ± 3	1246 ± 33	386 ± 20	NM ± NM	1.83 ± 0.08	NM	Unknown X	
35-DS-263	1216	1	A	58 ± 6	20 ± 3	125 ± 4	77 ± 3	44 ± 2	256 ± 5	10 ± 3	1567 ± 31	437 ± 20	NM ± NM	2.19 ± 0.08	NM	Newberry Volcano	
35-DS-263	1217	1	A	47 ± 6	22 ± 3	114 ± 4	63 ± 3	38 ± 2	234 ± 5	11 ± 3	1448 ± 32	444 ± 20	NM ± NM	2.25 ± 0.08	NM	Unknown X	
35-DS-263	1217	1	B	50 ± 6	15 ± 3	110 ± 4	66 ± 3	38 ± 2	234 ± 5	10 ± 3	1399 ± 31	454 ± 20	NM ± NM	2.22 ± 0.08	NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	1217	1	C	50 ± 6	20 ± 3	119 ± 4	69 ± 3	42 ± 2	246 ± 5	10 ± 3	1573 ± 32	471 ± 20	NM ± NM	2.35 ± 0.08	NM NM	Unknown X	
35-DS-263	1217	1	D	43 ± 6	16 ± 3	115 ± 4	67 ± 3	38 ± 2	236 ± 5	11 ± 3	1248 ± 30	390 ± 20	NM ± NM	1.96 ± 0.08	NM NM	Unknown X	
35-DS-263	1217	1	E	56 ± 5	15 ± 3	111 ± 4	70 ± 3	37 ± 2	237 ± 5	12 ± 3	1357 ± 32	436 ± 20	NM ± NM	2.22 ± 0.08	NM NM	Unknown X	
35-DS-263	1217	1	F	59 ± 6	20 ± 3	143 ± 4	63 ± 3	43 ± 2	210 ± 5	12 ± 3	1406 ± 31	381 ± 20	NM ± NM	1.91 ± 0.08	NM NM	Unknown X?	
35-DS-263	1218	1	A	35 ± 6	13 ± 3	109 ± 4	48 ± 3	34 ± 2	176 ± 5	8 ± 3	998 ± 30	336 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-DS-263	1218	1	B	48 ± 6	14 ± 3	115 ± 4	67 ± 3	40 ± 2	236 ± 5	11 ± 3	1492 ± 30	442 ± 20	NM ± NM	2.20 ± 0.08	NM NM	Unknown X	
35-DS-263	1219	1	A	51 ± 5	21 ± 3	112 ± 4	70 ± 3	38 ± 2	238 ± 5	10 ± 3	1314 ± 30	419 ± 20	NM ± NM	2.14 ± 0.08	NM NM	Unknown X	
35-DS-263	1219	1	B	48 ± 5	15 ± 3	124 ± 4	55 ± 3	39 ± 2	187 ± 5	8 ± 3	1180 ± 29	410 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte	
35-DS-263	1219	1	C	56 ± 6	15 ± 3	118 ± 4	69 ± 3	40 ± 2	249 ± 5	10 ± 3	1383 ± 29	410 ± 20	NM ± NM	2.08 ± 0.08	NM NM	Unknown X	
35-DS-263	1219	1	D	63 ± 6	14 ± 4	123 ± 4	73 ± 3	42 ± 2	254 ± 5	11 ± 3	1372 ± 32	416 ± 20	NM ± NM	2.10 ± 0.08	NM NM	Newberry Volcano?	
35-DS-263	1219	1	E	54 ± 6	19 ± 3	132 ± 4	57 ± 3	40 ± 2	202 ± 5	9 ± 3	1111 ± 30	428 ± 20	NM ± NM	1.77 ± 0.08	NM NM	McKay Butte	
35-DS-263	1219	1	F	73 ± 6	24 ± 3	135 ± 4	80 ± 3	44 ± 2	265 ± 5	7 ± 3	1323 ± 33	426 ± 20	NM ± NM	2.14 ± 0.08	NM NM	Newberry Volcano	
35-DS-263	1220	1	A	52 ± 6	18 ± 3	113 ± 4	70 ± 3	39 ± 2	243 ± 5	9 ± 3	1499 ± 31	457 ± 20	NM ± NM	2.26 ± 0.08	NM NM	Unknown X	
35-DS-263	1220	1	B	42 ± 6	15 ± 3	115 ± 4	68 ± 3	38 ± 2	233 ± 5	10 ± 3	1400 ± 31	471 ± 20	NM ± NM	2.22 ± 0.08	NM NM	Unknown X	
35-DS-263	1220	1	C	43 ± 8	20 ± 4	132 ± 5	57 ± 3	37 ± 2	205 ± 5	10 ± 3	1109 ± 34	300 ± 20	NM ± NM	1.60 ± 0.08	NM NM	McKay Butte	
35-DS-263	1221	1	A	48 ± 6	15 ± 3	111 ± 4	65 ± 3	40 ± 2	232 ± 5	7 ± 3	1337 ± 32	443 ± 20	NM ± NM	2.21 ± 0.08	NM NM	Unknown X	
35-DS-263	1221	1	B	48 ± 6	15 ± 3	113 ± 4	68 ± 3	38 ± 2	237 ± 5	12 ± 3	1395 ± 32	445 ± 20	NM ± NM	2.22 ± 0.08	NM NM	Unknown X	
35-DS-263	1221	1	C	67 ± 6	18 ± 4	134 ± 4	81 ± 3	47 ± 2	267 ± 5	11 ± 3	1613 ± 33	505 ± 20	NM ± NM	2.24 ± 0.08	NM NM	Newberry Volcano	
35-DS-263	1221	1	D	64 ± 7	25 ± 4	133 ± 5	81 ± 3	46 ± 2	269 ± 5	10 ± 3	1422 ± 34	412 ± 20	NM ± NM	2.12 ± 0.08	NM NM	Newberry Volcano	
35-DS-263	1222	1	A	44 ± 6	16 ± 3	109 ± 4	69 ± 3	43 ± 2	237 ± 5	9 ± 3	1358 ± 31	452 ± 20	NM ± NM	2.20 ± 0.08	NM NM	Unknown X	
35-DS-263	1222	1	B	48 ± 6	21 ± 3	118 ± 4	72 ± 3	42 ± 2	251 ± 5	9 ± 3	1185 ± 31	393 ± 20	NM ± NM	2.04 ± 0.08	NM NM	Unknown X	
35-DS-263	1222	1	C	58 ± 6	17 ± 4	114 ± 4	68 ± 3	42 ± 2	236 ± 5	9 ± 3	1436 ± 35	423 ± 20	NM ± NM	2.12 ± 0.08	NM NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-263	1260	1	—	61 ± 6	16 ± 4	113 ± 4	58 ± 3	39 ± 2	247 ± 5	11 ± 3	2161 ± 41	431 ± 20	NM ± NM	2.11 ± 0.08	NM	Unknown X	
35-DS-263	1324	1	—	38 ± 6	17 ± 3	118 ± 4	48 ± 3	35 ± 2	179 ± 5	7 ± 3	1019 ± 32	356 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-DS-263	1328	1	A	45 ± 6	22 ± 3	112 ± 4	68 ± 3	40 ± 2	235 ± 5	10 ± 3	1411 ± 32	446 ± 20	NM ± NM	2.21 ± 0.08	NM	Unknown X	
35-DS-263	1328	1	B	56 ± 6	15 ± 3	115 ± 4	68 ± 3	40 ± 2	242 ± 5	9 ± 3	1499 ± 32	460 ± 20	NM ± NM	2.29 ± 0.08	NM	Unknown X	
35-DS-263	1328	1	C	60 ± 6	15 ± 3	123 ± 4	73 ± 3	43 ± 2	258 ± 5	12 ± 3	1305 ± 31	393 ± 20	NM ± NM	2.00 ± 0.08	NM	Newberry Volcano	
35-DS-263	1328	1	D	61 ± 6	16 ± 4	135 ± 4	58 ± 3	42 ± 2	205 ± 5	9 ± 3	1171 ± 31	354 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte	
35-DS-263	1329	1	A	43 ± 6	16 ± 3	120 ± 4	53 ± 3	35 ± 2	187 ± 5	5 ± 3	1094 ± 29	356 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-DS-263	1329	1	B	45 ± 6	15 ± 3	103 ± 4	66 ± 3	35 ± 2	228 ± 5	10 ± 3	1355 ± 31	431 ± 20	NM ± NM	2.12 ± 0.08	NM	Unknown X	
35-DS-263	1329	1	C	54 ± 6	20 ± 3	137 ± 4	58 ± 3	39 ± 2	205 ± 5	7 ± 3	1226 ± 30	360 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte	
35-DS-263	1329	1	D	64 ± 6	20 ± 3	119 ± 4	71 ± 3	44 ± 2	254 ± 5	12 ± 3	1807 ± 35	456 ± 20	NM ± NM	2.20 ± 0.08	NM	Unknown X	
35-DS-263	1330	1	A	56 ± 6	22 ± 3	122 ± 4	39 ± 3	43 ± 2	255 ± 5	10 ± 3	1283 ± 31	475 ± 20	NM ± NM	2.18 ± 0.08	NM	Unknown X	
35-DS-263	1330	1	B	55 ± 5	18 ± 3	110 ± 4	69 ± 3	39 ± 2	244 ± 5	10 ± 3	1162 ± 28	370 ± 20	NM ± NM	1.92 ± 0.08	NM	Unknown X	
35-DS-263	1330	1	C	57 ± 5	17 ± 3	121 ± 4	70 ± 3	40 ± 2	243 ± 5	8 ± 3	1463 ± 30	475 ± 20	NM ± NM	2.22 ± 0.08	NM	Unknown X	
35-DS-263	1330	1	D	50 ± 5	16 ± 3	110 ± 4	66 ± 3	39 ± 2	235 ± 5	8 ± 3	1400 ± 30	432 ± 20	NM ± NM	2.18 ± 0.08	NM	Unknown X	
35-DS-263	1330	1	E	55 ± 6	18 ± 3	137 ± 4	67 ± 3	41 ± 2	212 ± 5	9 ± 3	1121 ± 30	348 ± 20	NM ± NM	1.81 ± 0.08	NM	Unknown X	
35-DS-263	1330	1	F	56 ± 6	19 ± 3	129 ± 4	57 ± 3	40 ± 2	199 ± 5	9 ± 3	1110 ± 30	358 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte	
35-DS-263	1330	1	G	58 ± 6	16 ± 3	120 ± 4	72 ± 3	42 ± 2	258 ± 5	13 ± 3	1295 ± 30	420 ± 20	NM ± NM	2.00 ± 0.08	NM	Newberry Volcano	
35-DS-263	1330	1	H	61 ± 6	23 ± 3	123 ± 4	76 ± 3	41 ± 2	259 ± 5	13 ± 3	1352 ± 32	422 ± 20	NM ± NM	2.08 ± 0.08	NM	Newberry Volcano	
35-DS-263	1330	1	I	54 ± 6	18 ± 3	130 ± 4	60 ± 3	38 ± 2	199 ± 5	12 ± 3	1257 ± 31	406 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-263	1331	1	—	46 ± 6	15 ± 3	105 ± 4	61 ± 3	35 ± 2	222 ± 5	10 ± 3	1213 ± 32	434 ± 20	NM ± NM	2.03 ± 0.08	NM	Unknown X	
35-DS-263	1331	2	A	51 ± 6	22 ± 3	120 ± 4	72 ± 3	40 ± 2	239 ± 5	9 ± 3	1450 ± 35	443 ± 20	NM ± NM	2.29 ± 0.08	NM	Unknown X	
35-DS-263	1331	2	B	46 ± 6	15 ± 3	113 ± 4	70 ± 3	38 ± 2	229 ± 5	7 ± 3	1395 ± 33	429 ± 20	NM ± NM	2.18 ± 0.08	NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	1331	2	C	48 ± 6	18 ± 3	113 ± 4	68 ± 3	39 ± 2	238 ± 5	10 ± 3	1448 ± 33	478 ± 20	NM ± NM	2.28 ± 0.08	NM	Unknown X	
35-DS-263	1331	2	D	62 ± 5	20 ± 3	115 ± 4	36 ± 3	46 ± 2	246 ± 5	11 ± 3	1082 ± 29	520 ± 20	NM ± NM	2.01 ± 0.08	NM	Unknown X	
35-DS-263	1331	2	E	52 ± 6	18 ± 3	125 ± 4	54 ± 3	37 ± 2	189 ± 5	8 ± 3	1178 ± 32	347 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-263	1331	2	F	60 ± 6	19 ± 3	117 ± 4	69 ± 3	36 ± 2	230 ± 5	10 ± 3	1464 ± 35	447 ± 20	NM ± NM	2.26 ± 0.08	NM	Unknown X	
35-DS-263	1331	2	G	59 ± 6	18 ± 4	130 ± 4	63 ± 3	39 ± 2	209 ± 5	9 ± 3	1033 ± 31	344 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-DS-263	1331	2	H	56 ± 6	19 ± 3	114 ± 4	68 ± 3	39 ± 2	233 ± 5	9 ± 3	1430 ± 34	434 ± 20	NM ± NM	2.22 ± 0.08	NM	Unknown X	
35-DS-263	1381	1	A	55 ± 6	17 ± 3	134 ± 4	52 ± 3	39 ± 2	271 ± 5	11 ± 3	1516 ± 33	430 ± 20	NM ± NM	2.11 ± 0.08	NM	Newberry Volcano	
35-DS-263	1381	1	B	48 ± 6	16 ± 3	124 ± 4	54 ± 3	39 ± 2	254 ± 5	13 ± 3	1474 ± 34	435 ± 20	NM ± NM	2.05 ± 0.08	NM	Newberry Volcano?	
35-DS-263	1382	1	—	54 ± 6	19 ± 3	129 ± 4	57 ± 3	38 ± 2	259 ± 5	15 ± 3	1638 ± 35	461 ± 20	NM ± NM	1.97 ± 0.08	NM	Newberry Volcano	
35-DS-263	1382	2	A	42 ± 6	20 ± 3	124 ± 4	56 ± 3	43 ± 2	260 ± 5	15 ± 3	1455 ± 31	435 ± 20	NM ± NM	2.07 ± 0.08	NM	Newberry Volcano	
35-DS-263	1382	2	B	49 ± 7	16 ± 4	138 ± 4	61 ± 3	45 ± 2	287 ± 5	16 ± 3	1188 ± 32	359 ± 20	NM ± NM	1.70 ± 0.08	NM	Newberry Volcano	
35-DS-263	1382	2	C	48 ± 6	17 ± 3	129 ± 4	60 ± 3	41 ± 2	266 ± 5	14 ± 3	1518 ± 32	451 ± 20	NM ± NM	2.14 ± 0.08	NM	Newberry Volcano	
35-DS-263	1383	1	A	60 ± 5	18 ± 3	126 ± 4	58 ± 3	41 ± 2	270 ± 5	16 ± 3	1457 ± 30	444 ± 20	NM ± NM	2.11 ± 0.08	NM	Newberry Volcano	
35-DS-263	1383	1	B	44 ± 6	20 ± 3	139 ± 4	59 ± 3	43 ± 2	288 ± 5	15 ± 3	1277 ± 30	404 ± 20	NM ± NM	1.93 ± 0.08	NM	Newberry Volcano	
35-DS-263	1383	1	C	55 ± 6	20 ± 3	135 ± 4	57 ± 3	41 ± 2	284 ± 5	15 ± 3	1354 ± 30	382 ± 20	NM ± NM	1.86 ± 0.08	NM	Newberry Volcano	
35-DS-263	1384	1	A	56 ± 6	19 ± 3	137 ± 4	62 ± 3	45 ± 2	287 ± 5	18 ± 3	1320 ± 32	407 ± 20	NM ± NM	1.99 ± 0.08	NM	Newberry Volcano	
35-DS-263	1384	1	B	55 ± 6	22 ± 3	142 ± 4	64 ± 3	46 ± 2	295 ± 5	15 ± 3	1396 ± 31	402 ± 20	NM ± NM	1.90 ± 0.08	NM	Newberry Volcano	
35-DS-263	1413	1	—	48 ± 6	14 ± 3	118 ± 4	53 ± 3	40 ± 2	260 ± 5	14 ± 3	1363 ± 32	435 ± 20	NM ± NM	1.94 ± 0.08	NM	Newberry Volcano	
35-DS-263	1413	4	—	46 ± 6	24 ± 3	121 ± 4	54 ± 3	40 ± 2	269 ± 5	14 ± 3	1206 ± 34	452 ± 20	NM ± NM	2.00 ± 0.08	NM	Newberry Volcano	
35-DS-263	1415	1	A	51 ± 7	21 ± 4	154 ± 5	64 ± 3	44 ± 2	300 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano?	
35-DS-263	1415	1	B	66 ± 6	15 ± 4	147 ± 5	64 ± 3	49 ± 2	296 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-263	1416	1	A	54 ± 6	19 ± 3	133 ± 4	60 ± 3	40 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-263	1416	1	B	56 ± 6	21 ± 3	139 ± 4	63 ± 3	42 ± 2	280 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1417	1	A	55 ± 6	15 ± 3	138 ± 4	61 ± 3	46 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1417	1	B	61 ± 7	17 ± 4	158 ± 5	68 ± 3	49 ± 2	296 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1418	1	A	53 ± 6	18 ± 3	135 ± 4	61 ± 3	42 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1418	1	B	60 ± 6	18 ± 3	126 ± 4	58 ± 3	44 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1419	1	A	69 ± 6	14 ± 4	138 ± 4	63 ± 3	45 ± 2	287 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1420	1	A	39 ± 6	19 ± 3	121 ± 4	52 ± 3	40 ± 2	259 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1425	2	—	51 ± 6	20 ± 3	117 ± 4	52 ± 3	35 ± 2	265 ± 5	12 ± 3	1412 ± 32	432 ± 20	NM ± NM	1.94 ± 0.08	NM	Newberry Volcano	
35-DS-263	1426	1	A	58 ± 6	15 ± 4	132 ± 5	62 ± 3	47 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1427	2	A	51 ± 7	16 ± 4	138 ± 4	60 ± 3	41 ± 2	280 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1428	1	A	56 ± 6	14 ± 3	133 ± 4	59 ± 3	42 ± 2	275 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1430	1	A	50 ± 6	17 ± 3	131 ± 4	58 ± 3	42 ± 2	278 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1430	1	B	51 ± 6	21 ± 3	127 ± 4	57 ± 3	43 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1431	1	A	63 ± 6	18 ± 4	144 ± 4	64 ± 3	46 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1431	1	B	43 ± 6	18 ± 3	120 ± 4	51 ± 3	40 ± 2	256 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1432	1	A	54 ± 6	18 ± 4	144 ± 4	64 ± 3	45 ± 2	294 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1432	1	B	61 ± 6	19 ± 3	133 ± 4	58 ± 3	42 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1433	1	A	60 ± 6	22 ± 3	132 ± 4	60 ± 3	40 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1434	1	A	56 ± 6	16 ± 4	135 ± 4	61 ± 3	45 ± 2	285 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1434	1	B	54 ± 6	15 ± 4	135 ± 4	59 ± 3	43 ± 2	277 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1435	1	A	59 ± 6	20 ± 3	147 ± 4	62 ± 3	45 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1435	1	B	54 ± 7	18 ± 4	146 ± 5	64 ± 3	48 ± 2	293 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	1435	1	C	52 ± 6	11 ± 4	130 ± 4	57 ± 3	37 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1435	1	D	45 ± 6	12 ± 4	129 ± 4	56 ± 3	42 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1435	1	E	43 ± 6	16 ± 3	124 ± 4	57 ± 3	42 ± 2	258 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1435	2	—	40 ± 6	17 ± 3	122 ± 4	56 ± 3	40 ± 2	259 ± 5	15 ± 3	1426 ± 31	425 ± 20	NM ± NM	1.85 ± 0.08	NM	Newberry Volcano	
35-DS-263	1437	1	A	37 ± 6	17 ± 3	118 ± 4	54 ± 3	39 ± 2	257 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1437	1	B	53 ± 6	19 ± 3	140 ± 4	63 ± 3	47 ± 2	283 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1437	1	C	70 ± 6	15 ± 4	140 ± 4	65 ± 3	46 ± 2	281 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1440	1	A	59 ± 6	19 ± 3	131 ± 4	59 ± 3	39 ± 2	270 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1440	1	B	66 ± 7	28 ± 3	138 ± 5	63 ± 3	45 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1442	1	A	50 ± 6	15 ± 3	131 ± 4	58 ± 3	44 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1442	1	B	47 ± 6	15 ± 3	127 ± 4	52 ± 3	39 ± 2	256 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1444	1	—	51 ± 5	15 ± 3	121 ± 4	53 ± 3	39 ± 2	263 ± 5	14 ± 3	1259 ± 29	425 ± 20	NM ± NM	1.84 ± 0.08	NM	Newberry Volcano	
35-DS-263	1444	2	A	39 ± 6	14 ± 3	119 ± 4	53 ± 3	40 ± 2	256 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1444	2	B	49 ± 6	21 ± 3	124 ± 4	57 ± 3	41 ± 2	250 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X?	
35-DS-263	1445	1	A	56 ± 7	19 ± 4	146 ± 5	64 ± 3	48 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1446	1	A	42 ± 6	13 ± 4	116 ± 4	51 ± 3	37 ± 2	247 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-263	1446	2	—	51 ± 6	19 ± 3	112 ± 4	52 ± 3	37 ± 2	259 ± 5	16 ± 3	1259 ± 33	442 ± 20	NM ± NM	1.95 ± 0.08	NM	Newberry Volcano	
35-DS-263	1447	1	A	60 ± 6	16 ± 4	132 ± 4	61 ± 3	40 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1448	1	A	57 ± 6	20 ± 3	129 ± 4	54 ± 3	43 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1458	1	A	48 ± 6	20 ± 3	131 ± 4	58 ± 3	46 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1458	1	B	52 ± 6	18 ± 3	124 ± 4	54 ± 3	39 ± 2	257 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-263	1458	1	C	46 ± 6	18 ± 3	132 ± 4	58 ± 3	44 ± 2	280 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-263	1459	1	A	52 ± 6	18 ± 3	133 ± 4	61 ± 3	47 ± 2	268 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1459	1	B	53 ± 6	21 ± 3	130 ± 4	60 ± 3	44 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1459	1	C	50 ± 7	18 ± 4	130 ± 4	60 ± 3	44 ± 2	287 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1460	1	A	54 ± 6	20 ± 3	138 ± 4	61 ± 3	44 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1460	1	B	50 ± 6	23 ± 3	133 ± 4	57 ± 3	41 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1460	1	C	47 ± 7	17 ± 4	130 ± 4	61 ± 3	41 ± 2	277 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1460	1	D	62 ± 7	18 ± 4	138 ± 5	60 ± 3	45 ± 2	284 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-263	1462	1	—	48 ± 6	21 ± 3	126 ± 4	53 ± 3	42 ± 2	264 ± 5	14 ± 3	1448 ± 35	430 ± 20	NM ± NM	2.08 ± 0.08	NM	Newberry Volcano	
35-DS-429	143	1	A	49 ± 6	20 ± 3	135 ± 4	56 ± 3	38 ± 2	198 ± 5	7 ± 3	1227 ± 25	353 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-429	144	1	A	57 ± 5	16 ± 3	135 ± 4	58 ± 3	41 ± 2	204 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte	
35-DS-429	144	1	B	50 ± 5	10 ± 3	125 ± 4	60 ± 3	38 ± 2	192 ± 5	10 ± 3	1067 ± 28	386 ± 20	NM ± NM	1.74 ± 0.08	NM	McKay Butte	
35-DS-429	144	1	C	85 ± 8	22 ± 4	142 ± 5	66 ± 3	42 ± 2	208 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte	
35-DS-429	144	1	D	76 ± 7	22 ± 4	145 ± 5	62 ± 3	45 ± 2	214 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte	
35-DS-429	144	3	—	41 ± 6	16 ± 3	123 ± 4	54 ± 3	37 ± 2	184 ± 5	9 ± 3	1138 ± 32	347 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte	
35-DS-429	145	1	A	76 ± 6	30 ± 3	165 ± 5	69 ± 3	45 ± 2	223 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte	
35-DS-429	145	1	B	75 ± 7	32 ± 3	152 ± 5	67 ± 3	49 ± 2	228 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte	
35-DS-429	145	1	C	46 ± 6	16 ± 3	135 ± 4	54 ± 3	39 ± 2	198 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte	
35-DS-429	146	1	A	50 ± 6	17 ± 3	142 ± 4	59 ± 3	40 ± 2	212 ± 5	9 ± 3	1210 ± 26	341 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-429	146	1	B	53 ± 6	18 ± 3	135 ± 4	56 ± 3	40 ± 2	196 ± 5	10 ± 3	1418 ± 26	386 ± 20	NM ± NM	1.94 ± 0.08	NM	McKay Butte	
35-DS-429	147	1	A	68 ± 8	23 ± 4	171 ± 5	68 ± 4	41 ± 3	221 ± 5	12 ± 3	1378 ± 32	383 ± 20	NM ± NM	2.04 ± 0.08	NM	McKay Butte	
35-DS-429	148	1	A	59 ± 6	19 ± 3	124 ± 4	58 ± 3	39 ± 2	196 ± 5	8 ± 3	1183 ± 32	339 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte	
35-DS-429	148	1	B	48 ± 6	19 ± 3	124 ± 4	55 ± 3	36 ± 2	190 ± 5	11 ± 3	1163 ± 27	361 ± 20	NM ± NM	1.90 ± 0.08	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-429	149	1	A	45 ± 5	19 ± 3	127 ± 4	56 ± 3	37 ± 2	192 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-DS-429	149	2	A	49 ± 5	20 ± 3	139 ± 4	60 ± 3	40 ± 2	200 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-DS-429	149	2	B	60 ± 5	17 ± 3	139 ± 4	59 ± 3	41 ± 2	207 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte
35-DS-429	149	2	C	54 ± 6	28 ± 3	157 ± 5	65 ± 3	50 ± 2	220 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte
35-DS-429	149	2	D	50 ± 6	19 ± 3	127 ± 4	58 ± 3	38 ± 2	186 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-DS-429	149	2	E	53 ± 6	19 ± 3	147 ± 4	68 ± 3	43 ± 2	215 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte
35-DS-429	149	2	F	46 ± 5	19 ± 3	128 ± 4	57 ± 3	39 ± 2	197 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-DS-429	149	2	G	57 ± 6	17 ± 3	140 ± 5	62 ± 3	42 ± 2	206 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte
35-DS-429	149	2	H	53 ± 6	18 ± 3	142 ± 5	58 ± 3	39 ± 2	204 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-DS-429	150	1	A	35 ± 6	17 ± 3	123 ± 4	50 ± 3	37 ± 2	182 ± 5	9 ± 3	1106 ± 26	339 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	NM	McKay Butte
35-DS-429	150	1	B	62 ± 8	21 ± 4	144 ± 5	65 ± 3	44 ± 2	213 ± 5	12 ± 3	1282 ± 31	370 ± 20	NM ± NM	1.82 ± 0.08	NM ± NM	NM	McKay Butte
35-DS-429	150	1	C	56 ± 7	18 ± 4	145 ± 5	64 ± 3	42 ± 2	213 ± 5	9 ± 3	1174 ± 28	356 ± 20	NM ± NM	1.88 ± 0.08	NM ± NM	NM	McKay Butte
35-DS-429	150	1	D	54 ± 6	17 ± 3	145 ± 4	65 ± 3	39 ± 2	211 ± 5	10 ± 3	1244 ± 26	359 ± 20	NM ± NM	1.86 ± 0.08	NM ± NM	NM	McKay Butte
35-DS-429	152	1	A	44 ± 6	21 ± 3	132 ± 4	55 ± 3	36 ± 2	189 ± 5	6 ± 3	1310 ± 29	367 ± 20	NM ± NM	1.89 ± 0.08	NM ± NM	NM	McKay Butte
35-DS-429	173	1	—	73 ± 6	19 ± 3	134 ± 4	62 ± 3	40 ± 2	179 ± 5	5 ± 3	880 ± 28	371 ± 20	NM ± NM	1.72 ± 0.08	NM ± NM	NM	Quartz Mountain/McKay Butte
35-DS-554	1	1	A	61 ± 6	19 ± 3	115 ± 4	51 ± 3	44 ± 2	334 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-DS-554	2	1	A	61 ± 8	24 ± 4	155 ± 5	70 ± 4	47 ± 3	301 ± 6	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	3	1	A	68 ± 6	22 ± 3	119 ± 4	52 ± 3	47 ± 2	340 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-DS-554	5	1	A	53 ± 7	21 ± 4	147 ± 5	71 ± 3	45 ± 2	298 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	7	1	A	76 ± 6	22 ± 3	133 ± 4	58 ± 3	51 ± 2	375 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-DS-554	8	1	A	47 ± 6	13 ± 3	128 ± 4	57 ± 3	41 ± 2	264 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	9	1	A	66 ± 6	13 ± 4	137 ± 5	69 ± 3	44 ± 2	286 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-71



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-554	10	1	A	59 ± 7	22 ± 3	148 ± 5	65 ± 3	46 ± 2	290 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	11	1	—	44 ± 6	19 ± 3	128 ± 4	57 ± 3	40 ± 2	263 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	12	1	A	57 ± 6	21 ± 3	138 ± 4	65 ± 3	44 ± 2	287 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	13	1	A	64 ± 6	18 ± 3	136 ± 4	61 ± 3	46 ± 2	280 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	14	1	A	51 ± 7	20 ± 4	145 ± 5	73 ± 3	42 ± 2	281 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	15	1	A	51 ± 6	20 ± 3	129 ± 4	60 ± 3	40 ± 2	263 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	16	1	A	51 ± 6	18 ± 3	136 ± 5	71 ± 3	40 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	17	1	A	52 ± 5	16 ± 3	126 ± 4	59 ± 3	40 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	18	1	A	56 ± 6	21 ± 3	136 ± 4	59 ± 3	44 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	19	1	A	45 ± 6	15 ± 3	125 ± 4	57 ± 3	39 ± 2	264 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	20	1	A	61 ± 6	20 ± 3	103 ± 4	46 ± 3	54 ± 2	327 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-DS-554	22	1	A	70 ± 6	19 ± 3	126 ± 4	58 ± 3	48 ± 2	362 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-DS-554	23	1	A	62 ± 6	22 ± 3	143 ± 5	62 ± 3	44 ± 2	298 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	24	1	A	65 ± 6	17 ± 4	149 ± 5	65 ± 3	41 ± 2	210 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte
35-DS-554	25	1	A	47 ± 6	19 ± 3	131 ± 4	57 ± 3	43 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-554	26	1	A	47 ± 6	15 ± 3	118 ± 4	61 ± 3	40 ± 2	256 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X
35-DS-555	1	1	—	51 ± 6	17 ± 3	122 ± 4	55 ± 3	39 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	2	1	—	50 ± 6	18 ± 3	129 ± 4	53 ± 3	42 ± 2	266 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	2	2	A	49 ± 5	16 ± 3	127 ± 4	59 ± 3	42 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	2	2	B	60 ± 5	18 ± 3	135 ± 4	60 ± 3	46 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	2	2	C	55 ± 6	18 ± 3	132 ± 4	58 ± 3	47 ± 2	272 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	2	2	D	50 ± 6	18 ± 3	133 ± 4	61 ± 3	47 ± 2	283 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-72

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-555	2	2	E	47 ± 6	22 ± 3	135 ± 4	59 ± 3	44 ± 2	273 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	F	64 ± 6	18 ± 3	130 ± 4	56 ± 3	42 ± 2	279 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	G	56 ± 6	17 ± 3	138 ± 4	59 ± 3	45 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	H	65 ± 6	20 ± 3	144 ± 5	62 ± 3	47 ± 2	302 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	I	55 ± 6	17 ± 3	148 ± 4	64 ± 3	45 ± 2	301 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	J	59 ± 6	22 ± 3	144 ± 5	59 ± 3	48 ± 2	289 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	K	51 ± 6	19 ± 3	134 ± 4	60 ± 3	46 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	L	55 ± 7	18 ± 3	143 ± 5	62 ± 3	42 ± 2	297 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	M	77 ± 6	22 ± 3	144 ± 5	67 ± 3	50 ± 2	295 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	N	59 ± 6	18 ± 3	147 ± 4	60 ± 3	44 ± 2	295 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	2	2	O	56 ± 6	16 ± 3	137 ± 4	60 ± 3	40 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	3	1	A	48 ± 6	16 ± 3	122 ± 4	58 ± 3	41 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	3	1	B	74 ± 6	20 ± 3	140 ± 4	65 ± 3	46 ± 2	289 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	3	1	C	76 ± 6	20 ± 4	152 ± 5	65 ± 3	47 ± 2	299 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	3	1	D	57 ± 6	18 ± 3	137 ± 4	62 ± 3	44 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	3	1	E	63 ± 6	17 ± 4	139 ± 5	61 ± 3	43 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	3	1	F	61 ± 6	18 ± 3	132 ± 4	62 ± 3	46 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	3	1	G	74 ± 6	16 ± 3	141 ± 4	63 ± 3	48 ± 2	293 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	6	1	—	50 ± 6	20 ± 3	137 ± 4	59 ± 3	41 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	9	1	—	42 ± 6	19 ± 3	123 ± 4	53 ± 3	40 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	14	3	—	63 ± 6	17 ± 3	133 ± 4	60 ± 3	42 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	A	49 ± 6	19 ± 3	126 ± 4	55 ± 3	42 ± 2	258 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-73

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-555	15	1	B	56 ± 6	19 ± 3	135 ± 4	58 ± 3	44 ± 2	276 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	C	62 ± 5	18 ± 3	136 ± 4	59 ± 3	43 ± 2	278 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	D	50 ± 6	19 ± 3	133 ± 4	61 ± 3	44 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	E	58 ± 7	21 ± 4	134 ± 5	59 ± 3	43 ± 2	287 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	F	67 ± 6	23 ± 3	151 ± 5	70 ± 3	47 ± 2	302 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	G	59 ± 6	17 ± 3	134 ± 4	56 ± 3	49 ± 2	283 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	H	61 ± 6	22 ± 3	157 ± 5	66 ± 3	48 ± 2	303 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	I	59 ± 6	16 ± 3	142 ± 4	63 ± 3	45 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	J	77 ± 6	18 ± 4	149 ± 5	65 ± 3	42 ± 2	301 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	K	71 ± 6	16 ± 4	137 ± 5	63 ± 3	47 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	L	56 ± 7	19 ± 4	143 ± 5	62 ± 3	51 ± 2	295 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	M	65 ± 6	20 ± 4	152 ± 5	67 ± 3	48 ± 2	294 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	1	N	84 ± 7	23 ± 4	155 ± 5	70 ± 3	46 ± 2	305 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	3	A	69 ± 6	22 ± 3	143 ± 5	63 ± 3	44 ± 2	289 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	15	4	—	62 ± 6	17 ± 3	84 ± 4	96 ± 3	16 ± 2	97 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-555	16	4	—	52 ± 6	20 ± 3	136 ± 4	59 ± 3	44 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	17	3	—	54 ± 5	15 ± 3	127 ± 4	61 ± 3	40 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	41	1	—	49 ± 6	16 ± 3	130 ± 4	55 ± 3	41 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	110	1	—	51 ± 6	17 ± 3	129 ± 4	59 ± 3	40 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	484	3	—	48 ± 6	18 ± 3	130 ± 4	52 ± 3	41 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	501	1	—	64 ± 6	18 ± 3	131 ± 4	58 ± 3	41 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	503	2	A	51 ± 6	13 ± 4	129 ± 4	55 ± 3	40 ± 2	259 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-74

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-555	503	2	B	62 ± 6	23 ± 3	139 ± 4	61 ± 3	45 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	504	2	A	65 ± 6	21 ± 4	151 ± 5	64 ± 3	46 ± 2	302 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?
35-DS-555	507	1	—	55 ± 6	19 ± 3	134 ± 5	55 ± 3	39 ± 2	262 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	507	3	A	57 ± 6	13 ± 4	131 ± 4	57 ± 3	40 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	507	3	B	73 ± 6	20 ± 3	150 ± 4	64 ± 3	46 ± 2	294 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	507	3	C	93 ± 6	21 ± 3	121 ± 4	4 ± 3	54 ± 2	340 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-DS-555	508	1	—	45 ± 6	19 ± 3	136 ± 4	56 ± 3	42 ± 2	275 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	508	3	A	66 ± 6	20 ± 3	150 ± 5	67 ± 3	46 ± 2	302 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	508	3	B	72 ± 6	17 ± 3	112 ± 4	4 ± 3	49 ± 2	311 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-DS-555	508	3	C	60 ± 6	21 ± 3	129 ± 4	58 ± 3	41 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	508	3	D	65 ± 6	23 ± 3	150 ± 5	67 ± 3	51 ± 2	304 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	508	3	E	72 ± 6	20 ± 4	160 ± 5	68 ± 3	47 ± 2	297 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	508	3	F	89 ± 6	20 ± 3	123 ± 4	8 ± 3	55 ± 2	339 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-DS-555	508	3	G	62 ± 7	20 ± 4	153 ± 5	70 ± 3	49 ± 2	295 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	508	3	H	71 ± 7	21 ± 4	136 ± 5	60 ± 3	43 ± 2	279 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	508	3	I	62 ± 6	23 ± 3	140 ± 5	65 ± 3	43 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	508	3	J	64 ± 7	24 ± 4	154 ± 5	61 ± 3	47 ± 2	303 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	509	1	A	61 ± 6	20 ± 4	147 ± 5	64 ± 3	50 ± 2	289 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	510	2	A	51 ± 6	18 ± 3	140 ± 4	60 ± 3	45 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	510	2	B	57 ± 8	19 ± 4	157 ± 5	62 ± 3	46 ± 2	299 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	510	2	C	52 ± 6	20 ± 3	138 ± 4	60 ± 3	42 ± 2	275 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-555	536	3	—	89 ± 5	19 ± 3	118 ± 4	5 ± 3	50 ± 2	320 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh

C.1-75

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-555	540	2	A	89 ± 6	16 ± 3	115 ± 4	4 ± 3	55 ± 2	325 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	540	2	B	50 ± 5	18 ± 3	131 ± 4	57 ± 3	41 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	540	2	C	58 ± 7	22 ± 4	95 ± 5	130 ± 4	17 ± 2	96 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Inman Creek/Salt Creek A
35-DS-555	540	2	D	94 ± 6	19 ± 3	125 ± 4	3 ± 3	56 ± 2	337 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	540	2	E	79 ± 6	21 ± 3	112 ± 4	4 ± 3	51 ± 2	323 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	540	2	F	90 ± 7	20 ± 4	130 ± 5	4 ± 3	54 ± 2	351 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	540	2	G	83 ± 8	29 ± 4	167 ± 5	70 ± 4	49 ± 3	302 ± 6	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	540	2	H	97 ± 6	20 ± 3	125 ± 4	3 ± 3	58 ± 2	344 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	540	3	A	98 ± 6	23 ± 3	132 ± 4	4 ± 3	56 ± 2	357 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	545	3	—	29 ± 6	14 ± 3	73 ± 4	92 ± 3	16 ± 2	87 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-555	546	2	—	80 ± 5	15 ± 3	116 ± 4	3 ± 3	50 ± 2	320 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	666	1	—	44 ± 6	14 ± 3	128 ± 4	56 ± 3	43 ± 2	267 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	723	1	A	54 ± 6	18 ± 3	135 ± 4	57 ± 3	44 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	723	1	B	88 ± 6	18 ± 3	115 ± 4	4 ± 3	51 ± 2	324 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	723	1	C	64 ± 6	17 ± 3	132 ± 4	56 ± 3	41 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	723	1	D	63 ± 7	16 ± 4	147 ± 5	62 ± 3	44 ± 2	294 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	724	1	A	48 ± 6	12 ± 4	129 ± 4	53 ± 3	41 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	724	1	B	86 ± 6	21 ± 3	128 ± 4	3 ± 3	55 ± 2	341 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	724	1	C	66 ± 6	19 ± 3	147 ± 4	63 ± 3	45 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	725	1	A	66 ± 6	23 ± 3	154 ± 4	64 ± 3	47 ± 2	289 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	725	1	B	47 ± 6	20 ± 3	134 ± 4	57 ± 3	43 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	725	2	—	63 ± 6	16 ± 3	136 ± 4	62 ± 3	45 ± 2	286 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-DS-555	726	1	A	57 ± 6	15 ± 3	137 ± 4	60 ± 3	44 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	1	B	56 ± 6	18 ± 3	132 ± 4	57 ± 3	43 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	1	C	76 ± 7	19 ± 4	170 ± 5	69 ± 3	50 ± 2	311 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?	
35-DS-555	726	1	D	48 ± 6	21 ± 3	141 ± 4	61 ± 3	45 ± 2	275 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	1	E	55 ± 6	14 ± 4	127 ± 4	56 ± 3	42 ± 2	258 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	1	F	57 ± 6	17 ± 4	141 ± 4	57 ± 3	45 ± 2	290 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	1	G	59 ± 7	24 ± 4	153 ± 5	67 ± 3	48 ± 2	301 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	1	H	59 ± 6	22 ± 3	139 ± 4	60 ± 3	45 ± 2	281 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	1	I	80 ± 6	22 ± 4	166 ± 5	70 ± 3	47 ± 2	308 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?	
35-DS-555	726	1	J	70 ± 7	25 ± 3	137 ± 5	61 ± 3	45 ± 2	278 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	2	—	56 ± 6	15 ± 3	133 ± 4	60 ± 3	41 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	726	3	—	68 ± 6	13 ± 3	112 ± 4	4 ± 3	49 ± 2	312 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-DS-555	728	1	A	57 ± 6	23 ± 3	139 ± 4	61 ± 3	43 ± 2	285 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	728	1	B	55 ± 6	21 ± 3	136 ± 4	58 ± 3	42 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	728	1	C	71 ± 8	25 ± 4	171 ± 5	74 ± 3	49 ± 2	321 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?	
35-DS-555	728	1	D	57 ± 6	17 ± 4	147 ± 4	61 ± 3	46 ± 2	297 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	728	1	E	55 ± 6	21 ± 3	139 ± 4	61 ± 3	40 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	729	1	A	73 ± 7	28 ± 4	168 ± 5	69 ± 3	46 ± 2	310 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?	
35-DS-555	729	1	B	61 ± 7	25 ± 4	156 ± 5	69 ± 3	46 ± 2	296 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-555	731	1	A	88 ± 7	21 ± 4	121 ± 4	6 ± 3	54 ± 2	335 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-DS-555	731	1	B	70 ± 7	26 ± 4	171 ± 5	74 ± 3	53 ± 2	321 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?	
35-DS-555	731	1	C	68 ± 7	19 ± 4	159 ± 5	64 ± 3	49 ± 2	300 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?	

C.1-77

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-555	732	1	A	50 ± 7	15 ± 4	134 ± 4	58 ± 3	45 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	732	1	B	89 ± 6	18 ± 3	119 ± 4	6 ± 3	53 ± 2	325 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	732	1	C	70 ± 6	21 ± 4	151 ± 5	66 ± 3	48 ± 2	299 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	733	1	A	65 ± 7	16 ± 4	142 ± 5	60 ± 3	47 ± 2	287 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	734	2	—	43 ± 6	19 ± 3	120 ± 4	55 ± 3	42 ± 2	263 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	735	1	A	66 ± 6	19 ± 3	142 ± 4	64 ± 3	47 ± 2	286 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	738	1	A	70 ± 7	24 ± 4	152 ± 5	64 ± 3	47 ± 2	298 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	738	2	—	36 ± 6	17 ± 3	77 ± 4	107 ± 3	17 ± 2	97 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-555	739	1	A	65 ± 6	20 ± 3	138 ± 4	63 ± 3	43 ± 2	286 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	739	1	B	61 ± 7	12 ± 4	149 ± 5	62 ± 3	47 ± 2	297 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	739	1	C	54 ± 7	18 ± 4	147 ± 5	62 ± 3	48 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	740	1	A	58 ± 6	21 ± 3	143 ± 4	65 ± 3	44 ± 2	284 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	740	1	B	81 ± 6	16 ± 3	120 ± 4	5 ± 3	53 ± 2	343 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-555	740	1	C	72 ± 6	22 ± 3	148 ± 4	62 ± 3	45 ± 2	295 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	741	2	—	68 ± 7	21 ± 4	140 ± 5	62 ± 3	44 ± 2	289 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	742	1	A	81 ± 7	21 ± 4	172 ± 5	73 ± 3	48 ± 2	300 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?
35-DS-555	743	1	A	68 ± 7	22 ± 4	162 ± 5	70 ± 3	46 ± 2	307 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?
35-DS-555	743	1	B	48 ± 6	13 ± 4	114 ± 4	53 ± 3	42 ± 2	254 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-DS-555	751	2	—	60 ± 6	15 ± 4	135 ± 4	59 ± 3	44 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-555	752	2	—	51 ± 6	18 ± 3	112 ± 4	64 ± 3	40 ± 2	240 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-DS-555	771	1	—	47 ± 6	15 ± 3	123 ± 4	55 ± 3	38 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	1	1	—	63 ± 6	20 ± 3	132 ± 4	58 ± 3	40 ± 2	176 ± 5	9 ± 3	655 ± 28	342 ± 20	NM ± NM	1.74 ± 0.08	NM ± NM	NM	Quartz Mountain

C.1-78

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	2	1	—	69 ± 6	17 ± 3	139 ± 4	60 ± 3	45 ± 2	180 ± 5	8 ± 3	697 ± 28	355 ± 20	NM ± NM	1.77 ± 0.08	NM NM	Quartz Mountain	
35-DS-557	4	1	—	45 ± 6	12 ± 4	133 ± 4	56 ± 3	40 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	6	1	—	48 ± 6	18 ± 3	132 ± 4	55 ± 3	39 ± 2	194 ± 5	12 ± 3	1161 ± 29	361 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	7	1	—	44 ± 6	14 ± 3	126 ± 4	53 ± 3	37 ± 2	190 ± 5	8 ± 3	1110 ± 30	354 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte	
35-DS-557	8	1	—	46 ± 6	15 ± 3	109 ± 4	64 ± 3	40 ± 2	230 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	9	1	—	47 ± 6	17 ± 3	124 ± 4	55 ± 3	41 ± 2	190 ± 5	8 ± 3	1145 ± 29	361 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-DS-557	10	1	—	56 ± 6	18 ± 3	108 ± 4	49 ± 3	40 ± 2	322 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Big Obsidian Flow	
35-DS-557	11	1	—	64 ± 6	17 ± 3	129 ± 4	61 ± 3	44 ± 2	271 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	12	1	—	60 ± 6	16 ± 3	111 ± 4	49 ± 3	42 ± 2	320 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Big Obsidian Flow	
35-DS-557	13	1	A	60 ± 6	22 ± 3	126 ± 4	40 ± 3	46 ± 2	258 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-DS-557	13	1	B	51 ± 6	17 ± 3	133 ± 4	56 ± 3	39 ± 2	196 ± 5	10 ± 3	1138 ± 30	358 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-557	13	1	C	56 ± 6	19 ± 3	121 ± 4	70 ± 3	41 ± 2	246 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	13	1	D	52 ± 5	18 ± 3	132 ± 4	57 ± 3	41 ± 2	198 ± 5	11 ± 3	1415 ± 32	343 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte	
35-DS-557	13	1	E	64 ± 6	17 ± 3	142 ± 4	65 ± 3	44 ± 2	275 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	13	1	F	64 ± 6	23 ± 3	147 ± 5	62 ± 3	47 ± 2	290 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	13	1	G	59 ± 6	21 ± 3	144 ± 4	66 ± 3	48 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	13	1	H	55 ± 6	18 ± 3	138 ± 4	62 ± 3	45 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	13	1	I	56 ± 7	20 ± 4	146 ± 5	67 ± 3	48 ± 2	301 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	13	1	J	56 ± 6	15 ± 3	150 ± 4	64 ± 3	40 ± 2	206 ± 5	9 ± 3	1101 ± 30	365 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	13	1	K	59 ± 6	18 ± 4	146 ± 5	64 ± 3	40 ± 2	210 ± 5	12 ± 3	1342 ± 35	328 ± 20	NM ± NM	1.68 ± 0.08	NM NM	McKay Butte	
35-DS-557	13	1	L	56 ± 6	18 ± 3	147 ± 4	63 ± 3	42 ± 2	210 ± 5	12 ± 3	1152 ± 30	335 ± 20	NM ± NM	1.74 ± 0.08	NM NM	McKay Butte	
35-DS-557	13	1	M	60 ± 6	18 ± 3	139 ± 4	62 ± 3	44 ± 2	283 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	13	1	N	62 ± 7	24 ± 4	157 ± 5	69 ± 3	50 ± 2	307 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	13	1	O	74 ± 7	20 ± 4	156 ± 5	67 ± 3	45 ± 2	212 ± 5	8 ± 3	1260 ± 34	373 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-557	14	1	—	49 ± 6	17 ± 3	127 ± 4	55 ± 3	38 ± 2	191 ± 5	7 ± 3	1193 ± 32	368 ± 20	NM ± NM	1.90 ± 0.08	NM	McKay Butte	
35-DS-557	18	1	A	58 ± 6	16 ± 4	130 ± 5	56 ± 3	43 ± 2	276 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	B	57 ± 6	19 ± 3	137 ± 5	61 ± 3	42 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	C	60 ± 6	21 ± 4	144 ± 5	59 ± 3	43 ± 2	275 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	D	70 ± 6	22 ± 3	146 ± 4	62 ± 3	50 ± 2	295 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	E	63 ± 6	17 ± 3	144 ± 4	71 ± 3	46 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	F	52 ± 6	18 ± 3	141 ± 4	62 ± 3	46 ± 2	286 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	G	49 ± 6	20 ± 3	134 ± 4	56 ± 3	40 ± 2	266 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	H	79 ± 7	21 ± 4	154 ± 5	67 ± 3	49 ± 2	305 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	I	63 ± 6	25 ± 3	145 ± 4	64 ± 3	45 ± 2	293 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	J	46 ± 6	19 ± 3	127 ± 4	56 ± 3	40 ± 2	195 ± 5	9 ± 3	1387 ± 32	370 ± 20	NM ± NM	1.86 ± 0.08	NM	McKay Butte	
35-DS-557	18	1	K	49 ± 5	18 ± 3	136 ± 4	60 ± 3	44 ± 2	274 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	L	62 ± 6	20 ± 3	142 ± 4	67 ± 3	49 ± 2	295 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	M	60 ± 6	18 ± 3	132 ± 4	59 ± 3	43 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	18	1	N	49 ± 5	17 ± 3	120 ± 4	53 ± 3	38 ± 2	185 ± 5	9 ± 3	1333 ± 32	363 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte	
35-DS-557	18	1	O	46 ± 6	18 ± 3	126 ± 4	53 ± 3	39 ± 2	188 ± 5	10 ± 3	1077 ± 30	321 ± 20	NM ± NM	1.66 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	A	46 ± 5	13 ± 3	120 ± 4	52 ± 3	39 ± 2	194 ± 5	9 ± 3	1254 ± 31	362 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	B	51 ± 6	19 ± 3	144 ± 4	62 ± 3	42 ± 2	210 ± 5	10 ± 3	1306 ± 33	361 ± 20	NM ± NM	1.90 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	C	38 ± 6	19 ± 3	127 ± 4	58 ± 3	38 ± 2	196 ± 5	10 ± 3	1205 ± 29	360 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	D	61 ± 5	17 ± 3	113 ± 4	68 ± 3	41 ± 2	232 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	

C.1-80

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-557	28	1	E	66 ± 6	19 ± 3	125 ± 4	74 ± 3	41 ± 2	251 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	28	1	F	60 ± 6	20 ± 4	129 ± 5	74 ± 3	40 ± 2	259 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	28	1	G	58 ± 6	18 ± 4	138 ± 4	80 ± 3	47 ± 2	265 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	28	1	H	52 ± 6	20 ± 3	140 ± 4	61 ± 3	41 ± 2	205 ± 5	11 ± 3	1249 ± 30	347 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	I	52 ± 6	22 ± 3	137 ± 4	64 ± 3	44 ± 2	208 ± 5	8 ± 3	1469 ± 32	362 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	J	54 ± 6	17 ± 3	131 ± 4	58 ± 3	40 ± 2	205 ± 5	10 ± 3	1053 ± 30	312 ± 20	NM ± NM	1.60 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	K	48 ± 6	15 ± 4	139 ± 5	56 ± 3	40 ± 2	201 ± 5	12 ± 3	977 ± 32	294 ± 20	NM ± NM	1.52 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	L	67 ± 6	16 ± 4	128 ± 4	64 ± 3	40 ± 2	202 ± 5	11 ± 3	1577 ± 34	382 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-557	28	1	M	72 ± 7	16 ± 4	133 ± 5	82 ± 3	45 ± 2	267 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	28	1	N	64 ± 7	25 ± 4	131 ± 5	79 ± 3	49 ± 2	267 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	28	1	O	58 ± 6	16 ± 4	122 ± 5	73 ± 3	42 ± 2	252 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	42	1	A	49 ± 6	19 ± 3	137 ± 4	61 ± 3	43 ± 2	276 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	42	1	B	48 ± 5	20 ± 3	124 ± 4	57 ± 3	38 ± 2	195 ± 5	13 ± 3	1358 ± 31	369 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte	
35-DS-557	42	1	C	47 ± 6	21 ± 3	131 ± 4	59 ± 3	39 ± 2	197 ± 5	8 ± 3	1187 ± 31	367 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-557	42	1	D	47 ± 6	18 ± 3	133 ± 4	60 ± 3	44 ± 2	278 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	42	1	E	86 ± 7	20 ± 4	148 ± 5	64 ± 3	46 ± 2	188 ± 5	6 ± 3	645 ± 33	319 ± 20	NM ± NM	1.54 ± 0.08	NM	Quartz Mountain	
35-DS-557	42	1	F	53 ± 6	17 ± 3	128 ± 4	61 ± 3	41 ± 2	196 ± 5	11 ± 3	1414 ± 32	375 ± 20	NM ± NM	1.90 ± 0.08	NM	McKay Butte	
35-DS-557	42	1	G	42 ± 6	17 ± 3	134 ± 4	58 ± 3	41 ± 2	274 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	42	1	H	64 ± 6	19 ± 3	139 ± 4	65 ± 3	39 ± 2	207 ± 5	9 ± 3	1302 ± 32	393 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-557	42	1	I	47 ± 6	17 ± 3	130 ± 4	62 ± 3	36 ± 2	199 ± 5	9 ± 3	1242 ± 33	328 ± 20	NM ± NM	1.65 ± 0.08	NM	McKay Butte	
35-DS-557	42	1	J	57 ± 6	23 ± 3	141 ± 4	67 ± 3	45 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	42	1	K	58 ± 6	18 ± 3	138 ± 4	61 ± 3	40 ± 2	203 ± 5	14 ± 3	1258 ± 34	346 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	

C.1-81

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-557	42	1	L	56 ± 6	15 ± 3	148 ± 4	65 ± 3	39 ± 2	207 ± 5	11 ± 3	1407 ± 31	371 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte
35-DS-557	42	1	M	52 ± 6	15 ± 3	133 ± 4	64 ± 3	46 ± 2	283 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	42	1	N	62 ± 6	13 ± 4	137 ± 5	71 ± 3	39 ± 2	206 ± 5	3 ± 3	1275 ± 34	346 ± 20	NM ± NM	1.70 ± 0.08	NM NM	McKay Butte
35-DS-557	42	1	O	53 ± 7	17 ± 4	94 ± 5	33 ± 3	54 ± 2	94 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes
35-DS-557	47	1	A	54 ± 6	18 ± 3	131 ± 4	61 ± 3	40 ± 2	271 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	B	51 ± 6	18 ± 3	127 ± 4	60 ± 3	38 ± 2	264 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	C	49 ± 6	13 ± 3	129 ± 4	57 ± 3	39 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	D	55 ± 5	12 ± 3	131 ± 4	60 ± 3	40 ± 2	198 ± 5	7 ± 3	1259 ± 31	383 ± 20	NM ± NM	1.89 ± 0.08	NM NM	McKay Butte
35-DS-557	47	1	E	63 ± 6	19 ± 3	140 ± 4	71 ± 3	39 ± 2	278 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	F	49 ± 5	17 ± 3	131 ± 4	59 ± 3	44 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	G	68 ± 6	22 ± 3	147 ± 4	68 ± 3	47 ± 2	296 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	H	74 ± 6	21 ± 3	142 ± 5	69 ± 3	42 ± 2	208 ± 5	9 ± 3	1155 ± 31	366 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte
35-DS-557	47	1	I	63 ± 5	20 ± 3	135 ± 4	62 ± 3	42 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	J	52 ± 6	17 ± 3	130 ± 4	64 ± 3	42 ± 2	273 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	K	76 ± 6	21 ± 3	146 ± 5	64 ± 3	45 ± 2	290 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	L	65 ± 6	22 ± 4	144 ± 5	66 ± 3	46 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	M	70 ± 6	17 ± 3	141 ± 5	61 ± 3	43 ± 2	284 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	N	76 ± 6	21 ± 3	156 ± 5	67 ± 3	42 ± 2	296 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	47	1	O	66 ± 6	19 ± 3	152 ± 5	66 ± 3	44 ± 2	292 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	57	1	A	33 ± 6	18 ± 3	118 ± 4	54 ± 3	34 ± 2	186 ± 5	9 ± 3	1038 ± 32	349 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte
35-DS-557	57	1	B	47 ± 6	17 ± 3	125 ± 4	57 ± 3	38 ± 2	194 ± 5	8 ± 3	1174 ± 31	359 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte
35-DS-557	57	1	C	48 ± 6	13 ± 3	120 ± 4	71 ± 3	40 ± 2	240 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X

C.1-82

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-DS-557	57	1	D	41 ± 6	17 ± 3	128 ± 4	55 ± 3	39 ± 2	271 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	57	1	E	47 ± 5	15 ± 3	129 ± 4	54 ± 3	38 ± 2	192 ± 5	10 ± 3	1120 ± 30	351 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-DS-557	57	1	F	54 ± 6	21 ± 3	144 ± 4	61 ± 3	41 ± 2	206 ± 5	10 ± 3	1229 ± 30	357 ± 20	NM ± NM	1.79 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-DS-557	57	1	G	55 ± 5	17 ± 3	112 ± 4	68 ± 3	39 ± 2	238 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-557	57	1	H	77 ± 7	18 ± 4	146 ± 5	82 ± 3	46 ± 2	279 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	57	1	I	54 ± 5	17 ± 3	138 ± 4	60 ± 3	38 ± 2	205 ± 5	8 ± 3	1108 ± 29	338 ± 20	NM ± NM	1.75 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-DS-557	57	1	J	63 ± 6	20 ± 3	116 ± 4	70 ± 3	38 ± 2	248 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-557	57	1	K	49 ± 6	19 ± 3	129 ± 4	57 ± 3	41 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	57	1	L	49 ± 5	19 ± 3	132 ± 4	57 ± 3	39 ± 2	196 ± 5	9 ± 3	1094 ± 30	365 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-DS-557	57	1	M	53 ± 6	18 ± 3	136 ± 4	58 ± 3	47 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	57	5	A	46 ± 5	17 ± 3	130 ± 4	58 ± 3	38 ± 2	191 ± 5	8 ± 3	1259 ± 31	353 ± 20	NM ± NM	1.86 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-DS-557	57	5	B	56 ± 5	18 ± 3	129 ± 4	58 ± 3	38 ± 2	192 ± 5	8 ± 3	1371 ± 33	351 ± 20	NM ± NM	1.85 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-DS-557	57	6	—	54 ± 6	19 ± 3	119 ± 4	73 ± 3	40 ± 2	246 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-557	57	7	—	69 ± 6	20 ± 3	144 ± 5	64 ± 3	45 ± 2	292 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	57	8	—	64 ± 6	18 ± 3	132 ± 5	61 ± 3	46 ± 2	276 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	58	1	—	80 ± 6	19 ± 3	116 ± 4	12 ± 3	55 ± 2	331 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-DS-557	59	4	—	43 ± 6	13 ± 3	137 ± 4	56 ± 3	36 ± 2	198 ± 5	10 ± 3	1218 ± 31	358 ± 20	NM ± NM	1.83 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-DS-557	63	3	—	46 ± 6	13 ± 3	127 ± 4	54 ± 3	40 ± 2	259 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	63	4	—	53 ± 6	22 ± 3	136 ± 4	62 ± 3	37 ± 2	192 ± 5	9 ± 3	1442 ± 32	459 ± 20	NM ± NM	2.21 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-DS-557	64	1	—	70 ± 7	20 ± 4	140 ± 5	71 ± 3	44 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	65	5	—	58 ± 6	18 ± 3	137 ± 4	61 ± 3	48 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-557	66	1	—	57 ± 6	20 ± 3	132 ± 4	55 ± 3	42 ± 2	269 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>										Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	
35-DS-557	67	4	—	68 ± 6	16 ± 3	115 ± 4	51 ± 3	44 ± 2	334 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-DS-557	68	1	—	49 ± 5	18 ± 3	124 ± 4	54 ± 3	37 ± 2	189 ± 5	9 ± 3	1150 ± 30	343 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte
35-DS-557	70	1	—	44 ± 6	18 ± 3	123 ± 4	48 ± 3	36 ± 2	180 ± 5	11 ± 3	1536 ± 31	412 ± 20	NM ± NM	1.98 ± 0.08	NM	McKay Butte
35-DS-557	929	4	—	58 ± 6	17 ± 3	134 ± 4	60 ± 3	42 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1261	2	A	54 ± 6	19 ± 3	139 ± 4	59 ± 3	39 ± 2	204 ± 5	8 ± 3	1249 ± 32	373 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte
35-DS-557	1261	2	B	54 ± 6	18 ± 3	118 ± 4	72 ± 3	39 ± 2	242 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1261	2	C	51 ± 5	19 ± 3	116 ± 4	70 ± 3	42 ± 2	240 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1261	2	D	61 ± 5	16 ± 3	128 ± 4	74 ± 3	38 ± 2	250 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1261	2	E	55 ± 6	21 ± 3	114 ± 4	66 ± 3	38 ± 2	231 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1261	2	F	53 ± 5	17 ± 3	122 ± 4	73 ± 3	43 ± 2	249 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1261	2	G	60 ± 6	22 ± 3	126 ± 4	74 ± 3	42 ± 2	259 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1261	2	H	55 ± 6	18 ± 3	140 ± 4	59 ± 3	42 ± 2	203 ± 5	7 ± 3	1036 ± 29	337 ± 20	NM ± NM	1.66 ± 0.08	NM	McKay Butte
35-DS-557	1261	2	I	69 ± 7	23 ± 4	145 ± 5	66 ± 3	42 ± 2	219 ± 5	7 ± 3	1144 ± 37	353 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte
35-DS-557	1262	2	A	58 ± 5	22 ± 3	116 ± 4	69 ± 3	40 ± 2	239 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1262	2	B	55 ± 6	14 ± 4	146 ± 4	59 ± 3	39 ± 2	210 ± 5	11 ± 3	1066 ± 32	340 ± 20	NM ± NM	1.65 ± 0.08	NM	McKay Butte
35-DS-557	1262	2	C	54 ± 6	15 ± 3	136 ± 4	62 ± 3	39 ± 2	197 ± 5	9 ± 3	1080 ± 29	331 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte
35-DS-557	1262	2	D	53 ± 6	19 ± 3	117 ± 4	69 ± 3	40 ± 2	248 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1262	2	E	63 ± 6	20 ± 3	133 ± 5	79 ± 3	45 ± 2	265 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1262	2	F	46 ± 5	19 ± 3	135 ± 4	57 ± 3	41 ± 2	198 ± 5	11 ± 3	1012 ± 29	360 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte
35-DS-557	1281	2	A	52 ± 6	17 ± 3	134 ± 4	59 ± 3	40 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1281	2	B	62 ± 6	20 ± 3	139 ± 4	66 ± 3	44 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1281	2	C	67 ± 7	22 ± 4	137 ± 5	80 ± 4	44 ± 2	262 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>														Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn					
35-DS-557	1281	2	D	65 ± 7	23 ± 4	129 ± 5	87 ± 3	43 ± 2	268 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-DS-557	1282	2	A	72 ± 7	17 ± 4	154 ± 5	70 ± 3	45 ± 2	303 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-DS-557	1283	1	A	54 ± 5	15 ± 3	114 ± 4	69 ± 3	40 ± 2	240 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X		
35-DS-557	1283	1	B	50 ± 6	18 ± 3	111 ± 4	71 ± 3	36 ± 2	242 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X		
35-DS-557	1285	2	A	65 ± 6	14 ± 3	123 ± 4	73 ± 3	43 ± 2	244 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X		
35-DS-557	1287	2	A	66 ± 6	20 ± 4	158 ± 5	66 ± 3	49 ± 2	307 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-DS-557	1287	2	B	58 ± 6	19 ± 4	126 ± 5	72 ± 3	41 ± 2	234 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X		
35-DS-557	1288	1	A	63 ± 6	22 ± 3	126 ± 4	77 ± 3	43 ± 2	253 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano/Unknown X		
35-DS-557	1288	1	B	53 ± 6	22 ± 3	125 ± 4	72 ± 3	39 ± 2	256 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano/Unknown X		
35-DS-557	1289	2	A	76 ± 6	21 ± 3	79 ± 4	165 ± 4	47 ± 2	317 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown B		
35-DS-557	1289	2	B	50 ± 6	16 ± 3	130 ± 4	59 ± 3	39 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-DS-557	1290	1	—	67 ± 8	16 ± 5	149 ± 5	73 ± 4	42 ± 3	292 ± 6	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-DS-557	1305	5	—	61 ± 5	19 ± 3	125 ± 4	73 ± 3	42 ± 2	251 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano/Unknown X		
35-DS-557	1309	2	A	46 ± 6	20 ± 3	134 ± 4	57 ± 3	38 ± 2	194 ± 5	10 ± 3	937 ± 32	340 ± 20	NM ± NM	1.74 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte		
35-DS-557	1309	2	B	60 ± 5	20 ± 3	133 ± 4	59 ± 3	41 ± 2	177 ± 5	9 ± 3	649 ± 28	377 ± 20	NM ± NM	1.77 ± 0.08	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain		
35-DS-557	1309	2	C	46 ± 6	18 ± 3	134 ± 4	58 ± 3	41 ± 2	201 ± 5	9 ± 3	1099 ± 30	346 ± 20	NM ± NM	1.73 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte		
35-DS-557	1309	2	D	54 ± 6	20 ± 4	136 ± 5	79 ± 3	45 ± 2	268 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-DS-557	1309	2	E	48 ± 6	20 ± 3	136 ± 4	60 ± 3	40 ± 2	202 ± 5	11 ± 3	1124 ± 31	365 ± 20	NM ± NM	1.83 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte		
35-DS-557	1309	2	F	54 ± 6	20 ± 4	142 ± 5	62 ± 3	45 ± 2	212 ± 5	11 ± 3	1240 ± 32	362 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte		
35-DS-557	1309	2	G	68 ± 7	21 ± 4	142 ± 5	83 ± 3	43 ± 2	271 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-DS-557	1309	2	H	56 ± 6	17 ± 3	127 ± 4	76 ± 3	46 ± 2	267 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-DS-557	1309	2	I	47 ± 5	19 ± 3	127 ± 4	58 ± 3	38 ± 2	195 ± 5	9 ± 3	1146 ± 32	335 ± 20	NM ± NM	1.78 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte		

C.1-85

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-557	1309	2	J	62 ± 6	21 ± 3	152 ± 5	66 ± 3	43 ± 2	209 ± 5	12 ± 3	1154 ± 34	371 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-557	1309	2	K	62 ± 6	18 ± 3	129 ± 4	57 ± 3	35 ± 2	192 ± 5	6 ± 3	1088 ± 33	344 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-557	1309	2	L	44 ± 6	21 ± 3	128 ± 4	59 ± 3	42 ± 2	202 ± 5	10 ± 3	1066 ± 30	346 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-557	1309	2	M	54 ± 6	19 ± 3	138 ± 5	57 ± 3	43 ± 2	211 ± 5	11 ± 3	1082 ± 33	353 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-DS-557	1309	3	—	53 ± 6	18 ± 3	120 ± 4	72 ± 3	41 ± 2	242 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X		
35-DS-557	1310	2	A	61 ± 6	18 ± 3	125 ± 4	70 ± 3	43 ± 2	248 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X		
35-DS-557	1310	2	B	68 ± 7	23 ± 3	151 ± 5	63 ± 3	44 ± 2	217 ± 5	8 ± 3	1091 ± 34	343 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-DS-557	1310	2	C	85 ± 7	23 ± 3	160 ± 5	67 ± 3	40 ± 2	216 ± 5	10 ± 3	1354 ± 35	361 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-557	1337	2	—	52 ± 6	23 ± 3	117 ± 4	69 ± 3	40 ± 2	237 ± 5	11 ± 3	1343 ± 28	450 ± 20	NM ± NM	2.19 ± 0.08	NM	Unknown X	
35-DS-557	1338	3	—	49 ± 6	16 ± 3	116 ± 4	69 ± 3	41 ± 2	241 ± 5	8 ± 3	1395 ± 27	441 ± 20	NM ± NM	2.15 ± 0.08	NM	Unknown X	
35-DS-557	1350	3	—	50 ± 6	17 ± 3	114 ± 4	66 ± 3	40 ± 2	228 ± 5	10 ± 3	1316 ± 28	472 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X	
35-DS-557	1406	1	A	50 ± 6	17 ± 3	107 ± 4	65 ± 3	37 ± 2	228 ± 5	7 ± 3	1320 ± 26	420 ± 20	NM ± NM	2.09 ± 0.08	NM	McKay Butte/Unknown X	
35-DS-557	1406	1	B	52 ± 6	17 ± 3	112 ± 4	67 ± 3	41 ± 2	231 ± 5	8 ± 3	1399 ± 28	437 ± 20	NM ± NM	2.19 ± 0.08	NM	Unknown X	
35-DS-557	1406	1	C	43 ± 6	14 ± 3	124 ± 4	55 ± 3	35 ± 2	186 ± 5	12 ± 3	1363 ± 27	360 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte	
35-DS-557	1406	1	D	65 ± 6	19 ± 3	124 ± 4	75 ± 3	40 ± 2	254 ± 5	8 ± 3	1494 ± 27	434 ± 20	NM ± NM	2.15 ± 0.08	NM	Newberry Volcano/Unknown X	
35-DS-557	1406	1	E	58 ± 6	15 ± 3	124 ± 4	72 ± 3	40 ± 2	241 ± 5	9 ± 3	1309 ± 26	428 ± 20	NM ± NM	2.13 ± 0.08	NM	Unknown X	
35-DS-557	1406	1	F	55 ± 6	17 ± 3	120 ± 4	70 ± 3	41 ± 2	248 ± 5	11 ± 3	1310 ± 26	443 ± 20	NM ± NM	2.05 ± 0.08	NM	Unknown X	
35-DS-557	1406	1	G	45 ± 6	16 ± 3	110 ± 4	67 ± 3	39 ± 2	235 ± 5	9 ± 3	1234 ± 25	408 ± 20	NM ± NM	1.99 ± 0.08	NM	Unknown X	
35-DS-557	1406	1	H	58 ± 6	16 ± 3	130 ± 4	55 ± 3	37 ± 2	190 ± 5	9 ± 3	1165 ± 27	357 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte	
35-DS-557	1406	1	I	44 ± 6	18 ± 3	119 ± 4	55 ± 3	34 ± 2	183 ± 5	11 ± 3	1205 ± 27	366 ± 20	NM ± NM	1.74 ± 0.08	NM	McKay Butte	
35-DS-557	1406	1	J	50 ± 6	13 ± 3	102 ± 4	61 ± 3	36 ± 2	211 ± 5	7 ± 3	1205 ± 28	408 ± 20	NM ± NM	1.99 ± 0.08	NM	McKay Butte?	
35-DS-557	1406	1	K	56 ± 6	17 ± 3	117 ± 4	70 ± 3	39 ± 2	247 ± 5	11 ± 3	1189 ± 26	399 ± 20	NM ± NM	1.93 ± 0.08	NM	McKay Butte?	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>										Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-557	1406	1	L	57 ± 6	20 ± 3	118 ± 4	70 ± 3	41 ± 2	241 ± 5	9 ± 3	1181 ± 25	397 ± 20	NM ± NM	1.91 ± 0.08	NM NM	McKay Butte?
35-DS-557	1406	1	M	58 ± 6	19 ± 3	122 ± 4	73 ± 3	40 ± 2	251 ± 5	14 ± 3	1325 ± 27	411 ± 20	NM ± NM	2.03 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	N	63 ± 6	22 ± 3	122 ± 4	71 ± 3	42 ± 2	251 ± 5	10 ± 3	1264 ± 27	395 ± 20	NM ± NM	1.93 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	O	54 ± 6	16 ± 3	125 ± 4	77 ± 3	44 ± 2	256 ± 5	10 ± 3	1205 ± 26	423 ± 20	NM ± NM	1.93 ± 0.08	NM NM	Newberry Volcano/Unknown X
35-DS-557	1406	1	P	54 ± 6	20 ± 3	120 ± 4	71 ± 3	41 ± 2	250 ± 5	9 ± 3	1271 ± 27	409 ± 20	NM ± NM	1.98 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	Q	60 ± 6	19 ± 3	115 ± 4	72 ± 3	39 ± 2	248 ± 5	9 ± 3	1288 ± 26	411 ± 20	NM ± NM	2.00 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	R	53 ± 6	18 ± 3	115 ± 4	68 ± 3	39 ± 2	236 ± 5	8 ± 3	1414 ± 29	436 ± 20	NM ± NM	2.16 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	S	61 ± 6	19 ± 3	125 ± 4	54 ± 3	37 ± 2	190 ± 5	10 ± 3	1170 ± 26	376 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte
35-DS-557	1406	1	T	54 ± 6	13 ± 3	131 ± 4	58 ± 3	38 ± 2	199 ± 5	10 ± 3	1268 ± 25	356 ± 20	NM ± NM	1.75 ± 0.08	NM NM	McKay Butte
35-DS-557	1406	1	U	64 ± 6	18 ± 3	122 ± 4	77 ± 3	42 ± 2	244 ± 5	10 ± 3	1447 ± 27	447 ± 20	NM ± NM	2.27 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	V	56 ± 6	14 ± 3	119 ± 4	73 ± 3	41 ± 2	241 ± 5	8 ± 3	1324 ± 28	443 ± 20	NM ± NM	2.22 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	W	46 ± 6	19 ± 3	118 ± 4	72 ± 3	42 ± 2	248 ± 5	11 ± 3	1419 ± 26	438 ± 20	NM ± NM	2.22 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	X	43 ± 6	15 ± 3	116 ± 4	68 ± 3	41 ± 2	241 ± 5	9 ± 3	1314 ± 28	428 ± 20	NM ± NM	2.17 ± 0.08	NM NM	Unknown X
35-DS-557	1406	1	Y	61 ± 6	18 ± 3	123 ± 4	75 ± 3	42 ± 2	258 ± 5	11 ± 3	1379 ± 26	430 ± 20	NM ± NM	2.11 ± 0.08	NM NM	Newberry Volcano/Unknown X
35-DS-557	1408	1	A	49 ± 6	20 ± 3	120 ± 4	54 ± 3	37 ± 2	194 ± 5	9 ± 3	1116 ± 26	358 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte
35-DS-557	1408	1	B	51 ± 6	17 ± 3	122 ± 4	72 ± 3	41 ± 2	246 ± 5	9 ± 3	1531 ± 28	478 ± 20	NM ± NM	2.33 ± 0.08	NM NM	Unknown X
35-DS-557	1408	1	C	51 ± 5	18 ± 3	114 ± 4	67 ± 3	38 ± 2	235 ± 5	9 ± 3	1337 ± 26	437 ± 20	NM ± NM	2.17 ± 0.08	NM NM	Unknown X
35-DS-557	1408	1	D	46 ± 6	17 ± 3	119 ± 4	53 ± 3	35 ± 2	186 ± 5	10 ± 3	1053 ± 26	356 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte
35-DS-557	1408	1	E	56 ± 5	15 ± 3	109 ± 4	68 ± 3	40 ± 2	235 ± 5	8 ± 3	1270 ± 26	749 ± 20	NM ± NM	2.19 ± 0.08	NM NM	Unknown X
35-DS-557	1408	1	F	54 ± 6	16 ± 3	119 ± 4	72 ± 3	40 ± 2	248 ± 5	12 ± 3	1318 ± 26	427 ± 20	NM ± NM	2.10 ± 0.08	NM NM	Unknown X
35-DS-557	1408	1	G	55 ± 6	16 ± 3	119 ± 4	70 ± 3	42 ± 2	244 ± 5	10 ± 3	1380 ± 26	443 ± 20	NM ± NM	2.22 ± 0.08	NM NM	Unknown X
35-DS-557	1408	1	H	48 ± 6	16 ± 3	111 ± 4	68 ± 3	34 ± 2	234 ± 5	9 ± 3	1382 ± 28	432 ± 20	NM ± NM	2.22 ± 0.08	NM NM	McKay Butte/Unknown X

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-557	1408	1	I	56 ± 6	17 ± 3	126 ± 4	75 ± 3	40 ± 2	248 ± 5	8 ± 3	1468 ± 27	483 ± 20	NM ± NM	2.25 ± 0.08	NM	Unknown X	
35-DS-557	1408	1	J	51 ± 6	17 ± 3	137 ± 4	59 ± 3	39 ± 2	196 ± 5	10 ± 3	1239 ± 29	384 ± 20	NM ± NM	1.98 ± 0.08	NM	McKay Butte	
35-DS-557	1408	1	K	50 ± 6	17 ± 3	113 ± 4	69 ± 3	38 ± 2	231 ± 5	10 ± 3	1366 ± 27	436 ± 20	NM ± NM	2.20 ± 0.08	NM	Unknown X	
35-DS-557	1408	1	L	55 ± 5	15 ± 3	121 ± 4	71 ± 3	40 ± 2	247 ± 5	10 ± 3	1384 ± 26	434 ± 20	NM ± NM	2.18 ± 0.08	NM	Unknown X	
35-DS-557	1408	1	M	66 ± 5	18 ± 3	117 ± 4	70 ± 3	39 ± 2	240 ± 5	11 ± 3	1425 ± 27	432 ± 20	NM ± NM	2.23 ± 0.08	NM	Unknown X	
35-DS-557	1408	1	N	44 ± 6	16 ± 3	125 ± 4	56 ± 3	38 ± 2	196 ± 5	11 ± 3	1088 ± 26	357 ± 20	NM ± NM	1.74 ± 0.08	NM	McKay Butte	
35-DS-557	1408	1	O	66 ± 5	14 ± 3	115 ± 4	66 ± 3	42 ± 2	241 ± 5	9 ± 3	1693 ± 27	417 ± 20	NM ± NM	2.29 ± 0.08	NM	Unknown X	
35-DS-557	1408	1	P	58 ± 6	19 ± 4	130 ± 4	75 ± 3	41 ± 2	264 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1408	1	Q	58 ± 6	19 ± 3	121 ± 4	73 ± 3	41 ± 2	251 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X	
35-DS-557	1408	1	R	63 ± 7	20 ± 4	127 ± 4	76 ± 3	40 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1408	1	S	72 ± 6	15 ± 4	127 ± 4	77 ± 3	45 ± 2	256 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X	
35-DS-557	1408	1	T	68 ± 6	18 ± 4	125 ± 4	71 ± 3	41 ± 2	251 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X	
35-DS-557	1408	1	U	62 ± 6	19 ± 3	123 ± 4	74 ± 3	40 ± 2	257 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X	
35-DS-557	1408	1	V	69 ± 6	20 ± 3	129 ± 4	74 ± 3	43 ± 2	260 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1408	1	W	57 ± 6	22 ± 3	129 ± 4	76 ± 3	40 ± 2	251 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1408	1	X	56 ± 7	21 ± 4	133 ± 4	76 ± 3	39 ± 2	256 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X	
35-DS-557	1409	1	A	45 ± 6	18 ± 3	118 ± 4	70 ± 3	40 ± 2	237 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1415	2	—	52 ± 6	14 ± 3	110 ± 4	61 ± 3	37 ± 2	230 ± 5	8 ± 3	1290 ± 27	448 ± 20	NM ± NM	2.10 ± 0.08	NM	Unknown X	
35-DS-557	1416	3	—	47 ± 6	16 ± 3	112 ± 4	65 ± 3	38 ± 2	238 ± 5	8 ± 3	1279 ± 29	447 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X	
35-DS-557	1421	1	—	53 ± 6	15 ± 3	113 ± 4	65 ± 3	37 ± 2	227 ± 5	8 ± 3	1342 ± 30	439 ± 20	NM ± NM	2.15 ± 0.08	NM	Unknown X	
35-DS-557	1426	2	—	45 ± 6	12 ± 4	121 ± 4	52 ± 3	35 ± 2	180 ± 5	9 ± 3	1395 ± 27	361 ± 20	NM ± NM	1.88 ± 0.08	NM	McKay Butte	
35-DS-557	1427	3	—	44 ± 6	15 ± 3	119 ± 4	50 ± 3	35 ± 2	184 ± 5	8 ± 3	1062 ± 26	376 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	1428	1	—	44 ± 5	14 ± 3	118 ± 4	55 ± 3	35 ± 2	183 ± 5	7 ± 3	1431 ± 26	360 ± 20	NM ± NM	1.99 ± 0.08	NM NM	McKay Butte	
35-DS-557	1442	2	—	34 ± 6	17 ± 3	117 ± 4	51 ± 3	35 ± 2	185 ± 5	7 ± 3	1039 ± 26	366 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-DS-557	1443	1	—	35 ± 6	15 ± 3	118 ± 4	51 ± 3	38 ± 2	184 ± 5	9 ± 3	1022 ± 24	345 ± 20	NM ± NM	1.68 ± 0.08	NM NM	McKay Butte	
35-DS-557	1449	1	A	45 ± 6	13 ± 4	124 ± 4	54 ± 3	36 ± 2	187 ± 5	9 ± 3	1120 ± 27	375 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	1449	1	B	40 ± 6	18 ± 3	122 ± 4	53 ± 3	37 ± 2	186 ± 5	9 ± 3	1165 ± 27	349 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte	
35-DS-557	1449	1	C	53 ± 6	16 ± 3	119 ± 4	72 ± 3	40 ± 2	243 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1449	1	D	63 ± 6	14 ± 3	124 ± 4	74 ± 3	43 ± 2	258 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano/Unknown X	
35-DS-557	1449	1	E	49 ± 6	19 ± 3	135 ± 4	61 ± 3	40 ± 2	201 ± 5	10 ± 3	1124 ± 28	345 ± 20	NM ± NM	1.68 ± 0.08	NM NM	McKay Butte	
35-DS-557	1449	1	F	51 ± 6	17 ± 3	139 ± 4	61 ± 3	40 ± 2	209 ± 5	10 ± 3	1084 ± 25	349 ± 20	NM ± NM	1.72 ± 0.08	NM NM	McKay Butte	
35-DS-557	1449	1	G	67 ± 6	17 ± 3	144 ± 4	62 ± 3	42 ± 2	207 ± 5	9 ± 3	1069 ± 26	350 ± 20	NM ± NM	1.65 ± 0.08	NM NM	McKay Butte	
35-DS-557	1449	1	H	51 ± 6	20 ± 3	128 ± 4	55 ± 3	41 ± 2	188 ± 5	9 ± 3	1102 ± 26	343 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	
35-DS-557	1449	1	I	58 ± 6	21 ± 3	124 ± 4	74 ± 3	43 ± 2	247 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1449	3	—	40 ± 6	16 ± 3	124 ± 4	49 ± 3	39 ± 2	179 ± 5	7 ± 3	1010 ± 26	350 ± 20	NM ± NM	1.70 ± 0.08	NM NM	McKay Butte	
35-DS-557	1449	4	—	37 ± 7	14 ± 4	128 ± 4	53 ± 3	37 ± 2	193 ± 5	9 ± 3	1453 ± 30	358 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-557	1450	1	A	47 ± 6	14 ± 3	116 ± 4	67 ± 3	38 ± 2	241 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1465	3	—	41 ± 6	18 ± 3	103 ± 4	64 ± 3	35 ± 2	220 ± 5	8 ± 3	1220 ± 29	413 ± 20	NM ± NM	2.04 ± 0.08	NM NM	McKay Butte/Unknown X	
35-DS-557	1474	2	—	54 ± 6	13 ± 3	112 ± 4	66 ± 3	40 ± 2	231 ± 5	11 ± 3	1355 ± 28	461 ± 20	NM ± NM	2.20 ± 0.08	NM NM	Unknown X	
35-DS-557	1476	1	A	47 ± 5	16 ± 3	127 ± 4	55 ± 3	37 ± 2	190 ± 5	10 ± 3	1144 ± 25	359 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-DS-557	1476	1	B	56 ± 6	21 ± 3	141 ± 4	61 ± 3	43 ± 2	204 ± 5	9 ± 3	1207 ± 29	372 ± 20	NM ± NM	1.76 ± 0.08	NM NM	McKay Butte	
35-DS-557	1476	1	C	68 ± 6	20 ± 3	138 ± 4	59 ± 3	41 ± 2	201 ± 5	9 ± 3	993 ± 25	314 ± 20	NM ± NM	1.60 ± 0.08	NM NM	McKay Butte	
35-DS-557	1476	1	D	62 ± 6	19 ± 3	142 ± 4	60 ± 3	41 ± 2	211 ± 5	11 ± 3	1161 ± 26	350 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-DS-557	1476	1	E	57 ± 6	19 ± 3	135 ± 4	59 ± 3	36 ± 2	197 ± 5	10 ± 3	1146 ± 28	341 ± 20	NM ± NM	1.77 ± 0.08	NM NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-557	1476	3	—	38	16	127	55	36	184	9	1135	416	NM	1.87	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	NM	
35-DS-557	1477	2	—	46	15	121	55	38	183	9	1262	360	NM	1.75	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	NM	
35-DS-557	1479	1	A	67	20	133	77	45	257	13	1483	435	NM	2.19	NM	Newberry Volcano/Unknown X
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 29	± 20	± NM	± 0.08	NM	
35-DS-557	1479	1	B	53	14	139	60	42	200	10	1007	326	NM	1.65	NM	McKay Butte
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	A	44	10	134	59	38	204	8	1252	356	NM	1.85	NM	McKay Butte
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	B	44	15	127	56	37	192	10	1319	439	NM	1.93	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	C	40	17	120	48	35	181	9	1152	338	NM	1.77	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	D	46	18	129	55	41	188	4	1135	378	NM	1.83	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	E	47	16	125	51	34	186	6	1156	367	NM	1.83	NM	McKay Butte
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	F	43	15	119	51	35	186	11	1022	361	NM	1.74	NM	McKay Butte
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± 25	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	G	53	16	131	57	41	199	10	1010	338	NM	1.65	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 25	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	H	44	16	128	55	39	185	8	1166	363	NM	1.82	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	I	47	20	112	65	37	232	9	1350	411	NM	2.11	NM	Unknown X
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	J	41	19	127	56	38	191	8	1257	362	NM	1.89	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	K	53	14	111	69	35	232	12	1494	421	NM	2.15	NM	Unknown X
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	L	42	17	122	53	37	188	10	1069	365	NM	1.74	NM	McKay Butte
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± 25	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	M	43	15	121	52	39	180	7	1134	369	NM	1.81	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	N	46	14	124	56	38	193	9	1170	391	NM	1.81	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	O	52	15	117	70	40	237	9	1369	426	NM	2.10	NM	Unknown X
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	P	50	18	133	58	39	198	10	1485	378	NM	1.98	NM	McKay Butte/Unknown X
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	Q	35	14	124	52	36	183	10	1426	361	NM	1.87	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 28	± 20	± NM	± 0.08	NM	
35-DS-557	1492	1	R	42	17	130	55	39	189	8	1151	372	NM	1.81	NM	McKay Butte
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-557	1492	1	S	48 ± 5	19 ± 3	129 ± 4	53 ± 3	38 ± 2	192 ± 5	9 ± 3	1167 ± 25	369 ± 20	NM ± NM	1.80 ± 0.08	NM NM	McKay Butte
35-DS-557	1492	1	T	73 ± 6	15 ± 3	117 ± 4	69 ± 3	39 ± 2	241 ± 5	8 ± 3	1376 ± 26	427 ± 20	NM ± NM	2.16 ± 0.08	NM NM	Unknown X
35-DS-557	1492	1	U	48 ± 6	13 ± 4	133 ± 4	60 ± 3	40 ± 2	204 ± 5	9 ± 3	1216 ± 26	355 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte
35-DS-557	1492	1	V	46 ± 5	18 ± 3	123 ± 4	55 ± 3	38 ± 2	188 ± 5	10 ± 3	1193 ± 25	343 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte
35-DS-557	1492	1	W	46 ± 6	19 ± 3	138 ± 4	59 ± 3	38 ± 2	202 ± 5	8 ± 3	1090 ± 25	375 ± 20	NM ± NM	1.70 ± 0.08	NM NM	McKay Butte
35-DS-557	1492	1	X	41 ± 6	17 ± 3	127 ± 4	54 ± 3	37 ± 2	190 ± 5	9 ± 3	1171 ± 28	359 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte
35-DS-557	1492	1	Y	45 ± 6	15 ± 3	117 ± 4	54 ± 3	34 ± 2	187 ± 5	7 ± 3	1116 ± 26	351 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte
35-DS-557	1492	3	—	43 ± 6	16 ± 3	108 ± 4	65 ± 3	38 ± 2	222 ± 5	11 ± 3	1251 ± 29	431 ± 20	NM ± NM	2.13 ± 0.08	NM NM	McKay Butte/Unknown X
35-DS-557	1518	1	A	45 ± 6	15 ± 3	117 ± 4	53 ± 3	38 ± 2	181 ± 5	10 ± 3	1441 ± 27	407 ± 20	NM ± NM	1.96 ± 0.08	NM NM	McKay Butte
35-DS-557	1518	1	B	45 ± 6	12 ± 3	130 ± 4	55 ± 3	37 ± 2	191 ± 5	7 ± 3	1156 ± 27	370 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte
35-DS-557	1518	1	C	54 ± 6	16 ± 3	123 ± 4	70 ± 3	42 ± 2	247 ± 5	11 ± 3	1398 ± 26	420 ± 20	NM ± NM	2.13 ± 0.08	NM NM	Unknown X
35-DS-557	1518	1	D	39 ± 6	17 ± 3	110 ± 4	68 ± 3	41 ± 2	237 ± 5	12 ± 3	1544 ± 31	427 ± 20	NM ± NM	2.20 ± 0.08	NM NM	Unknown X
35-DS-557	1518	1	E	50 ± 5	18 ± 3	115 ± 4	72 ± 3	39 ± 2	243 ± 5	9 ± 3	1497 ± 26	438 ± 20	NM ± NM	2.22 ± 0.08	NM NM	Unknown X
35-DS-557	1518	1	F	50 ± 5	17 ± 3	131 ± 4	56 ± 3	38 ± 2	192 ± 5	9 ± 3	1191 ± 25	365 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte
35-DS-557	1518	1	G	46 ± 6	18 ± 3	116 ± 4	68 ± 3	37 ± 2	235 ± 5	10 ± 3	1451 ± 28	414 ± 20	NM ± NM	2.14 ± 0.08	NM NM	Unknown X
35-DS-557	1518	1	H	46 ± 5	21 ± 3	118 ± 4	72 ± 3	37 ± 2	242 ± 5	9 ± 3	1384 ± 26	416 ± 20	NM ± NM	2.15 ± 0.08	NM NM	Unknown X
35-DS-557	1518	1	I	39 ± 6	20 ± 3	122 ± 4	53 ± 3	39 ± 2	188 ± 5	7 ± 3	1100 ± 26	363 ± 20	NM ± NM	1.80 ± 0.08	NM NM	McKay Butte
35-DS-557	1518	1	J	50 ± 6	15 ± 3	118 ± 4	69 ± 3	37 ± 2	234 ± 5	11 ± 3	1410 ± 26	457 ± 20	NM ± NM	2.15 ± 0.08	NM NM	Unknown X
35-DS-557	1518	1	K	44 ± 5	13 ± 3	127 ± 4	53 ± 3	37 ± 2	188 ± 5	10 ± 3	1185 ± 25	346 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte
35-DS-557	1518	1	L	39 ± 6	13 ± 3	128 ± 4	56 ± 3	36 ± 2	190 ± 5	10 ± 3	1105 ± 28	373 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte
35-DS-557	1518	1	M	46 ± 6	10 ± 4	121 ± 4	54 ± 3	37 ± 2	188 ± 5	9 ± 3	1160 ± 26	359 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte
35-DS-557	1518	1	N	40 ± 6	13 ± 3	127 ± 4	56 ± 3	38 ± 2	190 ± 5	10 ± 3	1084 ± 26	368 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	1518	1	O	57 ± 5	17 ± 3	132 ± 4	55 ± 3	39 ± 2	192 ± 5	8 ± 3	1223 ± 26	556 ± 20	NM ± NM	1.95 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	1	P	39 ± 6	18 ± 3	118 ± 4	53 ± 3	37 ± 2	181 ± 5	9 ± 3	1154 ± 28	365 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	1	Q	47 ± 6	17 ± 3	122 ± 4	52 ± 3	40 ± 2	186 ± 5	6 ± 3	1131 ± 27	367 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	1	R	44 ± 6	13 ± 3	122 ± 4	54 ± 3	37 ± 2	183 ± 5	5 ± 3	1124 ± 26	358 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	1	S	39 ± 6	14 ± 3	120 ± 4	54 ± 3	35 ± 2	181 ± 5	9 ± 3	1057 ± 25	390 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	1	T	49 ± 6	20 ± 3	118 ± 4	68 ± 3	39 ± 2	242 ± 5	10 ± 3	1520 ± 26	455 ± 20	NM ± NM	2.24 ± 0.08	NM NM	Unknown X	
35-DS-557	1518	1	U	58 ± 6	22 ± 3	125 ± 4	72 ± 3	40 ± 2	246 ± 5	10 ± 3	1273 ± 27	413 ± 20	NM ± NM	2.06 ± 0.08	NM NM	Unknown X	
35-DS-557	1518	1	V	40 ± 6	15 ± 3	127 ± 4	56 ± 3	42 ± 2	190 ± 5	9 ± 3	1261 ± 30	399 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	1	W	52 ± 6	15 ± 3	129 ± 4	54 ± 3	39 ± 2	199 ± 5	10 ± 3	1045 ± 25	330 ± 20	NM ± NM	1.64 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	1	X	54 ± 6	24 ± 3	129 ± 4	53 ± 3	37 ± 2	192 ± 5	10 ± 3	1149 ± 26	437 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	1	Y	40 ± 6	18 ± 3	132 ± 4	55 ± 3	36 ± 2	191 ± 5	10 ± 3	1115 ± 26	351 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte	
35-DS-557	1518	3	—	35 ± 6	14 ± 3	117 ± 4	47 ± 3	34 ± 2	172 ± 5	7 ± 3	1060 ± 27	335 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte?	
35-DS-557	1518	4	—	43 ± 6	18 ± 3	121 ± 4	54 ± 3	37 ± 2	183 ± 5	8 ± 3	1088 ± 26	369 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-557	1520	1	A	54 ± 6	21 ± 3	127 ± 4	73 ± 3	40 ± 2	246 ± 5	8 ± 3	1487 ± 26	454 ± 20	NM ± NM	2.21 ± 0.08	NM NM	Unknown X	
35-DS-557	1520	1	B	42 ± 6	17 ± 3	123 ± 4	52 ± 3	35 ± 2	184 ± 5	9 ± 3	1143 ± 27	347 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	1520	1	C	49 ± 5	16 ± 3	122 ± 4	51 ± 3	35 ± 2	188 ± 5	8 ± 3	1141 ± 26	380 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	1520	1	D	56 ± 6	18 ± 3	113 ± 4	68 ± 3	40 ± 2	238 ± 5	10 ± 3	1369 ± 26	434 ± 20	NM ± NM	2.21 ± 0.08	NM NM	Unknown X	
35-DS-557	1520	1	E	55 ± 6	16 ± 4	133 ± 4	56 ± 3	39 ± 2	191 ± 5	8 ± 3	1183 ± 30	368 ± 20	NM ± NM	1.89 ± 0.08	NM NM	McKay Butte	
35-DS-557	1520	1	F	42 ± 6	16 ± 3	130 ± 4	55 ± 3	36 ± 2	193 ± 5	11 ± 3	1133 ± 25	366 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-DS-557	1520	1	G	52 ± 6	15 ± 4	147 ± 4	58 ± 3	44 ± 2	210 ± 5	9 ± 3	1259 ± 28	384 ± 20	NM ± NM	1.91 ± 0.08	NM NM	McKay Butte	
35-DS-557	1520	1	H	42 ± 6	20 ± 3	127 ± 4	54 ± 3	40 ± 2	196 ± 5	8 ± 3	1231 ± 28	417 ± 20	NM ± NM	1.91 ± 0.08	NM NM	McKay Butte	
35-DS-557	1520	1	I	41 ± 6	20 ± 3	124 ± 4	53 ± 3	36 ± 2	186 ± 5	11 ± 3	1200 ± 28	383 ± 20	NM ± NM	1.89 ± 0.08	NM NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	1520	1	J	42 ± 6	16 ± 3	130 ± 4	57 ± 3	35 ± 2	194 ± 5	8 ± 3	1185 ± 26	367 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	K	46 ± 6	22 ± 3	131 ± 4	58 ± 3	39 ± 2	198 ± 5	9 ± 3	1215 ± 26	417 ± 20	NM ± NM	1.93 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	L	40 ± 6	18 ± 3	124 ± 4	53 ± 3	40 ± 2	188 ± 5	9 ± 3	1097 ± 25	343 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	M	49 ± 6	20 ± 3	142 ± 4	62 ± 3	42 ± 2	207 ± 5	10 ± 3	1276 ± 27	387 ± 20	NM ± NM	1.99 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	N	43 ± 6	18 ± 3	128 ± 4	51 ± 3	40 ± 2	191 ± 5	8 ± 3	1070 ± 24	342 ± 20	NM ± NM	1.69 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	O	48 ± 6	19 ± 3	128 ± 4	56 ± 3	37 ± 2	192 ± 5	11 ± 3	1076 ± 25	382 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	P	54 ± 6	23 ± 3	137 ± 4	58 ± 3	42 ± 2	200 ± 5	8 ± 3	1635 ± 29	397 ± 20	NM ± NM	2.10 ± 0.08	NM	McKay Butte/Unknown X?	
35-DS-557	1520	1	Q	45 ± 6	20 ± 3	128 ± 4	56 ± 3	38 ± 2	195 ± 5	8 ± 3	1320 ± 27	371 ± 20	NM ± NM	1.96 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	R	64 ± 6	25 ± 3	131 ± 4	81 ± 3	45 ± 2	262 ± 5	7 ± 3	1431 ± 29	434 ± 20	NM ± NM	2.22 ± 0.08	NM	Newberry Volcano	
35-DS-557	1520	1	S	69 ± 6	17 ± 3	110 ± 4	29 ± 3	50 ± 2	314 ± 5	14 ± 3	1096 ± 26	418 ± 20	NM ± NM	1.89 ± 0.08	NM	Silver Lake/Sycan Marsh?	
35-DS-557	1520	1	T	47 ± 6	16 ± 3	132 ± 4	59 ± 3	37 ± 2	200 ± 5	11 ± 3	1189 ± 25	427 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	U	53 ± 5	15 ± 3	124 ± 4	52 ± 3	38 ± 2	188 ± 5	8 ± 3	1204 ± 27	380 ± 20	NM ± NM	1.88 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	V	56 ± 6	17 ± 3	133 ± 4	58 ± 3	40 ± 2	201 ± 5	11 ± 3	1101 ± 26	403 ± 20	NM ± NM	1.73 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	W	61 ± 6	20 ± 3	122 ± 4	71 ± 3	42 ± 2	251 ± 5	8 ± 3	1285 ± 28	412 ± 20	NM ± NM	2.09 ± 0.08	NM	Newberry Volcano/Unknown X	
35-DS-557	1520	1	X	49 ± 6	19 ± 3	131 ± 4	59 ± 3	37 ± 2	199 ± 5	11 ± 3	1147 ± 25	392 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-557	1520	1	Y	61 ± 6	19 ± 4	135 ± 4	60 ± 3	41 ± 2	206 ± 5	8 ± 3	1184 ± 26	387 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-557	1520	3	—	38 ± 6	20 ± 3	131 ± 4	56 ± 3	38 ± 2	193 ± 5	9 ± 3	1390 ± 26	347 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-557	1526	3	—	51 ± 6	18 ± 3	114 ± 4	74 ± 3	42 ± 2	245 ± 5	10 ± 3	1470 ± 25	433 ± 20	NM ± NM	2.17 ± 0.08	NM	Unknown X	
35-DS-557	1526	4	—	47 ± 6	13 ± 3	126 ± 4	54 ± 3	37 ± 2	184 ± 5	8 ± 3	1246 ± 27	360 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-557	1534	3	—	49 ± 6	18 ± 3	121 ± 4	53 ± 3	33 ± 2	184 ± 5	10 ± 3	1181 ± 27	333 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-557	1534	4	—	46 ± 6	19 ± 3	112 ± 4	65 ± 3	38 ± 2	234 ± 5	9 ± 3	1392 ± 27	421 ± 20	NM ± NM	2.17 ± 0.08	NM	Unknown X	
35-DS-557	1547	2	—	42 ± 6	16 ± 3	115 ± 4	50 ± 3	34 ± 2	177 ± 5	9 ± 3	1070 ± 25	332 ± 20	NM ± NM	1.71 ± 0.08	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*										Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	
35-DS-557	1553	4	—	49 ± 6	12 ± 3	129 ± 4	56 ± 3	38 ± 2	191 ± 5	7 ± 3	1294 ± 26	345 ± 20	NM ± NM	1.89 ± 0.08	NM NM	McKay Butte
35-DS-557	1560	2	—	47 ± 5	15 ± 3	121 ± 4	52 ± 3	38 ± 2	184 ± 5	6 ± 3	1157 ± 27	352 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte
35-DS-557	1570	1	A	51 ± 6	18 ± 3	128 ± 4	59 ± 3	42 ± 2	276 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1570	1	B	49 ± 6	12 ± 3	124 ± 4	57 ± 3	36 ± 2	188 ± 5	10 ± 3	1587 ± 29	347 ± 20	NM ± NM	2.00 ± 0.08	NM NM	McKay Butte/Unknown X?
35-DS-557	1570	1	C	58 ± 6	18 ± 3	135 ± 4	58 ± 3	44 ± 2	282 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1570	1	D	52 ± 6	18 ± 3	135 ± 4	64 ± 3	43 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1570	1	E	62 ± 6	19 ± 4	148 ± 4	64 ± 3	43 ± 2	290 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1570	1	F	63 ± 6	24 ± 3	149 ± 5	67 ± 3	47 ± 2	302 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1570	1	G	54 ± 6	14 ± 4	138 ± 4	60 ± 3	40 ± 2	286 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1570	1	H	51 ± 6	11 ± 4	123 ± 4	53 ± 3	41 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1570	1	I	48 ± 6	18 ± 3	130 ± 4	60 ± 3	45 ± 2	278 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1570	1	J	57 ± 6	23 ± 3	138 ± 4	63 ± 3	44 ± 2	290 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1571	1	A	52 ± 6	18 ± 3	135 ± 4	60 ± 3	44 ± 2	287 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1571	1	B	41 ± 6	16 ± 3	123 ± 4	54 ± 3	35 ± 2	186 ± 5	6 ± 3	1159 ± 25	358 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte
35-DS-557	1571	1	C	49 ± 6	16 ± 3	135 ± 4	64 ± 3	43 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1571	1	D	53 ± 6	17 ± 3	130 ± 4	58 ± 3	41 ± 2	195 ± 5	8 ± 3	1271 ± 26	330 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte
35-DS-557	1571	1	E	51 ± 6	15 ± 3	128 ± 4	57 ± 3	36 ± 2	191 ± 5	9 ± 3	1249 ± 28	407 ± 20	NM ± NM	1.87 ± 0.08	NM NM	McKay Butte
35-DS-557	1571	1	F	48 ± 6	13 ± 3	123 ± 4	54 ± 3	39 ± 2	251 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X
35-DS-557	1571	1	G	41 ± 6	15 ± 3	121 ± 4	54 ± 3	37 ± 2	183 ± 5	9 ± 3	1076 ± 29	338 ± 20	NM ± NM	1.70 ± 0.08	NM NM	McKay Butte
35-DS-557	1571	1	H	44 ± 6	18 ± 3	138 ± 4	60 ± 3	41 ± 2	200 ± 5	10 ± 3	1705 ± 29	341 ± 20	NM ± NM	2.01 ± 0.08	NM NM	McKay Butte/Unknown X?
35-DS-557	1571	1	I	55 ± 6	18 ± 3	133 ± 4	62 ± 3	43 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-DS-557	1571	1	J	59 ± 6	16 ± 3	139 ± 4	62 ± 3	45 ± 2	204 ± 5	10 ± 3	1112 ± 27	335 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-557	1585	1	—	52 ± 6	15 ± 3	126 ± 4	57 ± 3	40 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	1586	1	—	90 ± 6	20 ± 3	115 ± 4	10 ± 3	50 ± 2	330 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-557	1587	1	—	64 ± 6	19 ± 3	112 ± 4	41 ± 3	51 ± 2	345 ± 5	15 ± 3	1842 ± 30	565 ± 20	NM ± NM	2.53 ± 0.08	NM	Big Obsidian Flow
35-DS-557	1588	1	—	62 ± 7	21 ± 4	140 ± 5	64 ± 3	43 ± 2	279 ± 5	15 ± 3	2253 ± 34	400 ± 20	NM ± NM	2.00 ± 0.08	NM	Newberry Volcano
35-DS-557	1590	1	—	43 ± 6	15 ± 3	119 ± 4	54 ± 3	39 ± 2	254 ± 5	12 ± 3	2181 ± 28	406 ± 20	NM ± NM	1.95 ± 0.08	NM	Newberry Volcano?
35-DS-557	1591	2	—	53 ± 6	14 ± 3	126 ± 4	55 ± 3	41 ± 2	198 ± 5	8 ± 3	1309 ± 26	319 ± 20	NM ± NM	1.69 ± 0.08	NM	McKay Butte
35-DS-557	1592	1	—	53 ± 6	16 ± 3	112 ± 4	66 ± 3	39 ± 2	233 ± 5	9 ± 3	1409 ± 27	425 ± 20	NM ± NM	2.20 ± 0.08	NM	Unknown X
35-DS-557	1592	2	—	40 ± 6	19 ± 3	125 ± 4	54 ± 3	35 ± 2	179 ± 5	9 ± 3	1102 ± 31	352 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte
35-DS-557	1641	1	—	74 ± 5	19 ± 3	114 ± 4	11 ± 3	49 ± 2	310 ± 5	16 ± 3	1148 ± 26	671 ± 20	NM ± NM	2.03 ± 0.08	NM	Silver Lake/Sycan Marsh
35-DS-557	1653	2	—	50 ± 6	17 ± 3	137 ± 4	59 ± 3	44 ± 2	282 ± 5	16 ± 3	1607 ± 28	454 ± 20	NM ± NM	2.18 ± 0.08	NM	Newberry Volcano
35-DS-557	1718	2	—	41 ± 6	18 ± 3	124 ± 4	54 ± 3	35 ± 2	185 ± 5	7 ± 3	1202 ± 27	365 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte
35-DS-557	1813	2	—	41 ± 6	16 ± 3	127 ± 4	54 ± 3	38 ± 2	192 ± 5	9 ± 3	1219 ± 26	395 ± 20	NM ± NM	1.88 ± 0.08	NM	McKay Butte
35-DS-557	1822	2	—	52 ± 6	21 ± 4	113 ± 4	65 ± 3	42 ± 2	233 ± 5	10 ± 3	1347 ± 27	423 ± 20	NM ± NM	2.17 ± 0.08	NM	Unknown X
35-DS-557	1834	5	—	79 ± 6	19 ± 4	106 ± 4	38 ± 3	53 ± 2	334 ± 5	14 ± 3	1505 ± 29	539 ± 20	NM ± NM	2.37 ± 0.08	NM	Big Obsidian Flow
35-DS-557	1837	3	—	48 ± 6	18 ± 3	112 ± 4	67 ± 3	39 ± 2	233 ± 5	9 ± 3	1325 ± 27	419 ± 20	NM ± NM	2.10 ± 0.08	NM	Unknown X
35-DS-557	1846	3	—	47 ± 6	17 ± 3	123 ± 4	52 ± 3	36 ± 2	186 ± 5	8 ± 3	1081 ± 28	375 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte
35-DS-557	1846	4	—	50 ± 6	14 ± 3	130 ± 4	54 ± 3	39 ± 2	188 ± 5	11 ± 3	1183 ± 26	371 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte
35-DS-557	1850	4	—	47 ± 6	19 ± 3	116 ± 4	71 ± 3	40 ± 2	242 ± 5	7 ± 3	1484 ± 28	439 ± 20	NM ± NM	2.24 ± 0.08	NM	Unknown X
35-DS-557	1850	5	—	62 ± 6	19 ± 3	124 ± 4	72 ± 3	40 ± 2	249 ± 5	10 ± 3	1387 ± 26	432 ± 20	NM ± NM	2.13 ± 0.08	NM	Unknown X
35-DS-557	1850	6	—	48 ± 6	22 ± 3	115 ± 4	67 ± 3	39 ± 2	236 ± 5	10 ± 3	1401 ± 26	440 ± 20	NM ± NM	2.18 ± 0.08	NM	Unknown X
35-DS-557	1859	1	A	48 ± 6	15 ± 3	108 ± 4	64 ± 3	35 ± 2	231 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1859	1	B	47 ± 6	16 ± 3	114 ± 4	73 ± 3	40 ± 2	237 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	1859	1	C	49 ± 6	15 ± 3	114 ± 4	67 ± 3	39 ± 2	235 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	D	48 ± 6	16 ± 3	136 ± 4	58 ± 3	39 ± 2	194 ± 5	10 ± 3	1169 ± 26	345 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	McKay Butte	
35-DS-557	1859	1	E	52 ± 5	18 ± 3	113 ± 4	72 ± 3	36 ± 2	237 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	F	44 ± 6	16 ± 3	115 ± 4	67 ± 3	39 ± 2	234 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	G	47 ± 6	18 ± 3	118 ± 4	71 ± 3	41 ± 2	236 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	H	47 ± 6	19 ± 3	115 ± 4	71 ± 3	39 ± 2	237 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	I	50 ± 6	14 ± 3	116 ± 4	69 ± 3	38 ± 2	237 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	J	50 ± 6	15 ± 3	114 ± 4	70 ± 3	36 ± 2	239 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	K	50 ± 6	18 ± 3	112 ± 4	68 ± 3	34 ± 2	225 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	L	47 ± 5	17 ± 3	112 ± 4	67 ± 3	38 ± 2	233 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	M	56 ± 5	20 ± 3	113 ± 4	67 ± 3	40 ± 2	241 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	N	47 ± 6	15 ± 3	113 ± 4	66 ± 3	39 ± 2	239 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	O	51 ± 6	15 ± 3	134 ± 4	58 ± 3	39 ± 2	198 ± 5	9 ± 3	1109 ± 24	343 ± 20	NM ± NM	1.72 ± 0.08	NM ± NM	McKay Butte	
35-DS-557	1859	1	P	55 ± 5	15 ± 3	135 ± 4	60 ± 3	40 ± 2	199 ± 5	7 ± 3	1096 ± 25	357 ± 20	NM ± NM	1.72 ± 0.08	NM ± NM	McKay Butte	
35-DS-557	1859	1	Q	48 ± 6	18 ± 3	116 ± 4	70 ± 3	36 ± 2	236 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	R	50 ± 5	15 ± 3	122 ± 4	52 ± 3	39 ± 2	186 ± 5	10 ± 3	1140 ± 25	355 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	McKay Butte	
35-DS-557	1859	1	S	51 ± 6	16 ± 3	113 ± 4	68 ± 3	40 ± 2	237 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	T	43 ± 6	18 ± 3	126 ± 4	54 ± 3	38 ± 2	193 ± 5	9 ± 3	1167 ± 26	368 ± 20	NM ± NM	1.87 ± 0.08	NM ± NM	McKay Butte	
35-DS-557	1859	1	U	49 ± 5	18 ± 3	112 ± 4	70 ± 3	39 ± 2	237 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	V	47 ± 6	14 ± 3	134 ± 4	60 ± 3	40 ± 2	201 ± 5	8 ± 3	1175 ± 26	365 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	McKay Butte	
35-DS-557	1859	1	W	44 ± 6	15 ± 3	118 ± 4	68 ± 3	39 ± 2	243 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	
35-DS-557	1859	1	X	45 ± 6	17 ± 3	114 ± 4	70 ± 3	41 ± 2	240 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-557	1859	1	Y	45	17	115	68	38	236	9	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1859	3	—	42	16	127	57	39	194	7	1197	372	NM	1.86	NM	McKay Butte	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM		
35-DS-557	1861	1	A	43	15	121	45	33	177	7	1041	355	NM	1.77	NM	McKay Butte	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	NM		
35-DS-557	1861	1	B	54	15	110	66	37	232	11	NM	NM	NM	NM	NM	Unknown X	
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	C	40	14	124	53	36	180	10	1080	351	NM	1.81	NM	McKay Butte	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	NM		
35-DS-557	1861	1	D	37	13	100	63	37	218	7	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	E	45	15	101	63	38	222	9	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	F	50	18	113	68	37	236	10	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	G	44	17	128	54	35	190	7	1210	361	NM	1.91	NM	McKay Butte	
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM		
35-DS-557	1861	1	H	52	18	114	70	37	237	11	NM	NM	NM	NM	NM	Unknown X	
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	I	55	19	135	58	35	203	10	1216	366	NM	1.88	NM	McKay Butte	
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM		
35-DS-557	1861	1	J	39	20	119	54	36	181	8	1133	343	NM	1.79	NM	McKay Butte	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM		
35-DS-557	1861	1	K	40	17	108	63	35	219	6	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	L	51	22	114	71	40	237	9	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	M	40	17	108	68	40	228	11	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	N	58	19	120	70	39	244	10	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	O	45	14	122	52	36	185	7	1099	351	NM	1.79	NM	McKay Butte	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM		
35-DS-557	1861	1	P	50	18	114	67	41	236	9	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	Q	45	15	104	67	38	227	12	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	R	40	15	124	51	37	183	10	1082	348	NM	1.79	NM	McKay Butte	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM		
35-DS-557	1861	1	S	49	19	116	66	40	236	9	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		
35-DS-557	1861	1	T	49	16	116	67	40	237	9	NM	NM	NM	NM	NM	Unknown X	
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	NM		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	1861	1	U	37 ± 6	18 ± 3	122 ± 4	52 ± 3	35 ± 2	186 ± 5	8 ± 3	1090 ± 26	346 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	
35-DS-557	1861	1	V	45 ± 6	17 ± 3	106 ± 4	67 ± 3	37 ± 2	226 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1861	1	W	49 ± 6	17 ± 3	121 ± 4	70 ± 3	38 ± 2	242 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1861	1	X	52 ± 6	19 ± 3	115 ± 4	69 ± 3	40 ± 2	237 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1861	1	Y	53 ± 5	18 ± 3	114 ± 4	67 ± 3	38 ± 2	240 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1861	4	—	48 ± 6	16 ± 3	116 ± 4	70 ± 3	40 ± 2	243 ± 5	10 ± 3	1389 ± 28	425 ± 20	NM ± NM	2.18 ± 0.08	NM NM	Unknown X	
35-DS-557	1861	6	—	52 ± 6	18 ± 3	116 ± 4	66 ± 3	38 ± 2	235 ± 5	10 ± 3	1415 ± 26	430 ± 20	NM ± NM	2.21 ± 0.08	NM NM	Unknown X	
35-DS-557	1861	7	—	48 ± 6	12 ± 4	109 ± 4	64 ± 3	37 ± 2	227 ± 5	7 ± 3	1166 ± 27	380 ± 20	NM ± NM	1.91 ± 0.08	NM NM	McKay Butte	
35-DS-557	1861	8	—	45 ± 6	16 ± 3	114 ± 4	68 ± 3	36 ± 2	243 ± 5	11 ± 3	1442 ± 26	422 ± 20	NM ± NM	2.17 ± 0.08	NM NM	Unknown X	
35-DS-557	1861	9	—	53 ± 6	14 ± 3	119 ± 4	71 ± 3	41 ± 2	240 ± 5	10 ± 3	1515 ± 27	432 ± 20	NM ± NM	2.25 ± 0.08	NM NM	Unknown X	
35-DS-557	1863	1	A	49 ± 6	18 ± 3	116 ± 4	66 ± 3	38 ± 2	233 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	B	39 ± 6	17 ± 3	107 ± 4	63 ± 3	38 ± 2	227 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	C	42 ± 6	17 ± 3	107 ± 4	66 ± 3	37 ± 2	229 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	D	52 ± 6	15 ± 3	111 ± 4	68 ± 3	39 ± 2	235 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	E	59 ± 6	19 ± 3	119 ± 4	74 ± 3	40 ± 2	244 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	F	51 ± 6	20 ± 3	122 ± 4	69 ± 3	43 ± 2	239 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	G	52 ± 5	18 ± 3	128 ± 4	54 ± 3	39 ± 2	192 ± 5	7 ± 3	1163 ± 25	331 ± 20	NM ± NM	1.72 ± 0.08	NM NM	McKay Butte	
35-DS-557	1863	1	H	61 ± 5	21 ± 3	112 ± 4	66 ± 3	40 ± 2	233 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	I	46 ± 6	15 ± 3	127 ± 4	52 ± 3	36 ± 2	190 ± 5	7 ± 3	1336 ± 27	353 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte	
35-DS-557	1863	1	J	60 ± 6	18 ± 3	120 ± 4	73 ± 3	41 ± 2	247 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	K	54 ± 6	16 ± 3	120 ± 4	70 ± 3	41 ± 2	246 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1863	1	L	56 ± 6	16 ± 3	118 ± 4	69 ± 3	41 ± 2	241 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	1863	1	M	47 ± 6	16 ± 3	111 ± 4	70 ± 3	40 ± 2	233 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X
35-DS-557	1863	1	N	55 ± 6	17 ± 3	128 ± 4	75 ± 3	43 ± 2	260 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-557	1863	1	O	51 ± 5	18 ± 3	115 ± 4	68 ± 3	38 ± 2	237 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1863	1	P	67 ± 6	19 ± 3	119 ± 4	71 ± 3	41 ± 2	250 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1863	1	Q	47 ± 6	16 ± 3	121 ± 4	71 ± 3	41 ± 2	242 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1863	1	R	40 ± 6	19 ± 3	109 ± 4	66 ± 3	37 ± 2	227 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1863	1	S	55 ± 6	15 ± 4	132 ± 4	57 ± 3	37 ± 2	198 ± 5	9 ± 3	1141 ± 28	329 ± 20	NM ± NM	1.74 ± 0.08	NM	McKay Butte	
35-DS-557	1863	1	T	43 ± 7	18 ± 4	134 ± 4	54 ± 3	41 ± 2	201 ± 5	12 ± 3	1019 ± 26	319 ± 20	NM ± NM	1.67 ± 0.08	NM	McKay Butte	
35-DS-557	1863	1	U	49 ± 6	19 ± 3	114 ± 4	67 ± 3	39 ± 2	233 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1863	1	V	75 ± 6	18 ± 3	136 ± 4	75 ± 3	41 ± 2	258 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X	
35-DS-557	1863	1	W	74 ± 6	20 ± 3	127 ± 4	77 ± 3	43 ± 2	255 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X	
35-DS-557	1863	1	X	54 ± 6	16 ± 3	116 ± 4	69 ± 3	39 ± 2	246 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1863	1	Y	55 ± 6	18 ± 3	124 ± 4	74 ± 3	41 ± 2	251 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-557	1865	3	—	49 ± 6	24 ± 3	124 ± 4	73 ± 3	41 ± 2	244 ± 5	11 ± 3	1519 ± 28	444 ± 20	NM ± NM	2.27 ± 0.08	NM	Unknown X	
35-DS-557	1866	2	—	50 ± 6	13 ± 3	113 ± 4	67 ± 3	40 ± 2	233 ± 5	10 ± 3	1436 ± 28	438 ± 20	NM ± NM	2.23 ± 0.08	NM	Unknown X	
35-DS-557	1867	4	—	44 ± 6	19 ± 3	110 ± 4	65 ± 3	38 ± 2	228 ± 5	10 ± 3	1356 ± 26	418 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X	
35-DS-557	1869	3	—	46 ± 6	18 ± 3	111 ± 4	67 ± 3	40 ± 2	236 ± 5	10 ± 3	1440 ± 27	430 ± 20	NM ± NM	2.19 ± 0.08	NM	Unknown X	
35-DS-557	1902	2	—	40 ± 6	15 ± 3	128 ± 4	51 ± 3	36 ± 2	188 ± 5	9 ± 3	1147 ± 27	356 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-557	1910	2	—	45 ± 5	20 ± 3	122 ± 4	52 ± 3	36 ± 2	189 ± 5	9 ± 3	1523 ± 27	346 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-557	1937	1	—	50 ± 6	16 ± 3	131 ± 4	54 ± 3	35 ± 2	196 ± 5	9 ± 3	1237 ± 27	382 ± 20	NM ± NM	1.90 ± 0.08	NM	McKay Butte	
35-DS-557	1944	2	—	45 ± 6	15 ± 3	116 ± 4	67 ± 3	37 ± 2	232 ± 5	9 ± 3	1366 ± 26	442 ± 20	NM ± NM	2.16 ± 0.08	NM	Unknown X	
35-DS-557	1945	3	—	46 ± 6	18 ± 3	115 ± 4	50 ± 3	35 ± 2	177 ± 5	4 ± 3	861 ± 25	295 ± 20	NM ± NM	1.53 ± 0.08	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	1972	1	A	48 ± 6	18 ± 3	130 ± 4	53 ± 3	37 ± 2	198 ± 5	9 ± 3	970 ± 26	348 ± 20	NM ± NM	1.63 ± 0.08	NM NM	McKay Butte	
35-DS-557	1972	1	B	47 ± 6	16 ± 4	140 ± 4	60 ± 3	41 ± 2	211 ± 5	10 ± 3	977 ± 28	311 ± 20	NM ± NM	1.57 ± 0.08	NM NM	McKay Butte	
35-DS-557	1972	1	C	56 ± 6	19 ± 3	139 ± 5	61 ± 3	39 ± 2	196 ± 5	10 ± 3	1219 ± 28	391 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	
35-DS-557	1972	1	D	58 ± 7	14 ± 4	121 ± 4	67 ± 3	42 ± 2	249 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1972	1	E	54 ± 6	17 ± 3	119 ± 4	73 ± 3	38 ± 2	245 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1972	1	F	54 ± 7	16 ± 4	142 ± 5	61 ± 3	39 ± 2	207 ± 5	7 ± 3	1272 ± 29	347 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-DS-557	1972	1	G	45 ± 6	21 ± 3	130 ± 4	56 ± 3	28 ± 2	192 ± 5	11 ± 3	1480 ± 27	356 ± 20	NM ± NM	1.96 ± 0.08	NM NM	McKay Butte/Unknown X?	
35-DS-557	1972	1	H	44 ± 6	16 ± 3	130 ± 4	53 ± 3	39 ± 2	189 ± 5	11 ± 3	1204 ± 26	548 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte	
35-DS-557	1972	1	I	51 ± 6	20 ± 3	109 ± 4	68 ± 3	38 ± 2	227 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-557	1972	1	J	47 ± 6	14 ± 3	124 ± 4	53 ± 3	35 ± 2	185 ± 5	9 ± 3	1114 ± 26	389 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	1972	1	K	41 ± 6	14 ± 3	125 ± 4	52 ± 3	37 ± 2	185 ± 5	11 ± 3	1191 ± 27	345 ± 20	NM ± NM	1.89 ± 0.08	NM NM	McKay Butte	
35-DS-557	1972	1	L	46 ± 6	19 ± 3	130 ± 4	55 ± 3	36 ± 2	193 ± 5	11 ± 3	1220 ± 25	376 ± 20	NM ± NM	1.92 ± 0.08	NM NM	McKay Butte	
35-DS-557	1972	1	M	45 ± 6	13 ± 4	116 ± 4	49 ± 3	33 ± 2	186 ± 5	10 ± 3	1568 ± 27	316 ± 20	NM ± NM	1.93 ± 0.08	NM NM	McKay Butte	
35-DS-557	1973	1	A	51 ± 6	18 ± 3	148 ± 4	60 ± 3	41 ± 2	205 ± 5	11 ± 3	1086 ± 25	433 ± 20	NM ± NM	1.70 ± 0.08	NM NM	McKay Butte	
35-DS-557	1975	1	A	53 ± 6	18 ± 3	135 ± 4	54 ± 3	40 ± 2	196 ± 5	10 ± 3	1104 ± 26	343 ± 20	NM ± NM	1.75 ± 0.08	NM NM	McKay Butte	
35-DS-557	1975	1	B	46 ± 6	15 ± 4	132 ± 4	56 ± 3	39 ± 2	198 ± 5	11 ± 3	1151 ± 27	331 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-DS-557	1975	1	C	56 ± 6	17 ± 3	134 ± 4	56 ± 3	39 ± 2	200 ± 5	12 ± 3	1003 ± 25	334 ± 20	NM ± NM	1.63 ± 0.08	NM NM	McKay Butte	
35-DS-557	1975	1	D	56 ± 6	16 ± 3	133 ± 4	59 ± 3	41 ± 2	203 ± 5	10 ± 3	1284 ± 29	367 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte	
35-DS-557	1975	1	E	50 ± 5	16 ± 3	129 ± 4	54 ± 3	38 ± 2	189 ± 5	8 ± 3	1085 ± 25	364 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte	
35-DS-557	1975	1	F	53 ± 6	15 ± 3	129 ± 4	56 ± 3	35 ± 2	186 ± 5	8 ± 3	1345 ± 30	409 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte	
35-DS-557	1977	1	A	44 ± 6	16 ± 3	125 ± 4	54 ± 3	39 ± 2	185 ± 5	12 ± 3	1066 ± 26	351 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-DS-557	1977	1	B	45 ± 5	15 ± 3	117 ± 4	51 ± 3	36 ± 2	182 ± 5	9 ± 3	1194 ± 26	351 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-557	1978	1	A	41 ± 6	14 ± 3	120 ± 4	52 ± 3	36 ± 2	187 ± 5	10 ± 3	1093 ± 25	352 ± 20	NM ± NM	1.74 ± 0.08	NM	McKay Butte
35-DS-557	1978	1	B	54 ± 6	19 ± 3	119 ± 4	70 ± 3	39 ± 2	240 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown X
35-DS-557	1978	1	C	37 ± 6	18 ± 3	129 ± 4	54 ± 3	35 ± 2	186 ± 5	5 ± 3	1191 ± 29	374 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte
35-DS-557	1992	5	—	43 ± 6	20 ± 3	117 ± 4	53 ± 3	36 ± 2	189 ± 5	8 ± 3	1167 ± 26	419 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte
35-DS-557	1994	1	—	42 ± 6	17 ± 3	121 ± 4	54 ± 3	36 ± 2	185 ± 5	9 ± 3	1502 ± 28	358 ± 20	NM ± NM	1.97 ± 0.08	NM	McKay Butte
35-DS-557	2009	2	—	53 ± 6	17 ± 3	132 ± 4	55 ± 3	36 ± 2	195 ± 5	8 ± 3	1347 ± 27	368 ± 20	NM ± NM	1.94 ± 0.08	NM	McKay Butte
35-DS-557	2009	3	—	50 ± 6	20 ± 3	118 ± 4	68 ± 3	38 ± 2	236 ± 5	10 ± 3	1566 ± 27	443 ± 20	NM ± NM	2.30 ± 0.08	NM	Unknown X
35-DS-557	2010	3	—	48 ± 6	16 ± 3	126 ± 4	52 ± 3	39 ± 2	185 ± 5	9 ± 3	1154 ± 25	348 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte
35-DS-557	2015	2	—	39 ± 6	15 ± 3	129 ± 4	55 ± 3	39 ± 2	195 ± 5	11 ± 3	1166 ± 27	361 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte
35-DS-557	2015	3	—	42 ± 6	15 ± 3	116 ± 4	50 ± 3	36 ± 2	174 ± 5	9 ± 3	1060 ± 30	338 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte
35-DS-557	2024	3	—	55 ± 6	16 ± 3	113 ± 4	71 ± 3	39 ± 2	239 ± 5	7 ± 3	1380 ± 27	411 ± 20	NM ± NM	2.14 ± 0.08	NM	Unknown X
35-DS-557	2032	2	—	37 ± 6	14 ± 4	126 ± 4	54 ± 3	39 ± 2	192 ± 5	13 ± 3	1259 ± 30	380 ± 20	NM ± NM	1.93 ± 0.08	NM	McKay Butte
35-DS-557	2032	3	—	44 ± 6	21 ± 3	125 ± 4	53 ± 3	37 ± 2	189 ± 5	11 ± 3	1283 ± 26	352 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte
35-DS-557	2037	3	—	39 ± 7	12 ± 4	130 ± 4	54 ± 3	40 ± 2	192 ± 5	12 ± 3	1188 ± 30	340 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte
35-DS-557	2041	5	—	35 ± 11	15 ± 6	119 ± 5	56 ± 4	34 ± 3	170 ± 6	4 ± 4	1114 ± 48	345 ± 22	NM ± NM	1.76 ± 0.08	NM	McKay Butte
35-DS-557	2042	1	—	41 ± 6	19 ± 3	126 ± 4	49 ± 3	36 ± 2	181 ± 5	9 ± 3	1227 ± 25	352 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte
35-DS-557	2049	3	—	47 ± 6	17 ± 3	125 ± 4	54 ± 3	36 ± 2	189 ± 5	8 ± 3	1174 ± 25	352 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte
35-DS-557	2049	4	—	45 ± 6	16 ± 3	119 ± 4	53 ± 3	39 ± 2	185 ± 5	8 ± 3	1178 ± 27	376 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte
35-DS-557	2054	3	—	47 ± 6	19 ± 3	129 ± 4	57 ± 3	41 ± 2	193 ± 5	6 ± 3	1108 ± 26	354 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	A	46 ± 6	15 ± 3	125 ± 4	51 ± 3	34 ± 2	188 ± 5	8 ± 3	1102 ± 27	377 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	B	52 ± 6	15 ± 3	117 ± 4	71 ± 3	39 ± 2	236 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown X
35-DS-557	2057	1	C	62 ± 6	19 ± 3	124 ± 4	54 ± 3	37 ± 2	195 ± 5	8 ± 3	964 ± 24	338 ± 20	NM ± NM	1.61 ± 0.08	NM	McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-557	2057	1	D	39 ± 6	14 ± 3	126 ± 4	52 ± 3	37 ± 2	190 ± 5	9 ± 3	1028 ± 25	354 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	E	36 ± 6	20 ± 3	125 ± 4	56 ± 3	37 ± 2	192 ± 5	11 ± 3	1076 ± 26	360 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	F	48 ± 6	17 ± 3	125 ± 4	52 ± 3	38 ± 2	184 ± 5	9 ± 3	1077 ± 27	372 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	G	40 ± 6	20 ± 3	113 ± 4	51 ± 3	37 ± 2	181 ± 5	11 ± 3	1056 ± 28	378 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	H	44 ± 6	15 ± 3	135 ± 4	56 ± 3	37 ± 2	194 ± 5	11 ± 3	1132 ± 29	385 ± 20	NM ± NM	1.95 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	I	40 ± 6	18 ± 3	129 ± 4	54 ± 3	36 ± 2	185 ± 5	9 ± 3	1182 ± 27	394 ± 20	NM ± NM	1.91 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	J	43 ± 6	13 ± 3	122 ± 4	50 ± 3	36 ± 2	184 ± 5	10 ± 3	1166 ± 26	381 ± 20	NM ± NM	1.86 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	K	57 ± 6	18 ± 3	111 ± 4	68 ± 3	39 ± 2	240 ± 5	8 ± 3	1237 ± 26	397 ± 20	NM ± NM	1.99 ± 0.08	NM	Unknown X
35-DS-557	2057	1	L	44 ± 6	16 ± 3	122 ± 4	53 ± 3	37 ± 2	183 ± 5	7 ± 3	1169 ± 26	355 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	M	44 ± 6	16 ± 3	124 ± 4	54 ± 3	38 ± 2	189 ± 5	7 ± 3	1094 ± 25	365 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	N	41 ± 6	15 ± 3	117 ± 4	50 ± 3	37 ± 2	179 ± 5	10 ± 3	1157 ± 29	355 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	O	52 ± 6	18 ± 3	124 ± 4	55 ± 3	40 ± 2	193 ± 5	9 ± 3	1064 ± 25	364 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	P	50 ± 6	20 ± 3	126 ± 4	54 ± 3	36 ± 2	192 ± 5	9 ± 3	1115 ± 26	359 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	Q	53 ± 6	15 ± 3	136 ± 4	60 ± 3	38 ± 2	196 ± 5	9 ± 3	1332 ± 27	381 ± 20	NM ± NM	1.96 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	R	37 ± 6	19 ± 3	134 ± 4	59 ± 3	38 ± 2	194 ± 5	8 ± 3	1195 ± 27	385 ± 20	NM ± NM	1.96 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	S	43 ± 6	22 ± 3	125 ± 4	55 ± 3	37 ± 2	191 ± 5	8 ± 3	1158 ± 27	380 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	T	46 ± 6	15 ± 4	128 ± 4	52 ± 3	38 ± 2	188 ± 5	10 ± 3	1138 ± 29	363 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	U	45 ± 6	13 ± 3	122 ± 4	51 ± 3	39 ± 2	189 ± 5	7 ± 3	1118 ± 26	363 ± 20	NM ± NM	1.88 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	V	45 ± 6	15 ± 3	132 ± 4	55 ± 3	37 ± 2	187 ± 5	10 ± 3	1143 ± 27	382 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	W	54 ± 6	14 ± 3	129 ± 4	55 ± 3	40 ± 2	195 ± 5	12 ± 3	977 ± 25	350 ± 20	NM ± NM	1.68 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	X	49 ± 5	15 ± 3	124 ± 4	54 ± 3	40 ± 2	193 ± 5	7 ± 3	1136 ± 26	370 ± 20	NM ± NM	1.86 ± 0.08	NM	McKay Butte
35-DS-557	2057	1	Y	51 ± 6	18 ± 3	126 ± 4	53 ± 3	38 ± 2	188 ± 5	10 ± 3	1199 ± 28	383 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	2058	1	A	40 ± 6	12 ± 3	125 ± 4	51 ± 3	39 ± 2	191 ± 5	5 ± 3	1078 ± 27	365 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	B	47 ± 6	16 ± 3	119 ± 4	53 ± 3	37 ± 2	186 ± 5	8 ± 3	1153 ± 28	363 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	C	45 ± 6	15 ± 3	118 ± 4	49 ± 3	36 ± 2	179 ± 5	7 ± 3	1020 ± 29	349 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	D	35 ± 8	12 ± 5	124 ± 4	51 ± 3	34 ± 2	186 ± 5	8 ± 3	1192 ± 31	356 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	E	39 ± 6	20 ± 3	128 ± 4	55 ± 3	39 ± 2	185 ± 5	8 ± 3	1109 ± 28	422 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	F	44 ± 6	15 ± 3	122 ± 4	51 ± 3	37 ± 2	189 ± 5	7 ± 3	1121 ± 28	358 ± 20	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	G	43 ± 6	14 ± 3	125 ± 4	55 ± 3	38 ± 2	191 ± 5	7 ± 3	1324 ± 26	372 ± 20	NM ± NM	1.93 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	H	44 ± 5	13 ± 3	120 ± 4	55 ± 3	38 ± 2	193 ± 5	7 ± 3	1120 ± 25	358 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	I	39 ± 6	16 ± 3	120 ± 4	51 ± 3	36 ± 2	182 ± 5	8 ± 3	1114 ± 26	362 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	J	48 ± 5	17 ± 3	125 ± 4	54 ± 3	37 ± 2	185 ± 5	10 ± 3	1119 ± 26	361 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	K	46 ± 6	17 ± 3	123 ± 4	53 ± 3	39 ± 2	186 ± 5	7 ± 3	1155 ± 27	358 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	L	38 ± 6	15 ± 3	119 ± 4	51 ± 3	37 ± 2	183 ± 5	9 ± 3	1103 ± 25	343 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	M	44 ± 6	14 ± 3	122 ± 4	52 ± 3	36 ± 2	181 ± 5	6 ± 3	1104 ± 26	353 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	N	41 ± 6	14 ± 3	119 ± 4	55 ± 3	38 ± 2	186 ± 5	10 ± 3	1114 ± 25	333 ± 20	NM ± NM	1.75 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	O	45 ± 6	20 ± 3	129 ± 4	56 ± 3	38 ± 2	193 ± 5	11 ± 3	1117 ± 26	377 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	P	44 ± 5	17 ± 3	123 ± 4	55 ± 3	36 ± 2	193 ± 5	7 ± 3	1071 ± 25	363 ± 20	NM ± NM	1.77 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	Q	47 ± 6	12 ± 3	127 ± 4	54 ± 3	35 ± 2	188 ± 5	9 ± 3	1112 ± 27	362 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	R	47 ± 6	15 ± 3	121 ± 4	55 ± 3	36 ± 2	181 ± 5	6 ± 3	1161 ± 27	365 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	S	48 ± 6	18 ± 3	129 ± 4	57 ± 3	38 ± 2	194 ± 5	9 ± 3	1220 ± 27	379 ± 20	NM ± NM	1.90 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	T	46 ± 6	12 ± 3	138 ± 4	59 ± 3	38 ± 2	196 ± 5	10 ± 3	1213 ± 26	361 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	U	47 ± 5	15 ± 3	118 ± 4	55 ± 3	36 ± 2	183 ± 5	8 ± 3	1093 ± 26	344 ± 20	NM ± NM	1.77 ± 0.08	NM NM	McKay Butte	
35-DS-557	2058	1	V	40 ± 6	14 ± 3	120 ± 4	54 ± 3	38 ± 2	184 ± 5	4 ± 3	1171 ± 28	367 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	2058	1	W	46 ± 6	18 ± 3	120 ± 4	53 ± 3	35 ± 2	190 ± 5	8 ± 3	1146 ± 27	367 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte	
35-DS-557	2058	1	X	49 ± 6	18 ± 3	135 ± 4	57 ± 3	41 ± 2	198 ± 5	14 ± 3	1189 ± 25	347 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-557	2058	1	Y	49 ± 6	18 ± 3	120 ± 4	51 ± 3	34 ± 2	182 ± 5	10 ± 3	1038 ± 26	386 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-DS-557	2058	7	—	49 ± 6	19 ± 3	125 ± 4	52 ± 3	36 ± 2	188 ± 5	8 ± 3	1192 ± 27	360 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte	
35-DS-557	2058	8	—	41 ± 6	16 ± 3	120 ± 4	54 ± 3	38 ± 2	184 ± 5	9 ± 3	1139 ± 25	363 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	A	35 ± 6	16 ± 3	120 ± 4	52 ± 3	35 ± 2	183 ± 5	8 ± 3	1062 ± 26	349 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	B	49 ± 6	20 ± 3	118 ± 4	51 ± 3	35 ± 2	183 ± 5	8 ± 3	1157 ± 27	367 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	C	40 ± 5	18 ± 3	118 ± 4	50 ± 3	35 ± 2	182 ± 5	11 ± 3	1006 ± 24	337 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	D	45 ± 6	13 ± 3	111 ± 4	66 ± 3	40 ± 2	232 ± 5	9 ± 3	1364 ± 27	442 ± 20	NM ± NM	2.24 ± 0.08	NM	Unknown X	
35-DS-557	2059	1	E	54 ± 5	18 ± 3	126 ± 4	57 ± 3	36 ± 2	190 ± 5	8 ± 3	1115 ± 25	363 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	F	39 ± 6	15 ± 3	125 ± 4	54 ± 3	39 ± 2	184 ± 5	8 ± 3	1218 ± 26	388 ± 20	NM ± NM	1.91 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	G	56 ± 5	18 ± 3	128 ± 4	56 ± 3	39 ± 2	193 ± 5	9 ± 3	1170 ± 26	350 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	H	45 ± 6	18 ± 3	125 ± 4	55 ± 3	37 ± 2	189 ± 5	7 ± 3	1150 ± 26	354 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	I	43 ± 6	13 ± 3	121 ± 4	51 ± 3	36 ± 2	186 ± 5	12 ± 3	1057 ± 26	359 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	J	39 ± 6	16 ± 3	124 ± 4	53 ± 3	38 ± 2	187 ± 5	9 ± 3	1116 ± 27	351 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	K	48 ± 6	12 ± 4	130 ± 4	56 ± 3	38 ± 2	192 ± 5	10 ± 3	1208 ± 28	394 ± 20	NM ± NM	1.93 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	L	41 ± 6	17 ± 3	121 ± 4	49 ± 3	35 ± 2	184 ± 5	10 ± 3	1084 ± 26	357 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	M	43 ± 6	16 ± 3	123 ± 4	53 ± 3	39 ± 2	182 ± 5	8 ± 3	1192 ± 29	368 ± 20	NM ± NM	1.86 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	N	47 ± 5	20 ± 3	128 ± 4	51 ± 3	38 ± 2	190 ± 5	10 ± 3	1079 ± 25	364 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	O	45 ± 6	19 ± 3	114 ± 4	49 ± 3	36 ± 2	179 ± 5	11 ± 3	1030 ± 26	357 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	P	42 ± 6	18 ± 3	122 ± 4	53 ± 3	37 ± 2	191 ± 5	11 ± 3	1110 ± 26	356 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-557	2059	1	Q	35 ± 6	19 ± 3	120 ± 4	55 ± 3	36 ± 2	187 ± 5	11 ± 3	1202 ± 27	358 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-557	2059	1	R	45 ± 6	13 ± 3	126 ± 4	56 ± 3	36 ± 2	194 ± 5	9 ± 3	1118 ± 26	379 ± 20	NM ± NM	1.87 ± 0.08	NM NM	McKay Butte
35-DS-557	2059	1	S	45 ± 6	13 ± 3	118 ± 4	45 ± 3	33 ± 2	174 ± 5	9 ± 3	995 ± 27	345 ± 20	NM ± NM	1.72 ± 0.08	NM NM	McKay Butte
35-DS-557	2059	1	T	45 ± 6	21 ± 3	127 ± 4	53 ± 3	34 ± 2	187 ± 5	9 ± 3	1175 ± 27	361 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte
35-DS-557	2059	1	U	48 ± 6	16 ± 3	128 ± 4	56 ± 3	38 ± 2	187 ± 5	9 ± 3	1107 ± 26	369 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte
35-DS-557	2059	1	V	44 ± 6	15 ± 3	126 ± 4	55 ± 3	39 ± 2	193 ± 5	11 ± 3	1151 ± 26	382 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte
35-DS-557	2059	1	W	51 ± 5	18 ± 3	130 ± 4	56 ± 3	39 ± 2	194 ± 5	9 ± 3	1137 ± 25	369 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte
35-DS-557	2059	1	X	47 ± 6	14 ± 3	125 ± 4	54 ± 3	36 ± 2	183 ± 5	8 ± 3	1123 ± 26	360 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte
35-DS-557	2059	1	Y	40 ± 6	13 ± 3	132 ± 4	53 ± 3	37 ± 2	195 ± 5	7 ± 3	1124 ± 27	393 ± 20	NM ± NM	1.87 ± 0.08	NM NM	McKay Butte
35-DS-557	2068	4	—	53 ± 6	18 ± 3	124 ± 4	56 ± 3	39 ± 2	186 ± 5	8 ± 3	1258 ± 27	378 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte
35-DS-557	2068	5	—	46 ± 6	14 ± 3	126 ± 4	55 ± 3	40 ± 2	193 ± 5	9 ± 3	1202 ± 26	362 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte
35-DS-557	2093	2	—	45 ± 6	18 ± 3	116 ± 4	67 ± 3	38 ± 2	239 ± 5	8 ± 3	1365 ± 28	419 ± 20	NM ± NM	2.16 ± 0.08	NM NM	Unknown X
35-DS-557	2094	2	—	44 ± 6	15 ± 3	117 ± 4	53 ± 3	36 ± 2	179 ± 5	7 ± 3	1084 ± 28	350 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte
35-DS-557	2095	1	—	42 ± 6	14 ± 3	120 ± 4	56 ± 3	37 ± 2	186 ± 5	9 ± 3	1099 ± 25	337 ± 20	NM ± NM	1.74 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	A	45 ± 6	18 ± 3	121 ± 4	54 ± 3	39 ± 2	178 ± 5	10 ± 3	1147 ± 28	402 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	B	42 ± 6	14 ± 3	126 ± 4	48 ± 3	38 ± 2	184 ± 5	6 ± 3	1146 ± 30	376 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	C	48 ± 6	18 ± 3	126 ± 4	57 ± 3	39 ± 2	193 ± 5	11 ± 3	1221 ± 27	371 ± 20	NM ± NM	1.90 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	D	42 ± 6	15 ± 3	123 ± 4	55 ± 3	37 ± 2	189 ± 5	7 ± 3	1139 ± 28	375 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	E	50 ± 5	18 ± 3	125 ± 4	56 ± 3	36 ± 2	194 ± 5	10 ± 3	1168 ± 25	353 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	F	51 ± 6	15 ± 3	118 ± 4	51 ± 3	38 ± 2	185 ± 5	10 ± 3	1111 ± 28	354 ± 20	NM ± NM	1.74 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	G	41 ± 6	15 ± 3	125 ± 4	55 ± 3	36 ± 2	189 ± 5	7 ± 3	1149 ± 28	412 ± 20	NM ± NM	1.89 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	H	58 ± 6	18 ± 3	136 ± 4	57 ± 3	39 ± 2	198 ± 5	10 ± 3	1179 ± 28	366 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte
35-DS-557	2108	1	I	40 ± 6	17 ± 3	121 ± 4	52 ± 3	37 ± 2	186 ± 5	9 ± 3	1054 ± 26	344 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-DS-557	2108	1	J	40 ± 6	14 ± 3	126 ± 4	52 ± 3	37 ± 2	185 ± 5	7 ± 3	1167 ± 26	354 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	K	47 ± 6	14 ± 3	129 ± 4	57 ± 3	39 ± 2	196 ± 5	8 ± 3	1032 ± 26	327 ± 20	NM ± NM	1.65 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	L	44 ± 6	17 ± 3	130 ± 4	56 ± 3	39 ± 2	193 ± 5	9 ± 3	1148 ± 27	379 ± 20	NM ± NM	1.87 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	M	48 ± 6	17 ± 3	126 ± 4	54 ± 3	37 ± 2	190 ± 5	11 ± 3	1085 ± 29	377 ± 20	NM ± NM	1.88 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	N	33 ± 6	16 ± 3	126 ± 4	54 ± 3	37 ± 2	187 ± 5	11 ± 3	1189 ± 27	360 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	O	48 ± 6	17 ± 3	128 ± 4	56 ± 3	37 ± 2	189 ± 5	11 ± 3	1326 ± 28	375 ± 20	NM ± NM	1.97 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	P	42 ± 6	18 ± 3	126 ± 4	55 ± 3	39 ± 2	189 ± 5	9 ± 3	1226 ± 27	367 ± 20	NM ± NM	1.91 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	Q	50 ± 6	16 ± 3	135 ± 4	53 ± 3	42 ± 2	190 ± 5	8 ± 3	1242 ± 29	412 ± 20	NM ± NM	1.95 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	R	46 ± 5	16 ± 3	125 ± 4	55 ± 3	39 ± 2	185 ± 5	10 ± 3	1154 ± 26	363 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	S	44 ± 6	13 ± 3	121 ± 4	52 ± 3	39 ± 2	187 ± 5	7 ± 3	1208 ± 26	356 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-557	2108	1	T	41 ± 6	20 ± 3	133 ± 4	54 ± 3	39 ± 2	190 ± 5	8 ± 3	1313 ± 29	384 ± 20	NM ± NM	1.98 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	A	38 ± 6	18 ± 3	121 ± 4	55 ± 3	39 ± 2	183 ± 5	7 ± 3	1158 ± 26	365 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	B	40 ± 6	17 ± 3	125 ± 4	54 ± 3	40 ± 2	185 ± 5	11 ± 3	1384 ± 27	364 ± 20	NM ± NM	1.96 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	C	31 ± 6	19 ± 3	125 ± 4	54 ± 3	37 ± 2	191 ± 5	6 ± 3	1156 ± 27	360 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	D	41 ± 6	19 ± 3	124 ± 4	52 ± 3	36 ± 2	187 ± 5	8 ± 3	1096 ± 26	346 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	E	55 ± 6	17 ± 3	130 ± 4	56 ± 3	39 ± 2	194 ± 5	11 ± 3	1156 ± 26	379 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	F	40 ± 6	14 ± 3	120 ± 4	52 ± 3	38 ± 2	185 ± 5	8 ± 3	1196 ± 26	379 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	G	40 ± 6	16 ± 3	129 ± 4	51 ± 3	36 ± 2	184 ± 5	11 ± 3	1088 ± 25	377 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	H	45 ± 6	16 ± 3	119 ± 4	51 ± 3	38 ± 2	183 ± 5	8 ± 3	1175 ± 27	370 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	I	46 ± 5	13 ± 3	121 ± 4	53 ± 3	38 ± 2	182 ± 5	6 ± 3	1161 ± 25	360 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	J	40 ± 6	16 ± 3	124 ± 4	51 ± 3	34 ± 2	189 ± 5	9 ± 3	1118 ± 27	375 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-DS-557	2110	1	K	49 ± 6	19 ± 3	128 ± 4	57 ± 3	39 ± 2	197 ± 5	12 ± 3	1134 ± 25	354 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	

C.1-106

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-557	2110	1	L	43 ± 5	15 ± 3	113 ± 4	50 ± 3	38 ± 2	179 ± 5	9 ± 3	1038 ± 25	341 ± 20	NM ± NM	1.70 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	1	M	35 ± 6	16 ± 3	125 ± 4	52 ± 3	36 ± 2	178 ± 5	6 ± 3	1220 ± 28	349 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	1	N	42 ± 6	21 ± 3	135 ± 4	52 ± 3	37 ± 2	191 ± 5	10 ± 3	1156 ± 26	396 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	1	O	40 ± 6	14 ± 3	124 ± 4	51 ± 3	37 ± 2	183 ± 5	8 ± 3	1158 ± 26	345 ± 20	NM ± NM	1.80 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	1	P	47 ± 5	16 ± 3	119 ± 4	48 ± 3	34 ± 2	178 ± 5	6 ± 3	1128 ± 26	413 ± 20	NM ± NM	1.77 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	1	Q	46 ± 6	14 ± 3	130 ± 4	51 ± 3	35 ± 2	193 ± 5	9 ± 3	1142 ± 26	370 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	1	R	43 ± 6	22 ± 3	134 ± 4	57 ± 3	39 ± 2	199 ± 5	8 ± 3	1213 ± 26	397 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	1	S	43 ± 6	13 ± 3	120 ± 4	52 ± 3	35 ± 2	181 ± 5	7 ± 3	1048 ± 26	355 ± 20	NM ± NM	1.75 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	1	T	42 ± 6	14 ± 3	130 ± 4	59 ± 3	40 ± 2	185 ± 5	8 ± 3	1254 ± 31	401 ± 20	NM ± NM	1.91 ± 0.08	NM NM	McKay Butte	
35-DS-557	2110	4	—	41 ± 6	14 ± 3	123 ± 4	54 ± 3	36 ± 2	190 ± 5	7 ± 3	1177 ± 25	347 ± 20	NM ± NM	1.80 ± 0.08	NM NM	McKay Butte	
35-DS-557	2113	1	A	50 ± 6	19 ± 3	131 ± 4	56 ± 3	41 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	2113	1	B	46 ± 6	18 ± 3	135 ± 4	57 ± 3	43 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	2113	1	C	54 ± 6	16 ± 3	134 ± 4	62 ± 3	44 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	2113	1	D	54 ± 5	16 ± 3	129 ± 4	57 ± 3	44 ± 2	266 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	2113	1	E	45 ± 5	17 ± 3	125 ± 4	53 ± 3	38 ± 2	186 ± 5	6 ± 3	1304 ± NA	378 ± NA	NM ± NM	1.90 ± NA	NM NM	McKay Butte	
35-DS-557	2113	1	F	62 ± 6	17 ± 3	125 ± 4	40 ± 3	48 ± 2	271 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-DS-557	2113	1	G	57 ± 6	21 ± 3	138 ± 4	59 ± 3	45 ± 2	285 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	2113	1	H	56 ± 6	19 ± 3	137 ± 4	60 ± 3	43 ± 2	281 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	2113	1	I	64 ± 6	22 ± 3	141 ± 4	64 ± 3	47 ± 2	294 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	2113	1	J	59 ± 6	17 ± 3	131 ± 4	57 ± 3	41 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-557	2117	2	—	39 ± 6	14 ± 4	83 ± 4	110 ± 3	16 ± 2	99 ± 5	4 ± 3	626 ± 23	325 ± 20	NM ± NM	1.05 ± 0.08	NM NM	Obsidian Cliffs	
35-DS-557	2117	3	—	42 ± 6	15 ± 3	121 ± 4	51 ± 3	36 ± 2	179 ± 5	9 ± 3	1164 ± 26	328 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>										Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	
35-DS-557	2117	4	—	33 ± 6	17 ± 3	116 ± 4	54 ± 3	34 ± 2	177 ± 5	10 ± 3	1098 ± 28	355 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte
35-DS-557	2125	2	—	76 ± 6	13 ± 4	131 ± 4	56 ± 3	35 ± 2	195 ± 5	9 ± 3	1176 ± 28	356 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte
35-DS-557	2136	3	—	42 ± 6	15 ± 3	124 ± 4	53 ± 3	36 ± 2	186 ± 5	8 ± 3	1241 ± 27	360 ± 20	NM ± NM	1.91 ± 0.08	NM	McKay Butte
35-DS-557	2171	1	—	47 ± 6	17 ± 3	124 ± 4	55 ± 3	38 ± 2	185 ± 5	12 ± 3	1125 ± 28	399 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte
35-DS-557	2210	3	—	48 ± 5	15 ± 3	121 ± 4	57 ± 3	40 ± 2	258 ± 5	18 ± 3	1422 ± 26	413 ± 20	NM ± NM	1.99 ± 0.08	NM	Newberry Volcano
35-DS-557	2213	1	A	52 ± 6	19 ± 3	130 ± 4	59 ± 3	42 ± 2	275 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	2213	1	B	61 ± 6	16 ± 4	130 ± 4	59 ± 3	42 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	2213	1	C	64 ± 6	21 ± 3	161 ± 4	69 ± 3	47 ± 2	297 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	2213	1	D	64 ± 6	17 ± 3	134 ± 4	59 ± 3	40 ± 2	202 ± 5	7 ± 3	1224 ± 28	330 ± 20	NM ± NM	1.67 ± 0.08	NM	McKay Butte
35-DS-557	2213	1	E	58 ± 6	20 ± 3	138 ± 4	59 ± 3	42 ± 2	273 ± 5	15 ± 3	1325 ± 30	378 ± 20	NM ± NM	1.98 ± 0.08	NM	Newberry Volcano
35-DS-557	2213	1	F	64 ± 7	18 ± 4	147 ± 5	65 ± 3	46 ± 2	290 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-557	2235	3	—	51 ± 6	14 ± 3	113 ± 4	70 ± 3	39 ± 2	233 ± 5	8 ± 3	1387 ± 27	444 ± 20	NM ± NM	2.17 ± 0.08	NM	Unknown X
35-DS-557	2236	1	—	47 ± 6	16 ± 3	118 ± 4	50 ± 3	36 ± 2	181 ± 5	10 ± 3	1066 ± 26	372 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte
35-DS-558	1	1	—	79 ± 6	16 ± 3	123 ± 4	58 ± 3	39 ± 2	172 ± 5	7 ± 3	862 ± 30	383 ± 20	NM ± NM	1.74 ± 0.08	NM	Quartz Mountain/McKay Butte
35-DS-558	2	1	—	54 ± 6	18 ± 3	133 ± 4	57 ± 3	45 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-558	3	1	A	69 ± 6	17 ± 3	127 ± 4	60 ± 3	41 ± 2	171 ± 5	7 ± 3	624 ± 28	392 ± 20	NM ± NM	2.06 ± 0.08	NM	Quartz Mountain
35-DS-558	3	1	B	70 ± 5	20 ± 3	132 ± 4	62 ± 3	43 ± 2	183 ± 5	8 ± 3	743 ± 26	343 ± 20	NM ± NM	1.63 ± 0.08	NM	Quartz Mountain
35-DS-558	3	1	C	65 ± 6	22 ± 3	128 ± 4	59 ± 3	40 ± 2	173 ± 5	6 ± 3	891 ± 30	393 ± 20	NM ± NM	1.95 ± 0.08	NM	Quartz Mountain/McKay Butte
35-DS-558	3	1	D	65 ± 6	21 ± 3	137 ± 4	61 ± 3	44 ± 2	184 ± 5	7 ± 3	762 ± 27	355 ± 20	NM ± NM	1.66 ± 0.08	NM	Quartz Mountain
35-DS-558	3	1	E	73 ± 6	20 ± 3	129 ± 4	61 ± 3	42 ± 2	176 ± 5	4 ± 3	692 ± 27	356 ± 20	NM ± NM	1.67 ± 0.08	NM	Quartz Mountain
35-DS-558	3	1	F	67 ± 5	15 ± 3	130 ± 4	61 ± 3	42 ± 2	175 ± 5	8 ± 3	755 ± 27	376 ± 20	NM ± NM	2.06 ± 0.08	NM	Quartz Mountain
35-DS-558	3	1	G	68 ± 6	24 ± 3	138 ± 4	65 ± 3	44 ± 2	180 ± 5	9 ± 3	600 ± 28	350 ± 20	NM ± NM	1.69 ± 0.08	NM	Quartz Mountain

C.1-108

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-558	3	1	H	77 ± 6	22 ± 3	140 ± 4	62 ± 3	46 ± 2	184 ± 5	11 ± 3	856 ± 31	375 ± 20	NM ± NM	1.80 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	4	1	A	61 ± 6	20 ± 3	129 ± 4	58 ± 3	39 ± 2	174 ± 5	8 ± 3	869 ± 27	369 ± 20	NM ± NM	1.65 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	4	1	B	68 ± 6	19 ± 3	129 ± 4	56 ± 3	39 ± 2	175 ± 5	11 ± 3	744 ± 29	365 ± 20	NM ± NM	1.68 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	4	1	C	75 ± 6	21 ± 3	135 ± 4	63 ± 3	45 ± 2	182 ± 5	8 ± 3	928 ± 29	355 ± 20	NM ± NM	1.56 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	4	1	D	66 ± 6	22 ± 3	130 ± 5	62 ± 3	43 ± 2	186 ± 5	8 ± 3	803 ± 31	338 ± 20	NM ± NM	1.61 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	4	1	E	77 ± 7	23 ± 4	156 ± 5	72 ± 3	48 ± 2	201 ± 5	6 ± 3	772 ± 35	341 ± 21	NM ± NM	1.68 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	4	1	F	92 ± 6	25 ± 3	140 ± 5	72 ± 3	41 ± 2	187 ± 5	10 ± 3	1210 ± 33	326 ± 20	NM ± NM	1.58 ± 0.08	NM NM	McKay Butte	
35-DS-558	4	1	G	64 ± 5	20 ± 3	132 ± 4	61 ± 3	40 ± 2	177 ± 5	6 ± 3	1010 ± 27	340 ± 20	NM ± NM	1.66 ± 0.08	NM NM	McKay Butte	
35-DS-558	9	2	—	68 ± 6	20 ± 3	133 ± 4	57 ± 3	46 ± 2	182 ± 5	8 ± 3	637 ± 27	333 ± 20	NM ± NM	1.60 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	A	81 ± 6	21 ± 3	154 ± 5	68 ± 3	48 ± 2	186 ± 5	6 ± 3	593 ± 29	335 ± 20	NM ± NM	1.63 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	B	89 ± 6	27 ± 3	158 ± 5	72 ± 3	47 ± 2	192 ± 5	7 ± 3	745 ± 29	336 ± 20	NM ± NM	1.61 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	13	1	C	67 ± 6	21 ± 3	132 ± 4	62 ± 3	44 ± 2	178 ± 5	7 ± 3	870 ± 29	369 ± 20	NM ± NM	1.77 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	13	1	D	74 ± 6	24 ± 3	148 ± 5	67 ± 3	44 ± 2	187 ± 5	5 ± 3	632 ± 29	317 ± 20	NM ± NM	1.55 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	E	86 ± 7	25 ± 4	150 ± 5	66 ± 3	43 ± 2	193 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	13	1	F	75 ± 7	20 ± 4	142 ± 5	67 ± 3	45 ± 2	188 ± 5	8 ± 3	860 ± 35	320 ± 20	NM ± NM	1.56 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	13	1	G	91 ± 7	27 ± 4	156 ± 5	67 ± 3	44 ± 2	200 ± 5	8 ± 3	569 ± 39	303 ± 21	NM ± NM	1.49 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	H	86 ± 6	11 ± 4	135 ± 4	70 ± 3	39 ± 2	178 ± 5	8 ± 3	1617 ± 33	458 ± 20	NM ± NM	1.82 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-558	13	1	I	81 ± 6	22 ± 3	141 ± 4	62 ± 3	40 ± 2	181 ± 5	10 ± 3	734 ± 29	371 ± 20	NM ± NM	1.76 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	J	68 ± 6	18 ± 3	137 ± 4	63 ± 3	42 ± 2	180 ± 5	8 ± 3	687 ± 27	342 ± 20	NM ± NM	1.64 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	K	73 ± 5	17 ± 3	142 ± 4	61 ± 3	44 ± 2	182 ± 5	6 ± 3	588 ± 26	315 ± 20	NM ± NM	1.55 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	L	65 ± 6	21 ± 3	135 ± 4	60 ± 3	42 ± 2	179 ± 5	6 ± 3	749 ± 28	351 ± 20	NM ± NM	1.69 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	M	71 ± 7	17 ± 4	147 ± 5	65 ± 3	44 ± 2	192 ± 5	9 ± 3	791 ± 31	336 ± 20	NM ± NM	1.67 ± 0.08	NM NM	Quartz Mountain/McKay Butte	

C.1-109

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-558	13	1	N	100 ± 7	22 ± 4	158 ± 5	70 ± 3	47 ± 2	203 ± 5	7 ± 3	683 ± 31	337 ± 20	NM ± NM	1.72 ± 0.08	NM NM	Quartz Mountain	
35-DS-558	13	1	O	73 ± 6	23 ± 3	135 ± 4	60 ± 3	46 ± 2	181 ± 5	8 ± 3	706 ± 29	360 ± 20	NM ± NM	1.76 ± 0.08	NM NM	Quartz Mountain	
35-DS-559	1	1	—	55 ± 6	18 ± 3	106 ± 4	24 ± 3	55 ± 2	291 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-DS-559	2	1	—	40 ± 6	14 ± 3	79 ± 4	102 ± 3	17 ± 2	95 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-DS-559	3	1	—	47 ± 6	16 ± 3	128 ± 4	56 ± 3	39 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-559	5	1	—	60 ± 6	20 ± 3	85 ± 4	105 ± 4	17 ± 2	100 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-DS-559	6	1	—	80 ± 6	19 ± 3	102 ± 4	38 ± 3	58 ± 2	133 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-DS-559	7	1	—	62 ± 6	23 ± 3	134 ± 4	60 ± 3	42 ± 2	179 ± 5	7 ± 3	655 ± 29	345 ± 20	NM ± NM	1.73 ± 0.08	NM NM	Quartz Mountain	
35-DS-559	8	1	—	57 ± 6	18 ± 3	132 ± 4	60 ± 3	44 ± 2	272 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-559	9	1	—	138 ± 6	20 ± 3	103 ± 4	3 ± 3	87 ± 2	600 ± 5	41 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown B	
35-DS-559	10	1	—	67 ± 5	19 ± 3	128 ± 4	58 ± 3	43 ± 2	182 ± 5	9 ± 3	966 ± 28	369 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-559	11	1	—	38 ± 5	16 ± 3	75 ± 4	102 ± 3	16 ± 2	94 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-DS-559	12	1	—	39 ± 6	13 ± 3	98 ± 4	67 ± 3	26 ± 2	105 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown C	
35-DS-559	14	1	—	56 ± 6	19 ± 3	127 ± 4	60 ± 3	39 ± 2	265 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-559	15	1	—	36 ± 6	17 ± 3	76 ± 4	101 ± 3	18 ± 2	93 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-DS-559	16	1	—	58 ± 7	16 ± 4	139 ± 5	63 ± 3	39 ± 2	211 ± 5	7 ± 3	1649 ± 39	370 ± 20	NM ± NM	2.01 ± 0.08	NM NM	McKay Butte	
35-DS-559	17	1	—	33 ± 6	14 ± 3	76 ± 4	98 ± 3	18 ± 2	93 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-DS-559	18	1	—	57 ± 6	18 ± 3	112 ± 4	67 ± 3	41 ± 2	239 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown D	
35-DS-559	20	1	—	64 ± 6	21 ± 3	137 ± 4	61 ± 3	42 ± 2	191 ± 5	8 ± 3	795 ± 27	316 ± 20	NM ± NM	1.58 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-559	21	1	—	98 ± 6	19 ± 3	128 ± 4	1 ± 4	105 ± 2	167 ± 5	39 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown E	
35-DS-559	22	1	—	50 ± 5	19 ± 3	133 ± 4	57 ± 3	42 ± 2	278 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-559	25	1	—	82 ± 6	22 ± 3	143 ± 5	61 ± 3	48 ± 2	183 ± 5	10 ± 3	709 ± 33	336 ± 20	NM ± NM	1.64 ± 0.08	NM NM	Quartz Mountain	

C.1-110

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-559	26	1	—	67 ± 6	19 ± 4	141 ± 5	60 ± 3	47 ± 2	290 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	27	1	—	58 ± 5	21 ± 3	130 ± 4	57 ± 3	43 ± 2	270 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	32	1	—	64 ± 6	19 ± 3	128 ± 4	55 ± 3	40 ± 2	174 ± 5	7 ± 3	776 ± 27	354 ± 20	NM ± NM	1.73 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-DS-559	34	2	A	70 ± 6	17 ± 3	143 ± 4	62 ± 3	44 ± 2	184 ± 5	8 ± 3	833 ± 28	331 ± 20	NM ± NM	1.69 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-DS-559	34	2	B	85 ± 6	20 ± 4	144 ± 5	63 ± 3	46 ± 2	186 ± 5	11 ± 3	737 ± 28	327 ± 20	NM ± NM	1.59 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-DS-559	34	2	C	75 ± 7	22 ± 4	135 ± 5	56 ± 3	42 ± 2	184 ± 5	9 ± 3	728 ± 32	328 ± 20	NM ± NM	1.60 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-DS-559	34	2	D	84 ± 7	24 ± 4	147 ± 5	69 ± 3	45 ± 2	190 ± 5	9 ± 3	689 ± 32	331 ± 20	NM ± NM	1.67 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-DS-559	35	2	A	74 ± 6	17 ± 4	143 ± 5	67 ± 3	47 ± 2	192 ± 5	10 ± 3	681 ± 30	345 ± 20	NM ± NM	1.71 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-DS-559	35	2	B	53 ± 5	17 ± 3	90 ± 4	27 ± 3	54 ± 2	97 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-DS-559	35	2	C	70 ± 7	24 ± 3	139 ± 5	69 ± 3	43 ± 2	182 ± 5	8 ± 3	727 ± 32	347 ± 20	NM ± NM	1.70 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-DS-559	35	3	—	39 ± 5	16 ± 3	72 ± 4	97 ± 3	15 ± 2	88 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-559	37	2	A	33 ± 6	18 ± 3	76 ± 4	99 ± 3	15 ± 2	91 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-559	37	2	B	62 ± 6	17 ± 3	140 ± 4	60 ± 3	43 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	37	2	C	56 ± 6	19 ± 3	138 ± 4	64 ± 3	42 ± 2	288 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	37	2	D	59 ± 6	21 ± 3	134 ± 4	65 ± 3	42 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	37	2	E	55 ± 6	18 ± 3	135 ± 4	58 ± 3	43 ± 2	273 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	37	2	F	52 ± 6	14 ± 4	138 ± 4	59 ± 3	44 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	37	2	G	60 ± 8	16 ± 4	137 ± 5	65 ± 3	44 ± 2	290 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	37	2	H	44 ± 7	15 ± 4	85 ± 4	114 ± 3	19 ± 2	100 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-559	37	2	I	38 ± 6	19 ± 3	83 ± 4	109 ± 3	16 ± 2	97 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-559	37	2	J	57 ± 6	17 ± 3	149 ± 5	67 ± 3	46 ± 2	297 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-559	37	2	K	44 ± 6	20 ± 3	82 ± 4	107 ± 3	19 ± 2	100 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs

C.1-111



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-559	38	2	A	58 ± 6	18 ± 3	134 ± 4	59 ± 3	46 ± 2	283 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-559	38	2	B	61 ± 7	21 ± 4	156 ± 5	66 ± 3	48 ± 2	301 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-559	41	3	—	40 ± 6	16 ± 3	78 ± 4	103 ± 3	16 ± 2	96 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-559	42	2	A	44 ± 5	16 ± 3	79 ± 4	103 ± 3	15 ± 2	91 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-559	42	2	B	61 ± 6	14 ± 3	131 ± 4	62 ± 3	47 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-559	42	2	C	48 ± 7	22 ± 3	129 ± 5	58 ± 3	45 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-559	45	2	A	51 ± 6	17 ± 3	83 ± 4	110 ± 3	19 ± 2	96 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-559	45	2	B	48 ± 7	18 ± 4	87 ± 4	118 ± 4	18 ± 2	102 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-559	45	2	C	54 ± 6	15 ± 4	89 ± 4	108 ± 4	15 ± 2	99 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-559	45	2	D	52 ± 7	23 ± 4	89 ± 4	124 ± 4	17 ± 2	101 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-559	45	2	E	57 ± 7	17 ± 4	92 ± 5	115 ± 4	17 ± 2	106 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-808	2	1	—	63 ± 6	22 ± 3	139 ± 5	61 ± 3	47 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	47	1	—	58 ± 6	21 ± 4	138 ± 5	61 ± 3	43 ± 2	281 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	175	1	A-A	58 ± 6	20 ± 4	125 ± 4	58 ± 3	43 ± 2	276 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	176	1	C-A	97 ± 8	16 ± 6	166 ± 5	67 ± 4	50 ± 2	305 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	176	1	F-C	66 ± 7	19 ± 4	150 ± 5	65 ± 3	44 ± 2	291 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	176	1	G-B	79 ± 7	14 ± 4	151 ± 5	68 ± 3	47 ± 2	299 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	177	2	B-A	59 ± 7	14 ± 4	133 ± 5	50 ± 3	42 ± 2	257 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	178	1	B-A	53 ± 7	19 ± 4	143 ± 5	63 ± 3	48 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	179	1	A-A	72 ± 7	27 ± 4	154 ± 5	65 ± 3	49 ± 2	296 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	180	1	A-A	70 ± 6	22 ± 4	151 ± 5	66 ± 3	48 ± 2	295 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	180	1	B-B	60 ± 7	20 ± 4	151 ± 5	64 ± 3	43 ± 2	290 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-112

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-808	180	1	C-C	93 ± 8	22 ± 4	159 ± 5	72 ± 3	46 ± 2	299 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	A	52 ± 6	18 ± 3	127 ± 4	55 ± 3	41 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	B	49 ± 6	18 ± 3	126 ± 4	55 ± 3	43 ± 2	269 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	C	51 ± 6	17 ± 3	132 ± 4	59 ± 3	40 ± 2	273 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	D	52 ± 6	16 ± 3	133 ± 4	59 ± 3	41 ± 2	271 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	E	55 ± 6	17 ± 4	137 ± 5	61 ± 3	43 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	F	55 ± 6	19 ± 3	137 ± 4	63 ± 3	44 ± 2	278 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	G	50 ± 6	19 ± 3	135 ± 4	57 ± 3	42 ± 2	280 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	H	63 ± 6	21 ± 3	146 ± 4	63 ± 3	46 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	I	54 ± 6	19 ± 4	132 ± 5	58 ± 3	43 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	J	59 ± 6	19 ± 3	142 ± 5	65 ± 3	45 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	K	62 ± 6	20 ± 3	136 ± 5	61 ± 3	45 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	L	58 ± 6	20 ± 4	139 ± 5	57 ± 3	43 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	M	65 ± 6	18 ± 4	129 ± 5	63 ± 3	47 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	N	69 ± 7	18 ± 4	149 ± 5	65 ± 3	48 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	395	1	O	57 ± 7	18 ± 4	144 ± 5	61 ± 3	44 ± 2	283 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	398	3	A	63 ± 6	19 ± 3	115 ± 4	50 ± 3	49 ± 2	340 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow	
35-DS-808	398	3	B	48 ± 6	19 ± 3	133 ± 4	59 ± 3	44 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	398	3	C	63 ± 7	21 ± 4	145 ± 5	64 ± 3	47 ± 2	288 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	398	4	A	49 ± 6	15 ± 3	127 ± 4	57 ± 3	39 ± 2	260 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	399	1	A	47 ± 6	17 ± 3	131 ± 4	57 ± 3	42 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-DS-808	399	1	B	67 ± 6	18 ± 3	128 ± 4	64 ± 3	42 ± 2	274 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	

C.1-113

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-808	399	1	C	60 ± 7	20 ± 4	137 ± 5	62 ± 3	39 ± 2	277 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	400	2	A	67 ± 6	15 ± 3	131 ± 4	57 ± 3	43 ± 2	273 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	401	1	A	59 ± 6	18 ± 3	130 ± 4	54 ± 3	42 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	401	1	B	48 ± 6	12 ± 3	116 ± 4	52 ± 3	37 ± 2	180 ± 5	9 ± 3	1283 ± 31	384 ± 20	NM ± NM	1.89 ± 0.08	NM ± NM	McKay Butte	
35-DS-808	401	1	C	49 ± 6	15 ± 3	131 ± 4	55 ± 3	43 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	401	1	D	46 ± 6	24 ± 3	146 ± 4	61 ± 3	45 ± 2	285 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	401	1	E	107 ± 7	21 ± 4	135 ± 5	12 ± 3	31 ± 2	359 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-808	401	1	F	55 ± 7	20 ± 4	134 ± 5	61 ± 3	43 ± 2	282 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	401	1	G	73 ± 7	18 ± 4	148 ± 5	69 ± 3	41 ± 2	209 ± 5	11 ± 3	1752 ± 46	347 ± 21	NM ± NM	1.85 ± 0.08	NM ± NM	McKay Butte	
35-DS-808	401	1	H	69 ± 6	24 ± 3	139 ± 5	62 ± 3	43 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	401	1	I	75 ± 7	24 ± 4	152 ± 5	62 ± 3	45 ± 2	292 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-808	401	1	J	122 ± 8	24 ± 4	129 ± 5	11 ± 3	55 ± 2	352 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-DS-809	1	1	A-A	47 ± 6	19 ± 3	121 ± 4	60 ± 3	40 ± 2	272 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-809	2	1	A-A	55 ± 6	15 ± 3	128 ± 4	61 ± 3	40 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-809	3	1	A-A	54 ± 6	17 ± 3	133 ± 4	63 ± 3	43 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-809	3	1	B-B	63 ± 6	25 ± 3	149 ± 5	61 ± 3	46 ± 2	301 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-809	5	1	A-A	50 ± 6	19 ± 3	135 ± 4	61 ± 3	42 ± 2	276 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-809	7	1	—	52 ± 5	16 ± 3	127 ± 4	53 ± 3	38 ± 2	195 ± 5	10 ± 3	1239 ± 33	377 ± 20	NM ± NM	1.89 ± 0.08	NM ± NM	McKay Butte	
35-DS-809	8	1	A	57 ± 6	18 ± 3	141 ± 4	67 ± 3	44 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-809	9	1	A	62 ± 6	21 ± 3	154 ± 5	68 ± 3	46 ± 2	296 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-809	10	1	A	56 ± 6	16 ± 3	125 ± 4	55 ± 3	39 ± 2	261 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-809	12	1	A	57 ± 7	20 ± 4	142 ± 5	61 ± 3	42 ± 2	187 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-114

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-809	13	1	A	52 ± 6	19 ± 3	135 ± 4	60 ± 3	39 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-865	1	1	—	42 ± 5	14 ± 3	76 ± 4	98 ± 3	18 ± 2	93 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-DS-865	2	1	—	81 ± 5	20 ± 3	94 ± 4	34 ± 3	56 ± 2	126 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-DS-865	3	1	—	76 ± 7	19 ± 4	139 ± 5	58 ± 3	47 ± 2	280 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-DS-865	4	1	A	85 ± 6	17 ± 3	124 ± 4	70 ± 3	41 ± 2	175 ± 5	8 ± 3	901 ± 28	364 ± 20	NM ± NM	1.76 ± 0.08	NM	Quartz Mountain/McKay Butte	
35-DS-865	5	1	A	60 ± 8	17 ± 4	161 ± 5	69 ± 4	45 ± 3	227 ± 5	12 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte	
35-DS-865	6	1	A	74 ± 8	23 ± 4	149 ± 5	49 ± 3	51 ± 2	289 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A	
35-DS-865	8	1	A	75 ± 7	23 ± 4	144 ± 5	68 ± 3	39 ± 2	211 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte	
35-DS-865	9	1	A	75 ± 7	19 ± 4	144 ± 5	71 ± 3	43 ± 2	188 ± 5	12 ± 3	898 ± 28	297 ± 20	NM ± NM	1.97 ± 0.08	NM	McKay Butte	
35-DS-865	10	1	A	83 ± 6	18 ± 3	139 ± 4	68 ± 3	46 ± 2	187 ± 5	10 ± 3	687 ± 29	354 ± 20	NM ± NM	1.73 ± 0.08	NM	Quartz Mountain	
35-DS-865	11	1	A	90 ± 6	23 ± 4	152 ± 5	73 ± 3	45 ± 2	196 ± 5	7 ± 3	1263 ± 28	352 ± 20	NM ± NM	1.93 ± 0.08	NM	McKay Butte	
35-DS-865	13	1	A	78 ± 5	21 ± 3	93 ± 4	36 ± 3	53 ± 2	124 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain	
35-DS-865	15	1	A	69 ± 5	21 ± 3	110 ± 4	39 ± 3	52 ± 2	337 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow	
35-DS-865	17	1	A	79 ± 6	26 ± 3	133 ± 4	69 ± 3	42 ± 2	179 ± 5	8 ± 3	1211 ± 29	345 ± 20	NM ± NM	1.93 ± 0.08	NM	McKay Butte	
35-DS-865	18	1	A	52 ± 6	19 ± 3	111 ± 4	69 ± 3	40 ± 2	237 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X	
35-DS-865	19	1	A	99 ± 8	24 ± 4	60 ± 4	212 ± 4	43 ± 2	358 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B	
35-DS-865	20	1	A	74 ± 6	22 ± 3	133 ± 4	62 ± 3	39 ± 2	179 ± 5	9 ± 3	778 ± 28	346 ± 20	NM ± NM	1.70 ± 0.08	NM	Quartz Mountain/McKay Butte	
35-DS-865	21	1	A	69 ± 5	21 ± 3	134 ± 4	58 ± 3	46 ± 2	179 ± 5	9 ± 3	667 ± NA	334 ± NA	NM ± NM	1.75 ± NA	NM	Quartz Mountain	
35-DS-865	23	1	A	78 ± 7	20 ± 4	63 ± 4	184 ± 4	39 ± 2	357 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B	
35-DS-865	24	1	A	79 ± 6	25 ± 3	148 ± 5	66 ± 3	50 ± 2	197 ± 5	10 ± 3	1156 ± NA	288 ± NA	NM ± NM	1.66 ± NA	NM	McKay Butte	
35-DS-865	25	1	A	88 ± 6	16 ± 3	84 ± 4	70 ± 3	67 ± 2	367 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C	
35-DS-865	26	1	A	48 ± 6	18 ± 3	142 ± 4	58 ± 3	39 ± 2	210 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-865	27	1	A	69 ± 5	18 ± 3	131 ± 4	59 ± 3	41 ± 2	177 ± 5	8 ± 3	1032 ± 29	350 ± 20	NM ± NM	1.90 ± 0.08	NM NM	McKay Butte	
35-DS-866	1	1	A	85 ± 6	26 ± 3	158 ± 5	71 ± 3	48 ± 2	198 ± 5	9 ± 3	993 ± 28	337 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-866	2	1	A	66 ± 6	19 ± 3	140 ± 4	60 ± 3	46 ± 2	187 ± 5	7 ± 3	881 ± 27	340 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-DS-866	3	1	A	91 ± 7	20 ± 4	149 ± 5	66 ± 3	48 ± 2	191 ± 5	9 ± 3	932 ± 33	336 ± 20	NM ± NM	1.74 ± 0.08	NM NM	McKay Butte	
35-DS-866	4	1	A	66 ± 5	19 ± 3	126 ± 4	57 ± 3	41 ± 2	175 ± 5	9 ± 3	883 ± 24	350 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte	
35-DS-866	5	1	—	79 ± 6	21 ± 3	143 ± 4	62 ± 3	47 ± 2	192 ± 5	9 ± 3	734 ± 27	329 ± 20	NM ± NM	1.69 ± 0.08	NM NM	Quartz Mountain	
35-DS-866	6	1	A	62 ± 5	21 ± 3	130 ± 4	58 ± 3	39 ± 2	175 ± 5	6 ± 3	808 ± 24	357 ± 20	NM ± NM	1.81 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-866	7	1	A	88 ± 7	23 ± 4	145 ± 5	64 ± 3	45 ± 2	183 ± 5	9 ± 3	813 ± 29	333 ± 20	NM ± NM	1.78 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-866	8	1	A	70 ± 5	19 ± 3	87 ± 4	34 ± 3	52 ± 2	123 ± 4	8 ± 3	517 ± 24	387 ± 20	NM ± NM	1.40 ± 0.08	NM NM	Cougar Mountain	
35-DS-866	9	1	A	76 ± 7	20 ± 3	100 ± 4	41 ± 3	52 ± 2	129 ± 5	11 ± 3	730 ± 30	344 ± 20	NM ± NM	1.35 ± 0.08	NM NM	Cougar Mountain	
35-DS-866	10	1	A	70 ± 6	22 ± 3	138 ± 4	65 ± 3	45 ± 2	188 ± 5	9 ± 3	1152 ± 26	360 ± 20	NM ± NM	1.88 ± 0.08	NM NM	McKay Butte	
35-DS-866	11	1	A	86 ± 6	22 ± 3	158 ± 4	70 ± 3	48 ± 2	196 ± 5	8 ± 3	806 ± 28	352 ± 20	NM ± NM	1.79 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-866	12	1	A	67 ± 5	18 ± 3	91 ± 4	34 ± 3	52 ± 2	122 ± 4	8 ± 3	367 ± 23	361 ± 20	NM ± NM	1.28 ± 0.08	NM NM	Cougar Mountain	
35-DS-866	13	1	A	69 ± 5	19 ± 3	91 ± 4	35 ± 3	54 ± 2	123 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-DS-866	13	1	B	129 ± 8	20 ± 4	104 ± 5	87 ± 3	75 ± 2	343 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-DS-866	13	1	C	70 ± 7	22 ± 4	116 ± 4	47 ± 3	57 ± 2	362 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Big Obsidian Flow	
35-DS-866	13	1	D	91 ± 7	22 ± 4	148 ± 5	65 ± 3	45 ± 2	186 ± 5	4 ± 3	934 ± 33	339 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-866	13	1	E	178 ± 8	24 ± 4	74 ± 4	21 ± 3	83 ± 2	441 ± 6	26 ± 3	1068 ± 36	728 ± 21	NM ± NM	2.16 ± 0.08	NM NM	Unknown B	
35-DS-866	14	1	A	81 ± 6	25 ± 3	125 ± 4	47 ± 3	57 ± 2	386 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Big Obsidian Flow	
35-DS-866	14	1	B	65 ± 6	21 ± 3	130 ± 4	62 ± 3	43 ± 2	175 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	McKay Butte	
35-DS-866	14	1	C	62 ± 6	22 ± 3	134 ± 4	65 ± 3	45 ± 2	177 ± 5	9 ± 3	1270 ± NA	365 ± NA	NM ± NM	2.03 ± NA	NM NM	McKay Butte	
35-DS-866	14	1	D	80 ± 6	18 ± 4	97 ± 4	36 ± 3	57 ± 2	132 ± 5	14 ± 3	1263 ± NA	341 ± NA	NM ± NM	1.86 ± NA	NM NM	Cougar Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-DS-866	14	1	E	102 ± 8	27 ± 3	136 ± 5	41 ± 3	62 ± 2	132 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-DS-866	14	1	F	92 ± 7	22 ± 4	152 ± 5	68 ± 3	48 ± 2	193 ± 5	9 ± 3	1086 ± 32	370 ± 20	NM ± NM	1.90 ± 0.08	NM ± NM	McKay Butte
35-DS-866	14	1	G	76 ± 7	25 ± 3	147 ± 4	62 ± 3	44 ± 2	186 ± 5	9 ± 3	846 ± 29	314 ± 20	NM ± NM	1.67 ± 0.08	NM ± NM	McKay Butte
35-DS-866	51	1	A	112 ± 8	29 ± 4	98 ± 5	77 ± 3	72 ± 2	407 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C
35-DS-917	22	2	A	50 ± 6	17 ± 3	127 ± 4	55 ± 3	36 ± 2	193 ± 5	5 ± 3	1218 ± 31	371 ± 20	NM ± NM	1.84 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	B	54 ± 6	17 ± 3	130 ± 4	56 ± 3	38 ± 2	191 ± 5	10 ± 3	1102 ± 31	372 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	C	58 ± 6	18 ± 3	131 ± 4	58 ± 3	40 ± 4	202 ± 6	11 ± 4	1344 ± 33	359 ± 20	NM ± NM	1.84 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	D	12 ± 6	NM ± 3	15 ± 5	NM ± 3	NM ± 2	NM ± 5	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not obsidian
35-DS-917	22	2	E	52 ± 6	17 ± 3	120 ± 4	69 ± 3	37 ± 2	247 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-917	22	2	F	49 ± 6	18 ± 3	132 ± 4	56 ± 3	41 ± 2	196 ± 5	8 ± 3	1163 ± 33	371 ± 20	NM ± NM	1.84 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	G	54 ± 6	19 ± 3	135 ± 4	61 ± 3	37 ± 2	208 ± 5	9 ± 3	1120 ± 30	350 ± 20	NM ± NM	1.68 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	H	54 ± 6	21 ± 3	149 ± 4	64 ± 3	42 ± 2	218 ± 5	12 ± 3	1098 ± 29	352 ± 20	NM ± NM	1.75 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	I	49 ± 5	16 ± 3	130 ± 4	55 ± 3	40 ± 2	198 ± 5	8 ± 3	1104 ± 30	360 ± 20	NM ± NM	1.78 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	J	45 ± 6	12 ± 3	121 ± 4	52 ± 3	36 ± 2	186 ± 5	9 ± 3	1146 ± 31	359 ± 20	NM ± NM	1.82 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	K	49 ± 6	23 ± 3	120 ± 4	69 ± 3	39 ± 2	242 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-917	22	2	L	53 ± 6	17 ± 4	132 ± 5	58 ± 3	41 ± 2	197 ± 5	8 ± 3	1403 ± 34	373 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	M	52 ± 6	23 ± 3	143 ± 4	64 ± 3	40 ± 2	207 ± 5	13 ± 3	1208 ± 30	366 ± 20	NM ± NM	1.78 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	N	69 ± 6	21 ± 3	125 ± 4	76 ± 3	40 ± 2	257 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-917	22	2	O	51 ± 6	20 ± 3	137 ± 4	62 ± 3	38 ± 2	199 ± 5	8 ± 3	1159 ± 29	345 ± 20	NM ± NM	1.69 ± 0.08	NM ± NM	McKay Butte
35-DS-917	22	2	P	66 ± 6	22 ± 3	127 ± 4	78 ± 3	42 ± 2	257 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-917	22	2	Q	65 ± 6	16 ± 4	132 ± 4	82 ± 3	43 ± 2	266 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown X
35-DS-917	25	2	A	45 ± 6	19 ± 3	131 ± 4	55 ± 3	37 ± 2	198 ± 5	7 ± 3	1314 ± 36	403 ± 20	NM ± NM	2.04 ± 0.08	NM ± NM	McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-917	25	2	B	49 ± 6	18 ± 3	128 ± 4	54 ± 3	40 ± 2	197 ± 5	11 ± 3	1406 ± 33	379 ± 20	NM ± NM	1.94 ± 0.08	NM NM	McKay Butte	
35-DS-917	25	2	C	55 ± 6	16 ± 3	113 ± 4	68 ± 3	38 ± 2	234 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-917	25	2	D	47 ± 5	18 ± 3	122 ± 4	58 ± 3	40 ± 2	191 ± 5	9 ± 3	1120 ± 29	360 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte	
35-DS-917	25	2	E	56 ± 6	19 ± 3	130 ± 4	58 ± 3	42 ± 2	199 ± 5	7 ± 3	1326 ± 32	389 ± 20	NM ± NM	1.91 ± 0.08	NM NM	McKay Butte	
35-DS-917	25	2	F	51 ± 5	20 ± 3	128 ± 4	55 ± 3	37 ± 2	191 ± 5	7 ± 3	1114 ± 29	367 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-917	25	2	G	52 ± 5	17 ± 3	127 ± 4	56 ± 3	39 ± 2	196 ± 5	11 ± 3	1198 ± 30	373 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-917	25	2	H	49 ± 6	23 ± 3	130 ± 4	57 ± 3	38 ± 2	190 ± 5	7 ± 3	1166 ± 33	365 ± 20	NM ± NM	1.75 ± 0.08	NM NM	McKay Butte	
35-DS-917	25	3	—	53 ± 5	18 ± 3	116 ± 4	67 ± 3	40 ± 2	237 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-917	25	4	—	35 ± 7	15 ± 4	117 ± 5	52 ± 3	35 ± 2	184 ± 5	7 ± 3	1399 ± 39	391 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	A	58 ± 5	18 ± 3	127 ± 4	60 ± 3	38 ± 2	193 ± 5	8 ± 3	1309 ± 33	396 ± 20	NM ± NM	1.87 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	B	46 ± 6	15 ± 3	128 ± 4	52 ± 3	36 ± 2	190 ± 5	9 ± 3	1054 ± 31	369 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	C	55 ± 6	22 ± 3	139 ± 4	58 ± 3	41 ± 2	204 ± 5	6 ± 3	987 ± 29	328 ± 20	NM ± NM	1.58 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	D	58 ± 6	16 ± 3	126 ± 4	58 ± 3	37 ± 2	196 ± 5	10 ± 3	1278 ± 31	336 ± 20	NM ± NM	1.67 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	E	43 ± 7	22 ± 3	135 ± 5	59 ± 3	43 ± 2	208 ± 5	14 ± 3	1072 ± 35	338 ± 20	NM ± NM	1.65 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	F	61 ± 6	19 ± 4	132 ± 5	57 ± 3	38 ± 2	200 ± 5	7 ± 3	891 ± 32	302 ± 20	NM ± NM	1.55 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-DS-917	214	2	G	69 ± 6	19 ± 4	145 ± 5	62 ± 3	41 ± 2	206 ± 5	10 ± 3	1206 ± 34	350 ± 20	NM ± NM	1.69 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	H	67 ± 7	20 ± 4	146 ± 5	65 ± 3	42 ± 2	206 ± 5	11 ± 3	1134 ± 37	377 ± 20	NM ± NM	1.78 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	I	78 ± 7	23 ± 4	153 ± 5	63 ± 3	39 ± 2	201 ± 5	5 ± 3	1378 ± 37	392 ± 21	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-DS-917	214	2	J	82 ± 7	19 ± 4	146 ± 5	61 ± 3	39 ± 2	204 ± 5	14 ± 3	1078 ± 39	360 ± 21	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-DS-917	215	2	B	45 ± 6	17 ± 3	118 ± 4	49 ± 3	35 ± 2	185 ± 5	10 ± 3	1212 ± 31	365 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-917	215	2	C	46 ± 6	15 ± 4	126 ± 4	54 ± 3	39 ± 2	190 ± 5	11 ± 3	1112 ± 30	354 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-DS-917	215	2	D	66 ± 6	15 ± 3	144 ± 5	59 ± 3	39 ± 2	198 ± 5	11 ± 3	973 ± 33	330 ± 20	NM ± NM	1.59 ± 0.08	NM NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-917	215	2	E	57 ± 6	17 ± 3	134 ± 4	62 ± 3	39 ± 2	201 ± 5	9 ± 3	1036 ± 29	346 ± 20	NM ± NM	1.67 ± 0.08	NM NM	McKay Butte	
35-DS-917	215	2	F	70 ± 6	19 ± 3	124 ± 4	69 ± 3	44 ± 2	242 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-917	215	2	G	55 ± 6	24 ± 3	137 ± 4	57 ± 3	42 ± 2	201 ± 5	14 ± 3	1395 ± 37	396 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-917	215	2	H	46 ± 6	16 ± 4	125 ± 4	55 ± 3	38 ± 2	185 ± 5	9 ± 3	1151 ± 32	371 ± 20	NM ± NM	1.80 ± 0.08	NM NM	McKay Butte	
35-DS-917	215	2	I	61 ± 7	12 ± 3	127 ± 5	51 ± 3	37 ± 2	191 ± 5	6 ± 3	1002 ± 33	342 ± 20	NM ± NM	1.66 ± 0.08	NM NM	McKay Butte	
35-DS-917	215	2	J	59 ± 6	21 ± 3	142 ± 5	61 ± 3	44 ± 2	205 ± 5	7 ± 3	1342 ± 34	363 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-DS-917	215	3	A	54 ± 6	13 ± 4	130 ± 4	58 ± 3	38 ± 2	197 ± 5	11 ± 3	903 ± 31	312 ± 20	NM ± NM	1.51 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	A	35 ± 6	17 ± 3	124 ± 4	52 ± 3	37 ± 2	186 ± 5	10 ± 3	1218 ± 33	358 ± 20	NM ± NM	1.77 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	B	51 ± 5	16 ± 3	112 ± 4	67 ± 3	40 ± 2	238 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-917	216	2	C	57 ± 6	26 ± 3	127 ± 5	51 ± 3	39 ± 2	185 ± 5	7 ± 3	918 ± 34	346 ± 20	NM ± NM	1.58 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	D	47 ± 6	16 ± 3	134 ± 4	54 ± 3	42 ± 2	189 ± 5	12 ± 3	1172 ± 33	352 ± 20	NM ± NM	1.75 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	E	54 ± 6	18 ± 3	139 ± 4	59 ± 3	40 ± 2	194 ± 5	8 ± 3	1119 ± 33	332 ± 20	NM ± NM	1.66 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	F	59 ± 7	23 ± 4	148 ± 5	64 ± 3	42 ± 2	213 ± 5	10 ± 3	1023 ± 33	327 ± 20	NM ± NM	1.63 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	G	55 ± 7	18 ± 4	138 ± 5	60 ± 3	42 ± 2	210 ± 5	10 ± 3	1003 ± 34	337 ± 20	NM ± NM	1.67 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	H	47 ± 8	15 ± 4	135 ± 5	57 ± 3	38 ± 2	201 ± 5	8 ± 3	1047 ± 36	327 ± 20	NM ± NM	1.61 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	I	59 ± 8	23 ± 4	146 ± 5	65 ± 3	47 ± 2	210 ± 5	12 ± 3	1109 ± 34	362 ± 20	NM ± NM	1.76 ± 0.08	NM NM	McKay Butte	
35-DS-917	216	2	J	68 ± 7	22 ± 4	147 ± 5	67 ± 3	43 ± 2	209 ± 5	8 ± 3	1171 ± 38	359 ± 21	NM ± NM	1.83 ± 0.08	NM NM	McKay Butte	
35-DS-917	217	2	A	48 ± 6	16 ± 3	128 ± 4	56 ± 3	39 ± 2	191 ± 5	10 ± 3	1092 ± 33	367 ± 20	NM ± NM	1.85 ± 0.08	NM NM	McKay Butte	
35-DS-917	217	2	B	42 ± 6	13 ± 4	119 ± 4	51 ± 3	37 ± 2	178 ± 5	7 ± 3	1047 ± 36	327 ± 20	NM ± NM	1.65 ± 0.08	NM NM	McKay Butte	
35-DS-917	217	2	C	43 ± 6	15 ± 3	126 ± 4	55 ± 3	39 ± 2	191 ± 5	7 ± 3	1058 ± 29	347 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	
35-DS-917	217	2	D	53 ± 6	19 ± 3	129 ± 4	54 ± 3	36 ± 2	189 ± 5	9 ± 3	1179 ± 34	384 ± 20	NM ± NM	1.84 ± 0.08	NM NM	McKay Butte	
35-DS-917	217	2	E	90 ± 8	20 ± 4	160 ± 5	83 ± 4	44 ± 3	272 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-917	217	2	F	72 ± 7	21 ± 4	140 ± 5	80 ± 3	47 ± 2	268 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-DS-917	217	2	G	52 ± 7	19 ± 4	132 ± 5	55 ± 3	39 ± 2	198 ± 5	7 ± 3	1070 ± 34	344 ± 20	NM ± NM	1.66 ± 0.08	NM	McKay Butte	
35-DS-917	217	2	H	61 ± 7	19 ± 4	137 ± 5	62 ± 3	43 ± 2	208 ± 5	10 ± 3	942 ± 31	323 ± 20	NM ± NM	1.56 ± 0.08	NM	McKay Butte	
35-DS-917	217	2	I	77 ± 6	22 ± 4	141 ± 5	59 ± 3	41 ± 2	202 ± 5	11 ± 3	977 ± 35	321 ± 20	NM ± NM	1.57 ± 0.08	NM	McKay Butte	
35-DS-917	217	2	J	62 ± 6	24 ± 3	133 ± 4	55 ± 3	39 ± 2	199 ± 5	9 ± 3	964 ± 34	314 ± 20	NM ± NM	1.49 ± 0.08	NM	McKay Butte	
35-DS-917	217	3	A	44 ± 6	14 ± 3	124 ± 4	56 ± 3	40 ± 2	193 ± 5	10 ± 3	1127 ± 34	354 ± 20	NM ± NM	1.69 ± 0.08	NM	McKay Butte	
35-DS-917	218	2	B	42 ± 6	17 ± 3	122 ± 4	53 ± 3	38 ± 2	187 ± 5	9 ± 3	1083 ± 31	365 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-917	218	2	C	46 ± 6	15 ± 3	127 ± 4	53 ± 3	35 ± 2	185 ± 5	6 ± 3	1589 ± 33	374 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	
35-DS-917	218	2	D	45 ± 6	19 ± 3	125 ± 4	53 ± 3	38 ± 2	189 ± 5	9 ± 3	1135 ± 31	363 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-DS-917	218	2	E	50 ± 6	117 ± 3	118 ± 4	66 ± 3	39 ± 2	244 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X		
35-DS-917	218	2	F	52 ± 6	19 ± 3	128 ± 4	55 ± 3	38 ± 2	192 ± 5	8 ± 3	1062 ± 31	361 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-DS-917	218	2	G	54 ± 7	20 ± 4	148 ± 5	60 ± 3	43 ± 2	214 ± 5	12 ± 3	1070 ± 33	341 ± 20	NM ± NM	1.63 ± 0.08	NM	McKay Butte	
35-DS-917	218	2	H	69 ± 7	21 ± 4	151 ± 5	63 ± 3	42 ± 2	206 ± 5	14 ± 3	1008 ± 34	316 ± 20	NM ± NM	1.59 ± 0.08	NM	McKay Butte	
35-DS-917	218	2	I	53 ± 5	19 ± 3	131 ± 4	54 ± 3	39 ± 2	198 ± 5	12 ± 3	1303 ± 32	363 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-917	218	2	J	42 ± 6	15 ± 3	120 ± 4	53 ± 3	36 ± 2	183 ± 5	10 ± 3	1056 ± 32	356 ± 20	NM ± NM	1.74 ± 0.08	NM	McKay Butte	
35-DS-917	218	3	A	35 ± 6	17 ± 3	121 ± 4	53 ± 3	38 ± 2	187 ± 5	9 ± 3	1054 ± 30	366 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-DS-917	219	2	A	59 ± 7	19 ± 4	146 ± 5	64 ± 3	40 ± 2	209 ± 5	11 ± 3	1127 ± 35	349 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-DS-917	219	2	B	69 ± 6	21 ± 3	136 ± 5	76 ± 3	45 ± 2	263 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Unknown X		
35-DS-917	219	2	C	63 ± 7	19 ± 4	148 ± 5	63 ± 3	44 ± 2	213 ± 5	7 ± 3	908 ± 34	347 ± 20	NM ± NM	1.63 ± 0.08	NM	McKay Butte	
35-DS-917	219	2	D	52 ± 6	17 ± 3	134 ± 4	56 ± 3	41 ± 2	195 ± 5	9 ± 3	1070 ± 30	361 ± 20	NM ± NM	1.73 ± 0.08	NM	McKay Butte	
35-DS-917	219	2	E	58 ± 6	19 ± 3	130 ± 5	55 ± 3	38 ± 2	195 ± 5	11 ± 3	987 ± 36	340 ± 20	NM ± NM	1.64 ± 0.08	NM	McKay Butte	
35-DS-917	219	2	F	86 ± 7	19 ± 4	158 ± 5	67 ± 3	43 ± 2	221 ± 5	8 ± 3	1156 ± 38	390 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-917	219	2	G	53 ± 6	20 ± 3	139 ± 4	55 ± 3	37 ± 2	199 ± 5	13 ± 3	1089 ± 33	362 ± 20	NM ± NM	1.76 ± 0.08	NM NM	McKay Butte	
35-DS-917	219	2	H	58 ± 6	22 ± 3	109 ± 4	67 ± 3	40 ± 2	229 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-917	219	2	I	46 ± 7	15 ± 4	137 ± 5	61 ± 3	43 ± 2	204 ± 5	10 ± 3	943 ± 32	315 ± 20	NM ± NM	1.58 ± 0.08	NM NM	McKay Butte	
35-DS-917	219	2	J	62 ± 8	15 ± 4	152 ± 5	63 ± 3	46 ± 2	210 ± 5	10 ± 3	1016 ± 38	321 ± 21	NM ± NM	1.57 ± 0.08	NM NM	McKay Butte	
35-DS-917	220	2	A	50 ± 6	19 ± 3	124 ± 4	54 ± 3	38 ± 2	188 ± 5	9 ± 3	1069 ± 32	364 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte	
35-DS-917	220	2	B	69 ± 6	17 ± 4	139 ± 5	61 ± 3	40 ± 2	208 ± 5	11 ± 3	1100 ± 34	356 ± 20	NM ± NM	1.72 ± 0.08	NM NM	McKay Butte	
35-DS-917	220	2	C	51 ± 6	21 ± 3	133 ± 4	57 ± 3	38 ± 2	191 ± 5	12 ± 3	1083 ± 33	361 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte	
35-DS-917	220	2	D	47 ± 7	19 ± 4	138 ± 5	56 ± 3	37 ± 2	201 ± 5	9 ± 3	1070 ± 36	336 ± 20	NM ± NM	1.74 ± 0.08	NM NM	McKay Butte	
35-DS-917	220	2	E	39 ± 6	16 ± 3	119 ± 4	56 ± 3	36 ± 2	189 ± 5	8 ± 3	1163 ± 31	371 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-DS-917	220	2	F	46 ± 6	11 ± 4	119 ± 4	55 ± 3	41 ± 2	188 ± 5	7 ± 3	1164 ± 35	348 ± 20	NM ± NM	1.74 ± 0.08	NM NM	McKay Butte	
35-DS-917	220	2	G	53 ± 7	20 ± 4	118 ± 5	74 ± 3	41 ± 2	254 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-917	220	2	H	58 ± 7	18 ± 4	122 ± 4	74 ± 3	41 ± 2	245 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown X	
35-DS-917	220	2	I	79 ± 8	24 ± 4	130 ± 5	79 ± 3	46 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano/Unknown X	
35-DS-917	220	2	J	63 ± 6	23 ± 3	141 ± 5	59 ± 3	42 ± 2	205 ± 5	8 ± 3	1004 ± 30	341 ± 20	NM ± NM	1.68 ± 0.08	NM NM	McKay Butte	
35-DS-917	221	2	A	54 ± 6	14 ± 4	134 ± 5	61 ± 3	39 ± 2	203 ± 5	12 ± 3	980 ± 28	341 ± 20	NM ± NM	1.61 ± 0.08	NM NM	McKay Butte	
35-DS-917	221	2	B	54 ± 6	22 ± 4	146 ± 5	62 ± 3	43 ± 2	213 ± 5	7 ± 3	936 ± 29	335 ± 20	NM ± NM	1.60 ± 0.08	NM NM	McKay Butte	
35-DS-917	221	2	C	66 ± 7	20 ± 4	147 ± 5	61 ± 3	39 ± 2	205 ± 5	9 ± 3	1093 ± 35	335 ± 20	NM ± NM	1.72 ± 0.08	NM NM	McKay Butte	
35-DS-917	222	2	A	69 ± 7	24 ± 4	151 ± 5	60 ± 3	42 ± 2	198 ± 5	15 ± 3	1116 ± 36	368 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte	
35-DS-983	2	1	—	58 ± 7	14 ± 4	145 ± 5	59 ± 3	46 ± 2	290 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-983	3	1	—	55 ± 8	20 ± 4	85 ± 5	112 ± 4	16 ± 2	98 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-DS-983	4	1	—	59 ± 6	21 ± 3	133 ± 4	56 ± 3	42 ± 2	275 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-DS-983	5	1	—	49 ± 6	13 ± 3	125 ± 4	56 ± 3	38 ± 2	189 ± 5	9 ± 3	1378 ± 31	368 ± 20	NM ± NM	2.02 ± 0.08	NM NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-983	6	1	—	59 ± 6	22 ± 3	139 ± 4	60 ± 3	38 ± 2	209 ± 5	7 ± 3	1759 ± 37	312 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-DS-983	7	1	—	55 ± 6	17 ± 3	134 ± 4	62 ± 3	42 ± 2	282 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	11	1	—	49 ± 6	18 ± 3	128 ± 4	55 ± 3	40 ± 2	270 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	12	1	—	44 ± 6	20 ± 3	81 ± 4	103 ± 3	15 ± 2	95 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-DS-983	13	1	—	59 ± 6	16 ± 4	127 ± 4	74 ± 3	39 ± 2	262 ± 5	12 ± 3	1907 ± 35	437 ± 20	NM ± NM	2.35 ± 0.08	NM	Unknown X	
35-DS-983	14	1	—	46 ± 7	20 ± 4	136 ± 4	61 ± 3	42 ± 2	280 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	16	1	—	34 ± 6	11 ± 4	71 ± 4	93 ± 3	17 ± 2	84 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-DS-983	18	1	—	77 ± 7	23 ± 4	140 ± 5	61 ± 3	44 ± 2	189 ± 5	8 ± 3	962 ± 34	310 ± 20	NM ± NM	1.58 ± 0.08	NM	McKay Butte	
35-DS-983	20	1	—	60 ± 7	21 ± 4	85 ± 4	98 ± 4	14 ± 2	87 ± 5	3 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-DS-983	21	1	—	28 ± 6	14 ± 3	114 ± 4	55 ± 3	24 ± 2	102 ± 5	8 ± 3	810 ± 28	288 ± 20	NM ± NM	1.07 ± 0.08	NM	Little Bear Creek/Whitewater Ridge (CES)	
35-DS-983	22	1	—	89 ± 6	22 ± 3	135 ± 4	63 ± 3	43 ± 2	183 ± 5	6 ± 3	1421 ± 36	292 ± 20	NM ± NM	1.66 ± 0.08	NM	McKay Butte	
35-DS-983	23	1	—	77 ± 6	18 ± 3	134 ± 4	61 ± 3	41 ± 2	176 ± 5	3 ± 3	837 ± 30	326 ± 20	NM ± NM	1.67 ± 0.08	NM	Quartz Mountain/McKay Butte	
35-DS-983	24	1	—	64 ± 7	18 ± 4	137 ± 5	58 ± 3	44 ± 2	281 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	25	1	—	56 ± 6	16 ± 3	136 ± 4	57 ± 3	41 ± 2	283 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	26	1	—	68 ± 6	21 ± 3	136 ± 4	62 ± 3	46 ± 2	185 ± 5	8 ± 3	1041 ± 30	354 ± 20	NM ± NM	1.92 ± 0.08	NM	McKay Butte	
35-DS-983	27	1	A	75 ± 7	22 ± 4	145 ± 5	64 ± 3	45 ± 2	286 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	27	1	B	51 ± 6	16 ± 4	144 ± 4	63 ± 3	43 ± 2	293 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	28	1	A	61 ± 7	16 ± 4	147 ± 5	62 ± 3	43 ± 2	298 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	28	1	B	65 ± 7	25 ± 3	152 ± 5	67 ± 3	44 ± 2	298 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-DS-983	29	1	A	87 ± 7	21 ± 4	151 ± 5	67 ± 3	50 ± 2	195 ± 5	5 ± 3	1024 ± 35	332 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-DS-983	29	1	B	81 ± 7	26 ± 4	158 ± 5	67 ± 3	48 ± 2	195 ± 5	4 ± 3	943 ± 34	344 ± 21	NM ± NM	1.88 ± 0.08	NM	McKay Butte	
35-DS-983	30	1	—	54 ± 5	22 ± 3	131 ± 4	59 ± 3	43 ± 2	279 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-DS-983	31	1	—	56 ± 6	21 ± 3	135 ± 4	56 ± 3	41 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-983	32	1	—	43 ± 5	15 ± 3	81 ± 4	22 ± 3	50 ± 2	90 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-DS-983	33	1	—	52 ± 6	20 ± 3	133 ± 4	58 ± 3	43 ± 2	271 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-983	34	1	—	23 ± 6	5 ± 6	1 ± 4	10 ± 3	4 ± 2	NM ± NM	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-DS-983	36	1	—	65 ± 7	22 ± 4	133 ± 5	65 ± 3	48 ± 2	189 ± 5	7 ± 3	1119 ± 32	337 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-983	39	1	—	70 ± 8	24 ± 4	149 ± 5	64 ± 3	44 ± 3	291 ± 6	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-983	42	1	—	88 ± 7	18 ± 4	143 ± 5	64 ± 3	49 ± 2	189 ± 5	6 ± 3	1017 ± 31	323 ± 20	NM ± NM	1.63 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-983	43	1	—	75 ± 6	22 ± 3	134 ± 5	61 ± 3	49 ± 2	180 ± 5	12 ± 3	838 ± 32	333 ± 20	NM ± NM	1.69 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-DS-983	44	1	—	47 ± 5	16 ± 3	110 ± 4	5 ± 3	64 ± 2	75 ± 4	11 ± 3	848 ± 24	474 ± 20	NM ± NM	0.87 ± 0.08	NM ± NM	NM ± NM	Unknown A
35-DS-983	45	1	—	48 ± 6	18 ± 3	82 ± 4	111 ± 3	18 ± 2	101 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-983	47	1	A	82 ± 8	21 ± 4	144 ± 5	63 ± 3	44 ± 2	190 ± 5	13 ± 3	764 ± 36	322 ± 21	NM ± NM	1.61 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-DS-983	47	1	B	77 ± 8	25 ± 4	138 ± 5	61 ± 3	43 ± 2	183 ± 5	15 ± 3	1053 ± 39	317 ± 21	NM ± NM	1.64 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-985	1	1	—	61 ± 6	19 ± 4	134 ± 4	58 ± 3	40 ± 2	201 ± 5	5 ± 3	1204 ± 34	345 ± 20	NM ± NM	1.91 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-985	2	1	—	55 ± 6	19 ± 3	134 ± 4	60 ± 3	43 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-985	3	1	—	40 ± 6	18 ± 3	77 ± 4	105 ± 3	16 ± 2	91 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-DS-985	5	1	—	45 ± 6	15 ± 3	120 ± 4	52 ± 3	38 ± 2	182 ± 5	8 ± 3	1037 ± 30	347 ± 20	NM ± NM	1.76 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-DS-985	6	1	—	67 ± 6	20 ± 4	111 ± 4	51 ± 3	32 ± 2	123 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
35-DS-985	9	1	A	101 ± 8	20 ± 4	96 ± 5	81 ± 3	69 ± 3	393 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown B
35-DS-985	15	1	A	63 ± 6	20 ± 3	133 ± 4	59 ± 3	44 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-985	18	1	A	45 ± 7	19 ± 4	97 ± 4	117 ± 4	30 ± 2	154 ± 5	2 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C
35-DS-985	23	1	A	36 ± 6	14 ± 3	131 ± 4	58 ± 3	42 ± 2	271 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-985	24	1	A	61 ± 7	19 ± 4	143 ± 5	63 ± 3	47 ± 2	286 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-DS-985	25	1	A	66 ± 6	17 ± 3	141 ± 4	66 ± 3	46 ± 2	291 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-985	26	1	A	56 ± 6	21 ± 3	139 ± 4	61 ± 3	42 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-DS-985	26	1	B	66 ± 6	16 ± 4	106 ± 4	41 ± 3	26 ± 2	116 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-DS-985	26	1	C	89 ± 5	19 ± 3	125 ± 4	9 ± 3	56 ± 2	341 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-DS-985	26	1	D	103 ± 6	24 ± 3	129 ± 4	12 ± 3	55 ± 2	359 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-DS-985	204	1	A	84 ± 6	21 ± 3	109 ± 4	40 ± 3	61 ± 2	142 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-GM-25	53	1	—	56 ± 7	19 ± 4	138 ± 3	98 ± 3	22 ± 2	143 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge?
35-GM-25	54	1	—	53 ± 8	19 ± 4	125 ± 4	103 ± 4	33 ± 2	141 ± 5	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	55	4	A	50 ± 8	19 ± 4	139 ± 3	67 ± 3	28 ± 2	119 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	55	4	B	62 ± 8	19 ± 4	133 ± 4	89 ± 4	29 ± 2	133 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	58	1	—	38 ± 7	13 ± 4	131 ± 3	62 ± 3	23 ± 2	109 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge
35-GM-25	60	4	—	42 ± 6	14 ± 3	126 ± 3	64 ± 3	27 ± 2	103 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge
35-GM-25	61	3	—	144 ± 7	17 ± 4	131 ± 3	NM ± 3	78 ± 2	471 ± 6	48 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
35-GM-25	66	3	—	37 ± 9	27 ± 4	140 ± 3	63 ± 3	30 ± 2	111 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	70	1	—	149 ± 9	29 ± 4	116 ± 3	NM ± 3	82 ± 3	530 ± 7	47 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown B
35-GM-25	76	1	—	44 ± 6	17 ± 3	126 ± 3	101 ± 3	29 ± 2	137 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	78	1	—	58 ± 8	19 ± 4	147 ± 4	100 ± 4	32 ± 2	139 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	112	1	—	49 ± 7	21 ± 4	140 ± 3	77 ± 3	27 ± 2	108 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge?
35-GM-25	113	1	—	198 ± 9	25 ± 4	115 ± 4	123 ± 4	65 ± 2	284 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C
35-GM-25	134	2	—	42 ± 6	12 ± 3	117 ± 5	88 ± 3	29 ± 2	134 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	140	1	—	67 ± 5	18 ± 3	91 ± 5	31 ± 3	54 ± 2	122 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-GM-25	141	1	—	39 ± 5	18 ± 3	122 ± 5	64 ± 3	25 ± 2	108 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-GM-25	161	3	—	112 ± 7	23 ± 3	95 ± 5	99 ± 3	62 ± 2	264 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown D
35-GM-25	211	2	—	57 ± 7	17 ± 4	114 ± 5	91 ± 3	28 ± 2	130 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	243	1	—	41 ± 5	15 ± 3	116 ± 5	88 ± 3	25 ± 2	127 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	248	12	—	58 ± 7	16 ± 4	141 ± 6	102 ± 4	22 ± 2	135 ± 5	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	250	5	—	62 ± 6	15 ± 4	136 ± 5	98 ± 3	25 ± 2	132 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	262	4	A	57 ± 6	16 ± 3	143 ± 5	100 ± 3	29 ± 2	145 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge?
35-GM-25	262	4	B	61 ± 7	26 ± 4	149 ± 6	105 ± 3	25 ± 2	145 ± 5	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge?
35-GM-25	262	4	C	58 ± 7	23 ± 4	132 ± 5	96 ± 3	24 ± 2	133 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	262	4	D	39 ± 7	15 ± 4	130 ± 5	97 ± 3	27 ± 2	133 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	262	4	E	36 ± 8	11 ± 4	122 ± 5	87 ± 3	25 ± 2	124 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	262	4	F	158 ± 8	25 ± 4	94 ± 5	109 ± 3	62 ± 2	273 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown D
35-GM-25	262	4	G	200 ± 9	25 ± 5	139 ± 6	1 ± 3	92 ± 3	585 ± 7	47 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Horse Mountain?
35-GM-25	262	8	—	30 ± 6	15 ± 3	121 ± 5	82 ± 3	25 ± 2	127 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	264	2	A	48 ± 6	11 ± 4	96 ± 5	24 ± 3	60 ± 2	94 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-GM-25	264	2	B	49 ± 8	17 ± 4	136 ± 5	99 ± 3	31 ± 2	140 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	264	6	—	79 ± 5	18 ± 3	85 ± 5	45 ± 3	40 ± 2	239 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown E
35-GM-25	266	1	—	33 ± 5	16 ± 3	105 ± 5	39 ± 3	30 ± 2	91 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Wolf Creek?
35-GM-25	266	9	A	225 ± 10	28 ± 5	137 ± 6	NM ± 14	108 ± 3	728 ± 9	51 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Horse Mountain?
35-GM-25	266	9	B	43 ± 7	12 ± 4	137 ± 5	91 ± 3	28 ± 2	129 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-GM-25	268	3	A	30 ± 6	16 ± 3	115 ± 5	57 ± 3	27 ± 2	104 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek
35-GM-25	268	3	B	63 ± 6	20 ± 3	130 ± 5	31 ± 3	50 ± 2	266 ± 5	28 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Chickahominy?
35-GM-25	268	3	D	56 ± 6	16 ± 3	135 ± 5	99 ± 3	27 ± 2	140 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-GM-25	268	3	E	71 ± 7	20 ± 4	125 ± 5	43 ± 3	48 ± 2	162 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain?
35-GM-25	268	9	—	36 ± 5	15 ± 3	131 ± 5	41 ± 3	28 ± 2	96 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Wolf Creek
35-GM-25	270	2	A	60 ± 6	20 ± 3	95 ± 5	111 ± 3	28 ± 2	141 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown F
35-GM-25	270	2	B	67 ± 7	14 ± 4	145 ± 3	93 ± 3	26 ± 2	128 ± 5	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge?
35-GM-25	271	4	A	68 ± 7	20 ± 4	140 ± 3	93 ± 3	30 ± 2	135 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-GM-25	272	4	A	37 ± 5	13 ± 3	84 ± 5	22 ± 3	51 ± 2	91 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-GM-25	272	4	B	48 ± 6	14 ± 3	98 ± 5	102 ± 3	28 ± 2	138 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge?
35-GM-25	272	4	C	53 ± 5	13 ± 3	129 ± 5	74 ± 3	28 ± 2	119 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-GM-25	272	4	D	42 ± 6	18 ± 3	137 ± 5	70 ± 3	28 ± 2	119 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-GM-25	272	4	E	23 ± 8	9 ± 3	2 ± 5	10 ± 3	4 ± 2	27 ± 4	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-GM-25	272	4	F	52 ± 6	14 ± 4	134 ± 5	82 ± 3	28 ± 2	122 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-GM-25	275	4	—	37 ± 6	15 ± 3	101 ± 5	54 ± 3	21 ± 2	96 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek
35-GM-25	275	6	A	75 ± 8	25 ± 4	145 ± 5	62 ± 3	43 ± 2	179 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-GM-25	275	6	B	53 ± 6	19 ± 3	118 ± 5	74 ± 3	29 ± 2	107 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-GM-25	275	7	A	58 ± 7	22 ± 4	149 ± 5	49 ± 3	28 ± 2	102 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Wolf Creek?
35-GM-25	275	7	B	46 ± 6	13 ± 3	129 ± 5	88 ± 3	28 ± 2	132 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-GM-25	275	7	C	60 ± 7	18 ± 4	124 ± 5	88 ± 3	23 ± 2	130 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-GM-25	275	7	D	70 ± 7	18 ± 4	120 ± 5	28 ± 3	60 ± 2	315 ± 5	24 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?
35-GM-25	275	7	E	82 ± 8	27 ± 4	119 ± 6	116 ± 4	31 ± 2	151 ± 5	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown H
35-GM-25	276	4	—	56 ± 8	20 ± 4	133 ± 6	73 ± 3	30 ± 2	112 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-GM-25	279	10	A	72 ± 5	14 ± 3	120 ± 5	26 ± 3	57 ± 2	310 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?
35-GM-25	279	10	B	92 ± 7	25 ± 4	131 ± 5	31 ± 3	58 ± 2	326 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-GM-25	279	10	C	61 ± 7	11 ± 4	136 ± 5	100 ± 3	27 ± 2	140 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-GM-25	279	10	D	49 ± 6	19 ± 4	131 ± 5	59 ± 3	28 ± 2	106 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek
35-GM-25	282	6	A	17 ± 8	3 ± 4	2 ± 5	14 ± 3	8 ± 2	13 ± 4	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-GM-25	282	6	B	50 ± 7	14 ± 4	134 ± 5	82 ± 3	27 ± 3	121 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-GM-25	287	2	—	41 ± 6	16 ± 3	125 ± 5	66 ± 3	28 ± 2	104 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-GM-25	459	2	A	13 ± 30	9 ± 6	1 ± 4	13 ± 3	3 ± 3	15 ± 5	NM ± 6	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-GM-25	461	1	—	55 ± 7	16 ± 4	121 ± 5	89 ± 3	24 ± 2	129 ± 5	6 ± 3	781 ± 30	257 ± 20	NM ± NM	1.03 ± 0.08	NM ± NM	NM	Whitewater Ridge
35-GM-25	468	4	A	44 ± 7	20 ± 4	148 ± 5	47 ± 3	32 ± 2	102 ± 5	13 ± 3	543 ± 26	263 ± 20	NM ± NM	0.84 ± 0.08	NM ± NM	NM	Wolf Creek?
35-GM-25	479	1	A	40 ± 7	20 ± 4	131 ± 4	81 ± 3	27 ± 2	126 ± 5	10 ± 3	NM ± 27	NM ± 20	NM ± NM	NM ± 0.08	NM ± NM	NM	Whitewater Ridge
35-GM-25	486	2	A	69 ± 8	16 ± 5	149 ± 5	101 ± 4	24 ± 3	133 ± 5	6 ± 3	1002 ± 36	273 ± 20	NM ± NM	1.13 ± 0.08	NM ± NM	NM	Unknown I
35-GM-25	496	4	A	37 ± 7	13 ± 4	121 ± 4	87 ± 3	24 ± 2	130 ± 5	8 ± 3	813 ± 28	275 ± 20	NM ± NM	1.14 ± 0.08	NM ± NM	NM	Whitewater Ridge
35-GM-25	496	4	B	65 ± 8	21 ± 4	144 ± 5	99 ± 4	30 ± 3	137 ± 5	4 ± 3	834 ± 35	251 ± 20	NM ± NM	0.99 ± 0.08	NM ± NM	NM	Whitewater Ridge?
35-GM-25	500	4	A	53 ± 7	14 ± 4	88 ± 4	114 ± 4	17 ± 2	98 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-GM-25	500	4	B	55 ± 7	15 ± 4	132 ± 5	103 ± 3	29 ± 2	140 ± 5	6 ± 3	933 ± 30	281 ± 20	NM ± NM	1.11 ± 0.08	NM ± NM	NM	Whitewater Ridge?
35-GM-25	500	4	C	19 ± 7	5 ± 7	NM ± NM	5 ± 3	3 ± 2	14 ± 5	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-GM-25	503	3	A	57 ± 7	20 ± 4	137 ± 5	106 ± 4	25 ± 2	144 ± 5	8 ± 3	1094 ± 34	297 ± 20	NM ± NM	1.28 ± 0.08	NM ± NM	NM	Unknown I
35-GM-25	507	3	A	47 ± 7	16 ± 4	135 ± 5	94 ± 4	27 ± 2	129 ± 5	5 ± 3	835 ± 31	268 ± 20	NM ± NM	1.09 ± 0.08	NM ± NM	NM	Whitewater Ridge
35-GM-25	519	1	A	45 ± 8	14 ± 4	147 ± 5	102 ± 4	24 ± 2	141 ± 5	7 ± 3	926 ± NA	283 ± NA	NM ± NM	1.19 ± NA	NM ± NM	NM	Unknown I
35-GM-25	519	1	B	54 ± 8	18 ± 4	106 ± 5	105 ± 4	28 ± 2	138 ± 5	4 ± 3	1108 ± 31	400 ± 20	NM ± NM	1.44 ± 0.08	NM ± NM	NM	Whitewater Ridge?
35-GM-25	525	2	A	74 ± 7	18 ± 4	129 ± 5	31 ± 3	40 ± 2	280 ± 5	28 ± 3	1355 ± 31	369 ± 20	NM ± NM	1.72 ± 0.08	NM ± NM	NM	Unknown J
35-GM-25	526	2	A	103 ± 6	21 ± 3	118 ± 4	2 ± 3	73 ± 2	429 ± 5	45 ± 3	772 ± 22	334 ± 20	NM ± NM	1.94 ± 0.08	NM ± NM	NM	Unknown B
35-GM-25	529	4	A	41 ± 7	21 ± 3	137 ± 5	100 ± 3	28 ± 2	140 ± 5	8 ± 3	790 ± 29	269 ± 20	NM ± NM	1.06 ± 0.08	NM ± NM	NM	Whitewater Ridge

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-GM-25	549	1	A	42 ± 5	14 ± 3	84 ± 4	87 ± 3	28 ± 2	118 ± 5	6 ± 3	999 ± 26	393 ± 20	NM ± NM	1.34 ± 0.08	NM	Juniper Spring 2/Whitewater Ridge	
35-GM-25	558	1	A	70 ± 7	23 ± 4	131 ± 5	48 ± 3	46 ± 2	158 ± 5	15 ± 3	814 ± 28	429 ± 20	NM ± NM	1.22 ± 0.08	NM	Quartz Mountain/McKay Butte	
35-GM-25	563	1	A	73 ± 8	22 ± 4	150 ± 5	102 ± 4	26 ± 3	144 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown I	
35-GM-25	642	4	A	37 ± 8	13 ± 4	118 ± 5	93 ± 3	24 ± 2	134 ± 5	3 ± 3	830 ± 31	273 ± 20	NM ± NM	1.11 ± 0.08	NM	Whitewater Ridge	
35-GM-25	642	4	B	43 ± 7	19 ± 4	142 ± 5	71 ± 3	25 ± 2	120 ± 5	9 ± 3	763 ± 30	266 ± 20	NM ± NM	1.03 ± 0.08	NM	Whitewater Ridge	
35-GM-25	644	3	A	65 ± 8	17 ± 5	132 ± 5	99 ± 4	25 ± 3	137 ± 5	10 ± 4	889 ± 37	260 ± 21	NM ± NM	1.09 ± 0.08	NM	Whitewater Ridge	
35-GM-25	644	3	B	33 ± 7	13 ± 4	120 ± 4	93 ± 3	24 ± 2	138 ± 5	9 ± 3	938 ± 28	288 ± 21	NM ± NM	1.19 ± 0.08	NM	Whitewater Ridge	
35-GM-25	651	2	A	43 ± 7	17 ± 3	117 ± 4	76 ± 3	26 ± 2	121 ± 5	9 ± 3	737 ± 29	283 ± 20	NM ± NM	1.05 ± 0.08	NM	Whitewater Ridge	
35-GM-25	661	3	A	50 ± 7	16 ± 4	97 ± 4	26 ± 3	59 ± 2	96 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-GM-25	664	3	A	37 ± 7	18 ± 3	89 ± 4	108 ± 3	26 ± 2	140 ± 5	8 ± 3	1093 ± 28	374 ± 20	NM ± NM	1.44 ± 0.08	NM	Whitewater Ridge	
35-GM-25	676	3	A	49 ± 7	23 ± 4	100 ± 4	29 ± 3	61 ± 2	99 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-GM-25	677	3	A	56 ± 8	23 ± 4	97 ± 5	115 ± 4	28 ± 2	143 ± 5	2 ± 3	1112 ± 35	394 ± 20	NM ± NM	1.46 ± 0.08	NM	Unknown F	
35-GM-25	678	4	—	38 ± 8	24 ± 4	127 ± 5	63 ± 3	26 ± 2	115 ± 5	10 ± 3	612 ± 20	250 ± 20	NM ± NM	0.87 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-GM-25	679	3	A	165 ± 8	20 ± 4	125 ± 5	3 ± 3	91 ± 3	571 ± 7	55 ± 4	829 ± 28	424 ± 20	NM ± NM	2.42 ± 0.08	NM	Unknown A	
35-GM-25	767	3	A	48 ± 6	16 ± 3	133 ± 4	64 ± 3	27 ± 2	114 ± 5	7 ± 3	659 ± 26	266 ± 20	NM ± NM	0.94 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-GM-25	775	2	A	51 ± 7	20 ± 4	135 ± 5	96 ± 3	25 ± 2	131 ± 5	8 ± 3	857 ± 30	273 ± 20	NM ± NM	1.09 ± 0.08	NM	Whitewater Ridge	
35-GM-25	777	3	—	135 ± 8	20 ± 4	114 ± 5	1 ± 4	88 ± 2	552 ± 6	48 ± 3	805 ± 27	423 ± 20	NM ± NM	2.31 ± 0.08	NM	Unknown B	
35-GM-25	790	3	A	132 ± 7	15 ± 4	97 ± 4	112 ± 3	60 ± 2	268 ± 5	16 ± 3	1062 ± 31	348 ± 20	NM ± NM	2.35 ± 0.08	NM	Unknown D	
35-GM-25	790	7	—	40 ± 6	15 ± 4	89 ± 4	26 ± 3	54 ± 2	94 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-GM-25	791	3	A	66 ± 7	17 ± 4	147 ± 5	47 ± 3	29 ± 2	101 ± 5	7 ± 3	554 ± 27	273 ± 20	NM ± NM	0.85 ± 0.08	NM	Wolf Creek?	
35-GM-25	806	1	—	33 ± 5	18 ± 3	121 ± 4	40 ± 3	25 ± 2	93 ± 5	8 ± 3	479 ± 23	284 ± 20	NM ± NM	0.89 ± 0.08	NM	Wolf Creek	
35-GM-25	809	3	A	50 ± 7	17 ± 4	148 ± 5	48 ± 3	30 ± 2	110 ± 5	15 ± 3	520 ± 26	250 ± 20	NM ± NM	0.81 ± 0.08	NM	Wolf Creek	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-GM-25	827	3	A	53 ± 7	19 ± 4	144 ± 5	106 ± 3	29 ± 2	140 ± 5	10 ± 3	815 ± 28	285 ± 20	NM ± NM	1.10 ± 0.08	NM NM	Unknown I	
35-GM-25	831	5	A	29 ± 6	14 ± 3	113 ± 4	82 ± 3	22 ± 2	120 ± 5	8 ± 3	862 ± 27	298 ± 20	NM ± NM	1.14 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	832	2	A	49 ± 7	18 ± 4	136 ± 5	41 ± 3	30 ± 2	101 ± 5	12 ± 3	465 ± 27	236 ± 20	NM ± NM	0.72 ± 0.08	NM NM	Wolf Creek?	
35-GM-25	835	6	A	58 ± 7	18 ± 4	133 ± 5	90 ± 3	28 ± 2	132 ± 5	12 ± 3	783 ± 29	261 ± 20	NM ± NM	1.07 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	847	2	A	49 ± 6	20 ± 3	129 ± 4	93 ± 3	25 ± 2	137 ± 5	9 ± 3	853 ± 26	279 ± 20	NM ± NM	1.08 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	847	2	B	17 ± 8	5 ± 12	2 ± 4	6 ± 3	2 ± 6	16 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-GM-25	879	3	A	62 ± 7	16 ± 4	137 ± 5	31 ± 3	48 ± 2	282 ± 5	32 ± 3	1198 ± 30	359 ± 20	NM ± NM	1.66 ± 0.08	NM NM	Unknown J	
35-GM-25	883	1	A	52 ± 6	14 ± 3	123 ± 4	92 ± 3	22 ± 2	129 ± 5	8 ± 3	854 ± 27	269 ± 20	NM ± NM	1.07 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	904	6	A	56 ± 7	20 ± 4	139 ± 5	105 ± 4	23 ± 2	138 ± 5	6 ± 3	928 ± 35	277 ± 20	NM ± NM	1.10 ± 0.08	NM NM	Whitewater Ridge?	
35-GM-25	904	6	B	45 ± 8	13 ± 4	143 ± 5	97 ± 4	27 ± 2	131 ± 5	7 ± 3	917 ± 31	291 ± 20	NM ± NM	1.21 ± 0.08	NM NM	Whitewater Ridge?	
35-GM-25	906	2	A	38 ± 6	15 ± 3	123 ± 4	93 ± 3	25 ± 2	131 ± 5	6 ± 3	891 ± 26	300 ± 20	NM ± NM	1.21 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	906	2	B	48 ± 7	21 ± 4	141 ± 5	74 ± 3	25 ± 2	115 ± 5	6 ± 3	704 ± 30	238 ± 20	NM ± NM	0.95 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	907	1	A	51 ± 7	19 ± 4	131 ± 5	67 ± 3	26 ± 2	115 ± 5	9 ± 3	606 ± 30	238 ± 20	NM ± NM	0.93 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-GM-25	909	2	A	43 ± 8	19 ± 4	141 ± 5	100 ± 4	24 ± 2	136 ± 5	7 ± 3	917 ± 32	291 ± 20	NM ± NM	1.18 ± 0.08	NM NM	Whitewater Ridge?	
35-GM-25	909	2	B	56 ± 7	12 ± 4	128 ± 5	95 ± 3	26 ± 2	135 ± 5	9 ± 3	995 ± 36	271 ± 20	NM ± NM	1.10 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	910	3	A	34 ± 7	18 ± 4	128 ± 5	92 ± 3	26 ± 2	140 ± 5	9 ± 3	864 ± 30	269 ± 20	NM ± NM	1.08 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	910	3	B	53 ± 7	20 ± 4	141 ± 5	93 ± 3	29 ± 2	133 ± 5	6 ± 3	893 ± 32	289 ± 20	NM ± NM	1.08 ± 0.08	NM NM	Whitewater Ridge?	
35-GM-25	915	1	—	35 ± 6	11 ± 3	116 ± 4	67 ± 3	23 ± 2	110 ± 5	7 ± 3	710 ± 27	278 ± 20	NM ± NM	1.01 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-GM-25	915	3	A	60 ± 7	19 ± 4	128 ± 5	100 ± 4	26 ± 2	136 ± 5	9 ± 3	940 ± 35	288 ± 20	NM ± NM	1.20 ± 0.08	NM NM	Whitewater Ridge?	
35-GM-25	933	1	—	41 ± 6	12 ± 3	81 ± 4	102 ± 3	14 ± 2	89 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs		
35-GM-25	934	5	—	47 ± 7	17 ± 4	89 ± 4	102 ± 4	24 ± 2	149 ± 5	5 ± 3	1174 ± 31	349 ± 20	NM ± NM	1.51 ± 0.08	NM NM	Unknown F	
35-GM-25	938	4	A	70 ± 8	25 ± 4	145 ± 5	106 ± 4	26 ± 2	138 ± 5	7 ± 3	925 ± 39	247 ± 20	NM ± NM	1.05 ± 0.08	NM NM	Unknown I	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-GM-25	938	4	B	52 ± 6	12 ± 4	90 ± 4	24 ± 3	54 ± 2	93 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes
35-GM-25	952	2	A	177 ± 10	24 ± 4	51 ± 4	277 ± 5	52 ± 2	271 ± 6	17 ± 3	26739 ± 128	2141 ± 24	NM ± NM	18.35 ± 0.10	NM	NM	Unknown K
35-GM-25	955	1	—	28 ± 7	17 ± 3	106 ± 4	54 ± 3	20 ± 2	97 ± 5	11 ± 3	619 ± 28	246 ± 20	NM ± NM	0.87 ± 0.08	NM	NM	Little Bear Creek
35-GM-25	958	2	A	59 ± 7	21 ± 4	133 ± 5	122 ± 4	29 ± 2	167 ± 5	8 ± 3	1161 ± 31	310 ± 20	NM ± NM	1.38 ± 0.08	NM	NM	Unknown G
35-GM-25	969	2	A	45 ± 7	14 ± 4	137 ± 5	74 ± 3	28 ± 2	111 ± 5	9 ± 3	759 ± 31	260 ± 20	NM ± NM	0.99 ± 0.08	NM	NM	Whitewater Ridge
35-GM-25	971	3	A	52 ± 7	22 ± 4	142 ± 5	100 ± 4	27 ± 2	139 ± 5	8 ± 3	914 ± 30	264 ± 20	NM ± NM	1.11 ± 0.08	NM	NM	Whitewater Ridge?
35-GM-25	973	1	A	40 ± 8	23 ± 4	120 ± 5	79 ± 3	28 ± 2	113 ± 5	5 ± 3	677 ± 31	344 ± 20	NM ± NM	0.94 ± 0.08	NM	NM	Little Bear Creek/Whitewater Ridge
35-GM-25	973	1	B	58 ± 8	15 ± 5	138 ± 5	73 ± 4	27 ± 2	111 ± 5	10 ± 3	747 ± 34	241 ± 20	NM ± NM	1.01 ± 0.08	NM	NM	Whitewater Ridge
35-GM-25	976	2	A	63 ± 6	13 ± 4	130 ± 5	90 ± 3	27 ± 2	131 ± 5	4 ± 3	769 ± 32	260 ± 20	NM ± NM	0.99 ± 0.08	NM	NM	Whitewater Ridge
35-GM-25	978	2	A	64 ± 7	22 ± 4	131 ± 5	98 ± 3	27 ± 2	136 ± 5	10 ± 3	858 ± 30	260 ± 20	NM ± NM	1.08 ± 0.08	NM	NM	Whitewater Ridge?
35-GM-25	978	2	B	60 ± 7	25 ± 4	144 ± 5	101 ± 4	27 ± 2	137 ± 5	8 ± 3	939 ± 30	279 ± 20	NM ± NM	1.17 ± 0.08	NM	NM	Whitewater Ridge?
35-GM-25	983	1	—	24 ± 7	13 ± 3	126 ± 4	41 ± 3	25 ± 2	93 ± 5	8 ± 3	581 ± 24	282 ± 20	NM ± NM	0.92 ± 0.08	NM	NM	Wolf Creek
35-GM-25	983	3	A	60 ± 6	20 ± 4	135 ± 5	98 ± 3	26 ± 2	138 ± 5	8 ± 3	1016 ± 30	290 ± 20	NM ± NM	1.25 ± 0.08	NM	NM	Whitewater Ridge?
35-GM-25	993	1	A	53 ± 8	17 ± 4	140 ± 5	93 ± 4	21 ± 2	130 ± 5	12 ± 3	1002 ± 33	280 ± 20	NM ± NM	1.22 ± 0.08	NM	NM	Whitewater Ridge?
35-GM-25	993	1	B	63 ± 7	19 ± 4	93 ± 5	176 ± 4	20 ± 2	152 ± 5	7 ± 3	1005 ± 30	411 ± 20	NM ± NM	1.56 ± 0.08	NM	NM	Unknown L
35-GM-25	1010	3	A	61 ± 8	20 ± 4	135 ± 5	95 ± 4	26 ± 2	140 ± 5	12 ± 3	852 ± 34	278 ± 20	NM ± NM	1.17 ± 0.08	NM	NM	Whitewater Ridge
35-GM-25	1111	1	A	45 ± 6	16 ± 4	144 ± 5	93 ± 3	30 ± 2	132 ± 5	11 ± 3	1018 ± 29	311 ± 20	NM ± NM	1.32 ± 0.08	NM	NM	Whitewater Ridge?
35-GM-25	1111	1	B	49 ± 7	17 ± 4	127 ± 5	77 ± 3	29 ± 2	127 ± 5	8 ± 3	821 ± 32	268 ± 20	NM ± NM	1.03 ± 0.08	NM	NM	Whitewater Ridge
35-GM-25	1111	1	C	48 ± 8	16 ± 4	134 ± 5	83 ± 4	24 ± 2	116 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Little Bear Creek/Whitewater Ridge
35-GM-25	1115	4	A	42 ± 7	18 ± 4	131 ± 5	49 ± 3	28 ± 2	99 ± 5	8 ± 3	764 ± 28	268 ± 20	NM ± NM	0.97 ± 0.08	NM	NM	Little Bear Creek
35-GM-25	1119	4	A	46 ± 6	15 ± 4	124 ± 4	65 ± 3	23 ± 2	108 ± 5	9 ± 3	708 ± 26	279 ± 20	NM ± NM	1.06 ± 0.08	NM	NM	Little Bear Creek/Whitewater Ridge
35-GM-25	1119	4	B	53 ± 7	21 ± 4	143 ± 5	99 ± 4	27 ± 2	140 ± 5	9 ± 3	831 ± 31	266 ± 20	NM ± NM	1.08 ± 0.08	NM	NM	Whitewater Ridge?

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-GM-25	1123	1	—	30 ± 6	13 ± 3	119 ± 4	57 ± 3	25 ± 2	102 ± 5	7 ± 3	722 ± 25	284 ± 20	NM ± NM	1.00 ± 0.08	NM NM	Little Bear Creek
35-GM-25	1123	5	A	45 ± 5	17 ± 3	128 ± 4	41 ± 3	27 ± 2	97 ± 5	9 ± 3	513 ± 23	293 ± 20	NM ± NM	0.83 ± 0.08	NM NM	Wolf Creek
35-GM-25	1124	1	—	27 ± 6	14 ± 3	119 ± 4	38 ± 3	26 ± 2	91 ± 5	9 ± 3	591 ± 23	278 ± 20	NM ± NM	0.92 ± 0.08	NM NM	Wolf Creek
35-GM-25	1124	3	A	75 ± 7	24 ± 4	147 ± 5	30 ± 3	50 ± 3	293 ± 6	29 ± 4	1300 ± 31	364 ± 20	NM ± NM	1.78 ± 0.08	NM NM	Unknown M
35-GM-25	1125	3	A	38 ± 8	15 ± 4	127 ± 5	93 ± 3	26 ± 2	132 ± 5	7 ± 3	825 ± 30	247 ± 20	NM ± NM	1.06 ± 0.08	NM NM	Whitewater Ridge
35-GM-25	1128	1	A	57 ± 8	24 ± 4	146 ± 5	81 ± 4	26 ± 2	119 ± 5	13 ± 3	693 ± 31	259 ± 20	NM ± NM	0.96 ± 0.08	NM NM	Unknown N
35-GM-25	1129	2	A	48 ± 7	14 ± 4	142 ± 5	75 ± 3	28 ± 2	121 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge?
35-GM-25	1134	1	A	66 ± 7	20 ± 4	143 ± 5	98 ± 3	26 ± 2	135 ± 5	9 ± 3	938 ± 30	273 ± 20	NM ± NM	1.19 ± 0.08	NM NM	Whitewater Ridge?
35-GM-25	1135	2	A	59 ± 7	23 ± 4	124 ± 5	119 ± 4	26 ± 2	164 ± 5	9 ± 3	1050 ± 30	283 ± 20	NM ± NM	1.30 ± 0.08	NM NM	Unknown G
35-GM-25	1136	5	A	42 ± 6	21 ± 3	89 ± 4	83 ± 3	25 ± 2	110 ± 5	7 ± 3	1216 ± 29	389 ± 20	NM ± NM	1.34 ± 0.08	NM NM	Little Bear Cr./Whitewater R./Juniper Sp.2
35-GM-25	1137	1	—	43 ± 6	16 ± 3	115 ± 4	89 ± 3	23 ± 2	137 ± 5	3 ± 3	932 ± 26	276 ± 20	NM ± NM	1.19 ± 0.08	NM NM	Whitewater Ridge
35-GM-25	1141	2	A	55 ± 7	21 ± 4	130 ± 5	95 ± 3	24 ± 2	128 ± 5	10 ± 3	916 ± 29	277 ± 20	NM ± NM	1.12 ± 0.08	NM NM	Whitewater Ridge
35-GM-25	1141	2	B	51 ± 7	18 ± 4	132 ± 5	96 ± 4	26 ± 2	139 ± 5	11 ± 3	911 ± 31	286 ± 20	NM ± NM	1.19 ± 0.08	NM NM	Whitewater Ridge
35-GM-25	1142	2	—	77 ± 7	20 ± 4	143 ± 5	65 ± 3	45 ± 2	184 ± 5	9 ± 3	714 ± 27	325 ± 20	NM ± NM	1.68 ± 0.08	NM NM	Quartz Mountain
35-GM-25	1145	1	—	14 ± 10	9 ± 3	1 ± 4	8 ± 3	4 ± 2	18 ± 5	NM ± 6	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian
35-GM-25	1145	7	A	38 ± 6	9 ± 4	124 ± 4	88 ± 3	26 ± 2	128 ± 5	5 ± 3	1004 ± 26	294 ± 20	NM ± NM	1.25 ± 0.08	NM NM	Whitewater Ridge?
35-GM-25	1145	7	B	49 ± 7	13 ± 4	126 ± 5	97 ± 4	23 ± 2	139 ± 5	9 ± 3	874 ± 32	260 ± 20	NM ± NM	1.07 ± 0.08	NM NM	Whitewater Ridge
35-GM-25	1146	1	A	64 ± 7	19 ± 4	155 ± 5	111 ± 4	25 ± 2	148 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown I
35-GM-25	1149	4	A	158 ± 9	17 ± 5	164 ± 5	4 ± 3	120 ± 3	191 ± 5	39 ± 4	960 ± 25	749 ± 21	NM ± NM	1.08 ± 0.08	NM NM	Delintment Creek?
35-GM-25	1149	4	B	63 ± 9	23 ± 4	147 ± 5	94 ± 4	27 ± 3	122 ± 5	3 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown N
35-GM-25	1150	5	A	129 ± 8	20 ± 4	135 ± 5	2 ± 3	82 ± 3	482 ± 6	45 ± 4	884 ± 27	343 ± 20	NM ± NM	2.09 ± 0.08	NM NM	Unknown A
35-GM-25	1152	5	A	50 ± 7	20 ± 4	138 ± 5	70 ± 3	27 ± 2	113 ± 5	9 ± 3	616 ± 28	270 ± 20	NM ± NM	0.95 ± 0.08	NM NM	Whitewater Ridge

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-GM-25	1152	5	B	46 ± 6	16 ± 3	133 ± 4	69 ± 3	24 ± 2	109 ± 5	8 ± 3	641 ± 25	259 ± 20	NM ± NM	0.94 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-GM-25	1156	2	—	79 ± 6	16 ± 4	108 ± 4	27 ± 3	58 ± 2	309 ± 5	19 ± 3	1108 ± 29	474 ± 20	NM ± NM	1.79 ± 0.08	NM NM	Unknown O	
35-GM-25	1156	3	A	45 ± 7	12 ± 4	132 ± 5	93 ± 3	24 ± 2	137 ± 5	9 ± 3	797 ± 30	264 ± 20	NM ± NM	1.09 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1156	3	B	61 ± 8	21 ± 4	134 ± 5	102 ± 4	27 ± 2	135 ± 5	8 ± 3	909 ± 33	278 ± 20	NM ± NM	1.18 ± 0.08	NM NM	Whitewater Ridge?	
35-GM-25	1156	3	C	135 ± 8	29 ± 4	151 ± 5	3 ± 3	115 ± 3	188 ± 5	39 ± 3	855 ± 24	665 ± 20	NM ± NM	0.96 ± 0.08	NM NM	Delintment Creek?	
35-GM-25	1167	1	—	42 ± 6	17 ± 3	118 ± 4	88 ± 3	25 ± 2	133 ± 5	7 ± 3	859 ± 28	275 ± 20	NM ± NM	1.11 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1167	4	A	48 ± 7	13 ± 4	121 ± 4	92 ± 3	26 ± 2	134 ± 5	9 ± 3	1019 ± 31	280 ± 20	NM ± NM	1.33 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1169	2	A	47 ± 7	20 ± 4	130 ± 5	70 ± 3	28 ± 2	117 ± 5	11 ± 3	785 ± 28	252 ± 20	NM ± NM	1.06 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1171	1	—	38 ± 7	14 ± 4	115 ± 4	85 ± 3	25 ± 2	131 ± 5	6 ± 3	916 ± 26	276 ± 20	NM ± NM	1.17 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1176	2	A	57 ± 8	13 ± 5	153 ± 5	91 ± 4	33 ± 2	133 ± 5	7 ± 3	917 ± 34	298 ± 20	NM ± NM	1.14 ± 0.08	NM NM	Unknown I	
35-GM-25	1176	2	B	50 ± 7	15 ± 4	138 ± 5	116 ± 4	25 ± 2	168 ± 5	8 ± 3	1151 ± 32	315 ± 20	NM ± NM	1.38 ± 0.08	NM NM	Unknown G	
35-GM-25	1176	2	C	18 ± 7	6 ± 5	3 ± 4	10 ± 3	NM ± NM	14 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-GM-25	1177	1	A	32 ± 6	15 ± 3	119 ± 4	57 ± 3	25 ± 2	103 ± 5	7 ± 3	607 ± 26	274 ± 20	NM ± NM	0.97 ± 0.08	NM NM	Little Bear Creek	
35-GM-25	1181	1	A	52 ± 7	18 ± 4	109 ± 5	68 ± 3	26 ± 2	107 ± 5	10 ± 3	718 ± 29	356 ± 20	NM ± NM	1.00 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-GM-25	1182	4	A	22 ± 8	NM ± NM	NM ± NM	27 ± 3	3 ± 3	12 ± 7	1 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-GM-25	1186	5	A	67 ± 6	17 ± 3	152 ± 4	65 ± 3	48 ± 2	306 ± 5	16 ± 3	1381 ± 28	391 ± 20	NM ± NM	1.99 ± 0.08	NM NM	Newberry Volcano?	
35-GM-25	1189	4	A	39 ± 6	15 ± 3	131 ± 4	75 ± 3	26 ± 2	122 ± 5	9 ± 3	690 ± 25	274 ± 20	NM ± NM	1.01 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1190	2	A	43 ± 6	9 ± 4	114 ± 4	83 ± 3	27 ± 2	128 ± 5	10 ± 3	861 ± 30	255 ± 20	NM ± NM	1.07 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1191	3	—	58 ± 6	23 ± 3	138 ± 4	61 ± 3	44 ± 2	270 ± 5	16 ± 3	1324 ± 30	387 ± 20	NM ± NM	1.99 ± 0.08	NM NM	Newberry Volcano	
35-GM-25	1191	4	A	117 ± 7	21 ± 3	105 ± 4	3 ± 3	83 ± 2	520 ± 6	44 ± 3	966 ± 25	468 ± 20	NM ± NM	2.67 ± 0.08	NM NM	Unknown B	
35-GM-25	1195	1	A	44 ± 6	17 ± 3	128 ± 4	76 ± 3	29 ± 2	117 ± 5	7 ± 3	652 ± 26	271 ± 20	NM ± NM	1.02 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1256	1	—	55 ± 7	15 ± 4	101 ± 4	69 ± 3	28 ± 2	109 ± 5	7 ± 3	661 ± 29	327 ± 20	NM ± NM	0.89 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-GM-25	1265	1	—	33 ± 6	21 ± 3	112 ± 4	81 ± 3	22 ± 2	119 ± 5	8 ± 3	1851 ± 31	288 ± 20	NM ± NM	1.14 ± 0.08	NM NM	Whitewater Ridge?	
35-GM-25	1279	1	—	34 ± 6	13 ± 3	113 ± 4	79 ± 3	24 ± 2	119 ± 5	6 ± 3	898 ± 27	294 ± 20	NM ± NM	1.18 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1283	3	A	74 ± 7	17 ± 4	153 ± 5	63 ± 3	46 ± 2	300 ± 5	17 ± 3	1429 ± 34	404 ± 20	NM ± NM	2.05 ± 0.08	NM NM	Newberry Volcano?	
35-GM-25	1285	2	—	30 ± 6	12 ± 3	114 ± 4	56 ± 3	23 ± 2	97 ± 5	8 ± 3	682 ± 26	271 ± 20	NM ± NM	0.98 ± 0.08	NM NM	Little Bear Creek	
35-GM-25	1285	4	A	41 ± 6	10 ± 4	120 ± 4	88 ± 3	26 ± 2	128 ± 5	8 ± 3	895 ± 27	277 ± 20	NM ± NM	1.15 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1288	1	—	48 ± 7	18 ± 4	122 ± 5	96 ± 3	26 ± 2	141 ± 5	4 ± 3	1027 ± 31	293 ± 20	NM ± NM	1.24 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1288	4	A	42 ± 6	16 ± 3	121 ± 4	62 ± 3	24 ± 2	98 ± 5	4 ± 3	677 ± 26	274 ± 20	NM ± NM	0.98 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-GM-25	1288	4	B	86 ± 7	22 ± 4	150 ± 5	64 ± 3	46 ± 2	193 ± 5	7 ± 3	570 ± 26	304 ± 20	NM ± NM	1.54 ± 0.08	NM NM	Quartz Mountain	
35-GM-25	1290	1	A	45 ± 7	18 ± 4	139 ± 5	64 ± 3	27 ± 2	114 ± 5	5 ± 3	700 ± 29	274 ± 20	NM ± NM	1.00 ± 0.08	NM NM	Little Bear Creek?	
35-GM-25	1290	1	B	44 ± 8	9 ± 5	123 ± 5	94 ± 4	27 ± 2	132 ± 5	6 ± 3	828 ± 30	271 ± 20	NM ± NM	1.06 ± 0.08	NM NM	Whitewater Ridge	
35-GM-25	1292	5	A	68 ± 6	19 ± 3	128 ± 4	59 ± 3	44 ± 2	177 ± 5	6 ± 3	681 ± 24	355 ± 20	NM ± NM	1.80 ± 0.08	NM NM	Quartz Mountain	
35-GM-101	10	1	A	43 ± 5	16 ± 3	113 ± 5	86 ± 3	26 ± 2	127 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge	
35-GM-101	10	1	B	112 ± 10	30 ± 5	167 ± 6	67 ± 4	48 ± 3	191 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-GM-101	15	1	A	49 ± 6	20 ± 3	128 ± 5	65 ± 3	23 ± 2	113 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Little Bear Creek/Whitewater Ridge	
35-GM-101	15	1	B	90 ± 7	19 ± 4	94 ± 5	32 ± 3	58 ± 2	128 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-GM-101	15	1	C	65 ± 7	22 ± 3	142 ± 5	62 ± 3	44 ± 2	183 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-GM-101	19	1	—	53 ± 6	19 ± 3	77 ± 5	49 ± 3	54 ± 2	114 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-GM-101	86	3	—	40 ± 7	11 ± 4	121 ± 5	87 ± 3	22 ± 2	129 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge	
35-GM-101	108	1	—	74 ± 6	18 ± 3	97 ± 5	36 ± 3	59 ± 2	133 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-GM-101	118	2	—	40 ± 7	19 ± 4	109 ± 5	66 ± 3	22 ± 2	110 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Little Bear Creek/Whitewater Ridge	
35-GM-105	35	1	—	31 ± 6	21 ± 3	129 ± 5	55 ± 3	25 ± 2	101 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-GM-105	36	1	—	41 ± 6	12 ± 3	119 ± 5	88 ± 3	25 ± 2	125 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-GM-105	43	1	—	178 ± 7	21 ± 3	121 ± 5	3 ± 3	97 ± 2	657 ± 6	46 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Horse Mountain?
35-GM-105	50	1	—	96 ± 6	16 ± 3	111 ± 5	38 ± 3	61 ± 2	131 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-GM-110	23	6	—	19 ± 6	3 ± 12	3 ± 5	3 ± 3	NM ± 3	21 ± 4	3 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-JE-49	2	1	—	42 ± 5	19 ± 3	78 ± 5	117 ± 3	15 ± 2	105 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
35-JE-49	6	1	—	44 ± 5	15 ± 3	73 ± 5	99 ± 3	16 ± 2	90 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek?
35-JE-49	14	1	—	28 ± 5	NM ± 3	NM ± 5	27 ± 3	4 ± 2	8 ± 9	1 ± 6	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-JE-49	31	1	—	47 ± 5	14 ± 3	78 ± 5	125 ± 3	18 ± 2	116 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	35	1	—	67 ± 5	16 ± 3	130 ± 5	56 ± 3	40 ± 2	175 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	39	6	—	74 ± 8	27 ± 4	139 ± 6	60 ± 3	47 ± 2	281 ± 6	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	127	4	—	88 ± 7	12 ± 4	123 ± 5	7 ± 3	57 ± 2	347 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-JE-49	127	5	—	60 ± 6	20 ± 3	138 ± 5	60 ± 3	49 ± 2	282 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	127	8	—	79 ± 5	14 ± 3	59 ± 5	174 ± 3	42 ± 2	335 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown B
35-JE-49	127	9	—	37 ± 7	3 ± 19	NM ± 5	25 ± 3	NM ± 2	10 ± 5	NM ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-JE-49	127	10	—	91 ± 12	15 ± 6	128 ± 6	62 ± 4	43 ± 3	165 ± 6	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	127	14	A	109 ± 9	15 ± 5	155 ± 6	63 ± 4	48 ± 3	174 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	127	14	B	67 ± 8	21 ± 4	94 ± 5	25 ± 3	50 ± 3	91 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-49	127	14	C	61 ± 6	20 ± 3	136 ± 5	63 ± 3	45 ± 2	289 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	128	4	—	58 ± 7	12 ± 4	139 ± 5	63 ± 3	47 ± 2	289 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	128	5	—	68 ± 8	23 ± 4	137 ± 6	61 ± 3	38 ± 3	267 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	128	6	—	63 ± 8	23 ± 4	126 ± 5	60 ± 3	39 ± 2	279 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	128	7	—	101 ± 12	19 ± 6	117 ± 6	47 ± 4	34 ± 3	224 ± 6	7 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C
35-JE-49	128	8	—	62 ± 12	4 ± 11	NM ± 5	1 ± 3	5 ± 3	9 ± 10	7 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-JE-49	128	9	—	65 ± 7	20 ± 4	141 ± 5	57 ± 3	45 ± 2	187 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	128	13	A	90 ± 7	21 ± 4	146 ± 5	59 ± 3	43 ± 2	187 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	128	13	B	79 ± 6	16 ± 4	149 ± 5	60 ± 3	47 ± 2	295 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	129	4	—	64 ± 6	16 ± 3	133 ± 5	60 ± 3	43 ± 2	181 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	129	5	—	45 ± 7	21 ± 4	89 ± 5	114 ± 3	20 ± 2	98 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	129	6	A	53 ± 5	17 ± 3	128 ± 5	60 ± 3	46 ± 2	280 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	129	6	B	71 ± 5	19 ± 3	138 ± 5	62 ± 3	49 ± 2	183 ± 4	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	129	6	C	46 ± 8	27 ± 4	141 ± 5	60 ± 3	43 ± 2	284 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	129	6	D	102 ± 11	27 ± 5	141 ± 6	57 ± 4	45 ± 3	178 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	130	3	—	35 ± 5	13 ± 3	73 ± 5	95 ± 3	14 ± 2	85 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	130	10	A	58 ± 5	15 ± 3	130 ± 5	58 ± 3	43 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	130	10	B	50 ± 5	13 ± 3	124 ± 5	52 ± 3	45 ± 2	262 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	130	10	C	37 ± 5	12 ± 3	108 ± 5	51 ± 3	30 ± 2	89 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown D
35-JE-49	130	10	D	49 ± 6	16 ± 3	87 ± 5	112 ± 3	19 ± 2	100 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	131	1	—	61 ± 6	18 ± 3	144 ± 5	60 ± 3	45 ± 2	290 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	131	3	—	53 ± 6	17 ± 3	136 ± 5	59 ± 3	46 ± 2	282 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	131	8	A	66 ± 6	16 ± 3	152 ± 5	64 ± 3	47 ± 2	287 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	131	8	B	53 ± 6	21 ± 3	138 ± 5	64 ± 3	47 ± 2	296 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	131	8	C	74 ± 7	29 ± 4	150 ± 6	62 ± 3	45 ± 2	289 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	132	3	A	76 ± 6	19 ± 3	138 ± 5	59 ± 3	49 ± 2	181 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	132	3	B	89 ± 7	20 ± 4	155 ± 6	62 ± 3	48 ± 2	196 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	132	3	C	90 ± 8	19 ± 5	155 ± 6	66 ± 3	52 ± 3	187 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte

C.1-135



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	135	4	A	105 ± 7	28 ± 4	165 ± 5	76 ± 3	51 ± 2	203 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-49	135	4	B	54 ± 7	15 ± 4	96 ± 5	26 ± 3	56 ± 2	99 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-49	135	4	C	69 ± 8	28 ± 4	152 ± 6	66 ± 3	49 ± 3	298 ± 6	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	136	3	A	42 ± 5	16 ± 3	81 ± 5	104 ± 3	18 ± 2	91 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-49	136	3	B	85 ± 7	22 ± 3	150 ± 5	69 ± 3	52 ± 2	200 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-49	137	4	A	77 ± 7	21 ± 3	157 ± 5	66 ± 3	49 ± 2	196 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-49	139	6	—	59 ± 6	22 ± 3	150 ± 5	63 ± 3	44 ± 2	292 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	140	5	A	53 ± 5	17 ± 3	141 ± 5	61 ± 3	47 ± 2	286 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	140	5	B	63 ± 6	15 ± 4	139 ± 5	67 ± 3	47 ± 2	300 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	140	5	C	49 ± 7	23 ± 4	93 ± 5	127 ± 3	18 ± 2	105 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-49	143	3	A	66 ± 6	20 ± 3	156 ± 5	66 ± 3	50 ± 2	313 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	144	1	—	46 ± 5	19 ± 3	130 ± 5	55 ± 3	43 ± 2	271 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	146	7	—	54 ± 5	15 ± 3	126 ± 5	63 ± 3	45 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	147	3	—	79 ± 6	19 ± 3	153 ± 5	66 ± 3	48 ± 2	192 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-49	149	4	—	61 ± 5	16 ± 3	128 ± 5	56 ± 3	41 ± 2	175 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-49	151	7	—	84 ± 7	14 ± 4	138 ± 6	58 ± 3	43 ± 2	274 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	176	3	A	76 ± 9	20 ± 5	130 ± 5	54 ± 4	44 ± 3	269 ± 6	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	176	3	B	104 ± 10	15 ± 6	171 ± 5	70 ± 4	49 ± 3	206 ± 6	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-49	176	3	C	90 ± 11	21 ± 6	179 ± 6	66 ± 4	47 ± 3	301 ± 7	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown E
35-JE-49	178	8	—	55 ± 9	16 ± 5	72 ± 5	97 ± 4	21 ± 2	92 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-49	179	3	—	58 ± 7	21 ± 4	140 ± 5	63 ± 3	44 ± 2	300 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	182	1	—	50 ± 5	10 ± 3	131 ± 5	55 ± 3	44 ± 2	268 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-136

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	183	3	—	58 ± 7	23 ± 4	148 ± 5	66 ± 3	46 ± 2	294 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	183	6	—	59 ± 8	18 ± 4	138 ± 5	62 ± 3	44 ± 2	187 ± 5	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	187	3	A	65 ± 7	20 ± 4	157 ± 5	66 ± 3	46 ± 2	292 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	187	3	B	72 ± 12	21 ± 6	83 ± 5	189 ± 5	20 ± 3	180 ± 6	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown F
35-JE-49	189	3	—	54 ± 5	16 ± 3	133 ± 5	58 ± 3	47 ± 2	281 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	190	3	—	62 ± 7	19 ± 4	145 ± 5	63 ± 3	43 ± 2	285 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	A	112 ± 8	24 ± 4	168 ± 5	71 ± 4	47 ± 3	195 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	191	3	B	90 ± 7	23 ± 3	145 ± 5	66 ± 3	48 ± 2	183 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	191	3	C	62 ± 8	20 ± 4	97 ± 5	118 ± 4	17 ± 3	100 ± 5	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	191	3	D	78 ± 9	23 ± 5	148 ± 5	63 ± 4	46 ± 3	289 ± 6	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	E	62 ± 9	17 ± 5	159 ± 5	69 ± 4	49 ± 3	309 ± 6	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	F	56 ± 9	16 ± 5	156 ± 5	75 ± 4	53 ± 3	315 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	G	62 ± 9	15 ± 5	147 ± 5	67 ± 4	44 ± 3	288 ± 6	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	H	133 ± 12	13 ± 8	148 ± 6	71 ± 4	47 ± 3	184 ± 6	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	191	3	I	48 ± 6	19 ± 3	129 ± 4	56 ± 3	39 ± 2	262 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	J	64 ± 6	19 ± 3	144 ± 5	63 ± 3	44 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	K	70 ± 8	18 ± 5	134 ± 5	56 ± 4	40 ± 3	277 ± 6	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	L	60 ± 7	24 ± 4	149 ± 5	70 ± 3	45 ± 2	311 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	191	3	M	56 ± 6	19 ± 3	130 ± 4	55 ± 3	41 ± 2	173 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	191	8	—	76 ± 6	15 ± 4	136 ± 5	60 ± 3	49 ± 2	183 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-49	191	9	—	105 ± 12	15 ± 6	115 ± 7	40 ± 4	45 ± 3	143 ± 6	8 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown G
35-JE-49	193	3	A	46 ± 6	17 ± 3	88 ± 4	118 ± 3	19 ± 2	101 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-JE-49	193	3	B	47 ± 6	18 ± 3	118 ± 4	52 ± 3	42 ± 2	261 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	193	6	—	36 ± 8	15 ± 4	76 ± 5	102 ± 4	14 ± 2	88 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	194	3	A	60 ± 8	18 ± 4	135 ± 5	6 ± 3	75 ± 3	84 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Potato Hills
35-JE-49	194	3	B	77 ± 7	24 ± 4	153 ± 5	68 ± 3	45 ± 2	297 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	206	1	—	35 ± 6	15 ± 3	86 ± 5	20 ± 3	50 ± 2	88 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-49	208	1	A	83 ± 9	28 ± 5	170 ± 6	75 ± 4	47 ± 3	311 ± 6	24 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	208	1	B	48 ± 6	24 ± 3	91 ± 5	26 ± 3	60 ± 2	91 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-49	211	2	—	53 ± 7	19 ± 4	98 ± 5	23 ± 3	56 ± 2	95 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-49	213	2	—	61 ± 7	21 ± 4	138 ± 5	63 ± 3	42 ± 2	287 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	227	3	—	57 ± 10	20 ± 5	144 ± 6	61 ± 4	43 ± 3	282 ± 6	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	232	3	—	51 ± 6	18 ± 3	98 ± 4	110 ± 3	24 ± 2	148 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown H
35-JE-49	234	2	—	51 ± 6	16 ± 3	139 ± 4	59 ± 3	44 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	235	5	—	48 ± 7	19 ± 3	96 ± 4	25 ± 3	57 ± 2	97 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-49	242	7	—	64 ± 7	23 ± 4	132 ± 5	58 ± 3	45 ± 2	273 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	242	8	—	38 ± 5	17 ± 3	76 ± 5	98 ± 3	16 ± 2	89 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	242	9	—	68 ± 6	16 ± 4	135 ± 5	52 ± 3	42 ± 2	274 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	242	10	—	47 ± 5	21 ± 3	118 ± 5	55 ± 3	41 ± 2	265 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	242	11	—	74 ± 9	23 ± 4	124 ± 6	54 ± 3	41 ± 3	164 ± 5	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	242	20	—	70 ± 8	21 ± 4	112 ± 5	49 ± 3	34 ± 2	123 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-JE-49	242	25	—	35 ± 5	14 ± 3	95 ± 5	63 ± 3	28 ± 2	95 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Juniper Spring 1
35-JE-49	243	1	—	67 ± 6	16 ± 3	133 ± 5	63 ± 3	44 ± 2	291 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	245	8	—	53 ± 5	15 ± 3	123 ± 5	54 ± 3	45 ± 2	263 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-JE-49	247	2	—	73 ± 10	19 ± 5	110 ± 6	3 ± 3	69 ± 3	74 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Potato Hills?	
35-JE-49	250	5	—	66 ± 10	16 ± 5	78 ± 6	98 ± 4	18 ± 3	85 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-49	251	1	—	52 ± 5	17 ± 3	81 ± 5	87 ± 3	24 ± 2	189 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown I	
35-JE-49	255	5	—	74 ± 6	26 ± 3	143 ± 5	61 ± 3	47 ± 2	184 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-JE-49	255	10	—	72 ± 7	17 ± 3	130 ± 5	61 ± 3	43 ± 2	272 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-49	261	1	—	41 ± 5	15 ± 3	79 ± 5	100 ± 3	15 ± 2	93 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-49	264	3	—	74 ± 5	20 ± 3	117 ± 5	49 ± 3	44 ± 2	348 ± 5	23 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow	
35-JE-49	264	4	—	70 ± 10	8 ± 7	87 ± 6	36 ± 3	53 ± 3	336 ± 7	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Brooks Canyon	
35-JE-49	265	1	—	51 ± 6	23 ± 3	83 ± 5	106 ± 3	15 ± 2	98 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-49	265	2	—	68 ± 6	18 ± 3	134 ± 5	59 ± 3	42 ± 2	183 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-JE-49	265	3	—	56 ± 7	21 ± 4	142 ± 5	58 ± 3	37 ± 2	202 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-JE-49	267	2	—	68 ± 5	20 ± 3	138 ± 5	58 ± 3	44 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-49	267	3	—	52 ± 5	17 ± 3	124 ± 5	60 ± 3	41 ± 2	273 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-49	270	3	—	78 ± 6	19 ± 4	144 ± 5	59 ± 3	50 ± 2	187 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-JE-49	270	7	—	54 ± 5	19 ± 3	135 ± 5	53 ± 3	40 ± 2	273 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-49	273	3	—	36 ± 5	9 ± 3	76 ± 5	96 ± 3	16 ± 2	90 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-49	307	1	—	55 ± 6	19 ± 3	135 ± 4	56 ± 3	42 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-49	332	1	—	38 ± 6	16 ± 3	76 ± 4	103 ± 3	17 ± 2	94 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-49	349	3	A	51 ± 6	19 ± 4	82 ± 4	108 ± 3	19 ± 2	97 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-49	349	3	B	55 ± 7	17 ± 3	89 ± 4	115 ± 3	16 ± 2	102 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-49	351	2	A	38 ± 6	13 ± 4	83 ± 5	109 ± 3	17 ± 2	97 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-49	364	4	A	66 ± 8	19 ± 4	162 ± 5	71 ± 3	48 ± 3	296 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	

C.1-139

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	366	2	A	79 ± 7	24 ± 3	146 ± 5	66 ± 3	45 ± 2	194 ± 5	7 ± 3	616 ± 25	319 ± 20	NM ± NM	1.56 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	366	2	B	97 ± 8	30 ± 4	161 ± 5	68 ± 4	44 ± 3	298 ± 6	23 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	366	2	C	35 ± 6	13 ± 3	69 ± 4	93 ± 3	16 ± 2	86 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	366	2	D	39 ± 6	15 ± 3	77 ± 4	104 ± 3	17 ± 2	93 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	367	1	A	67 ± 7	14 ± 4	156 ± 5	69 ± 3	44 ± 2	292 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	368	3	A	44 ± 6	16 ± 3	99 ± 4	25 ± 3	55 ± 2	94 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-49	371	3	A	84 ± 6	22 ± 3	165 ± 5	72 ± 3	52 ± 2	300 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	371	3	B	75 ± 7	18 ± 4	148 ± 5	64 ± 3	49 ± 2	192 ± 5	10 ± 3	650 ± 30	319 ± 20	NM ± NM	1.59 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	373	3	—	40 ± 6	16 ± 3	77 ± 4	106 ± 3	14 ± 2	91 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	376	2	A	42 ± 7	21 ± 3	95 ± 4	103 ± 3	27 ± 2	141 ± 5	9 ± 3	1079 ± 31	366 ± 20	NM ± NM	1.40 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-49	378	3	A	49 ± 6	18 ± 3	94 ± 4	103 ± 3	26 ± 2	140 ± 5	8 ± 3	1054 ± 27	371 ± 20	NM ± NM	1.43 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-49	379	2	A	54 ± 7	20 ± 4	106 ± 4	29 ± 3	57 ± 2	97 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-49	383	1	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	405	1	A	51 ± 7	23 ± 4	101 ± 4	26 ± 3	55 ± 2	102 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-49	407	4	A	48 ± 6	17 ± 3	94 ± 4	26 ± 3	53 ± 2	92 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-49	409	3	A	87 ± 8	19 ± 4	106 ± 5	122 ± 4	28 ± 2	146 ± 5	4 ± 3	1261 ± 34	430 ± 20	NM ± NM	1.67 ± 0.08	NM NM	Unknown H	
35-JE-49	411	2	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	411	2	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	421	5	—	72 ± 7	18 ± 4	61 ± 4	179 ± 4	38 ± 2	345 ± 5	11 ± 3	3708 ± 41	763 ± 21	NM ± NM	4.07 ± 0.08	NM NM	Unknown B	
35-JE-49	430	2	A	81 ± 7	16 ± 4	159 ± 5	68 ± 3	50 ± 2	293 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	438	2	A	65 ± 6	23 ± 4	130 ± 5	6 ± 3	68 ± 2	80 ± 5	5 ± 3	461 ± 21	449 ± 20	NM ± NM	0.74 ± 0.08	NM NM	Potato Hills	
35-JE-49	440	2	A	72 ± 7	20 ± 4	156 ± 5	69 ± 3	45 ± 2	298 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

C.1-140

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	448	1	A	75 ± 7	24 ± 4	149 ± 5	65 ± 3	46 ± 2	192 ± 5	9 ± 3	604 ± 26	338 ± 20	NM ± NM	1.63 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	450	4	A	66 ± 6	18 ± 3	151 ± 5	70 ± 3	48 ± 2	305 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	450	6	—	62 ± 6	18 ± 3	93 ± 4	34 ± 3	53 ± 2	120 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-JE-49	452	3	A	63 ± 7	27 ± 4	158 ± 5	66 ± 3	52 ± 2	307 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	454	1	A	55 ± 7	20 ± 4	138 ± 5	66 ± 3	47 ± 2	292 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	454	1	B	45 ± 7	19 ± 4	94 ± 4	123 ± 4	21 ± 2	107 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	454	1	D	62 ± 6	19 ± 3	138 ± 4	62 ± 3	44 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	457	3	A	67 ± 6	17 ± 4	145 ± 4	63 ± 3	47 ± 2	293 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	459	3	A	44 ± 6	15 ± 4	78 ± 4	111 ± 3	15 ± 2	93 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	460	3	A	111 ± 8	25 ± 4	101 ± 4	87 ± 3	79 ± 2	423 ± 6	19 ± 3	1366 ± 32	612 ± 20	NM ± NM	2.33 ± 0.08	NM NM	Unknown J	
35-JE-49	460	3	B	46 ± 6	15 ± 3	126 ± 4	54 ± 3	40 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	462	3	A	76 ± 6	22 ± 4	102 ± 4	45 ± 3	70 ± 2	391 ± 5	17 ± 3	1617 ± 31	478 ± 20	NM ± NM	2.06 ± 0.08	NM NM	Brooks Canyon	
35-JE-49	462	3	B	103 ± 6	23 ± 3	96 ± 4	79 ± 3	76 ± 2	395 ± 5	15 ± 3	1490 ± 28	668 ± 20	NM ± NM	2.57 ± 0.08	NM NM	Unknown J	
35-JE-49	472	2	A	76 ± 7	14 ± 4	143 ± 4	62 ± 3	42 ± 2	185 ± 6	5 ± 3	575 ± 27	324 ± 20	NM ± NM	1.53 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	474	3	A	106 ± 7	14 ± 4	95 ± 4	83 ± 3	75 ± 2	403 ± 6	20 ± 3	1426 ± 35	605 ± 20	NM ± NM	2.29 ± 0.08	NM NM	Unknown J	
35-JE-49	477	2	A	85 ± NA	17 ± NA	88 ± NA	71 ± NA	67 ± NA	371 ± NA	17 ± NA	1464 ± 32	616 ± 20	NM ± NM	2.40 ± 0.08	NM NM	Unknown J	
35-JE-49	478	3	—	87 ± 6	21 ± 3	79 ± 4	67 ± 3	68 ± 2	363 ± 5	17 ± 3	1547 ± 29	669 ± 20	NM ± NM	2.45 ± 0.08	NM NM	Unknown K	
35-JE-49	480	4	A	55 ± 6	18 ± 3	132 ± 4	63 ± 3	44 ± 2	285 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	480	4	B	58 ± 7	18 ± 4	97 ± 4	26 ± 3	55 ± 2	100 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-49	480	4	C	37 ± 6	22 ± 3	107 ± 4	73 ± 3	26 ± 2	104 ± 5	7 ± 3	641 ± 25	364 ± 20	NM ± NM	0.95 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-JE-49	480	5	—	43 ± 6	15 ± 3	86 ± 4	95 ± 3	24 ± 2	129 ± 5	6 ± 3	1093 ± 26	391 ± 20	NM ± NM	1.48 ± 0.08	NM NM	Juniper Spring 2	
35-JE-49	482	4	A	65 ± 6	21 ± 3	149 ± 4	63 ± 3	44 ± 2	293 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

C.1-141

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	482	4	B	68 ± 6	14 ± 3	134 ± 4	60 ± 3	49 ± 2	188 ± 5	10 ± 3	655 ± 25	340 ± 20	NM ± NM	1.61 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	482	4	C	36 ± 7	17 ± 4	86 ± 4	116 ± 4	18 ± 2	104 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	482	4	D	72 ± 7	24 ± 4	161 ± 5	65 ± 3	48 ± 2	297 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	482	4	E	70 ± 7	26 ± 3	153 ± 5	68 ± 3	44 ± 2	290 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	482	4	F	61 ± 6	22 ± 3	127 ± 4	58 ± 3	39 ± 2	172 ± 5	8 ± 3	772 ± 25	329 ± 20	NM ± NM	1.68 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	482	4	G	55 ± 6	19 ± 3	137 ± 4	64 ± 3	40 ± 2	283 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	483	3	A	58 ± 6	16 ± 4	146 ± 4	61 ± 3	46 ± 2	294 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	483	3	B	79 ± 6	22 ± 4	136 ± 4	57 ± 3	50 ± 2	373 ± 5	27 ± 3	1262 ± 30	494 ± 20	NM ± NM	2.19 ± 0.08	NM NM	Big Obsidian Flow	
35-JE-49	483	3	C	66 ± 7	16 ± 4	146 ± 5	64 ± 3	48 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	483	3	D	63 ± 6	23 ± 3	129 ± 4	57 ± 3	42 ± 2	276 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	483	3	E	30 ± 6	16 ± 3	109 ± 4	56 ± 3	29 ± 2	93 ± 5	6 ± 3	552 ± 23	401 ± 20	NM ± NM	0.87 ± 0.08	NM NM	Little Bear Creek	
35-JE-49	484	3	A	68 ± 6	20 ± 4	151 ± 5	64 ± 3	44 ± 2	297 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	484	4	—	48 ± 6	13 ± 4	124 ± 4	55 ± 3	39 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	485	4	A	100 ± 6	18 ± 3	92 ± 4	76 ± 3	71 ± 2	386 ± 5	16 ± 3	1404 ± 30	632 ± 20	NM ± NM	2.42 ± 0.08	NM NM	Unknown J	
35-JE-49	485	4	B	83 ± 7	22 ± 4	161 ± 5	70 ± 3	48 ± 2	298 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	485	4	C	41 ± 7	16 ± 4	128 ± 4	6 ± 3	70 ± 2	86 ± 5	15 ± 3	469 ± 22	434 ± 20	NM ± NM	0.72 ± 0.08	NM NM	Potato Hills	
35-JE-49	492	4	A	67 ± 7	21 ± 4	151 ± 5	67 ± 3	47 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	498	6	—	42 ± 6	16 ± 3	75 ± 4	98 ± 3	18 ± 2	92 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	502	5	B	80 ± 7	19 ± 4	145 ± 4	64 ± 3	44 ± 2	189 ± 5	11 ± 3	598 ± 27	319 ± 20	NM ± NM	1.52 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	502	5	C	78 ± 7	20 ± 4	140 ± 4	67 ± 3	49 ± 2	300 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	502	6	—	68 ± 7	13 ± 4	131 ± 5	57 ± 3	42 ± 2	174 ± 5	11 ± 3	630 ± 28	340 ± 20	NM ± NM	1.65 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	503	6	—	45 ± 6	18 ± 3	123 ± 4	55 ± 3	41 ± 2	262 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

C.1-142

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	504	4	A	83 ± 6	20 ± 3	136 ± 4	62 ± 3	44 ± 2	191 ± 5	10 ± 3	611 ± 26	332 ± 20	NM ± NM	1.66 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	504	4	B	73 ± 6	23 ± 3	142 ± 4	65 ± 3	43 ± 2	187 ± 5	6 ± 3	637 ± 25	335 ± 20	NM ± NM	1.63 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	504	4	D	31 ± 6	15 ± 3	72 ± 4	98 ± 3	17 ± 2	87 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	507	4	A	53 ± 6	18 ± 3	129 ± 4	61 ± 3	41 ± 2	279 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	507	4	B	72 ± 7	14 ± 4	152 ± 5	64 ± 3	49 ± 2	300 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	507	4	C	51 ± 6	18 ± 3	133 ± 4	60 ± 3	44 ± 2	282 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	507	4	D	63 ± 7	18 ± 4	133 ± 5	62 ± 3	43 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	507	4	F	51 ± 6	17 ± 3	130 ± 4	59 ± 3	40 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	507	4	G	55 ± 6	19 ± 3	123 ± 4	59 ± 3	42 ± 2	264 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	508	3	A	55 ± 6	17 ± 3	131 ± 4	65 ± 3	44 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	508	6	—	85 ± 6	13 ± 4	99 ± 4	36 ± 3	57 ± 2	135 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-JE-49	509	6	A	34 ± 7	16 ± 4	127 ± 4	62 ± 3	32 ± 2	103 ± 5	9 ± 3	591 ± 26	403 ± 20	NM ± NM	0.89 ± 0.08	NM NM	Little Bear Creek?	
35-JE-49	510	3	A	60 ± 7	19 ± 4	93 ± 4	128 ± 4	18 ± 2	96 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	510	3	B	74 ± 6	22 ± 3	136 ± 4	65 ± 3	46 ± 2	184 ± 5	6 ± 3	642 ± 24	342 ± 20	NM ± NM	1.64 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	513	2	A	73 ± 6	21 ± 3	149 ± 5	67 ± 3	45 ± 2	193 ± 5	7 ± 3	544 ± 25	327 ± 20	NM ± NM	1.61 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	513	2	B	52 ± 6	19 ± 3	128 ± 4	59 ± 3	43 ± 2	271 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	516	3	A	60 ± 7	19 ± 4	98 ± 4	124 ± 4	18 ± 2	107 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	517	4	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian? (MV)	
35-JE-49	517	4	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	518	3	A	89 ± 8	24 ± 4	153 ± 5	70 ± 3	46 ± 2	204 ± 5	8 ± 3	698 ± 28	317 ± 20	NM ± NM	1.62 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	523	2	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	601	1	A	56 ± 6	18 ± 3	139 ± 4	62 ± 3	41 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

C.1-143



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	628	1	A	44 ± 6	16 ± 3	118 ± 4	58 ± 3	39 ± 2	264 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	639	1	A	48 ± 6	18 ± 3	118 ± 4	54 ± 3	38 ± 2	250 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	651	6	A	51 ± 7	20 ± 3	121 ± 4	49 ± 3	39 ± 2	264 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	651	6	B	52 ± 6	22 ± 3	139 ± 5	63 ± 3	44 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	651	6	C	72 ± 6	17 ± 3	141 ± 4	61 ± 3	41 ± 2	178 ± 5	8 ± 3	615 ± 25	339 ± 20	NM ± NM	1.63 ± 0.08	NM	NM	Quartz Mountain
35-JE-49	651	6	D	66 ± 6	24 ± 3	138 ± 4	41 ± 3	51 ± 2	273 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	651	6	E	45 ± 6	21 ± 3	87 ± 4	25 ± 3	53 ± 2	94 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes
35-JE-49	651	6	F	74 ± 6	22 ± 3	138 ± 4	62 ± 3	46 ± 2	190 ± 5	9 ± 3	617 ± 26	337 ± 20	NM ± NM	1.67 ± 0.08	NM	NM	Quartz Mountain
35-JE-49	651	6	G	55 ± 7	14 ± 4	140 ± 5	62 ± 3	43 ± 2	287 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	651	6	H	39 ± 6	21 ± 3	76 ± 4	107 ± 3	18 ± 2	92 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-JE-49	651	11	—	48 ± 6	23 ± 3	135 ± 4	63 ± 3	41 ± 2	281 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	651	40	—	63 ± 6	17 ± 3	132 ± 4	60 ± 3	42 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	651	42	—	56 ± 5	19 ± 3	134 ± 4	56 ± 3	41 ± 2	277 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	651	55	—	59 ± 5	14 ± 3	117 ± 4	60 ± 3	39 ± 2	266 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	683	1	—	44 ± 6	16 ± 3	125 ± 4	56 ± 3	38 ± 2	266 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	705	2	A	72 ± 7	17 ± 4	150 ± 5	68 ± 3	47 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	710	1	—	62 ± 7	17 ± 4	134 ± 5	71 ± 3	45 ± 2	291 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	715	4	A	76 ± 7	16 ± 4	150 ± 5	67 ± 3	49 ± 2	299 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	715	4	B	52 ± 6	19 ± 3	139 ± 4	64 ± 3	45 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	718	3	A	73 ± 6	19 ± 4	142 ± 5	62 ± 3	44 ± 2	282 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	718	3	B	56 ± 6	24 ± 3	145 ± 5	64 ± 3	47 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	718	3	C	51 ± 6	18 ± 3	126 ± 4	59 ± 3	41 ± 2	268 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano

C.1-144

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	719	1	—	56 ± 5	17 ± 3	124 ± 4	56 ± 3	40 ± 2	168 ± 5	8 ± 3	550 ± 23	335 ± 20	NM ± NM	1.62 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	719	7	D	45 ± 6	22 ± 3	132 ± 4	59 ± 3	43 ± 2	274 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	720	5	—	53 ± 5	19 ± 3	123 ± 4	54 ± 3	38 ± 2	174 ± 5	9 ± 3	603 ± 24	349 ± 20	NM ± NM	1.70 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	721	2	A	53 ± 6	17 ± 3	129 ± 4	61 ± 3	44 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	722	2	A	50 ± 6	19 ± 3	130 ± 4	59 ± 3	40 ± 2	275 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	725	3	A	63 ± 7	20 ± 4	146 ± 5	66 ± 3	43 ± 2	209 ± 5	7 ± 3	1163 ± 31	348 ± 20	NM ± NM	1.76 ± 0.08	NM NM	McKay Butte	
35-JE-49	737	3	A	56 ± 6	18 ± 3	131 ± 4	63 ± 3	42 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	759	3	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	759	3	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	765	2	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	773	2	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	778	4	A	75 ± 7	22 ± 4	143 ± 5	45 ± 3	48 ± 2	282 ± 5	9 ± 3	990 ± 27	393 ± 20	NM ± NM	1.89 ± 0.08	NM NM	Newberry Volcano?	
35-JE-49	779	4	—	58 ± 6	13 ± 3	135 ± 4	62 ± 3	46 ± 2	285 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	780	4	A	63 ± 7	20 ± 4	142 ± 5	61 ± 3	41 ± 2	280 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	782	3	—	60 ± 5	17 ± 3	127 ± 4	59 ± 3	42 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	782	7	A	59 ± 6	16 ± 3	131 ± 4	40 ± 3	48 ± 2	266 ± 5	11 ± 3	1010 ± 26	419 ± 20	NM ± NM	1.99 ± 0.08	NM NM	Unknown L	
35-JE-49	782	7	B	70 ± 6	26 ± 3	137 ± 4	62 ± 3	46 ± 2	186 ± 5	7 ± 3	609 ± 24	341 ± 20	NM ± NM	1.67 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	783	2	—	64 ± 5	7 ± 4	NM ± 5	30 ± 3	3 ± 2	15 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-JE-49	791	1	A	47 ± 6	18 ± 3	87 ± 4	111 ± 3	16 ± 2	100 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	792	3	A	67 ± 6	18 ± 3	139 ± 4	59 ± 3	43 ± 2	281 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	811	2	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	825	3	A	51 ± 6	12 ± 4	130 ± 4	58 ± 3	43 ± 2	279 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	826	3	A	53 ± 7	13 ± 4	137 ± 5	60 ± 3	40 ± 2	274 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	826	3	B	73 ± 6	6 ± 5	NM ± NM	29 ± 3	4 ± 2	12 ± 7	1 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-JE-49	830	4	A	75 ± 6	18 ± 4	144 ± 4	62 ± 3	44 ± 2	297 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	834	2	A	104 ± 7	23 ± 4	95 ± 4	81 ± 3	71 ± 2	396 ± 5	17 ± 3	1454 ± 32	603 ± 20	NM ± NM	2.30 ± 0.08	NM	Unknown J	
35-JE-49	861	2	A	67 ± 6	21 ± 4	132 ± 4	58 ± 3	43 ± 2	279 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	861	2	B	82 ± 7	23 ± 4	143 ± 5	63 ± 3	48 ± 2	187 ± 5	6 ± 3	580 ± 26	321 ± 20	NM ± NM	1.61 ± 0.08	NM	Quartz Mountain	
35-JE-49	866	5	A	33 ± 6	16 ± 3	113 ± 4	55 ± 3	28 ± 2	94 ± 5	8 ± 3	586 ± 25	395 ± 20	NM ± NM	0.87 ± 0.08	NM	Little Bear Creek	
35-JE-49	881	2	A	58 ± 7	21 ± 4	93 ± 4	124 ± 4	18 ± 2	100 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-49	905	3	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)	
35-JE-49	908	1	—	36 ± 6	11 ± 4	93 ± 4	44 ± 3	24 ± 2	68 ± 5	10 ± 3	351 ± 21	555 ± 20	277 ± NA	0.77 ± 0.08	NM	Round Top Butte	
35-JE-49	920	3	A	41 ± 6	11 ± 4	78 ± 4	102 ± 3	16 ± 2	96 ± 5	3 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-49	923	7	A	56 ± 6	13 ± 4	75 ± 4	102 ± 3	17 ± 2	91 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-49	923	7	B	58 ± 6	15 ± 4	128 ± 4	64 ± 3	45 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	923	7	D	61 ± 6	20 ± 3	111 ± 4	51 ± 3	36 ± 2	152 ± 5	5 ± 3	577 ± 26	332 ± 20	NM ± NM	1.64 ± 0.08	NM	Quartz Mountain	
35-JE-49	924	4	A	58 ± 7	16 ± 4	138 ± 4	60 ± 3	44 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	925	4	A	67 ± 7	14 ± 4	126 ± 5	54 ± 3	49 ± 2	366 ± 6	22 ± 3	1374 ± 32	506 ± 20	NM ± NM	2.24 ± 0.08	NM	Big Obsidian Flow	
35-JE-49	925	4	B	64 ± 7	14 ± 4	135 ± 5	64 ± 3	44 ± 2	286 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	925	8	—	55 ± 7	17 ± 4	132 ± 5	62 ± 3	47 ± 2	289 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	927	4	A	116 ± 8	23 ± 4	158 ± 5	67 ± 4	43 ± 3	294 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	927	4	B	57 ± 7	15 ± 4	89 ± 4	23 ± 3	51 ± 2	91 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-49	927	4	C	48 ± 6	17 ± 4	141 ± 4	61 ± 3	45 ± 2	282 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	936	3	A	63 ± 6	19 ± 3	142 ± 4	67 ± 3	43 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	938	8	—	54 ± 6	19 ± 3	124 ± 4	58 ± 3	39 ± 2	263 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-49	938	13	A	83 ± 6	25 ± 3	139 ± 5	62 ± 3	41 ± 2	185 ± 5	12 ± 3	691 ± 27	358 ± 20	NM ± NM	1.66 ± 0.08	NM	NM	Quartz Mountain
35-JE-49	938	13	B	48 ± 6	19 ± 3	133 ± 4	58 ± 3	44 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Newberry Volcano
35-JE-49	938	13	C	51 ± 6	18 ± 3	139 ± 4	64 ± 3	45 ± 2	287 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Newberry Volcano
35-JE-49	938	13	D	102 ± 8	26 ± 4	174 ± 5	77 ± 4	49 ± 3	201 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Quartz Mountain/McKay Butte
35-JE-49	938	13	E	82 ± 6	22 ± 3	146 ± 4	64 ± 3	46 ± 2	188 ± 5	9 ± 3	588 ± 26	348 ± 20	NM ± NM	1.68 ± 0.08	NM	NM	Quartz Mountain
35-JE-49	938	13	F	43 ± 6	14 ± 3	74 ± 4	100 ± 3	16 ± 2	91 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Obsidian Cliffs
35-JE-49	938	14	—	83 ± 6	19 ± 3	61 ± 4	181 ± 4	41 ± 2	348 ± 5	16 ± 3	3285 ± 38	709 ± 20	NM ± NM	3.83 ± 0.08	NM	NM	Unknown B
35-JE-49	939	3	—	81 ± 7	21 ± 4	134 ± 5	67 ± 3	42 ± 2	180 ± 5	10 ± 3	704 ± 28	338 ± 20	NM ± NM	1.48 ± 0.08	NM	NM	Quartz Mountain
35-JE-49	939	5	A	86 ± 7	25 ± 4	138 ± 5	72 ± 3	44 ± 2	268 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Newberry Volcano
35-JE-49	939	5	B	52 ± 7	21 ± 3	139 ± 5	62 ± 3	45 ± 2	287 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Newberry Volcano
35-JE-49	939	5	C	69 ± 6	21 ± 3	149 ± 4	62 ± 3	45 ± 2	296 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Newberry Volcano
35-JE-49	940	3	A	92 ± 7	27 ± 4	170 ± 5	75 ± 3	45 ± 2	317 ± 5	19 ± 3	1360 ± 29	415 ± 20	NM ± NM	2.10 ± 0.08	NM	NM	Newberry Volcano?
35-JE-49	940	3	B	100 ± 6	20 ± 3	90 ± 4	75 ± 3	69 ± 2	385 ± 5	19 ± 3	1518 ± 29	643 ± 20	NM ± NM	2.49 ± 0.08	NM	NM	Unknown J
35-JE-49	944	5	A	51 ± 6	19 ± 3	137 ± 4	60 ± 3	42 ± 2	294 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Newberry Volcano
35-JE-49	944	5	B	44 ± 5	18 ± 3	112 ± 4	5 ± 3	65 ± 2	81 ± 5	11 ± 3	380 ± 20	440 ± 20	NM ± NM	0.73 ± 0.08	NM	NM	Potato Hills
35-JE-49	946	2	A	53 ± 6	20 ± 3	124 ± 4	5 ± 3	72 ± 2	89 ± 5	13 ± 3	413 ± 20	432 ± 20	NM ± NM	0.71 ± 0.08	NM	NM	Potato Hills
35-JE-49	958	4	—	31 ± 5	13 ± 3	68 ± 4	93 ± 3	15 ± 2	86 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Obsidian Cliffs
35-JE-49	958	7	C	65 ± 6	20 ± 3	140 ± 4	63 ± 3	42 ± 2	182 ± 5	7 ± 3	573 ± 23	322 ± 20	NM ± NM	1.56 ± 0.08	NM	NM	Quartz Mountain
35-JE-49	959	3	A	90 ± 8	17 ± 4	149 ± 5	65 ± 3	47 ± 2	297 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Newberry Volcano
35-JE-49	959	3	B	36 ± 7	14 ± 4	92 ± 4	118 ± 3	14 ± 2	99 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Obsidian Cliffs
35-JE-49	987	1	—	44 ± 7	14 ± 4	86 ± 4	113 ± 4	17 ± 2	96 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	NM	Obsidian Cliffs

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	988	4	A	51 ± 6	13 ± 4	119 ± 4	5 ± 3	71 ± 2	85 ± 5	14 ± 3	386 ± 20	395 ± 20	NM ± NM	0.65 ± 0.08	NM NM	Potato Hills	
35-JE-49	988	4	B	61 ± 7	21 ± 4	138 ± 5	67 ± 3	41 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	988	4	C	67 ± 6	23 ± 3	148 ± 5	70 ± 3	43 ± 2	283 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	988	4	D	69 ± 7	21 ± 4	140 ± 5	42 ± 3	50 ± 2	272 ± 5	13 ± 3	953 ± 25	386 ± 20	NM ± NM	1.81 ± 0.08	NM NM	Unknown L	
35-JE-49	989	1	A	73 ± 6	16 ± 4	139 ± 4	61 ± 3	46 ± 2	276 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	989	1	B	63 ± 7	21 ± 4	135 ± 5	60 ± 3	43 ± 2	278 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	992	7	A	65 ± 6	17 ± 4	134 ± 4	63 ± 3	41 ± 2	276 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	992	7	B	45 ± 6	10 ± 4	127 ± 4	55 ± 3	41 ± 2	268 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	994	5	A	74 ± 7	22 ± 3	126 ± 4	56 ± 3	41 ± 2	160 ± 5	7 ± 3	704 ± 28	318 ± 20	NM ± NM	1.60 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	994	5	C	73 ± 7	19 ± 4	157 ± 5	64 ± 3	46 ± 2	296 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	994	5	D	54 ± 6	19 ± 3	129 ± 4	61 ± 3	40 ± 2	278 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	996	5	B	92 ± 7	25 ± 3	159 ± 5	70 ± 3	47 ± 2	194 ± 5	7 ± 3	584 ± 27	338 ± 20	NM ± NM	1.68 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	996	5	E	65 ± 6	19 ± 3	139 ± 4	65 ± 3	41 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	1000	1	—	51 ± 6	20 ± 4	133 ± 5	57 ± 3	43 ± 2	261 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-49	1000	5	A	83 ± 7	18 ± 4	158 ± 5	69 ± 3	47 ± 2	200 ± 5	7 ± 3	639 ± 27	329 ± 20	NM ± NM	1.61 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	1001	6	A	71 ± 6	21 ± 3	133 ± 4	61 ± 3	46 ± 2	175 ± 5	12 ± 3	574 ± 24	333 ± 20	NM ± NM	1.66 ± 0.08	NM NM	Quartz Mountain	
35-JE-49	1004	4	—	21 ± 8	14 ± 3	NM ± NM	25 ± 3	6 ± 2	37 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-JE-49	1004	11	A	106 ± 6	19 ± 3	89 ± 4	76 ± 3	73 ± 2	395 ± 5	16 ± 3	1672 ± 29	664 ± 20	NM ± NM	2.61 ± 0.08	NM NM	Unknown J	
35-JE-49	1007	4	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs? (MV)	
35-JE-49	1007	4	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	1007	4	C	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	1008	4	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	1015	4	A	63 ± 6	22 ± 3	141 ± 4	63 ± 3	42 ± 2	207 ± 5	10 ± 3	1129 ± 29	358 ± 20	NM ± NM	1.80 ± 0.08	NM NM	McKay Butte	
35-JE-49	1015	4	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	1018	6	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	1018	6	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	1018	6	C	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	1018	6	D	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	1019	3	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	1020	4	A	49 ± 7	13 ± 4	92 ± 4	115 ± 4	17 ± 2	103 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-49	1020	4	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian? (MV)	
35-JE-49	1020	4	C	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	1027	3	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	1027	3	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs? (MV)	
35-JE-49	1027	3	C	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs? (MV)	
35-JE-49	1027	3	D	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	1027	3	E	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	1028	4	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs (MV)	
35-JE-49	1030	2	A	119 ± 8	18 ± 5	99 ± 5	87 ± 4	77 ± 3	406 ± 6	21 ± 3	1428 ± 35	616 ± 21	NM ± NM	2.35 ± 0.08	NM NM	Unknown J	
35-JE-49	1031	5	—	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown (MV)	
35-JE-49	1032	6	A	67 ± 7	20 ± 3	97 ± 4	34 ± 3	50 ± 2	121 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-JE-49	1035	3	A	51 ± 7	14 ± 4	129 ± 5	88 ± 3	29 ± 2	131 ± 5	8 ± 3	774 ± 29	276 ± 20	NM ± NM	1.08 ± 0.08	NM NM	Whitewater Ridge	
35-JE-49	1035	3	B	47 ± 6	17 ± 3	127 ± 4	58 ± 3	38 ± 2	196 ± 5	9 ± 3	1223 ± 26	368 ± 20	NM ± NM	1.91 ± 0.08	NM NM	McKay Butte	
35-JE-49	1040	4	A	52 ± 6	15 ± 3	126 ± 4	61 ± 3	41 ± 2	274 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	1041	4	A	61 ± 7	20 ± 4	163 ± 5	65 ± 3	45 ± 2	221 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-JE-49	1050	6	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown (MV)
35-JE-49	1050	6	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs (MV)
35-JE-49	1050	6	C	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian? (MV)
35-JE-49	1050	6	D	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown (MV)
35-JE-49	1052	4	A	47 ± 7	19 ± 4	81 ± 4	23 ± 3	52 ± 2	92 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-49	1054	4	A	70 ± 7	27 ± 3	146 ± 5	65 ± 3	46 ± 2	186 ± 5	9 ± 3	616 ± 27	332 ± 20	NM ± NM	1.63 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	1054	4	B	52 ± 7	18 ± 4	83 ± 4	107 ± 3	20 ± 2	99 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	1054	4	C	97 ± 6	23 ± 3	91 ± 4	76 ± 3	73 ± 2	387 ± 5	20 ± 3	1552 ± 31	647 ± 20	NM ± NM	2.50 ± 0.08	NM ± NM	NM ± NM	Unknown J
35-JE-49	1054	4	D	62 ± 7	19 ± 4	143 ± 5	60 ± 3	49 ± 2	291 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1057	6	A	81 ± 7	26 ± 4	146 ± 5	64 ± 3	50 ± 2	194 ± 5	9 ± 3	646 ± 28	378 ± 20	NM ± NM	1.60 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	1058	1	—	73 ± 6	22 ± 3	139 ± 4	61 ± 3	45 ± 2	185 ± 5	7 ± 3	597 ± 26	331 ± 20	NM ± NM	1.63 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	1058	2	—	66 ± 6	23 ± 3	132 ± 4	59 ± 3	42 ± 2	180 ± 5	7 ± 3	573 ± 24	319 ± 20	NM ± NM	1.55 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	1058	3	—	119 ± 7	24 ± 4	138 ± 5	63 ± 3	45 ± 2	185 ± 5	13 ± 3	629 ± 28	327 ± 20	NM ± NM	1.51 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	1058	8	—	46 ± 6	20 ± 3	131 ± 4	54 ± 3	41 ± 2	198 ± 5	10 ± 3	961 ± 25	326 ± 20	NM ± NM	1.63 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-JE-49	1058	11	A	55 ± 6	16 ± 4	132 ± 4	63 ± 3	40 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1058	11	B	55 ± 6	22 ± 3	135 ± 4	56 ± 3	45 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1058	11	C	49 ± 6	23 ± 3	95 ± 4	120 ± 3	16 ± 2	104 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	1058	11	D	68 ± 7	19 ± 4	150 ± 5	72 ± 3	46 ± 2	299 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1058	11	F	92 ± 7	23 ± 4	147 ± 5	44 ± 3	56 ± 2	285 ± 5	11 ± 3	976 ± 30	394 ± 20	NM ± NM	1.86 ± 0.08	NM ± NM	NM ± NM	Newberry Volcano?
35-JE-49	1058	11	G	57 ± 6	16 ± 3	124 ± 4	38 ± 3	48 ± 2	263 ± 5	15 ± 3	921 ± 26	400 ± 20	NM ± NM	1.87 ± 0.08	NM ± NM	NM ± NM	Chickahominy
35-JE-49	1058	11	H	48 ± 5	20 ± 3	123 ± 4	54 ± 3	39 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-150

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	1059	1	—	38	19	77	104	16	92	7	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1059	3	B	74	18	154	63	47	190	5	628	345	NM	1.64	NM	NM	Quartz Mountain
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	± NM	± NM	
35-JE-49	1060	6	—	41	15	77	108	16	98	5	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 7	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1060	11	A	101	15	111	10	62	456	25	1355	737	NM	2.48	NM	NM	Riley
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± 30	± 20	± NM	± 0.08	± NM	± NM	
35-JE-49	1060	11	B	69	22	136	43	52	280	14	893	373	NM	1.72	NM	NM	Chickahominy?
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± 29	± 20	± NM	± 0.08	± NM	± NM	
35-JE-49	1060	11	C	83	24	146	65	45	291	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 8	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1060	11	E	56	21	132	62	40	273	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1060	11	F	63	22	146	61	47	290	18	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	2	—	61	20	129	56	39	266	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	3	—	62	18	92	34	53	125	11	NM	NM	NM	NM	NM	NM	Cougar Mountain
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	13	B	87	27	152	65	46	190	7	632	334	NM	1.65	NM	NM	Quartz Mountain
				± 7	± 3	± 5	± 3	± 2	± 5	± 3	± 27	± 20	± NM	± 0.08	± NM	± NM	
35-JE-49	1061	13	C	66	20	152	68	49	304	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	13	D	42	17	78	111	19	101	7	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	13	E	59	22	148	66	42	295	18	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	13	F	76	14	155	69	46	300	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	13	G	66	26	158	70	49	301	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	13	H	70	15	149	62	45	286	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1061	13	I	54	12	130	63	43	275	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1063	3	B	77	26	153	69	47	298	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 3	± 6	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1063	3	E	72	17	149	70	43	300	18	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1064	1	—	39	17	67	97	13	90	7	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	
35-JE-49	1064	5	A	47	21	130	60	41	278	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	

C.1-151



# Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	1064	5	D	58 ± 7	20 ± 4	152 ± 5	73 ± 3	48 ± 2	310 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1064	5	G	56 ± 7	17 ± 4	145 ± 5	70 ± 3	43 ± 2	298 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1064	5	H	71 ± 6	21 ± 4	149 ± 5	68 ± 3	46 ± 2	303 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1064	5	I	61 ± 6	18 ± 4	141 ± 4	70 ± 3	44 ± 2	294 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1064	5	J	51 ± 6	18 ± 3	127 ± 4	57 ± 3	42 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1065	2	A	66 ± 7	25 ± 4	150 ± 5	71 ± 3	46 ± 2	298 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1065	2	B	54 ± 6	16 ± 3	129 ± 4	58 ± 3	43 ± 2	271 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1067	1	—	56 ± 5	18 ± 3	125 ± 4	56 ± 3	41 ± 2	171 ± 5	5 ± 3	554 ± 24	347 ± 20	NM ± NM	1.66 ± 0.08	NM	Quartz Mountain	
35-JE-49	1067	6	—	51 ± 6	17 ± 3	132 ± 4	56 ± 3	42 ± 2	201 ± 5	10 ± 3	995 ± 27	330 ± 20	NM ± NM	1.64 ± 0.08	NM	McKay Butte	
35-JE-49	1068	2	A	73 ± 7	19 ± 4	165 ± 5	67 ± 3	52 ± 2	299 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1070	4	A	86 ± 6	22 ± 4	144 ± 5	68 ± 3	48 ± 2	187 ± 5	7 ± 3	663 ± 28	343 ± 20	NM ± NM	1.67 ± 0.08	NM	Quartz Mountain	
35-JE-49	1070	4	B	85 ± 6	20 ± 4	150 ± 5	67 ± 3	44 ± 2	192 ± 5	8 ± 3	598 ± 26	317 ± 20	NM ± NM	1.57 ± 0.08	NM	Quartz Mountain	
35-JE-49	1081	3	A	50 ± 6	21 ± 3	81 ± 4	112 ± 3	17 ± 2	98 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-49	1082	5	A	46 ± 6	13 ± 3	130 ± 4	59 ± 3	40 ± 2	273 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1083	22	A	51 ± 6	22 ± 3	127 ± 4	58 ± 3	40 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1083	22	B	46 ± 7	18 ± 4	124 ± 4	61 ± 3	45 ± 2	266 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1083	22	C	49 ± 6	20 ± 3	128 ± 4	60 ± 3	41 ± 2	271 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1083	22	D	54 ± 6	18 ± 3	135 ± 4	61 ± 3	44 ± 2	286 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1083	22	E	63 ± 7	21 ± 4	142 ± 5	63 ± 3	44 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1083	22	F	67 ± 6	18 ± 3	134 ± 4	64 ± 3	43 ± 2	183 ± 5	9 ± 3	663 ± 24	357 ± 20	NM ± NM	1.71 ± 0.08	NM	Quartz Mountain	
35-JE-49	1083	22	G	52 ± 6	17 ± 3	129 ± 4	57 ± 3	39 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1083	22	H	48 ± 7	17 ± 4	139 ± 5	70 ± 3	42 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

C.1-152

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-JE-49	1083	22	I	35 ± 8	19 ± 4	90 ± 4	24 ± 3	52 ± 2	92 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-49	1083	22	J	50 ± 7	17 ± 4	132 ± 4	64 ± 3	43 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1083	22	K	56 ± 7	13 ± 4	141 ± 5	65 ± 3	44 ± 2	288 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1087	4	A	55 ± 6	19 ± 3	138 ± 4	59 ± 3	45 ± 2	277 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1087	4	B	49 ± 7	20 ± 4	131 ± 4	58 ± 3	44 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1090	3	A	34 ± 6	15 ± 3	78 ± 4	98 ± 3	16 ± 2	91 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	1090	3	B	56 ± 6	11 ± 4	79 ± 4	92 ± 3	23 ± 2	195 ± 5	11 ± 3	1154 ± 26	390 ± 20	NM ± NM	1.86 ± 0.08	NM ± NM	NM ± NM	Unknown I
35-JE-49	1090	3	C	58 ± 6	19 ± 3	140 ± 4	58 ± 3	43 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1091	6	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown (MV)
35-JE-49	1097	4	A	57 ± 6	13 ± 3	116 ± 4	52 ± 3	38 ± 2	164 ± 5	6 ± 3	584 ± 23	372 ± 20	NM ± NM	1.64 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	1097	4	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs (MV)
35-JE-49	1101	1	A	46 ± 7	22 ± 4	91 ± 4	114 ± 4	17 ± 2	97 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	1107	4	A	73 ± 6	25 ± 3	137 ± 5	58 ± 3	42 ± 2	181 ± 5	8 ± 3	573 ± 27	329 ± 20	NM ± NM	1.62 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	1109	2	—	72 ± 7	14 ± 4	135 ± 5	58 ± 3	45 ± 2	276 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1109	7	A	85 ± 6	20 ± 3	98 ± 4	35 ± 3	57 ± 2	129 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-JE-49	1109	7	B	55 ± 7	19 ± 4	134 ± 5	69 ± 3	42 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1109	7	C	51 ± 6	17 ± 3	133 ± 4	59 ± 3	42 ± 2	271 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1109	7	D	60 ± 6	19 ± 3	136 ± 4	62 ± 3	47 ± 2	286 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1112	1	—	60 ± 5	19 ± 3	130 ± 4	57 ± 3	42 ± 2	275 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1113	2	A	72 ± 7	19 ± 4	95 ± 4	119 ± 3	20 ± 2	107 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-49	1115	2	D	39 ± 6	15 ± 3	124 ± 4	55 ± 3	38 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1115	2	E	60 ± 6	17 ± 3	139 ± 4	58 ± 3	43 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-153

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	1115	5	—	54 ± 7	14 ± 4	78 ± 5	113 ± 4	18 ± 2	100 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-49	1117	2	A	55 ± 6	20 ± 3	143 ± 4	61 ± 3	46 ± 2	291 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1119	6	A	60 ± 6	18 ± 3	143 ± 4	66 ± 3	45 ± 2	293 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1119	9	—	77 ± 6	15 ± 3	98 ± 4	35 ± 3	57 ± 2	126 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-JE-49	1120	2	A	78 ± 7	24 ± 4	164 ± 5	66 ± 3	45 ± 2	304 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1121	1	B	74 ± 7	19 ± 4	149 ± 5	66 ± 3	49 ± 2	181 ± 5	7 ± 3	618 ± 28	339 ± 20	NM ± NM	1.65 ± 0.08	NM	Quartz Mountain	
35-JE-49	1122	2	A	53 ± 7	16 ± 4	132 ± 5	61 ± 3	42 ± 2	276 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1124	1	B	58 ± 6	20 ± 3	140 ± 4	65 ± 3	46 ± 2	291 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1126	3	A	69 ± 6	21 ± 4	149 ± 5	65 ± 3	48 ± 2	294 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1128	2	A	102 ± 7	26 ± 4	164 ± 5	71 ± 3	51 ± 2	194 ± 5	6 ± 3	598 ± 28	346 ± 20	NM ± NM	1.64 ± 0.08	NM	Quartz Mountain	
35-JE-49	1128	5	—	29 ± 6	13 ± 3	103 ± 4	73 ± 3	20 ± 2	116 ± 5	6 ± 3	898 ± 26	301 ± 20	NM ± NM	1.19 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-JE-49	1129	2	A	73 ± 6	21 ± 3	140 ± 4	67 ± 3	47 ± 2	294 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1131	4	—	77 ± 7	24 ± 4	133 ± 5	59 ± 3	44 ± 2	183 ± 5	9 ± 3	615 ± 26	299 ± 20	NM ± NM	1.51 ± 0.08	NM	Quartz Mountain	
35-JE-49	1134	2	A	65 ± 7	20 ± 4	147 ± 5	69 ± 3	45 ± 2	294 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1141	4	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)
35-JE-49	1141	4	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)
35-JE-49	1141	4	C	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)
35-JE-49	1146	4	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs (MV)
35-JE-49	1150	2	A	57 ± 7	26 ± 4	92 ± 5	102 ± 4	28 ± 2	137 ± 5	6 ± 3	1170 ± 30	387 ± 20	NM ± NM	1.54 ± 0.08	NM	Whitewater Ridge?	
35-JE-49	1150	2	B	63 ± 6	19 ± 4	144 ± 5	61 ± 3	47 ± 2	292 ± 5	15 ± 3	NM ± 25	NM ± 20	NM ± NM	NM ± 0.08	NM	Newberry Volcano	
35-JE-49	1151	2	A	50 ± 6	14 ± 4	134 ± 4	65 ± 3	45 ± 2	286 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1151	2	B	79 ± 6	21 ± 4	150 ± 5	66 ± 3	45 ± 2	187 ± 5	6 ± 3	574 ± NA	346 ± NA	NM ± NM	1.70 ± NA	NM	Quartz Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	1151	2	C	44 ± 6	23 ± 3	132 ± 4	63 ± 3	40 ± 2	279 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1151	2	D	63 ± 7	18 ± 4	143 ± 5	59 ± 3	43 ± 2	183 ± 5	7 ± 3	668 ± 27	349 ± 20	NM ± NM	1.70 ± 0.08	NM ± NM	NM	Quartz Mountain
35-JE-49	1151	2	E	67 ± 6	17 ± 3	97 ± 4	42 ± 3	64 ± 2	366 ± 5	15 ± 3	1812 ± 31	519 ± 20	NM ± NM	2.26 ± 0.08	NM ± NM	NM	Big Obsidian Flow?
35-JE-49	1151	2	F	62 ± 7	19 ± 4	149 ± 5	64 ± 3	43 ± 2	291 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1151	2	G	67 ± 6	16 ± 4	138 ± 4	64 ± 3	48 ± 2	288 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1151	2	H	73 ± 7	21 ± 4	134 ± 5	65 ± 3	42 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1151	2	I	71 ± 8	18 ± 4	144 ± 5	64 ± 3	45 ± 2	286 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1151	2	J	48 ± 7	19 ± 4	86 ± 4	22 ± 3	50 ± 2	91 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-49	1151	2	K	51 ± 6	17 ± 3	131 ± 4	60 ± 3	43 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1151	7	—	31 ± 6	13 ± 3	67 ± 4	96 ± 3	16 ± 2	89 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-49	1152	2	A	57 ± 6	17 ± 4	137 ± 4	67 ± 3	49 ± 2	295 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1152	2	B	64 ± 7	18 ± 4	121 ± 4	59 ± 3	45 ± 2	174 ± 5	9 ± 3	565 ± 25	304 ± 20	NM ± NM	1.41 ± 0.08	NM ± NM	NM	Quartz Mountain
35-JE-49	1152	2	C	60 ± 7	25 ± 4	126 ± 5	61 ± 3	44 ± 2	281 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1152	2	D	63 ± 7	20 ± 4	137 ± 5	65 ± 3	44 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1152	2	E	55 ± 6	20 ± 3	136 ± 4	58 ± 3	41 ± 2	273 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1152	8	—	48 ± 5	17 ± 3	126 ± 4	59 ± 3	42 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1153	2	A	63 ± 6	24 ± 3	137 ± 4	67 ± 3	44 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1154	1	—	44 ± 6	18 ± 3	126 ± 4	55 ± 3	38 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1157	2	A	58 ± 6	15 ± 3	131 ± 4	58 ± 3	43 ± 2	271 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1160	2	A	53 ± 6	19 ± 3	130 ± 4	59 ± 3	44 ± 2	274 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1160	2	B	49 ± 7	14 ± 4	134 ± 5	59 ± 3	44 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1160	2	C	54 ± 7	27 ± 4	152 ± 5	62 ± 3	44 ± 2	283 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	1163	5	A	49 ± 7	18 ± 4	138 ± 5	59 ± 3	42 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1163	5	B	47 ± 7	26 ± 4	137 ± 5	58 ± 3	44 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1167	2	A	48 ± 6	14 ± 3	132 ± 4	58 ± 3	43 ± 2	275 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1167	2	B	66 ± 7	21 ± 4	146 ± 5	69 ± 3	49 ± 2	306 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1170	2	A	51 ± 6	17 ± 3	123 ± 4	60 ± 3	40 ± 2	259 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1170	2	B	53 ± 7	16 ± 4	138 ± 4	60 ± 3	47 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1180	4	A	54 ± 7	17 ± 4	136 ± 5	62 ± 3	42 ± 2	287 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1180	4	B	60 ± 7	13 ± 4	151 ± 5	61 ± 3	45 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1182	1	—	51 ± 6	17 ± 3	122 ± 4	35 ± 3	44 ± 2	248 ± 5	13 ± 3	958 ± 26	406 ± 20	NM ± NM	1.80 ± 0.08	NM ± NM	NM ± NM	Chickahominy
35-JE-49	1183	5	A	63 ± 6	22 ± 3	132 ± 4	55 ± 3	45 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1185	3	A	48 ± 7	22 ± 3	125 ± 5	58 ± 3	41 ± 2	264 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1188	3	A	53 ± 6	18 ± 3	127 ± 4	56 ± 3	41 ± 2	260 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1188	3	B	61 ± 7	25 ± 4	138 ± 5	67 ± 3	43 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1188	3	C	40 ± 6	20 ± 3	78 ± 4	168 ± 4	19 ± 2	185 ± 5	7 ± 3	1514 ± 30	420 ± 20	NM ± NM	1.88 ± 0.08	NM ± NM	NM ± NM	Unknown F
35-JE-49	1189	4	A	65 ± 6	18 ± 4	140 ± 5	61 ± 3	45 ± 2	282 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1190	2	A	61 ± 7	18 ± 4	141 ± 5	62 ± 3	39 ± 2	284 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1192	3	A	65 ± 7	16 ± 4	137 ± 5	60 ± 3	47 ± 2	281 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1203	2	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown (MV)
35-JE-49	1205	5	A	50 ± 6	21 ± 3	138 ± 4	59 ± 3	45 ± 2	278 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1205	5	B	66 ± 7	20 ± 4	132 ± 5	62 ± 3	43 ± 2	180 ± 5	7 ± 3	557 ± 25	310 ± 20	NM ± NM	1.47 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-49	1205	5	C	62 ± 7	20 ± 4	143 ± 5	62 ± 3	47 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-49	1210	3	A	48 ± 6	15 ± 4	125 ± 4	58 ± 3	42 ± 2	261 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-49	1216	2	A	63 ± 6	16 ± 4	144 ± 5	62 ± 3	43 ± 2	285 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1216	2	B	58 ± 7	26 ± 4	144 ± 5	67 ± 3	48 ± 2	296 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-49	1226	5	A	94 ± 7	23 ± 4	162 ± 5	69 ± 3	46 ± 2	191 ± 5	5 ± 3	693 ± 27	377 ± 20	NM ± NM	1.78 ± 0.08	NM	Quartz Mountain	
35-JE-49	1226	5	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)	
35-JE-49	1227	3	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)	
35-JE-49	1228	4	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)	
35-JE-49	1229	2	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)	
35-JE-49	1230	3	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)	
35-JE-49	1231	4	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)	
35-JE-49	1232	2	A	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown (MV)	
35-JE-49	1306	2	A	64 ± 7	18 ± 4	150 ± 5	64 ± 3	46 ± 2	194 ± 5	8 ± 3	757 ± 27	355 ± 20	NM ± NM	1.74 ± 0.08	NM	Quartz Mountain	
35-JE-49	1319	1	A	55 ± 6	17 ± 3	144 ± 4	63 ± 3	45 ± 2	285 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-49	1476	16	—	93 ± 6	20 ± 3	130 ± 4	60 ± 3	43 ± 2	174 ± 5	6 ± 3	653 ± 24	322 ± 20	NM ± NM	1.58 ± 0.08	NM	Quartz Mountain	
35-JE-49	1476	17	—	66 ± 6	20 ± 3	126 ± 4	56 ± 3	40 ± 2	168 ± 5	9 ± 3	673 ± 27	346 ± 20	NM ± NM	1.62 ± 0.08	NM	Quartz Mountain	
35-JE-50	67	2	—	36 ± 6	15 ± 3	83 ± 5	23 ± 3	53 ± 2	87 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-50	167	2	—	57 ± 6	17 ± 3	96 ± 5	23 ± 3	54 ± 2	93 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-50	168	1	—	68 ± 7	17 ± 4	153 ± 6	64 ± 3	45 ± 2	289 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-50	206	2	—	62 ± 6	20 ± 3	137 ± 5	70 ± 3	50 ± 2	295 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-50	504	1	—	50 ± 6	19 ± 3	78 ± 4	107 ± 3	17 ± 2	99 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-50	505	1	—	44 ± 6	15 ± 3	84 ± 4	22 ± 3	50 ± 2	93 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-50	554	2	—	68 ± 7	24 ± 4	142 ± 5	62 ± 3	45 ± 2	185 ± 5	14 ± 3	721 ± 32	308 ± 20	NM ± NM	1.66 ± 0.08	NM	Quartz Mountain	
35-JE-50	609	1	—	58 ± 6	19 ± 3	142 ± 4	60 ± 3	45 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-50	643	2	—	92 ± 6	20 ± 3	109 ± 4	9 ± 3	61 ± 2	466 ± 5	28 ± 3	1443 ± 37	712 ± 21	NM ± NM	2.46 ± 0.08	NM NM	Riley	
35-JE-50	828	1	—	49 ± 7	19 ± 4	139 ± 5	61 ± 3	47 ± 2	292 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	839	2	—	67 ± 6	21 ± 3	134 ± 4	59 ± 3	43 ± 2	179 ± 5	10 ± 3	635 ± 28	367 ± 20	NM ± NM	1.80 ± 0.08	NM NM	Quartz Mountain	
35-JE-50	883	1	—	48 ± 6	18 ± 3	127 ± 4	55 ± 3	42 ± 2	268 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	933	3	—	63 ± 7	12 ± 4	150 ± 5	68 ± 3	48 ± 2	294 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	954	1	—	36 ± 6	14 ± 3	81 ± 4	22 ± 3	48 ± 2	90 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-50	955	1	—	52 ± 7	17 ± 4	139 ± 5	59 ± 3	41 ± 2	197 ± 5	10 ± 3	1275 ± 36	327 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-JE-50	982	1	—	84 ± 7	20 ± 4	161 ± 5	72 ± 3	47 ± 2	306 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	987	1	A	49 ± 7	19 ± 4	90 ± 4	115 ± 4	18 ± 2	101 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-50	990	1	—	58 ± 6	17 ± 3	131 ± 4	58 ± 3	42 ± 2	176 ± 5	5 ± 3	605 ± 27	344 ± 20	NM ± NM	1.72 ± 0.08	NM NM	Quartz Mountain	
35-JE-50	1005	1	—	40 ± 6	14 ± 4	91 ± 4	101 ± 3	27 ± 2	137 ± 5	8 ± 3	1219 ± 33	398 ± 20	NM ± NM	1.52 ± 0.08	NM NM	Juniper Spring 2/Whitewater Ridge	
35-JE-50	1110	1	A	50 ± 6	NM ± 3	NM ± 4	22 ± 3	8 ± 2	16 ± 5	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-JE-50	1110	1	B	55 ± 6	17 ± 3	126 ± 4	54 ± 3	41 ± 2	172 ± 5	7 ± 3	665 ± 29	362 ± 20	NM ± NM	1.77 ± 0.08	NM NM	Quartz Mountain	
35-JE-50	1126	1	—	61 ± 7	18 ± 4	146 ± 5	65 ± 3	45 ± 2	294 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	1136	1	—	75 ± 6	21 ± 3	140 ± 4	61 ± 3	46 ± 2	187 ± 5	7 ± 3	607 ± 29	331 ± 20	NM ± NM	1.63 ± 0.08	NM NM	Quartz Mountain	
35-JE-50	1138	2	—	39 ± 6	17 ± 3	127 ± 4	59 ± 3	42 ± 2	269 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	1159	1	—	66 ± 7	15 ± 4	132 ± 5	57 ± 3	39 ± 2	197 ± 5	10 ± 3	1150 ± 35	338 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	
35-JE-50	1232	2	A	43 ± 7	18 ± 3	94 ± 4	27 ± 3	55 ± 2	95 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-50	1256	1	—	56 ± 5	19 ± 3	127 ± 4	55 ± 3	41 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	1256	2	—	59 ± 6	19 ± 3	137 ± 4	60 ± 3	43 ± 2	278 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	1259	1	—	52 ± 5	19 ± 3	133 ± 4	57 ± 3	42 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-50	1265	3	A	44 ± 6	17 ± 3	136 ± 4	60 ± 3	43 ± 2	275 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-JE-50	1265	3	B	50 ± 6	17 ± 3	128 ± 4	58 ± 3	41 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-JE-50	1279	3	—	35 ± 6	14 ± 3	105 ± 4	73 ± 3	27 ± 2	109 ± 5	4 ± 3	692 ± 31	349 ± 20	1369 ± 17	0.97 ± 0.08	NM NM	Whitewater Ridge			
35-JE-50	1287	4	—	96 ± 8	28 ± 4	163 ± 5	72 ± 3	48 ± 3	195 ± 5	8 ± 3	760 ± 38	392 ± 21	NM ± NM	2.02 ± 0.08	NM NM	Quartz Mountain/McKay Butte			
35-JE-50	1288	1	—	64 ± 6	22 ± 3	139 ± 4	55 ± 3	43 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-50	1342	1	—	60 ± 6	18 ± 3	123 ± 4	55 ± 3	42 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-50	1348	3	A	49 ± 6	19 ± 3	139 ± 4	60 ± 3	44 ± 2	282 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-50	1349	1	—	54 ± 6	18 ± 3	102 ± 4	66 ± 3	31 ± 2	103 ± 5	6 ± 3	651 ± 30	344 ± 20	1389 ± 17	0.90 ± 0.08	NM NM	Whitewater Ridge			
35-JE-50	1380	1	—	38 ± 6	19 ± 3	80 ± 4	106 ± 3	16 ± 2	93 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-JE-50	1404	2	A	68 ± 8	21 ± 4	142 ± 5	65 ± 3	43 ± 2	191 ± 5	3 ± 3	550 ± 34	279 ± 21	NM ± NM	1.35 ± 0.08	NM NM	Quartz Mountain			
35-JE-50	1404	2	B	76 ± 6	20 ± 3	138 ± 4	56 ± 3	44 ± 2	183 ± 5	8 ± 3	529 ± 29	304 ± 20	NM ± NM	1.47 ± 0.08	NM NM	Quartz Mountain			
35-JE-50	1420	2	—	81 ± 6	24 ± 3	150 ± 5	65 ± 3	46 ± 2	197 ± 5	8 ± 3	605 ± 28	336 ± 20	NM ± NM	1.60 ± 0.08	NM NM	Quartz Mountain			
35-JE-50	1443	2	—	88 ± 8	25 ± 4	148 ± 5	66 ± 3	46 ± 2	189 ± 5	10 ± 3	698 ± 35	337 ± 21	NM ± NM	1.69 ± 0.08	NM NM	Quartz Mountain			
35-JE-50	1464	3	—	46 ± 8	22 ± 4	153 ± 5	107 ± 4	26 ± 2	141 ± 5	9 ± 3	1156 ± 42	318 ± 21	NM ± NM	1.36 ± 0.08	NM	Unknown A			
35-JE-51B	100	2	A	50 ± 6	16 ± 3	84 ± 5	109 ± 3	18 ± 2	100 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-JE-51B	100	2	B	50 ± 5	17 ± 3	78 ± 5	109 ± 3	17 ± 2	96 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-JE-51B	106	1	—	55 ± 7	21 ± 4	158 ± 6	65 ± 3	46 ± 2	308 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	121	2	A	47 ± 5	18 ± 3	80 ± 5	104 ± 3	15 ± 2	92 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-JE-51B	121	2	B	52 ± 6	14 ± 3	85 ± 5	108 ± 3	16 ± 2	95 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-JE-51B	131	1	A	69 ± 8	12 ± 5	136 ± 6	86 ± 4	30 ± 2	117 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge			
35-JE-51B	132	1	—	63 ± 7	21 ± 3	136 ± 5	59 ± 3	44 ± 2	279 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	133	3	—	50 ± 6	19 ± 4	142 ± 5	58 ± 3	44 ± 2	288 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	165	2	—	57 ± 7	17 ± 4	91 ± 5	98 ± 3	27 ± 2	136 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Juniper Spring 2/Whitewater Ridge			

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	166	1	—	51 ± 6	13 ± 4	92 ± 5	99 ± 3	23 ± 2	135 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Juniper Spring 2/Whitewater Ridge
35-JE-51B	190	6	—	52 ± 6	11 ± 4	117 ± 5	81 ± 3	23 ± 2	120 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-JE-51B	190	8	—	55 ± 6	21 ± 3	132 ± 5	58 ± 3	37 ± 2	195 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-51B	190	9	—	59 ± 5	21 ± 3	134 ± 5	59 ± 3	42 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	208	3	—	37 ± 5	17 ± 3	83 ± 5	19 ± 3	51 ± 2	83 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	209	3	—	177 ± 10	8 ± 5	106 ± 5	47 ± 3	43 ± 2	243 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A
35-JE-51B	215	9	A	62 ± 7	18 ± 4	140 ± 5	63 ± 3	50 ± 2	288 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	215	9	B	69 ± 5	6 ± 4	2 ± 5	1 ± 3	3 ± 2	10 ± 5	1 ± 6	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-JE-51B	215	9	C	63 ± 7	18 ± 4	90 ± 5	117 ± 4	21 ± 2	100 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	215	9	D	87 ± 7	22 ± 4	147 ± 6	63 ± 3	45 ± 2	190 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-51B	217	6	A	185 ± 8	24 ± 4	124 ± 5	33 ± 3	129 ± 3	507 ± 6	69 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B
35-JE-51B	217	6	B	57 ± 7	20 ± 3	89 ± 5	112 ± 3	18 ± 2	101 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	217	6	C	63 ± 7	21 ± 4	140 ± 5	58 ± 3	44 ± 2	286 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	217	6	D	73 ± 8	13 ± 5	143 ± 6	60 ± 3	46 ± 2	288 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	217	6	E	47 ± 5	15 ± 3	84 ± 5	20 ± 3	52 ± 2	88 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	217	6	F	52 ± 6	17 ± 4	81 ± 5	105 ± 3	18 ± 2	97 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	219	3	A	73 ± 6	27 ± 3	147 ± 5	62 ± 3	48 ± 2	295 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	219	3	B	57 ± 8	22 ± 4	159 ± 6	65 ± 3	45 ± 2	296 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	219	3	C	49 ± 7	18 ± 4	105 ± 5	72 ± 3	29 ± 2	106 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	219	3	D	85 ± 6	13 ± 4	136 ± 5	60 ± 3	49 ± 2	378 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-JE-51B	219	3	E	66 ± 7	18 ± 4	151 ± 5	68 ± 3	50 ± 2	305 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	219	3	F	65 ± 6	19 ± 3	101 ± 5	125 ± 3	21 ± 2	103 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	221	3	A	64 ± 7	20 ± 4	102 ± 5	22 ± 3	62 ± 2	98 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes?
35-JE-51B	221	3	B	48 ± 8	21 ± 4	99 ± 5	136 ± 4	18 ± 2	105 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs?
35-JE-51B	221	3	C	59 ± 7	11 ± 4	87 ± 5	116 ± 4	30 ± 2	158 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C
35-JE-51B	221	3	D	63 ± 6	22 ± 3	149 ± 5	61 ± 3	46 ± 2	291 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	221	3	E	49 ± 5	20 ± 3	136 ± 5	62 ± 3	39 ± 2	275 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	221	3	F	49 ± 6	18 ± 3	94 ± 5	128 ± 3	17 ± 2	103 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	221	3	G	50 ± 6	21 ± 3	134 ± 5	56 ± 3	46 ± 2	271 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	221	3	H	61 ± 7	21 ± 4	152 ± 5	62 ± 3	43 ± 2	304 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	221	3	I	53 ± 6	10 ± 4	90 ± 5	120 ± 3	17 ± 2	95 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	221	3	J	73 ± 7	14 ± 4	141 ± 5	53 ± 3	46 ± 2	278 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	221	3	K	58 ± 5	21 ± 3	97 ± 5	24 ± 3	53 ± 2	95 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	221	3	L	41 ± 6	13 ± 3	85 ± 5	108 ± 3	19 ± 2	97 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	223	5	A	109 ± 9	18 ± 5	166 ± 6	68 ± 3	51 ± 3	300 ± 6	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	223	5	B	60 ± 6	21 ± 3	146 ± 5	63 ± 3	46 ± 2	292 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	223	5	C	38 ± 5	14 ± 3	91 ± 5	24 ± 3	54 ± 2	90 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	223	5	D	78 ± 6	28 ± 4	152 ± 5	69 ± 3	49 ± 2	314 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	223	5	E	39 ± 5	19 ± 3	87 ± 5	23 ± 3	52 ± 2	87 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	223	5	F	57 ± 7	17 ± 4	93 ± 5	122 ± 4	20 ± 2	101 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	223	5	G	49 ± 5	15 ± 3	80 ± 5	116 ± 3	21 ± 2	97 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	223	5	H	60 ± 6	17 ± 3	88 ± 5	118 ± 3	20 ± 2	101 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	223	5	I	64 ± 6	15 ± 3	155 ± 5	62 ± 3	44 ± 2	291 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	223	5	J	69 ± 8	17 ± 5	165 ± 6	68 ± 3	50 ± 3	310 ± 6	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-161

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	223	5	K	58 ± 7	19 ± 4	87 ± 5	113 ± 3	21 ± 2	99 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	223	5	L	68 ± 7	17 ± 4	96 ± 5	123 ± 4	16 ± 2	100 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	223	5	M	73 ± 8	20 ± 4	150 ± 6	70 ± 3	52 ± 2	315 ± 6	23 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	227	2	A	45 ± 6	18 ± 3	89 ± 5	121 ± 3	21 ± 2	101 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	227	2	B	45 ± 6	11 ± 4	81 ± 5	104 ± 3	17 ± 2	93 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	227	2	C	50 ± 5	21 ± 3	139 ± 5	58 ± 3	43 ± 2	277 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	227	2	D	36 ± 5	12 ± 3	87 ± 5	93 ± 3	24 ± 2	126 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Juniper Spring 2
35-JE-51B	227	2	E	38 ± 5	11 ± 3	82 ± 5	92 ± 3	24 ± 2	129 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Juniper Spring 2
35-JE-51B	227	8	—	49 ± 6	12 ± 4	122 ± 5	51 ± 3	41 ± 2	246 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X?
35-JE-51B	227	9	—	49 ± 8	15 ± 4	87 ± 5	114 ± 4	19 ± 2	103 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	231	7	A	82 ± 7	23 ± 4	146 ± 5	62 ± 3	48 ± 2	188 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-51B	231	7	B	205 ± 10	20 ± 5	126 ± 6	1 ± 3	104 ± 3	682 ± 8	50 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Horse Mountain?
35-JE-51B	231	7	C	47 ± 6	15 ± 3	95 ± 5	24 ± 3	55 ± 2	88 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	231	7	D	44 ± 5	18 ± 3	91 ± 5	110 ± 3	18 ± 2	99 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	232	3	A	61 ± 6	24 ± 3	152 ± 5	58 ± 3	46 ± 2	289 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	232	3	B	57 ± 7	14 ± 4	91 ± 5	21 ± 3	54 ± 2	93 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	232	3	C	94 ± 9	18 ± 5	169 ± 6	74 ± 4	45 ± 3	304 ± 6	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	232	3	D	56 ± 7	22 ± 4	112 ± 5	74 ± 3	29 ± 2	109 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	232	3	E	61 ± 7	20 ± 4	104 ± 5	75 ± 3	30 ± 2	101 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	233	3	A	111 ± 10	23 ± 5	156 ± 6	99 ± 4	25 ± 3	133 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-JE-51B	233	3	B	76 ± 9	18 ± 5	93 ± 6	23 ± 3	55 ± 3	84 ± 5	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	237	2	—	68 ± 8	24 ± 4	97 ± 5	123 ± 4	14 ± 2	102 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	238	5	A	59 ± 7	20 ± 4	143 ± 5	60 ± 3	48 ± 2	288 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	238	5	B	37 ± 7	18 ± 3	73 ± 5	109 ± 3	18 ± 2	96 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	238	5	C	59 ± 8	22 ± 4	72 ± 5	172 ± 4	22 ± 2	191 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown D	
35-JE-51B	238	5	D	58 ± 6	16 ± 3	135 ± 5	54 ± 3	46 ± 2	275 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	241	4	A	96 ± 8	12 ± 5	119 ± 5	28 ± 3	62 ± 2	303 ± 5	23 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?	
35-JE-51B	241	4	B	91 ± 8	27 ± 4	159 ± 6	74 ± 3	44 ± 3	309 ± 6	26 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	241	4	C	62 ± 7	21 ± 4	84 ± 5	111 ± 3	15 ± 2	94 ± 4	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	241	4	D	43 ± 7	20 ± 3	83 ± 5	112 ± 3	17 ± 2	97 ± 4	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	241	4	E	76 ± 7	15 ± 4	86 ± 5	108 ± 4	16 ± 2	98 ± 4	3 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	241	4	F	60 ± 7	NM ± 4	NM ± 5	6 ± 3	4 ± 2	11 ± 5	3 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian	
35-JE-51B	246	4	—	65 ± 6	19 ± 3	98 ± 5	47 ± 3	34 ± 2	135 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain?	
35-JE-51B	248	6	—	83 ± 7	12 ± 4	135 ± 5	55 ± 3	43 ± 2	178 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte	
35-JE-51B	252	2	—	45 ± 6	21 ± 3	92 ± 5	121 ± 3	18 ± 2	99 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	343	2	A	59 ± 8	18 ± 5	135 ± 5	94 ± 4	23 ± 2	136 ± 5	7 ± 3	884 ± 30	305 ± 20	NM ± NM	1.17 ± 0.08	NM	Whitewater Ridge	
35-JE-51B	498	6	A	72 ± 7	13 ± 5	110 ± 4	46 ± 3	43 ± 2	320 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow	
35-JE-51B	498	6	C	47 ± 7	17 ± 4	127 ± 5	55 ± 3	38 ± 2	188 ± 5	7 ± 3	1097 ± 26	363 ± 20	NM ± NM	1.77 ± 0.08	NM	McKay Butte	
35-JE-51B	498	10	—	41 ± 7	19 ± 4	77 ± 5	87 ± 3	23 ± 2	121 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Juniper Spring 2	
35-JE-51B	499	6	A	61 ± 7	21 ± 4	151 ± 5	63 ± 3	45 ± 2	289 ± 5	16 ± 3	NM ± 28	NM ± 20	NM ± NM	NM ± 0.08	NM	Newberry Volcano	
35-JE-51B	499	6	B	76 ± 7	21 ± 4	153 ± 5	59 ± 3	46 ± 2	177 ± 5	6 ± 3	528 ± NA	298 ± NA	NM ± NA	1.40 ± NA	NM	Quartz Mountain	
35-JE-51B	499	6	C	69 ± 7	22 ± 4	146 ± 5	64 ± 3	47 ± 2	290 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	499	6	D	85 ± 6	18 ± 3	132 ± 4	58 ± 3	47 ± 2	370 ± 5	24 ± 3	1275 ± 30	503 ± 20	NM ± NM	2.12 ± 0.08	NM	Big Obsidian Flow	
35-JE-51B	499	6	F	47 ± 6	17 ± 3	122 ± 4	52 ± 3	40 ± 2	261 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Fe <sub>2</sub> O <sub>3</sub>	Ratio Fe/Mn	Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba				
35-JE-51B	500	4	A	53 ± 7	17 ± 4	81 ± 4	108 ± 4	21 ± 2	97 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-51B	500	4	B	57 ± 7	16 ± 4	124 ± 5	5 ± 3	73 ± 2	85 ± 5	13 ± 3	456 ± 22	373 ± 20	NM ± NM	0.66 ± 0.08	NM ± NM	Potato Hills	
35-JE-51B	500	4	C	66 ± 8	18 ± 5	157 ± 5	69 ± 3	49 ± 3	302 ± 6	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	500	4	D	42 ± 7	19 ± 4	81 ± 4	108 ± 3	17 ± 2	97 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-51B	500	4	E	69 ± 8	14 ± 4	140 ± 5	63 ± 3	43 ± 2	274 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	500	4	F	51 ± 7	14 ± 4	85 ± 4	108 ± 3	17 ± 2	96 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-51B	500	4	G	68 ± 7	23 ± 4	126 ± 4	55 ± 3	48 ± 2	354 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow	
35-JE-51B	500	4	H	53 ± 7	17 ± 4	86 ± 4	118 ± 3	18 ± 2	102 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-51B	500	12	—	127 ± 7	11 ± 4	117 ± 5	5 ± 3	53 ± 2	321 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-JE-51B	500	13	—	38 ± 7	12 ± 4	67 ± 5	87 ± 3	24 ± 2	120 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Juniper Spring 2	
35-JE-51B	501	5	A	78 ± 7	19 ± 4	124 ± 5	56 ± 3	42 ± 2	168 ± 5	8 ± 3	539 ± 26	326 ± 20	NM ± NM	1.46 ± 0.08	NM ± NM	Quartz Mountain	
35-JE-51B	501	5	B	56 ± 6	19 ± 3	146 ± 4	63 ± 3	44 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	501	5	C	91 ± 6	15 ± 4	135 ± 4	62 ± 3	42 ± 2	276 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	501	5	D	56 ± 7	18 ± 4	139 ± 5	59 ± 3	43 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	501	5	E	36 ± 7	20 ± 3	107 ± 4	67 ± 3	26 ± 2	104 ± 5	7 ± 3	618 ± 26	347 ± 20	NM ± NM	0.87 ± 0.08	NM ± NM	Little Bear Creek/Whitewater Ridge	
35-JE-51B	501	5	F	59 ± 7	17 ± 4	140 ± 5	57 ± 3	44 ± 2	280 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	501	5	G	76 ± 6	19 ± 3	110 ± 4	3 ± 3	49 ± 2	312 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-JE-51B	501	5	H	69 ± 7	15 ± 4	93 ± 4	116 ± 4	15 ± 2	98 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-51B	501	5	I	57 ± 7	19 ± 4	143 ± 5	61 ± 3	48 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	502	4	A	44 ± 7	17 ± 4	101 ± 4	79 ± 3	26 ± 2	112 ± 5	2 ± 3	777 ± 29	367 ± 20	NM ± NM	1.03 ± 0.08	NM ± NM	Little Bear Creek/Whitewater Ridge	
35-JE-51B	502	4	B	55 ± 7	19 ± 4	153 ± 5	64 ± 3	46 ± 2	296 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	502	4	C	62 ± 7	25 ± 4	150 ± 5	63 ± 3	45 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-JE-51B	502	4	D	58 ± 7	15 ± 4	134 ± 5	63 ± 3	47 ± 2	277 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	502	4	E	71 ± 7	24 ± 4	129 ± 5	54 ± 3	52 ± 2	360 ± 6	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-JE-51B	502	4	F	60 ± 6	14 ± 3	123 ± 4	55 ± 3	42 ± 2	167 ± 5	8 ± 3	590 ± 23	334 ± 20	NM ± NM	1.53 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-51B	506	4	A	46 ± 6	15 ± 4	121 ± 4	52 ± 3	38 ± 2	259 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	506	4	B	69 ± 8	20 ± 4	138 ± 5	59 ± 3	39 ± 2	273 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	506	4	C	60 ± 8	27 ± 4	129 ± 5	53 ± 3	47 ± 2	354 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-JE-51B	506	4	D	54 ± 7	21 ± 4	152 ± 5	60 ± 3	44 ± 2	294 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	506	4	E	68 ± 7	19 ± 4	132 ± 5	54 ± 3	48 ± 2	361 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-JE-51B	506	4	F	58 ± 7	18 ± 4	150 ± 5	66 ± 3	48 ± 2	295 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	506	4	G	48 ± 7	23 ± 4	130 ± 5	53 ± 3	39 ± 2	252 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	506	13	—	54 ± 6	18 ± 3	110 ± 4	51 ± 3	44 ± 2	331 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-JE-51B	507	4	A	46 ± 6	17 ± 3	74 ± 4	100 ± 3	14 ± 2	91 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	507	4	B	76 ± 7	24 ± 4	129 ± 5	57 ± 3	49 ± 2	365 ± 6	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-JE-51B	508	9	—	67 ± 7	21 ± 4	136 ± 5	60 ± 3	43 ± 2	180 ± 5	9 ± 3	652 ± 30	329 ± 20	NM ± NM	1.60 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-51B	509	4	A	75 ± 7	26 ± 4	156 ± 5	66 ± 3	51 ± 2	302 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	510	4	A	90 ± 8	16 ± 4	159 ± 5	69 ± 3	45 ± 2	198 ± 5	11 ± 3	647 ± 29	350 ± 20	NM ± NM	1.60 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-51B	510	4	B	74 ± 7	27 ± 4	134 ± 5	57 ± 3	49 ± 2	374 ± 6	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-JE-51B	510	4	C	88 ± 8	21 ± 4	158 ± 5	70 ± 3	49 ± 2	198 ± 5	9 ± 3	560 ± 27	342 ± 20	NM ± NM	1.53 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-51B	510	4	D	36 ± 6	17 ± 3	87 ± 4	24 ± 3	52 ± 2	90 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-51B	511	3	A	49 ± 6	22 ± 3	88 ± 4	114 ± 3	18 ± 2	101 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	511	3	B	62 ± 7	20 ± 4	153 ± 5	64 ± 3	47 ± 2	304 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	511	3	C	72 ± 7	22 ± 4	151 ± 5	70 ± 3	47 ± 2	306 ± 5	18 ± 3	1254 ± 33	431 ± 20	NM ± NM	1.91 ± 0.08	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	517	3	A	61 ± 7	20 ± 4	154 ± 5	71 ± 3	48 ± 2	302 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	517	3	B	49 ± 5	16 ± 3	134 ± 4	55 ± 3	38 ± 2	194 ± 5	8 ± 3	1019 ± 26	380 ± 20	NM ± NM	1.73 ± 0.08	NM	McKay Butte	
35-JE-51B	519	3	A	63 ± 6	22 ± 3	97 ± 4	119 ± 4	17 ± 2	101 ± 5	10 ± 3	578 ± NA	328 ± NA	NM ± NM	1.54 ± NA	NM	Obsidian Cliffs	
35-JE-51B	519	3	B	60 ± 6	16 ± 3	95 ± 4	120 ± 3	18 ± 2	101 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	519	3	C	58 ± 6	19 ± 3	142 ± 4	59 ± 3	45 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	519	3	D	33 ± 6	14 ± 3	72 ± 4	93 ± 3	18 ± 2	89 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	521	3	A	62 ± 6	21 ± 3	136 ± 4	61 ± 3	42 ± 2	186 ± 5	6 ± 3	578 ± 25	328 ± 20	NM ± NM	1.54 ± 0.08	NM	Quartz Mountain	
35-JE-51B	525	6	A	76 ± 7	22 ± 4	164 ± 5	65 ± 3	46 ± 2	224 ± 5	9 ± 3	1189 ± 33	384 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte	
35-JE-51B	525	6	B	64 ± 6	23 ± 4	144 ± 5	62 ± 3	43 ± 2	209 ± 5	6 ± 3	893 ± 29	311 ± 20	NM ± NM	1.57 ± 0.08	NM	McKay Butte	
35-JE-51B	525	6	C	72 ± 6	18 ± 3	154 ± 4	67 ± 3	48 ± 2	299 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	525	6	D	74 ± 6	21 ± 3	149 ± 4	64 ± 3	43 ± 2	298 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	525	6	E	40 ± 6	11 ± 3	83 ± 4	106 ± 3	16 ± 2	96 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	525	9	—	58 ± 7	13 ± 3	105 ± 4	46 ± 3	45 ± 2	322 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow	
35-JE-51B	526	7	A	53 ± 7	16 ± 4	142 ± 5	60 ± 3	44 ± 2	207 ± 5	13 ± 3	1031 ± 29	351 ± 20	NM ± NM	1.60 ± 0.08	NM	McKay Butte	
35-JE-51B	526	7	B	58 ± 6	20 ± 3	146 ± 4	62 ± 3	48 ± 2	297 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	526	9	—	40 ± 7	19 ± 3	84 ± 4	90 ± 3	27 ± 2	130 ± 5	3 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Juniper Spring 2	
35-JE-51B	527	5	A	80 ± 7	23 ± 3	124 ± 4	56 ± 3	51 ± 2	362 ± 5	24 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow	
35-JE-51B	527	5	B	87 ± 7	17 ± 4	138 ± 5	60 ± 3	52 ± 2	380 ± 6	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow	
35-JE-51B	527	5	C	72 ± 7	20 ± 4	155 ± 5	64 ± 3	46 ± 2	304 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	527	5	D	73 ± 7	16 ± 4	155 ± 5	71 ± 3	53 ± 2	306 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	527	5	E	56 ± 6	18 ± 3	143 ± 4	63 ± 3	45 ± 2	297 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	527	5	F	59 ± 6	17 ± 3	143 ± 4	60 ± 3	41 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	527	12	—	38 ± 7	16 ± 3	114 ± 4	49 ± 3	38 ± 2	242 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Bald Butte
35-JE-51B	528	4	A	103 ± 7	25 ± 3	100 ± 4	81 ± 3	78 ± 2	407 ± 5	20 ± 3	1320 ± 30	623 ± 20	NM ± NM	2.24 ± 0.08	NM	NM	Unknown E
35-JE-51B	528	4	B	64 ± 6	17 ± 3	140 ± 4	58 ± 3	46 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	528	4	C	58 ± 6	17 ± 3	120 ± 4	6 ± 3	71 ± 2	86 ± 5	14 ± 3	386 ± 21	408 ± 20	NM ± NM	0.65 ± 0.08	NM	NM	Potato Hills
35-JE-51B	528	4	D	60 ± 7	27 ± 4	153 ± 5	66 ± 3	46 ± 2	300 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	528	4	E	81 ± 7	29 ± 4	158 ± 5	65 ± 3	48 ± 2	309 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	528	4	F	61 ± 7	22 ± 4	115 ± 4	48 ± 3	41 ± 2	336 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Big Obsidian Flow
35-JE-51B	528	4	G	64 ± 7	28 ± 3	117 ± 4	52 ± 3	49 ± 2	350 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Big Obsidian Flow
35-JE-51B	528	4	H	66 ± 6	20 ± 3	123 ± 4	53 ± 3	48 ± 2	359 ± 5	24 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Big Obsidian Flow
35-JE-51B	528	4	I	73 ± 7	20 ± 4	153 ± 5	67 ± 3	49 ± 2	302 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	528	4	J	52 ± 7	21 ± 3	148 ± 5	65 ± 3	45 ± 2	294 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	528	4	K	68 ± 7	21 ± 4	159 ± 5	69 ± 3	51 ± 2	301 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	528	4	L	45 ± 6	17 ± 3	131 ± 4	58 ± 3	41 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	528	4	M	33 ± 6	11 ± 3	79 ± 4	22 ± 3	49 ± 2	85 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes
35-JE-51B	528	4	N	44 ± 5	14 ± 3	83 ± 4	109 ± 3	17 ± 2	97 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-JE-51B	528	6	—	42 ± 7	16 ± 4	110 ± 5	81 ± 3	21 ± 2	121 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-JE-51B	528	9	—	52 ± 7	11 ± 4	127 ± 5	52 ± 3	43 ± 2	270 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	528	10	—	46 ± 7	18 ± 4	125 ± 5	53 ± 3	41 ± 2	261 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	529	3	A	84 ± 7	29 ± 4	153 ± 5	66 ± 3	44 ± 2	299 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	529	3	B	50 ± 6	10 ± 4	95 ± 4	101 ± 3	26 ± 2	136 ± 5	9 ± 3	1032 ± 28	387 ± 20	NM ± NM	1.42 ± 0.08	NM	NM	Whitewater Ridge
35-JE-51B	529	3	C	57 ± 6	16 ± 3	149 ± 4	64 ± 3	47 ± 2	298 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	529	6	—	41 ± 7	13 ± 3	78 ± 4	108 ± 3	16 ± 2	97 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	532	5	—	74 ± 7	19 ± 3	139 ± 4	65 ± 3	44 ± 2	186 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-51B	533	2	A	75 ± 7	23 ± 3	142 ± 4	59 ± 3	54 ± 2	388 ± 5	22 ± 3	1203 ± 28	519 ± 20	NM ± NM	2.16 ± 0.08	NM	NM	Big Obsidian Flow
35-JE-51B	534	4	A	45 ± 6	24 ± 3	87 ± 4	109 ± 3	19 ± 2	98 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-JE-51B	542	3	A	55 ± 6	18 ± 3	141 ± 4	62 ± 3	43 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	555	2	A	67 ± 7	27 ± 3	135 ± 5	66 ± 3	45 ± 2	306 ± 5	21 ± 3	1217 ± 32	384 ± 20	NM ± NM	1.75 ± 0.08	NM	NM	Newberry Volcano
35-JE-51B	557	1	A	48 ± 6	19 ± 3	136 ± 4	57 ± 3	45 ± 2	274 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	566	1	A	70 ± 7	22 ± 4	152 ± 5	61 ± 3	46 ± 2	295 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	568	4	A	92 ± 8	17 ± 5	133 ± 5	53 ± 3	48 ± 2	370 ± 6	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Big Obsidian Flow
35-JE-51B	568	4	B	53 ± 6	18 ± 3	124 ± 4	55 ± 3	41 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	569	3	A	66 ± 6	20 ± 3	122 ± 4	54 ± 3	50 ± 2	347 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Big Obsidian Flow
35-JE-51B	572	5	A	56 ± 7	20 ± 4	146 ± 5	68 ± 3	45 ± 2	219 ± 5	8 ± 3	1000 ± 29	346 ± 20	NM ± NM	1.70 ± 0.08	NM	NM	McKay Butte
35-JE-51B	572	6	—	82 ± 7	20 ± 4	128 ± 5	56 ± 3	53 ± 2	383 ± 5	25 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Big Obsidian Flow
35-JE-51B	574	2	A	59 ± 7	24 ± 4	146 ± 5	64 ± 3	45 ± 2	300 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	575	2	A	57 ± 7	26 ± 3	91 ± 4	114 ± 4	18 ± 2	104 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-JE-51B	576	2	—	49 ± 6	15 ± 4	129 ± 4	54 ± 3	43 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	576	3	A	74 ± 6	19 ± 4	135 ± 4	56 ± 3	52 ± 2	374 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Big Obsidian Flow
35-JE-51B	576	3	B	63 ± 6	24 ± 3	129 ± 4	57 ± 3	39 ± 2	167 ± 5	9 ± 3	631 ± 27	345 ± 20	NM ± NM	1.56 ± 0.08	NM	NM	Quartz Mountain
35-JE-51B	586	5	A	60 ± 6	14 ± 4	130 ± 4	55 ± 3	40 ± 2	269 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	586	5	B	66 ± 7	19 ± 4	150 ± 5	66 ± 3	49 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	586	5	C	72 ± 8	26 ± 4	145 ± 5	67 ± 3	52 ± 2	195 ± 5	12 ± 3	622 ± 29	328 ± 20	NM ± NM	1.46 ± 0.08	NM	NM	Quartz Mountain
35-JE-51B	587	3	A	59 ± 7	19 ± 4	142 ± 5	59 ± 3	43 ± 2	285 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-JE-51B	587	3	B	48 ± 8	20 ± 4	142 ± 5	57 ± 3	43 ± 2	208 ± 5	11 ± 3	1005 ± 32	344 ± 20	NM ± NM	1.64 ± 0.08	NM	NM	McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	587	3	C	72 ± 6	17 ± 3	96 ± 4	36 ± 3	56 ± 2	128 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-JE-51B	597	3	A	40 ± 8	9 ± 5	130 ± 5	100 ± 4	24 ± 2	139 ± 5	9 ± 3	832 ± 33	297 ± 20	NM ± NM	1.07 ± 0.08	NM ± NM	NM	Whitewater Ridge?
35-JE-51B	597	3	B	46 ± 7	19 ± 4	95 ± 4	26 ± 3	53 ± 2	98 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	629	2	A	52 ± 6	22 ± 3	91 ± 4	117 ± 3	18 ± 2	102 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	630	4	A	46 ± 7	20 ± 4	116 ± 5	76 ± 3	33 ± 2	112 ± 5	7 ± 3	622 ± 32	336 ± 20	NM ± NM	0.85 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	636	5	A	62 ± 6	16 ± 4	124 ± 4	54 ± 3	49 ± 2	345 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-JE-51B	638	6	—	45 ± 6	18 ± 3	81 ± 4	108 ± 3	17 ± 2	99 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	648	2	A	32 ± 6	12 ± 3	98 ± 4	66 ± 3	29 ± 2	101 ± 5	6 ± 3	589 ± 26	366 ± 20	NM ± NM	0.93 ± 0.08	NM ± NM	NM	Little Bear Cr./Whitewater R./Juniper Sp. 1
35-JE-51B	649	5	A	53 ± 6	19 ± 3	95 ± 4	25 ± 3	56 ± 2	95 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	649	5	B	55 ± 6	23 ± 3	130 ± 4	59 ± 3	42 ± 2	269 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	649	9	—	40 ± 7	11 ± 4	130 ± 4	65 ± 3	27 ± 2	114 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	655	4	A	41 ± 7	15 ± 4	108 ± 4	78 ± 3	30 ± 2	115 ± 5	12 ± 3	615 ± 27	375 ± 20	NM ± NM	0.97 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	655	4	B	63 ± 6	20 ± 4	137 ± 5	62 ± 3	42 ± 2	283 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	658	7	A	78 ± 7	16 ± 4	143 ± 5	68 ± 3	48 ± 2	306 ± 5	13 ± 3	1212 ± 33	392 ± 20	NM ± NM	1.73 ± 0.08	NM ± NM	NM	Newberry Volcano
35-JE-51B	662	2	A	38 ± 6	22 ± 3	80 ± 4	107 ± 3	15 ± 2	100 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	662	2	B	40 ± 7	12 ± 4	85 ± 4	112 ± 3	18 ± 2	101 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	663	2	—	68 ± 6	18 ± 3	130 ± 4	57 ± 3	43 ± 2	175 ± 5	6 ± 3	595 ± 25	357 ± 20	NM ± NM	1.59 ± 0.08	NM ± NM	NM	Quartz Mountain
35-JE-51B	663	4	A	59 ± 6	21 ± 3	83 ± 4	110 ± 3	18 ± 2	97 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	663	4	B	68 ± 7	20 ± 4	154 ± 5	67 ± 3	46 ± 2	305 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	665	3	—	66 ± 6	21 ± 4	144 ± 5	62 ± 3	47 ± 2	294 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	665	5	A	59 ± 8	24 ± 4	92 ± 5	118 ± 4	20 ± 2	105 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	670	3	A	56 ± 6	25 ± 3	135 ± 5	100 ± 3	30 ± 2	141 ± 5	11 ± 3	815 ± 32	295 ± 20	NM ± NM	1.08 ± 0.08	NM ± NM	NM	Whitewater Ridge?

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	702	7	A	67 ± 6	21 ± 4	141 ± 5	64 ± 3	43 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	702	7	B	73 ± 7	28 ± 4	150 ± 5	65 ± 3	49 ± 2	297 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	702	7	C	41 ± 7	12 ± 4	123 ± 4	90 ± 3	25 ± 2	132 ± 5	10 ± 3	674 ± 30	275 ± 20	NM ± NM	1.00 ± 0.08	NM	Whitewater Ridge	
35-JE-51B	702	7	D	47 ± 7	23 ± 3	139 ± 4	63 ± 3	44 ± 2	290 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	702	7	E	37 ± 6	18 ± 3	78 ± 4	104 ± 3	16 ± 2	93 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	703	16	A	65 ± 6	20 ± 4	144 ± 5	65 ± 3	44 ± 2	297 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	703	16	B	74 ± 6	19 ± 4	121 ± 4	51 ± 3	46 ± 2	341 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow	
35-JE-51B	703	16	C	76 ± 7	23 ± 4	133 ± 5	59 ± 3	47 ± 2	377 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow	
35-JE-51B	704	9	—	70 ± 6	23 ± 4	112 ± 4	45 ± 3	59 ± 2	356 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow	
35-JE-51B	704	12	A	55 ± 6	13 ± 4	136 ± 4	65 ± 3	39 ± 2	277 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	704	12	B	52 ± 6	18 ± 3	118 ± 4	6 ± 3	66 ± 2	84 ± 5	15 ± 3	354 ± 20	373 ± 20	NM ± NM	0.59 ± 0.08	NM	Potato Hills	
35-JE-51B	704	12	C	66 ± 6	17 ± 3	143 ± 4	64 ± 3	46 ± 2	288 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	704	12	D	57 ± 6	18 ± 4	88 ± 4	112 ± 3	18 ± 2	103 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	704	12	E	103 ± 7	20 ± 4	93 ± 4	82 ± 3	74 ± 2	408 ± 6	18 ± 3	1312 ± 34	615 ± 20	NM ± NM	2.21 ± 0.08	NM	Unknown E	
35-JE-51B	704	12	F	52 ± 6	17 ± 3	85 ± 4	107 ± 3	16 ± 2	97 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	704	12	G	43 ± 6	18 ± 3	82 ± 4	109 ± 3	17 ± 2	96 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	704	12	H	69 ± 6	20 ± 3	148 ± 4	66 ± 3	45 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	714	3	A	63 ± 6	14 ± 4	140 ± 4	63 ± 3	46 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	717	2	A	33 ± 6	18 ± 3	103 ± 4	67 ± 3	27 ± 2	104 ± 5	3 ± 3	504 ± 23	348 ± 20	NM ± NM	0.86 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-JE-51B	718	4	A	76 ± 6	17 ± 3	139 ± 4	66 ± 3	50 ± 2	307 ± 5	18 ± 3	1139 ± 29	405 ± 20	NM ± NM	1.80 ± 0.08	NM	Newberry Volcano	
35-JE-51B	739	1	A	53 ± 7	18 ± 4	95 ± 4	27 ± 3	56 ± 2	97 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-51B	739	1	B	38 ± 7	17 ± 4	125 ± 5	94 ± 3	28 ± 2	138 ± 5	9 ± 3	662 ± 31	279 ± 20	NM ± NM	1.01 ± 0.08	NM	Whitewater Ridge?	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	763	1	A	67 ± 6	22 ± 3	135 ± 5	64 ± 3	49 ± 2	307 ± 5	18 ± 3	1196 ± 31	413 ± 20	NM ± NM	1.86 ± 0.08	NM NM	Newberry Volcano	
35-JE-51B	763	1	B	86 ± 7	25 ± 4	155 ± 5	67 ± 3	51 ± 2	302 ± 5	16 ± 3	1425 ± 37	443 ± 20	NM ± NM	2.05 ± 0.08	NM NM	Newberry Volcano?	
35-JE-51B	767	3	A	65 ± 5	20 ± 3	134 ± 4	58 ± 3	44 ± 2	276 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM NM	NM NM	Newberry Volcano	
35-JE-51B	768	1	A	92 ± 7	13 ± 4	138 ± 5	61 ± 3	28 ± 2	115 ± 5	9 ± 3	643 ± 31	316 ± 20	NM ± NM	0.98 ± 0.08	NM NM	Whitewater Ridge	
35-JE-51B	769	2	A	73 ± 7	23 ± 4	140 ± 5	66 ± 3	46 ± 2	303 ± 5	17 ± 3	1306 ± 37	409 ± 20	NM ± NM	1.91 ± 0.08	NM NM	Newberry Volcano	
35-JE-51B	770	1	—	52 ± 6	19 ± 3	139 ± 4	97 ± 3	24 ± 2	137 ± 5	7 ± 3	763 ± 34	289 ± 20	NM ± NM	1.06 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-51B	776	3	A	57 ± 6	20 ± 3	136 ± 4	63 ± 3	43 ± 2	282 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM NM	NM NM	Newberry Volcano	
35-JE-51B	783	1	A	77 ± 7	24 ± 4	139 ± 5	50 ± 3	45 ± 2	168 ± 5	19 ± 3	638 ± 35	391 ± 20	NM ± NM	1.04 ± 0.08	NM NM	Quartz Mountain	
35-JE-51B	784	1	A	53 ± 6	17 ± 3	89 ± 4	26 ± 3	55 ± 2	105 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM NM	NM NM	Glass Buttes	
35-JE-51B	786	1	A	41 ± 6	15 ± 3	119 ± 4	86 ± 3	27 ± 2	131 ± 5	8 ± 3	842 ± 28	287 ± 20	NM ± NM	1.11 ± 0.08	NM NM	Whitewater Ridge	
35-JE-51B	786	1	B	51 ± 6	16 ± 3	128 ± 4	93 ± 3	28 ± 2	139 ± 5	10 ± 3	726 ± 28	267 ± 20	NM ± NM	1.00 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-JE-51B	786	1	C	59 ± 7	14 ± 4	122 ± 5	95 ± 3	27 ± 2	144 ± 5	7 ± 3	792 ± 33	292 ± 20	NM ± NM	1.06 ± 0.08	NM NM	Whitewater Ridge	
35-JE-51B	786	1	D	51 ± 7	21 ± 4	137 ± 5	64 ± 3	26 ± 2	113 ± 5	10 ± 3	644 ± 36	252 ± 20	NM ± NM	0.95 ± 0.08	NM NM	Little Bear Creek?	
35-JE-51B	787	1	A	150 ± 6	23 ± 3	121 ± 4	2 ± 3	86 ± 2	560 ± 5	53 ± 3	741 ± 25	437 ± 20	NM ± NM	2.24 ± 0.08	NM NM	Unknown F	
35-JE-51B	788	1	A	38 ± 5	17 ± 3	115 ± 4	85 ± 3	25 ± 2	126 ± 5	7 ± 3	797 ± 27	298 ± 20	NM ± NM	1.07 ± 0.08	NM NM	Whitewater Ridge	
35-JE-51B	788	1	B	37 ± 6	13 ± 3	108 ± 4	81 ± 3	23 ± 2	123 ± 5	7 ± 3	703 ± 29	265 ± 20	NM ± NM	0.97 ± 0.08	NM NM	Whitewater Ridge	
35-JE-51B	788	1	C	51 ± 6	18 ± 3	103 ± 4	27 ± 3	57 ± 2	98 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM NM	NM NM	Glass Buttes	
35-JE-51B	788	1	D	52 ± 6	21 ± 3	140 ± 4	101 ± 3	27 ± 2	135 ± 5	6 ± 3	850 ± 32	303 ± 20	NM ± NM	1.14 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-51B	788	1	E	70 ± 6	22 ± 3	122 ± 4	44 ± 3	47 ± 2	171 ± 5	15 ± 3	741 ± 29	388 ± 20	NM ± NM	1.08 ± 0.08	NM NM	Quartz Mountain?	
35-JE-51B	788	1	F	60 ± 6	14 ± 3	95 ± 4	24 ± 3	54 ± 2	96 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM NM	NM NM	Glass Buttes	
35-JE-51B	788	1	G	63 ± 6	20 ± 4	143 ± 5	99 ± 3	24 ± 2	146 ± 5	8 ± 3	860 ± 31	303 ± 20	NM ± NM	1.16 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-51B	788	1	H	52 ± 7	18 ± 4	131 ± 5	95 ± 3	23 ± 2	133 ± 5	8 ± 3	878 ± 35	296 ± 20	NM ± NM	1.14 ± 0.08	NM NM	Whitewater Ridge	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	788	1	I	59 ± 6	12 ± 4	125 ± 4	93 ± 3	26 ± 2	138 ± 5	5 ± 3	903 ± 37	295 ± 20	NM ± NM	1.14 ± 0.08	NM NM	Whitewater Ridge	
35-JE-51B	788	5	—	154 ± 6	21 ± 3	111 ± 4	3 ± 3	90 ± 2	625 ± 5	46 ± 3	887 ± 25	533 ± 20	NM ± NM	2.70 ± 0.08	NM NM	Horse Mountain?	
35-JE-51B	790	1	A	74 ± 6	17 ± 4	122 ± 4	45 ± 3	45 ± 2	158 ± 5	13 ± 3	838 ± 34	390 ± 20	NM ± NM	1.12 ± 0.08	NM NM	Quartz Mountain?	
35-JE-51B	796	1	A	82 ± 8	20 ± 4	161 ± 5	70 ± 3	43 ± 3	315 ± 6	13 ± 3	NM ± 33	NM ± 20	NM ± NM	NM ± 0.08	NM NM	Newberry Volcano?	
35-JE-51B	796	1	B	84 ± 7	17 ± 4	136 ± 5	57 ± 3	48 ± 2	370 ± 6	23 ± 3	1328 ± 33	547 ± 20	NM ± NM	2.21 ± 0.08	NM NM	Big Obsidian Flow	
35-JE-51B	796	1	C	74 ± 6	18 ± 3	123 ± 4	51 ± 3	48 ± 2	353 ± 5	21 ± 3	1060 ± 28	502 ± 20	NM ± NM	2.05 ± 0.08	NM NM	Big Obsidian Flow	
35-JE-51B	797	1	A	52 ± 6	20 ± 3	132 ± 4	56 ± 3	40 ± 2	198 ± 5	9 ± 3	1274 ± NA	410 ± NA	NM ± NM	1.89 ± NA	NM NM	McKay Butte	
35-JE-51B	797	1	B	45 ± 6	18 ± 3	138 ± 4	56 ± 3	40 ± 2	205 ± 5	12 ± 3	818 ± 29	321 ± 20	NM ± NM	1.45 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-JE-51B	797	1	C	51 ± 6	18 ± 3	131 ± 4	59 ± 3	40 ± 2	199 ± 5	7 ± 3	986 ± 30	344 ± 20	NM ± NM	1.59 ± 0.08	NM NM	McKay Butte	
35-JE-51B	797	1	D	44 ± 6	14 ± 3	129 ± 4	55 ± 3	40 ± 2	194 ± 5	9 ± 3	524 ± 26	331 ± 20	NM ± NM	1.02 ± 0.08	NM NM	Quartz Mountain	
35-JE-51B	798	3	A	57 ± 7	18 ± 4	147 ± 5	59 ± 3	40 ± 2	217 ± 5	8 ± 3	937 ± 26	359 ± 20	NM ± NM	1.62 ± 0.08	NM NM	McKay Butte	
35-JE-51B	799	2	A	43 ± 6	20 ± 3	126 ± 4	55 ± 3	37 ± 2	190 ± 5	8 ± 3	963 ± 29	350 ± 20	NM ± NM	1.61 ± 0.08	NM NM	McKay Butte	
35-JE-51B	800	2	A	65 ± 6	18 ± 4	150 ± 5	62 ± 3	43 ± 2	209 ± 5	9 ± 3	1014 ± 26	368 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-JE-51B	800	2	B	75 ± 6	19 ± 4	138 ± 5	53 ± 3	52 ± 2	373 ± 5	25 ± 3	1069 ± 28	351 ± 20	NM ± NM	1.69 ± 0.08	NM NM	Big Obsidian Flow	
35-JE-51B	804	1	A	53 ± 5	16 ± 3	117 ± 4	53 ± 3	41 ± 2	259 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	832	3	A	37 ± 6	18 ± 3	118 ± 4	84 ± 3	24 ± 2	130 ± 5	7 ± 3	1255 ± 27	424 ± 20	NM ± NM	1.90 ± 0.08	NM NM	Juniper Spring 2/Whitewater Ridge	
35-JE-51B	832	3	B	69 ± 6	17 ± 3	122 ± 4	54 ± 3	42 ± 2	262 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	836	1	—	34 ± 5	16 ± 3	73 ± 4	103 ± 3	17 ± 2	91 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-51B	850	8	A	70 ± 5	20 ± 3	147 ± 4	65 ± 3	41 ± 2	212 ± 5	11 ± 3	970 ± 26	371 ± 20	NM ± NM	1.68 ± 0.08	NM NM	McKay Butte	
35-JE-51B	850	8	B	54 ± 5	20 ± 3	138 ± 4	58 ± 3	44 ± 2	205 ± 5	9 ± 3	888 ± 28	328 ± 20	NM ± NM	1.53 ± 0.08	NM NM	McKay Butte	
35-JE-51B	878	18	A	70 ± 6	20 ± 3	150 ± 5	64 ± 3	40 ± 2	214 ± 5	11 ± 3	881 ± 31	318 ± 20	NM ± NM	1.43 ± 0.08	NM NM	McKay Butte	
35-JE-51B	879	5	A	57 ± 5	18 ± 3	145 ± 4	61 ± 3	40 ± 2	207 ± 5	9 ± 3	993 ± 29	330 ± 20	NM ± NM	1.64 ± 0.08	NM NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	894	5	A	50 ± 7	14 ± 4	85 ± 4	111 ± 3	17 ± 2	98 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	899	1	—	39 ± 7	14 ± 4	87 ± 4	98 ± 3	26 ± 2	138 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Juniper Spring 2
35-JE-51B	901	6	A	51 ± 7	18 ± 4	90 ± 4	124 ± 4	20 ± 2	105 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	901	6	B	45 ± 6	22 ± 3	84 ± 4	110 ± 3	14 ± 2	99 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	901	6	C	36 ± 6	15 ± 3	76 ± 4	98 ± 3	15 ± 2	89 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	902	6	A	52 ± 8	13 ± 5	93 ± 5	118 ± 4	15 ± 2	97 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	902	6	B	52 ± 7	18 ± 4	93 ± 4	23 ± 3	55 ± 2	92 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-51B	906	4	A	55 ± 7	21 ± 4	88 ± 4	109 ± 4	16 ± 2	100 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	909	4	A	62 ± 6	19 ± 4	91 ± 4	25 ± 3	54 ± 2	95 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-51B	936	1	—	63 ± 6	15 ± 4	126 ± 4	56 ± 3	41 ± 2	170 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain
35-JE-51B	1184	1	A	60 ± 6	20 ± 4	93 ± 4	116 ± 3	15 ± 2	100 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	1185	1	A	106 ± 8	23 ± 4	141 ± 5	68 ± 3	46 ± 3	291 ± 6	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	1287	1	A	42 ± 7	18 ± 4	83 ± 4	22 ± 3	51 ± 2	86 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-51B	1287	1	C	54 ± 6	18 ± 3	90 ± 4	24 ± 3	49 ± 2	89 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-51B	1287	1	D	48 ± 6	15 ± 4	85 ± 4	20 ± 3	50 ± 2	94 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-51B	1392	1	A	75 ± 7	19 ± 4	145 ± 5	73 ± 3	52 ± 2	308 ± 5	17 ± 3	1265 ± 28	435 ± 20	NM ± NM	1.91 ± 0.08	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	1400	1	A	38 ± 6	16 ± 3	85 ± 4	105 ± 3	18 ± 2	99 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	1496	1	A	91 ± 8	29 ± 4	150 ± 5	64 ± 3	50 ± 3	298 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	1592	1	A	78 ± 7	17 ± 4	154 ± 5	67 ± 3	47 ± 2	196 ± 5	9 ± 3	558 ± 27	351 ± 20	NM ± NM	1.59 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-51B	1770	2	A	70 ± 7	19 ± 4	132 ± 5	54 ± 3	50 ± 2	364 ± 6	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-JE-51B	1871	1	A	84 ± 8	20 ± 4	157 ± 5	68 ± 3	43 ± 2	295 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	1871	1	B	68 ± 7	14 ± 4	159 ± 5	70 ± 3	47 ± 2	303 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	1873	1	A	43 ± 7	16 ± 4	130 ± 4	57 ± 3	43 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1873	1	B	56 ± 7	16 ± 4	152 ± 5	62 ± 3	46 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1873	1	C	70 ± 7	23 ± 4	134 ± 5	62 ± 3	42 ± 2	289 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1873	1	D	58 ± 7	17 ± 4	133 ± 5	100 ± 3	28 ± 2	141 ± 5	4 ± 3	778 ± 30	276 ± 20	NM ± NM	1.02 ± 0.08	NM ± NM	NM	Whitewater Ridge?
35-JE-51B	1873	1	E	89 ± 8	28 ± 4	154 ± 5	74 ± 3	47 ± 3	300 ± 6	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1873	1	F	72 ± 7	20 ± 4	146 ± 5	61 ± 3	49 ± 2	284 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1873	1	G	84 ± 6	17 ± 4	140 ± 5	53 ± 3	40 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1873	1	H	85 ± 7	22 ± 4	145 ± 5	68 ± 3	50 ± 2	307 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1873	1	I	44 ± 6	15 ± 3	124 ± 4	57 ± 3	43 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1875	1	A	71 ± 6	17 ± 4	146 ± 4	60 ± 3	45 ± 2	286 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1875	1	B	72 ± 7	22 ± 4	147 ± 5	62 ± 3	46 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1875	1	C	70 ± 7	21 ± 4	141 ± 5	67 ± 3	45 ± 2	305 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1875	1	D	56 ± 6	16 ± 4	145 ± 4	63 ± 3	44 ± 2	276 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1876	8	—	43 ± 7	17 ± 4	81 ± 5	21 ± 3	50 ± 2	91 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	1877	1	A	68 ± 7	24 ± 4	139 ± 5	69 ± 3	48 ± 2	302 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1877	1	B	56 ± 7	19 ± 4	140 ± 5	100 ± 4	21 ± 2	138 ± 5	5 ± 3	723 ± 32	275 ± 20	NM ± NM	1.04 ± 0.08	NM ± NM	NM	Whitewater Ridge?
35-JE-51B	1881	1	A	68 ± 8	25 ± 4	172 ± 5	76 ± 3	47 ± 3	317 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?
35-JE-51B	1881	1	B	50 ± 7	16 ± 4	130 ± 5	95 ± 3	27 ± 2	132 ± 5	9 ± 3	822 ± 21	311 ± 20	NM ± NM	1.04 ± 0.08	NM ± NM	NM	Whitewater Ridge?
35-JE-51B	1881	1	C	54 ± 6	19 ± 3	128 ± 4	58 ± 3	43 ± 2	270 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1881	1	D	55 ± 6	17 ± 4	118 ± 4	49 ± 3	40 ± 2	253 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1881	5	—	48 ± 6	19 ± 3	125 ± 4	55 ± 3	40 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1881	6	—	57 ± 6	19 ± 3	138 ± 4	58 ± 3	42 ± 2	285 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-JE-51B	1885	1	A	43 ± 6	15 ± 3	134 ± 4	61 ± 3	42 ± 2	278 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-JE-51B	1886	1	A	48 ± 6	14 ± 3	100 ± 4	69 ± 3	27 ± 2	103 ± 5	8 ± 3	526 ± 24	343 ± 20	NM ± NM	0.85 ± 0.08	NM	Little Bear Creek/Whitewater Ridge			
35-JE-51B	1886	1	B	69 ± 6	20 ± 4	142 ± 5	60 ± 3	45 ± 2	285 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	1886	1	C	51 ± 6	17 ± 3	127 ± 4	54 ± 3	41 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	1887	1	A	49 ± 8	17 ± 4	123 ± 5	91 ± 4	26 ± 2	129 ± 5	7 ± 3	775 ± 31	293 ± 20	NM ± NM	1.06 ± 0.08	NM	Whitewater Ridge			
35-JE-51B	1888	1	A	49 ± 6	15 ± 4	93 ± 4	85 ± 3	27 ± 2	128 ± 5	8 ± 3	894 ± 30	404 ± 20	NM ± NM	1.16 ± 0.08	NM	Juniper Spring 2/Whitewater Ridge			
35-JE-51B	1888	1	B	64 ± 7	20 ± 4	103 ± 5	30 ± 3	58 ± 2	107 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes			
35-JE-51B	1889	1	A	65 ± 7	18 ± 4	140 ± 5	60 ± 3	44 ± 2	276 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	1890	1	A	47 ± 6	18 ± 3	89 ± 4	23 ± 3	52 ± 2	91 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes			
35-JE-51B	1891	1	A	42 ± 7	13 ± 4	121 ± 5	50 ± 3	39 ± 2	253 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	1892	1	A	105 ± 9	23 ± 4	115 ± 5	133 ± 4	21 ± 2	106 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-JE-51B	1902	1	A	77 ± 6	21 ± 4	157 ± 5	65 ± 3	49 ± 2	297 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	1902	1	B	79 ± 6	18 ± 4	121 ± 4	50 ± 3	45 ± 2	344 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow			
35-JE-51B	1902	1	C	36 ± 7	13 ± 4	88 ± 4	22 ± 3	47 ± 2	84 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes			
35-JE-51B	1902	1	D	61 ± 6	24 ± 3	151 ± 4	64 ± 3	47 ± 2	299 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	1904	1	A	45 ± 7	11 ± 4	82 ± 4	111 ± 3	16 ± 2	104 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-JE-51B	1905	1	A	66 ± 7	18 ± 4	136 ± 5	57 ± 3	44 ± 2	282 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	1906	1	A	63 ± 6	19 ± 4	135 ± 5	58 ± 3	46 ± 2	276 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-JE-51B	1913	1	A	79 ± 6	20 ± 3	108 ± 4	145 ± 3	18 ± 2	109 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown F			
35-JE-51B	1913	1	B	53 ± 6	16 ± 3	86 ± 4	111 ± 3	22 ± 2	98 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-JE-51B	1914	1	A	67 ± 6	20 ± 3	133 ± 4	100 ± 3	28 ± 2	143 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge?			
35-JE-51B	1916	1	A	67 ± 6	23 ± 3	97 ± 4	127 ± 3	16 ± 2	108 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	1916	6	—	42 ± 6	13 ± 3	82 ± 4	108 ± 3	18 ± 2	100 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	1918	1	A	87 ± 6	20 ± 3	153 ± 4	68 ± 3	47 ± 2	302 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1943	1	A	48 ± 6	15 ± 3	133 ± 4	58 ± 3	42 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1944	1	A	60 ± 7	18 ± 4	134 ± 5	65 ± 3	43 ± 2	279 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	1999	1	A	82 ± 7	22 ± 4	129 ± 5	55 ± 3	48 ± 2	367 ± 5	23 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-JE-51B	2040	1	A	52 ± 7	15 ± 4	132 ± 5	57 ± 3	39 ± 2	251 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2042	1	A	56 ± 6	22 ± 3	126 ± 4	53 ± 3	40 ± 2	264 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2046	1	—	68 ± 7	18 ± 4	133 ± 5	51 ± 3	45 ± 2	180 ± 5	8 ± 3	1250 ± NA	358 ± NA	NM ± NM	1.84 ± NA	NM	McKay Butte	
35-JE-51B	2047	1	A	56 ± 7	20 ± 4	147 ± 5	65 ± 3	42 ± 2	293 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2055	1	A	44 ± 6	15 ± 4	116 ± 4	78 ± 3	24 ± 2	123 ± 5	9 ± 3	695 ± 28	292 ± 20	NM ± NM	0.96 ± 0.08	NM	Whitewater Ridge	
35-JE-51B	2057	1	A	47 ± 8	15 ± 4	90 ± 4	114 ± 4	19 ± 2	102 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2057	6	—	45 ± 7	16 ± 4	83 ± 4	108 ± 3	17 ± 2	101 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2062	1	A	38 ± 7	17 ± 4	93 ± 4	28 ± 3	57 ± 2	92 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-51B	2062	1	B	44 ± 6	13 ± 4	88 ± 4	23 ± 3	50 ± 2	91 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-51B	2063	1	A	64 ± 6	19 ± 4	151 ± 5	66 ± 3	47 ± 2	294 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	2064	1	A	45 ± 6	19 ± 3	92 ± 4	25 ± 3	55 ± 2	93 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-51B	2065	1	A	52 ± 6	17 ± 3	88 ± 4	23 ± 3	55 ± 2	92 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-51B	2065	1	B	44 ± 5	15 ± 3	77 ± 4	101 ± 3	16 ± 2	90 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2066	1	A	90 ± 7	21 ± 4	147 ± 5	62 ± 3	43 ± 2	190 ± 5	5 ± 3	567 ± 29	353 ± 20	NM ± NM	1.47 ± 0.08	NM	Quartz Mountain	
35-JE-51B	2070	1	A	52 ± 6	14 ± 4	88 ± 4	22 ± 3	52 ± 2	94 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-51B	2070	1	B	35 ± 6	17 ± 3	90 ± 4	25 ± 3	47 ± 2	87 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-51B	2070	1	C	32 ± 6	13 ± 3	76 ± 4	97 ± 3	15 ± 2	92 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	2083	4	A	73 ± 7	14 ± 5	154 ± 5	62 ± 3	47 ± 2	291 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2083	6	—	163 ± 6	29 ± 3	56 ± 5	269 ± 3	64 ± 2	320 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown G
35-JE-51B	2102	2	A	62 ± 6	22 ± 3	144 ± 4	61 ± 3	47 ± 2	290 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2106	4	A	31 ± 6	14 ± 3	72 ± 4	95 ± 3	16 ± 2	89 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2106	4	B	59 ± 7	21 ± 4	146 ± 5	62 ± 3	49 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2121	3	A	56 ± 7	22 ± 4	83 ± 4	110 ± 4	15 ± 2	92 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2122	3	A	45 ± 7	19 ± 4	128 ± 5	54 ± 3	41 ± 2	256 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2124	4	A	55 ± 6	14 ± 4	129 ± 4	53 ± 3	37 ± 2	187 ± 5	7 ± 3	1023 ± 30	368 ± 20	NM ± NM	1.67 ± 0.08	NM	McKay Butte	
35-JE-51B	2125	4	A	37 ± 6	14 ± 3	75 ± 4	20 ± 3	48 ± 2	84 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	2129	1	—	81 ± 7	15 ± 4	114 ± 4	9 ± 3	49 ± 2	325 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-JE-51B	2130	1	—	48 ± 7	20 ± 4	80 ± 4	109 ± 3	18 ± 2	98 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2221	2	A	56 ± 5	16 ± 3	94 ± 4	27 ± 3	54 ± 2	95 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	2265	4	A	105 ± 8	25 ± 4	150 ± 5	70 ± 3	47 ± 2	290 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2265	6	—	63 ± 7	17 ± 3	129 ± 4	55 ± 3	41 ± 2	282 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2279	3	A	34 ± 7	18 ± 3	73 ± 4	102 ± 3	15 ± 2	85 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2285	3	A	70 ± 7	20 ± 4	128 ± 4	54 ± 3	47 ± 2	361 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Big Obsidian Flow
35-JE-51B	2285	4	—	70 ± 6	17 ± 3	100 ± 4	46 ± 3	31 ± 2	125 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-JE-51B	2306	2	A	45 ± 6	16 ± 3	103 ± 4	69 ± 3	26 ± 2	104 ± 5	9 ± 3	539 ± 25	345 ± 20	NM ± NM	0.84 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-JE-51B	2309	3	A	41 ± 6	19 ± 3	77 ± 4	96 ± 3	15 ± 2	86 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2312	7	A	41 ± 6	12 ± 4	81 ± 4	104 ± 3	13 ± 2	97 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2312	7	B	52 ± 6	18 ± 4	89 ± 4	113 ± 3	17 ± 2	102 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2316	3	A	74 ± 8	21 ± 4	147 ± 5	63 ± 3	43 ± 2	197 ± 5	9 ± 3	508 ± 28	329 ± 20	NM ± NM	1.36 ± 0.08	NM	Quartz Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	2317	4	A	44	12	88	22	51	86	12	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2317	4	B	62	18	99	24	54	91	13	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2338	13	A	77	20	160	68	45	297	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2344	1	—	62	14	137	69	44	290	20	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2351	4	A	58	14	83	142	33	181	7	NM	NM	NM	NM	NM	NM	Unknown H
				± 8	± 4	± 4	± 4	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2351	4	B	29	13	72	20	48	82	9	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 6	± 3	± 4	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2357	2	A	70	20	123	56	38	168	6	452	331	NM	1.34	NM	NM	Quartz Mountain
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 26	± 20	± NM	± 0.08	NM	NM	
35-JE-51B	2362	2	A	44	17	127	55	41	262	14	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2365	1	—	35	12	100	69	27	102	4	NM	NM	NM	NM	NM	NM	Little Bear Creek/Whitewater Ridge
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2378	2	A	42	17	87	22	54	95	8	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2391	2	A	66	19	145	67	45	282	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2391	2	B	66	20	141	60	44	282	20	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2391	2	C	62	14	150	63	44	283	14	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2393	3	A	52	11	86	111	18	95	6	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2393	3	B	43	24	82	111	18	93	7	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2399	2	A	60	17	132	58	43	280	19	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2400	7	—	56	20	142	63	46	293	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2408	2	A	54	13	95	27	56	100	12	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 7	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2412	3	A	48	19	90	109	15	98	12	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 7	± 4	± 4	± 4	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2422	2	A	46	16	86	111	15	90	8	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2425	2	A	38	15	78	22	49	89	10	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-51B	2425	2	B	37	14	80	22	46	88	10	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 5	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	2435	2	A	45 ± 8	21 ± 4	116 ± 5	70 ± 4	29 ± 2	108 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2435	2	B	39 ± 7	11 ± 4	108 ± 4	74 ± 3	29 ± 2	103 ± 5	7 ± 3	525 ± 27	359 ± 20	NM ± NM	0.87 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-JE-51B	2435	5	—	49 ± 6	18 ± 3	90 ± 4	99 ± 3	26 ± 2	139 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Juniper Spring 2/Whitewater Ridge	
35-JE-51B	2437	2	A	97 ± 6	18 ± 3	105 ± 4	141 ± 3	19 ± 2	107 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown F	
35-JE-51B	2445	3	A	70 ± 5	19 ± 3	138 ± 4	62 ± 3	43 ± 2	180 ± 5	7 ± 3	577 ± 21	307 ± 19	NM ± NM	1.52 ± 0.08	NM	Quartz Mountain	
35-JE-51B	2445	3	B	48 ± 5	18 ± 3	95 ± 4	109 ± 3	28 ± 2	141 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C	
35-JE-51B	2445	3	C	90 ± 5	24 ± 3	162 ± 4	72 ± 3	48 ± 2	304 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?	
35-JE-51B	2445	3	D	77 ± 6	21 ± 3	147 ± 4	67 ± 3	48 ± 2	292 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	2445	3	E	41 ± 5	16 ± 3	78 ± 4	105 ± 3	15 ± 2	93 ± 4	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2445	3	F	113 ± 6	18 ± 3	154 ± 4	84 ± 3	49 ± 2	307 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?	
35-JE-51B	2445	3	G	84 ± 6	21 ± 3	95 ± 4	122 ± 3	17 ± 2	103 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2445	3	H	85 ± 6	21 ± 3	144 ± 4	81 ± 3	42 ± 2	291 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	2445	3	I	54 ± 6	18 ± 3	99 ± 4	112 ± 3	30 ± 2	143 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C	
35-JE-51B	2445	3	J	66 ± 6	25 ± 3	151 ± 4	66 ± 3	49 ± 2	294 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	2448	1	—	46 ± 6	16 ± 3	79 ± 4	102 ± 3	17 ± 2	93 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2451	2	A	94 ± 5	18 ± 3	139 ± 4	73 ± 3	45 ± 2	289 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	2469	1	—	37 ± 6	18 ± 3	76 ± 4	100 ± 3	16 ± 2	90 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2492	4	A	52 ± 6	17 ± 3	82 ± 4	103 ± 3	14 ± 2	96 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2494	4	A	52 ± 6	23 ± 3	85 ± 4	115 ± 3	15 ± 2	98 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-51B	2494	4	B	40 ± 6	12 ± 3	79 ± 4	22 ± 3	49 ± 2	85 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-51B	2494	6	—	55 ± 6	26 ± 3	135 ± 4	63 ± 3	41 ± 2	286 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-51B	2496	4	A	48 ± 6	13 ± 4	88 ± 4	109 ± 3	18 ± 2	97 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	2496	4	B	49 ± 6	17 ± 3	123 ± 4	53 ± 3	39 ± 2	251 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2503	4	A	31 ± 6	16 ± 3	75 ± 4	98 ± 3	14 ± 2	89 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	2503	4	B	51 ± 7	13 ± 4	97 ± 4	27 ± 3	54 ± 2	95 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-51B	2503	4	C	115 ± 8	17 ± 4	99 ± 5	27 ± 3	53 ± 2	92 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-51B	2503	4	D	52 ± 6	15 ± 3	121 ± 4	5 ± 3	73 ± 2	82 ± 5	16 ± 3	352 ± 20	440 ± 20	NM ± NM	0.67 ± 0.08	NM ± NM	NM ± NM	Potato Hills
35-JE-51B	2505	3	A	73 ± 7	16 ± 4	145 ± 5	66 ± 3	47 ± 2	296 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2505	3	B	37 ± 7	19 ± 3	87 ± 4	109 ± 3	18 ± 2	99 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	2505	3	C	47 ± 6	17 ± 3	84 ± 4	109 ± 3	19 ± 2	100 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	2505	3	D	41 ± 6	15 ± 4	102 ± 4	70 ± 3	28 ± 2	105 ± 5	4 ± 3	562 ± 26	379 ± 20	NM ± NM	0.92 ± 0.08	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2505	4	A	100 ± 8	18 ± 4	110 ± 5	79 ± 4	29 ± 2	101 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2505	4	B	51 ± 6	19 ± 3	133 ± 4	57 ± 3	42 ± 2	272 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2505	5	—	53 ± 6	18 ± 3	123 ± 4	52 ± 3	40 ± 2	257 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2514	2	A	53 ± 6	20 ± 3	128 ± 4	56 ± 3	42 ± 2	278 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2518	2	A	193 ± 8	12 ± 4	134 ± 5	61 ± 3	41 ± 2	288 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2522	2	A	58 ± 6	14 ± 4	139 ± 4	57 ± 3	41 ± 2	203 ± 5	12 ± 3	890 ± 28	332 ± 20	NM ± NM	1.51 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-JE-51B	2522	2	B	27 ± 6	15 ± 3	104 ± 4	81 ± 3	20 ± 2	123 ± 5	6 ± 3	783 ± 26	300 ± 20	NM ± NM	1.08 ± 0.08	NM ± NM	NM ± NM	Whitewater Ridge
35-JE-51B	2523	2	A	45 ± 7	15 ± 4	139 ± 5	58 ± 3	42 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2526	4	A	60 ± 6	17 ± 3	133 ± 4	63 ± 3	46 ± 2	287 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2528	2	A	57 ± 7	20 ± 4	149 ± 5	65 ± 3	43 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2531	2	A	68 ± 7	24 ± 4	121 ± 5	52 ± 3	47 ± 2	356 ± 5	25 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Big Obsidian Flow
35-JE-51B	2531	2	B	70 ± 7	23 ± 4	146 ± 5	58 ± 3	55 ± 2	285 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-51B	2534	2	A	51 ± 7	17 ± 4	98 ± 4	25 ± 3	55 ± 2	97 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	2534	2	B	59 ± 7	20 ± 4	130 ± 5	95 ± 3	23 ± 2	130 ± 5	4 ± 3	769 ± 30	286 ± 20	NM ± NM	1.00 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-51B	2536	2	A	52 ± 6	14 ± 4	134 ± 4	61 ± 3	45 ± 2	277 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2543	3	A	45 ± 7	15 ± 4	121 ± 5	76 ± 3	25 ± 2	111 ± 5	9 ± 3	514 ± 29	361 ± 20	NM ± NM	0.86 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-JE-51B	2543	3	B	42 ± 6	15 ± 3	95 ± 4	65 ± 3	28 ± 2	99 ± 5	7 ± 3	554 ± 26	368 ± 20	NM ± NM	0.87 ± 0.08	NM NM	Little Bear Cr./Whitewater R./Juniper Sp. 1	
35-JE-51B	2547	3	A	43 ± 6	16 ± 3	118 ± 4	54 ± 3	41 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2547	3	B	56 ± 7	13 ± 4	123 ± 4	53 ± 3	38 ± 2	261 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2550	2	A	51 ± 6	9 ± 4	103 ± 4	67 ± 3	26 ± 2	98 ± 5	7 ± 3	468 ± 28	328 ± 20	NM ± NM	0.77 ± 0.08	NM NM	Little Bear Cr./Whitewater R./Juniper Sp. 1	
35-JE-51B	2561	3	A	57 ± 8	21 ± 4	86 ± 5	116 ± 4	20 ± 2	102 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-51B	2562	1	—	49 ± 7	17 ± 4	132 ± 4	57 ± 3	39 ± 2	258 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2562	3	A	66 ± 7	20 ± 4	138 ± 5	60 ± 3	45 ± 2	282 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2562	3	B	53 ± 6	15 ± 4	77 ± 4	105 ± 3	19 ± 2	95 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-51B	2563	2	A	73 ± 7	25 ± 4	154 ± 5	63 ± 3	40 ± 2	287 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2568	4	A	68 ± 7	20 ± 4	129 ± 5	72 ± 3	40 ± 2	256 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2582	1	—	87 ± 7	17 ± 4	81 ± 4	66 ± 3	68 ± 2	360 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Yreka Butte	
35-JE-51B	2597	2	A	63 ± 6	17 ± 4	137 ± 5	59 ± 3	45 ± 2	285 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2600	1	—	47 ± 7	13 ± 4	124 ± 4	52 ± 3	43 ± 2	260 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2604	2	A	63 ± 6	17 ± 3	117 ± 4	54 ± 3	40 ± 2	250 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-51B	2615	1	—	46 ± 7	16 ± 4	69 ± 4	150 ± 3	17 ± 2	175 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown I	
35-JE-51B	2615	2	—	50 ± 7	12 ± 4	94 ± 4	45 ± 3	28 ± 2	117 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Spodue Mountain	
35-JE-51B	2615	3	—	74 ± 7	15 ± 4	114 ± 4	51 ± 3	30 ± 2	132 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Spodue Mountain	
35-JE-51B	2622	3	A	52 ± 6	12 ± 4	82 ± 4	19 ± 3	43 ± 2	90 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-51B	2622	3	B	71 ± 7	16 ± 4	149 ± 5	68 ± 3	47 ± 2	294 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	2625	1	—	69 ± 7	20 ± 4	132 ± 4	64 ± 3	47 ± 2	289 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2636	1	—	34 ± 7	17 ± 4	77 ± 4	22 ± 3	49 ± 2	87 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	2638	2	A	52 ± 7	23 ± 4	80 ± 4	105 ± 4	15 ± 2	98 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2638	2	B	51 ± 7	19 ± 4	81 ± 4	111 ± 4	19 ± 2	105 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2654	1	—	55 ± 7	14 ± 4	76 ± 4	105 ± 3	17 ± 2	97 ± 5	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2664	1	—	39 ± 7	17 ± 4	76 ± 4	21 ± 3	48 ± 2	81 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-51B	2664	4	A	34 ± 7	13 ± 4	127 ± 4	61 ± 3	28 ± 2	109 ± 5	7 ± 3	493 ± 25	283 ± 20	NM ± NM	0.86 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2664	4	B	56 ± 8	12 ± 5	129 ± 5	62 ± 3	27 ± 2	111 ± 5	6 ± 3	572 ± 32	289 ± 20	NM ± NM	0.88 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2664	4	C	36 ± 6	17 ± 3	99 ± 4	68 ± 3	25 ± 2	102 ± 5	9 ± 3	486 ± 25	361 ± 20	NM ± NM	0.85 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2664	4	D	52 ± 6	17 ± 4	98 ± 4	66 ± 3	27 ± 2	101 ± 5	8 ± 3	535 ± 26	334 ± 20	NM ± NM	0.79 ± 0.08	NM ± NM	NM	Little Bear Cr./Whitewater R./Juniper Sp. 1
35-JE-51B	2664	4	E	61 ± 7	18 ± 4	111 ± 4	74 ± 3	26 ± 2	111 ± 5	14 ± 3	474 ± 28	344 ± 20	NM ± NM	0.80 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2664	4	F	50 ± 7	13 ± 4	111 ± 4	74 ± 3	30 ± 2	105 ± 5	6 ± 3	517 ± 27	354 ± 20	NM ± NM	0.83 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2664	4	G	45 ± 6	15 ± 4	127 ± 4	62 ± 3	29 ± 2	112 ± 5	10 ± 3	490 ± 25	278 ± 20	NM ± NM	0.82 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2664	4	H	34 ± 6	15 ± 3	72 ± 4	96 ± 3	14 ± 2	87 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2664	4	I	94 ± 6	20 ± 3	108 ± 4	1 ± 3	72 ± 2	413 ± 5	44 ± 3	545 ± 22	353 ± 20	NM ± NM	1.69 ± 0.08	NM ± NM	NM	Unknown J
35-JE-51B	2665	2	A	67 ± 7	21 ± 4	148 ± 5	65 ± 3	45 ± 2	294 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-51B	2666	6	A	34 ± 8	10 ± 5	106 ± 5	69 ± 3	32 ± 2	99 ± 5	5 ± 3	482 ± 29	331 ± 20	NM ± NM	0.79 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-51B	2666	6	B	109 ± 7	23 ± 3	113 ± 4	1 ± 4	74 ± 2	417 ± 5	45 ± 3	616 ± 26	344 ± 20	NM ± NM	1.64 ± 0.08	NM ± NM	NM	Unknown J
35-JE-51B	2666	6	C	31 ± 6	16 ± 3	116 ± 4	54 ± 3	25 ± 2	97 ± 5	7 ± 3	503 ± 24	283 ± 20	NM ± NM	0.85 ± 0.08	NM ± NM	NM	Little Bear Creek
35-JE-51B	2666	6	D	80 ± 6	19 ± 3	107 ± 4	NM ± NM	67 ± 2	407 ± 5	41 ± 3	580 ± 22	364 ± 20	NM ± NM	1.76 ± 0.08	NM ± NM	NM	Unknown J
35-JE-51B	2703	22	A	56 ± 6	18 ± 3	99 ± 4	122 ± 3	16 ± 2	105 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-51B	2703	22	B	79 ± 6	20 ± 3	104 ± 4	136 ± 3	18 ± 2	109 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs?

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-51B	2725	2	A	55 ± 6	25 ± 3	92 ± 4	123 ± 3	17 ± 2	101 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-51B	2748	3	A	94 ± 7	26 ± 4	155 ± 5	64 ± 3	44 ± 2	188 ± 5	11 ± 3	707 ± 27	315 ± 20	NM ± NM	1.59 ± 0.08	NM ± NM	Quartz Mountain	
35-JE-51B	2784	1	—	37 ± 4	15 ± 3	73 ± 4	95 ± 3	15 ± 2	90 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-51B	2795	3	A	99 ± 7	20 ± 4	107 ± 4	39 ± 3	58 ± 2	130 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain	
35-JE-51B	2861	3	A	99 ± 6	25 ± 3	164 ± 4	73 ± 3	46 ± 2	305 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano?	
35-JE-51B	2895	9	—	58 ± 7	22 ± 4	137 ± 4	59 ± 3	43 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	2923	5	—	54 ± 7	19 ± 4	120 ± 4	53 ± 3	39 ± 2	164 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain	
35-JE-51B	3671	2	A	76 ± 6	21 ± 3	152 ± 4	65 ± 3	44 ± 2	293 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	3671	2	B	44 ± 5	14 ± 3	78 ± 4	103 ± 3	18 ± 2	95 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-51B	3711	3	A	65 ± 6	20 ± 3	154 ± 4	107 ± 3	27 ± 2	145 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown K	
35-JE-51B	3721	4	A	79 ± 6	26 ± 3	157 ± 4	67 ± 3	43 ± 2	191 ± 5	9 ± 3	672 ± 23	321 ± 20	NM ± NM	1.59 ± 0.08	NM ± NM	Quartz Mountain	
35-JE-51B	3747	3	—	55 ± 7	25 ± 4	131 ± 4	58 ± 3	46 ± 2	276 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-51B	3817	4	A	50 ± 6	20 ± 3	113 ± 4	77 ± 3	30 ± 2	106 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge	
35-JE-281	63	1	—	62 ± 6	16 ± 3	131 ± 5	57 ± 3	44 ± 2	180 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-JE-281	64	1	—	NM ± NM	NM ± NM	81 ± 3	110 ± 12	14 ± 3	89 ± 7	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-281	87	1	—	41 ± 5	4 ± 4	2 ± 5	5 ± 3	4 ± 2	11 ± 4	NM ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian	
35-JE-281	95	1	—	NM ± NM	NM ± NM	98 ± 3	36 ± 12	53 ± 3	126 ± 7	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain	
35-JE-281	97	1	—	NM ± NM	NM ± NM	76 ± 3	108 ± 12	16 ± 3	85 ± 7	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-281	111	1	—	NM ± NM	NM ± NM	81 ± 3	108 ± 12	13 ± 3	89 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-282	1	1	—	163 ± 7	22 ± 4	135 ± 5	37 ± 3	114 ± 2	516 ± 6	66 ± 4	NM ± NM	NM ± NM	978 ± 13	NM ± NM	NM ± NM	Unknown A	
35-JE-282	1	10	—	136 ± 6	21 ± 3	160 ± 5	13 ± 3	69 ± 2	492 ± 5	48 ± 3	NM ± NM	NM ± NM	378 ± 11	NM ± NM	NM ± NM	Unknown B	
35-JE-282	15	1	—	34 ± 5	15 ± 3	78 ± 5	20 ± 3	52 ± 2	86 ± 4	11 ± 3	NM ± NM	NM ± NM	1114 ± 12	NM ± NM	NM ± NM	Glass Buttes	

C.1-183



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>										Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	
35-JE-282	18	1	—	57 ± 5	19 ± 3	102 ± 5	51 ± 3	46 ± 2	181 ± 4	16 ± 3	NM ± NM	NM ± NM	1408 ± 14	NM ± NM	NM ± NM	Unknown C
35-JE-282	25	1	—	56 ± 5	14 ± 3	90 ± 5	23 ± 3	57 ± 2	91 ± 4	14 ± 3	NM ± NM	NM ± NM	1162 ± 14	NM ± NM	NM ± NM	Glass Buttes
35-JE-282	69	2	—	173 ± 9	20 ± 4	129 ± 6	44 ± 3	116 ± 3	453 ± 7	64 ± 4	NM ± NM	NM ± NM	1073 ± 17	NM ± NM	NM ± NM	Unknown A
35-JE-282	160	1	A	145 ± 7	22 ± 4	144 ± 5	39 ± 3	100 ± 2	476 ± 6	65 ± 3	NM ± NM	NM ± NM	944 ± 13	NM ± NM	NM ± NM	Unknown A
35-JE-282	160	1	B	151 ± 9	22 ± 4	131 ± 5	35 ± 3	109 ± 3	486 ± 6	67 ± 4	NM ± NM	NM ± NM	943 ± 14	NM ± NM	NM ± NM	Unknown A
35-JE-282	215	1	B	80 ± 7	28 ± 4	156 ± 5	64 ± 3	52 ± 2	200 ± 5	12 ± 4	NM ± NM	NM ± NM	933 ± 17	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-282	220	2	—	56 ± 6	15 ± 3	88 ± 5	98 ± 3	25 ± 2	134 ± 4	6 ± 4	NM ± NM	NM ± NM	1234 ± 18	NM ± NM	NM ± NM	Whitewater Ridge
35-JE-282	222	2	A	69 ± 6	21 ± 3	143 ± 5	61 ± 3	43 ± 2	188 ± 4	8 ± 4	NM ± NM	NM ± NM	922 ± 15	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-282	222	2	B	85 ± 8	21 ± 5	88 ± 5	133 ± 4	14 ± 2	110 ± 5	13 ± 4	NM ± NM	NM ± NM	862 ± 21	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-282	226	1	—	65 ± 5	18 ± 3	104 ± 5	23 ± 3	50 ± 2	274 ± 4	20 ± 3	NM ± NM	NM ± NM	1285 ± 13	NM ± NM	NM ± NM	Chickahominy?
35-JE-283	6	1	—	46 ± 6	17 ± 3	123 ± 5	56 ± 3	26 ± 2	102 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek?
35-JE-283	17	2	—	54 ± 5	16 ± 3	135 ± 5	58 ± 3	47 ± 2	281 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	39	2	—	59 ± 5	17 ± 3	137 ± 5	58 ± 3	44 ± 2	278 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	77	1	—	68 ± 8	24 ± 4	151 ± 3	64 ± 3	45 ± 3	304 ± 6	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	115	1	—	51 ± 6	23 ± 3	148 ± 5	64 ± 3	48 ± 2	295 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	120	2	—	62 ± 7	17 ± 4	127 ± 5	52 ± 3	44 ± 2	266 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	154	3	—	135 ± 9	22 ± 5	107 ± 5	84 ± 3	76 ± 3	403 ± 6	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
35-JE-283	156	4	—	53 ± 5	14 ± 3	113 ± 5	56 ± 3	46 ± 2	277 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	157	1	—	38 ± 6	20 ± 3	77 ± 5	98 ± 3	18 ± 2	93 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-283	177	1	A	73 ± 7	18 ± 4	148 ± 5	62 ± 3	44 ± 2	298 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	177	1	B	53 ± 7	17 ± 4	94 ± 5	112 ± 3	17 ± 2	93 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-283	180	1	A	67 ± 7	20 ± 4	151 ± 5	63 ± 3	47 ± 2	289 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-184

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-JE-283	180	1	B	129 ± 7	26 ± 4	105 ± 5	87 ± 3	83 ± 2	421 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A	
35-JE-283	181	1	A	82 ± 7	20 ± 4	90 ± 5	34 ± 3	51 ± 2	120 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain	
35-JE-283	181	1	B	88 ± 7	21 ± 4	156 ± 6	68 ± 3	46 ± 2	295 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	182	1	A	69 ± 6	12 ± 4	143 ± 5	62 ± 3	43 ± 2	284 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	182	1	B	60 ± 6	17 ± 3	124 ± 5	56 ± 3	42 ± 2	276 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	182	1	C	58 ± 6	17 ± 3	148 ± 5	62 ± 3	45 ± 2	300 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	182	1	D	61 ± 5	17 ± 3	139 ± 5	59 ± 3	46 ± 2	283 ± 4	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	183	1	A	54 ± 6	18 ± 3	146 ± 5	59 ± 3	46 ± 2	289 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	183	1	B	74 ± 7	18 ± 4	153 ± 6	69 ± 3	49 ± 2	302 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	183	1	C	49 ± 5	18 ± 3	124 ± 5	55 ± 3	44 ± 2	272 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	184	1	—	74 ± 7	22 ± 4	155 ± 5	65 ± 3	48 ± 2	291 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	185	1	—	61 ± 5	21 ± 3	144 ± 5	57 ± 3	45 ± 2	292 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	186	1	A	64 ± 6	22 ± 3	148 ± 5	63 ± 3	49 ± 2	291 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	186	1	B	56 ± 6	22 ± 3	143 ± 5	60 ± 3	46 ± 2	293 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	186	1	C	74 ± 6	22 ± 3	156 ± 5	69 ± 3	48 ± 2	305 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	188	1	—	72 ± 7	17 ± 4	161 ± 5	66 ± 3	46 ± 2	305 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	192	1	A	65 ± 9	14 ± 5	163 ± 6	67 ± 4	49 ± 3	305 ± 6	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	192	1	B	54 ± 7	25 ± 4	137 ± 5	65 ± 3	46 ± 2	304 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	192	1	C	61 ± 7	20 ± 4	157 ± 5	66 ± 3	45 ± 2	299 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	201	1	—	84 ± 8	29 ± 4	150 ± 6	60 ± 3	47 ± 2	281 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	210	2	A	60 ± 7	19 ± 4	154 ± 5	71 ± 3	49 ± 2	307 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-283	210	2	B	75 ± 8	20 ± 4	165 ± 6	74 ± 3	53 ± 2	311 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?	

C.1-185

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-JE-283	210	2	C	58 ± 6	13 ± 4	138 ± 5	63 ± 3	43 ± 2	288 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	217	1	—	72 ± 8	21 ± 4	156 ± 6	73 ± 3	49 ± 2	297 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	225	1	—	35 ± 8	5 ± 14	NM ± NM	12 ± 3	3 ± 3	15 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-JE-283	233	1	—	60 ± 8	19 ± 4	107 ± 5	137 ± 4	25 ± 2	107 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs?
35-JE-283	237	3	—	58 ± 7	23 ± 4	145 ± 5	66 ± 3	45 ± 2	302 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	241	3	—	50 ± 6	19 ± 3	137 ± 4	63 ± 3	42 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	258	1	—	72 ± 7	15 ± 4	146 ± 5	66 ± 3	48 ± 2	298 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	260	1	—	61 ± 7	27 ± 4	154 ± 5	68 ± 3	46 ± 2	312 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	267	3	—	62 ± 6	22 ± 4	141 ± 5	60 ± 3	44 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	303	1	—	43 ± 5	14 ± 3	78 ± 4	103 ± 3	16 ± 2	92 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-283	316	3	—	30 ± 7	NM ± NM	2 ± 4	15 ± 3	NM ± NM	11 ± 10	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-JE-283	334	3	A	71 ± 7	21 ± 4	150 ± 5	64 ± 3	40 ± 2	295 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	334	3	B	107 ± 7	27 ± 4	98 ± 4	84 ± 3	75 ± 2	407 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
35-JE-283	336	3	—	67 ± 7	24 ± 4	145 ± 5	64 ± 3	45 ± 2	300 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	337	3	—	51 ± 6	17 ± 3	131 ± 4	58 ± 3	42 ± 2	272 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	376	2	—	62 ± 6	14 ± 4	142 ± 4	64 ± 3	41 ± 2	294 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	381	1	—	68 ± 7	16 ± 4	135 ± 5	62 ± 3	46 ± 2	286 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	388	1	—	54 ± 7	18 ± 4	85 ± 5	113 ± 4	18 ± 2	100 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-283	408	1	A	40 ± 7	13 ± 4	89 ± 4	116 ± 3	17 ± 2	100 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-283	408	1	B	73 ± 6	20 ± 3	154 ± 5	63 ± 3	46 ± 2	298 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	413	2	A	69 ± 6	19 ± 3	152 ± 4	70 ± 3	45 ± 2	300 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-283	425	3	—	71 ± 6	26 ± 3	148 ± 5	64 ± 3	40 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

C.1-186

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-283	428	1	A	64	27	147	65	46	302	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	428	1	B	52	14	123	55	41	259	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	429	1	—	59	16	87	113	15	103	6	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	430	1	—	58	19	150	66	45	300	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	433	1	—	44	21	96	122	16	100	8	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 7	± 4	± 4	± 4	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	454	1	—	98	17	90	77	69	390	16	NM	NM	NM	NM	NM	NM	Unknown A
				± 6	± 4	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	455	3	—	84	19	160	67	48	304	14	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	459	1	A	89	22	86	74	69	382	16	NM	NM	NM	NM	NM	NM	Unknown A
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	474	1	—	58	21	131	62	48	279	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	476	1	—	51	18	135	62	42	276	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	478	1	A	62	22	148	65	49	296	13	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	480	5	A	78	24	155	66	50	305	18	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	483	1	A	69	18	144	64	44	292	20	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	487	1	A	47	19	129	60	42	274	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	487	1	B	59	21	145	67	48	293	14	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	488	1	A	54	16	147	65	45	284	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	488	1	B	59	20	146	63	43	293	18	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	489	2	A	64	20	151	65	50	303	15	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	490	1	—	46	21	139	58	39	267	16	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	492	1	A	73	20	144	67	48	299	22	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	494	1	—	57	14	138	61	43	270	14	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 4	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-283	506	2	A	62	20	154	64	45	300	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-283	508	1	—	66 ± 7	17 ± 4	143 ± 5	60 ± 3	45 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	509	1	A	67 ± 7	21 ± 4	148 ± 5	69 ± 3	46 ± 2	291 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	510	1	A	69 ± 7	19 ± 4	155 ± 5	65 ± 3	46 ± 2	296 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	510	1	B	55 ± 7	23 ± 4	151 ± 5	67 ± 3	47 ± 2	303 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	510	1	C	51 ± 6	18 ± 3	132 ± 4	59 ± 3	46 ± 2	276 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	510	1	D	51 ± 6	22 ± 3	136 ± 4	65 ± 3	46 ± 2	287 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	512	1	A	105 ± 7	19 ± 4	95 ± 4	80 ± 3	70 ± 2	405 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A
35-JE-283	515	1	A	74 ± 7	22 ± 4	147 ± 5	75 ± 3	52 ± 2	305 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	517	1	A	63 ± 6	18 ± 3	139 ± 4	65 ± 3	44 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	527	1	—	41 ± 6	16 ± 3	128 ± 4	56 ± 3	43 ± 2	267 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	527	2	—	57 ± 7	17 ± 4	99 ± 5	124 ± 4	21 ± 2	105 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-283	530	2	A	63 ± 6	17 ± 3	145 ± 4	62 ± 3	46 ± 2	281 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	555	1	—	55 ± 6	14 ± 3	130 ± 4	59 ± 3	40 ± 2	275 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	664	2	—	57 ± 6	15 ± 4	141 ± 5	63 ± 3	44 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	700	1	A	62 ± 6	19 ± 3	145 ± 4	62 ± 3	42 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	704	1	—	57 ± 6	19 ± 3	151 ± 5	63 ± 3	45 ± 2	288 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	753	1	A	89 ± 7	19 ± 4	168 ± 5	70 ± 3	48 ± 2	307 ± 6	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	793	3	—	45 ± 6	17 ± 3	107 ± 4	71 ± 3	29 ± 2	107 ± 5	10 ± 3	684 ± 26	357 ± 20	1262 ± 16	0.96 ± 0.08	NM	Whitewater Ridge	
35-JE-283	817	1	A	66 ± 6	6 ± 4	1 ± 4	4 ± 3	26 ± 2	17 ± 5	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-JE-283	821	2	—	56 ± 6	14 ± 4	73 ± 4	53 ± 3	48 ± 2	121 ± 5	9 ± 3	704 ± 30	308 ± 20	1285 ± 18	0.95 ± 0.08	NM	Unknown B	
35-JE-283	826	2	—	82 ± 6	18 ± 4	147 ± 5	61 ± 3	44 ± 2	300 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-283	866	2	—	58 ± 5	19 ± 3	136 ± 4	61 ± 3	45 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-283	869	1	A	129 ± 7	21 ± 4	105 ± 4	93 ± 3	81 ± 2	419 ± 6	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
35-JE-283	874	1	—	62 ± 6	18 ± 3	150 ± 4	63 ± 3	45 ± 2	294 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-284	5	1	—	28 ± 6	14 ± 3	82 ± 5	90 ± 3	26 ± 2	124 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-JE-284	7	12	A	96 ± 6	19 ± 3	115 ± 5	6 ± 3	64 ± 2	468 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Riley?
35-JE-284	7	12	B	69 ± 6	21 ± 4	143 ± 5	65 ± 3	46 ± 2	293 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-284	7	12	C	65 ± 7	16 ± 4	143 ± 6	62 ± 3	49 ± 2	295 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-284	8	12	A	53 ± 6	22 ± 3	90 ± 5	112 ± 3	18 ± 2	97 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-284	8	12	B	41 ± 6	14 ± 3	105 ± 5	70 ± 3	29 ± 2	105 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge
35-JE-284	10	3	—	33 ± 5	13 ± 3	70 ± 5	96 ± 3	16 ± 2	85 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-284	296	2	A	69 ± 7	21 ± 4	146 ± 5	56 ± 3	50 ± 2	294 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-284	296	2	B	69 ± 8	24 ± 4	97 ± 5	28 ± 3	53 ± 2	91 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-284	329	3	—	149 ± 9	21 ± 5	112 ± 6	49 ± 3	75 ± 3	392 ± 7	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Brooks Canyon?
35-JE-284	332	2	—	101 ± 8	21 ± 4	95 ± 5	47 ± 3	64 ± 2	396 ± 6	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Brooks Canyon?
35-JE-284	337	2	—	151 ± 13	17 ± 7	91 ± 6	76 ± 4	69 ± 4	359 ± 8	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Yreka Butte?
35-JE-285	4	1	—	90 ± 5	16 ± 3	108 ± 5	6 ± 3	62 ± 2	455 ± 5	23 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Riley
35-JE-285	10	1	—	42 ± 5	15 ± 3	80 ± 5	106 ± 3	18 ± 2	96 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-285	11	4	A	62 ± 6	19 ± 3	146 ± 5	58 ± 3	48 ± 2	295 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-285	11	4	B	62 ± 6	18 ± 4	135 ± 5	60 ± 3	43 ± 2	281 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-285	11	4	C	43 ± 6	17 ± 3	136 ± 5	60 ± 3	45 ± 2	283 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-285	11	4	D	55 ± 5	16 ± 3	136 ± 5	59 ± 3	45 ± 2	280 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-285	11	4	E	70 ± 6	20 ± 3	143 ± 5	60 ± 3	49 ± 2	292 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-285	11	4	F	66 ± 6	19 ± 3	142 ± 5	63 ± 3	47 ± 2	290 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-285	11	4	G	60 ± 6	18 ± 3	133 ± 5	54 ± 3	39 ± 2	271 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-285	11	4	H	68 ± 6	14 ± 4	139 ± 5	60 ± 3	43 ± 2	288 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-285	11	4	I	64 ± 7	23 ± 4	155 ± 5	60 ± 3	53 ± 2	309 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-285	11	4	J	90 ± 7	8 ± 4	NM ± 5	12 ± 3	8 ± 2	9 ± 6	NM ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-JE-285	11	4	K	45 ± 6	19 ± 3	119 ± 5	94 ± 3	25 ± 2	129 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-JE-285	11	4	L	68 ± 6	59 ± 4	147 ± 5	65 ± 3	52 ± 2	296 ± 5	23 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-285	12	4	A	62 ± 7	18 ± 4	142 ± 5	61 ± 3	47 ± 2	288 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-285	12	4	B	63 ± 7	21 ± 3	137 ± 5	61 ± 3	48 ± 2	293 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-285	77	3	—	55 ± 5	17 ± 3	143 ± 5	60 ± 3	45 ± 2	281 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-285	89	2	—	61 ± 8	23 ± 4	147 ± 6	64 ± 3	50 ± 3	296 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-286	4	1	—	40 ± 5	15 ± 3	82 ± 5	20 ± 3	51 ± 2	88 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-287	2	1	—	50 ± 6	16 ± 3	134 ± 5	58 ± 3	48 ± 2	290 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-287	4	1	—	43 ± 5	8 ± 4	91 ± 5	97 ± 3	25 ± 2	139 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-JE-287	7	5	—	47 ± 6	15 ± 3	80 ± 5	104 ± 3	14 ± 2	101 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-287	51	1	—	68 ± 5	19 ± 3	128 ± 5	56 ± 3	46 ± 2	174 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain
35-JE-288	60	1	—	53 ± 7	19 ± 4	92 ± 5	23 ± 3	56 ± 2	93 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-288	76	1	—	38 ± 6	15 ± 3	84 ± 5	21 ± 3	54 ± 2	85 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-288	80	1	—	64 ± 5	23 ± 3	133 ± 5	59 ± 3	43 ± 2	178 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-288	83	1	—	170 ± 8	16 ± 4	113 ± 5	1 ± 3	98 ± 3	664 ± 7	43 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Horse Mountain?
35-JE-288	87	1	—	40 ± 5	15 ± 3	84 ± 5	23 ± 3	54 ± 2	92 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-288	99	1	—	60 ± 5	23 ± 3	136 ± 5	58 ± 3	43 ± 2	282 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-288	105	3	A	59 ± 8	12 ± 4	82 ± 5	17 ± 3	43 ± 2	87 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-JE-288	105	3	B	38	11	106	53	30	91	7	NM	NM	NM	NM	NM	NM	Little Bear Creek	
				± 5	± 3	± 5	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-288	110	13	—	45	11	118	85	27	129	9	NM	NM	NM	NM	NM	NM	Whitewater Ridge	
				± 6	± 3	± 5	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-288	294	1	—	52	13	144	71	44	298	20	NM	NM	NM	NM	NM	NM	Newberry Volcano	
				± 7	± 4	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-289	157	2	—	114	40	173	73	56	206	13	NM	NM	NM	NM	NM	NM	Unknown A	
				± 9	± 4	± 6	± 3	± 3	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-290	4	1	—	39	13	74	99	16	92	8	NM	NM	NM	NM	NM	NM	Obsidian Cliffs	
				± 5	± 3	± 5	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-290	22	3	—	73	20	153	60	47	300	15	NM	NM	NM	NM	NM	NM	Newberry Volcano	
				± 8	± 4	± 5	± 3	± 3	± 6	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	3	1	—	67	19	132	60	48	279	18	NM	NM	NM	NM	NM	NM	Newberry Volcano	
				± 6	± 3	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	6	1	—	57	15	132	63	47	280	20	NM	NM	NM	NM	NM	NM	Newberry Volcano	
				± 6	± 4	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	16	1	—	40	20	80	106	17	93	10	NM	NM	NM	NM	NM	NM	Obsidian Cliffs	
				± 6	± 3	± 5	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	82	5	A	52	20	90	118	21	99	10	NM	NM	NM	NM	NM	NM	Obsidian Cliffs	
				± 7	± 4	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	82	5	B	56	17	84	111	20	98	10	NM	NM	NM	NM	NM	NM	Obsidian Cliffs	
				± 6	± 3	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	82	5	C	42	17	84	111	18	99	11	NM	NM	NM	NM	NM	NM	Obsidian Cliffs	
				± 6	± 3	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	82	5	D	67	16	89	104	20	91	10	NM	NM	NM	NM	NM	NM	Obsidian Cliffs	
				± 8	± 4	± 5	± 4	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	82	5	E	47	21	97	24	57	94	12	NM	NM	NM	NM	NM	NM	Glass Buttes	
				± 6	± 3	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	82	5	F	54	13	84	110	19	99	9	NM	NM	NM	NM	NM	NM	Obsidian Cliffs	
				± 7	± 4	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	83	5	A	55	18	87	118	12	101	6	NM	NM	NM	NM	NM	NM	Obsidian Cliffs	
				± 7	± 4	± 5	± 4	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	83	5	B	230	7	92	38	32	67	9	NM	NM	NM	NM	NM	NM	Not Obsidian?	
				± 14	± 8	± 6	± 3	± 3	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	151	1	—	53	12	103	133	21	105	4	NM	NM	NM	NM	NM	NM	Inman Creek/Salt Creek A	
				± 8	± 4	± 5	± 4	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	202	1	—	61	16	161	71	48	305	16	NM	NM	NM	NM	NM	NM	Newberry Volcano	
				± 8	± 5	± 6	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	221	1	—	71	23	157	65	45	302	20	NM	NM	NM	NM	NM	NM	Newberry Volcano	
				± 7	± 4	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	239	1	—	125	15	153	68	47	195	9	NM	NM	NM	NM	NM	NM	Quartz Mountain/McKay Butte	
				± 8	± 4	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		
35-JE-291	240	1	—	87	26	137	82	44	274	10	NM	NM	NM	NM	NM	NM	Newberry Volcano	
				± 8	± 4	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-JE-292	19	1	—	66 ± 6	20 ± 3	133 ± 5	59 ± 3	44 ± 2	178 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte		
35-JE-293	1	1	—	57 ± 5	16 ± 3	92 ± 5	40 ± 3	64 ± 2	377 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A		
35-JE-293	17	1	—	50 ± 6	20 ± 3	122 ± 5	53 ± 3	41 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-JE-293	21	1	—	58 ± 5	21 ± 3	125 ± 5	55 ± 3	45 ± 2	171 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain		
35-JE-293	91	3	—	136 ± 12	21 ± 6	107 ± 6	8 ± 3	52 ± 3	433 ± 8	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown B		
35-JE-293	91	8	—	67 ± 6	16 ± 4	142 ± 5	62 ± 3	46 ± 2	287 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-JE-293	93	6	—	62 ± 7	16 ± 4	82 ± 5	115 ± 3	14 ± 2	97 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs		
35-JE-293	93	10	B	83 ± 5	NM ± 4	NM ± 5	46 ± 3	8 ± 2	143 ± 4	185 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian		
35-JE-293	96	10	—	54 ± 6	15 ± 3	140 ± 5	61 ± 3	43 ± 2	289 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-JE-293	96	22	B	17 ± 7	26 ± 3	NM ± 5	2 ± 3	34 ± 2	8 ± 9	NM ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian		
35-JE-293	96	23	—	100 ± 7	22 ± 4	123 ± 5	63 ± 3	51 ± 2	188 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte		
35-JE-293	101	2	B	65 ± 7	20 ± 4	142 ± 5	62 ± 3	46 ± 2	291 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-JE-293	101	17	—	62 ± 6	18 ± 3	138 ± 5	60 ± 3	45 ± 2	286 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-JE-293	101	20	—	58 ± 6	16 ± 4	142 ± 5	63 ± 3	50 ± 2	290 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-JE-293	107	16	B	52 ± 6	23 ± 3	95 ± 5	122 ± 3	18 ± 2	100 ± 4	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs		
35-JE-293	109	1	—	71 ± 6	23 ± 3	136 ± 5	63 ± 3	42 ± 2	182 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte		
35-JE-293	116	20	—	58 ± 5	19 ± 3	129 ± 5	54 ± 3	42 ± 2	173 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain?		
35-JE-293	116	22	—	70 ± 5	15 ± 3	141 ± 5	58 ± 3	42 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-JE-293	116	30	B	67 ± 5	18 ± 3	138 ± 5	57 ± 3	46 ± 2	178 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain		
35-JE-293	117	3	—	81 ± 6	16 ± 3	98 ± 5	35 ± 3	59 ± 2	131 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain		
35-JE-293	117	13	B	46 ± 7	16 ± 4	143 ± 5	48 ± 3	29 ± 2	99 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Wolf Creek		
35-JE-293	117	14	—	56 ± 9	14 ± 5	141 ± 6	60 ± 3	44 ± 3	286 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-293	120	1	—	37	16	73	101	19	89	6	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 5	± 3	± 5	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	123	6	—	43	13	128	55	43	271	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 5	± 3	± 5	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	123	10	—	71	19	139	60	45	288	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 7	± 4	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	123	11	—	57	17	138	63	48	286	19	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	123	27	B	61	12	103	110	27	144	12	NM	NM	NM	NM	NM	NM	Unknown C
				± 6	± 4	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	123	27	C	61	20	146	59	43	291	21	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	135	3	B	56	15	140	61	48	288	19	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	135	3	C	87	22	141	58	44	178	9	NM	NM	NM	NM	NM	NM	Quartz Mountain/McKay Butte
				± 6	± 3	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	135	11	—	57	19	106	44	35	237	11	NM	NM	NM	NM	NM	NM	Chickahominy?
				± 12	± 5	± 6	± 4	± 3	± 6	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	135	16	—	49	NM	2	9	3	8	NM	NM	NM	NM	NM	NM	NM	Not Obsidian
				± 5	± 5	± 5	± 3	± 2	± 7	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	136	4	B	103	23	159	65	47	183	13	NM	NM	NM	NM	NM	NM	Quartz Mountain/McKay Butte
				± 9	± 5	± 6	± 3	± 3	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	137	4	B	86	19	139	63	49	182	10	NM	NM	NM	NM	NM	NM	Quartz Mountain/McKay Butte
				± 6	± 3	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	138	1	—	79	14	110	7	52	302	15	NM	NM	NM	NM	NM	NM	Silver Lake/Sycan Marsh?
				± 65	± 3	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	149	1	—	91	26	158	66	49	186	12	NM	NM	NM	NM	NM	NM	Quartz Mountain/McKay Butte
				± 8	± 4	± 5	± 3	± 3	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	205	5	B	46	14	106	76	30	103	9	NM	NM	NM	NM	NM	NM	Little Bear Creek/Whitewater Ridge
				± 7	± 4	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	206	7	B	156	17	119	1	100	640	47	NM	NM	NM	NM	NM	NM	Horse Mountain?
				± 7	± 3	± 5	± 3	± 2	± 6	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	206	7	C	56	16	95	23	53	91	15	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 6	± 3	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	207	9	B	68	25	149	65	51	296	17	NM	NM	NM	NM	NM	NM	Newberry Volcano
				± 6	± 3	± 5	± 3	± 2	± 5	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	207	9	C	44	14	83	24	51	84	15	NM	NM	NM	NM	NM	NM	Glass Buttes
				± 5	± 3	± 5	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	208	9	B	47	15	87	109	15	97	11	NM	NM	NM	NM	NM	NM	Obsidian Cliffs
				± 8	± 4	± 5	± 4	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	208	9	C	78	21	131	59	46	183	10	NM	NM	NM	NM	NM	NM	Quartz Mountain/McKay Butte
				± 6	± 3	± 5	± 3	± 2	± 4	± 4	± NM	± NM	± NM	± NM	± NM	NM	
35-JE-293	209	4	B	111	23	147	65	38	168	12	NM	NM	NM	NM	NM	NM	Quartz Mountain
				± 10	± 5	± 6	± 4	± 3	± 6	± 4	± NM	± NM	± NM	± NM	± NM	NM	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-JE-293	209	8	—	71 ± 6	16 ± 3	141 ± 5	58 ± 3	48 ± 2	290 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-293	210	4	B	38 ± 5	15 ± 3	85 ± 5	21 ± 3	48 ± 2	88 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-296	5	1	—	46 ± 6	16 ± 3	77 ± 5	106 ± 3	16 ± 2	97 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-296	65	1	—	48 ± 7	11 ± 4	75 ± 5	53 ± 3	46 ± 2	118 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C
35-JE-296	66	3	—	72 ± 7	19 ± 4	85 ± 5	127 ± 4	19 ± 2	99 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-296	80	1	—	56 ± 8	15 ± 4	100 ± 5	89 ± 3	29 ± 2	115 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-JE-296	250	2	—	NM ± NM	NM ± NM	77 ± 3	26 ± 12	49 ± 3	93 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-296	250	3	—	NM ± NM	NM ± NM	115 ± 3	9 ± 12	92 ± 3	669 ± 9	38 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
35-JE-296	310	3	—	74 ± 6	26 ± 3	145 ± 5	71 ± 3	50 ± 2	298 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-296	333	1	—	70 ± 7	18 ± 4	147 ± 5	106 ± 3	27 ± 2	139 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge?
35-JE-296	380	1	—	88 ± 7	21 ± 4	149 ± 5	65 ± 3	49 ± 2	305 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-296	402	1	—	61 ± 5	17 ± 3	112 ± 5	58 ± 3	47 ± 2	193 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-JE-296	408	2	A	60 ± 6	12 ± 3	93 ± 5	28 ± 3	59 ± 2	99 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-296	408	2	B	83 ± 7	20 ± 4	126 ± 5	101 ± 3	27 ± 2	134 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-JE-296	412	1	—	NM ± NM	NM ± NM	114 ± 4	64 ± 12	32 ± 4	264 ± 8	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-296	412	2	A	34 ± 6	19 ± 3	119 ± 5	88 ± 3	24 ± 2	132 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-JE-296	412	2	B	40 ± 5	14 ± 3	124 ± 5	89 ± 3	27 ± 2	128 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-JE-296	412	2	C	61 ± 7	21 ± 3	94 ± 5	27 ± 3	56 ± 2	93 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-JE-296	413	2	A	50 ± 6	14 ± 4	81 ± 5	55 ± 3	47 ± 2	123 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C
35-JE-296	415	1	—	NM ± NM	NM ± NM	61 ± 3	48 ± 12	42 ± 3	103 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C
35-JE-296	416	2	—	NM ± NM	NM ± NM	124 ± 4	59 ± 12	34 ± 4	259 ± 8	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-JE-296	416	5	A	46 ± 8	15 ± 4	76 ± 5	51 ± 3	50 ± 2	118 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type		
35-JE-296	416	5	B	36 ± 7	16 ± 4	80 ± 5	104 ± 3	18 ± 2	97 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	416	5	C	72 ± 7	21 ± 4	95 ± 5	118 ± 4	15 ± 2	95 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	416	5	D	33 ± 5	14 ± 3	79 ± 5	21 ± 3	55 ± 2	88 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	419	2	—	54 ± 7	14 ± 4	82 ± 5	105 ± 3	16 ± 2	97 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	420	2	—	62 ± 7	19 ± 4	88 ± 5	112 ± 3	21 ± 2	100 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	434	3	—	76 ± 6	22 ± 4	150 ± 5	69 ± 3	54 ± 2	306 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-JE-296	436	1	—	NM ± NM	NM ± NM	80 ± 3	108 ± 12	18 ± 3	92 ± 7	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	438	3	A	69 ± 8	23 ± 4	174 ± 6	72 ± 3	50 ± 2	324 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?		
35-JE-296	438	3	B	65 ± 6	20 ± 4	162 ± 5	74 ± 3	44 ± 2	306 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-JE-296	438	3	C	47 ± 6	18 ± 3	92 ± 5	108 ± 3	26 ± 2	141 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B		
35-JE-296	442	4	—	79 ± 8	21 ± 4	156 ± 6	63 ± 3	46 ± 3	300 ± 6	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-JE-296	463	1	—	84 ± 6	20 ± 4	136 ± 5	59 ± 3	45 ± 2	182 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte		
35-JE-296	467	1	A	52 ± 7	14 ± 4	91 ± 5	115 ± 4	18 ± 2	96 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	467	1	B	63 ± 6	13 ± 4	93 ± 5	119 ± 3	16 ± 2	98 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	610	2	—	48 ± 7	20 ± 4	108 ± 4	91 ± 3	30 ± 2	127 ± 5	5 ± 3	929 ± 31	341 ± 20	NM ± NM	1.11 ± 0.08	NM	Whitewater Ridge		
35-JE-296	731	3	—	74 ± 6	19 ± 3	137 ± 4	60 ± 3	47 ± 2	182 ± 5	8 ± 3	675 ± 29	307 ± 20	NM ± NM	1.51 ± 0.08	NM	Quartz Mountain		
35-JE-296	736	2	—	71 ± 6	19 ± 3	126 ± 4	58 ± 3	42 ± 2	174 ± 5	7 ± 3	573 ± 27	310 ± 20	NM ± NM	1.53 ± 0.08	NM	Quartz Mountain		
35-JE-296	792	2	—	37 ± 5	16 ± 3	80 ± 4	102 ± 3	16 ± 2	96 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	795	1	—	36 ± 6	14 ± 3	83 ± 4	105 ± 3	17 ± 2	98 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	818	1	—	58 ± 7	14 ± 4	92 ± 4	83 ± 3	29 ± 2	120 ± 5	11 ± 3	774 ± 33	304 ± 20	NM ± NM	1.02 ± 0.08	NM	Whitewater Ridge		
35-JE-296	832	2	A	56 ± 6	17 ± 4	99 ± 4	25 ± 3	60 ± 2	103 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	833	2	—	65 ± 6	15 ± 3	81 ± 4	59 ± 3	48 ± 2	128 ± 5	9 ± 3	940 ± 31	326 ± 20	NM ± NM	1.01 ± 0.08	NM	Unknown C		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-JE-296	834	2	A	47 ± 5	15 ± 3	91 ± 4	23 ± 3	55 ± 2	93 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-296	834	2	B	41 ± 5	16 ± 3	91 ± 4	24 ± 3	52 ± 2	92 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-JE-296	835	2	A	55 ± 6	14 ± 3	75 ± 4	55 ± 3	47 ± 2	124 ± 5	12 ± 3	752 ± 29	320 ± 20	NM ± NM	0.96 ± 0.08	NM	Unknown C		
35-JE-296	835	2	B	56 ± 7	22 ± 4	91 ± 4	62 ± 3	49 ± 2	124 ± 5	7 ± 3	937 ± 30	355 ± 20	NM ± NM	1.11 ± 0.08	NM	Unknown C		
35-JE-296	835	2	C	61 ± 7	17 ± 4	96 ± 4	125 ± 4	18 ± 2	105 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-JE-296	839	2	—	58 ± 6	22 ± 3	88 ± 4	59 ± 3	52 ± 2	126 ± 5	10 ± 3	737 ± 27	328 ± 20	NM ± NM	1.01 ± 0.08	NM	Unknown C		
35-JE-296	863	1	A	55 ± 6	19 ± 3	98 ± 4	26 ± 3	54 ± 2	102 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	863	2	—	30 ± 5	14 ± 3	96 ± 4	64 ± 3	26 ± 2	101 ± 4	4 ± 3	579 ± 23	342 ± 20	NM ± NM	0.89 ± 0.08	NM	Little Bear Creek/Whitewater Ridge		
35-JE-296	867	2	A	45 ± 5	17 ± 3	90 ± 4	101 ± 3	25 ± 2	135 ± 5	5 ± 3	1104 ± 27	375 ± 20	NM ± NM	1.42 ± 0.08	NM	Whitewater Ridge		
35-JE-296	867	2	B	47 ± 5	16 ± 3	88 ± 4	23 ± 3	58 ± 2	94 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	869	2	—	51 ± 5	19 ± 3	90 ± 4	100 ± 3	27 ± 2	136 ± 5	5 ± 3	1417 ± 29	417 ± 20	NM ± NM	1.63 ± 0.08	NM	Whitewater Ridge		
35-JE-296	871	2	—	56 ± 6	20 ± 3	100 ± 4	109 ± 3	32 ± 2	146 ± 5	7 ± 3	1228 ± 30	392 ± 20	NM ± NM	1.52 ± 0.08	NM	Unknown B		
35-JE-296	872	2	A	41 ± 6	18 ± 3	91 ± 4	103 ± 3	26 ± 2	137 ± 5	7 ± 3	1120 ± 29	366 ± 20	NM ± NM	1.41 ± 0.08	NM	Whitewater Ridge		
35-JE-296	882	1	—	47 ± 6	20 ± 3	93 ± 4	27 ± 3	56 ± 2	97 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	883	2	A	47 ± 5	14 ± 3	86 ± 4	23 ± 3	50 ± 2	89 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	886	2	—	48 ± 6	13 ± 3	87 ± 4	25 ± 3	52 ± 2	95 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	897	2	A	114 ± 6	19 ± 3	141 ± 4	7 ± 3	112 ± 2	194 ± 5	41 ± 3	740 ± 23	625 ± 20	NM ± NM	0.95 ± 0.08	NM	Delintment Creek		
35-JE-296	899	4	—	41 ± 5	18 ± 3	90 ± 4	24 ± 3	51 ± 2	91 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	899	5	—	76 ± 6	25 ± 3	138 ± 4	65 ± 3	45 ± 2	190 ± 5	7 ± 3	618 ± 26	307 ± 20	NM ± NM	1.48 ± 0.08	NM	Quartz Mountain		
35-JE-296	901	3	A	54 ± 7	16 ± 4	96 ± 4	110 ± 3	30 ± 2	146 ± 5	7 ± 3	1235 ± 36	380 ± 20	NM ± NM	1.49 ± 0.08	NM	Unknown B		
35-JE-296	901	3	B	50 ± 6	20 ± 3	94 ± 4	25 ± 3	56 ± 2	91 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-JE-296	901	3	C	46 ± 6	20 ± 3	97 ± 4	24 ± 3	50 ± 2	92 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-296	902	4	—	44 ± 5	15 ± 3	92 ± 4	100 ± 3	25 ± 2	138 ± 5	3 ± 3	1160 ± 27	405 ± 20	NM ± NM	1.48 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-296	903	2	A	61 ± 6	19 ± 3	94 ± 4	24 ± 3	52 ± 2	92 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-296	903	2	B	66 ± 7	15 ± 4	106 ± 4	24 ± 3	58 ± 2	96 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-296	904	2	—	134 ± 6	21 ± 3	115 ± 4	2 ± 3	111 ± 2	273 ± 5	34 ± 3	706 ± 23	651 ± 20	NM ± NM	1.29 ± 0.08	NM NM	Sawmill Creek	
35-JE-296	919	2	—	53 ± 6	20 ± 3	80 ± 4	108 ± 3	19 ± 2	99 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-296	921	2	A	70 ± 6	17 ± 3	93 ± 4	121 ± 3	19 ± 2	105 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-296	923	2	A	46 ± 5	16 ± 3	94 ± 4	26 ± 3	55 ± 2	95 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-296	923	2	B	68 ± 6	18 ± 3	100 ± 4	113 ± 3	28 ± 2	144 ± 5	6 ± 3	1430 ± 33	436 ± 20	NM ± NM	1.65 ± 0.08	NM NM	Unknown B	
35-JE-296	925	3	A	48 ± 6	18 ± 3	89 ± 4	119 ± 3	17 ± 2	104 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-296	925	3	B	53 ± 6	16 ± 3	88 ± 4	118 ± 3	21 ± 2	101 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-296	926	2	—	57 ± 5	17 ± 3	85 ± 4	112 ± 3	16 ± 2	98 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-296	927	2	—	46 ± 5	17 ± 3	83 ± 4	27 ± 3	53 ± 2	92 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-296	966	2	—	60 ± 5	20 ± 3	129 ± 4	58 ± 3	40 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-296	967	2	—	52 ± 6	17 ± 3	82 ± 4	110 ± 3	18 ± 2	95 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-296	968	3	A	73 ± 6	17 ± 3	111 ± 4	26 ± 3	54 ± 2	286 ± 5	20 ± 3	1270 ± 34	512 ± 20	NM ± NM	1.95 ± 0.08	NM NM	Chickahominy	
35-JE-296	968	3	B	69 ± 6	16 ± 3	134 ± 4	62 ± 3	42 ± 2	182 ± 5	5 ± 3	665 ± 28	326 ± 20	NM ± NM	1.54 ± 0.08	NM NM	Quartz Mountain	
35-JE-296	970	2	A	53 ± 7	17 ± 4	101 ± 4	23 ± 3	56 ± 2	102 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-JE-296	970	2	B	46 ± 5	18 ± 3	96 ± 4	105 ± 3	26 ± 2	140 ± 5	7 ± 3	1159 ± 27	405 ± 20	NM ± NM	1.49 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-296	972	3	A	44 ± 7	15 ± 4	95 ± 4	102 ± 3	26 ± 2	136 ± 5	6 ± 3	1326 ± 33	379 ± 20	NM ± NM	1.52 ± 0.08	NM NM	Whitewater Ridge?	
35-JE-296	972	3	B	62 ± 5	19 ± 3	139 ± 4	61 ± 3	44 ± 2	288 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-JE-296	974	2	A	51 ± 6	20 ± 3	94 ± 4	123 ± 3	19 ± 2	105 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-JE-296	990	3	—	44 ± 5	17 ± 3	77 ± 4	101 ± 3	16 ± 2	93 ± 4	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-296	994	2	—	48 ± 7	17 ± 4	105 ± 4	117 ± 3	29 ± 2	144 ± 5	4 ± 3	1017 ± 36	322 ± 21	NM ± NM	1.27 ± 0.08	NM	Unknown B	
35-JE-296	1007	2	—	61 ± 6	17 ± 4	102 ± 4	120 ± 3	28 ± 2	146 ± 5	7 ± 3	1268 ± 35	371 ± 20	NM ± NM	1.48 ± 0.08	NM	Unknown B	
35-JE-296	1008	2	—	67 ± 7	18 ± 4	153 ± 5	66 ± 3	47 ± 2	303 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-JE-296	1015	1	—	33 ± 5	14 ± 3	80 ± 4	107 ± 3	16 ± 2	93 ± 4	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-JE-296	1016	1	—	67 ± 5	23 ± 3	139 ± 4	62 ± 3	43 ± 2	184 ± 5	6 ± 3	597 ± 24	318 ± 20	NM ± NM	1.58 ± 0.08	NM	Quartz Mountain	
35-JE-296	1030	2	A	64 ± 5	18 ± 3	143 ± 4	63 ± 3	49 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-JE-296	1032	3	A	57 ± 5	16 ± 3	146 ± 4	64 ± 3	47 ± 2	292 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-JE-296	1034	2	A	63 ± 6	17 ± 3	138 ± 4	63 ± 3	45 ± 2	287 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-JE-296	1034	2	B	61 ± 6	19 ± 3	120 ± 4	185 ± 4	29 ± 2	109 ± 5	13 ± 3	925 ± 29	582 ± 20	NM ± NM	1.42 ± 0.08	NM	Unknown D	
35-JE-296	1034	4	—	37 ± 7	11 ± 4	102 ± 4	69 ± 3	27 ± 2	103 ± 5	6 ± 3	613 ± 31	312 ± 20	NM ± NM	0.84 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-JE-296	1061	2	—	63 ± 5	18 ± 3	129 ± 4	56 ± 3	42 ± 2	172 ± 5	8 ± 3	580 ± 23	328 ± 20	NM ± NM	1.59 ± 0.08	NM	Quartz Mountain	
35-JE-296	1064	2	A	55 ± 6	16 ± 4	100 ± 4	111 ± 3	27 ± 2	148 ± 5	7 ± 3	1092 ± 30	348 ± 20	NM ± NM	1.34 ± 0.08	NM	Unknown B	
35-JE-296	1098	2	—	46 ± 5	16 ± 3	82 ± 4	107 ± 3	16 ± 2	96 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-JE-296	1117	2	—	56 ± 5	18 ± 3	138 ± 4	62 ± 3	44 ± 2	287 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-JE-297	7	1	—	40 ± 5	15 ± 3	77 ± 5	96 ± 3	17 ± 2	91 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-JE-297	13	1	—	38 ± 5	12 ± 3	96 ± 5	40 ± 3	23 ± 2	67 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown A	
35-JE-297	16	1	—	50 ± 6	21 ± 3	78 ± 5	117 ± 3	19 ± 2	88 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-JE-297	25	1	—	38 ± 5	12 ± 3	75 ± 5	99 ± 3	18 ± 2	90 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-JE-297	33	1	—	39 ± 5	15 ± 3	67 ± 5	97 ± 3	19 ± 2	92 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-JE-297	37	1	—	60 ± 5	17 ± 3	97 ± 5	51 ± 3	37 ± 2	239 ± 4	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown B	
35-JE-297	44	1	—	61 ± 6	19 ± 3	129 ± 5	52 ± 3	46 ± 2	277 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-JE-297	45	1	—	43 ± 6	10 ± 3	97 ± 5	66 ± 3	30 ± 2	102 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Little Bear Creek/Whitewater Ridge	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations*													Ratio	
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type		
35-JE-297	52	1 —	64 ± 6	20 ± 3	125 ± 5	53 ± 3	39 ± 2	141 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C	
35-JE-297	54	1 —	48 ± 5	15 ± 3	133 ± 5	54 ± 3	41 ± 2	265 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 A	50 ± 6	18 ± 3	137 ± 5	60 ± 3	45 ± 2	288 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 B	59 ± 5	13 ± 3	85 ± 5	110 ± 3	16 ± 2	97 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-297	64	1 C	54 ± 6	18 ± 3	139 ± 5	67 ± 3	46 ± 2	286 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 D	56 ± 5	16 ± 3	136 ± 5	57 ± 3	43 ± 2	282 ± 4	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 E	59 ± 7	22 ± 3	140 ± 5	60 ± 3	44 ± 2	278 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 F	60 ± 6	16 ± 4	134 ± 5	60 ± 3	44 ± 2	284 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 G	39 ± 5	15 ± 3	79 ± 5	110 ± 3	20 ± 2	98 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-297	64	1 H	61 ± 6	25 ± 3	136 ± 5	59 ± 3	45 ± 2	282 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 I	49 ± 6	18 ± 3	88 ± 5	111 ± 3	18 ± 2	95 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-297	64	1 J	46 ± 6	17 ± 3	83 ± 5	116 ± 3	19 ± 2	98 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-297	64	1 K	69 ± 7	18 ± 4	135 ± 5	64 ± 3	47 ± 2	292 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 L	71 ± 8	19 ± 4	156 ± 6	67 ± 3	47 ± 3	302 ± 6	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 M	48 ± 6	20 ± 3	83 ± 5	107 ± 3	22 ± 2	95 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-297	64	1 N	57 ± 6	12 ± 4	140 ± 5	56 ± 3	44 ± 2	282 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 O	53 ± 5	16 ± 3	134 ± 5	59 ± 3	44 ± 2	275 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 P	61 ± 6	20 ± 3	154 ± 5	66 ± 3	43 ± 2	301 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 Q	79 ± 7	20 ± 4	149 ± 5	69 ± 3	45 ± 2	293 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 R	74 ± 6	20 ± 3	156 ± 5	64 ± 3	46 ± 2	305 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-JE-297	64	1 S	46 ± 6	17 ± 3	88 ± 5	116 ± 3	13 ± 2	98 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-297	64	4 —	40 ± 6	14 ± 3	75 ± 5	99 ± 3	16 ± 2	92 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*													Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type		
35-JE-297	64	5	—	50 ± 5	15 ± 3	130 ± 5	55 ± 3	44 ± 2	268 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-297	68	1	A	43 ± 5	13 ± 3	78 ± 5	102 ± 3	15 ± 2	91 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	68	1	B	46 ± 5	13 ± 3	82 ± 5	105 ± 3	18 ± 2	92 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	68	1	C	52 ± 6	20 ± 3	88 ± 5	148 ± 4	19 ± 2	130 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Inman Creek/Salt Creek A	
35-JE-297	68	1	D	46 ± 6	19 ± 3	89 ± 5	109 ± 3	14 ± 2	99 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	68	1	E	62 ± 6	25 ± 3	142 ± 5	60 ± 3	49 ± 2	282 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-297	68	1	F	96 ± 6	23 ± 3	169 ± 5	68 ± 3	49 ± 2	195 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-JE-297	68	1	G	56 ± 6	17 ± 3	128 ± 5	61 ± 3	45 ± 2	278 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-297	68	1	H	68 ± 6	29 ± 3	150 ± 5	68 ± 3	49 ± 2	297 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-297	68	1	I	58 ± 7	17 ± 4	146 ± 5	70 ± 3	51 ± 2	293 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-297	68	5	—	36 ± 5	13 ± 3	77 ± 5	99 ± 3	17 ± 2	92 ± 4	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	69	1	A	59 ± 6	23 ± 3	87 ± 5	121 ± 3	20 ± 2	103 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	69	1	B	73 ± 6	20 ± 3	78 ± 5	177 ± 3	20 ± 2	188 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown D	
35-JE-297	72	1	A	42 ± 6	14 ± 3	87 ± 5	106 ± 3	20 ± 2	97 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	72	1	B	49 ± 6	19 ± 3	87 ± 5	114 ± 3	18 ± 2	101 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	72	1	C	41 ± 6	17 ± 3	76 ± 5	104 ± 3	16 ± 2	96 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	72	1	D	55 ± 6	17 ± 3	87 ± 5	114 ± 3	20 ± 2	98 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	207	1	—	46 ± 5	16 ± 3	82 ± 4	110 ± 3	18 ± 2	97 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	216	1	A	64 ± 6	22 ± 3	144 ± 4	65 ± 3	46 ± 2	301 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-297	218	1	A	52 ± 6	19 ± 3	96 ± 4	118 ± 3	15 ± 2	103 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-297	218	1	B	54 ± 5	18 ± 3	136 ± 4	59 ± 3	44 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-297	218	1	C	57 ± 6	19 ± 3	93 ± 4	123 ± 3	16 ± 2	103 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-298	88	1	—	53 ± 5	11 ± 3	84 ± 5	106 ± 3	18 ± 2	96 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-298	89	6	A	126 ± 6	23 ± 3	93 ± 5	NM ± 3	88 ± 2	545 ± 5	51 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A
35-JE-298	89	6	B	63 ± 6	21 ± 4	98 ± 5	130 ± 3	20 ± 2	114 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Inman Creek/Salt Creek A
35-JE-298	89	6	C	58 ± 7	16 ± 4	87 ± 5	115 ± 3	17 ± 2	98 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-298	90	7	—	78 ± 6	15 ± 4	139 ± 5	64 ± 3	43 ± 2	181 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	91	7	A	76 ± 8	26 ± 4	158 ± 6	75 ± 3	49 ± 2	306 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	91	7	B	75 ± 7	16 ± 4	149 ± 5	65 ± 3	42 ± 2	289 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	92	6	A	52 ± 7	14 ± 4	82 ± 5	111 ± 3	19 ± 2	106 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-298	92	6	B	77 ± 7	22 ± 4	149 ± 5	63 ± 3	50 ± 2	296 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	92	6	C	83 ± 7	16 ± 4	147 ± 5	64 ± 3	46 ± 2	293 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	94	6	A	75 ± 8	16 ± 5	152 ± 6	61 ± 3	51 ± 2	292 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	97	3	—	63 ± 7	18 ± 4	149 ± 6	65 ± 3	47 ± 2	298 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	101	1	—	58 ± 5	16 ± 3	131 ± 5	59 ± 3	41 ± 2	176 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	108	1	—	30 ± 7	8 ± 4	NM ± 5	37 ± 3	3 ± 3	8 ± 7	NM ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-JE-298	125	4	A	54 ± 6	11 ± 4	77 ± 5	102 ± 3	17 ± 2	94 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-298	125	4	B	74 ± 6	23 ± 3	138 ± 5	64 ± 3	45 ± 2	182 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	125	4	C	57 ± 6	NM ± 3	1 ± 5	4 ± 3	5 ± 2	11 ± 5	NM ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-JE-298	125	4	D	53 ± 7	15 ± 4	113 ± 5	22 ± 3	58 ± 2	300 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-JE-298	126	3	—	68 ± 6	25 ± 3	152 ± 5	66 ± 3	47 ± 2	294 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	128	2	—	61 ± 5	16 ± 3	133 ± 5	58 ± 3	42 ± 2	177 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	130	1	—	48 ± 6	15 ± 4	125 ± 5	56 ± 3	44 ± 2	275 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	130	4	A	51 ± 7	16 ± 4	91 ± 5	115 ± 4	17 ± 2	96 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs

C.1-201

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-298	130	4	B	95 ± 7	23 ± 4	161 ± 5	66 ± 3	47 ± 2	295 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	130	5	—	139 ± 8	17 ± 4	135 ± 5	63 ± 3	42 ± 2	181 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	132	1	—	108 ± 8	32 ± 4	160 ± 6	68 ± 3	49 ± 3	190 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	137	2	A	92 ± 7	26 ± 4	152 ± 5	67 ± 3	50 ± 2	192 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	137	2	B	47 ± 6	18 ± 3	133 ± 5	56 ± 3	41 ± 2	272 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	138	1	—	64 ± 5	16 ± 3	135 ± 5	61 ± 3	47 ± 2	176 ± 4	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	141	1	—	58 ± 6	18 ± 3	135 ± 5	57 ± 3	45 ± 2	285 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	143	1	—	53 ± 5	17 ± 3	131 ± 5	58 ± 3	45 ± 2	280 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	144	1	—	57 ± 6	19 ± 3	133 ± 5	62 ± 3	44 ± 2	296 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	145	1	—	43 ± 5	17 ± 3	81 ± 5	106 ± 3	16 ± 2	94 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-298	148	1	—	65 ± 5	22 ± 3	137 ± 5	63 ± 3	45 ± 2	182 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	149	1	—	88 ± 6	19 ± 3	123 ± 5	NM ± 3	100 ± 2	156 ± 4	37 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Delintment Creek
35-JE-298	150	1	—	62 ± 6	11 ± 4	117 ± 5	27 ± 3	47 ± 2	261 ± 5	28 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?
35-JE-298	151	1	—	41 ± 6	15 ± 3	63 ± 5	51 ± 3	50 ± 2	120 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B
35-JE-298	152	1	—	58 ± 7	13 ± 4	127 ± 5	23 ± 3	46 ± 2	245 ± 5	29 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?
35-JE-298	161	1	—	32 ± 5	13 ± 3	117 ± 5	72 ± 3	28 ± 2	114 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-JE-298	168	1	—	40 ± 6	13 ± 3	77 ± 5	105 ± 3	19 ± 2	94 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-298	170	1	—	57 ± 5	21 ± 3	137 ± 5	61 ± 3	44 ± 2	288 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	171	1	—	98 ± 8	15 ± 4	95 ± 5	33 ± 3	55 ± 2	129 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-JE-298	172	1	—	44 ± 5	16 ± 3	77 ± 5	22 ± 3	48 ± 2	82 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes
35-JE-298	175	1	—	68 ± 6	18 ± 3	130 ± 5	59 ± 3	41 ± 2	177 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	179	1	—	80 ± 8	20 ± 4	118 ± 6	53 ± 3	34 ± 2	241 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano

C.1-202

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-298	196	1	—	39 ± 6	14 ± 3	119 ± 5	84 ± 3	24 ± 2	129 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-JE-298	197	1	—	74 ± 5	20 ± 3	132 ± 5	58 ± 3	42 ± 2	179 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-298	207	1	—	43 ± 5	13 ± 3	70 ± 5	45 ± 3	47 ± 2	109 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B
35-JE-298	219	4	A	59 ± 5	16 ± 3	136 ± 5	57 ± 3	44 ± 2	279 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	219	4	B	54 ± 6	20 ± 3	146 ± 5	65 ± 3	47 ± 2	290 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	219	5	—	92 ± 8	14 ± 4	132 ± 5	64 ± 3	46 ± 2	274 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	271	1	—	41 ± 5	18 ± 3	116 ± 5	54 ± 3	42 ± 2	264 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	301	1	A	55 ± 5	133 ± 3	127 ± 5	53 ± 3	45 ± 2	267 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	301	1	B	73 ± 7	19 ± 4	141 ± 5	62 ± 3	49 ± 2	288 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	301	1	C	68 ± 6	23 ± 3	136 ± 5	55 ± 3	45 ± 2	278 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	303	2	—	66 ± 6	25 ± 3	132 ± 5	57 ± 3	43 ± 2	281 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	306	3	A	62 ± 5	21 ± 3	142 ± 5	58 ± 3	44 ± 2	285 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-JE-298	306	3	B	43 ± 6	13 ± 3	89 ± 5	114 ± 3	18 ± 2	101 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-298	307	3	—	97 ± 6	22 ± 3	145 ± 5	62 ± 3	49 ± 2	187 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-300	16	1	—	36 ± 5	13 ± 3	76 ± 5	100 ± 3	16 ± 2	91 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-301	3	1	—	65 ± 5	15 ± 3	128 ± 5	58 ± 3	44 ± 2	178 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-JE-301	5	1	—	49 ± 6	20 ± 3	81 ± 5	108 ± 3	15 ± 2	95 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-301	7	1	—	32 ± 5	14 ± 3	63 ± 5	106 ± 3	19 ± 2	91 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-301	10	1	—	37 ± 5	16 ± 3	78 ± 5	102 ± 3	17 ± 2	94 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-301	18	1	—	50 ± 6	17 ± 3	77 ± 5	103 ± 3	16 ± 2	99 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-302	25	1	—	58 ± 6	15 ± 4	91 ± 5	116 ± 3	20 ± 2	100 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-302	27	1	—	53 ± 7	20 ± 4	86 ± 5	122 ± 4	18 ± 2	103 ± 5	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs

C.1-203

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-302	28	3	—	69 ± 7	13 ± 4	83 ± 5	104 ± 3	14 ± 2	100 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	29	3	—	48 ± 6	17 ± 3	82 ± 5	109 ± 3	17 ± 2	96 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	32	2	A	49 ± 7	16 ± 4	82 ± 5	110 ± 3	16 ± 2	95 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	32	2	B	41 ± 6	14 ± 3	81 ± 5	100 ± 3	15 ± 2	97 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	33	3	—	49 ± 7	19 ± 3	87 ± 5	105 ± 3	15 ± 2	96 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	34	3	A	58 ± 7	17 ± 4	93 ± 5	117 ± 3	15 ± 2	96 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	34	3	B	47 ± 6	16 ± 3	90 ± 5	109 ± 3	18 ± 2	93 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	126	2	—	53 ± 6	11 ± 4	82 ± 4	110 ± 3	18 ± 2	99 ± 5	3 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	178	2	A	78 ± 7	24 ± 3	139 ± 4	64 ± 3	45 ± 2	187 ± 5	10 ± 3	786 ± 26	311 ± 20	NM ± NM	1.61 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-JE-302	202	1	A	41 ± 6	12 ± 3	79 ± 4	105 ± 3	15 ± 2	93 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	307	3	—	45 ± 6	17 ± 3	85 ± 4	110 ± 3	17 ± 2	97 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	311	2	A	55 ± 6	15 ± 4	85 ± 4	112 ± 3	18 ± 2	101 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	313	3	A	41 ± 6	18 ± 3	83 ± 4	109 ± 3	15 ± 2	97 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	315	2	—	45 ± 6	19 ± 3	94 ± 4	119 ± 3	16 ± 2	102 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	317	3	A	30 ± 6	19 ± 3	81 ± 4	104 ± 3	15 ± 2	95 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	317	3	B	31 ± 6	5 ± 8	NM ± NM	7 ± 3	NM ± NM	11 ± 10	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-JE-302	323	1	—	52 ± 7	23 ± 3	89 ± 4	120 ± 4	19 ± 2	102 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	324	1	—	68 ± 7	24 ± 4	95 ± 4	120 ± 4	18 ± 2	99 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	331	2	—	39 ± 6	19 ± 3	88 ± 4	112 ± 3	17 ± 2	98 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	355	2	—	47 ± 6	19 ± 3	107 ± 4	76 ± 3	29 ± 2	113 ± 5	9 ± 3	819 ± 26	330 ± 20	NM ± NM	0.94 ± 0.08	NM ± NM	NM ± NM	Whitewater Ridge
35-JE-302	357	3	A	53 ± 7	17 ± 4	97 ± 4	122 ± 4	18 ± 2	106 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-JE-302	357	3	B	52 ± 6	19 ± 3	83 ± 4	109 ± 3	17 ± 2	98 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs

C.1-204

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-JE-302	363	3	A	52 ± 6	20 ± 3	83 ± 4	116 ± 3	17 ± 2	105 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	370	1	—	44 ± 6	18 ± 3	80 ± 4	102 ± 3	17 ± 2	96 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	386	1	—	36 ± 6	14 ± 3	76 ± 4	99 ± 3	16 ± 2	91 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	393	2	—	40 ± 6	16 ± 3	84 ± 4	112 ± 3	18 ± 2	99 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	396	2	—	54 ± 6	14 ± 4	83 ± 4	109 ± 3	18 ± 2	96 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	407	2	A	53 ± 6	19 ± 3	90 ± 4	114 ± 3	17 ± 2	95 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	409	2	A	48 ± 7	14 ± 4	91 ± 4	120 ± 4	17 ± 2	99 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	411	3	A	81 ± 7	9 ± 4	NM ± NM	20 ± 3	8 ± 2	13 ± 6	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian	
35-JE-302	413	3	—	46 ± 6	12 ± 4	89 ± 4	112 ± 3	17 ± 2	100 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	425	3	A	60 ± 7	15 ± 4	88 ± 4	122 ± 4	18 ± 2	96 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	429	2	A	65 ± 7	19 ± 4	89 ± 4	111 ± 4	18 ± 2	99 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	429	2	B	23 ± 8	NM ± NM	NM ± NM	7 ± 3	NM ± NM	13 ± 5	NM ± 6	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian	
35-JE-302	429	3	—	46 ± 6	13 ± 3	81 ± 4	101 ± 3	17 ± 2	95 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	431	2	—	54 ± 6	15 ± 4	82 ± 4	118 ± 3	17 ± 2	105 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	439	2	—	50 ± 6	20 ± 3	80 ± 4	108 ± 3	15 ± 2	96 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	445	2	—	42 ± 6	15 ± 3	119 ± 4	88 ± 3	24 ± 2	125 ± 5	10 ± 3	954 ± 28	267 ± 20	NM ± NM	1.12 ± 0.08	NM ± NM	NM ± NM	Whitewater Ridge	
35-JE-302	461	2	—	49 ± 6	18 ± 3	83 ± 4	114 ± 3	17 ± 2	96 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	467	2	—	14 ± 11	8 ± 3	NM ± NM	28 ± 3	3 ± 2	14 ± 5	3 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian	
35-JE-302	469	2	A	41 ± 6	16 ± 3	78 ± 4	106 ± 3	16 ± 2	98 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	469	2	B	52 ± 7	16 ± 4	88 ± 4	119 ± 4	18 ± 2	105 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	469	3	—	45 ± 6	17 ± 3	84 ± 4	106 ± 3	15 ± 2	98 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	471	3	A	54 ± 6	12 ± 4	90 ± 4	121 ± 3	18 ± 2	106 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	

C.1-205

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-JE-302	473	3	—	35 ± 6	18 ± 3	74 ± 4	100 ± 3	16 ± 2	93 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	474	2	A	51 ± 7	23 ± 4	89 ± 4	127 ± 4	16 ± 2	108 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	475	2	A	39 ± 6	21 ± 3	89 ± 4	120 ± 3	19 ± 2	103 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	477	2	A	47 ± 6	16 ± 3	87 ± 4	118 ± 3	19 ± 2	102 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	491	2	A	38 ± 6	15 ± 3	84 ± 4	108 ± 3	16 ± 2	98 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	494	2	A	50 ± 7	15 ± 4	82 ± 4	117 ± 3	13 ± 2	103 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	495	2	—	38 ± 7	19 ± 4	89 ± 4	119 ± 3	18 ± 2	101 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	497	2	—	51 ± 6	18 ± 4	86 ± 4	116 ± 3	15 ± 2	103 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	510	2	—	36 ± 6	15 ± 3	75 ± 4	98 ± 3	16 ± 2	89 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	511	3	A	51 ± 7	18 ± 4	89 ± 4	119 ± 4	19 ± 2	103 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	511	3	B	52 ± 7	20 ± 4	91 ± 4	125 ± 4	16 ± 2	106 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	518	1	A	89 ± 7	24 ± 4	153 ± 5	72 ± 3	47 ± 2	305 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-JE-302	530	2	A	48 ± 7	17 ± 4	92 ± 4	116 ± 4	16 ± 2	105 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	533	2	—	47 ± 6	14 ± 3	77 ± 4	103 ± 3	15 ± 2	94 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	538	1	A	43 ± 6	17 ± 3	85 ± 4	109 ± 3	19 ± 2	96 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	539	2	—	53 ± 7	15 ± 4	87 ± 4	117 ± 4	20 ± 2	102 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	543	2	—	49 ± 6	17 ± 3	84 ± 4	116 ± 3	20 ± 2	98 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	548	2	—	51 ± 7	21 ± 4	101 ± 4	122 ± 4	15 ± 2	108 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	574	2	A	50 ± 6	17 ± 4	84 ± 4	120 ± 3	19 ± 2	100 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	599	3	A	56 ± 6	16 ± 3	85 ± 4	115 ± 3	14 ± 2	102 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	604	3	—	43 ± 6	14 ± 4	82 ± 4	104 ± 3	15 ± 2	92 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-JE-302	607	3	A	49 ± 8	20 ± 4	97 ± 5	132 ± 4	19 ± 2	104 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	

C.1-206

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-302	607	3	B	47 ± 6	16 ± 3	81 ± 4	105 ± 3	16 ± 2	96 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-302	609	2	A	35 ± 6	14 ± 3	77 ± 4	103 ± 3	16 ± 2	98 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-JE-302	617	1	—	45 ± 6	13 ± 4	115 ± 4	89 ± 3	26 ± 2	133 ± 5	7 ± 3	1034 ± 29	274 ± 20	NM ± NM	1.18 ± 0.08	NM	Whitewater Ridge	
35-JE-302	626	1	A	57 ± 6	14 ± 4	80 ± 4	113 ± 4	16 ± 2	103 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	627	1	A	50 ± 6	15 ± 3	80 ± 4	104 ± 3	15 ± 2	96 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	627	1	B	33 ± 6	14 ± 3	70 ± 4	97 ± 3	15 ± 2	92 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	629	1	A	45 ± 6	20 ± 3	86 ± 4	114 ± 3	16 ± 2	101 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	639	1	A	43 ± 6	19 ± 3	80 ± 4	112 ± 3	18 ± 2	96 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	639	1	B	61 ± 6	16 ± 4	83 ± 4	116 ± 3	17 ± 2	100 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	640	1	A	49 ± 7	18 ± 4	93 ± 4	123 ± 4	12 ± 2	104 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	644	1	—	50 ± 7	14 ± 4	86 ± 4	116 ± 4	21 ± 2	100 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	657	1	A	56 ± 6	17 ± 4	78 ± 4	106 ± 3	17 ± 2	98 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	658	1	A	39 ± 7	18 ± 3	85 ± 4	111 ± 3	18 ± 2	100 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	662	1	—	49 ± 6	16 ± 3	81 ± 4	114 ± 3	18 ± 2	95 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	674	1	A	49 ± 7	17 ± 4	86 ± 4	118 ± 4	18 ± 2	105 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	675	1	A	47 ± 6	17 ± 4	85 ± 4	117 ± 3	20 ± 2	101 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	675	1	B	53 ± 6	16 ± 3	91 ± 4	119 ± 3	18 ± 2	105 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-302	676	1	A	41 ± 6	19 ± 3	119 ± 4	60 ± 3	30 ± 2	98 ± 5	5 ± 3	566 ± 27	350 ± 20	NM ± NM	0.83 ± 0.08	NM	Little Bear Creek	
35-JE-302	679	2	A	41 ± 7	15 ± 4	84 ± 4	109 ± 3	16 ± 2	94 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-JE-304	1	1	—	56 ± 5	20 ± 3	119 ± 5	35 ± 3	48 ± 2	247 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?	
35-JE-304	2	1	—	52 ± 5	21 ± 3	120 ± 5	36 ± 3	44 ± 2	255 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?	
35-JE-304	25	1	—	110 ± 6	22 ± 3	80 ± 5	31 ± 3	62 ± 2	412 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>										Ratio		Artifact Source/Chemical Type	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-JE-304	38	1	—	67 ± 5	17 ± 3	108 ± 5	40 ± 3	53 ± 2	339 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?
35-JE-305	2	1	—	19 ± 8	NM ± 3	1 ± 5	19 ± 3	10 ± 2	10 ± 5	4 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-JE-305	10	1	—	46 ± 5	21 ± 3	135 ± 5	57 ± 3	39 ± 2	272 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	1	1	—	46 ± 5	17 ± 3	128 ± 5	54 ± 3	42 ± 2	271 ± 4	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	2	1	—	59 ± 6	22 ± 3	131 ± 5	54 ± 3	45 ± 2	276 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	5	1	—	64 ± 5	23 ± 3	98 ± 5	37 ± 3	54 ± 2	122 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-KL-810	6	1	—	69 ± 5	17 ± 3	90 ± 5	30 ± 3	53 ± 2	122 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-KL-810	20	1	—	85 ± 6	15 ± 3	120 ± 5	4 ± 3	52 ± 2	317 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	52	1	—	46 ± 6	12 ± 3	100 ± 5	45 ± 3	26 ± 2	120 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	104	1	—	45 ± 6	18 ± 3	100 ± 5	41 ± 3	23 ± 2	117 ± 4	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	221	2	A	87 ± 6	20 ± 3	120 ± 5	5 ± 3	50 ± 2	321 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	221	2	B	55 ± 6	20 ± 3	119 ± 5	59 ± 3	41 ± 2	271 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	221	2	C	76 ± 7	18 ± 4	101 ± 5	34 ± 3	54 ± 2	128 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-KL-810	221	2	D	64 ± 7	16 ± 4	76 ± 5	74 ± 3	29 ± 2	245 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A
35-KL-810	221	2	E	58 ± 6	24 ± 3	106 ± 5	41 ± 3	23 ± 2	114 ± 4	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	221	2	F	92 ± 9	21 ± 4	143 ± 6	11 ± 3	61 ± 3	353 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	222	2	—	92 ± 6	22 ± 3	114 ± 5	9 ± 3	57 ± 2	330 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	222	5	A	87 ± 7	11 ± 4	86 ± 5	34 ± 3	50 ± 2	108 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-KL-810	222	5	B	88 ± 7	18 ± 4	104 ± 5	37 ± 3	54 ± 2	125 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain?
35-KL-810	223	1	A	116 ± 10	20 ± 5	140 ± 6	5 ± 3	48 ± 3	341 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	223	1	B	153 ± 9	18 ± 5	144 ± 6	6 ± 3	55 ± 3	343 ± 6	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	224	1	—	97 ± 8	21 ± 4	135 ± 6	9 ± 3	65 ± 2	362 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-810	245	1	—	55 ± 5	17 ± 3	137 ± 5	54 ± 3	43 ± 2	266 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	253	1	—	45 ± 6	14 ± 4	130 ± 4	63 ± 3	26 ± 2	167 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS
35-KL-810	253	2	—	40 ± 5	19 ± 3	80 ± 5	102 ± 3	19 ± 2	95 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-KL-810	273	1	A	72 ± 5	16 ± 3	111 ± 5	6 ± 3	52 ± 2	318 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	273	1	B	90 ± 6	18 ± 3	125 ± 5	4 ± 3	58 ± 2	347 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	273	1	C	97 ± 6	18 ± 3	114 ± 5	15 ± 3	57 ± 2	333 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	273	1	D	98 ± 7	15 ± 4	129 ± 5	1 ± 3	60 ± 2	353 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	273	1	E	96 ± 6	15 ± 3	120 ± 5	3 ± 3	54 ± 2	327 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	273	1	F	88 ± 6	18 ± 3	121 ± 5	5 ± 3	56 ± 2	333 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	273	1	G	87 ± 7	17 ± 4	131 ± 5	9 ± 3	56 ± 2	337 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	273	1	H	57 ± 6	15 ± 4	113 ± 5	45 ± 3	23 ± 2	112 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	274	1	—	77 ± 5	16 ± 3	115 ± 5	1 ± 3	54 ± 2	329 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	274	2	A	79 ± 5	17 ± 3	105 ± 5	3 ± 3	57 ± 2	321 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	274	2	B	107 ± 7	18 ± 3	126 ± 5	7 ± 3	54 ± 2	332 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	274	2	C	89 ± 6	22 ± 3	92 ± 5	39 ± 3	60 ± 2	131 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	274	2	D	101 ± 8	22 ± 4	130 ± 5	10 ± 3	57 ± 2	334 ± 6	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	274	2	E	85 ± 6	20 ± 4	124 ± 5	2 ± 3	52 ± 2	328 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	276	1	—	35 ± 6	20 ± 3	105 ± 5	39 ± 3	25 ± 2	115 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	276	2	—	91 ± 6	21 ± 3	121 ± 5	7 ± 3	54 ± 2	344 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	276	3	—	89 ± 6	21 ± 3	126 ± 5	4 ± 3	58 ± 2	349 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	278	1	—	43 ± 5	14 ± 3	68 ± 5	69 ± 3	28 ± 2	231 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A
35-KL-810	278	2	—	78 ± 5	19 ± 3	111 ± 5	8 ± 3	54 ± 2	335 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-KL-810	279	1	—	95 ± 7	15 ± 4	133 ± 5	11 ± 3	58 ± 2	353 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	280	1	A	80 ± 6	13 ± 3	113 ± 5	3 ± 3	53 ± 2	317 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	280	1	B	50 ± 6	12 ± 3	90 ± 5	41 ± 3	23 ± 2	107 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-810	284	1	—	103 ± 6	18 ± 3	126 ± 5	5 ± 3	54 ± 2	336 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	351	1	A	71 ± 5	17 ± 3	112 ± 5	8 ± 3	48 ± 2	300 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	351	1	B	100 ± 7	24 ± 3	101 ± 5	42 ± 3	57 ± 2	131 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-810	351	1	C	96 ± 6	20 ± 4	118 ± 5	5 ± 3	49 ± 2	320 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	351	1	D	65 ± 7	16 ± 4	146 ± 5	61 ± 3	46 ± 2	289 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-KL-810	351	1	E	96 ± 7	22 ± 3	129 ± 5	6 ± 3	60 ± 2	346 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	351	1	F	116 ± 5	25 ± 4	136 ± 5	9 ± 3	58 ± 2	366 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	351	3	—	74 ± 6	15 ± 3	94 ± 5	33 ± 3	59 ± 2	128 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-KL-810	352	1	—	79 ± 5	20 ± 3	115 ± 5	9 ± 3	56 ± 2	319 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	353	1	—	89 ± 6	16 ± 3	119 ± 5	7 ± 3	58 ± 2	341 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	354	1	A	86 ± 5	17 ± 3	121 ± 5	6 ± 3	55 ± 2	326 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	354	1	B	98 ± 7	13 ± 1	124 ± 5	3 ± 3	60 ± 2	346 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	354	4	—	73 ± 5	18 ± 3	110 ± 5	7 ± 3	52 ± 2	323 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	354	5	—	79 ± 5	21 ± 3	111 ± 5	1 ± 3	53 ± 2	318 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	355	2	—	87 ± 5	17 ± 3	108 ± 5	7 ± 3	53 ± 2	312 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	359	2	—	48 ± 5	19 ± 3	98 ± 5	39 ± 3	25 ± 2	112 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-810	359	3	—	79 ± 5	16 ± 3	114 ± 5	7 ± 3	51 ± 2	328 ± 4	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	360	1	A	53 ± 5	16 ± 3	132 ± 5	56 ± 3	44 ± 2	266 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-KL-810	360	1	B	62 ± 6	20 ± 3	128 ± 5	57 ± 3	45 ± 2	265 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-810	360	1	C	102 ± 8	21 ± 4	118 ± 5	39 ± 3	61 ± 2	138 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-KL-810	360	1	D	57 ± 6	24 ± 3	140 ± 5	65 ± 3	45 ± 2	284 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	360	4	—	85 ± 5	24 ± 3	110 ± 5	3 ± 3	57 ± 2	344 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	360	5	—	78 ± 5	20 ± 3	117 ± 5	6 ± 3	55 ± 2	327 ± 4	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	361	1	—	51 ± 6	18 ± 3	130 ± 5	59 ± 3	44 ± 2	271 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	361	5	—	83 ± 6	13 ± 4	123 ± 5	8 ± 3	58 ± 2	341 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	362	4	—	60 ± 7	12 ± 4	102 ± 5	39 ± 3	26 ± 2	114 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	503	1	—	48 ± 6	18 ± 3	99 ± 4	41 ± 3	22 ± 2	112 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	591	1	—	83 ± 6	16 ± 3	121 ± 4	8 ± 3	53 ± 2	318 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	596	1	A	42 ± 7	11 ± 4	65 ± 4	56 ± 3	24 ± 2	216 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Deer Creek/Burn Butte
35-KL-810	600	1	—	83 ± 6	15 ± 3	113 ± 4	11 ± 3	48 ± 2	317 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	643	1	A	85 ± 6	16 ± 3	112 ± 4	9 ± 3	51 ± 2	324 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	795	1	—	48 ± 6	17 ± 3	105 ± 4	42 ± 3	23 ± 2	118 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	796	1	A	86 ± 6	20 ± 4	121 ± 4	5 ± 3	54 ± 2	335 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	812	1	A	86 ± 6	17 ± 4	125 ± 4	4 ± 3	54 ± 2	337 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	819	1	A	71 ± 6	12 ± 4	109 ± 4	8 ± 3	49 ± 2	310 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	819	1	B	87 ± 6	17 ± 3	121 ± 4	9 ± 3	57 ± 2	341 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	819	1	C	89 ± 6	20 ± 3	120 ± 4	5 ± 3	52 ± 2	330 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	819	1	D	88 ± 7	15 ± 4	132 ± 5	7 ± 3	57 ± 2	346 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	819	1	E	92 ± 7	15 ± 4	129 ± 4	4 ± 3	54 ± 2	344 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	819	1	F	87 ± 7	20 ± 4	125 ± 4	12 ± 3	60 ± 2	333 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	820	1	A	108 ± 7	21 ± 4	131 ± 5	12 ± 3	56 ± 2	339 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-KL-810	820	1 B	111 ± 7	19 ± 4	136 ± 5	3 ± 3	59 ± 2	352 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	820	1 C	101 ± 8	26 ± 4	133 ± 5	5 ± 3	60 ± 2	362 ± 6	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	820	1 D	101 ± 7	19 ± 4	129 ± 5	5 ± 3	55 ± 2	342 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	820	1 E	84 ± 7	15 ± 4	130 ± 4	6 ± 3	53 ± 2	345 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	820	1 F	91 ± 8	24 ± 4	132 ± 5	5 ± 3	62 ± 2	353 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	821	1 A	84 ± 7	16 ± 4	123 ± 4	5 ± 3	51 ± 2	338 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	822	1 A	85 ± 6	18 ± 3	120 ± 4	4 ± 3	54 ± 2	335 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	822	1 B	94 ± 6	22 ± 3	123 ± 4	5 ± 3	51 ± 2	333 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	822	1 C	54 ± 6	16 ± 3	49 ± 4	352 ± 4	25 ± 2	220 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B		
35-KL-810	823	1 A	63 ± 6	16 ± 3	108 ± 4	3 ± 3	44 ± 2	297 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	824	1 A	77 ± 6	11 ± 4	106 ± 4	9 ± 3	47 ± 2	298 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	825	1 A	94 ± 6	18 ± 4	112 ± 4	12 ± 3	51 ± 2	319 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	826	1 A	75 ± 6	19 ± 3	120 ± 4	2 ± 3	51 ± 2	315 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	826	1 B	76 ± 6	21 ± 3	125 ± 4	5 ± 3	53 ± 2	329 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	827	1 A	78 ± 6	20 ± 3	112 ± 4	9 ± 3	53 ± 2	323 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	829	1 A	90 ± 6	19 ± 3	117 ± 4	4 ± 3	55 ± 2	337 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	829	1 B	87 ± 6	23 ± 3	125 ± 4	3 ± 3	53 ± 2	338 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	833	1 A	75 ± 6	13 ± 3	115 ± 4	6 ± 3	51 ± 2	308 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	833	1 B	81 ± 6	22 ± 3	115 ± 4	6 ± 3	53 ± 2	318 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	839	1 A	95 ± 6	21 ± 3	127 ± 4	9 ± 3	54 ± 2	340 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	839	1 B	83 ± 6	18 ± 3	106 ± 4	11 ± 3	51 ± 2	314 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	839	1 C	94 ± 7	20 ± 4	132 ± 5	4 ± 3	54 ± 2	354 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-810	839	1	D	58 ± 6	20 ± 3	75 ± 4	163 ± 3	17 ± 2	184 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C	
35-KL-810	839	1	E	36 ± 6	14 ± 3	72 ± 4	53 ± 3	27 ± 2	198 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Deer Creek/Burn Butte	
35-KL-810	841	1	A	100 ± 7	19 ± 4	134 ± 5	5 ± 3	58 ± 2	343 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	841	1	B	81 ± 6	20 ± 4	117 ± 4	6 ± 3	52 ± 2	331 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	841	1	C	87 ± 7	19 ± 4	117 ± 5	5 ± 3	53 ± 2	318 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	841	1	D	87 ± 6	17 ± 3	123 ± 4	4 ± 3	53 ± 2	332 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	841	1	E	76 ± 6	17 ± 3	122 ± 4	8 ± 3	54 ± 2	325 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	847	1	A	79 ± 6	17 ± 3	116 ± 4	5 ± 3	50 ± 2	322 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	847	1	B	76 ± 6	13 ± 4	108 ± 4	6 ± 3	51 ± 2	312 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	847	1	C	91 ± 6	19 ± 4	122 ± 4	5 ± 3	52 ± 2	328 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	847	1	D	87 ± 7	20 ± 3	131 ± 4	4 ± 3	56 ± 2	336 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	848	1	—	49 ± 6	17 ± 3	128 ± 4	55 ± 3	41 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-KL-810	849	1	A	73 ± 6	17 ± 3	105 ± 4	9 ± 3	46 ± 2	298 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	850	1	A	83 ± 6	19 ± 3	122 ± 4	4 ± 3	54 ± 2	332 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	853	1	A	78 ± 6	16 ± 4	116 ± 4	4 ± 3	53 ± 2	333 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	853	1	B	47 ± 6	17 ± 3	126 ± 4	53 ± 3	39 ± 2	258 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-KL-810	853	1	C	46 ± 6	14 ± 3	133 ± 4	54 ± 3	39 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-KL-810	855	1	—	62 ± 6	16 ± 3	85 ± 4	31 ± 3	51 ± 2	116 ± 5	9 ± 3	311 ± 25	362 ± 20	NM ± NM	1.23 ± 0.08	NM	Cougar Mountain		
35-KL-810	855	2	A	103 ± 7	15 ± 4	129 ± 4	5 ± 3	53 ± 2	335 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	866	1	—	78 ± 6	18 ± 3	114 ± 4	9 ± 3	52 ± 2	325 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	867	1	A	77 ± 6	20 ± 3	115 ± 4	4 ± 3	50 ± 2	316 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	869	1	A	82 ± 6	14 ± 4	117 ± 4	10 ± 3	49 ± 2	325 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>														Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn					
35-KL-810	872	1	A	74 ± 6	19 ± 3	114 ± 4	5 ± 3	51 ± 2	314 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	873	2	A	54 ± 6	18 ± 3	54 ± 4	370 ± 4	23 ± 2	215 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B			
35-KL-810	877	1	A	74 ± 6	16 ± 3	118 ± 4	5 ± 3	53 ± 2	326 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	877	1	B	90 ± 6	15 ± 4	123 ± 4	4 ± 3	52 ± 2	330 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	878	1	A	80 ± 7	15 ± 4	121 ± 4	4 ± 3	54 ± 2	326 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	879	1	A	87 ± 6	19 ± 3	115 ± 4	11 ± 3	47 ± 2	298 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	879	1	B	69 ± 6	20 ± 3	113 ± 4	5 ± 3	51 ± 2	313 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	879	1	C	63 ± 6	15 ± 3	111 ± 4	5 ± 3	49 ± 2	306 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	880	1	A	86 ± 6	16 ± 4	116 ± 4	5 ± 3	53 ± 2	328 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	882	1	A	83 ± 6	19 ± 3	111 ± 4	6 ± 3	53 ± 2	317 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	882	1	B	74 ± 7	17 ± 4	118 ± 4	3 ± 3	49 ± 2	328 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	882	1	C	48 ± 7	14 ± 4	83 ± 4	114 ± 3	17 ± 2	95 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-KL-810	882	1	D	80 ± 7	19 ± 4	126 ± 4	7 ± 3	53 ± 2	333 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	882	1	E	76 ± 6	22 ± 3	111 ± 4	9 ± 3	50 ± 2	320 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	883	1	A	94 ± 7	15 ± 4	128 ± 4	9 ± 3	55 ± 2	341 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	883	1	B	95 ± 7	19 ± 4	126 ± 4	3 ± 3	55 ± 2	339 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	883	1	C	77 ± 6	19 ± 3	116 ± 4	5 ± 3	49 ± 2	320 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	884	1	—	73 ± 6	17 ± 3	113 ± 4	5 ± 3	50 ± 2	322 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	884	2	A	101 ± 7	20 ± 4	129 ± 5	3 ± 3	53 ± 2	340 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	884	2	B	84 ± 9	19 ± 5	132 ± 5	7 ± 3	54 ± 2	349 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	884	2	C	85 ± 8	19 ± 4	123 ± 5	7 ± 3	49 ± 2	328 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	884	2	D	93 ± 8	26 ± 4	119 ± 5	3 ± 3	55 ± 2	340 ± 6	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-810	886	1	A	102 ± 8	20 ± 4	138 ± 5	7 ± 3	55 ± 2	331 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	886	1	B	90 ± 8	12 ± 5	127 ± 5	1 ± 4	53 ± 2	343 ± 6	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	888	1	A	79 ± 7	17 ± 4	117 ± 4	8 ± 3	52 ± 2	328 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	888	1	B	86 ± 7	17 ± 4	117 ± 5	5 ± 3	52 ± 2	324 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	888	1	C	98 ± 7	20 ± 4	120 ± 5	5 ± 3	53 ± 2	326 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	888	1	D	70 ± 6	14 ± 3	108 ± 4	8 ± 3	48 ± 2	316 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	889	1	—	55 ± 6	19 ± 3	84 ± 4	111 ± 3	18 ± 2	75 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-KL-810	889	2	A	75 ± 7	18 ± 4	116 ± 4	3 ± 3	49 ± 2	333 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	889	2	B	81 ± 7	22 ± 4	112 ± 4	6 ± 3	54 ± 2	324 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	890	1	A	105 ± 8	25 ± 4	140 ± 5	3 ± 3	59 ± 2	351 ± 6	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	890	1	B	95 ± 8	23 ± 4	136 ± 5	6 ± 3	59 ± 2	341 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	892	1	A	100 ± 8	19 ± 4	141 ± 5	5 ± 3	57 ± 2	347 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	892	1	B	60 ± 7	18 ± 4	134 ± 5	57 ± 3	45 ± 2	279 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	894	1	A	67 ± 7	10 ± 5	105 ± 4	2 ± 3	46 ± 2	301 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	894	1	B	104 ± 6	17 ± 4	125 ± 4	5 ± 3	56 ± 2	335 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	894	1	C	88 ± 7	9 ± 5	104 ± 4	4 ± 3	51 ± 2	312 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	897	1	A	80 ± 7	18 ± 4	116 ± 4	4 ± 3	52 ± 2	324 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	903	1	A	87 ± 7	24 ± 4	129 ± 5	3 ± 3	59 ± 2	333 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	905	1	A	59 ± 6	13 ± 4	68 ± 4	149 ± 3	18 ± 2	165 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C
35-KL-810	906	1	A	84 ± 7	19 ± 4	129 ± 4	9 ± 3	53 ± 2	336 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	907	1	A	88 ± 6	15 ± 4	109 ± 4	9 ± 3	50 ± 2	318 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	909	1	A	95 ± 7	13 ± 4	118 ± 4	5 ± 3	53 ± 2	328 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-810	910	1	A	86 ± 8	17 ± 4	119 ± 5	9 ± 3	54 ± 2	333 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	910	1	B	86 ± 7	16 ± 4	117 ± 4	5 ± 3	53 ± 2	328 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	911	1	A	84 ± 7	18 ± 4	115 ± 4	9 ± 3	52 ± 2	317 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	911	1	B	65 ± 7	15 ± 4	138 ± 5	61 ± 3	48 ± 2	288 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-KL-810	912	1	A	85 ± 7	16 ± 4	113 ± 4	4 ± 3	52 ± 2	325 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	912	1	B	78 ± 7	11 ± 4	110 ± 4	10 ± 3	51 ± 2	312 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	913	1	A	81 ± 7	20 ± 4	116 ± 5	8 ± 3	56 ± 2	327 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	913	1	B	77 ± 6	16 ± 4	105 ± 4	9 ± 3	44 ± 2	299 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	914	1	A	102 ± 8	30 ± 4	126 ± 5	12 ± 3	56 ± 2	343 ± 6	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	914	2	—	59 ± 6	10 ± 4	130 ± 4	60 ± 3	43 ± 2	282 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-KL-810	915	1	A	86 ± 7	14 ± 4	144 ± 5	5 ± 3	54 ± 2	328 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	915	1	B	86 ± 7	18 ± 4	116 ± 4	6 ± 3	53 ± 2	329 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	915	1	C	93 ± 7	16 ± 4	120 ± 4	4 ± 3	49 ± 2	333 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	915	2	—	80 ± 6	23 ± 3	119 ± 4	9 ± 3	55 ± 2	342 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	916	1	A	75 ± 6	15 ± 3	105 ± 4	13 ± 3	50 ± 2	315 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	917	1	A	84 ± 7	18 ± 4	126 ± 5	5 ± 3	57 ± 2	337 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	917	1	B	85 ± 7	20 ± 3	117 ± 4	7 ± 3	52 ± 2	324 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	917	1	C	77 ± 6	17 ± 4	114 ± 4	4 ± 3	48 ± 2	317 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	921	1	A	67 ± 6	17 ± 4	99 ± 4	2 ± 3	44 ± 2	286 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	921	1	B	89 ± 6	15 ± 4	112 ± 4	8 ± 3	52 ± 2	324 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	921	1	C	68 ± 6	18 ± 4	104 ± 4	5 ± 3	47 ± 2	288 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-810	921	1	D	61 ± 6	9 ± 4	107 ± 4	5 ± 3	48 ± 2	299 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>		
35-KL-810	921	1	E	85 ± 7	20 ± 4	121 ± 4	6 ± 3	54 ± 2	331 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	921	1	F	102 ± 7	17 ± 4	114 ± 5	10 ± 3	51 ± 2	325 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	921	1	G	82 ± 6	24 ± 3	112 ± 4	5 ± 3	49 ± 2	322 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	931	1	A	84 ± 7	16 ± 4	117 ± 4	4 ± 3	53 ± 2	326 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	931	1	B	75 ± 6	16 ± 3	113 ± 4	5 ± 3	52 ± 2	314 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	932	1	A	76 ± 6	10 ± 4	108 ± 4	10 ± 3	50 ± 2	305 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	934	2	A	74 ± 6	22 ± 3	106 ± 4	3 ± 3	48 ± 2	297 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	937	1	A	93 ± 7	24 ± 4	131 ± 4	3 ± 3	51 ± 2	328 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	937	1	B	74 ± 6	16 ± 4	107 ± 4	5 ± 3	51 ± 2	300 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	940	1	A	76 ± 6	21 ± 3	105 ± 4	6 ± 3	47 ± 2	300 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	942	1	A	68 ± 7	12 ± 5	112 ± 5	6 ± 3	53 ± 2	321 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	942	1	B	80 ± 6	16 ± 4	111 ± 4	10 ± 3	51 ± 2	313 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	943	1	A	98 ± 8	14 ± 5	132 ± 5	7 ± 3	58 ± 2	334 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	943	1	B	93 ± 8	20 ± 4	124 ± 5	4 ± 3	54 ± 2	335 ± 6	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	943	1	C	77 ± 7	22 ± 4	111 ± 4	7 ± 3	49 ± 2	312 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	944	1	A	87 ± 7	19 ± 4	123 ± 5	10 ± 3	49 ± 2	322 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	944	1	B	87 ± 7	16 ± 4	121 ± 4	3 ± 3	54 ± 2	336 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	944	1	C	82 ± 6	15 ± 3	121 ± 4	3 ± 3	51 ± 2	335 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	949	1	A	91 ± 6	19 ± 3	119 ± 4	8 ± 3	55 ± 2	335 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	954	1	A	59 ± 6	18 ± 4	109 ± 4	40 ± 3	25 ± 2	117 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-810	955	1	A	89 ± 6	17 ± 3	125 ± 4	6 ± 3	56 ± 2	344 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-810	956	1	A	102 ± 6	18 ± 3	134 ± 4	6 ± 3	55 ± 2	353 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-810	957	1	—	83 ± 6	16 ± 3	113 ± 4	7 ± 3	47 ± 2	306 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	963	2	—	26 ± 6	11 ± 3	118 ± 4	46 ± 3	24 ± 2	108 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	966	1	A	111 ± 7	28 ± 4	141 ± 5	12 ± 3	59 ± 2	376 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	966	1	B	79 ± 6	15 ± 3	118 ± 4	4 ± 3	53 ± 2	335 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	966	1	C	76 ± 6	20 ± 3	121 ± 4	5 ± 3	53 ± 2	340 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	966	1	D	78 ± 6	18 ± 3	122 ± 4	4 ± 3	52 ± 2	338 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	967	1	A	85 ± 6	15 ± 3	119 ± 4	4 ± 3	53 ± 2	321 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	968	1	A	76 ± 6	25 ± 3	106 ± 4	8 ± 3	52 ± 2	317 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	970	2	—	45 ± 6	18 ± 3	132 ± 4	57 ± 3	43 ± 2	274 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	971	1	A	82 ± 6	19 ± 3	120 ± 4	8 ± 3	56 ± 2	341 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	972	1	A	43 ± 6	22 ± 3	101 ± 4	41 ± 3	24 ± 2	113 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	973	2	—	40 ± 6	16 ± 3	101 ± 4	39 ± 3	25 ± 2	114 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	976	1	A	87 ± 6	20 ± 3	119 ± 4	6 ± 3	55 ± 2	338 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	976	1	B	80 ± 6	17 ± 3	120 ± 4	6 ± 3	51 ± 2	337 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	977	1	A	86 ± 6	23 ± 3	121 ± 4	9 ± 3	55 ± 2	333 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	978	1	A	84 ± 6	18 ± 3	128 ± 4	3 ± 3	54 ± 2	346 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	983	1	A	86 ± 6	22 ± 3	119 ± 4	11 ± 3	53 ± 2	340 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	985	1	A	83 ± 6	19 ± 3	118 ± 4	6 ± 3	53 ± 2	326 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	987	1	—	38 ± 5	17 ± 3	95 ± 4	37 ± 3	24 ± 2	111 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	990	1	A	71 ± 5	19 ± 3	108 ± 4	4 ± 3	51 ± 2	306 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	993	1	A	83 ± 6	21 ± 3	127 ± 4	5 ± 3	52 ± 2	341 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	995	1	A	87 ± 7	21 ± 4	126 ± 5	10 ± 3	55 ± 2	359 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-810	995	1	B	52 ± 6	18 ± 3	139 ± 4	61 ± 3	46 ± 2	285 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-KL-810	996	1	—	74 ± 6	15 ± 3	111 ± 4	9 ± 3	51 ± 2	311 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	997	1	A	81 ± 6	11 ± 4	121 ± 4	10 ± 3	54 ± 2	340 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	997	1	B	48 ± 6	13 ± 4	106 ± 4	38 ± 3	26 ± 2	118 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-810	998	1	A	87 ± 6	17 ± 3	122 ± 4	7 ± 3	52 ± 2	336 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	998	1	B	78 ± 6	21 ± 3	119 ± 4	2 ± 3	52 ± 2	323 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	998	1	C	91 ± 8	25 ± 4	143 ± 5	6 ± 3	57 ± 2	370 ± 6	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	998	1	D	76 ± 7	20 ± 4	128 ± 5	5 ± 3	57 ± 2	352 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	998	1	E	49 ± 6	19 ± 3	109 ± 4	46 ± 3	25 ± 2	121 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-810	998	1	F	95 ± 7	21 ± 4	133 ± 4	14 ± 3	50 ± 2	346 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	998	3	—	81 ± 6	13 ± 3	115 ± 4	11 ± 3	52 ± 2	336 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	998	4	—	39 ± 6	16 ± 3	101 ± 4	44 ± 3	23 ± 2	117 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-810	998	5	—	45 ± 6	16 ± 3	132 ± 4	165 ± 4	17 ± 2	159 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Beatys Butte	
35-KL-810	999	1	A	87 ± 7	21 ± 4	119 ± 4	10 ± 3	52 ± 2	346 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	999	1	B	50 ± 6	12 ± 3	106 ± 4	41 ± 3	24 ± 2	114 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-810	999	2	—	80 ± 7	12 ± 4	109 ± 4	8 ± 3	53 ± 2	321 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	999	3	—	89 ± 7	15 ± 4	118 ± 5	12 ± 3	52 ± 2	351 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	999	4	—	99 ± 7	18 ± 4	118 ± 5	17 ± 3	53 ± 2	347 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1000	1	A	89 ± 6	19 ± 3	122 ± 4	5 ± 3	52 ± 2	334 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1002	1	A	94 ± 6	14 ± 4	128 ± 4	7 ± 3	53 ± 2	354 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1002	1	B	58 ± 6	15 ± 3	106 ± 4	47 ± 3	27 ± 2	119 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-810	1003	1	A	50 ± 6	17 ± 3	104 ± 4	43 ± 3	24 ± 2	122 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-810	1003	1	B	117 ± 7	21 ± 4	130 ± 4	6 ± 3	56 ± 2	349 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1003	1	C	83 ± 6	19 ± 3	129 ± 4	12 ± 3	56 ± 2	349 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1003	1	D	77 ± 7	18 ± 4	99 ± 4	40 ± 3	58 ± 2	130 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain
35-KL-810	1003	2	—	77 ± 7	18 ± 4	119 ± 5	4 ± 3	57 ± 2	328 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1004	1	A	41 ± 5	18 ± 3	99 ± 4	44 ± 3	23 ± 2	114 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	1015	1	A	90 ± 6	19 ± 3	118 ± 4	10 ± 3	51 ± 2	341 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1016	1	A	83 ± 6	21 ± 3	118 ± 4	4 ± 3	51 ± 2	330 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1016	1	B	84 ± 6	12 ± 4	114 ± 4	7 ± 3	51 ± 2	324 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1016	1	C	56 ± 6	16 ± 4	106 ± 4	44 ± 3	21 ± 2	122 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	1016	1	D	86 ± 6	21 ± 3	121 ± 4	6 ± 3	55 ± 2	342 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1016	1	E	90 ± 6	20 ± 3	127 ± 4	5 ± 3	55 ± 2	351 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1017	1	A	96 ± 6	22 ± 3	137 ± 4	5 ± 3	54 ± 2	355 ± 5	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1017	1	B	117 ± 7	28 ± 4	150 ± 5	3 ± 3	62 ± 2	380 ± 6	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1017	2	—	43 ± 5	17 ± 3	100 ± 4	40 ± 3	22 ± 2	110 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	1018	2	—	101 ± 7	22 ± 4	140 ± 5	6 ± 3	54 ± 2	352 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1019	1	A	85 ± 6	24 ± 3	125 ± 4	7 ± 3	56 ± 2	342 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1020	1	A	91 ± 6	17 ± 4	126 ± 4	4 ± 3	57 ± 2	349 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1020	1	B	86 ± 6	20 ± 3	127 ± 4	6 ± 3	57 ± 2	351 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1021	1	A	81 ± 7	17 ± 4	110 ± 4	11 ± 3	50 ± 2	319 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1021	1	B	89 ± 7	23 ± 3	134 ± 4	6 ± 3	57 ± 2	356 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1021	1	C	43 ± 6	15 ± 3	105 ± 4	43 ± 3	21 ± 2	120 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	1021	1	D	68 ± 6	15 ± 3	102 ± 4	5 ± 3	46 ± 2	302 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-810	1022	1	—	39 ± 6	16 ± 3	98 ± 4	39 ± 3	22 ± 2	109 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1023	1	A	86 ± 6	16 ± 4	123 ± 4	11 ± 3	58 ± 2	349 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1025	1	A	234 ± 9	19 ± 4	140 ± 5	14 ± 3	56 ± 2	350 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1025	1	B	71 ± 8	24 ± 4	132 ± 5	45 ± 3	27 ± 2	125 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1027	1	A	72 ± 6	20 ± 3	111 ± 4	4 ± 3	50 ± 2	318 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1029	2	—	43 ± 6	17 ± 3	102 ± 4	41 ± 3	23 ± 2	120 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1030	1	A	81 ± 6	16 ± 3	122 ± 4	5 ± 3	56 ± 2	345 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1030	1	B	98 ± 7	13 ± 4	139 ± 5	7 ± 3	56 ± 2	361 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1032	1	—	42 ± 5	14 ± 3	96 ± 4	41 ± 3	24 ± 2	115 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1035	1	A	58 ± 6	19 ± 4	116 ± 4	48 ± 3	23 ± 2	120 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1035	1	B	87 ± 6	19 ± 3	126 ± 4	5 ± 3	55 ± 2	349 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1061	1	A	97 ± 6	23 ± 3	129 ± 4	6 ± 3	54 ± 2	352 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1061	1	B	81 ± 6	14 ± 3	123 ± 4	4 ± 3	55 ± 2	342 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1062	1	A	55 ± 6	20 ± 3	117 ± 4	47 ± 3	23 ± 2	126 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1062	2	—	40 ± 5	14 ± 3	97 ± 4	39 ± 3	23 ± 2	109 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1062	3	—	105 ± 7	20 ± 4	135 ± 4	9 ± 3	59 ± 2	367 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1063	1	A	51 ± 6	18 ± 3	113 ± 4	45 ± 3	24 ± 2	123 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1063	1	B	58 ± 6	21 ± 3	115 ± 4	44 ± 3	25 ± 2	126 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-810	1063	1	C	77 ± 6	19 ± 3	118 ± 4	4 ± 3	53 ± 2	338 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1070	1	A	91 ± 7	17 ± 4	137 ± 5	5 ± 3	59 ± 2	368 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1071	1	A	81 ± 7	22 ± 4	121 ± 4	6 ± 3	51 ± 2	341 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-810	1071	2	—	77 ± 6	19 ± 3	109 ± 4	7 ± 3	48 ± 2	320 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-810	1073	1	A	82 ± 6	21 ± 3	121 ± 4	4 ± 3	53 ± 2	344 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1076	1	A	98 ± 6	20 ± 3	129 ± 4	6 ± 3	57 ± 2	355 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1076	1	B	93 ± 7	23 ± 4	138 ± 5	5 ± 3	56 ± 2	360 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1076	1	C	80 ± 6	17 ± 3	116 ± 4	6 ± 3	50 ± 2	315 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1076	1	D	87 ± 6	17 ± 3	124 ± 4	6 ± 3	55 ± 2	342 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1076	1	E	49 ± 6	14 ± 3	129 ± 4	53 ± 3	41 ± 2	264 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-KL-810	1076	2	—	45 ± 6	18 ± 3	104 ± 4	42 ± 3	24 ± 2	118 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	1077	1	A	82 ± 6	18 ± 3	122 ± 4	5 ± 3	56 ± 2	350 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1077	4	—	80 ± 6	21 ± 3	119 ± 4	10 ± 3	52 ± 2	318 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1078	1	A	105 ± 6	25 ± 3	131 ± 4	4 ± 3	57 ± 2	354 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1078	2	—	44 ± 5	17 ± 3	100 ± 4	39 ± 3	20 ± 2	111 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	1079	1	A	89 ± 7	20 ± 4	132 ± 5	6 ± 3	60 ± 2	360 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1079	1	B	99 ± 7	24 ± 4	140 ± 5	4 ± 3	57 ± 2	363 ± 6	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1080	1	A	105 ± 7	22 ± 4	139 ± 5	4 ± 3	56 ± 2	353 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1080	1	B	106 ± 7	26 ± 4	138 ± 5	4 ± 3	58 ± 2	356 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1080	3	—	74 ± 6	17 ± 3	92 ± 4	31 ± 3	50 ± 2	123 ± 5	11 ± 3	489 ± 27	380 ± 20	NM ± NM	1.25 ± 0.08	NM	Cougar Mountain	
35-KL-810	1080	4	—	56 ± 6	12 ± 4	108 ± 4	46 ± 3	24 ± 2	119 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	1081	1	A	84 ± 7	21 ± 4	123 ± 4	9 ± 3	56 ± 2	354 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1081	1	B	72 ± 6	17 ± 3	119 ± 4	4 ± 3	54 ± 2	334 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1081	4	—	92 ± 7	21 ± 4	117 ± 4	11 ± 3	56 ± 2	340 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-810	1082	1	A	44 ± 6	16 ± 3	99 ± 4	40 ± 3	23 ± 2	113 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-810	1082	1	B	94 ± 6	18 ± 3	130 ± 4	6 ± 3	56 ± 2	352 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Site	Lot	Spec Item	Trace Element Concentrations*											Ratio Fe/Mn Artifact Source/Chemical Type								
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>									
35-KL-810	1082	2	—	80	± 6	± 4	± 3	± 2	± 48	± 316	± 15	± 3	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1084	1	A	85	± 6	± 3	± 4	± 3	± 4	± 55	± 332	± 17	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1084	1	B	96	± 6	± 3	± 4	± 6	± 56	± 354	± 11	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1085	1	A	89	± 6	± 3	± 4	± 3	± 2	± 5	± 3	± 3	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1085	1	B	97	± 7	± 3	± 4	± 3	± 59	± 352	± 17	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1086	1	—	79	± 6	± 3	± 4	± 4	± 51	± 322	± 16	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1087	1	A	82	± 6	± 3	± 4	± 3	± 58	± 348	± 17	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1088	1	—	37	± 6	± 3	± 4	± 41	± 20	± 112	± 11	± NM	± NM	± NM	± NM	± NM	± NM	Spodue Mountain	NM	NM	± NM	± NM
35-KL-810	1089	1	A	83	± 6	± 3	± 4	± 5	± 55	± 341	± 14	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1089	1	B	91	± 6	± 3	± 4	± 3	± 56	± 349	± 13	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1089	2	—	90	± 7	± 4	± 4	± 3	± 56	± 345	± 15	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1090	1	A	76	± 6	± 3	± 4	± 3	± 54	± 343	± 14	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1090	1	B	66	± 6	± 4	± 5	± 64	± 42	± 289	± 19	± NM	± NM	± NM	± NM	± NM	± NM	Newberry Volcano	NM	NM	± NM	± NM
35-KL-810	1091	1	A	84	± 6	± 4	± 5	± 3	± 2	± 5	± 3	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1091	1	B	95	± 7	± 4	± 4	± 4	± 56	± 345	± 15	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1091	1	C	94	± 6	± 4	± 4	± 3	± 59	± 353	± 14	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1091	1	D	78	± 5	± 3	± 4	± 3	± 51	± 320	± 15	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1091	1	E	46	± 5	± 3	± 4	± 38	± 23	± 110	± 15	± NM	± NM	± NM	± NM	± NM	± NM	Spodue Mountain	NM	NM	± NM	± NM
35-KL-810	1092	1	A	80	± 5	± 3	± 4	± 3	± 53	± 329	± 16	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1093	1	A	49	± 6	± 3	± 4	± 42	± 23	± 123	± 12	± NM	± NM	± NM	± NM	± NM	± NM	Spodue Mountain	NM	NM	± NM	± NM
35-KL-810	1094	1	A	84	± 6	± 3	± 4	± 10	± 55	± 334	± 16	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM
35-KL-810	1095	1	A	95	± 7	± 4	± 4	± 9	± 53	± 352	± 16	± NM	± NM	± NM	± NM	± NM	± NM	Silver Lake/Sycan Marsh	NM	NM	± NM	± NM

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).



Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-KL-810	1095	1	B	115 ± 7	18 ± 4	135 ± 5	11 ± 3	61 ± 2	368 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	1095	1	C	88 ± 7	28 ± 3	137 ± 4	3 ± 3	55 ± 2	351 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	1095	1	D	102 ± 6	22 ± 3	138 ± 4	6 ± 3	60 ± 2	362 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	1096	1	A	85 ± 6	20 ± 3	126 ± 4	5 ± 3	59 ± 2	340 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	1096	1	B	88 ± 6	18 ± 4	119 ± 4	8 ± 3	56 ± 2	339 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-810	1096	1	C	86 ± 7	17 ± 4	104 ± 4	35 ± 3	57 ± 2	130 ± 5	16 ± 3	508 ± 26	375 ± 20	NM ± NM	1.28 ± 0.08	NM	Cougar Mountain			
35-KL-810	1097	1	A	46 ± 6	16 ± 3	99 ± 4	42 ± 3	22 ± 2	114 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain			
35-KL-810	1098	1	A	106 ± 7	22 ± 4	135 ± 5	11 ± 3	59 ± 2	364 ± 6	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1098	1	B	89 ± 6	15 ± 4	123 ± 4	6 ± 3	57 ± 2	349 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1098	1	C	69 ± 6	19 ± 3	106 ± 4	4 ± 3	50 ± 2	304 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1098	1	D	38 ± 5	16 ± 3	91 ± 4	39 ± 3	22 ± 2	112 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain			
35-KL-810	1099	1	A	91 ± 6	21 ± 3	123 ± 4	3 ± 3	57 ± 2	343 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1100	1	A	101 ± 6	21 ± 3	131 ± 4	3 ± 3	54 ± 2	354 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1100	3	—	47 ± 6	19 ± 3	114 ± 4	41 ± 3	22 ± 2	120 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain			
35-KL-810	1103	1	A	73 ± 6	17 ± 3	118 ± 4	5 ± 3	52 ± 2	333 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1104	1	A	42 ± 6	19 ± 3	94 ± 4	40 ± 3	23 ± 2	104 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain			
35-KL-810	1105	1	A	74 ± 7	21 ± 3	121 ± 4	5 ± 3	53 ± 2	339 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1107	1	A	77 ± 5	17 ± 3	109 ± 4	9 ± 3	50 ± 2	312 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1107	3	—	63 ± 6	17 ± 3	100 ± 4	44 ± 3	24 ± 2	113 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain			
35-KL-810	1114	1	A	82 ± 6	19 ± 3	118 ± 4	4 ± 3	52 ± 2	331 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1118	1	A	88 ± 6	20 ± 3	128 ± 4	11 ± 3	54 ± 2	354 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-KL-810	1123	1	A	92 ± 6	26 ± 3	134 ± 4	5 ± 3	54 ± 2	341 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-810	1123	1	B	81 ± 6	21 ± 3	104 ± 4	37 ± 3	57 ± 2	134 ± 5	14 ± 3	360 ± 25	341 ± 20	NM ± NM	1.14 ± 0.08	NM NM	Cougar Mountain		
35-KL-810	1123	1	C	60 ± 6	23 ± 3	120 ± 4	49 ± 3	24 ± 2	122 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Spodue Mountain		
35-KL-810	1124	1	A	107 ± 6	16 ± 4	124 ± 4	6 ± 3	56 ± 2	349 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Silver Lake/Sycan Marsh		
35-KL-810	1124	1	B	84 ± 7	20 ± 4	105 ± 4	39 ± 3	58 ± 2	130 ± 5	13 ± 3	366 ± 25	314 ± 20	NM ± NM	1.07 ± 0.08	NM NM	Cougar Mountain		
35-KL-810	1125	1	A	96 ± 7	20 ± 4	134 ± 5	11 ± 3	57 ± 2	356 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Silver Lake/Sycan Marsh		
35-KL-810	1129	1	A	98 ± 6	17 ± 3	127 ± 4	3 ± 3	54 ± 2	349 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Silver Lake/Sycan Marsh		
35-KL-811	3	3	—	42 ± 5	15 ± 3	75 ± 5	52 ± 3	28 ± 2	210 ± 4	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte?		
35-KL-811	4	1	—	64 ± 5	18 ± 3	89 ± 5	33 ± 3	55 ± 2	122 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain		
35-KL-811	5	6	A	68 ± 6	17 ± 3	84 ± 5	65 ± 3	30 ± 2	248 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	5	6	B	49 ± 5	17 ± 3	76 ± 5	67 ± 3	32 ± 2	238 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	84	1	—	66 ± 6	15 ± 3	78 ± 5	72 ± 3	26 ± 2	221 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	94	1	A	53 ± 5	16 ± 3	77 ± 5	70 ± 3	26 ± 2	221 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	94	1	B	53 ± 6	18 ± 3	74 ± 5	40 ± 3	27 ± 2	198 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	94	1	C	56 ± 6	17 ± 3	77 ± 5	101 ± 3	30 ± 2	274 ± 5	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte?		
35-KL-811	205	1	A	46 ± 6	20 ± 3	75 ± 5	65 ± 3	29 ± 2	231 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	205	1	B	52 ± 6	18 ± 3	85 ± 5	57 ± 3	28 ± 2	222 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	207	1	—	45 ± 6	13 ± 3	83 ± 5	75 ± 3	29 ± 2	253 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	208	1	A	55 ± 7	26 ± 4	90 ± 5	52 ± 3	32 ± 2	224 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	208	1	B	58 ± 6	18 ± 3	78 ± 5	79 ± 3	32 ± 2	255 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-811	214	1	—	44 ± 5	17 ± 3	78 ± 5	47 ± 3	29 ± 2	209 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Deer Creek/Burn Butte		
35-KL-812	33	1	—	NM ± NM	NM ± NM	98 ± 3	45 ± 5	22 ± 4	112 ± 12	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Spodue Mountain		
35-KL-812	42	1	—	NM ± NM	NM ± NM	132 ± 3	15 ± 12	52 ± 3	378 ± 8	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Silver Lake/Sycan Marsh		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-812	154	1	—	NM ± NM	NM ±NM	125 ± 3	14 ± 12	52 ± 3	357 ± 8	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	155	1	A	43 ± 5	12 ± 3	99 ± 5	37 ± 3	22 ± 2	108 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	155	1	B	117 ± 8	20 ± 4	135 ± 5	11 ± 3	60 ± 2	351 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	155	1	C	85 ± 6	19 ± 3	108 ± 5	7 ± 3	51 ± 2	316 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	156	1	—	88 ± 5	20 ± 3	111 ± 5	10 ± 3	55 ± 2	328 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	156	2	—	NM ± NM	NM ±NM	100 ± 3	49 ± 12	22 ± 3	100 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	157	1	A	109 ± 6	15 ± 3	121 ± 5	6 ± 3	58 ± 2	337 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	157	1	B	90 ± 5	22 ± 3	123 ± 5	7 ± 3	55 ± 2	336 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	157	1	C	64 ± 6	11 ± 4	118 ± 5	45 ± 3	26 ± 2	119 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	157	2	—	NM ± NM	NM ±NM	112 ± 4	45 ± 12	25 ± 3	118 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	158	1	—	NM ± NM	NM ±NM	129 ± 4	17 ± 12	60 ± 3	372 ± 8	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	161	1	A	73 ± 5	17 ± 3	110 ± 5	5 ± 3	51 ± 2	308 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	161	1	B	57 ± 6	22 ± 3	115 ± 5	42 ± 3	29 ± 2	117 ± 3	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	161	1	C	56 ± 7	18 ± 4	122 ± 5	47 ± 3	25 ± 2	130 ± 3	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	162	1	A	34 ± 5	12 ± 3	91 ± 5	38 ± 3	20 ± 2	104 ± 3	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	162	1	B	95 ± 7	19 ± 4	126 ± 5	9 ± 3	63 ± 2	346 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	162	1	C	115 ± 7	27 ± 4	110 ± 5	9 ± 3	59 ± 2	359 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	174	1	—	NM ± NM	NM ±NM	112 ± 3	49 ± 12	25 ± 3	116 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	176	1	—	87 ± 5	20 ± 3	113 ± 5	8 ± 3	57 ± 2	329 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	176	2	—	NM ± NM	NM ±NM	130 ± 4	11 ± 12	57 ± 4	365 ± 8	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	177	1	A	69 ± 6	18 ± 3	122 ± 5	49 ± 3	28 ± 2	122 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	177	1	B	78 ± 6	13 ± 4	115 ± 5	42 ± 3	25 ± 2	117 ± 4	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-812	177	1	C	62 ± 7	16 ± 4	101 ± 5	43 ± 3	26 ± 2	112 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	178	1	A	35 ± 5	11 ± 3	92 ± 5	36 ± 3	31 ± 2	102 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	178	1	B	78 ± 5	23 ± 3	114 ± 5	8 ± 3	51 ± 2	325 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	178	1	C	44 ± 6	17 ± 3	114 ± 5	45 ± 3	26 ± 2	120 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	185	1	A	113 ± 8	23 ± 4	137 ± 6	9 ± 3	59 ± 2	333 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	185	1	B	92 ± 6	15 ± 4	124 ± 5	8 ± 3	57 ± 2	341 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	185	1	C	66 ± 7	13 ± 4	102 ± 5	44 ± 3	26 ± 2	124 ± 4	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	185	1	D	60 ± 6	14 ± 3	111 ± 5	42 ± 3	24 ± 2	121 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	185	1	E	109 ± 8	22 ± 4	122 ± 5	9 ± 3	55 ± 2	338 ± 5	23 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	186	1	A	94 ± 6	21 ± 3	131 ± 5	9 ± 3	60 ± 2	364 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	186	1	B	115 ± 8	26 ± 4	142 ± 6	13 ± 3	57 ± 3	363 ± 6	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	186	1	C	128 ± 8	23 ± 4	145 ± 5	9 ± 3	57 ± 2	366 ± 6	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	197	1	—	NM ± NM	NM ± NM	98 ± 3	43 ± 12	24 ± 3	106 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	198	1	—	44 ± 5	18 ± 3	108 ± 5	42 ± 3	23 ± 2	115 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	199	1	A	94 ± 6	21 ± 3	135 ± 5	10 ± 3	6 ± 2	370 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	199	1	B	89 ± 5	17 ± 3	117 ± 5	9 ± 3	53 ± 2	312 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	199	1	C	119 ± 7	16 ± 3	102 ± 5	9 ± 3	50 ± 2	306 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	199	1	D	60 ± 9	22 ± 5	102 ± 6	44 ± 3	22 ± 2	118 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	199	1	E	120 ± 7	31 ± 4	131 ± 5	13 ± 3	62 ± 2	361 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	200	1	A	87 ± 5	19 ± 3	116 ± 5	6 ± 3	54 ± 2	335 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	200	1	B	62 ± 7	13 ± 4	99 ± 5	40 ± 3	22 ± 2	112 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	200	1	C	55 ± 6	16 ± 3	110 ± 5	43 ± 3	29 ± 2	118 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-812	209	1	—	60 ± 6	16 ± 3	105 ± 5	45 ± 3	24 ± 2	117 ± 4	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	210	1	A	52 ± 5	17 ± 3	100 ± 5	43 ± 3	24 ± 2	113 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	210	1	B	56 ± 6	22 ± 3	117 ± 5	48 ± 3	26 ± 2	120 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	210	1	C	52 ± 5	13 ± 3	107 ± 5	42 ± 3	23 ± 2	115 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	210	1	D	70 ± 7	20 ± 4	124 ± 5	51 ± 3	24 ± 2	131 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	211	1	A	57 ± 6	18 ± 3	112 ± 5	47 ± 3	25 ± 2	116 ± 4	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	211	1	B	65 ± 7	12 ± 4	119 ± 5	47 ± 3	26 ± 2	123 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	211	1	C	65 ± 7	16 ± 4	120 ± 5	48 ± 3	24 ± 2	124 ± 4	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	211	1	D	64 ± 6	20 ± 3	123 ± 5	51 ± 3	27 ± 2	133 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	211	1	E	65 ± 8	26 ± 4	117 ± 5	46 ± 3	22 ± 2	131 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	212	1	—	NM ± NM	NM ± NM	165 ± 5	13 ± 12	75 ± 5	458 ± 12	24 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A	
35-KL-812	214	1	A	97 ± 7	18 ± 4	115 ± 5	7 ± 3	53 ± 2	324 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	214	1	B	69 ± 8	25 ± 4	128 ± 6	52 ± 3	25 ± 2	130 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	214	1	C	98 ± 7	24 ± 3	132 ± 5	9 ± 3	55 ± 2	354 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	216	1	—	96 ± 7	19 ± 4	126 ± 5	11 ± 3	57 ± 2	343 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	248	2	—	NM ± NM	NM ± NM	118 ± 3	17 ± 12	50 ± 3	349 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	253	1	—	71 ± 5	21 ± 3	112 ± 5	2 ± 3	50 ± 2	311 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	257	1	—	48 ± 6	14 ± 3	101 ± 5	39 ± 3	22 ± 2	108 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	285	1	—	87 ± 6	17 ± 4	121 ± 4	9 ± 3	53 ± 2	347 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	290	2	—	47 ± 6	18 ± 4	109 ± 4	44 ± 3	24 ± 2	121 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	319	1	A	57 ± 7	16 ± 4	110 ± 5	45 ± 3	22 ± 2	116 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-812	322	1	A	91 ± 6	20 ± 3	118 ± 4	11 ± 3	51 ± 2	332 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-812	325	1	A	59 ± 7	21 ± 4	118 ± 5	50 ± 3	28 ± 2	120 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	325	1	B	37 ± 6	18 ± 3	104 ± 4	43 ± 3	22 ± 2	116 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	336	1	A	57 ± 6	13 ± 4	122 ± 4	46 ± 3	28 ± 2	132 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	336	1	B	NM ± NM	18 ± 3	2 ± 4	14 ± 3	2 ± 38	14 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-KL-812	338	1	—	42 ± 6	12 ± 3	100 ± 4	43 ± 3	25 ± 2	111 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	348	1	—	54 ± 6	17 ± 4	110 ± 4	44 ± 3	26 ± 2	124 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	358	1	—	62 ± 5	15 ± 3	107 ± 4	43 ± 3	25 ± 2	118 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	359	2	—	93 ± 7	19 ± 4	125 ± 5	10 ± 3	57 ± 2	353 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	359	3	—	99 ± 7	21 ± 4	119 ± 4	7 ± 3	55 ± 2	345 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	391	2	—	92 ± 6	18 ± 3	117 ± 4	9 ± 3	57 ± 2	332 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	399	1	—	64 ± 7	17 ± 4	117 ± 5	47 ± 3	27 ± 2	126 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	401	1	—	77 ± 5	17 ± 3	113 ± 4	9 ± 3	51 ± 2	323 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	403	1	A	134 ± 8	27 ± 4	138 ± 5	13 ± 3	59 ± 2	363 ± 6	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	403	2	—	44 ± 5	17 ± 3	103 ± 4	40 ± 3	23 ± 2	115 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	404	2	—	37 ± 6	12 ± 3	95 ± 4	40 ± 3	24 ± 2	108 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	408	1	—	44 ± 5	16 ± 3	96 ± 4	41 ± 3	24 ± 2	108 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	410	1	—	72 ± 6	17 ± 3	111 ± 4	10 ± 3	51 ± 2	328 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	410	2	—	48 ± 5	14 ± 3	104 ± 4	42 ± 3	25 ± 2	115 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	410	3	—	78 ± 6	18 ± 3	117 ± 4	10 ± 3	53 ± 2	327 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	411	1	—	77 ± 6	16 ± 3	113 ± 4	10 ± 3	54 ± 2	332 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	412	1	A	87 ± 6	18 ± 3	118 ± 4	8 ± 3	53 ± 2	328 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	412	1	B	99 ± 7	18 ± 4	129 ± 5	11 ± 3	54 ± 2	352 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-812	412	1	C	103 ± 9	23 ± 4	146 ± 5	5 ± 3	57 ± 3	376 ± 6	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	414	1	A	103 ± 8	26 ± 4	128 ± 5	11 ± 3	57 ± 2	354 ± 6	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	416	1	A	80 ± 6	18 ± 3	115 ± 4	8 ± 3	50 ± 2	326 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	418	1	A	99 ± 6	17 ± 3	124 ± 4	10 ± 3	56 ± 2	340 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	419	1	—	87 ± 7	21 ± 4	109 ± 4	11 ± 3	52 ± 2	320 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	420	1	A	86 ± 7	16 ± 4	119 ± 5	34 ± 3	36 ± 2	185 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A
35-KL-812	422	1	A	42 ± 5	17 ± 3	98 ± 4	41 ± 3	23 ± 2	111 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	422	1	B	54 ± 6	19 ± 3	100 ± 4	45 ± 3	23 ± 2	117 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	423	1	—	57 ± 6	19 ± 3	113 ± 4	46 ± 3	25 ± 2	124 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	424	1	—	74 ± 7	16 ± 4	106 ± 4	9 ± 3	49 ± 2	302 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	424	2	A	92 ± 6	20 ± 3	119 ± 4	9 ± 3	57 ± 2	341 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	424	2	B	109 ± 8	23 ± 4	129 ± 5	10 ± 3	58 ± 3	353 ± 6	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	424	2	C	50 ± 7	18 ± 4	117 ± 5	52 ± 3	22 ± 2	120 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	431	1	—	72 ± 5	19 ± 3	111 ± 4	9 ± 3	51 ± 2	322 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	431	2	A	106 ± 6	19 ± 4	125 ± 4	11 ± 3	56 ± 2	356 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	432	1	A	110 ± 7	13 ± 4	122 ± 5	11 ± 3	57 ± 2	343 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	432	1	B	68 ± 7	23 ± 4	120 ± 5	50 ± 3	25 ± 2	119 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	434	1	—	80 ± 6	17 ± 3	115 ± 4	9 ± 3	54 ± 2	322 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	440	1	A	74 ± 6	21 ± 3	111 ± 4	8 ± 3	50 ± 2	315 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	440	1	B	94 ± 6	21 ± 3	118 ± 4	12 ± 3	57 ± 2	342 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	442	1	—	52 ± 6	12 ± 3	103 ± 4	42 ± 3	25 ± 2	115 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	444	1	—	62 ± 6	17 ± 3	102 ± 4	40 ± 3	22 ± 2	119 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-812	451	1	—	138 ± 6	8 ± 5	103 ± 4	41 ± 3	23 ± 2	112 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	452	1	—	130 ± 7	19 ± 4	137 ± 5	12 ± 3	60 ± 2	354 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	455	1	A	62 ± 6	24 ± 3	106 ± 4	47 ± 3	27 ± 2	121 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	455	1	B	80 ± 6	20 ± 3	113 ± 4	9 ± 3	51 ± 2	321 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	458	1	A	48 ± 5	16 ± 3	101 ± 4	38 ± 3	25 ± 2	113 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	458	1	B	60 ± 6	14 ± 4	113 ± 4	48 ± 3	23 ± 2	121 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	460	1	—	78 ± 6	20 ± 3	115 ± 4	8 ± 3	55 ± 2	333 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	461	1	A	66 ± 7	24 ± 4	121 ± 5	48 ± 3	25 ± 2	124 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	462	1	—	55 ± 7	15 ± 4	102 ± 4	39 ± 3	24 ± 2	120 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	462	2	A	43 ± 5	14 ± 3	96 ± 4	39 ± 3	24 ± 2	113 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	464	1	—	49 ± 6	15 ± 3	98 ± 4	41 ± 3	22 ± 2	110 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	468	1	A	42 ± 5	17 ± 3	96 ± 4	39 ± 3	23 ± 2	114 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	470	2	A	59 ± 6	15 ± 3	108 ± 4	43 ± 3	25 ± 2	119 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	470	2	B	75 ± 7	21 ± 4	116 ± 4	9 ± 3	50 ± 2	320 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	470	2	C	69 ± 8	18 ± 5	114 ± 5	47 ± 3	28 ± 3	128 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	474	1	—	50 ± 6	18 ± 3	99 ± 4	40 ± 3	25 ± 2	115 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	478	1	A	70 ± 7	17 ± 4	121 ± 5	43 ± 3	26 ± 2	124 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	478	1	B	87 ± 6	18 ± 3	120 ± 4	9 ± 3	52 ± 2	326 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	480	1	—	49 ± 7	16 ± 4	117 ± 4	44 ± 3	29 ± 2	126 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-812	481	1	—	79 ± 6	20 ± 3	110 ± 4	8 ± 3	51 ± 2	314 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	486	1	A	90 ± 6	20 ± 3	118 ± 4	12 ± 3	55 ± 2	338 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-812	488	1	A	96 ± 7	19 ± 4	120 ± 4	10 ± 3	50 ± 2	331 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-812	488	1	B	76 ± 6	20 ± 3	111 ± 4	9 ± 3	52 ± 2	324 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	489	1	—	72 ± 6	21 ± 3	107 ± 4	11 ± 3	52 ± 2	321 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	489	2	—	82 ± 6	15 ± 3	110 ± 4	9 ± 3	53 ± 2	316 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	489	3	A	87 ± 6	16 ± 3	120 ± 4	10 ± 3	54 ± 2	328 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	494	1	A	83 ± 6	18 ± 3	115 ± 4	7 ± 3	53 ± 2	318 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	496	1	—	99 ± 7	18 ± 4	121 ± 4	10 ± 3	59 ± 2	339 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	496	2	—	56 ± 6	14 ± 4	105 ± 4	43 ± 3	21 ± 2	116 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-812	499	2	—	45 ± 6	16 ± 3	107 ± 4	41 ± 3	21 ± 2	125 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-812	507	1	A	84 ± 6	15 ± 3	120 ± 4	9 ± 3	57 ± 2	336 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	507	1	B	91 ± 7	23 ± 3	110 ± 4	18 ± 3	52 ± 2	319 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	507	1	C	70 ± 6	18 ± 4	114 ± 4	49 ± 3	27 ± 2	127 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-812	508	1	A	92 ± 6	16 ± 3	112 ± 4	10 ± 3	51 ± 2	327 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	509	1	A	99 ± 7	17 ± 4	132 ± 5	9 ± 3	58 ± 2	348 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	515	1	A	51 ± 6	17 ± 3	109 ± 4	45 ± 3	22 ± 2	119 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-812	515	1	B	104 ± 8	16 ± 4	128 ± 5	12 ± 3	60 ± 2	347 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	515	2	—	45 ± 6	19 ± 3	105 ± 4	40 ± 3	26 ± 2	116 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-812	517	1	A	59 ± 6	13 ± 4	111 ± 4	42 ± 3	26 ± 2	122 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-812	517	2	—	75 ± 6	20 ± 3	113 ± 4	9 ± 3	49 ± 2	316 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh	
35-KL-812	517	3	—	48 ± 6	18 ± 3	99 ± 4	37 ± 3	24 ± 2	112 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-812	521	1	A	59 ± 7	25 ± 4	111 ± 4	48 ± 3	25 ± 2	123 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-813	1	1	—	NM ± NM	NM ± NM	112 ± 4	45 ± 12	20 ± 4	114 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain	
35-KL-813	2	1	—	NM ± NM	NM ± NM	109 ± 3	58 ± 12	20 ± 3	66 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	McComb Butte/Tucker Hill?	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type		
35-KL-813	3	1	—	NM ± NM	NM ±NM	112 ± 4	4 ± 14	58 ± 4	327 ± 8	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-813	7	1	—	NM ± NM	NM ±NM	118 ± 3	53 ± 12	22 ± 3	120 ± 7	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	8	1	—	NM ± NM	NM ±NM	103 ± 3	41 ± 12	22 ± 3	115 ± 7	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	9	1	—	NM ± NM	NM ±NM	96 ± 4	53 ± 12	40 ± 4	253 ± 8	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Deer Creek/Burn Butte?	
35-KL-813	44	1	A	47 ± 5	17 ± 3	108 ± 5	44 ± 3	24 ± 2	118 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	44	1	B	50 ± 5	15 ± 3	98 ± 5	40 ± 3	23 ± 2	111 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	44	1	C	46 ± 7	14 ± 4	108 ± 5	47 ± 3	27 ± 2	115 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	48	1	A	77 ± 5	16 ± 3	104 ± 5	43 ± 3	24 ± 2	113 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	48	1	B	64 ± 7	15 ± 4	102 ± 5	46 ± 3	30 ± 2	124 ± 4	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	48	1	C	80 ± 8	25 ± 4	118 ± 6	47 ± 3	22 ± 3	116 ± 5	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	48	1	D	71 ± 6	17 ± 3	107 ± 5	46 ± 3	26 ± 2	121 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	49	1	A	58 ± 7	18 ± 4	112 ± 5	47 ± 3	22 ± 2	123 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	49	1	B	64 ± 7	14 ± 4	106 ± 5	46 ± 3	23 ± 2	115 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	49	1	C	65 ± 6	17 ± 3	113 ± 5	45 ± 3	27 ± 2	120 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	50	1	A	69 ± 7	20 ± 4	115 ± 5	44 ± 3	28 ± 2	125 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	50	1	B	65 ± 6	11 ± 4	104 ± 5	47 ± 3	29 ± 2	111 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	50	1	C	54 ± 5	22 ± 3	114 ± 5	46 ± 3	26 ± 2	117 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	52	1	A	67 ± 6	13 ± 3	103 ± 5	42 ± 3	26 ± 2	114 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	111	2	—	NM ± NM	NM ±NM	109 ± 3	16 ± 12	47 ± 3	325 ± 7	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-813	143	2	—	NM ± NM	NM ±NM	99 ± 4	51 ± 12	20 ± 4	109 ± 7	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	163	2	—	NM ± NM	NM ±NM	113 ± 3	50 ± 12	25 ± 3	115 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-813	163	3	—	NM ± NM	NM ±NM	117 ± 4	12 ± 12	53 ± 4	349 ± 8	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-813	179	3	—	NM ± NM	NM ±NM	97 ± 4	13 ± 12	53 ± 4	300 ± 9	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	239	1	—	NM ± NM	NM ±NM	100 ± 3	48 ± 12	19 ± 3	110 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	252	1	A	59 ± 6	16 ± 3	100 ± 5	41 ± 3	20 ± 2	112 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	252	1	B	74 ± 5	18 ± 3	111 ± 5	10 ± 3	54 ± 2	324 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	252	1	C	73 ± 6	19 ± 3	100 ± 5	7 ± 3	50 ± 2	297 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	255	1	—	NM ± NM	NM ±NM	117 ± 3	16 ± 12	52 ± 3	339 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	255	2	—	56 ± 7	17 ± 4	106 ± 5	43 ± 3	25 ± 2	120 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	256	1	A	87 ± 7	17 ± 4	126 ± 5	14 ± 3	57 ± 2	340 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	256	1	B	94 ± 6	14 ± 3	114 ± 5	10 ± 3	56 ± 2	330 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	258	1	A	85 ± 5	15 ± 3	109 ± 5	9 ± 3	53 ± 2	322 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	258	1	B	47 ± 6	12 ± 3	91 ± 5	37 ± 3	24 ± 2	110 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	C	61 ± 5	16 ± 3	97 ± 5	42 ± 3	28 ± 2	118 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	D	52 ± 5	15 ± 3	100 ± 5	45 ± 3	24 ± 2	114 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	E	51 ± 5	17 ± 3	104 ± 5	39 ± 3	27 ± 2	114 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	F	48 ± 5	21 ± 3	108 ± 5	43 ± 3	24 ± 2	117 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	G	50 ± 6	18 ± 3	102 ± 5	41 ± 3	25 ± 2	114 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	H	65 ± 6	17 ± 3	100 ± 5	48 ± 3	22 ± 2	114 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	I	86 ± 6	18 ± 3	106 ± 5	42 ± 3	22 ± 2	113 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	J	50 ± 6	19 ± 3	100 ± 5	44 ± 3	26 ± 2	116 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	K	78 ± 6	17 ± 3	120 ± 5	11 ± 3	53 ± 2	336 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	258	1	L	44 ± 6	20 ± 3	105 ± 5	41 ± 3	21 ± 2	115 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	258	1	M	54 ± 7	13 ± 4	107 ± 5	40 ± 3	23 ± 2	121 ± 4	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-813	259	1	A	82 ± 5	19 ± 3	108 ± 5	6 ± 3	54 ± 2	318 ± 4	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	259	1	B	54 ± 5	13 ± 3	100 ± 5	42 ± 3	25 ± 2	114 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	259	1	C	78 ± 6	14 ± 3	102 ± 5	43 ± 3	21 ± 2	117 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	259	1	D	146 ± 7	22 ± 3	132 ± 5	12 ± 3	54 ± 2	344 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	259	1	E	83 ± 6	15 ± 3	116 ± 5	7 ± 3	53 ± 2	344 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	259	1	F	118 ± 6	15 ± 3	114 ± 5	54 ± 3	26 ± 2	117 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	259	2	—	NM ± NM	NM ± NM	99 ± 3	44 ± 12	20 ± 3	105 ± 7	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	259	3	—	NM ± NM	NM ± NM	121 ± 4	6 ± 12	48 ± 4	337 ± 8	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	260	1	A	85 ± 5	20 ± 3	110 ± 5	14 ± 3	53 ± 2	325 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	260	1	B	75 ± 6	19 ± 3	121 ± 5	7 ± 3	54 ± 2	344 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	262	1	—	106 ± 8	26 ± 4	135 ± 5	12 ± 3	60 ± 2	356 ± 6	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	276	1	A	59 ± 7	23 ± 3	117 ± 5	48 ± 3	24 ± 2	120 ± 4	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	276	1	B	53 ± 9	15 ± 5	114 ± 6	44 ± 3	21 ± 2	113 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	277	1	A	54 ± 7	19 ± 4	112 ± 5	43 ± 3	22 ± 2	124 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	282	2	—	NM ± NM	NM ± NM	133 ± 4	16 ± 12	57 ± 3	363 ± 8	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	285	1	—	NM ± NM	NM ± NM	104 ± 3	44 ± 12	22 ± 3	110 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	285	2	—	NM ± NM	NM ± NM	112 ± 4	49 ± 12	24 ± 4	112 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	300	2	A	81 ± 7	15 ± 4	118 ± 5	12 ± 3	52 ± 2	327 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	300	2	B	127 ± 6	19 ± 3	121 ± 5	10 ± 3	54 ± 2	335 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	301	1	—	54 ± 6	20 ± 3	96 ± 5	38 ± 3	22 ± 2	106 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	302	2	—	86 ± 6	22 ± 3	113 ± 5	7 ± 3	46 ± 2	314 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	302	3	—	NM ± NM	NM ± NM	111 ± 3	46 ± 12	28 ± 3	116 ± 7	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-813	303	1	—	50 ± 5	18 ± 3	107 ± 5	44 ± 3	24 ± 2	119 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	305	1	—	54 ± 6	15 ± 3	107 ± 5	43 ± 3	26 ± 2	121 ± 4	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	306	1	A	52 ± 5	17 ± 3	112 ± 5	48 ± 3	24 ± 2	117 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	311	2	A	54 ± 5	17 ± 3	108 ± 5	44 ± 3	26 ± 2	120 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	311	2	B	67 ± 8	17 ± 4	124 ± 5	44 ± 3	23 ± 2	120 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	312	1	A	56 ± 7	11 ± 4	109 ± 5	43 ± 3	26 ± 2	115 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	312	1	B	54 ± 6	13 ± 3	106 ± 5	42 ± 3	24 ± 2	116 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	312	3	—	NM ± NM	NM ± NM	119 ± 3	14 ± 12	54 ± 3	349 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	313	2	A	53 ± 5	17 ± 3	111 ± 5	43 ± 3	25 ± 2	115 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	313	2	B	96 ± 7	20 ± 4	133 ± 5	11 ± 3	59 ± 2	344 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	313	2	C	85 ± 6	12 ± 3	114 ± 5	7 ± 3	56 ± 2	337 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	313	2	D	106 ± 7	18 ± 4	132 ± 5	8 ± 3	61 ± 2	351 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	314	2	A	92 ± 6	20 ± 3	116 ± 5	10 ± 3	57 ± 2	335 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	314	2	B	61 ± 6	21 ± 3	117 ± 5	49 ± 3	26 ± 2	121 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	314	2	C	98 ± 7	18 ± 4	128 ± 5	15 ± 3	55 ± 2	340 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	314	2	D	141 ± 12	23 ± 6	133 ± 6	12 ± 3	54 ± 3	292 ± 7	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	315	1	—	NM ± NM	NM ± NM	95 ± 3	44 ± 12	21 ± 3	104 ± 7	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	317	2	—	NM ± NM	NM ± NM	103 ± 3	44 ± 12	21 ± 3	110 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	317	3	—	NM ± NM	NM ± NM	108 ± 3	17 ± 12	49 ± 3	324 ± 7	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	326	1	A	61 ± 5	12 ± 3	107 ± 5	47 ± 3	27 ± 2	116 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-813	326	1	B	82 ± 5	18 ± 3	113 ± 5	12 ± 3	52 ± 2	328 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-813	329	1	A	77 ± 5	19 ± 3	111 ± 5	8 ± 3	52 ± 2	321 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-813	330	1	A	86 ± 5	16 ± 3	110 ± 5	16 ± 3	57 ± 2	337 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	340	1	A	75 ± 5	16 ± 3	105 ± 5	44 ± 3	26 ± 2	115 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	343	1	—	NM ± NM	NM ± NM	112 ± 3	11 ± 12	48 ± 3	340 ± 8	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	343	3	A	50 ± 6	18 ± 3	104 ± 5	43 ± 3	24 ± 2	124 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	343	3	B	50 ± 5	19 ± 3	104 ± 5	42 ± 3	24 ± 2	120 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	343	3	C	57 ± 6	13 ± 3	100 ± 5	41 ± 3	25 ± 2	118 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	351	1	A	85 ± 6	20 ± 3	118 ± 5	7 ± 3	56 ± 2	326 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	351	1	B	84 ± 5	18 ± 3	119 ± 5	3 ± 3	55 ± 2	334 ± 4	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	351	1	C	60 ± 6	15 ± 3	107 ± 5	40 ± 3	25 ± 2	115 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	352	3	A	106 ± 6	21 ± 3	121 ± 5	12 ± 3	57 ± 2	335 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	352	3	C	107 ± 7	19 ± 4	120 ± 5	7 ± 3	58 ± 2	344 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	353	1	—	NM ± NM	NM ± NM	104 ± 3	47 ± 12	24 ± 3	113 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	353	2	A	132 ± 9	24 ± 5	132 ± 6	11 ± 3	61 ± 3	336 ± 6	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	354	2	A	75 ± 5	18 ± 3	116 ± 5	8 ± 3	57 ± 2	328 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	355	1	A	90 ± 6	20 ± 3	129 ± 5	8 ± 3	56 ± 2	335 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	355	1	B	68 ± 5	19 ± 3	108 ± 5	11 ± 3	52 ± 2	312 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	355	1	C	97 ± 6	24 ± 3	128 ± 5	7 ± 3	56 ± 2	347 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	356	1	A	125 ± 7	27 ± 4	132 ± 5	8 ± 3	60 ± 2	359 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-813	358	1	—	NM ± NM	NM ± NM	63 ± 3	43 ± 12	23 ± 3	102 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-813	359	1	—	80 ± 5	17 ± 3	110 ± 5	13 ± 3	51 ± 2	329 ± 4	16 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh	
35-KL-814	1	1	—	NM ± NM	NM ± NM	101 ± 3	46 ± 12	22 ± 3	109 ± 7	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain	
35-KL-814	4	1	—	NM ± NM	NM ± NM	132 ± 3	69 ± 12	26 ± 3	176 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	GF/LIW/RS	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-814	5	1	—	NM ± NM	NM ± NM	160 ± 4	90 ± 12	26 ± 3	217 ± 7	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Mountain?
35-KL-814	115	1	—	NM ± NM	NM ± NM	102 ± 3	50 ± 12	25 ± 3	112 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	135	2	—	NM ± NM	NM ± NM	102 ± 3	47 ± 12	28 ± 3	110 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	138	1	—	NM ± NM	NM ± NM	106 ± 3	46 ± 12	24 ± 3	114 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	143	1	—	NM ± NM	NM ± NM	101 ± 3	44 ± 12	26 ± 3	110 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	165	2	—	NM ± NM	NM ± NM	102 ± 4	46 ± 12	25 ± 4	110 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	167	2	—	NM ± NM	NM ± NM	93 ± 4	43 ± 12	23 ± 4	99 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	226	1	B	55 ± 6	15 ± 3	105 ± 5	40 ± 3	22 ± 2	112 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	226	1	C	111 ± 7	20 ± 4	119 ± 5	8 ± 3	57 ± 2	339 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-814	226	1	D	50 ± 8	21 ± 4	99 ± 5	40 ± 3	22 ± 2	116 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	226	1	E	55 ± 5	17 ± 3	94 ± 5	38 ± 3	23 ± 2	112 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	226	1	F	45 ± 5	15 ± 3	96 ± 5	38 ± 3	24 ± 2	106 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	226	1	G	55 ± 6	13 ± 3	92 ± 5	37 ± 3	23 ± 2	114 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	226	1	H	53 ± 5	18 ± 3	103 ± 5	43 ± 3	25 ± 2	115 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	228	2	A	85 ± 6	18 ± 3	109 ± 5	48 ± 3	26 ± 2	117 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	228	2	B	37 ± 5	12 ± 3	95 ± 5	38 ± 3	22 ± 2	102 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	228	2	C	46 ± 5	14 ± 3	102 ± 5	46 ± 3	22 ± 2	111 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	228	2	D	58 ± 5	21 ± 3	105 ± 5	42 ± 3	26 ± 2	120 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	228	2	E	51 ± 5	17 ± 3	104 ± 5	43 ± 3	25 ± 2	118 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	229	1	—	116 ± 7	20 ± 3	112 ± 5	47 ± 3	24 ± 2	109 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	229	3	—	NM ± NM	NM ± NM	97 ± 3	45 ± 12	22 ± 3	105 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	230	1	A	47 ± 5	14 ± 3	99 ± 5	40 ± 3	24 ± 2	120 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-KL-814	230	1	B	99 ± 7	18 ± 4	119 ± 5	7 ± 3	57 ± 2	351 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	230	1	C	61 ± 6	13 ± 3	106 ± 5	48 ± 3	24 ± 2	120 ± 4	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	231	1	B	53 ± 6	10 ± 3	104 ± 5	44 ± 3	25 ± 2	115 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	231	1	C	49 ± 5	19 ± 3	106 ± 5	46 ± 3	27 ± 2	121 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	231	1	D	58 ± 7	14 ± 4	116 ± 5	50 ± 3	30 ± 2	119 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	232	1	C	44 ± 6	19 ± 3	109 ± 5	39 ± 3	23 ± 2	106 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	232	1	D	43 ± 6	14 ± 3	103 ± 5	41 ± 3	24 ± 2	114 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	232	1	E	77 ± 6	16 ± 3	106 ± 5	42 ± 3	23 ± 2	122 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	232	1	F	38 ± 6	16 ± 3	94 ± 5	37 ± 3	22 ± 2	109 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	232	1	G	51 ± 5	16 ± 3	106 ± 5	42 ± 3	26 ± 2	114 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	232	1	H	41 ± 5	10 ± 3	92 ± 5	38 ± 3	23 ± 2	105 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	232	1	I	111 ± 7	25 ± 3	138 ± 5	8 ± 3	61 ± 2	365 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	232	2	—	NM ± NM	NM ± NM	114 ± 3	12 ± 12	55 ± 3	345 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	233	2	B	49 ± 5	18 ± 3	102 ± 5	43 ± 3	26 ± 2	117 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	233	2	C	86 ± 5	19 ± 3	122 ± 5	8 ± 3	57 ± 2	343 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	233	2	D	58 ± 6	12 ± 4	115 ± 5	45 ± 3	22 ± 2	122 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	233	2	E	85 ± 7	16 ± 4	127 ± 5	7 ± 3	56 ± 2	339 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	234	1	B	52 ± 5	15 ± 3	104 ± 5	40 ± 3	25 ± 2	115 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	234	1	C	52 ± 6	18 ± 3	108 ± 5	45 ± 3	27 ± 2	114 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	234	1	D	71 ± 7	20 ± 4	124 ± 5	50 ± 3	28 ± 2	124 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	234	1	E	71 ± 7	20 ± 4	125 ± 5	49 ± 3	26 ± 2	125 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	234	1	F	74 ± 7	23 ± 4	125 ± 5	51 ± 3	31 ± 2	123 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-KL-814	234	1	G	66 ± 6	14 ± 4	117 ± 6	45 ± 3	29 ± 2	128 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	235	1	B	40 ± 8	11 ± 3	101 ± 5	43 ± 3	25 ± 2	122 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	235	1	C	66 ± 7	26 ± 4	138 ± 5	52 ± 3	26 ± 2	129 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	235	1	D	57 ± 7	18 ± 4	117 ± 5	42 ± 3	23 ± 2	119 ± 4	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	235	1	E	65 ± 7	24 ± 4	127 ± 5	47 ± 3	24 ± 2	127 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	236	1	A	67 ± 6	19 ± 3	109 ± 5	45 ± 3	27 ± 2	122 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	236	1	B	63 ± 7	15 ± 4	111 ± 5	44 ± 3	25 ± 2	115 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	237	1	—	53 ± 6	12 ± 4	111 ± 5	43 ± 3	27 ± 2	121 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	239	1	—	71 ± 6	17 ± 3	103 ± 5	5 ± 3	50 ± 2	295 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	256	1	—	NM ± NM	NM ± NM	107 ± 4	45 ± 12	15 ± 4	115 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	266	1	—	NM ± NM	NM ± NM	102 ± 3	46 ± 12	24 ± 3	105 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	266	2	—	NM ± NM	NM ± NM	108 ± 4	49 ± 12	20 ± 4	113 ± 7	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	272	1	—	NM ± NM	NM ± NM	100 ± 3	47 ± 12	19 ± 3	109 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	293	1	—	NM ± NM	NM ± NM	120 ± 3	14 ± 12	55 ± 3	358 ± 7	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	315	1	—	89 ± 6	18 ± 4	115 ± 4	7 ± 3	51 ± 2	328 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	316	1	—	41 ± 7	17 ± 4	102 ± 4	41 ± 3	23 ± 2	112 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	317	1	—	74 ± 6	20 ± 3	115 ± 4	9 ± 3	52 ± 2	318 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	318	1	—	50 ± 6	22 ± 3	105 ± 4	45 ± 3	23 ± 2	115 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	319	1	—	71 ± 6	21 ± 3	112 ± 4	10 ± 3	53 ± 2	322 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	321	1	—	46 ± 6	17 ± 3	96 ± 4	42 ± 3	24 ± 2	113 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	322	1	—	42 ± 5	16 ± 3	99 ± 4	40 ± 3	22 ± 2	111 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	323	1	—	42 ± 6	20 ± 3	99 ± 4	41 ± 3	23 ± 2	116 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-KL-814	324	1	—	75 ± 5	16 ± 3	114 ± 4	9 ± 3	48 ± 2	315 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	325	1	A	43 ± 6	16 ± 3	95 ± 4	42 ± 3	22 ± 2	110 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	B	79 ± 6	17 ± 3	111 ± 4	9 ± 3	50 ± 2	320 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	325	1	C	53 ± 6	19 ± 3	108 ± 4	46 ± 3	26 ± 2	120 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	D	36 ± 6	18 ± 3	95 ± 4	37 ± 3	23 ± 2	109 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	E	88 ± 6	20 ± 3	117 ± 4	8 ± 3	51 ± 2	342 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	325	1	F	56 ± 6	17 ± 3	104 ± 4	45 ± 3	24 ± 2	120 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	G	56 ± 6	15 ± 4	107 ± 4	43 ± 3	22 ± 2	116 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	H	52 ± 6	11 ± 4	112 ± 4	48 ± 3	27 ± 2	122 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	I	58 ± 7	17 ± 4	108 ± 4	44 ± 3	28 ± 2	116 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	J	53 ± 6	14 ± 4	110 ± 4	47 ± 3	25 ± 2	121 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	K	54 ± 6	19 ± 4	122 ± 4	49 ± 3	26 ± 2	120 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	L	43 ± 6	17 ± 3	102 ± 4	43 ± 3	24 ± 2	112 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	M	72 ± 7	20 ± 3	105 ± 4	49 ± 3	26 ± 2	117 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	N	38 ± 7	21 ± 3	106 ± 4	43 ± 3	24 ± 2	117 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	O	53 ± 6	14 ± 4	107 ± 4	45 ± 3	24 ± 2	122 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	P	54 ± 7	20 ± 4	108 ± 4	45 ± 3	25 ± 2	120 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	Q	44 ± 6	16 ± 3	103 ± 4	42 ± 3	24 ± 2	121 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	325	1	R	95 ± 7	23 ± 4	127 ± 5	10 ± 3	56 ± 2	346 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	325	3	—	61 ± 6	21 ± 3	108 ± 4	44 ± 3	24 ± 2	122 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	326	1	A	42 ± 6	16 ± 3	101 ± 4	42 ± 3	21 ± 2	118 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	326	3	—	58 ± 6	19 ± 3	101 ± 4	44 ± 3	23 ± 2	122 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-814	328	1	A	50 ± 6	16 ± 3	104 ± 4	43 ± 3	27 ± 2	120 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	328	1	B	53 ± 6	18 ± 3	105 ± 4	47 ± 3	21 ± 2	118 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	328	1	C	52 ± 7	20 ± 3	117 ± 4	48 ± 3	23 ± 2	126 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	329	1	A	62 ± 7	17 ± 4	112 ± 4	45 ± 3	28 ± 2	121 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	330	1	A	43 ± 6	15 ± 3	95 ± 4	39 ± 3	22 ± 2	113 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	330	1	B	37 ± 6	15 ± 3	92 ± 4	37 ± 3	25 ± 2	110 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	330	1	C	96 ± 8	18 ± 4	111 ± 5	10 ± 3	52 ± 2	334 ± 6	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	330	1	D	63 ± 6	20 ± 3	106 ± 4	42 ± 3	24 ± 2	114 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	330	1	E	72 ± 7	21 ± 4	122 ± 5	53 ± 3	26 ± 2	128 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	331	1	A	63 ± 7	23 ± 4	114 ± 5	50 ± 3	25 ± 2	123 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	332	1	A	92 ± 6	18 ± 4	113 ± 4	9 ± 3	54 ± 2	328 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	336	1	A	42 ± 6	16 ± 3	96 ± 4	40 ± 3	24 ± 2	112 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	336	1	B	58 ± 7	18 ± 4	126 ± 5	49 ± 3	27 ± 2	129 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	338	1	A	58 ± 6	18 ± 4	114 ± 4	48 ± 3	25 ± 2	121 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	339	1	A	45 ± 5	15 ± 3	96 ± 4	41 ± 3	23 ± 2	112 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	339	1	B	76 ± 6	22 ± 3	118 ± 4	8 ± 3	56 ± 2	335 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	340	2	—	52 ± 7	14 ± 4	113 ± 4	48 ± 3	27 ± 2	120 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	341	1	A	55 ± 6	15 ± 3	110 ± 4	44 ± 3	24 ± 2	119 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	341	1	B	52 ± 6	22 ± 3	100 ± 4	44 ± 3	26 ± 2	118 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	342	1	A	46 ± 7	21 ± 4	106 ± 4	49 ± 3	22 ± 2	124 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	342	1	B	46 ± 6	13 ± 4	101 ± 4	42 ± 3	24 ± 2	112 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	342	1	C	42 ± 6	13 ± 3	94 ± 4	44 ± 3	22 ± 2	108 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-814	342	1	D	37 ± 6	15 ± 3	96 ± 4	38 ± 3	21 ± 2	115 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	342	2	—	44 ± 6	22 ± 3	105 ± 4	46 ± 3	26 ± 2	120 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	344	1	A	56 ± 7	24 ± 3	110 ± 4	48 ± 3	28 ± 2	122 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	345	1	A	52 ± 6	18 ± 4	110 ± 4	45 ± 3	22 ± 2	118 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	345	1	B	49 ± 6	16 ± 4	105 ± 4	44 ± 3	24 ± 2	116 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	352	1	A	46 ± 7	25 ± 3	115 ± 4	50 ± 3	28 ± 2	119 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	362	2	—	44 ± 5	15 ± 3	96 ± 4	37 ± 3	26 ± 2	112 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	376	2	—	36 ± 6	16 ± 3	98 ± 4	41 ± 3	23 ± 2	107 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	406	3	—	43 ± 5	15 ± 3	94 ± 4	39 ± 3	20 ± 2	105 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	446	2	—	38 ± 6	18 ± 3	105 ± 4	43 ± 3	23 ± 2	116 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	458	1	—	39 ± 6	15 ± 3	94 ± 4	40 ± 3	22 ± 2	110 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	458	2	A	46 ± 6	15 ± 3	96 ± 4	40 ± 3	24 ± 2	111 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	460	1	A	42 ± 7	16 ± 4	109 ± 4	47 ± 3	26 ± 2	116 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	460	1	B	38 ± 6	16 ± 3	99 ± 4	42 ± 3	20 ± 2	114 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	463	1	A	59 ± 6	16 ± 3	111 ± 4	48 ± 3	30 ± 2	121 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	464	1	A	41 ± 6	19 ± 3	95 ± 4	39 ± 3	23 ± 2	107 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	464	1	B	43 ± 7	12 ± 4	105 ± 4	43 ± 3	25 ± 2	119 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	464	1	C	50 ± 6	14 ± 4	103 ± 4	42 ± 3	23 ± 2	113 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	536	2	—	43 ± 5	14 ± 3	89 ± 4	39 ± 3	21 ± 2	108 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	588	1	A	45 ± 6	17 ± 3	107 ± 4	43 ± 3	23 ± 2	117 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	588	1	B	85 ± 6	18 ± 3	109 ± 4	17 ± 3	49 ± 2	322 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	590	1	A	36 ± 6	15 ± 3	91 ± 4	37 ± 3	22 ± 2	103 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-814	590	1	B	55 ± 6	20 ± 4	108 ± 4	41 ± 3	24 ± 2	117 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	592	1	A	42 ± 6	13 ± 3	97 ± 4	41 ± 3	21 ± 2	107 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	593	1	A	60 ± 8	23 ± 4	117 ± 5	47 ± 3	24 ± 2	118 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	594	1	A	44 ± 7	18 ± 3	108 ± 4	42 ± 3	24 ± 2	122 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	594	1	B	72 ± 6	11 ± 4	113 ± 4	9 ± 3	52 ± 2	327 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-814	594	1	C	45 ± 7	16 ± 4	101 ± 4	43 ± 3	25 ± 2	117 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	595	1	A	46 ± 6	13 ± 4	97 ± 4	43 ± 3	22 ± 2	112 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	596	1	A	60 ± 7	16 ± 4	107 ± 4	44 ± 3	25 ± 2	120 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	597	1	A	67 ± 7	16 ± 4	113 ± 5	48 ± 3	23 ± 2	125 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	598	1	A	41 ± 6	15 ± 3	100 ± 4	44 ± 3	24 ± 2	118 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	599	1	A	53 ± 7	20 ± 4	102 ± 4	46 ± 3	23 ± 2	116 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	600	1	A	50 ± 6	17 ± 4	106 ± 4	46 ± 3	26 ± 2	122 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	600	1	B	74 ± 7	19 ± 4	114 ± 4	46 ± 3	24 ± 2	129 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	600	2	—	75 ± 5	18 ± 3	111 ± 4	10 ± 3	56 ± 2	320 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-814	620	1	A	46 ± 6	19 ± 3	98 ± 4	48 ± 3	26 ± 2	118 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	620	1	B	40 ± 6	13 ± 3	85 ± 4	34 ± 3	20 ± 2	104 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	622	1	A	57 ± 7	21 ± 4	119 ± 4	45 ± 3	26 ± 2	124 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	624	1	A	47 ± 6	18 ± 3	103 ± 4	41 ± 3	25 ± 2	114 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	625	1	A	45 ± 6	17 ± 3	96 ± 4	42 ± 3	23 ± 2	109 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	625	2	—	41 ± 5	14 ± 3	95 ± 4	41 ± 3	22 ± 2	109 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	626	1	A	51 ± 7	17 ± 4	105 ± 4	43 ± 3	24 ± 2	121 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	632	1	A	88 ± 6	18 ± 3	114 ± 4	11 ± 3	51 ± 2	329 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-814	636	1	A	94 ± 7	27 ± 3	122 ± 4	10 ± 3	57 ± 2	348 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	636	2	—	50 ± 7	14 ± 4	117 ± 5	46 ± 3	28 ± 2	117 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	637	1	A	90 ± 7	20 ± 4	125 ± 5	7 ± 3	57 ± 2	337 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	638	1	A	79 ± 6	14 ± 4	114 ± 4	12 ± 3	53 ± 2	331 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	642	1	A	42 ± 6	19 ± 3	96 ± 4	35 ± 3	25 ± 2	101 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	657	2	—	35 ± 6	13 ± 3	98 ± 4	38 ± 3	23 ± 2	111 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	692	1	A	55 ± 6	18 ± 3	107 ± 4	47 ± 3	28 ± 2	120 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	693	1	A	38 ± 6	14 ± 3	97 ± 4	42 ± 3	19 ± 2	109 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	694	1	A	86 ± 7	26 ± 4	125 ± 5	11 ± 3	53 ± 2	343 ± 6	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	694	1	B	36 ± 6	12 ± 3	97 ± 4	43 ± 3	22 ± 2	118 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	694	1	C	46 ± 6	14 ± 3	107 ± 4	42 ± 3	22 ± 2	115 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	696	1	A	50 ± 6	15 ± 3	92 ± 4	42 ± 3	24 ± 2	108 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	698	1	A	56 ± 6	15 ± 3	105 ± 4	41 ± 3	25 ± 2	123 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	698	1	B	57 ± 6	14 ± 4	111 ± 4	47 ± 3	23 ± 2	123 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	700	1	A	46 ± 6	17 ± 3	95 ± 4	41 ± 3	23 ± 2	108 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	704	1	A	46 ± 6	16 ± 3	97 ± 4	40 ± 3	24 ± 2	114 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	706	1	A	90 ± 7	18 ± 4	120 ± 4	8 ± 3	55 ± 2	335 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	707	1	A	57 ± 7	23 ± 4	113 ± 4	44 ± 3	24 ± 2	116 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	707	1	B	43 ± 6	13 ± 4	89 ± 4	36 ± 3	19 ± 2	106 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	708	1	A	42 ± 6	17 ± 3	100 ± 4	41 ± 3	22 ± 2	112 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	708	1	B	48 ± 6	15 ± 4	106 ± 4	42 ± 3	25 ± 2	118 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-814	708	1	C	58 ± 6	17 ± 3	100 ± 4	40 ± 3	25 ± 2	112 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-KL-814	709	1	A	53 ± 7	19 ± 3	101 ± 4	43 ± 3	24 ± 2	113 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	709	1	B	54 ± 7	18 ± 4	109 ± 4	47 ± 3	22 ± 2	122 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	710	1	A	43 ± 5	15 ± 3	92 ± 4	38 ± 3	21 ± 2	109 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	712	1	A	47 ± 6	20 ± 3	105 ± 4	42 ± 3	22 ± 2	114 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	721	1	A	42 ± 6	12 ± 4	89 ± 4	42 ± 3	24 ± 2	112 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	722	1	A	45 ± 6	17 ± 3	104 ± 4	46 ± 3	24 ± 2	115 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	722	1	B	54 ± 6	19 ± 4	104 ± 4	45 ± 3	25 ± 2	115 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	724	1	A	41 ± 6	14 ± 3	93 ± 4	43 ± 3	23 ± 2	107 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	724	1	B	58 ± 6	13 ± 4	107 ± 4	42 ± 3	24 ± 2	118 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	726	1	A	37 ± 6	14 ± 3	96 ± 4	39 ± 3	23 ± 2	109 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	728	1	A	34 ± 6	13 ± 3	90 ± 4	40 ± 3	23 ± 2	104 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	730	1	A	39 ± 6	13 ± 3	95 ± 4	37 ± 3	23 ± 2	109 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	731	1	A	47 ± 6	15 ± 3	93 ± 4	41 ± 3	25 ± 2	112 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	735	1	A	47 ± 6	16 ± 3	98 ± 4	45 ± 3	25 ± 2	112 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	735	1	B	72 ± 6	15 ± 3	103 ± 4	9 ± 3	49 ± 2	300 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-814	736	1	A	44 ± 7	21 ± 4	100 ± 4	40 ± 3	22 ± 2	110 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	737	1	A	52 ± 6	13 ± 4	102 ± 4	43 ± 3	23 ± 2	120 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	737	1	B	50 ± 6	19 ± 3	106 ± 4	45 ± 3	26 ± 2	114 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	737	1	C	69 ± 6	21 ± 3	116 ± 4	49 ± 3	25 ± 2	124 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	738	1	A	53 ± 6	20 ± 3	119 ± 4	49 ± 3	25 ± 2	129 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	738	1	B	59 ± 6	24 ± 3	115 ± 4	44 ± 3	25 ± 2	124 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-814	738	1	C	89 ± 6	18 ± 3	119 ± 4	9 ± 3	54 ± 2	330 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-KL-814	738	1	D	73 ± 7	22 ± 4	117 ± 5	49 ± 3	27 ± 2	123 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	738	1	E	131 ± 8	22 ± 4	152 ± 5	10 ± 3	62 ± 2	389 ± 6	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-814	738	1	F	79 ± 6	19 ± 3	121 ± 4	9 ± 3	56 ± 2	339 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-814	738	1	G	48 ± 6	20 ± 3	111 ± 4	44 ± 3	25 ± 2	121 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	738	3	—	50 ± 5	17 ± 3	102 ± 4	41 ± 3	24 ± 2	113 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	739	1	A	74 ± 6	18 ± 3	107 ± 4	47 ± 3	29 ± 2	127 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	740	1	A	46 ± 6	19 ± 3	94 ± 4	40 ± 3	24 ± 2	113 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	740	1	B	45 ± 6	16 ± 3	102 ± 4	42 ± 3	25 ± 2	116 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	740	1	C	64 ± 6	19 ± 3	114 ± 4	47 ± 3	25 ± 2	122 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	740	1	D	57 ± 6	19 ± 4	117 ± 4	49 ± 3	27 ± 2	123 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	740	1	E	37 ± 7	21 ± 3	105 ± 4	43 ± 3	25 ± 2	118 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	742	1	A	41 ± 6	18 ± 3	103 ± 4	42 ± 3	23 ± 2	117 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	742	1	B	104 ± 7	19 ± 4	134 ± 4	12 ± 3	59 ± 2	360 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-814	743	1	A	56 ± 6	20 ± 3	115 ± 4	47 ± 3	26 ± 2	113 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	746	1	A	81 ± 7	18 ± 4	106 ± 4	8 ± 3	51 ± 2	326 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-814	775	2	—	46 ± 5	16 ± 3	107 ± 4	43 ± 3	24 ± 2	121 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	783	2	—	49 ± 5	16 ± 3	97 ± 4	42 ± 3	23 ± 2	116 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	800	1	A	62 ± 7	19 ± 4	113 ± 5	51 ± 3	26 ± 2	123 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	808	1	—	74 ± 6	20 ± 3	117 ± 4	9 ± 3	53 ± 2	339 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-814	818	1	—	42 ± 6	16 ± 3	90 ± 4	38 ± 3	19 ± 2	102 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	820	6	—	38 ± 6	18 ± 3	97 ± 4	36 ± 3	22 ± 2	108 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-814	820	7	—	49 ± 5	18 ± 3	101 ± 4	42 ± 3	23 ± 2	114 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-KL-814	821	1	—	89 ± 6	20 ± 3	121 ± 4	9 ± 3	54 ± 2	334 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	831	1	—	83 ± 6	18 ± 3	113 ± 4	11 ± 3	52 ± 2	331 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	852	2	—	51 ± 6	15 ± 3	103 ± 4	46 ± 3	24 ± 2	123 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	854	2	—	44 ± 5	17 ± 3	102 ± 4	42 ± 3	23 ± 2	116 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	869	2	—	76 ± 6	22 ± 3	109 ± 4	9 ± 3	50 ± 2	315 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	871	2	—	49 ± 6	16 ± 3	103 ± 4	44 ± 3	27 ± 2	115 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	875	3	—	38 ± 5	14 ± 3	99 ± 4	32 ± 3	22 ± 2	102 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	899	2	—	96 ± 6	15 ± 3	116 ± 4	8 ± 3	56 ± 2	338 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	927	2	—	42 ± 6	15 ± 3	96 ± 4	38 ± 3	23 ± 2	110 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	947	3	—	48 ± 6	16 ± 3	104 ± 4	41 ± 3	21 ± 2	110 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	950	2	—	46 ± 6	18 ± 3	101 ± 4	45 ± 3	24 ± 2	114 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	951	2	—	37 ± 5	14 ± 3	97 ± 4	39 ± 3	21 ± 2	115 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	966	2	—	50 ± 6	20 ± 3	105 ± 4	43 ± 3	23 ± 2	117 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	975	2	—	41 ± 6	18 ± 3	94 ± 4	40 ± 3	24 ± 2	116 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	977	3	—	53 ± 6	15 ± 4	110 ± 4	44 ± 3	25 ± 2	116 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	987	2	—	43 ± 6	15 ± 3	98 ± 4	46 ± 3	25 ± 2	109 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	989	2	—	38 ± 5	18 ± 3	94 ± 4	37 ± 3	22 ± 2	111 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	994	2	—	105 ± 6	22 ± 3	136 ± 4	12 ± 3	56 ± 2	360 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	995	2	—	49 ± 5	13 ± 3	104 ± 4	42 ± 3	26 ± 2	116 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	996	2	—	49 ± 5	17 ± 3	98 ± 4	40 ± 3	23 ± 2	124 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-814	996	3	—	74 ± 5	17 ± 3	115 ± 4	8 ± 3	50 ± 2	329 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-814	1027	2	—	43 ± 5	14 ± 3	97 ± 4	40 ± 3	23 ± 2	113 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-814	1028	2	—	74 ± 7	10 ± 4	118 ± 4	9 ± 3	53 ± 2	340 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh
35-KL-814	1029	2	—	37 ± 6	14 ± 3	93 ± 4	36 ± 3	22 ± 2	106 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1040	2	—	45 ± 6	12 ± 3	97 ± 4	39 ± 3	25 ± 2	113 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1042	2	—	44 ± 6	15 ± 3	101 ± 4	44 ± 3	24 ± 2	112 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1047	2	—	41 ± 5	13 ± 3	95 ± 4	41 ± 3	23 ± 2	111 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1050	2	—	45 ± 6	18 ± 3	102 ± 4	42 ± 3	26 ± 2	112 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1061	2	—	46 ± 6	14 ± 3	106 ± 4	42 ± 3	25 ± 2	118 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1099	2	—	47 ± 6	16 ± 3	98 ± 4	41 ± 3	24 ± 2	119 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1100	1	—	52 ± 5	15 ± 3	106 ± 4	42 ± 3	25 ± 2	121 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1105	2	—	70 ± 6	18 ± 3	108 ± 4	7 ± 3	53 ± 2	321 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Silver Lake/Sycan Marsh
35-KL-814	1112	2	—	48 ± 6	18 ± 3	103 ± 4	43 ± 3	24 ± 2	116 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1113	3	—	40 ± 5	16 ± 3	97 ± 4	40 ± 3	23 ± 2	108 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1118	2	—	53 ± 6	15 ± 3	95 ± 4	43 ± 3	24 ± 2	116 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1131	2	—	37 ± 6	19 ± 3	100 ± 4	40 ± 3	23 ± 2	115 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-814	1132	2	—	42 ± 5	19 ± 3	101 ± 4	42 ± 3	26 ± 2	111 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-815	1	1	—	62 ± 6	14 ± 3	99 ± 5	42 ± 3	24 ± 2	117 ± 4	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-815	22	1	—	52 ± 5	15 ± 3	102 ± 5	39 ± 3	24 ± 2	117 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-815	40	1	—	46 ± 5	16 ± 3	97 ± 5	43 ± 3	22 ± 2	110 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-815	101	1	—	68 ± 7	18 ± 4	121 ± 5	47 ± 3	28 ± 2	123 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-815	185	1	—	64 ± 7	13 ± 4	116 ± 5	49 ± 3	26 ± 2	119 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-815	195	1	—	42 ± 5	17 ± 3	94 ± 5	40 ± 3	22 ± 2	112 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain
35-KL-815	199	1	—	51 ± 5	19 ± 3	99 ± 5	39 ± 3	24 ± 2	108 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Spodue Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-815	200	1	—	52 ± 6	19 ± 3	114 ± 5	48 ± 3	28 ± 2	125 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-815	201	1	—	67 ± 6	19 ± 3	104 ± 5	49 ± 3	23 ± 2	118 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	202	1	—	38 ± 6	15 ± 3	95 ± 5	38 ± 3	24 ± 2	106 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	203	1	—	44 ± 5	15 ± 3	100 ± 5	38 ± 3	23 ± 2	115 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	204	1	—	48 ± 5	14 ± 3	100 ± 5	38 ± 3	23 ± 2	114 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	205	1	—	50 ± 5	10 ± 3	93 ± 5	40 ± 3	22 ± 2	109 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	206	1	—	45 ± 5	14 ± 3	101 ± 5	35 ± 3	25 ± 2	109 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	207	1	—	43 ± 5	10 ± 3	92 ± 5	35 ± 3	23 ± 2	107 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	208	1	—	NM ± NM	NM ± NM	102 ± 3	46 ± 12	24 ± 3	120 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	210	1	—	42 ± 5	13 ± 3	95 ± 5	37 ± 3	22 ± 2	105 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	211	1	—	NM ± NM	NM ± NM	118 ± 3	16 ± 12	54 ± 3	347 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-815	213	1	—	NM ± NM	NM ± NM	121 ± 4	51 ± 12	25 ± 4	123 ± 7	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	213	2	—	NM ± NM	NM ± NM	101 ± 3	46 ± 12	21 ± 3	111 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-815	214	1	—	NM ± NM	NM ± NM	123 ± 3	14 ± 12	53 ± 4	359 ± 8	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-815	219	1	—	NM ± NM	NM ± NM	92 ± 4	43 ± 12	21 ± 4	103 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-816	3	1	—	83 ± 5	19 ± 3	108 ± 5	9 ± 3	53 ± 2	318 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-817	40	1	—	52 ± 7	17 ± 4	101 ± 5	44 ± 3	27 ± 2	120 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-818	1	1	—	NM ± NM	NM ± NM	157 ± 4	81 ± 12	28 ± 3	211 ± 7	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	East Medicine Lake?	
35-KL-818	2	1	—	NM ± NM	NM ± NM	106 ± 3	37 ± 12	38 ± 3	164 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A	
35-KL-818	3	1	—	NM ± NM	NM ± NM	62 ± 3	6 ± 12	74 ± 3	392 ± 8	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Blue Mountain	
35-KL-818	4	1	—	NM ± NM	NM ± NM	103 ± 3	46 ± 12	24 ± 3	109 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-818	7	1	—	NM ± NM	NM ± NM	124 ± 3	78 ± 12	24 ± 3	137 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-818	8	1	—	NM ± NM	NM ± NM	64 ± 3	4 ± 14	78 ± 4	394 ± 8	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Blue Mountain
35-KL-818	9	1	—	NM ± NM	NM ± NM	164 ± 4	86 ± 12	30 ± 3	221 ± 7	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	East Medicine Lake?
35-KL-818	10	1	—	NM ± NM	NM ± NM	139 ± 4	67 ± 12	33 ± 3	184 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS
35-KL-818	11	1	—	NM ± NM	NM ± NM	107 ± 3	45 ± 12	23 ± 3	115 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-818	13	1	—	NM ± NM	NM ± NM	125 ± 4	12 ± 12	27 ± 3	74 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat
35-KL-818	14	1	—	NM ± NM	NM ± NM	134 ± 3	74 ± 12	30 ± 3	192 ± 7	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS
35-KL-818	15	1	—	NM ± NM	NM ± NM	152 ± 3	80 ± 12	28 ± 3	206 ± 7	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	East Medicine Lake?
35-KL-818	16	1	—	NM ± NM	NM ± NM	107 ± 3	46 ± 12	22 ± 3	108 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-818	17	1	—	NM ± NM	NM ± NM	104 ± 3	41 ± 12	23 ± 3	109 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-818	19	1	—	NM ± NM	NM ± NM	156 ± 3	4 ± 13	68 ± 3	135 ± 7	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Butte?
35-KL-818	20	1	—	NM ± NM	NM ± NM	147 ± 4	79 ± 12	28 ± 3	208 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	East Medicine Lake?
35-KL-818	21	1	—	NM ± NM	NM ± NM	142 ± 3	74 ± 12	29 ± 3	198 ± 7	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	East Medicine Lake?
35-KL-818	24	1	—	NM ± NM	NM ± NM	136 ± 3	15 ± 12	28 ± 3	77 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat
35-KL-818	27	1	—	NM ± NM	NM ± NM	125 ± 4	13 ± 12	20 ± 3	70 ± 7	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat
35-KL-818	31	1	—	31 ± 6	14 ± 3	103 ± 5	14 ± 3	24 ± 2	89 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat
35-KL-818	32	1	—	37 ± 5	13 ± 3	139 ± 5	72 ± 3	31 ± 2	199 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS/East Medicine Lake
35-KL-818	33	1	—	66 ± 6	15 ± 3	101 ± 5	41 ± 3	23 ± 2	117 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-818	34	1	—	36 ± 6	14 ± 3	137 ± 5	73 ± 3	30 ± 2	195 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS/East Medicine Lake
35-KL-818	36	1	—	52 ± 5	13 ± 3	105 ± 5	43 ± 3	23 ± 2	120 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-818	37	1	—	46 ± 5	13 ± 3	108 ± 5	46 ± 3	28 ± 2	116 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain
35-KL-818	38	1	—	39 ± 6	15 ± 3	159 ± 5	78 ± 3	31 ± 2	217 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	East Medicine Lake?
35-KL-818	39	1	—	46 ± 5	17 ± 3	132 ± 5	7 ± 3	30 ± 2	84 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-KL-818	40	1	—	39 ± 5	13 ± 3	148 ± 5	102 ± 3	27 ± 2	217 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Mountain?	
35-KL-818	41	1	—	38 ± 5	17 ± 3	113 ± 5	16 ± 3	24 ± 2	96 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat	
35-KL-818	42	1	—	47 ± 5	15 ± 3	100 ± 5	41 ± 3	25 ± 2	119 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-818	43	1	—	42 ± 5	12 ± 3	118 ± 5	15 ± 3	20 ± 2	83 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat	
35-KL-818	44	1	—	37 ± 5	16 ± 3	126 ± 5	17 ± 3	20 ± 2	82 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat	
35-KL-818	45	1	—	52 ± 6	18 ± 3	97 ± 5	42 ± 3	24 ± 2	114 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-818	46	1	—	NM ± NM	NM ± NM	101 ± 3	44 ± 12	21 ± 3	103 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-818	49	1	—	36 ± 5	14 ± 3	140 ± 5	68 ± 3	28 ± 2	194 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS/East Medicine Lake	
35-KL-818	50	1	—	188 ± 8	26 ± 4	62 ± 5	4 ± 3	78 ± 2	289 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Blue Mountain	
35-KL-818	51	1	—	NM ± NM	NM ± NM	151 ± 3	81 ± 12	29 ± 3	212 ± 7	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	East Medicine Lake?	
35-KL-818	52	1	—	205 ± 8	29 ± 4	68 ± 5	NM ± 3	88 ± 2	397 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Blue Mountain	
35-KL-818	56	1	—	67 ± 9	25 ± 4	142 ± 6	8 ± 3	35 ± 3	84 ± 5	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Drews Creek/Butcher Flat	
35-KL-818	57	1	—	34 ± 5	16 ± 3	123 ± 5	83 ± 3	29 ± 2	168 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS/East Medicine Lake	
35-KL-818	59	1	—	69 ± 6	15 ± 4	116 ± 5	52 ± 3	25 ± 2	128 ± 4	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-818	60	1	—	57 ± 5	15 ± 3	102 ± 5	40 ± 3	25 ± 2	116 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-818	61	1	—	169 ± 7	16 ± 4	58 ± 5	1 ± 3	78 ± 2	366 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Blue Mountain	
35-KL-818	62	1	—	47 ± 5	19 ± 3	102 ± 5	40 ± 3	23 ± 2	113 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-818	100	1	A	161 ± 9	24 ± 4	54 ± 5	NM ± 8	76 ± 2	351 ± 6	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Blue Mountain	
35-KL-818	100	1	B	179 ± 6	25 ± 3	61 ± 5	1 ± 3	76 ± 2	367 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Blue Mountain	
35-KL-818	102	1	—	NM ± NM	NM ± NM	133 ± 3	64 ± 12	32 ± 3	176 ± 7	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS	
35-KL-818	126	1	—	177 ± 8	22 ± 4	61 ± 5	1 ± 3	77 ± 2	374 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Blue Mountain	
35-KL-818	128	1	A	40 ± 7	15 ± 4	135 ± 5	73 ± 3	29 ± 2	200 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	GF/LIW/RS/East Medicine Lake	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-KL-818	128	1	B	48 ± 6	15 ± 3	115 ± 5	7 ± 3	25 ± 2	78 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Drews Creek/Butcher Flat
35-KL-818	129	1	—	NM ± NM	NM ± NM	100 ± 3	46 ± 12	24 ± 3	113 ± 7	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-818	130	1	—	NM ± NM	NM ± NM	130 ± 3	12 ± 12	28 ± 3	78 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Drews Creek/Butcher Flat
35-KL-818	156	1	—	NM ± NM	NM ± NM	125 ± 3	7 ± 12	48 ± 3	349 ± 8	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-KL-832	20	1	—	NM ± NM	NM ± NM	91 ± 3	43 ± 12	24 ± 3	105 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	21	1	—	NM ± NM	NM ± NM	96 ± 4	41 ± 12	21 ± 4	106 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	23	1	—	NM ± NM	NM ± NM	111 ± 3	50 ± 12	25 ± 3	121 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	24	1	—	NM ± NM	NM ± NM	106 ± 3	43 ± 12	22 ± 3	111 ± 7	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	27	4	A	42 ± 5	16 ± 3	104 ± 5	44 ± 3	25 ± 2	118 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	27	4	B	46 ± 5	18 ± 3	108 ± 5	43 ± 3	23 ± 2	116 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	27	4	C	49 ± 5	17 ± 3	98 ± 5	42 ± 3	22 ± 2	109 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	27	4	D	50 ± 5	15 ± 3	99 ± 5	39 ± 3	25 ± 2	108 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	27	5	—	NM ± NM	NM ± NM	103 ± 3	45 ± 12	24 ± 3	113 ± 7	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	27	6	—	42 ± 5	15 ± 3	100 ± 5	41 ± 3	23 ± 2	110 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	27	7	—	45 ± 5	17 ± 3	99 ± 5	40 ± 3	21 ± 2	109 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	9999	1	A	41 ± 7	18 ± 4	94 ± 5	39 ± 3	23 ± 2	109 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	9999	2	A	47 ± 7	14 ± 4	103 ± 5	40 ± 3	22 ± 2	115 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-832	9999	3	A	70 ± NA	20 ± NA	101 ± NA	43 ± NA	50 ± NA	200 ± NA	11 ± NA	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown A
35-KL-834	2	1	—	49 ± 6	22 ± 3	113 ± 5	48 ± 3	27 ± 2	121 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-834	3	1	—	45 ± 5	16 ± 3	94 ± 5	38 ± 3	23 ± 2	104 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-834	4	1	—	39 ± 5	12 ± 3	96 ± 5	40 ± 3	22 ± 2	112 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain
35-KL-834	5	1	—	50 ± 6	17 ± 3	96 ± 5	38 ± 3	25 ± 2	114 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Spodue Mountain

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## Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	NM			
35-KL-834	6	1	—	80 ± 5	19 ± 3	121 ± 5	6 ± 3	53 ± 2	339 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-834	64	1	A	45 ± 6	18 ± 3	105 ± 5	43 ± 3	25 ± 2	117 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-834	64	2	—	50 ± 5	15 ± 3	96 ± 5	39 ± 3	22 ± 2	114 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-834	70	1	—	48 ± 6	13 ± 3	93 ± 5	36 ± 3	23 ± 2	106 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-834	71	1	—	79 ± 6	22 ± 3	116 ± 5	8 ± 3	54 ± 2	336 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-835	1	1	—	61 ± 5	22 ± 3	115 ± 5	47 ± 3	24 ± 2	121 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	2	1	—	50 ± 6	15 ± 3	102 ± 5	44 ± 3	22 ± 2	115 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	3	1	—	43 ± 5	10 ± 3	96 ± 5	39 ± 3	25 ± 2	107 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	4	1	—	78 ± 5	17 ± 3	110 ± 5	8 ± 3	51 ± 2	317 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-835	5	1	—	52 ± 5	15 ± 3	105 ± 5	40 ± 3	25 ± 2	112 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	7	1	—	77 ± 5	17 ± 3	119 ± 5	8 ± 3	54 ± 2	334 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-KL-835	8	1	—	44 ± 5	15 ± 3	93 ± 5	38 ± 3	23 ± 2	113 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	10	1	—	50 ± 5	16 ± 3	100 ± 5	42 ± 3	23 ± 2	111 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	11	1	—	60 ± 7	13 ± 4	109 ± 5	47 ± 3	22 ± 2	126 ± 4	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	12	1	—	75 ± 6	16 ± 3	49 ± 5	188 ± 4	41 ± 2	270 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A		
35-KL-835	13	1	—	56 ± 6	15 ± 3	116 ± 5	44 ± 3	25 ± 2	118 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	15	1	—	64 ± 6	13 ± 3	99 ± 5	41 ± 3	25 ± 2	114 ± 4	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	16	1	—	42 ± 5	16 ± 3	97 ± 5	39 ± 3	24 ± 2	110 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	17	1	—	63 ± 6	18 ± 3	106 ± 5	45 ± 3	23 ± 2	117 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	18	1	—	43 ± 5	17 ± 3	93 ± 5	38 ± 3	22 ± 2	106 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	19	1	—	NM ± NM	NM ± NM	104 ± 3	49 ± 12	23 ± 3	119 ± 7	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		
35-KL-835	20	1	—	NM ± NM	NM ± NM	100 ± 3	46 ± 12	23 ± 3	111 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain		

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type		
35-KL-835	21	1	—	102 ± 8	21 ± 4	59 ± 5	183 ± 4	44 ± 2	310 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A	
35-KL-835	26	1	—	60 ± 6	15 ± 4	114 ± 5	45 ± 3	22 ± 2	124 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-835	29	1	—	80 ± 5	19 ± 3	111 ± 5	9 ± 3	53 ± 2	327 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-KL-835	42	1	—	63 ± 5	16 ± 3	101 ± 5	40 ± 3	25 ± 2	116 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-835	48	1	A	44 ± 5	15 ± 3	95 ± 5	40 ± 3	23 ± 2	108 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-835	48	1	B	39 ± 5	13 ± 3	98 ± 5	38 ± 3	24 ± 2	113 ± 4	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-835	48	1	C	55 ± 6	15 ± 3	99 ± 5	47 ± 3	26 ± 2	115 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-835	49	1	—	NM ± NM	NM ± NM	97 ± 3	56 ± 12	22 ± 3	105 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-835	76	1	—	41 ± 5	17 ± 3	104 ± 5	40 ± 3	25 ± 2	110 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-835	183	1	—	197 ± 7	26 ± 4	214 ± 5	3 ± 3	108 ± 2	1135 ± 9	96 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Witham Creek	
35-KL-835	188	1	—	46 ± 5	17 ± 3	98 ± 5	40 ± 3	26 ± 2	115 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-835	189	1	—	68 ± 8	26 ± 4	127 ± 6	46 ± 3	26 ± 2	116 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-865	2	2	—	63 ± 6	17 ± 3	114 ± 5	46 ± 3	26 ± 2	133 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-KL-865	29	1	—	69 ± 7	16 ± 4	104 ± 5	45 ± 3	25 ± 2	120 ± 4	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Spodue Mountain	
35-SH-135	1	1	—	48 ± 5	15 ± 3	85 ± 5	94 ± 3	26 ± 2	133 ± 4	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-135	9	1	—	81 ± 5	16 ± 3	83 ± 5	69 ± 3	67 ± 2	372 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A	
35-SH-135	15	1	—	70 ± 5	20 ± 3	131 ± 5	58 ± 3	43 ± 2	178 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte	
35-SH-135	110	3	—	79 ± 6	26 ± 3	152 ± 4	66 ± 3	49 ± 2	197 ± 5	10 ± 3	973 ± 31	358 ± 20	NM ± NM	1.94 ± 0.08	NM ± NM	NM	McKay Butte	
35-SH-135	113	3	A	66 ± 6	23 ± 3	139 ± 4	68 ± 3	47 ± 2	192 ± 5	9 ± 3	718 ± 29	330 ± 20	NM ± NM	1.74 ± 0.08	NM ± NM	NM	Quartz Mountain/McKay Butte	
35-SH-135	113	3	B	65 ± 6	18 ± 4	141 ± 4	59 ± 3	44 ± 2	186 ± 5	11 ± 3	650 ± 32	291 ± 20	NM ± NM	1.61 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-SH-135	113	3	C	79 ± 6	26 ± 3	152 ± 4	66 ± 3	47 ± 2	192 ± 5	9 ± 3	610 ± 30	312 ± 20	NM ± NM	1.72 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-SH-135	113	3	D	75 ± 6	22 ± 3	145 ± 5	66 ± 3	46 ± 2	194 ± 5	9 ± 3	842 ± 31	332 ± 20	NM ± NM	1.86 ± 0.08	NM ± NM	NM	Quartz Mountain/McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-SH-135	113	3	E	80 ± 6	17 ± 3	146 ± 4	63 ± 3	47 ± 2	190 ± 5	10 ± 3	800 ± 30	321 ± 20	NM ± NM	1.75 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-SH-135	113	3	F	66 ± 6	22 ± 3	146 ± 4	65 ± 3	48 ± 2	195 ± 5	8 ± 3	758 ± 30	331 ± 20	NM ± NM	1.80 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-SH-136	5	1	—	43 ± 5	12 ± 3	118 ± 5	79 ± 3	25 ± 2	126 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge	
35-SH-136	6	1	—	131 ± 6	19 ± 3	115 ± 5	NM ± 3	85 ± 2	548 ± 6	49 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Horse Mountain?	
35-SH-136	8	1	—	141 ± 9	15 ± 5	111 ± 5	NM ± 3	90 ± 3	523 ± 7	49 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Horse Mountain?	
35-SH-136	17	1	—	13 ± 26	4 ± 4	NM ± 5	7 ± 3	5 ± 2	8 ± 7	1 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-SH-136	21	3	—	36 ± 7	17 ± 3	106 ± 5	74 ± 3	26 ± 2	114 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Little Bear Creek/Whitewater Ridge	
35-SH-137	4	1	—	76 ± 5	19 ± 3	90 ± 5	33 ± 3	54 ± 2	122 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-SH-137	11	1	—	50 ± 6	19 ± 3	139 ± 5	58 ± 3	45 ± 2	286 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-SH-137	19	1	—	178 ± 8	31 ± 4	49 ± 5	270 ± 4	55 ± 2	282 ± 5	24 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-SH-137	25	2	—	60 ± 6	19 ± 3	145 ± 5	62 ± 3	47 ± 2	297 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-SH-137	33	1	—	202 ± 8	18 ± 4	50 ± 5	275 ± 4	51 ± 2	266 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-SH-137	41	1	—	59 ± 5	18 ± 3	132 ± 5	60 ± 3	42 ± 2	289 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-SH-140	9	1	—	39 ± 6	15 ± 3	126 ± 5	94 ± 3	27 ± 2	140 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge	
35-SH-140	46	1	—	58 ± 6	18 ± 3	139 ± 5	70 ± 3	29 ± 2	118 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge	
35-SH-140	77	5	—	18 ± 9	6 ± 6	NM ± NM	2 ± 3	10 ± 2	16 ± 5	2 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-SH-140	241	1	—	36 ± 5	15 ± 3	113 ± 4	88 ± 3	25 ± 2	124 ± 5	6 ± 3	859 ± 27	289 ± 20	1488 ± 14	1.15 ± 0.08	NM NM	Whitewater Ridge	
35-SH-140	346	3	—	52 ± 6	18 ± 3	98 ± 4	110 ± 3	25 ± 2	146 ± 5	7 ± 3	1271 ± 29	393 ± 20	1289 ± 15	1.61 ± 0.08	NM NM	Unknown A	
35-SH-145	14	7	—	45 ± 6	16 ± 3	132 ± 4	70 ± 3	27 ± 2	116 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Little Bear Cr./Whitewater Ridge	
35-SH-145	16	2	—	55 ± 7	24 ± 4	152 ± 5	74 ± 3	31 ± 2	118 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown D	
35-SH-145	19	1	A	88 ± 7	21 ± 4	154 ± 5	69 ± 3	47 ± 2	297 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-SH-145	20	1	A	64 ± 6	25 ± 3	153 ± 5	63 ± 3	45 ± 2	295 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-SH-145	21	1	A	46 ± 6	16 ± 4	122 ± 4	95 ± 3	25 ± 2	131 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	23	3	A	49 ± 6	21 ± 3	100 ± 4	108 ± 3	27 ± 2	143 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C	
35-SH-145	25	1	A	56 ± 6	19 ± 3	145 ± 4	81 ± 3	28 ± 2	123 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge?	
35-SH-145	26	1	—	54 ± 7	16 ± 4	92 ± 4	22 ± 3	52 ± 2	93 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-SH-145	36	1	—	46 ± 6	16 ± 3	121 ± 4	90 ± 3	28 ± 2	133 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	63	1	A	60 ± 7	20 ± 4	140 ± 5	88 ± 3	29 ± 2	128 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	67	1	—	65 ± 6	25 ± 3	138 ± 4	89 ± 3	27 ± 2	129 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	79	2	—	55 ± 7	21 ± 4	143 ± 5	67 ± 3	25 ± 2	113 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge?	
35-SH-145	95	1	—	55 ± 6	23 ± 3	128 ± 5	96 ± 3	26 ± 2	134 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	96	1	—	57 ± 7	18 ± 4	108 ± 4	88 ± 3	28 ± 2	122 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	98	1	—	91 ± 6	22 ± 3	158 ± 4	67 ± 3	45 ± 2	194 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte	
35-SH-145	100	1	A	47 ± 6	14 ± 3	127 ± 4	96 ± 3	27 ± 2	134 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	129	1	A	53 ± 6	21 ± 3	137 ± 4	70 ± 3	28 ± 2	119 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	130	1	A	51 ± 6	19 ± 4	136 ± 5	80 ± 3	32 ± 2	125 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	131	1	A	38 ± 5	16 ± 3	77 ± 4	105 ± 3	18 ± 2	92 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-SH-145	131	1	B	121 ± 6	19 ± 4	135 ± 4	5 ± 3	109 ± 2	206 ± 5	40 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A	
35-SH-145	131	1	C	55 ± 6	17 ± 3	90 ± 4	121 ± 3	30 ± 2	154 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown C	
35-SH-145	132	3	A	38 ± 6	14 ± 3	114 ± 4	84 ± 3	24 ± 2	123 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	
35-SH-145	132	3	B	66 ± 7	27 ± 3	141 ± 5	62 ± 3	45 ± 2	290 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-SH-145	133	11	A	50 ± 7	22 ± 4	148 ± 5	79 ± 3	29 ± 2	123 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown D	
35-SH-145	133	11	B	46 ± 6	19 ± 3	146 ± 5	67 ± 3	28 ± 2	118 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown D	
35-SH-145	133	11	C	52 ± 6	15 ± 4	133 ± 4	90 ± 3	27 ± 2	131 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-SH-145	133	11	D	66 ± 7	19 ± 4	147 ± 5	28 ± 3	52 ± 2	259 ± 5	35 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B
35-SH-145	134	15	A	50 ± 6	13 ± 4	136 ± 4	96 ± 3	26 ± 2	134 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	143	4	A	58 ± 6	26 ± 3	149 ± 5	88 ± 3	31 ± 2	132 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown D
35-SH-145	143	4	B	44 ± 6	17 ± 3	119 ± 4	91 ± 3	26 ± 2	136 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	146	4	A	66 ± 6	18 ± 3	102 ± 4	124 ± 3	30 ± 2	162 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown C
35-SH-145	146	8	—	41 ± 5	15 ± 3	115 ± 4	76 ± 3	24 ± 2	122 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	147	10	A	33 ± 6	17 ± 3	117 ± 4	86 ± 3	24 ± 2	124 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	147	10	B	47 ± 6	12 ± 4	126 ± 4	87 ± 3	24 ± 2	128 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	148	4	—	61 ± 5	20 ± 3	129 ± 4	61 ± 3	43 ± 2	276 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-SH-145	148	6	A	50 ± 6	19 ± 3	144 ± 4	98 ± 3	25 ± 2	136 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge?
35-SH-145	148	6	B	50 ± 6	17 ± 3	131 ± 4	96 ± 3	27 ± 2	135 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	149	1	A	55 ± 7	20 ± 3	140 ± 5	87 ± 3	26 ± 2	128 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	158	1	—	46 ± 6	15 ± 3	122 ± 4	85 ± 3	24 ± 2	126 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	158	2	—	49 ± 5	12 ± 3	123 ± 4	80 ± 3	24 ± 2	123 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-145	181	1	—	38 ± 5	15 ± 3	109 ± 4	103 ± 3	26 ± 2	156 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown C
35-SH-149	6	1	—	50 ± 5	17 ± 3	76 ± 4	103 ± 3	17 ± 2	95 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-SH-150	9	1	A	39 ± 6	16 ± 3	122 ± 4	87 ± 3	27 ± 2	129 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-150	9	1	B	39 ± 7	20 ± 3	131 ± 4	94 ± 3	27 ± 2	138 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-150	9	1	C	38 ± 6	17 ± 3	122 ± 4	89 ± 3	27 ± 2	130 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Whitewater Ridge
35-SH-151	2	1	—	230 ± 9	25 ± 4	51 ± 4	304 ± 5	59 ± 2	274 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Not obsidian
35-SH-151	24	1	—	187 ± 9	23 ± 4	52 ± 4	280 ± 5	55 ± 2	287 ± 6	24 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Not obsidian
35-UM-154	213	4	A	68 ± 6	18 ± 3	127 ± 4	30 ± 3	44 ± 2	279 ± 5	29 ± 3	1186 ± 26	356 ± 20	NM ± NM	1.59 ± 0.08	NM	NM	Unknown B

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-UM-154	213	4	B	263 ± 10	26 ± 5	146 ± 5	5 ± 3	106 ± 3	714 ± 8	44 ± 4	962 ± 30	489 ± 21	NM ± NM	2.73 ± 0.08	NM NM	Unknown A	
35-UM-154	343	1	—	43 ± 6	14 ± 3	120 ± 4	63 ± 3	25 ± 2	109 ± 5	10 ± 3	594 ± 27	263 ± 20	NM ± NM	0.88 ± 0.08	NM NM	Unknown C	
35-UM-154	368	3	A	199 ± 8	22 ± 4	134 ± 5	5 ± 3	100 ± 2	687 ± 7	47 ± 3	1076 ± 28	480 ± 20	NM ± NM	2.66 ± 0.08	NM NM	Unknown A	
35-WS-120	1	1	—	49 ± 5	12 ± 3	122 ± 5	57 ± 3	40 ± 2	260 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-120	2	1	—	41 ± 5	14 ± 3	76 ± 5	98 ± 3	14 ± 2	92 ± 4	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-120	8	1	—	52 ± 5	16 ± 3	113 ± 5	57 ± 3	45 ± 2	274 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-120	10	1	—	67 ± 5	22 ± 3	132 ± 5	57 ± 3	44 ± 2	175 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	11	1	—	36 ± 5	15 ± 3	73 ± 5	103 ± 3	17 ± 2	93 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-120	19	1	—	64 ± 5	14 ± 3	137 ± 5	59 ± 3	48 ± 2	286 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-120	51	1	—	79 ± 5	18 ± 3	116 ± 5	1 ± 3	54 ± 2	323 ± 4	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Silver Lake/Sycan Marsh?	
35-WS-120	53	1	—	41 ± 5	18 ± 3	86 ± 5	94 ± 3	25 ± 2	205 ± 4	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-WS-120	56	8	A	62 ± 5	15 ± 3	135 ± 5	58 ± 3	47 ± 2	285 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-120	56	8	B	69 ± 6	22 ± 3	131 ± 5	59 ± 3	49 ± 2	190 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	56	8	C	78 ± 7	16 ± 4	136 ± 5	60 ± 3	50 ± 2	188 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	56	8	D	71 ± 6	20 ± 3	138 ± 5	64 ± 3	48 ± 2	189 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	56	8	E	88 ± 8	18 ± 4	137 ± 6	61 ± 3	41 ± 2	183 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	56	8	F	87 ± 6	29 ± 3	141 ± 5	63 ± 3	41 ± 2	189 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	57	2	—	60 ± 6	20 ± 3	123 ± 5	61 ± 3	50 ± 2	295 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-120	236	2	—	65 ± 6	20 ± 3	133 ± 5	56 ± 3	42 ± 2	176 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	237	3	—	74 ± 6	19 ± 3	143 ± 5	62 ± 3	47 ± 2	187 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	276	2	—	62 ± 8	20 ± 4	146 ± 5	61 ± 3	42 ± 2	179 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-120	360	1	—	89 ± 7	19 ± 4	104 ± 5	36 ± 3	61 ± 2	129 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-120	371	2	—	71 ± 8	18 ± 4	97 ± 5	114 ± 4	17 ± 2	104 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-120	380	2	—	75 ± 7	23 ± 4	163 ± 6	81 ± 3	53 ± 2	315 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	385	1	—	64 ± 7	16 ± 4	134 ± 5	58 ± 3	46 ± 2	276 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	387	5	—	59 ± 6	19 ± 3	139 ± 5	58 ± 3	41 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	391	2	—	62 ± 6	12 ± 4	133 ± 5	63 ± 3	44 ± 2	284 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	393	2	—	66 ± 6	26 ± 3	140 ± 5	61 ± 3	43 ± 2	188 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-WS-120	414	7	A	71 ± 7	18 ± 4	160 ± 5	72 ± 3	51 ± 2	310 ± 5	24 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	414	7	B	71 ± 7	22 ± 4	146 ± 5	63 ± 3	45 ± 2	292 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	416	6	A	70 ± 7	18 ± 4	155 ± 6	70 ± 3	48 ± 2	293 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	416	6	B	53 ± 9	14 ± 5	96 ± 6	26 ± 3	55 ± 3	91 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-120	416	6	C	78 ± 8	31 ± 4	156 ± 6	63 ± 3	45 ± 3	191 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-WS-120	416	6	D	58 ± 7	11 ± 4	123 ± 5	91 ± 3	28 ± 2	127 ± 4	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-WS-120	418	3	A	51 ± 7	17 ± 4	136 ± 5	58 ± 3	44 ± 2	283 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	418	3	B	74 ± 6	22 ± 3	147 ± 5	68 ± 3	44 ± 2	295 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	418	3	C	168 ± 8	19 ± 4	114 ± 5	2 ± 3	92 ± 2	653 ± 6	47 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Horse Mountain?
35-WS-120	418	3	D	75 ± 8	21 ± 4	140 ± 6	66 ± 3	48 ± 2	299 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	418	3	E	61 ± 7	18 ± 4	120 ± 5	76 ± 3	29 ± 2	109 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge
35-WS-120	420	2	A	43 ± 6	15 ± 3	99 ± 5	67 ± 3	26 ± 2	108 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge
35-WS-120	420	2	B	94 ± 8	20 ± 4	128 ± 5	36 ± 3	58 ± 2	344 ± 6	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Chickahominy?
35-WS-120	422	4	A	62 ± 6	21 ± 3	138 ± 5	65 ± 3	45 ± 2	282 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-120	422	4	B	66 ± 6	19 ± 3	138 ± 5	63 ± 3	44 ± 2	286 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-223	8	1	—	47 ± 5	14 ± 3	79 ± 5	20 ± 3	48 ± 2	88 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-224	4	1	—	51 ± 5	18 ± 3	125 ± 5	53 ± 3	45 ± 2	270 ± 4	17 ± 3	NM ± NM	NM ± NM	914 ± 12	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-224	5	1	—	44 ± 5	16 ± 3	78 ± 5	105 ± 3	17 ± 2	96 ± 4	10 ± 3	NM ± NM	NM ± NM	920 ± 13	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-224	20	1	—	64 ± 5	15 ± 3	133 ± 5	58 ± 3	46 ± 2	289 ± 4	17 ± 3	NM ± NM	NM ± NM	967 ± 12	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-224	31	1	—	47 ± 7	17 ± 4	97 ± 5	110 ± 3	29 ± 2	151 ± 4	7 ± 4	NM ± NM	NM ± NM	1206 ± 17	NM ± NM	NM ± NM	Unknown A	
35-WS-224	38	1	—	51 ± 5	21 ± 3	134 ± 5	58 ± 3	48 ± 2	274 ± 4	16 ± 3	NM ± NM	NM ± NM	957 ± 14	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-224	39	1	—	70 ± 5	20 ± 3	138 ± 5	60 ± 3	47 ± 2	183 ± 4	12 ± 3	NM ± NM	NM ± NM	893 ± 13	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-224	42	1	—	56 ± 6	22 ± 3	145 ± 5	60 ± 3	44 ± 2	287 ± 5	16 ± 4	NM ± NM	NM ± NM	855 ± 14	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-224	46	1	—	61 ± 6	21 ± 3	149 ± 5	62 ± 3	45 ± 2	291 ± 5	16 ± 4	NM ± NM	NM ± NM	933 ± 15	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-224	47	1	—	155 ± 6	21 ± 3	117 ± 5	1 ± 3	99 ± 2	670 ± 5	52 ± 3	NM ± NM	NM ± NM	52 ± 11	NM ± NM	NM ± NM	Horse Mountain?	
35-WS-224	48	1	—	72 ± 6	20 ± 3	143 ± 5	63 ± 3	50 ± 2	299 ± 5	19 ± 4	NM ± NM	NM ± NM	938 ± 15	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-224	161	2	—	114 ± 7	21 ± 3	125 ± 5	4 ± 3	106 ± 2	209 ± 5	41 ± 4	NM ± NM	NM ± NM	203 ± 13	NM ± NM	NM ± NM	Unknown B	
35-WS-225	135	2	A	213 ± 9	21 ± 5	135 ± 5	NM ± 6	105 ± 3	681 ± 8	50 ± 4	NM ± NM	NM ± NM	4 ± 11	NM ± NM	NM ± NM	Horse Mountain?	
35-WS-225	135	2	B	57 ± 6	19 ± 3	136 ± 5	55 ± 3	46 ± 2	274 ± 5	19 ± 3	NM ± NM	NM ± NM	927 ± 13	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	138	3	A	120 ± 8	26 ± 4	162 ± 6	73 ± 3	49 ± 3	192 ± 5	13 ± 4	NM ± NM	NM ± NM	856 ± 19	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-225	138	3	B	63 ± 7	16 ± 4	149 ± 5	62 ± 3	47 ± 2	289 ± 5	19 ± 4	NM ± NM	NM ± NM	957 ± 15	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	153	2	—	65 ± 5	19 ± 3	115 ± 5	49 ± 3	45 ± 2	339 ± 4	23 ± 3	NM ± NM	NM ± NM	888 ± 12	NM ± NM	NM ± NM	Big Obsidian Flow?	
35-WS-225	154	3	—	76 ± 7	24 ± 3	142 ± 5	59 ± 3	44 ± 2	281 ± 5	18 ± 4	NM ± NM	NM ± NM	865 ± 17	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	154	4	—	76 ± 7	19 ± 4	133 ± 5	60 ± 3	54 ± 2	374 ± 5	21 ± 4	NM ± NM	NM ± NM	872 ± 15	NM ± NM	NM ± NM	Big Obsidian Flow	
35-WS-225	155	2	A	90 ± 7	21 ± 4	141 ± 5	60 ± 3	51 ± 2	380 ± 5	27 ± 4	NM ± NM	NM ± NM	841 ± 16	NM ± NM	NM ± NM	Big Obsidian Flow	
35-WS-225	155	2	B	91 ± 7	22 ± 4	125 ± 5	55 ± 3	49 ± 2	355 ± 5	24 ± 4	NM ± NM	NM ± NM	969 ± 16	NM ± NM	NM ± NM	Big Obsidian Flow?	
35-WS-225	157	2	—	34 ± 5	14 ± 3	75 ± 5	97 ± 3	14 ± 2	88 ± 4	9 ± 3	NM ± NM	NM ± NM	810 ± 12	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-225	161	2	—	42 ± 6	14 ± 3	72 ± 5	17 ± 3	41 ± 2	81 ± 4	14 ± 4	NM ± NM	NM ± NM	1089 ± 18	NM ± NM	NM ± NM	Glass Buttes	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-225	162	4	B	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-WS-225	163	2	—	90 ± 7	23 ± 4	162 ± 6	71 ± 3	49 ± 2	312 ± 5	19 ± 4	NM ± NM	NM ± NM	870 ± 17	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	193	2	—	83 ± 8	15 ± 4	141 ± 6	63 ± 3	40 ± 3	202 ± 5	12 ± 4	NM ± NM	NM ± NM	1029 ± 20	NM ± NM	NM	NM	Quartz Mountain/McKay Butte	
35-WS-225	195	1	—	76 ± 6	18 ± 3	123 ± 5	54 ± 3	51 ± 2	349 ± 5	21 ± 4	NM ± NM	NM ± NM	893 ± 14	NM ± NM	NM	NM	Big Obsidian Flow	
35-WS-225	201	4	—	91 ± 8	19 ± 4	154 ± 6	65 ± 3	42 ± 2	290 ± 5	16 ± 4	NM ± NM	NM ± NM	875 ± 19	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	219	5	—	68 ± 5	21 ± 3	119 ± 5	52 ± 3	50 ± 2	355 ± 5	25 ± 3	NM ± NM	NM ± NM	946 ± 12	NM ± NM	NM	NM	Big Obsidian Flow?	
35-WS-225	259	1	A	54 ± 7	20 ± 4	136 ± 5	58 ± 3	37 ± 2	197 ± 5	9 ± 3	1132 ± 29	337 ± 20	NM ± NM	1.76 ± 0.08	NM	NM	McKay Butte	
35-WS-225	268	2	A	75 ± 8	16 ± 5	151 ± 5	65 ± 3	45 ± 3	295 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	270	3	A	76 ± 8	18 ± 4	144 ± 5	61 ± 3	41 ± 3	206 ± 5	10 ± 3	1132 ± 31	318 ± 20	NM ± NM	1.67 ± 0.08	NM	NM	McKay Butte	
35-WS-225	279	1	A	78 ± 8	26 ± 4	153 ± 5	63 ± 3	39 ± 3	203 ± 5	7 ± 3	1395 ± 33	356 ± 20	NM ± NM	1.94 ± 0.08	NM	NM	McKay Butte	
35-WS-225	300	3	—	42 ± 6	18 ± 3	119 ± 4	8 ± 3	69 ± 2	88 ± 5	12 ± 3	418 ± 20	410 ± 20	NM ± NM	0.68 ± 0.08	NM	NM	Potato Hills?	
35-WS-225	309	1	A	74 ± 5	16 ± 3	87 ± 4	34 ± 3	50 ± 2	121 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Cougar Mountain	
35-WS-225	374	1	A	37 ± 6	14 ± 3	85 ± 4	21 ± 3	50 ± 2	85 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-225	502	1	A	39 ± 6	5 ± 6	NM ± NM	24 ± 3	2 ± 3	11 ± 7	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Not Obsidian	
35-WS-225	534	1	—	47 ± 6	15 ± 3	129 ± 4	59 ± 3	37 ± 2	198 ± 5	9 ± 3	1050 ± 25	355 ± 20	NM ± NM	1.77 ± 0.08	NM	NM	McKay Butte	
35-WS-225	542	1	A	54 ± 6	21 ± 3	121 ± 4	54 ± 3	41 ± 2	162 ± 5	6 ± 3	697 ± 25	310 ± 20	NM ± NM	1.67 ± 0.08	NM	NM	Quartz Mountain	
35-WS-225	586	5	—	56 ± 6	20 ± 3	147 ± 4	63 ± 3	46 ± 2	293 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	587	1	A	68 ± 8	25 ± 4	149 ± 5	63 ± 3	46 ± 2	190 ± 5	9 ± 3	864 ± 29	337 ± 20	NM ± NM	1.74 ± 0.08	NM	NM	Quartz Mountain	
35-WS-225	614	1	A	59 ± 6	16 ± 4	125 ± 4	62 ± 3	41 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	628	1	A	36 ± 6	14 ± 3	69 ± 4	91 ± 3	13 ± 2	85 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-WS-225	662	1	A	53 ± 7	17 ± 4	114 ± 5	75 ± 3	29 ± 2	108 ± 5	6 ± 3	622 ± 27	351 ± 20	NM ± NM	0.96 ± 0.08	NM	NM	Little Bear Creek/Whitewater Ridge	
35-WS-225	664	1	—	36 ± 6	16 ± 3	95 ± 4	67 ± 3	25 ± 2	95 ± 5	5 ± 3	807 ± 31	348 ± 20	NM ± NM	0.94 ± 0.08	NM	NM	Little Bear Cr./Whitewater R./Juniper Sp. 1	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-WS-225	668	1	A	36 ± 7	13 ± 4	110 ± 4	76 ± 3	27 ± 2	108 ± 5	1 ± 3	782 ± 27	326 ± 20	NM ± NM	0.97 ± 0.08	NM	Little Bear Creek/Whitewater Ridge			
35-WS-225	696	1	A	77 ± 8	15 ± 4	125 ± 5	56 ± 3	40 ± 2	358 ± 6	16 ± 3	1459 ± 33	507 ± 20	NM ± NM	2.32 ± 0.08	NM	Big Obsidian Flow			
35-WS-225	696	1	B	77 ± 7	26 ± 4	121 ± 5	54 ± 3	48 ± 2	348 ± 5	20 ± 3	1507 ± 30	524 ± 20	NM ± NM	2.35 ± 0.08	NM	Big Obsidian Flow			
35-WS-225	697	1	A	84 ± 8	24 ± 4	133 ± 5	58 ± 3	50 ± 2	361 ± 6	20 ± 3	1291 ± 36	477 ± 21	NM ± NM	2.20 ± 0.08	NM	Big Obsidian Flow			
35-WS-225	698	2	A	50 ± 8	15 ± 4	107 ± 5	24 ± 3	60 ± 2	97 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes			
35-WS-225	721	1	—	49 ± 6	16 ± 3	128 ± 4	58 ± 3	42 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	747	3	A	59 ± 7	14 ± 4	139 ± 5	63 ± 3	40 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	752	3	A	51 ± 7	19 ± 4	129 ± 4	60 ± 3	44 ± 2	266 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	753	3	—	76 ± 7	16 ± 4	138 ± 5	62 ± 3	46 ± 2	284 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	754	4	A	121 ± 6	24 ± 3	103 ± 4	2 ± 3	76 ± 2	504 ± 5	41 ± 3	905 ± 23	479 ± 20	NM ± NM	2.74 ± 0.08	NM	Unknown A			
35-WS-225	769	2	A	44 ± 7	19 ± 4	133 ± 4	66 ± 3	44 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	770	2	A	50 ± 6	14 ± 3	123 ± 4	56 ± 3	41 ± 2	172 ± 5	8 ± 3	672 ± 24	341 ± 20	NM ± NM	1.71 ± 0.08	NM	Quartz Mountain			
35-WS-225	772	4	—	42 ± 6	18 ± 3	128 ± 4	54 ± 3	37 ± 2	190 ± 5	9 ± 3	1134 ± 28	372 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte			
35-WS-225	776	3	A	45 ± 6	19 ± 3	130 ± 4	56 ± 3	42 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	776	3	B	49 ± 6	15 ± 3	121 ± 4	54 ± 3	40 ± 2	252 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	782	4	A	46 ± 7	21 ± 4	138 ± 5	57 ± 3	37 ± 2	188 ± 5	8 ± 3	1100 ± 28	313 ± 20	NM ± NM	1.61 ± 0.08	NM	McKay Butte			
35-WS-225	782	4	B	61 ± 7	22 ± 4	157 ± 5	65 ± 3	46 ± 2	293 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	782	4	C	46 ± 6	18 ± 3	116 ± 4	56 ± 3	39 ± 2	260 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	783	4	—	61 ± 6	18 ± 3	133 ± 4	57 ± 3	38 ± 2	197 ± 5	10 ± 3	941 ± 27	323 ± 20	NM ± NM	1.58 ± 0.08	NM	McKay Butte			
35-WS-225	785	3	—	63 ± 6	15 ± 3	144 ± 4	65 ± 3	45 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano			
35-WS-225	791	5	A	39 ± 7	14 ± 4	102 ± 4	72 ± 3	26 ± 2	103 ± 5	5 ± 3	860 ± 28	373 ± 20	NM ± NM	1.05 ± 0.08	NM	Little Bear Creek/Whitewater Ridge			
35-WS-225	797	4	A	44 ± 6	14 ± 4	77 ± 4	107 ± 3	16 ± 2	91 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs			

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-225	797	4	B	58 ± 6	16 ± 4	136 ± 4	62 ± 3	41 ± 2	202 ± 5	6 ± 3	1097 ± 26	336 ± 20	NM ± NM	1.73 ± 0.08	NM	McKay Butte	
35-WS-225	797	4	C	40 ± 6	15 ± 3	116 ± 4	52 ± 3	36 ± 2	182 ± 5	7 ± 3	1127 ± 25	358 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-WS-225	797	5	—	50 ± 8	13 ± 5	141 ± 5	59 ± 3	47 ± 3	296 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	800	6	—	53 ± 6	15 ± 3	136 ± 4	60 ± 3	43 ± 2	279 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	801	5	—	75 ± 6	23 ± 3	133 ± 4	61 ± 3	43 ± 2	179 ± 5	7 ± 3	609 ± 24	319 ± 20	NM ± NM	1.53 ± 0.08	NM	Quartz Mountain	
35-WS-225	801	6	—	55 ± 6	18 ± 4	146 ± 4	58 ± 3	41 ± 2	288 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	805	2	A	50 ± 6	16 ± 3	140 ± 4	59 ± 3	38 ± 2	200 ± 5	8 ± 3	1022 ± 25	338 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte	
35-WS-225	806	3	A	53 ± 6	20 ± 3	133 ± 4	57 ± 3	38 ± 2	198 ± 5	11 ± 3	1154 ± 27	359 ± 20	NM ± NM	1.85 ± 0.08	NM	McKay Butte	
35-WS-225	807	4	A	59 ± 7	20 ± 4	132 ± 5	59 ± 3	42 ± 2	193 ± 5	10 ± 3	1181 ± 30	339 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-WS-225	809	2	A	40 ± 7	NM ± NM	NM ± NM	19 ± 3	3 ± 2	NM ± NM	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Not Obsidian	
35-WS-225	842	4	A	42 ± 7	18 ± 4	120 ± 5	91 ± 3	26 ± 2	131 ± 5	8 ± 3	871 ± 28	273 ± 20	NM ± NM	1.12 ± 0.08	NM	Whitewater Ridge	
35-WS-225	842	4	B	87 ± 7	15 ± 4	134 ± 5	58 ± 3	36 ± 2	202 ± 5	12 ± 3	1122 ± 30	332 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte	
35-WS-225	846	3	A	37 ± 6	17 ± 3	121 ± 4	55 ± 3	37 ± 2	180 ± 5	10 ± 3	1296 ± 28	381 ± 20	NM ± NM	1.89 ± 0.08	NM	McKay Butte	
35-WS-225	846	3	B	54 ± 6	20 ± 3	136 ± 4	58 ± 3	42 ± 2	276 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	848	4	A	67 ± 7	17 ± 4	137 ± 5	61 ± 3	45 ± 2	269 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	850	3	A	41 ± 7	18 ± 4	135 ± 4	55 ± 3	42 ± 2	281 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	861	2	A	39 ± 6	21 ± 3	87 ± 4	86 ± 3	26 ± 2	119 ± 5	8 ± 3	1028 ± 25	391 ± 20	NM ± NM	1.36 ± 0.08	NM	Juniper Spring 2/Whitewater Ridge	
35-WS-225	925	3	A	27 ± 7	5 ± 7	NM ± NM	9 ± 3	3 ± 3	12 ± 6	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Not Obsidian	
35-WS-225	945	3	A	56 ± 6	21 ± 4	136 ± 4	61 ± 3	44 ± 2	278 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-225	947	2	A	35 ± 8	NM ± 4	NM ± 4	28 ± 3	3 ± 3	12 ± 8	1 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Not Obsidian	
35-WS-225	953	2	A	119 ± 6	27 ± 4	116 ± 4	41 ± 3	64 ± 2	138 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Cougar Mountain	
35-WS-225	953	2	B	63 ± 6	15 ± 4	147 ± 4	62 ± 3	40 ± 2	211 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-WS-225	953	2	C	57 ± 6	25 ± 4	164 ± 4	71 ± 3	46 ± 2	222 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte		
35-WS-225	953	2	D	82 ± 6	21 ± 4	161 ± 4	66 ± 3	44 ± 2	211 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	McKay Butte		
35-WS-225	953	2	E	112 ± 6	25 ± 4	115 ± 4	39 ± 3	63 ± 2	141 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain		
35-WS-225	953	2	F	82 ± 6	20 ± 4	106 ± 4	38 ± 3	61 ± 2	138 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain		
35-WS-225	953	2	G	92 ± 6	19 ± 4	104 ± 4	37 ± 3	56 ± 2	134 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain		
35-WS-225	953	2	H	74 ± 6	17 ± 4	97 ± 4	36 ± 3	53 ± 2	127 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain		
35-WS-225	957	3	A	35 ± 6	16 ± 4	109 ± 4	77 ± 3	23 ± 2	121 ± 5	8 ± 3	855 ± 25	276 ± 20	NM ± NM	1.12 ± 0.08	NM	Whitewater Ridge			
35-WS-225	958	1	A	35 ± 6	15 ± 3	119 ± 4	85 ± 3	22 ± 2	123 ± 5	6 ± 3	939 ± 27	284 ± 20	NM ± NM	1.14 ± 0.08	NM	Whitewater Ridge			
35-WS-225	987	2	A	31 ± 7	12 ± 4	103 ± 4	80 ± 3	24 ± 2	116 ± 5	9 ± 3	791 ± 26	271 ± 20	NM ± NM	1.02 ± 0.08	NM	Little Bear Creek/Whitewater Ridge			
35-WS-225	999	1	—	50 ± 6	20 ± 3	121 ± 4	61 ± 3	41 ± 2	259 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano/Unknown X			
35-WS-225	1015	1	A	31 ± 6	11 ± 3	84 ± 4	58 ± 3	22 ± 2	93 ± 5	4 ± 3	708 ± 25	363 ± 20	NM ± NM	0.99 ± 0.08	NM	Little Bear Creek			
35-WS-225	1032	1	A	57 ± 6	14 ± 4	104 ± 4	25 ± 3	36 ± 2	230 ± 5	27 ± 3	1322 ± 28	378 ± 20	NM ± NM	1.72 ± 0.08	NM	Unknown B			
35-WS-225	1034	1	A	76 ± 6	17 ± 4	156 ± 5	67 ± 3	48 ± 2	305 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-WS-225	1079	1	A	93 ± 6	26 ± 3	124 ± 4	4 ± 3	55 ± 2	347 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh			
35-WS-225	1103	1	—	43 ± 6	15 ± 3	131 ± 4	57 ± 3	39 ± 2	262 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-WS-225	1111	1	A	42 ± 6	15 ± 3	82 ± 4	94 ± 3	24 ± 2	126 ± 5	5 ± 3	1127 ± 26	380 ± 20	NM ± NM	1.50 ± 0.08	NM	Juniper Spring 2/Whitewater Ridge			
35-WS-225	1116	1	—	41 ± 6	15 ± 4	110 ± 4	61 ± 3	35 ± 2	216 ± 5	11 ± 3	1298 ± 31	394 ± 20	NM ± NM	1.98 ± 0.08	NM	McKay Butte			
35-WS-225	1123	2	A	49 ± 7	13 ± 4	92 ± 4	28 ± 3	55 ± 2	90 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes			
35-WS-225	1126	3	—	37 ± 7	12 ± 4	89 ± 4	88 ± 3	28 ± 2	125 ± 5	8 ± 3	1119 ± 30	375 ± 20	NM ± NM	1.39 ± 0.08	NM	Juniper Spring 2/Whitewater Ridge			
35-WS-225	1149	3	A	75 ± 7	21 ± 4	146 ± 5	68 ± 3	46 ± 2	194 ± 5	9 ± 3	1127 ± NA	380 ± NA	NM ± NM	1.50 ± NA	NM	Quartz Mountain			
35-WS-225	1192	3	A	67 ± 6	16 ± 4	123 ± 4	53 ± 3	47 ± 2	353 ± 5	22 ± 3	1468 ± 30	463 ± 20	NM ± NM	2.28 ± 0.08	NM	Big Obsidian Flow			
35-WS-225	1192	3	B	61 ± 7	22 ± 4	146 ± 5	67 ± 3	44 ± 2	223 ± 5	10 ± 3	1192 ± 28	336 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte			

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-225	1192	3	C	56 ± 6	17 ± 3	139 ± 4	63 ± 3	48 ± 2	290 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1192	4	—	63 ± 6	19 ± 3	110 ± 4	25 ± 3	57 ± 2	300 ± 5	19 ± 3	1151 ± 30	447 ± 20	NM ± NM	1.64 ± 0.08	NM	Silver Lake/Sycan Marsh?	
35-WS-225	1194	3	A	72 ± 6	24 ± 3	133 ± 4	59 ± 3	52 ± 2	373 ± 5	19 ± 3	1671 ± 30	542 ± 20	NM ± NM	2.49 ± 0.08	NM	Big Obsidian Flow	
35-WS-225	1205	5	—	56 ± 6	14 ± 4	120 ± 4	56 ± 3	39 ± 2	258 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1208	4	—	42 ± 6	16 ± 3	81 ± 4	108 ± 3	17 ± 2	97 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-WS-225	1210	4	A	56 ± 7	15 ± 4	101 ± 4	30 ± 3	59 ± 2	99 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-WS-225	1211	1	A	57 ± 6	16 ± 4	145 ± 4	66 ± 3	44 ± 2	296 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1223	4	A	66 ± 7	21 ± 4	139 ± 5	62 ± 3	46 ± 2	213 ± 5	7 ± 3	1198 ± 32	316 ± 20	NM ± NM	1.68 ± 0.08	NM	McKay Butte	
35-WS-225	1225	1	A	65 ± 7	20 ± 4	147 ± 5	62 ± 3	38 ± 2	206 ± 5	12 ± 3	1426 ± 31	349 ± 20	NM ± NM	2.01 ± 0.08	NM	McKay Butte	
35-WS-225	1228	1	A	98 ± 8	30 ± 4	152 ± 5	59 ± 3	53 ± 2	394 ± 6	25 ± 3	1595 ± 31	516 ± 20	NM ± NM	2.44 ± 0.08	NM	Big Obsidian Flow?	
35-WS-225	1230	1	A	39 ± 6	19 ± 3	86 ± 4	21 ± 3	51 ± 2	87 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-WS-225	1235	1	A	115 ± 7	26 ± 4	141 ± 5	12 ± 3	61 ± 2	370 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh	
35-WS-225	1245	2	A	20 ± 8	5 ± 7	2 ± 4	6 ± 3	NM ± NM	16 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian	
35-WS-225	1261	2	A	40 ± 6	15 ± 3	89 ± 4	103 ± 3	30 ± 2	144 ± 5	5 ± 3	1264 ± 27	396 ± 20	NM ± NM	1.64 ± 0.08	NM	Whitewater Ridge?	
35-WS-225	1284	5	A	70 ± 6	18 ± 3	141 ± 4	65 ± 3	43 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1287	2	A	68 ± 6	20 ± 3	133 ± 4	60 ± 3	42 ± 2	208 ± 5	11 ± 3	1132 ± 32	332 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte	
35-WS-225	1287	10	—	53 ± 6	17 ± 3	138 ± 4	59 ± 3	45 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1287	11	—	61 ± 7	21 ± 4	146 ± 5	61 ± 3	44 ± 2	288 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1291	1	—	41 ± 6	19 ± 3	132 ± 4	56 ± 3	39 ± 2	196 ± 5	10 ± 3	1072 ± 27	370 ± 20	NM ± NM	1.86 ± 0.08	NM	McKay Butte	
35-WS-225	1294	4	A	23 ± 6	5 ± 7	NM ± 4	14 ± 3	3 ± 2	12 ± 6	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian	
35-WS-225	1300	1	—	50 ± 6	16 ± 3	121 ± 4	65 ± 3	29 ± 2	108 ± 5	8 ± 3	779 ± 29	267 ± 20	NM ± NM	0.97 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-WS-225	1308	3	A	62 ± 6	20 ± 4	143 ± 5	62 ± 3	42 ± 2	211 ± 5	7 ± 3	1140 ± 30	344 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-225	1310	2	A	55 ± 7	21 ± 4	152 ± 5	61 ± 3	38 ± 2	214 ± 5	10 ± 3	1108 ± 29	342 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte		
35-WS-225	1310	2	B	59 ± 7	15 ± 4	145 ± 5	62 ± 3	44 ± 2	215 ± 5	13 ± 3	1136 ± 33	330 ± 20	NM ± NM	1.68 ± 0.08	NM	McKay Butte		
35-WS-225	1310	2	C	69 ± 7	18 ± 4	148 ± 5	69 ± 3	48 ± 2	298 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-225	1310	2	D	62 ± 7	24 ± 4	144 ± 5	63 ± 3	44 ± 2	213 ± 5	9 ± 3	1023 ± 31	296 ± 20	NM ± NM	1.59 ± 0.08	NM	McKay Butte		
35-WS-225	1310	2	E	66 ± 7	22 ± 4	142 ± 5	62 ± 3	41 ± 2	215 ± 5	7 ± 3	1176 ± 32	342 ± 20	NM ± NM	1.78 ± 0.08	NM	McKay Butte		
35-WS-225	1310	2	F	49 ± 5	18 ± 3	128 ± 4	57 ± 3	36 ± 2	195 ± 5	9 ± 3	1070 ± 25	343 ± 20	NM ± NM	1.79 ± 0.08	NM	McKay Butte		
35-WS-225	1312	4	A	57 ± 6	15 ± 4	134 ± 5	60 ± 3	43 ± 2	202 ± 5	11 ± 3	1054 ± 28	327 ± 20	NM ± NM	1.71 ± 0.08	NM	McKay Butte		
35-WS-225	1312	4	B	60 ± 7	20 ± 4	143 ± 5	63 ± 3	47 ± 2	291 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-225	1312	4	C	51 ± 6	18 ± 3	140 ± 4	58 ± 3	39 ± 2	206 ± 5	9 ± 3	1026 ± 25	333 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte		
35-WS-225	1314	1	A	74 ± 6	19 ± 4	127 ± 4	54 ± 3	46 ± 2	361 ± 5	22 ± 3	1492 ± 30	539 ± 20	NM ± NM	2.42 ± 0.08	NM	Big Obsidian Flow		
35-WS-225	1314	1	B	68 ± 7	23 ± 4	142 ± 5	64 ± 3	41 ± 2	205 ± 5	11 ± 3	1181 ± 32	344 ± 20	NM ± NM	1.74 ± 0.08	NM	McKay Butte		
35-WS-225	1314	1	C	47 ± 6	22 ± 3	125 ± 4	58 ± 3	41 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-225	1321	3	A	45 ± 6	15 ± 4	70 ± 4	87 ± 3	16 ± 2	84 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs		
35-WS-225	1328	2	A	50 ± 6	22 ± 3	135 ± 4	58 ± 3	42 ± 2	201 ± 5	11 ± 3	1499 ± 74	234 ± 25	NM ± NM	1.07 ± 0.08	NM	McKay Butte		
35-WS-225	1367	3	A	52 ± 6	16 ± 4	111 ± 4	78 ± 3	30 ± 2	109 ± 5	10 ± 3	731 ± 25	335 ± 20	NM ± NM	0.96 ± 0.08	NM	Little Bear Creek/Whitewater Ridge		
35-WS-225	1369	3	A	67 ± 6	24 ± 3	152 ± 5	67 ± 3	44 ± 2	219 ± 5	10 ± 3	1083 ± 27	358 ± 20	NM ± NM	1.80 ± 0.08	NM	McKay Butte		
35-WS-225	1369	3	B	59 ± 6	19 ± 3	140 ± 4	56 ± 3	42 ± 2	276 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-225	1369	3	C	47 ± 6	22 ± 3	134 ± 4	58 ± 3	45 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-225	1400	2	A	49 ± 6	18 ± 3	122 ± 4	54 ± 3	39 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-225	1401	3	A	45 ± 6	14 ± 3	125 ± 4	52 ± 3	35 ± 2	184 ± 5	9 ± 3	1237 ± 29	355 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte		
35-WS-225	1405	3	A	55 ± 6	23 ± 3	138 ± 4	62 ± 3	47 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-225	1405	3	B	51 ± 6	20 ± 3	140 ± 4	61 ± 3	46 ± 2	292 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-225	1405	3	C	48 ± 6	23 ± 3	129 ± 4	58 ± 3	41 ± 2	263 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1405	5	—	85 ± 7	14 ± 4	137 ± 5	62 ± 3	44 ± 2	211 ± 5	10 ± 3	976 ± 33	322 ± 20	NM ± NM	1.62 ± 0.08	NM ± NM	McKay Butte	
35-WS-225	1406	4	A	54 ± 7	16 ± 4	144 ± 4	63 ± 3	43 ± 2	208 ± 5	8 ± 3	987 ± 27	324 ± 20	NM ± NM	1.67 ± 0.08	NM ± NM	McKay Butte	
35-WS-225	1406	4	B	54 ± 6	18 ± 3	138 ± 4	62 ± 3	46 ± 2	284 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1406	6	—	41 ± 6	13 ± 3	121 ± 4	54 ± 3	38 ± 2	187 ± 5	7 ± 3	1055 ± 26	360 ± 20	NM ± NM	1.78 ± 0.08	NM ± NM	McKay Butte	
35-WS-225	1408	3	A	78 ± 6	20 ± 3	155 ± 5	69 ± 3	45 ± 2	210 ± 5	11 ± 3	1161 ± 26	371 ± 20	NM ± NM	1.85 ± 0.08	NM ± NM	McKay Butte	
35-WS-225	1408	3	B	80 ± 6	16 ± 3	137 ± 4	61 ± 3	44 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1408	3	C	65 ± 6	19 ± 4	136 ± 4	57 ± 3	47 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1417	3	—	87 ± 7	30 ± 3	144 ± 5	60 ± 3	46 ± 2	183 ± 5	6 ± 3	642 ± 28	325 ± 20	NM ± NM	1.57 ± 0.08	NM ± NM	Quartz Mountain	
35-WS-225	1419	3	A	40 ± 6	16 ± 3	125 ± 4	54 ± 3	38 ± 2	191 ± 5	8 ± 3	1113 ± 25	365 ± 20	NM ± NM	1.82 ± 0.08	NM ± NM	McKay Butte	
35-WS-225	1421	2	A	55 ± 6	16 ± 3	135 ± 4	58 ± 3	39 ± 2	200 ± 5	9 ± 3	1220 ± 27	382 ± 20	NM ± NM	1.91 ± 0.08	NM ± NM	McKay Butte	
35-WS-225	1422	3	A	46 ± 6	21 ± 3	132 ± 4	62 ± 3	40 ± 2	200 ± 5	6 ± 3	1119 ± 27	369 ± 20	NM ± NM	1.86 ± 0.08	NM ± NM	McKay Butte	
35-WS-225	1426	3	A	33 ± 6	15 ± 3	130 ± 4	40 ± 3	26 ± 2	95 ± 5	10 ± 3	524 ± 23	278 ± 20	NM ± NM	0.89 ± 0.08	NM ± NM	Wolf Creek	
35-WS-225	1440	3	A	43 ± 6	18 ± 3	127 ± 4	54 ± 3	41 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1444	3	A	52 ± 6	19 ± 3	135 ± 4	63 ± 3	43 ± 2	263 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1444	3	B	52 ± 6	16 ± 3	138 ± 4	59 ± 3	43 ± 2	277 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1444	3	C	56 ± 5	19 ± 3	137 ± 4	60 ± 3	42 ± 2	204 ± 5	12 ± 3	1086 ± 26	358 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	McKay Butte	
35-WS-225	1445	4	A	56 ± 7	14 ± 4	121 ± 5	75 ± 3	27 ± 2	110 ± 5	10 ± 3	733 ± 32	365 ± 20	NM ± NM	1.03 ± 0.08	NM ± NM	Little Bear Creek/Whitewater Ridge	
35-WS-225	1447	2	A	66 ± 6	16 ± 4	145 ± 5	59 ± 3	46 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1447	2	B	87 ± 7	18 ± 4	154 ± 5	67 ± 3	41 ± 2	304 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1447	2	C	46 ± 6	16 ± 3	129 ± 4	55 ± 3	41 ± 2	268 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	1448	3	A	63 ± 6	17 ± 4	145 ± 4	66 ± 3	47 ± 2	295 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type
35-WS-225	1448	3	B	66 ± 7	21 ± 4	146 ± 5	61 ± 3	44 ± 2	279 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1448	3	C	55 ± 5	14 ± 3	127 ± 4	55 ± 3	41 ± 2	263 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1448	3	D	64 ± 6	23 ± 3	143 ± 4	64 ± 3	42 ± 2	209 ± 5	11 ± 3	1101 ± 26	346 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte
35-WS-225	1448	3	E	69 ± 6	22 ± 3	141 ± 5	62 ± 3	39 ± 2	211 ± 5	12 ± 3	1094 ± 29	327 ± 20	NM ± NM	1.69 ± 0.08	NM	McKay Butte
35-WS-225	1449	2	A	67 ± 6	23 ± 3	148 ± 5	64 ± 3	43 ± 2	214 ± 5	12 ± 3	1057 ± 28	325 ± 20	NM ± NM	1.67 ± 0.08	NM	McKay Butte
35-WS-225	1450	3	A	71 ± 7	16 ± 4	151 ± 5	69 ± 3	42 ± 2	219 ± 5	12 ± 3	1080 ± 30	352 ± 20	NM ± NM	1.73 ± 0.08	NM	McKay Butte
35-WS-225	1450	3	B	70 ± 6	19 ± 4	143 ± 5	66 ± 3	44 ± 2	292 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1450	3	C	69 ± 6	18 ± 3	133 ± 4	59 ± 3	43 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1450	3	D	67 ± 7	22 ± 4	146 ± 5	65 ± 3	44 ± 2	211 ± 5	10 ± 3	1052 ± 29	326 ± 20	NM ± NM	1.71 ± 0.08	NM	McKay Butte
35-WS-225	1457	3	—	50 ± 6	15 ± 3	123 ± 4	53 ± 3	37 ± 2	189 ± 5	10 ± 3	1108 ± 26	375 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte
35-WS-225	1460	2	A	71 ± 7	25 ± 3	145 ± 5	66 ± 3	46 ± 2	301 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1461	3	A	59 ± 6	21 ± 3	149 ± 5	70 ± 3	46 ± 2	306 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1463	3	A	73 ± 6	24 ± 3	139 ± 4	63 ± 3	48 ± 2	189 ± 5	7 ± 3	655 ± 25	318 ± 20	NM ± NM	1.62 ± 0.08	NM	Quartz Mountain?
35-WS-225	1475	3	A	43 ± 6	16 ± 3	122 ± 4	53 ± 3	36 ± 2	187 ± 5	8 ± 3	1107 ± 27	349 ± 20	NM ± NM	1.81 ± 0.08	NM	McKay Butte
35-WS-225	1475	4	—	43 ± 6	14 ± 3	126 ± 4	54 ± 3	37 ± 2	189 ± 5	6 ± 3	1025 ± 25	367 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte
35-WS-225	1478	3	A	50 ± 6	14 ± 3	95 ± 4	109 ± 3	26 ± 2	143 ± 5	6 ± 3	1222 ± 26	396 ± 20	NM ± NM	1.53 ± 0.08	NM	Unknown C
35-WS-225	1488	3	A	48 ± 5	16 ± 3	127 ± 4	57 ± 3	41 ± 2	262 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1503	2	A	31 ± 6	8 ± 3	NM ± NM	20 ± 3	NM ± NM	10 ± 17	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-WS-225	1509	2	A	99 ± 7	24 ± 4	116 ± 4	44 ± 3	60 ± 2	142 ± 5	8 ± 3	351 ± 25	355 ± 20	NM ± NM	1.25 ± 0.08	NM	Cougar Mountain
35-WS-225	1517	3	A	43 ± 6	16 ± 3	127 ± 4	59 ± 3	42 ± 2	275 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1550	3	A	46 ± 5	10 ± 4	131 ± 4	57 ± 3	37 ± 2	199 ± 5	9 ± 3	1125 ± 26	352 ± 20	NM ± NM	1.83 ± 0.08	NM	McKay Butte
35-WS-225	1550	3	B	64 ± 7	28 ± 4	153 ± 5	66 ± 3	42 ± 2	217 ± 5	10 ± 3	1084 ± 29	341 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact	Source/Chemical Type
35-WS-225	1550	3	C	65 ± 7	23 ± 4	152 ± 5	64 ± 3	42 ± 2	222 ± 5	11 ± 3	986 ± 32	315 ± 20	NM ± NM	1.61 ± 0.08	NM	McKay Butte	
35-WS-225	1553	4	A	66 ± 7	22 ± 4	138 ± 5	59 ± 3	42 ± 2	210 ± 5	6 ± 3	1058 ± 30	322 ± 20	NM ± NM	1.66 ± 0.08	NM	McKay Butte	
35-WS-225	1553	4	B	42 ± 5	18 ± 3	124 ± 4	57 ± 3	37 ± 2	191 ± 5	8 ± 3	1088 ± 26	366 ± 20	NM ± NM	1.84 ± 0.08	NM	McKay Butte	
35-WS-225	1554	3	A	58 ± 6	22 ± 3	139 ± 4	60 ± 3	37 ± 2	205 ± 5	7 ± 3	989 ± 28	323 ± 20	NM ± NM	1.68 ± 0.08	NM	McKay Butte	
35-WS-225	1554	3	B	64 ± 7	15 ± 4	156 ± 5	71 ± 3	42 ± 2	219 ± 5	9 ± 3	1098 ± 29	345 ± 20	NM ± NM	1.73 ± 0.08	NM	McKay Butte	
35-WS-225	1563	3	A	89 ± 6	20 ± 3	145 ± 4	64 ± 3	44 ± 2	287 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1597	2	A	48 ± 6	19 ± 3	91 ± 4	119 ± 3	16 ± 2	105 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-WS-225	1602	2	A	88 ± 7	25 ± 3	147 ± 5	67 ± 3	41 ± 2	291 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1605	2	A	112 ± 7	21 ± 4	129 ± 5	5 ± 3	79 ± 2	464 ± 6	54 ± 3	788 ± 24	342 ± 20	NM ± NM	1.98 ± 0.08	NM	Unknown D	
35-WS-225	1605	2	B	57 ± 6	19 ± 3	134 ± 4	62 ± 3	45 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1614	4	A	49 ± 6	17 ± 3	81 ± 4	120 ± 3	17 ± 2	110 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-WS-225	1616	4	A	70 ± 6	18 ± 4	173 ± 5	70 ± 3	50 ± 2	310 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1616	4	B	140 ± 6	18 ± 3	111 ± 4	2 ± 3	90 ± 2	621 ± 6	47 ± 3	945 ± 24	487 ± 20	NM ± NM	2.82 ± 0.08	NM	Horse Mountain	
35-WS-225	1631	6	A	79 ± 6	21 ± 4	154 ± 5	70 ± 3	44 ± 2	304 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1631	6	B	46 ± 6	17 ± 3	127 ± 4	55 ± 3	35 ± 2	189 ± 5	9 ± 3	1062 ± 27	353 ± 20	NM ± NM	1.82 ± 0.08	NM	McKay Butte	
35-WS-225	1631	6	C	72 ± 7	21 ± 4	153 ± 5	66 ± 3	44 ± 2	301 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1633	2	A	46 ± 5	14 ± 3	131 ± 4	57 ± 3	38 ± 2	266 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1635	2	A	43 ± 6	16 ± 4	107 ± 4	74 ± 3	28 ± 2	106 ± 5	6 ± 3	721 ± 28	333 ± 20	NM ± NM	0.93 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-WS-225	1667	1	—	38 ± 6	13 ± 3	76 ± 4	19 ± 3	45 ± 2	86 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-WS-225	1671	5	A	59 ± 6	17 ± 4	146 ± 5	65 ± 3	44 ± 2	297 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1673	5	A	64 ± 7	19 ± 4	139 ± 5	62 ± 3	41 ± 2	210 ± 5	11 ± 3	981 ± 29	357 ± 20	NM ± NM	1.72 ± 0.08	NM	McKay Butte	
35-WS-225	1685	3	A	48 ± 8	21 ± 4	120 ± 5	81 ± 4	32 ± 2	111 ± 5	9 ± 3	785 ± 32	329 ± 20	NM ± NM	0.98 ± 0.08	NM	Whitewater Ridge	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-225	1695	1	—	49 ± 6	20 ± 3	129 ± 4	57 ± 3	41 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1695	2	A	51 ± 6	17 ± 3	135 ± 4	58 ± 3	42 ± 2	272 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-225	1696	4	A	68 ± 7	20 ± 4	165 ± 5	70 ± 3	48 ± 2	228 ± 5	11 ± 3	1053 ± 34	314 ± 20	NM ± NM	1.67 ± 0.08	NM	McKay Butte	
35-WS-225	1696	4	B	87 ± 7	20 ± 4	154 ± 5	65 ± 3	42 ± 2	213 ± 5	9 ± 3	1137 ± 32	336 ± 20	NM ± NM	1.69 ± 0.08	NM	McKay Butte	
35-WS-225	1696	4	C	64 ± 7	20 ± 4	147 ± 5	63 ± 3	44 ± 2	204 ± 5	10 ± 3	1038 ± 31	338 ± 20	NM ± NM	1.75 ± 0.08	NM	McKay Butte	
35-WS-225	1696	4	D	62 ± 6	18 ± 4	150 ± 5	64 ± 3	37 ± 2	208 ± 5	7 ± 3	1016 ± 29	317 ± 20	NM ± NM	1.65 ± 0.08	NM	McKay Butte	
35-WS-225	1697	5	A	53 ± 7	10 ± 5	140 ± 5	64 ± 3	40 ± 2	199 ± 5	6 ± 3	983 ± 33	309 ± 20	NM ± NM	1.59 ± 0.08	NM	McKay Butte	
35-WS-225	1698	1	A	66 ± 6	25 ± 3	149 ± 5	67 ± 3	41 ± 2	212 ± 5	10 ± 3	1118 ± 29	344 ± 20	NM ± NM	1.76 ± 0.08	NM	McKay Butte	
35-WS-225	1698	1	B	50 ± 6	14 ± 3	131 ± 4	60 ± 3	45 ± 2	265 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1699	1	A	40 ± 6	21 ± 3	129 ± 4	57 ± 3	42 ± 2	268 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1702	2	A	91 ± 7	20 ± 4	157 ± 5	68 ± 3	40 ± 2	214 ± 5	10 ± 3	1167 ± 31	341 ± 20	NM ± NM	1.70 ± 0.08	NM	McKay Butte	
35-WS-225	1707	5	A	66 ± 7	20 ± 4	153 ± 5	66 ± 3	46 ± 2	306 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1708	3	A	96 ± 7	23 ± 4	150 ± 5	68 ± 3	40 ± 2	205 ± 5	7 ± 3	1077 ± 29	334 ± 20	NM ± NM	1.67 ± 0.08	NM	McKay Butte	
35-WS-225	1708	3	B	55 ± 6	19 ± 3	130 ± 4	57 ± 3	44 ± 2	274 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1708	6	—	61 ± 6	19 ± 3	124 ± 4	55 ± 3	42 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1710	1	A	65 ± 7	15 ± 4	138 ± 5	67 ± 3	43 ± 2	291 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1710	1	B	48 ± 6	17 ± 3	132 ± 4	59 ± 3	42 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1710	1	C	40 ± 6	18 ± 3	138 ± 4	57 ± 3	43 ± 2	268 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1714	3	A	54 ± 7	23 ± 4	149 ± 5	61 ± 3	46 ± 2	292 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1714	3	B	64 ± 7	16 ± 4	146 ± 5	62 ± 3	50 ± 2	304 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1714	3	C	53 ± 6	17 ± 3	134 ± 4	56 ± 3	41 ± 2	281 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-225	1714	3	D	54 ± 6	18 ± 3	138 ± 4	59 ± 3	42 ± 2	279 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-225	1716	1	A	72 ± 7	19 ± 4	144 ± 5	60 ± 3	55 ± 2	211 ± 5	10 ± 3	1052 ± 29	321 ± 20	NM ± NM	NM ± NM	1.57 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1716	1	B	60 ± 6	17 ± 3	107 ± 4	3 ± 3	51 ± 2	307 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Silver Lake/Sycan Marsh
35-WS-225	1723	2	A	47 ± 6	12 ± 3	127 ± 4	56 ± 3	41 ± 2	266 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1728	3	A	66 ± 7	19 ± 4	143 ± 5	66 ± 3	44 ± 2	293 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1735	1	—	26 ± 6	14 ± 3	66 ± 4	87 ± 3	15 ± 2	85 ± 5	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-225	1746	4	A	47 ± 6	21 ± 3	86 ± 4	112 ± 3	20 ± 2	101 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-225	1748	3	A	57 ± 6	17 ± 3	132 ± 4	57 ± 3	42 ± 2	199 ± 5	9 ± 3	1080 ± 27	318 ± 20	NM ± NM	NM ± NM	1.66 ± 0.08	NM ± NM	Quartz Mountain/McKay Butte
35-WS-225	1750	1	A	43 ± 6	20 ± 3	129 ± 4	58 ± 3	42 ± 2	272 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1756	3	A	67 ± 7	27 ± 4	162 ± 5	68 ± 3	51 ± 2	304 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1766	3	A	67 ± 7	23 ± 4	143 ± 5	63 ± 3	44 ± 2	207 ± 5	12 ± 3	1043 ± 30	330 ± 20	NM ± NM	NM ± NM	1.65 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1779	3	A	46 ± 6	18 ± 3	83 ± 4	25 ± 3	53 ± 2	90 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-225	1791	5	A	46 ± 6	14 ± 3	127 ± 4	55 ± 3	43 ± 2	259 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1794	2	A	191 ± 7	19 ± 3	132 ± 4	57 ± 3	36 ± 2	190 ± 5	12 ± 3	1154 ± 27	353 ± 20	NM ± NM	NM ± NM	1.85 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1805	3	A	65 ± 7	18 ± 4	150 ± 5	63 ± 3	45 ± 2	210 ± 5	12 ± 3	1116 ± 30	345 ± 20	NM ± NM	NM ± NM	1.80 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1810	3	A	64 ± 7	16 ± 4	142 ± 5	63 ± 3	44 ± 2	210 ± 5	13 ± 3	644 ± 30	314 ± 20	NM ± NM	NM ± NM	1.53 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1810	3	B	63 ± 6	21 ± 3	135 ± 4	61 ± 3	39 ± 2	207 ± 5	6 ± 3	1026 ± 26	338 ± 20	NM ± NM	NM ± NM	1.69 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1810	3	C	50 ± 5	17 ± 3	128 ± 4	58 ± 3	37 ± 2	185 ± 5	10 ± 3	992 ± 24	336 ± 20	NM ± NM	NM ± NM	1.72 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1813	4	A	64 ± 7	23 ± 3	147 ± 5	64 ± 3	45 ± 2	205 ± 5	12 ± 3	1088 ± 30	326 ± 20	NM ± NM	NM ± NM	1.71 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1814	3	A	69 ± 7	18 ± 4	141 ± 5	67 ± 3	48 ± 2	293 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1814	3	B	53 ± 6	19 ± 3	137 ± 4	60 ± 3	41 ± 2	207 ± 5	9 ± 3	1095 ± 26	360 ± 20	NM ± NM	NM ± NM	1.78 ± 0.08	NM ± NM	McKay Butte
35-WS-225	1814	3	C	44 ± 6	18 ± 3	137 ± 4	58 ± 3	43 ± 2	271 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1820	4	A	61 ± 5	20 ± 3	140 ± 4	59 ± 3	43 ± 2	280 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-225	1822	2	A	74 ± 7	29 ± 4	153 ± 5	68 ± 3	42 ± 2	217 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	McKay Butte
35-WS-225	1823	3	A	55 ± 7	18 ± 3	142 ± 4	62 ± 3	46 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1838	3	A	56 ± 7	16 ± 4	136 ± 5	59 ± 3	39 ± 2	194 ± 5	9 ± 3	1171 ± 31	338 ± 20	NM ± NM	1.79 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	1858	2	A	29 ± 6	14 ± 3	93 ± 4	64 ± 3	26 ± 2	99 ± 5	5 ± 3	715 ± 26	338 ± 20	NM ± NM	1.00 ± 0.08	NM ± NM	NM ± NM	Little Bear Cr./Whitewater R./Juniper Sp. 1
35-WS-225	1903	2	A	51 ± 5	5 ± 7	NM ± NM	3 ± 3	10 ± 2	16 ± 5	2 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-WS-225	1913	2	A	34 ± 6	NM ± NM	NM ± NM	6 ± 3	4 ± 2	NM ± NM	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian
35-WS-225	1947	1	—	62 ± 7	17 ± 4	137 ± 5	56 ± 3	43 ± 2	201 ± 5	7 ± 3	1301 ± 34	333 ± 20	NM ± NM	1.69 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	1950	1	—	53 ± 7	22 ± 3	129 ± 4	58 ± 3	40 ± 2	274 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	1956	2	—	42 ± 7	16 ± 4	90 ± 4	23 ± 3	54 ± 2	94 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-225	2045	1	—	90 ± 6	17 ± 3	89 ± 4	75 ± 3	69 ± 2	370 ± 5	16 ± 3	1530 ± 29	670 ± 20	NM ± NM	2.49 ± 0.08	NM ± NM	NM ± NM	Yreka Butte
35-WS-225	2046	5	A	63 ± 8	18 ± 4	150 ± 5	62 ± 3	42 ± 2	217 ± 5	10 ± 3	1144 ± 32	351 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2048	3	A	66 ± 6	20 ± 3	143 ± 4	63 ± 3	46 ± 2	294 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2087	3	A	57 ± 7	25 ± 3	144 ± 5	61 ± 3	42 ± 2	207 ± 5	10 ± 3	1165 ± 30	358 ± 20	NM ± NM	1.78 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2098	3	A	67 ± 7	24 ± 4	164 ± 5	68 ± 3	43 ± 2	226 ± 5	9 ± 3	1275 ± 30	390 ± 20	NM ± NM	1.94 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2098	3	B	66 ± 5	18 ± 3	93 ± 4	34 ± 3	53 ± 2	125 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-WS-225	2100	2	A	101 ± 6	25 ± 3	113 ± 4	39 ± 3	56 ± 2	137 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-WS-225	2112	1	—	56 ± 6	16 ± 3	129 ± 4	54 ± 3	37 ± 2	200 ± 5	11 ± 3	1029 ± 27	337 ± 20	NM ± NM	1.70 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2115	2	A	79 ± 7	17 ± 4	100 ± 4	37 ± 3	56 ± 2	133 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-WS-225	2116	1	A	89 ± 7	27 ± 3	106 ± 4	40 ± 3	60 ± 2	132 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain
35-WS-225	2121	1	A	61 ± 5	19 ± 3	126 ± 4	55 ± 3	40 ± 2	171 ± 5	9 ± 3	576 ± 24	353 ± 20	NM ± NM	1.70 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-225	2142	4	A	53 ± 6	16 ± 4	135 ± 5	59 ± 3	39 ± 2	205 ± 5	12 ± 3	929 ± 29	322 ± 20	NM ± NM	1.59 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2145	3	A	65 ± 6	20 ± 4	148 ± 5	63 ± 3	43 ± 2	290 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-225	2162	3	A	49 ± 6	17 ± 3	132 ± 4	55 ± 3	42 ± 2	199 ± 5	15 ± 3	1357 ± 27	352 ± 20	NM ± NM	1.86 ± 0.08	NM NM	McKay Butte	
35-WS-225	2193	3	A	63 ± 6	18 ± 3	117 ± 4	49 ± 3	47 ± 2	333 ± 5	19 ± 3	1367 ± 26	549 ± 20	NM ± NM	2.37 ± 0.08	NM NM	Big Obsidian Flow	
35-WS-225	2197	4	A	45 ± 6	18 ± 3	122 ± 4	60 ± 3	40 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-225	2198	3	A	62 ± 6	19 ± 3	137 ± 4	60 ± 3	38 ± 2	207 ± 5	13 ± 3	1127 ± 27	352 ± 20	NM ± NM	1.79 ± 0.08	NM NM	McKay Butte	
35-WS-225	2198	4	—	53 ± 5	18 ± 3	130 ± 4	55 ± 3	37 ± 2	197 ± 5	8 ± 3	1132 ± 25	367 ± 20	NM ± NM	1.81 ± 0.08	NM NM	McKay Butte	
35-WS-225	2200	7	A	50 ± 6	12 ± 4	133 ± 4	55 ± 3	39 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-225	2211	3	A	55 ± 6	18 ± 3	132 ± 4	57 ± 3	41 ± 2	264 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-225	2213	4	A	68 ± 7	23 ± 4	149 ± 5	64 ± 3	46 ± 2	219 ± 5	13 ± 3	1061 ± 28	340 ± 20	NM ± NM	1.71 ± 0.08	NM NM	McKay Butte	
35-WS-225	2213	4	B	61 ± 7	20 ± 4	139 ± 5	63 ± 3	39 ± 2	205 ± 5	12 ± 3	1039 ± 30	329 ± 20	NM ± NM	1.66 ± 0.08	NM NM	McKay Butte	
35-WS-225	2213	4	C	53 ± 6	19 ± 3	137 ± 4	61 ± 3	40 ± 2	207 ± 5	13 ± 3	1133 ± 28	347 ± 20	NM ± NM	1.76 ± 0.08	NM NM	McKay Butte	
35-WS-225	2213	4	D	55 ± 6	17 ± 3	136 ± 4	58 ± 3	37 ± 2	198 ± 5	9 ± 3	1119 ± 26	356 ± 20	NM ± NM	1.82 ± 0.08	NM NM	McKay Butte	
35-WS-225	2213	6	—	52 ± 6	14 ± 3	121 ± 4	55 ± 3	39 ± 2	189 ± 5	9 ± 3	1068 ± 27	356 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	
35-WS-225	2213	7	—	50 ± 6	21 ± 3	131 ± 4	59 ± 3	41 ± 2	198 ± 5	9 ± 3	1053 ± 30	336 ± 20	NM ± NM	1.65 ± 0.08	NM NM	McKay Butte	
35-WS-225	2214	3	A	71 ± 7	23 ± 4	143 ± 5	64 ± 3	45 ± 2	298 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-225	2214	3	B	63 ± 6	17 ± 4	148 ± 5	64 ± 3	40 ± 2	215 ± 5	12 ± 3	1109 ± 28	344 ± 20	NM ± NM	1.73 ± 0.08	NM NM	McKay Butte	
35-WS-225	2215	3	A	67 ± 6	19 ± 3	120 ± 4	52 ± 3	46 ± 2	350 ± 5	18 ± 3	1261 ± 29	507 ± 20	NM ± NM	2.19 ± 0.08	NM NM	Big Obsidian Flow	
35-WS-225	2215	3	B	77 ± 6	21 ± 3	124 ± 4	57 ± 3	50 ± 2	362 ± 5	22 ± 3	1327 ± 28	528 ± 20	NM ± NM	2.29 ± 0.08	NM NM	Big Obsidian Flow	
35-WS-225	2215	3	C	62 ± 6	18 ± 3	147 ± 4	63 ± 3	47 ± 2	297 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-225	2215	3	D	74 ± 7	18 ± 4	128 ± 5	53 ± 3	47 ± 2	357 ± 5	17 ± 3	1294 ± 32	489 ± 20	NM ± NM	2.18 ± 0.08	NM NM	Big Obsidian Flow	
35-WS-225	2215	3	E	75 ± 7	15 ± 4	136 ± 5	59 ± 3	50 ± 2	375 ± 5	21 ± 3	1207 ± 30	465 ± 20	NM ± NM	2.10 ± 0.08	NM NM	Big Obsidian Flow	
35-WS-225	2215	3	F	57 ± 6	16 ± 4	132 ± 4	55 ± 3	45 ± 2	269 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-225	2215	3	G	45 ± 6	17 ± 3	119 ± 4	53 ± 3	39 ± 2	256 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn				
35-WS-225	2215	3	H	55 ± 6	15 ± 3	141 ± 4	62 ± 3	43 ± 2	286 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2239	4	A	41 ± 6	17 ± 3	121 ± 4	52 ± 3	35 ± 2	191 ± 5	9 ± 3	1120 ± 26	349 ± 20	NM ± NM	1.77 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2239	4	B	87 ± 7	24 ± 4	149 ± 5	67 ± 3	42 ± 2	217 ± 5	12 ± 3	1163 ± 29	353 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2241	4	A	54 ± 6	19 ± 3	135 ± 4	58 ± 3	39 ± 2	200 ± 5	12 ± 3	1072 ± 26	355 ± 20	NM ± NM	1.81 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2241	4	B	42 ± 6	13 ± 3	122 ± 4	54 ± 3	40 ± 2	191 ± 5	9 ± 3	1017 ± 24	337 ± 20	NM ± NM	1.68 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2241	4	C	62 ± 7	18 ± 4	148 ± 5	63 ± 3	41 ± 2	214 ± 5	11 ± 3	1203 ± 31	373 ± 20	NM ± NM	1.82 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2241	4	D	55 ± 7	16 ± 4	139 ± 5	60 ± 3	41 ± 2	203 ± 5	12 ± 3	1056 ± 28	335 ± 20	NM ± NM	1.71 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2244	4	A	83 ± 7	27 ± 4	152 ± 5	68 ± 3	45 ± 2	192 ± 5	8 ± 3	724 ± 27	344 ± 20	NM ± NM	1.71 ± 0.08	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain	
35-WS-225	2248	1	—	59 ± 7	12 ± 4	142 ± 5	58 ± 3	45 ± 2	288 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2248	4	A	46 ± 5	16 ± 3	129 ± 4	56 ± 3	36 ± 2	191 ± 5	11 ± 3	1022 ± 25	342 ± 20	NM ± NM	1.68 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2250	2	A	56 ± 6	21 ± 3	142 ± 4	65 ± 3	45 ± 2	286 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2252	4	A	59 ± 6	17 ± 3	135 ± 4	59 ± 3	42 ± 2	277 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2252	4	B	45 ± 6	14 ± 3	130 ± 4	58 ± 3	44 ± 2	269 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2252	4	C	69 ± 6	18 ± 4	156 ± 5	64 ± 3	43 ± 2	212 ± 5	13 ± 3	1090 ± 27	355 ± 20	NM ± NM	1.73 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2255	1	—	65 ± 6	22 ± 3	123 ± 4	54 ± 3	40 ± 2	255 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2255	2	—	54 ± 6	17 ± 3	126 ± 4	56 ± 3	39 ± 2	265 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2265	2	—	50 ± 6	16 ± 3	130 ± 4	56 ± 3	45 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2266	3	A	57 ± 6	16 ± 3	128 ± 4	56 ± 3	34 ± 2	192 ± 5	14 ± 3	1077 ± 25	356 ± 20	NM ± NM	1.73 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2267	3	A	87 ± 6	20 ± 3	125 ± 4	57 ± 3	43 ± 2	272 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2267	3	B	51 ± 6	13 ± 4	139 ± 4	60 ± 3	41 ± 2	206 ± 5	10 ± 3	1053 ± 25	337 ± 20	NM ± NM	1.69 ± 0.08	NM ± NM	NM ± NM	NM ± NM	McKay Butte	
35-WS-225	2267	3	C	52 ± 6	14 ± 3	128 ± 4	56 ± 3	41 ± 2	267 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-225	2267	3	D	56 ± 6	22 ± 3	137 ± 4	58 ± 3	40 ± 2	270 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-WS-225	2267	3	E	62 ± 6	16 ± 3	127 ± 4	55 ± 3	42 ± 2	270 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	F	63 ± 6	19 ± 3	131 ± 4	57 ± 3	42 ± 2	270 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	G	114 ± 6	15 ± 3	134 ± 4	58 ± 3	43 ± 2	282 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	H	51 ± 6	14 ± 4	144 ± 4	64 ± 3	42 ± 2	295 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	I	57 ± 6	20 ± 3	140 ± 4	62 ± 3	45 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	J	48 ± 6	23 ± 3	144 ± 4	64 ± 3	41 ± 2	271 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	K	39 ± 6	19 ± 3	126 ± 4	54 ± 3	40 ± 2	264 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	L	54 ± 5	17 ± 3	129 ± 4	57 ± 3	38 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	M	46 ± 6	17 ± 3	129 ± 4	56 ± 3	42 ± 2	270 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	N	48 ± 5	14 ± 3	125 ± 4	54 ± 3	41 ± 2	266 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	O	47 ± 5	16 ± 3	121 ± 4	52 ± 3	42 ± 2	259 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2267	3	P	49 ± 6	18 ± 3	125 ± 4	55 ± 3	39 ± 2	256 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2269	1	—	71 ± 7	18 ± 4	145 ± 5	64 ± 3	42 ± 2	285 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2274	1	A	59 ± 6	19 ± 3	137 ± 4	57 ± 3	41 ± 2	271 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2274	1	B	63 ± 6	19 ± 3	130 ± 4	59 ± 3	40 ± 2	201 ± 5	7 ± 3	1022 ± 26	334 ± 20	NM ± NM	1.69 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2275	3	A	61 ± 6	14 ± 4	130 ± 4	60 ± 3	41 ± 2	275 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2275	3	B	47 ± 6	18 ± 3	135 ± 4	61 ± 3	45 ± 2	280 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2275	3	C	68 ± 7	21 ± 4	149 ± 5	64 ± 3	43 ± 2	208 ± 5	8 ± 3	1072 ± 32	324 ± 20	NM ± NM	1.73 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2287	2	A	43 ± 6	22 ± 3	131 ± 4	58 ± 3	41 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2293	2	A	37 ± 6	19 ± 3	77 ± 4	104 ± 3	16 ± 2	91 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-225	2295	2	A	49 ± 6	19 ± 3	125 ± 4	56 ± 3	36 ± 2	190 ± 5	12 ± 3	1049 ± 27	351 ± 20	NM ± NM	1.76 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2303	2	A	42 ± 6	18 ± 3	132 ± 4	84 ± 3	25 ± 2	128 ± 5	3 ± 3	956 ± 26	293 ± 20	NM ± NM	1.22 ± 0.08	NM ± NM	NM ± NM	Whitewater Ridge

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-225	2309	2	A	68 ± 6	19 ± 3	150 ± 4	66 ± 3	50 ± 2	294 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2315	5	—	49 ± 6	14 ± 4	77 ± 4	104 ± 3	15 ± 2	97 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-225	2328	2	A	53 ± 6	17 ± 4	94 ± 4	28 ± 3	55 ± 2	95 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-225	2365	5	A	53 ± 6	16 ± 3	117 ± 4	53 ± 3	42 ± 2	258 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2381	3	A	43 ± 6	20 ± 3	92 ± 4	25 ± 3	56 ± 2	102 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-225	2396	2	A	66 ± 7	22 ± 4	109 ± 5	27 ± 3	59 ± 2	96 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-225	2396	2	B	63 ± 6	23 ± 3	141 ± 4	62 ± 3	45 ± 2	283 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2406	2	A	55 ± 6	21 ± 3	137 ± 5	62 ± 3	42 ± 2	281 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2406	2	B	73 ± 7	18 ± 4	138 ± 5	69 ± 3	42 ± 2	280 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2465	4	A	63 ± 6	19 ± 3	142 ± 4	62 ± 3	43 ± 2	282 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2488	3	A	47 ± 6	18 ± 3	149 ± 4	61 ± 3	44 ± 2	285 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2489	2	A	49 ± 7	23 ± 4	104 ± 4	28 ± 3	55 ± 2	99 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-225	2490	2	A	66 ± 7	15 ± 4	144 ± 5	64 ± 3	42 ± 2	288 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2530	2	A	55 ± 6	16 ± 3	124 ± 4	56 ± 3	42 ± 2	266 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2531	1	—	48 ± 6	13 ± 3	123 ± 4	54 ± 3	41 ± 2	260 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2531	4	A	64 ± 6	19 ± 4	143 ± 4	61 ± 3	44 ± 2	286 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-225	2531	5	—	65 ± 6	13 ± 4	135 ± 5	61 ± 3	41 ± 2	204 ± 5	13 ± 3	963 ± 30	316 ± 20	NM ± NM	1.57 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2532	2	A	63 ± 6	21 ± 3	150 ± 4	64 ± 3	39 ± 2	213 ± 5	8 ± 3	1337 ± 28	412 ± 20	NM ± NM	1.92 ± 0.08	NM ± NM	NM ± NM	McKay Butte
35-WS-225	2565	3	—	33 ± 6	14 ± 3	80 ± 4	81 ± 3	25 ± 2	117 ± 5	6 ± 3	1129 ± 29	408 ± 20	NM ± NM	1.42 ± 0.08	NM ± NM	NM ± NM	Juniper Spring 2/Whitewater Ridge?
35-WS-225	2735	3	—	28 ± 6	13 ± 3	109 ± 4	77 ± 3	21 ± 2	118 ± 5	5 ± 3	832 ± 26	291 ± 20	NM ± NM	1.13 ± 0.08	NM ± NM	NM ± NM	Whitewater Ridge
35-WS-226	6	8	A	56 ± 7	16 ± 4	91 ± 5	110 ± 4	15 ± 2	98 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-226	6	8	B	88 ± 8	18 ± 4	157 ± 6	69 ± 3	49 ± 2	196 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-226	6	8	C	57 ± 9	11 ± 5	87 ± 5	106 ± 4	14 ± 2	95 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-226	8	4	A	61 ± 6	20 ± 3	145 ± 5	61 ± 3	46 ± 2	294 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-226	8	4	B	71 ± 7	26 ± 4	151 ± 5	66 ± 3	43 ± 2	288 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-226	9	2	A	38 ± 5	18 ± 3	82 ± 5	109 ± 3	17 ± 2	96 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-226	9	2	B	62 ± 7	18 ± 4	82 ± 5	115 ± 4	19 ± 2	95 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-226	11	3	A	63 ± 7	24 ± 3	144 ± 5	68 ± 3	45 ± 2	295 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-226	11	3	B	63 ± 6	15 ± 4	89 ± 5	115 ± 3	15 ± 2	99 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-226	11	3	C	87 ± 7	16 ± 4	160 ± 6	72 ± 3	49 ± 3	296 ± 6	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-226	11	3	D	60 ± 7	12 ± 4	90 ± 5	115 ± 3	16 ± 2	97 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-226	12	2	A	54 ± 5	18 ± 3	137 ± 5	59 ± 3	43 ± 2	281 ± 4	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-226	12	2	B	109 ± 7	26 ± 4	110 ± 5	38 ± 3	60 ± 2	133 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain	
35-WS-226	36	2	—	50 ± 7	17 ± 4	90 ± 5	123 ± 4	19 ± 2	98 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-226	40	2	—	60 ± 8	20 ± 4	97 ± 5	119 ± 4	19 ± 2	99 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-226	91	2	—	82 ± 6	15 ± 4	142 ± 5	59 ± 3	45 ± 2	288 ± 5	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-226	93	2	—	57 ± 6	16 ± 3	84 ± 5	109 ± 3	20 ± 2	101 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-227	4	1	A	45 ± 6	16 ± 3	87 ± 5	20 ± 3	54 ± 2	97 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes	
35-WS-227	12	1	—	NM ± NM	NM ± NM	141 ± 3	63 ± 12	43 ± 3	294 ± 7	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-227	29	10	A	47 ± 5	17 ± 3	107 ± 5	57 ± 3	35 ± 2	93 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek	
35-WS-227	29	10	B	49 ± 6	20 ± 3	88 ± 5	121 ± 3	22 ± 2	101 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-227	29	10	C	68 ± 6	19 ± 4	151 ± 5	65 ± 3	48 ± 2	301 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-227	29	10	D	70 ± 5	22 ± 3	137 ± 5	63 ± 3	46 ± 2	180 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-227	30	7	A	70 ± 5	15 ± 3	109 ± 5	25 ± 3	60 ± 2	300 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Chickahominy?	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-227	30	7	B	52 ± 5	17 ± 3	134 ± 5	57 ± 3	44 ± 2	280 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-227	31	9	—	NM ± NM	NM ± NM	140 ± 4	59 ± 12	45 ± 4	285 ± 8	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-227	31	14	B	77 ± 6	21 ± 3	150 ± 5	65 ± 3	50 ± 2	310 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-227	31	14	E	67 ± 7	15 ± 4	138 ± 5	61 ± 3	43 ± 2	189 ± 5	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-WS-227	31	14	H	75 ± 6	17 ± 3	139 ± 5	59 ± 3	44 ± 2	185 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-WS-227	31	14	I	59 ± 6	20 ± 3	149 ± 5	69 ± 3	50 ± 2	304 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-227	31	14	J	28 ± 8	NM ± 3	NM ± 5	30 ± 3	6 ± 2	10 ± 5	NM ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Not Obsidian
35-WS-227	62	4	A	40 ± 6	19 ± 3	81 ± 5	110 ± 3	19 ± 2	98 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-WS-227	62	4	B	51 ± 6	23 ± 3	91 ± 5	112 ± 3	26 ± 2	142 ± 4	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B
35-WS-227	63	11	A	38 ± 6	15 ± 3	87 ± 5	109 ± 3	29 ± 2	144 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown B
35-WS-227	63	11	B	125 ± 7	20 ± 4	132 ± 5	3 ± 3	85 ± 2	467 ± 6	51 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A
35-WS-227	106	2	A	40 ± 5	13 ± 3	116 ± 5	87 ± 3	24 ± 2	123 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge
35-WS-227	134	3	—	60 ± 6	19 ± 4	151 ± 5	65 ± 3	47 ± 2	302 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-227	140	3	A	87 ± 7	20 ± 4	160 ± 5	68 ± 3	48 ± 2	297 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano
35-WS-227	141	8	—	NM ± NM	NM ± NM	85 ± 3	111 ± 12	15 ± 3	93 ± 7	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-WS-227	141	10	—	NM ± NM	NM ± NM	79 ± 4	110 ± 12	14 ± 4	83 ± 7	5 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-WS-227	141	11	—	NM ± NM	NM ± NM	142 ± 4	69 ± 12	39 ± 3	194 ± 7	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-WS-227	141	13	A	89 ± 7	25 ± 4	148 ± 5	68 ± 3	48 ± 2	185 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-WS-227	141	13	C	81 ± 7	18 ± 4	147 ± 5	66 ± 3	48 ± 2	192 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte
35-WS-227	141	13	D	54 ± 7	18 ± 4	107 ± 5	75 ± 3	27 ± 2	102 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge
35-WS-227	141	13	E	40 ± 6	22 ± 3	88 ± 5	111 ± 3	21 ± 2	98 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs
35-WS-227	141	13	F	78 ± 6	21 ± 3	147 ± 5	68 ± 3	49 ± 2	189 ± 4	9 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-227	142	12	B	37 ± 5	NM ± 3	NM ± 5	NM ± 3	3 ± 2	9 ± 5	2 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian	
35-WS-227	142	12	E	49 ± 6	23 ± 3	91 ± 5	117 ± 3	20 ± 2	104 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-227	142	12	F	100 ± 7	23 ± 4	110 ± 5	44 ± 3	60 ± 2	134 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Cougar Mountain	
35-WS-227	143	8	A	43 ± 5	13 ± 3	92 ± 5	78 ± 3	26 ± 2	114 ± 4	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge	
35-WS-227	144	8	A	87 ± 7	24 ± 4	160 ± 5	64 ± 3	51 ± 2	188 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-227	144	8	B	60 ± 6	12 ± 4	145 ± 5	62 ± 3	43 ± 2	294 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-227	144	8	C	90 ± 7	22 ± 4	156 ± 5	67 ± 3	56 ± 2	197 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-227	144	8	D	68 ± 6	20 ± 3	139 ± 5	62 ± 3	45 ± 2	183 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-227	144	8	E	79 ± 6	22 ± 3	150 ± 5	63 ± 3	48 ± 2	187 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-227	146	2	A	40 ± 8	9 ± 5	137 ± 5	71 ± 3	27 ± 2	116 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge	
35-WS-227	146	2	B	55 ± 7	18 ± 4	96 ± 5	28 ± 3	55 ± 2	95 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes	
35-WS-227	146	2	C	96 ± 7	25 ± 4	154 ± 5	68 ± 3	48 ± 2	191 ± 5	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-227	146	2	D	160 ± 11	30 ± 5	46 ± 5	261 ± 5	58 ± 3	282 ± 6	26 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Not Obsidian	
35-WS-227	146	2	E	56 ± 7	10 ± 4	100 ± 5	108 ± 3	27 ± 2	144 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown B	
35-WS-227	146	2	F	81 ± 6	19 ± 4	146 ± 5	61 ± 3	43 ± 2	186 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-230	5	1	—	73 ± 5	19 ± 3	125 ± 5	51 ± 3	41 ± 2	176 ± 4	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-230	8	1	—	52 ± 7	19 ± 4	113 ± 5	72 ± 3	34 ± 2	111 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge?	
35-WS-230	9	1	—	68 ± 6	26 ± 3	129 ± 5	62 ± 3	43 ± 2	280 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-230	108	2	—	71 ± 7	20 ± 4	148 ± 5	69 ± 3	46 ± 2	296 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-230	179	2	—	64 ± 7	23 ± 4	99 ± 5	26 ± 3	59 ± 2	93 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes	
35-WS-230	192	1	—	74 ± 6	23 ± 4	145 ± 5	64 ± 3	50 ± 2	188 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-230	248	2	—	103 ± 8	25 ± 4	159 ± 6	70 ± 3	52 ± 2	199 ± 5	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-230	251	1	—	101 ± 7	20 ± 4	113 ± 5	43 ± 3	64 ± 2	136 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain		
35-WS-230	262	1	—	121 ± 9	33 ± 4	118 ± 6	38 ± 3	58 ± 3	132 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain		
35-WS-231	30	1	—	48 ± 5	16 ± 3	75 ± 5	113 ± 3	17 ± 2	102 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-WS-231	39	9	—	62 ± 6	19 ± 3	104 ± 5	22 ± 3	55 ± 2	294 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Chickahominy?		
35-WS-231	399	4	—	38 ± 5	15 ± 3	75 ± 5	98 ± 3	16 ± 2	91 ± 4	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-WS-231	405	1	—	59 ± 6	14 ± 4	71 ± 5	95 ± 3	17 ± 2	90 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-WS-231	412	3	—	80 ± 7	17 ± 4	134 ± 5	59 ± 3	45 ± 2	177 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte		
35-WS-231	416	3	—	61 ± 5	20 ± 3	138 ± 5	58 ± 3	48 ± 2	281 ± 4	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-WS-231	440	4	A	69 ± 6	17 ± 3	143 ± 5	60 ± 3	45 ± 2	295 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-WS-231	440	4	B	59 ± 6	10 ± 4	124 ± 5	97 ± 3	26 ± 2	137 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Whitewater Ridge		
35-WS-231	440	5	—	32 ± 5	13 ± 3	8 ± 5	82 ± 3	26 ± 2	121 ± 4	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Unknown A		
35-WS-231	440	6	—	74 ± 6	23 ± 3	138 ± 5	59 ± 3	42 ± 2	188 ± 4	7 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte		
35-WS-231	441	2	A	56 ± 6	18 ± 3	95 ± 5	23 ± 3	57 ± 2	97 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-WS-231	441	2	B	66 ± 6	17 ± 3	95 ± 5	122 ± 3	18 ± 2	100 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs		
35-WS-231	441	2	C	64 ± 6	16 ± 3	143 ± 5	66 ± 3	46 ± 2	290 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-WS-231	442	3	—	42 ± 5	15 ± 3	85 ± 5	21 ± 3	52 ± 2	93 ± 4	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-WS-231	443	7	A	84 ± 6	24 ± 3	149 ± 5	60 ± 3	46 ± 2	189 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte		
35-WS-231	443	7	B	72 ± 6	21 ± 4	154 ± 5	62 ± 3	48 ± 2	302 ± 5	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-WS-231	443	7	C	70 ± 7	19 ± 4	143 ± 5	60 ± 3	43 ± 2	180 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Quartz Mountain/McKay Butte		
35-WS-231	443	7	D	84 ± 9	18 ± 4	142 ± 6	58 ± 3	45 ± 3	274 ± 6	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-WS-231	444	4	A	63 ± 7	18 ± 4	101 ± 5	27 ± 3	59 ± 2	100 ± 4	15 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-WS-231	444	4	B	50 ± 7	18 ± 4	101 ± 5	72 ± 3	29 ± 2	107 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Little Bear Creek/Whitewater Ridge		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	444	4	C	63 ± 6	15 ± 3	142 ± 5	64 ± 3	44 ± 2	297 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	444	4	D	98 ± 7	18 ± 4	105 ± 5	8 ± 3	64 ± 2	451 ± 6	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Riley?
35-WS-231	444	4	E	80 ± 7	23 ± 4	108 ± 5	27 ± 3	57 ± 2	93 ± 4	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-231	445	2	A	57 ± 6	13 ± 3	140 ± 5	59 ± 3	44 ± 2	268 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	445	2	B	38 ± 6	17 ± 3	81 ± 5	104 ± 3	18 ± 2	99 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-231	445	2	C	51 ± 7	22 ± 4	100 ± 5	26 ± 3	58 ± 2	102 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-231	445	2	D	56 ± 6	12 ± 4	88 ± 5	97 ± 3	22 ± 2	129 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-WS-231	447	1	—	49 ± 5	17 ± 3	87 ± 5	91 ± 3	24 ± 2	202 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown B
35-WS-231	447	4	A	67 ± 6	18 ± 3	136 ± 5	58 ± 3	48 ± 2	180 ± 4	6 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-WS-231	447	4	B	51 ± 6	14 ± 3	121 ± 5	66 ± 3	27 ± 2	118 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-WS-231	447	4	C	63 ± 6	28 ± 3	152 ± 5	62 ± 3	49 ± 2	299 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	447	4	D	62 ± 6	16 ± 3	147 ± 5	64 ± 3	48 ± 2	297 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	447	4	E	69 ± 9	27 ± 4	99 ± 5	28 ± 3	59 ± 3	93 ± 5	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-231	448	2	A	65 ± 5	19 ± 3	142 ± 5	61 ± 3	44 ± 2	284 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	448	2	B	42 ± 5	16 ± 3	79 ± 5	22 ± 3	52 ± 2	91 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-231	448	2	C	51 ± 7	20 ± 4	139 ± 5	65 ± 3	48 ± 2	302 ± 5	21 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	448	2	D	53 ± 6	14 ± 3	132 ± 5	57 ± 3	44 ± 2	277 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	448	2	E	66 ± 7	14 ± 4	90 ± 5	123 ± 4	16 ± 2	101 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-231	448	2	F	104 ± 8	22 ± 4	148 ± 6	62 ± 3	48 ± 2	180 ± 5	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-WS-231	449	7	A	117 ± 6	21 ± 3	122 ± 5	NM ± 3	105 ± 2	181 ± 4	40 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown C
35-WS-231	449	7	B	70 ± 6	18 ± 3	146 ± 5	64 ± 3	48 ± 2	291 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	449	7	C	89 ± 7	16 ± 4	143 ± 5	59 ± 3	44 ± 2	282 ± 5	16 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>													Ratio	Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-231	449	7	D	94 ± 7	24 ± 4	148 ± 6	7 ± 3	78 ± 3	87 ± 4	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown D	
35-WS-231	450	2	A	74 ± 7	19 ± 4	152 ± 5	60 ± 3	49 ± 2	303 ± 5	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	450	2	B	49 ± 6	16 ± 3	105 ± 5	69 ± 3	29 ± 2	104 ± 4	12 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	450	2	C	68 ± 6	18 ± 3	142 ± 5	59 ± 3	46 ± 2	290 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	450	2	D	117 ± 7	19 ± 4	125 ± 5	7 ± 3	63 ± 2	474 ± 6	25 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown E	
35-WS-231	450	2	E	122 ± 10	24 ± 5	117 ± 6	83 ± 4	79 ± 3	285 ± 7	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown F	
35-WS-231	450	2	F	135 ± 8	21 ± 4	107 ± 5	87 ± 3	78 ± 2	416 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown G	
35-WS-231	450	2	G	60 ± 7	15 ± 4	87 ± 5	111 ± 3	18 ± 2	97 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-231	452	1	A	74 ± 6	16 ± 3	141 ± 5	64 ± 3	42 ± 2	177 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-231	452	1	B	66 ± 6	17 ± 3	144 ± 5	62 ± 3	49 ± 2	291 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	452	1	C	115 ± 7	17 ± 4	101 ± 5	78 ± 3	72 ± 2	407 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Unknown G	
35-WS-231	452	1	D	86 ± 9	19 ± 5	166 ± 6	73 ± 3	46 ± 3	299 ± 6	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	452	2	—	51 ± 5	14 ± 3	133 ± 5	55 ± 3	43 ± 2	273 ± 4	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	453	2	A	74 ± 5	20 ± 3	136 ± 5	56 ± 3	43 ± 2	171 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain	
35-WS-231	453	2	B	74 ± 6	24 ± 3	157 ± 5	67 ± 3	50 ± 2	303 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	453	2	C	65 ± 7	15 ± 4	101 ± 5	25 ± 3	60 ± 2	93 ± 4	14 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes	
35-WS-231	453	2	D	55 ± 8	27 ± 4	101 ± 5	123 ± 4	16 ± 2	104 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs	
35-WS-231	454	5	A	60 ± 7	16 ± 4	91 ± 5	103 ± 3	27 ± 2	136 ± 4	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge?	
35-WS-231	454	5	B	105 ± 7	26 ± 4	156 ± 6	66 ± 3	50 ± 2	190 ± 5	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	
35-WS-231	455	7	A	54 ± 5	18 ± 3	147 ± 5	63 ± 3	46 ± 2	289 ± 4	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	455	7	B	61 ± 7	17 ± 4	145 ± 5	60 ± 3	49 ± 2	290 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	455	7	C	76 ± 6	18 ± 4	153 ± 5	66 ± 3	49 ± 2	193 ± 4	11 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-231	455	7	D	154 ± 6	22 ± 3	122 ± 5	NM ± 3	92 ± 2	563 ± 5	54 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Horse Mountain?	
35-WS-231	456	4	A	200 ± 10	18 ± 5	130 ± 6	2 ± 3	90 ± 3	665 ± 8	47 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Horse Mountain?	
35-WS-231	468	2	A	47 ± 7	20 ± 4	100 ± 4	29 ± 3	55 ± 2	95 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-231	470	2	A	76 ± 7	23 ± 4	147 ± 5	70 ± 3	49 ± 2	191 ± 5	3 ± 3	616 ± 26	339 ± 20	NM ± NM	1.61 ± 0.08	NM	NM	Quartz Mountain	
35-WS-231	478	2	A	38 ± 6	15 ± 3	83 ± 4	23 ± 3	48 ± 2	86 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-231	504	3	A	48 ± 6	17 ± 3	90 ± 4	22 ± 3	53 ± 2	95 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-231	504	3	B	56 ± 6	15 ± 4	84 ± 4	23 ± 3	55 ± 2	90 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-231	506	3	A	34 ± 6	16 ± 3	103 ± 4	51 ± 3	27 ± 2	86 ± 5	9 ± 3	525 ± 23	380 ± 20	NM ± NM	0.79 ± 0.08	NM	NM	Little Bear Creek	
35-WS-231	512	2	A	45 ± 7	16 ± 4	99 ± 4	107 ± 3	27 ± 2	133 ± 5	5 ± 3	1066 ± 30	391 ± 20	NM ± NM	1.48 ± 0.08	NM	NM	Whitewater Ridge?	
35-WS-231	522	1	A	74 ± 6	17 ± 3	131 ± 4	58 ± 3	41 ± 2	175 ± 5	6 ± 3	536 ± 24	332 ± 20	NM ± NM	1.56 ± 0.08	NM	NM	Quartz Mountain	
35-WS-231	580	2	A	86 ± 6	21 ± 3	140 ± 4	59 ± 3	44 ± 2	184 ± 5	6 ± 3	550 ± 24	322 ± 20	NM ± NM	1.50 ± 0.08	NM	NM	Quartz Mountain	
35-WS-231	587	3	A	40 ± 6	16 ± 3	108 ± 4	80 ± 3	31 ± 2	110 ± 5	10 ± 3	761 ± 26	376 ± 20	NM ± NM	1.10 ± 0.08	NM	NM	Whitewater Ridge	
35-WS-231	588	2	A	92 ± 7	23 ± 4	158 ± 5	67 ± 3	48 ± 2	202 ± 5	9 ± 3	626 ± 28	317 ± 20	NM ± NM	1.54 ± 0.08	NM	NM	Quartz Mountain	
35-WS-231	588	2	B	48 ± 6	17 ± 4	94 ± 4	91 ± 3	30 ± 2	126 ± 5	4 ± 3	856 ± 27	344 ± 20	NM ± NM	1.12 ± 0.08	NM	NM	Whitewater Ridge	
35-WS-231	593	3	A	34 ± 6	18 ± 3	75 ± 4	109 ± 3	17 ± 2	102 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-WS-231	594	4	A	70 ± 6	19 ± 4	143 ± 5	65 ± 3	49 ± 2	284 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-231	596	4	A	46 ± 7	17 ± 4	133 ± 5	97 ± 3	23 ± 2	136 ± 5	11 ± 3	843 ± 30	276 ± 20	NM ± NM	1.08 ± 0.08	NM	NM	Whitewater Ridge	
35-WS-231	598	2	A	49 ± 6	15 ± 3	123 ± 4	52 ± 3	41 ± 2	255 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-231	598	2	B	51 ± 6	15 ± 3	83 ± 4	24 ± 3	51 ± 2	92 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-231	598	2	C	43 ± 6	14 ± 3	88 ± 4	24 ± 3	50 ± 2	91 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-231	598	2	D	48 ± 6	15 ± 3	88 ± 4	26 ± 3	52 ± 2	91 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-231	600	5	—	61 ± 7	20 ± 4	134 ± 4	54 ± 3	46 ± 2	276 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	604	2	A	31 ± 7	22 ± 3	137 ± 5	62 ± 3	32 ± 2	135 ± 5	5 ± 3	943 ± 28	273 ± 20	NM ± NM	1.11 ± 0.08	NM NM	Whitewater Ridge	
35-WS-231	604	2	B	98 ± 7	22 ± 4	158 ± 5	76 ± 3	52 ± 2	197 ± 5	12 ± 3	633 ± 27	330 ± 20	NM ± NM	1.55 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	609	2	A	59 ± 6	18 ± 4	138 ± 4	60 ± 3	43 ± 2	284 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	614	3	A	43 ± 6	21 ± 3	90 ± 4	25 ± 3	52 ± 2	90 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	618	1	A	61 ± 6	18 ± 3	142 ± 4	61 ± 3	46 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	618	1	B	61 ± 7	26 ± 4	153 ± 5	62 ± 3	48 ± 2	294 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	628	3	A	54 ± 7	17 ± 4	109 ± 5	160 ± 4	28 ± 2	93 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Inman Creek/Salt Creek A?	
35-WS-231	634	3	A	53 ± 6	15 ± 4	132 ± 5	57 ± 3	46 ± 2	273 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	660	2	A	65 ± 7	23 ± 4	145 ± 5	65 ± 3	47 ± 2	191 ± 5	7 ± 3	614 ± 27	334 ± 20	NM ± NM	1.53 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	662	1	A	57 ± 7	16 ± 4	142 ± 5	57 ± 3	43 ± 2	285 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	676	1	—	46 ± 6	15 ± 4	123 ± 4	57 ± 3	40 ± 2	261 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	676	4	A	37 ± 6	17 ± 3	84 ± 4	94 ± 3	23 ± 2	133 ± 5	4 ± 3	1116 ± 26	388 ± 20	NM ± NM	1.40 ± 0.08	NM NM	Juniper Spring 2	
35-WS-231	678	2	A	53 ± 7	22 ± 4	85 ± 4	118 ± 4	18 ± 2	109 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	696	3	A	68 ± 7	16 ± 4	119 ± 5	61 ± 3	49 ± 2	187 ± 5	18 ± 3	939 ± 30	433 ± 20	NM ± NM	1.24 ± 0.08	NM NM	McKay Butte	
35-WS-231	697	7	—	44 ± 8	10 ± 5	77 ± 4	24 ± 3	55 ± 2	88 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	697	8	A	44 ± 5	17 ± 3	86 ± 4	98 ± 3	27 ± 2	131 ± 5	5 ± 3	1228 ± 26	416 ± 20	NM ± NM	1.53 ± 0.08	NM NM	Juniper Spring 2	
35-WS-231	697	8	B	47 ± 7	21 ± 4	95 ± 4	25 ± 3	49 ± 2	92 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	697	8	C	50 ± 7	13 ± 4	95 ± 4	23 ± 3	58 ± 2	90 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	697	8	D	55 ± 7	17 ± 4	146 ± 5	66 ± 3	45 ± 2	289 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	698	3	—	42 ± 6	16 ± 4	120 ± 4	54 ± 3	44 ± 2	256 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	700	4	A	59 ± 6	19 ± 3	142 ± 4	59 ± 3	42 ± 2	279 ± 5	12 ± 3	572 ± NA	326 ± NA	NM ± NM	1.54 ± NA	NM NM	Newberry Volcano	
35-WS-231	701	1	—	49 ± 7	12 ± 4	133 ± 4	59 ± 3	41 ± 2	273 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	701	4	A	79 ± 6	25 ± 3	140 ± 5	61 ± 3	45 ± 2	187 ± 5	9 ± 3	572 ± 26	326 ± 20	NM ± NM	1.54 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	701	4	B	35 ± 8	17 ± 4	90 ± 4	116 ± 4	19 ± 2	102 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	701	4	C	48 ± 7	18 ± 4	113 ± 4	74 ± 3	27 ± 2	106 ± 5	9 ± 3	614 ± 29	362 ± 20	NM ± NM	0.93 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	702	4	A	62 ± 6	19 ± 3	119 ± 4	54 ± 3	37 ± 2	166 ± 5	7 ± 3	560 ± 25	311 ± 20	NM ± NM	1.44 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	703	4	A	65 ± 6	21 ± 3	145 ± 4	60 ± 3	48 ± 2	296 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	703	4	B	52 ± 7	14 ± 4	135 ± 4	59 ± 3	40 ± 2	280 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	703	4	C	48 ± 6	19 ± 3	101 ± 4	25 ± 3	57 ± 2	97 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	705	3	—	69 ± 6	11 ± 4	123 ± 4	52 ± 3	41 ± 2	166 ± 5	8 ± 3	666 ± 25	341 ± 20	NM ± NM	1.52 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	705	6	A	42 ± 6	14 ± 3	71 ± 4	95 ± 3	19 ± 2	90 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	705	6	B	56 ± 6	17 ± 3	145 ± 4	62 ± 3	46 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	706	3	A	38 ± 6	17 ± 3	84 ± 4	21 ± 3	50 ± 2	85 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	707	4	A	56 ± 6	20 ± 3	133 ± 4	6 ± 3	73 ± 2	85 ± 5	13 ± 3	461 ± 21	424 ± 20	NM ± NM	0.75 ± 0.08	NM NM	Potato Hills	
35-WS-231	708	5	A	107 ± 6	30 ± 3	134 ± 4	3 ± 3	101 ± 2	173 ± 5	40 ± 3	696 ± 21	637 ± 20	NM ± NM	0.92 ± 0.08	NM NM	Delintment Creek	
35-WS-231	713	3	A	51 ± 6	16 ± 3	93 ± 4	101 ± 3	27 ± 2	133 ± 5	6 ± 3	1171 ± 30	405 ± 20	NM ± NM	1.50 ± 0.08	NM NM	Whitewater Ridge?	
35-WS-231	715	4	A	69 ± 6	18 ± 3	127 ± 4	54 ± 3	43 ± 2	173 ± 5	9 ± 3	614 ± 24	329 ± 20	NM ± NM	1.53 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	715	4	B	67 ± 7	21 ± 4	132 ± 5	59 ± 3	44 ± 2	183 ± 5	11 ± 3	570 ± 26	318 ± 20	NM ± NM	1.45 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	719	3	—	60 ± 6	20 ± 4	139 ± 4	55 ± 3	42 ± 2	283 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	721	4	A	93 ± 8	25 ± 4	158 ± 5	70 ± 3	44 ± 2	193 ± 5	10 ± 3	583 ± 29	344 ± 20	NM ± NM	1.59 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	722	2	A	51 ± 7	19 ± 4	121 ± 4	29 ± 3	46 ± 2	259 ± 5	30 ± 3	1155 ± 28	372 ± 20	NM ± NM	1.61 ± 0.08	NM NM	Chickahominy	
35-WS-231	724	4	A	42 ± 7	19 ± 4	90 ± 4	113 ± 4	16 ± 2	99 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	727	4	A	80 ± 7	29 ± 4	158 ± 5	65 ± 3	44 ± 2	296 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	728	3	A	77 ± 7	21 ± 4	147 ± 5	66 ± 3	46 ± 2	193 ± 5	9 ± 3	511 ± 25	329 ± 20	NM ± NM	1.46 ± 0.08	NM NM	Quartz Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-231	731	3	A	47 ± 7	13 ± 4	87 ± 4	112 ± 3	14 ± 2	97 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs	
35-WS-231	823	2	A	59 ± 6	19 ± 3	135 ± 4	59 ± 3	43 ± 2	170 ± 5	3 ± 3	588 ± 25	351 ± 20	NM ± NM	1.60 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-WS-231	828	5	A	54 ± 7	21 ± 4	102 ± 4	27 ± 3	57 ± 2	98 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-WS-231	829	3	A	83 ± 7	27 ± 4	153 ± 5	67 ± 3	46 ± 2	191 ± 5	10 ± 3	565 ± 26	356 ± 20	NM ± NM	1.56 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-WS-231	830	3	A	67 ± 6	21 ± 3	130 ± 4	58 ± 3	41 ± 2	168 ± 5	9 ± 3	607 ± 25	367 ± 20	NM ± NM	1.65 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-WS-231	839	3	A	41 ± 6	15 ± 3	89 ± 4	22 ± 3	55 ± 2	93 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-WS-231	841	4	A	37 ± 6	12 ± 3	80 ± 4	87 ± 3	25 ± 2	124 ± 5	5 ± 3	1503 ± 28	428 ± 20	NM ± NM	1.69 ± 0.08	NM ± NM	NM	Juniper Spring 2	
35-WS-231	841	4	B	75 ± 6	20 ± 4	146 ± 5	62 ± 3	44 ± 2	186 ± 5	6 ± 3	608 ± 27	339 ± 20	NM ± NM	1.57 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-WS-231	844	4	A	38 ± 6	15 ± 3	121 ± 4	52 ± 3	38 ± 2	254 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-231	845	3	A	46 ± 6	16 ± 3	123 ± 4	52 ± 3	42 ± 2	258 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-231	847	2	A	42 ± 7	23 ± 4	110 ± 5	74 ± 3	27 ± 2	111 ± 5	7 ± 3	657 ± 30	359 ± 20	NM ± NM	0.94 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	848	4	A	89 ± 8	23 ± 4	110 ± 5	35 ± 3	58 ± 2	129 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Cougar Mountain	
35-WS-231	848	4	B	65 ± 7	20 ± 4	134 ± 5	64 ± 3	46 ± 2	285 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano	
35-WS-231	848	4	C	34 ± 6	14 ± 3	85 ± 4	99 ± 3	26 ± 2	139 ± 5	5 ± 3	1032 ± 29	383 ± 20	NM ± NM	1.35 ± 0.08	NM ± NM	NM	Unknown H	
35-WS-231	849	5	A	71 ± 6	17 ± 3	139 ± 4	65 ± 3	43 ± 2	184 ± 5	12 ± 3	660 ± 24	337 ± 20	NM ± NM	1.55 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-WS-231	849	5	B	62 ± 6	24 ± 3	134 ± 4	57 ± 3	44 ± 2	170 ± 5	8 ± 3	483 ± 25	329 ± 20	NM ± NM	1.50 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-WS-231	849	5	C	48 ± 7	13 ± 4	116 ± 5	56 ± 3	28 ± 2	97 ± 5	5 ± 3	496 ± 28	341 ± 20	NM ± NM	0.75 ± 0.08	NM ± NM	NM	Little Bear Creek	
35-WS-231	850	1	—	35 ± 6	16 ± 3	68 ± 4	39 ± 3	44 ± 2	104 ± 5	9 ± 3	577 ± 25	361 ± 20	NM ± NM	0.86 ± 0.08	NM ± NM	NM	Unknown I	
35-WS-231	851	4	A	46 ± 6	14 ± 3	84 ± 4	22 ± 3	51 ± 2	85 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	
35-WS-231	852	3	A	35 ± 7	14 ± 4	106 ± 4	70 ± 3	27 ± 2	103 ± 5	9 ± 3	632 ± 28	340 ± 20	NM ± NM	0.89 ± 0.08	NM ± NM	NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	853	4	A	84 ± 7	20 ± 4	139 ± 5	66 ± 3	44 ± 2	187 ± 5	8 ± 3	540 ± 27	319 ± 20	NM ± NM	1.50 ± 0.08	NM ± NM	NM	Quartz Mountain	
35-WS-231	853	4	B	47 ± 6	12 ± 3	89 ± 4	24 ± 3	54 ± 2	95 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	Artifact Source/Chemical Type	
35-WS-231	854	4	A	73 ± 6	18 ± 3	132 ± 4	59 ± 3	47 ± 2	181 ± 5	8 ± 3	627 ± 25	332 ± 20	NM ± NM	1.53 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	854	4	B	46 ± 6	17 ± 3	121 ± 4	65 ± 3	18 ± 2	95 ± 5	12 ± 3	529 ± 23	421 ± 20	NM ± NM	0.77 ± 0.08	NM NM	Little Bear Creek	
35-WS-231	854	4	C	64 ± 6	19 ± 3	138 ± 4	59 ± 3	45 ± 2	183 ± 5	9 ± 3	627 ± 25	344 ± 20	NM ± NM	1.55 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	854	4	D	44 ± 7	16 ± 4	87 ± 4	101 ± 3	30 ± 2	138 ± 5	5 ± 3	1181 ± 28	408 ± 20	NM ± NM	1.46 ± 0.08	NM NM	Whitewater Ridge?	
35-WS-231	857	5	A	44 ± 8	15 ± 5	131 ± 5	96 ± 4	26 ± 2	123 ± 5	9 ± 3	797 ± 33	274 ± 20	NM ± NM	1.10 ± 0.08	NM NM	Whitewater Ridge	
35-WS-231	861	4	—	71 ± 7	16 ± 4	140 ± 5	60 ± 3	39 ± 2	176 ± 5	5 ± 3	630 ± 30	330 ± 20	NM ± NM	1.45 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	861	6	A	20 ± 10	4 ± 39	NM ± NM	35 ± 3	27 ± 2	14 ± 6	NM ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
35-WS-231	870	2	A	57 ± 6	17 ± 4	91 ± 4	24 ± 3	52 ± 2	93 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	873	4	A	44 ± 6	14 ± 3	94 ± 4	67 ± 3	25 ± 2	97 ± 5	4 ± 3	636 ± 26	354 ± 20	NM ± NM	0.99 ± 0.08	NM NM	Little Bear Cr./Whitewater R./Juniper Sp. 1	
35-WS-231	875	2	A	54 ± 5	19 ± 3	123 ± 4	55 ± 3	41 ± 2	168 ± 5	8 ± 3	543 ± 24	360 ± 20	NM ± NM	1.61 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	875	2	B	57 ± 7	25 ± 3	143 ± 5	62 ± 3	43 ± 2	284 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	877	5	A	65 ± 6	19 ± 3	119 ± 4	54 ± 3	40 ± 2	168 ± 5	8 ± 3	537 ± 26	301 ± 20	NM ± NM	1.35 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	877	5	B	77 ± 7	17 ± 4	139 ± 5	63 ± 3	44 ± 2	178 ± 5	7 ± 3	498 ± 27	330 ± 20	NM ± NM	1.47 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	909	3	A	67 ± 7	20 ± 4	144 ± 5	62 ± 3	45 ± 2	292 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	909	3	B	51 ± 7	16 ± 4	100 ± 4	104 ± 4	32 ± 2	139 ± 5	4 ± 3	928 ± 31	367 ± 20	NM ± NM	1.27 ± 0.08	NM NM	Whitewater Ridge?	
35-WS-231	913	2	A	68 ± 6	25 ± 3	133 ± 4	60 ± 3	40 ± 2	173 ± 5	4 ± 3	541 ± 26	362 ± 20	NM ± NM	1.56 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	913	2	B	76 ± 6	24 ± 3	146 ± 4	65 ± 3	46 ± 2	194 ± 5	8 ± 3	512 ± 25	337 ± 20	NM ± NM	1.49 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	914	3	A	92 ± 8	19 ± 5	166 ± 5	66 ± 3	48 ± 2	186 ± 5	8 ± 3	542 ± 29	329 ± 20	NM ± NM	1.52 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	915	3	A	72 ± 8	21 ± 4	142 ± 5	61 ± 3	48 ± 2	184 ± 5	8 ± 3	560 ± 30	347 ± 20	NM ± NM	1.54 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	915	3	B	83 ± 7	16 ± 4	139 ± 5	58 ± 3	40 ± 2	178 ± 5	8 ± 3	533 ± 29	334 ± 20	NM ± NM	1.43 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	915	3	C	61 ± 6	15 ± 4	134 ± 5	60 ± 3	44 ± 2	270 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	921	2	A	58 ± 6	21 ± 3	116 ± 4	48 ± 3	40 ± 2	159 ± 5	8 ± 3	592 ± 25	357 ± 20	NM ± NM	1.60 ± 0.08	NM NM	Quartz Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	921	2	B	64 ± 6	14 ± 4	135 ± 5	58 ± 3	44 ± 2	270 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	921	2	C	76 ± 7	24 ± 4	138 ± 5	61 ± 3	46 ± 2	178 ± 5	8 ± 3	520 ± 27	360 ± 20	NM ± NM	1.64 ± 0.08	NM	NM	Quartz Mountain
35-WS-231	922	3	A	73 ± 6	21 ± 3	138 ± 4	58 ± 3	46 ± 2	177 ± 5	7 ± 3	542 ± 25	325 ± 20	NM ± NM	1.48 ± 0.08	NM	NM	Quartz Mountain
35-WS-231	924	3	—	57 ± 6	16 ± 3	130 ± 4	56 ± 3	41 ± 2	174 ± 5	9 ± 3	509 ± 23	315 ± 20	NM ± NM	1.39 ± 0.08	NM	NM	Quartz Mountain
35-WS-231	924	4	A	89 ± 6	24 ± 3	143 ± 5	63 ± 3	49 ± 2	187 ± 5	8 ± 3	557 ± 25	352 ± 20	NM ± NM	1.54 ± 0.08	NM	NM	Quartz Mountain
35-WS-231	925	3	A	77 ± 7	20 ± 4	133 ± 5	55 ± 3	44 ± 2	179 ± 5	9 ± 3	530 ± 26	357 ± 20	NM ± NM	1.56 ± 0.08	NM	NM	Quartz Mountain
35-WS-231	926	1	A	65 ± 7	23 ± 4	115 ± 5	58 ± 3	32 ± 2	99 ± 5	6 ± 3	498 ± 27	372 ± 20	NM ± NM	0.78 ± 0.08	NM	NM	Whitewater Ridge
35-WS-231	943	2	A	55 ± 7	15 ± 4	89 ± 4	104 ± 4	26 ± 2	141 ± 5	10 ± 3	1120 ± 32	395 ± 20	NM ± NM	1.45 ± 0.08	NM	NM	Whitewater Ridge?
35-WS-231	948	2	A	71 ± 7	15 ± 4	139 ± 5	64 ± 3	44 ± 2	176 ± 5	8 ± 3	644 ± 27	353 ± 20	NM ± NM	1.59 ± 0.08	NM	NM	Quartz Mountain
35-WS-231	955	2	A	78 ± 7	22 ± 4	146 ± 5	62 ± 3	44 ± 2	173 ± 5	8 ± 3	614 ± 26	351 ± 20	NM ± NM	1.58 ± 0.08	NM	NM	Quartz Mountain
35-WS-231	955	2	B	54 ± 7	15 ± 4	84 ± 4	108 ± 4	17 ± 2	95 ± 5	3 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-WS-231	955	2	C	57 ± 7	17 ± 4	81 ± 4	112 ± 3	15 ± 2	95 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-WS-231	957	4	A	70 ± 5	20 ± 3	124 ± 4	63 ± 3	47 ± 2	175 ± 5	7 ± 3	647 ± 24	349 ± 20	NM ± NM	1.58 ± 0.08	NM	NM	Quartz Mountain
35-WS-231	958	2	A	58 ± 7	13 ± 4	86 ± 4	21 ± 3	50 ± 2	89 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes
35-WS-231	962	2	A	75 ± 8	22 ± 4	149 ± 5	69 ± 3	46 ± 2	289 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	985	3	A	57 ± 6	20 ± 3	132 ± 4	59 ± 3	43 ± 2	287 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	999	3	A	57 ± 7	15 ± 4	135 ± 5	30 ± 3	50 ± 2	276 ± 5	31 ± 3	1188 ± 30	359 ± 20	NM ± NM	1.62 ± 0.08	NM	NM	Chickahominy
35-WS-231	1000	5	A	48 ± 7	20 ± 3	99 ± 4	115 ± 3	28 ± 2	143 ± 5	7 ± 3	1018 ± 30	394 ± 20	NM ± NM	1.38 ± 0.08	NM	NM	Unknown H
35-WS-231	1000	5	B	61 ± 6	16 ± 3	138 ± 4	59 ± 3	41 ± 2	270 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	1027	3	A	45 ± 6	16 ± 3	87 ± 4	99 ± 3	26 ± 2	134 ± 5	8 ± 3	1079 ± 28	373 ± 20	NM ± NM	1.33 ± 0.08	NM	NM	Juniper Spring 2
35-WS-231	1027	3	B	64 ± 6	23 ± 3	141 ± 4	59 ± 3	48 ± 2	290 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	1027	3	C	44 ± 6	19 ± 3	84 ± 4	113 ± 3	16 ± 2	103 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	1029	2	A	60 ± 7	17 ± 4	125 ± 5	64 ± 3	48 ± 2	204 ± 5	16 ± 3	831 ± 29	379 ± 20	NM ± NM	1.13 ± 0.08	NM NM	Quartz Mountain/McKay Butte	
35-WS-231	1030	4	A	54 ± 7	10 ± 4	108 ± 4	120 ± 4	28 ± 2	151 ± 5	6 ± 3	1598 ± 32	407 ± 20	NM ± NM	1.63 ± 0.08	NM NM	Unknown H	
35-WS-231	1031	4	A	49 ± 6	19 ± 3	96 ± 4	25 ± 3	56 ± 2	99 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	1031	4	B	84 ± 7	19 ± 4	162 ± 5	72 ± 3	47 ± 2	194 ± 5	10 ± 3	708 ± 29	344 ± 20	NM ± NM	1.57 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1032	3	A	53 ± 6	18 ± 3	129 ± 4	61 ± 3	35 ± 2	100 ± 5	9 ± 3	610 ± 29	361 ± 20	NM ± NM	0.83 ± 0.08	NM NM	Little Bear Creek	
35-WS-231	1032	3	B	54 ± 6	15 ± 3	133 ± 4	54 ± 3	43 ± 2	272 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1033	3	A	44 ± 6	18 ± 3	130 ± 4	56 ± 3	41 ± 2	267 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1033	3	B	39 ± 6	15 ± 3	88 ± 4	96 ± 3	25 ± 2	133 ± 5	7 ± 3	1112 ± 27	428 ± 20	NM ± NM	1.50 ± 0.08	NM NM	Juniper Spring 2	
35-WS-231	1033	3	C	52 ± 6	19 ± 3	90 ± 4	116 ± 3	19 ± 2	102 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	1034	4	A	69 ± 6	19 ± 3	135 ± 4	58 ± 3	44 ± 2	182 ± 5	9 ± 3	501 ± 24	320 ± 20	NM ± NM	1.38 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1034	4	B	64 ± 6	19 ± 3	140 ± 4	65 ± 3	47 ± 2	188 ± 5	8 ± 3	515 ± 25	314 ± 20	NM ± NM	1.43 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1037	1	—	47 ± 6	17 ± 3	121 ± 4	53 ± 3	39 ± 2	168 ± 5	9 ± 3	522 ± 23	352 ± 20	NM ± NM	1.54 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1037	2	A	89 ± 7	24 ± 4	155 ± 5	65 ± 3	51 ± 2	195 ± 5	7 ± 3	520 ± 29	325 ± 20	NM ± NM	1.49 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1037	2	B	55 ± 7	21 ± 4	109 ± 4	114 ± 4	26 ± 2	151 ± 5	2 ± 3	1046 ± 29	379 ± 20	NM ± NM	1.36 ± 0.08	NM NM	Unknown H	
35-WS-231	1038	3	A	74 ± 7	23 ± 4	153 ± 5	64 ± 3	48 ± 2	188 ± 5	7 ± 3	591 ± 28	337 ± 20	NM ± NM	1.53 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1038	3	B	74 ± 6	19 ± 3	132 ± 4	60 ± 3	45 ± 2	179 ± 5	8 ± 3	633 ± 27	361 ± 20	NM ± NM	1.58 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1039	3	A	67 ± 6	14 ± 4	134 ± 4	59 ± 3	44 ± 2	175 ± 5	8 ± 3	560 ± 26	343 ± 20	NM ± NM	1.51 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1039	3	B	60 ± 8	26 ± 4	107 ± 5	27 ± 3	55 ± 3	95 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	1039	3	C	51 ± 6	17 ± 3	93 ± 4	23 ± 3	55 ± 2	95 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	1040	4	A	103 ± 8	13 ± 4	123 ± 5	9 ± 3	70 ± 2	503 ± 6	27 ± 3	1246 ± 23	686 ± 20	NM ± NM	2.24 ± 0.08	NM NM	Unknown E	
35-WS-231	1040	4	B	42 ± 7	17 ± 4	98 ± 4	105 ± 3	27 ± 2	142 ± 5	3 ± 3	1057 ± 29	388 ± 20	NM ± NM	1.37 ± 0.08	NM NM	Whitewater Ridge?	
35-WS-231	1060	3	A	95 ± 6	17 ± 3	124 ± 4	4 ± 3	101 ± 2	171 ± 5	37 ± 3	734 ± 22	662 ± 20	NM ± NM	0.94 ± 0.08	NM NM	Delintment Creek	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	1074	2	A	51 ± 7	11 ± 4	91 ± 4	116 ± 4	29 ± 2	150 ± 5	8 ± 3	1189 ± 30	399 ± 20	NM ± NM	1.48 ± 0.08	NM NM	Unknown H	
35-WS-231	1075	3	A	57 ± 6	17 ± 3	127 ± 4	56 ± 3	40 ± 2	265 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1078	1	—	34 ± 6	12 ± 3	71 ± 4	97 ± 3	15 ± 2	88 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	1078	4	A	37 ± 5	11 ± 3	86 ± 4	78 ± 3	25 ± 2	116 ± 5	5 ± 3	799 ± 24	382 ± 20	NM ± NM	1.16 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	1089	2	A	38 ± 8	27 ± 4	144 ± 5	73 ± 4	20 ± 2	102 ± 5	13 ± 3	669 ± 28	405 ± 20	NM ± NM	0.80 ± 0.08	NM NM	Whitewater Ridge?	
35-WS-231	1093	3	A	40 ± 7	16 ± 4	88 ± 4	26 ± 3	54 ± 2	98 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	1094	3	A	104 ± 7	17 ± 4	115 ± 5	10 ± 3	66 ± 2	468 ± 6	25 ± 3	1188 ± 33	646 ± 20	NM ± NM	2.13 ± 0.08	NM NM	Riley	
35-WS-231	1094	3	B	69 ± 7	22 ± 4	144 ± 5	63 ± 3	47 ± 2	302 ± 5	20 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1095	1	—	57 ± 7	21 ± 4	126 ± 5	60 ± 3	45 ± 2	276 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1097	4	A	55 ± 6	16 ± 4	93 ± 4	116 ± 3	17 ± 2	101 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	1098	4	A	32 ± 6	15 ± 3	76 ± 4	21 ± 3	46 ± 2	85 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	1100	2	A	43 ± 5	16 ± 3	82 ± 4	22 ± 3	50 ± 2	93 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	1104	3	A	59 ± 7	16 ± 4	149 ± 5	66 ± 3	47 ± 2	309 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1106	3	A	82 ± 7	20 ± 4	102 ± 4	34 ± 3	58 ± 2	131 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Cougar Mountain	
35-WS-231	1108	3	A	67 ± 7	24 ± 4	143 ± 5	68 ± 3	45 ± 2	299 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1110	3	A	54 ± 6	25 ± 3	85 ± 4	51 ± 3	54 ± 2	118 ± 5	8 ± 3	499 ± 25	303 ± 20	NM ± NM	0.78 ± 0.08	NM NM	Little Bear Creek	
35-WS-231	1162	2	A	57 ± 6	22 ± 3	107 ± 4	113 ± 3	28 ± 2	146 ± 5	3 ± 3	1110 ± 30	399 ± 20	NM ± NM	1.43 ± 0.08	NM NM	Unknown H	
35-WS-231	1170	2	A	61 ± 6	19 ± 4	106 ± 4	116 ± 3	31 ± 2	150 ± 5	5 ± 3	1105 ± 29	412 ± 20	NM ± NM	1.43 ± 0.08	NM NM	Unknown H	
35-WS-231	1172	2	A	60 ± 5	16 ± 3	130 ± 4	60 ± 3	43 ± 2	170 ± 5	8 ± 3	538 ± 24	354 ± 20	NM ± NM	1.55 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1172	2	B	82 ± 7	23 ± 4	169 ± 5	68 ± 3	52 ± 2	316 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1172	2	C	63 ± 7	10 ± 5	107 ± 5	57 ± 3	38 ± 2	253 ± 5	22 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1173	3	A	39 ± 6	16 ± 3	84 ± 4	23 ± 3	49 ± 2	89 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	1173	3	B	94 ± 7	30 ± 4	161 ± 5	72 ± 3	49 ± 2	202 ± 5	12 ± 3	514 ± 28	337 ± 20	NM ± NM	NM ± NM	1.48 ± 0.08	NM	Quartz Mountain
35-WS-231	1173	3	C	59 ± 6	19 ± 4	139 ± 4	64 ± 3	45 ± 2	289 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	1173	3	D	45 ± 7	17 ± 4	96 ± 4	25 ± 3	55 ± 2	98 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes
35-WS-231	1174	1	A	38 ± 6	19 ± 3	91 ± 4	97 ± 3	26 ± 2	133 ± 5	8 ± 3	807 ± 26	381 ± 20	NM ± NM	NM ± NM	1.23 ± 0.08	NM	Whitewater Ridge
35-WS-231	1174	1	B	48 ± 7	19 ± 4	142 ± 5	99 ± 3	27 ± 2	138 ± 5	10 ± 3	750 ± 30	272 ± 20	NM ± NM	NM ± NM	1.00 ± 0.08	NM	Whitewater Ridge
35-WS-231	1176	1	A	109 ± 8	22 ± 4	147 ± 5	32 ± 3	62 ± 3	335 ± 6	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Unknown J
35-WS-231	1176	1	B	83 ± 8	28 ± 4	171 ± 5	68 ± 3	51 ± 3	312 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano?
35-WS-231	1179	2	A	72 ± 6	21 ± 3	139 ± 4	58 ± 3	43 ± 2	190 ± 5	7 ± 3	534 ± 23	319 ± 20	NM ± NM	NM ± NM	1.43 ± 0.08	NM	Quartz Mountain
35-WS-231	1179	2	B	71 ± 6	20 ± 3	132 ± 4	59 ± 3	43 ± 2	181 ± 5	8 ± 3	552 ± 24	339 ± 20	NM ± NM	NM ± NM	1.44 ± 0.08	NM	Quartz Mountain
35-WS-231	1179	2	C	51 ± 6	16 ± 4	93 ± 4	27 ± 3	53 ± 2	97 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes
35-WS-231	1179	2	D	56 ± 6	19 ± 3	136 ± 4	58 ± 3	41 ± 2	273 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	1179	2	E	59 ± 6	22 ± 3	133 ± 4	62 ± 3	44 ± 2	177 ± 5	11 ± 3	597 ± 26	330 ± 20	NM ± NM	NM ± NM	1.52 ± 0.08	NM	Quartz Mountain
35-WS-231	1180	3	A	58 ± 6	22 ± 3	140 ± 4	61 ± 3	45 ± 2	280 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	1180	3	B	71 ± 6	20 ± 3	132 ± 4	60 ± 3	44 ± 2	181 ± 5	9 ± 3	522 ± 23	320 ± 20	NM ± NM	NM ± NM	1.38 ± 0.08	NM	Quartz Mountain
35-WS-231	1181	4	A	56 ± 7	15 ± 4	95 ± 4	27 ± 3	59 ± 2	97 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes
35-WS-231	1181	4	B	37 ± 6	8 ± 4	NM ± NM	24 ± 3	3 ± 3	12 ± 6	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Not Obsidian
35-WS-231	1181	4	C	77 ± 7	22 ± 4	156 ± 5	67 ± 3	49 ± 2	205 ± 5	8 ± 3	458 ± 28	317 ± 20	NM ± NM	NM ± NM	1.41 ± 0.08	NM	Quartz Mountain
35-WS-231	1183	1	A	57 ± 7	23 ± 4	148 ± 5	69 ± 3	44 ± 2	294 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	1184	2	A	55 ± 6	21 ± 3	141 ± 4	60 ± 3	44 ± 2	288 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	1184	2	B	65 ± 6	22 ± 3	134 ± 4	58 ± 3	42 ± 2	179 ± 5	6 ± 3	549 ± 26	358 ± 20	NM ± NM	NM ± NM	1.53 ± 0.08	NM	Quartz Mountain
35-WS-231	1184	2	C	36 ± 6	14 ± 3	85 ± 4	100 ± 3	25 ± 2	136 ± 5	6 ± 3	973 ± 29	361 ± 20	NM ± NM	NM ± NM	1.26 ± 0.08	NM	Whitewater Ridge?
35-WS-231	1186	3	A	82 ± 7	27 ± 4	145 ± 5	69 ± 3	47 ± 2	185 ± 5	7 ± 3	632 ± 27	344 ± 20	NM ± NM	NM ± NM	1.54 ± 0.08	NM	Quartz Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Trace Element Concentrations*													Ratio Fe/Mn	Artifact Source/ Chemical Type	
			Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>					
PEP 7-3	1	1	NM	NM	75	99	25	279	8	NM	NM	NM	NM	NM	NM	NM	NM	Deer Creek/Burn Butte?
			± NM	± NM	± 3	± 12	± 3	± 7	± 3	± NM	± NM	± NM	± NM	± NM	± NM	± NM	± NM	NM
PEP 7-3	2	1	41	13	73	81	27	244	5	NM	NM	NM	NM	NM	NM	NM	NM	Deer Creek/Burn Butte?
			± 5	± 3	± 5	± 3	± 2	± 4	± 3	± NM	± NM	± NM	± NM	± NM	± NM	± NM	± NM	NM

\* All trace element values in parts per million; ± = pooled estimate (in ppm) of x-ray counting uncertainty and regression fitting error; NA = Not available; NM = Not measured.

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	1186	3	B	71 ± 6	19 ± 3	96 ± 4	25 ± 3	56 ± 2	97 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes
35-WS-231	1186	3	C	47 ± 6	17 ± 4	101 ± 4	108 ± 3	28 ± 2	146 ± 5	6 ± 3	1026 ± 28	391 ± 20	NM ± NM	1.35 ± 0.08	NM ± NM	NM ± NM	Unknown H
35-WS-231	1186	3	D	64 ± 7	23 ± 4	115 ± 5	122 ± 4	34 ± 2	159 ± 5	7 ± 3	1268 ± 34	455 ± 20	NM ± NM	1.60 ± 0.08	NM ± NM	NM ± NM	Unknown H
35-WS-231	1187	1	A	207 ± 8	23 ± 4	127 ± 4	4 ± 3	105 ± 2	694 ± 7	54 ± 3	809 ± 26	470 ± 20	NM ± NM	2.33 ± 0.08	NM ± NM	NM ± NM	Unknown O
35-WS-231	1187	1	B	112 ± 6	19 ± 3	104 ± 4	NM ± NM	81 ± 2	503 ± 5	46 ± 3	726 ± 24	488 ± 20	NM ± NM	2.34 ± 0.08	NM ± NM	NM ± NM	Unknown E
35-WS-231	1189	3	A	60 ± 8	15 ± 4	102 ± 5	111 ± 4	29 ± 2	145 ± 5	7 ± 3	1063 ± 33	387 ± 20	NM ± NM	1.33 ± 0.08	NM ± NM	NM ± NM	Unknown H
35-WS-231	1189	3	B	83 ± 7	21 ± 4	150 ± 5	66 ± 3	44 ± 2	191 ± 5	8 ± 3	593 ± 29	331 ± 20	NM ± NM	1.47 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-231	1191	3	A	44 ± 6	18 ± 3	83 ± 4	109 ± 3	13 ± 2	93 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-231	1191	3	B	71 ± 7	18 ± 4	149 ± 5	65 ± 3	50 ± 2	299 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	1196	1	A	70 ± 6	21 ± 3	144 ± 4	62 ± 3	44 ± 2	182 ± 5	6 ± 3	491 ± 24	336 ± 20	NM ± NM	1.42 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-231	1197	2	A	61 ± 7	15 ± 4	96 ± 4	99 ± 4	25 ± 2	131 ± 5	1 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Whitewater Ridge
35-WS-231	1203	2	A	89 ± 8	23 ± 4	149 ± 5	70 ± 3	43 ± 3	195 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Quartz Mountain/McKay Butte
35-WS-231	1207	1	A	52 ± 6	15 ± 4	122 ± 4	7 ± 3	72 ± 2	89 ± 5	13 ± 3	457 ± 22	418 ± 20	NM ± NM	0.72 ± 0.08	NM ± NM	NM ± NM	Potato Hills
35-WS-231	1207	1	B	59 ± 6	27 ± 3	124 ± 4	57 ± 3	37 ± 2	170 ± 5	4 ± 3	550 ± 29	342 ± 20	NM ± NM	1.41 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-231	1209	1	A	94 ± 7	22 ± 4	145 ± 5	66 ± 3	45 ± 2	197 ± 5	10 ± 3	661 ± 28	379 ± 20	NM ± NM	1.65 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-231	1210	3	A	64 ± 7	25 ± 3	144 ± 5	62 ± 3	44 ± 2	185 ± 5	10 ± 3	449 ± 27	325 ± 20	NM ± NM	1.38 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-231	1210	3	B	77 ± 7	23 ± 4	142 ± 5	63 ± 3	46 ± 2	188 ± 5	7 ± 3	546 ± 27	346 ± 20	NM ± NM	1.46 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-231	1211	3	A	55 ± 6	18 ± 3	136 ± 4	60 ± 3	45 ± 2	287 ± 5	19 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano
35-WS-231	1212	3	A	78 ± 7	21 ± 4	157 ± 5	64 ± 3	48 ± 2	199 ± 5	8 ± 3	507 ± 28	346 ± 20	NM ± NM	1.46 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-231	1215	2	A	53 ± 7	23 ± 4	81 ± 4	110 ± 4	18 ± 2	99 ± 5	4 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Obsidian Cliffs
35-WS-231	1230	4	A	64 ± 6	14 ± 3	126 ± 4	55 ± 3	41 ± 2	168 ± 5	7 ± 3	430 ± 24	324 ± 20	NM ± NM	1.36 ± 0.08	NM ± NM	NM ± NM	Quartz Mountain
35-WS-231	1230	4	B	56 ± 6	18 ± 4	150 ± 4	62 ± 3	45 ± 2	302 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>										Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn	
35-WS-231	1230	4	C	47 ± 7	19 ± 3	92 ± 4	105 ± 3	27 ± 2	140 ± 5	8 ± 3	966 ± 30	395 ± 20	NM ± NM	1.33 ± 0.08	NM NM	Whitewater Ridge?
35-WS-231	1232	2	A	47 ± 6	19 ± 4	94 ± 4	22 ± 3	56 ± 2	98 ± 5	10 ± 3	1053 ± 33	679 ± 20	NM ± NM	2.03 ± 0.08	NM NM	Glass Buttes
35-WS-231	1232	2	B	59 ± 6	25 ± 3	98 ± 4	125 ± 4	17 ± 2	106 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs
35-WS-231	1232	2	C	83 ± 7	18 ± 4	107 ± 4	10 ± 3	62 ± 2	447 ± 6	24 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Riley
35-WS-231	1234	1	A	70 ± 6	17 ± 3	141 ± 4	66 ± 3	45 ± 2	182 ± 5	6 ± 3	514 ± 25	338 ± 20	NM ± NM	1.44 ± 0.08	NM NM	Quartz Mountain
35-WS-231	1234	1	B	41 ± 6	17 ± 3	91 ± 4	23 ± 3	54 ± 2	98 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes
35-WS-231	1234	4	—	42 ± 8	18 ± 4	77 ± 4	95 ± 4	16 ± 2	93 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs
35-WS-231	1235	3	A	57 ± 6	27 ± 3	110 ± 4	27 ± 3	58 ± 2	99 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes
35-WS-231	1236	1	A	75 ± 7	24 ± 4	142 ± 5	65 ± 3	48 ± 2	188 ± 5	9 ± 3	526 ± 28	342 ± 20	NM ± NM	1.48 ± 0.08	NM NM	Quartz Mountain
35-WS-231	1237	2	A	40 ± 6	24 ± 3	84 ± 4	25 ± 3	52 ± 2	88 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes
35-WS-231	1240	4	A	49 ± 6	17 ± 3	132 ± 4	56 ± 3	43 ± 2	281 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano
35-WS-231	1246	1	A	63 ± 5	22 ± 3	129 ± 4	59 ± 3	42 ± 2	174 ± 5	7 ± 3	449 ± 25	354 ± 20	NM ± NM	1.52 ± 0.08	NM NM	Quartz Mountain
35-WS-231	1251	3	A	44 ± 6	18 ± 3	92 ± 4	105 ± 3	28 ± 2	138 ± 5	7 ± 3	991 ± 29	401 ± 20	NM ± NM	1.38 ± 0.08	NM NM	Whitewater Ridge?
35-WS-231	1260	2	A	44 ± 8	13 ± 5	162 ± 5	65 ± 3	35 ± 3	139 ± 5	20 ± 3	685 ± 31	316 ± 20	NM ± NM	1.09 ± 0.08	NM NM	Unknown K
35-WS-231	1289	7	A	73 ± 7	22 ± 3	147 ± 5	64 ± 3	46 ± 2	190 ± 5	10 ± 3	419 ± 27	303 ± 20	NM ± NM	1.27 ± 0.08	NM NM	Quartz Mountain
35-WS-231	1290	3	A	73 ± 6	20 ± 3	149 ± 4	62 ± 3	43 ± 2	196 ± 5	7 ± 3	549 ± 25	339 ± 20	NM ± NM	1.44 ± 0.08	NM NM	Quartz Mountain
35-WS-231	1293	4	A	41 ± 6	12 ± 3	85 ± 4	110 ± 3	14 ± 2	98 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs
35-WS-231	1301	4	A	74 ± 6	21 ± 3	137 ± 5	64 ± 3	46 ± 2	183 ± 5	6 ± 3	409 ± 26	311 ± 20	NM ± NM	1.32 ± 0.08	NM NM	Quartz Mountain.
35-WS-231	1305	3	A	63 ± 6	15 ± 3	128 ± 4	59 ± 3	21 ± 2	178 ± 5	7 ± 3	470 ± 24	331 ± 20	NM ± NM	1.38 ± 0.08	NM NM	Quartz Mountain
35-WS-231	1309	3	A	39 ± 6	16 ± 3	99 ± 4	66 ± 3	27 ± 2	100 ± 5	5 ± 3	506 ± 26	342 ± 20	NM ± NM	0.78 ± 0.08	NM NM	Little Bear Cr./Whitewater R./Juniper Sp. 1
35-WS-231	1342	3	A	58 ± 6	20 ± 4	125 ± 5	79 ± 3	31 ± 2	118 ± 5	9 ± 3	477 ± 27	370 ± 20	NM ± NM	0.85 ± 0.08	NM NM	Whitewater Ridge
35-WS-231	1344	2	—	47 ± 6	17 ± 3	124 ± 4	54 ± 3	38 ± 2	164 ± 5	8 ± 3	549 ± 25	374 ± 20	NM ± NM	1.67 ± 0.08	NM NM	Quartz Mountain

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-231	1354	3	A	51 ± 6	13 ± 3	138 ± 4	58 ± 3	42 ± 2	282 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano	
35-WS-231	1356	3	A	76 ± 6	27 ± 3	140 ± 4	64 ± 3	47 ± 2	185 ± 5	7 ± 3	446 ± 25	346 ± 20	NM ± NM	1.39 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1357	4	A	72 ± 6	21 ± 3	135 ± 4	59 ± 3	44 ± 2	179 ± 5	9 ± 3	506 ± 25	356 ± 20	NM ± NM	1.46 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1358	3	A	88 ± 6	21 ± 3	151 ± 5	68 ± 3	50 ± 2	188 ± 5	6 ± 3	477 ± 27	331 ± 20	NM ± NM	1.41 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1360	3	A	74 ± 6	26 ± 3	147 ± 5	63 ± 3	47 ± 2	190 ± 5	10 ± 3	529 ± 27	334 ± 20	NM ± NM	1.41 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1373	3	A	73 ± 6	22 ± 4	153 ± 5	63 ± 3	44 ± 2	192 ± 5	10 ± 3	490 ± 26	320 ± 20	NM ± NM	1.30 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1374	4	A	78 ± 7	26 ± 3	159 ± 5	69 ± 3	46 ± 2	192 ± 5	9 ± 3	547 ± 26	361 ± 20	NM ± NM	1.54 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1374	4	B	58 ± 6	19 ± 3	92 ± 4	23 ± 3	56 ± 2	92 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Glass Buttes		
35-WS-231	1378	1	—	75 ± 7	19 ± 4	133 ± 5	61 ± 3	42 ± 2	179 ± 5	12 ± 3	518 ± 27	320 ± 20	NM ± NM	1.39 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1378	4	A	70 ± 6	21 ± 3	142 ± 4	61 ± 3	45 ± 2	182 ± 5	6 ± 3	524 ± 24	352 ± 20	NM ± NM	1.49 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1378	4	B	87 ± 6	20 ± 4	138 ± 5	61 ± 3	45 ± 2	188 ± 5	4 ± 3	461 ± 27	309 ± 20	NM ± NM	1.32 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1383	2	A	51 ± 7	23 ± 4	175 ± 5	25 ± 3	41 ± 2	67 ± 5	12 ± 3	433 ± 24	544 ± 20	200 ± NA	0.61 ± 0.08	NM ± NM	Round Top Butte		
35-WS-231	1393	3	A	72 ± 6	14 ± 4	132 ± 4	61 ± 3	42 ± 2	179 ± 5	8 ± 3	501 ± 27	315 ± 20	NM ± NM	1.32 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1394	2	A	74 ± 7	19 ± 4	97 ± 4	48 ± 3	68 ± 2	397 ± 5	19 ± 3	1295 ± 34	428 ± 20	NM ± NM	1.68 ± 0.08	NM ± NM	Unknown L		
35-WS-231	1395	3	A	67 ± 6	25 ± 3	134 ± 4	62 ± 3	41 ± 2	183 ± 5	9 ± 3	524 ± 25	349 ± 20	NM ± NM	1.49 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1395	3	B	74 ± 6	20 ± 4	133 ± 4	63 ± 3	45 ± 2	186 ± 5	8 ± 3	448 ± 26	345 ± 20	NM ± NM	1.43 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1397	3	A	40 ± 6	15 ± 3	89 ± 4	102 ± 3	25 ± 2	136 ± 5	9 ± 3	1142 ± 28	383 ± 20	NM ± NM	1.50 ± 0.08	NM ± NM	Whitewater Ridge?		
35-WS-231	1397	3	B	66 ± 6	18 ± 4	139 ± 5	60 ± 3	43 ± 2	280 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	Newberry Volcano		
35-WS-231	1401	6	A	64 ± 6	16 ± 4	138 ± 4	61 ± 3	46 ± 2	184 ± 5	7 ± 3	585 ± 24	324 ± 20	NM ± NM	1.60 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1403	3	A	75 ± 7	24 ± 4	146 ± 5	67 ± 3	49 ± 2	188 ± 5	5 ± 3	600 ± 27	319 ± 20	NM ± NM	1.63 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1403	3	B	79 ± 6	18 ± 3	135 ± 4	63 ± 3	45 ± 2	185 ± 5	7 ± 3	554 ± 24	283 ± 20	NM ± NM	1.45 ± 0.08	NM ± NM	Quartz Mountain		
35-WS-231	1408	4	A	79 ± 6	21 ± 3	145 ± 4	63 ± 3	46 ± 2	191 ± 5	4 ± 3	613 ± 24	328 ± 20	NM ± NM	1.63 ± 0.08	NM ± NM	Quartz Mountain		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	1408	4	B	81 ± 6	21 ± 3	139 ± 4	64 ± 3	47 ± 2	187 ± 5	12 ± 3	564 ± 25	299 ± 20	NM ± NM	1.49 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1422	4	A	43 ± 6	18 ± 3	74 ± 4	98 ± 3	16 ± 2	89 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	1423	1	—	42 ± 6	14 ± 3	118 ± 4	52 ± 3	38 ± 2	164 ± 5	7 ± 3	564 ± 24	346 ± 20	NM ± NM	1.54 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1423	4	A	44 ± 6	16 ± 3	83 ± 4	106 ± 3	19 ± 2	95 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	1424	2	—	40 ± 6	14 ± 3	75 ± 4	97 ± 3	17 ± 2	88 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	1424	4	A	76 ± 7	25 ± 4	136 ± 5	66 ± 3	50 ± 2	187 ± 5	10 ± 3	757 ± 28	333 ± NA	NM ± NM	1.67 ± NA	NM NM	Quartz Mountain	
35-WS-231	1428	1	—	31 ± 6	18 ± 3	86 ± 4	57 ± 3	24 ± 2	92 ± 5	8 ± 3	640 ± 26	385 ± 20	NM ± NM	0.91 ± 0.08	NM NM	Juniper Spring 1	
35-WS-231	1431	2	A	41 ± 5	19 ± 3	78 ± 4	22 ± 3	50 ± 2	88 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
35-WS-231	1434	2	A	95 ± 7	19 ± 4	151 ± 5	65 ± 3	44 ± 2	187 ± 5	8 ± 3	691 ± 28	319 ± 20	NM ± NM	1.62 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1435	3	A	44 ± 7	20 ± 3	91 ± 4	116 ± 3	17 ± 2	101 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	1435	3	B	53 ± 7	14 ± 4	104 ± 4	73 ± 3	29 ± 2	110 ± 5	9 ± 3	785 ± 29	336 ± 20	NM ± NM	0.96 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	1436	3	A	45 ± 6	14 ± 4	124 ± 4	65 ± 3	25 ± 2	108 ± 5	8 ± 3	759 ± 27	279 ± 20	NM ± NM	1.03 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	1437	1	—	51 ± 6	17 ± 3	127 ± 4	54 ± 3	40 ± 2	263 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1437	4	A	76 ± 7	24 ± 3	142 ± 5	61 ± 3	44 ± 2	178 ± 5	11 ± 3	779 ± 27	341 ± 20	NM ± NM	1.76 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1440	4	A	68 ± 7	20 ± 4	154 ± 5	72 ± 3	45 ± 2	307 ± 5	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1460	1	A	68 ± 6	15 ± 4	142 ± 4	64 ± 3	46 ± 2	289 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-231	1466	1	A	98 ± 6	26 ± 4	149 ± 5	66 ± 3	44 ± 2	198 ± 5	11 ± 3	661 ± 25	337 ± 20	NM ± NM	1.73 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1469	1	A	170 ± 7	19 ± 4	111 ± 4	1 ± 4	89 ± 2	612 ± 6	42 ± 3	973 ± 25	492 ± 20	NM ± NM	2.82 ± 0.08	NM NM	Horse Mountain	
35-WS-231	1489	1	A	74 ± 6	21 ± 3	139 ± 4	63 ± 3	45 ± 2	179 ± 5	8 ± 3	901 ± 27	326 ± 20	NM ± NM	1.76 ± 0.08	NM NM	McKay Butte	
35-WS-231	1490	1	A	45 ± 7	18 ± 4	83 ± 4	109 ± 3	17 ± 2	95 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-231	1491	1	A	78 ± 7	19 ± 4	138 ± 5	64 ± 3	49 ± 2	186 ± 5	14 ± 3	700 ± 29	287 ± 20	NM ± NM	1.52 ± 0.08	NM NM	Quartz Mountain	
35-WS-231	1492	1	A	42 ± 7	9 ± 5	89 ± 4	100 ± 3	27 ± 2	134 ± 5	5 ± 3	1255 ± 33	404 ± 20	NM ± NM	1.57 ± 0.08	NM NM	Whitewater Ridge?	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-231	1492	1	B	48 ± 7	16 ± 4	134 ± 5	58 ± 3	40 ± 2	274 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-WS-231	1493	1	A	86 ± 6	20 ± 4	155 ± 5	70 ± 3	45 ± 2	196 ± 5	11 ± 3	785 ± 27	369 ± 20	NM ± NM	1.84 ± 0.08	NM	Quartz Mountain		
35-WS-231	1494	1	A	35 ± 6	17 ± 3	109 ± 4	62 ± 3	23 ± 2	87 ± 5	9 ± 3	648 ± 22	438 ± 20	NM ± NM	0.86 ± 0.08	NM	Little Bear Creek		
35-WS-231	1495	1	A	101 ± 7	24 ± 4	160 ± 5	76 ± 3	48 ± 2	196 ± 5	8 ± 3	669 ± 31	333 ± 20	NM ± NM	1.63 ± 0.08	NM	Quartz Mountain		
35-WS-231	1495	1	B	57 ± 7	21 ± 4	94 ± 4	29 ± 3	56 ± 2	93 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes			
35-WS-231	1500	1	A	80 ± 7	20 ± 4	150 ± 5	70 ± 3	49 ± 2	191 ± 5	10 ± 3	601 ± 26	341 ± 20	NM ± NM	1.66 ± 0.08	NM	Quartz Mountain		
35-WS-231	1502	1	A	74 ± 6	19 ± 3	141 ± 4	62 ± 3	45 ± 2	183 ± 5	10 ± 3	578 ± 23	322 ± 20	NM ± NM	1.63 ± 0.08	NM	Quartz Mountain		
35-WS-231	1503	1	A	69 ± 6	20 ± 3	120 ± 4	55 ± 3	41 ± 2	171 ± 5	9 ± 3	578 ± 26	317 ± 20	NM ± NM	1.56 ± 0.08	NM	Quartz Mountain		
35-WS-231	1505	1	A	66 ± 7	19 ± 4	149 ± 5	68 ± 3	46 ± 2	295 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-WS-231	1510	1	A	46 ± 6	11 ± 4	110 ± 4	88 ± 3	28 ± 2	121 ± 5	8 ± 3	889 ± 29	272 ± 20	NM ± NM	1.14 ± 0.08	NM	Whitewater Ridge		
35-WS-231	1538	1	—	48 ± 6	18 ± 3	119 ± 4	54 ± 3	38 ± 2	169 ± 5	9 ± 3	1335 ± 27	424 ± 20	NM ± NM	1.98 ± 0.08	NM	McKay Butte		
35-WS-231	1539	3	A	53 ± 6	16 ± 3	93 ± 4	105 ± 3	29 ± 2	140 ± 5	7 ± 3	1208 ± 27	390 ± 20	NM ± NM	1.49 ± 0.08	NM	Whitewater Ridge?		
35-WS-231	1541	1	—	38 ± 6	18 ± 3	124 ± 4	54 ± 3	39 ± 2	256 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano			
35-WS-231	1541	3	A	102 ± 7	20 ± 4	93 ± 4	80 ± 3	76 ± 2	402 ± 5	18 ± 3	1447 ± 31	610 ± 20	NM ± NM	2.33 ± 0.08	NM	Unknown G		
35-WS-231	1543	1	—	47 ± 6	19 ± 3	119 ± 4	50 ± 3	40 ± 2	251 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano?			
35-WS-231	1543	5	A	41 ± 6	14 ± 3	78 ± 4	101 ± 3	16 ± 2	93 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-WS-231	1555	3	A	50 ± 6	14 ± 4	81 ± 4	112 ± 3	19 ± 2	95 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-WS-231	1555	3	B	52 ± 7	16 ± 4	96 ± 4	117 ± 4	17 ± 2	100 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-WS-231	1556	2	—	42 ± 6	12 ± 3	75 ± 4	20 ± 3	45 ± 2	85 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes			
35-WS-231	1557	4	A	45 ± 7	17 ± 4	90 ± 4	115 ± 4	19 ± 2	102 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Obsidian Cliffs			
35-WS-231	1564	3	A	36 ± 6	14 ± 3	97 ± 4	68 ± 3	26 ± 2	100 ± 5	7 ± 3	578 ± 25	344 ± 20	NM ± NM	0.94 ± 0.08	NM	Little Bear Creek/Whitewater Ridge		
35-WS-231	1565	3	A	103 ± 8	25 ± 4	165 ± 5	71 ± 3	44 ± 3	189 ± 5	5 ± 3	725 ± 30	356 ± 20	NM ± NM	1.74 ± 0.08	NM	Quartz Mountain		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*												Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn			
35-WS-231	1565	3	B	55 ± 7	19 ± 4	89 ± 4	101 ± 3	27 ± 2	134 ± 5	2 ± 3	1194 ± 29	372 ± 20	NM ± NM	1.46 ± 0.08	NM	Whitewater Ridge?		
35-WS-231	1566	5	A	212 ± 10	20 ± 5	134 ± 5	3 ± 3	101 ± 3	692 ± 8	47 ± 4	1016 ± 28	481 ± 20	NM ± NM	2.88 ± 0.08	NM	Horse Mountain		
35-WS-231	1568	3	A	53 ± 6	17 ± 3	96 ± 4	26 ± 3	55 ± 2	101 ± 5	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes		
35-WS-231	1569	2	—	37 ± 6	12 ± 3	77 ± 4	19 ± 3	48 ± 2	87 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes		
35-WS-231	1569	5	A	64 ± 6	20 ± 3	144 ± 4	61 ± 3	45 ± 2	292 ± 5	16 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-231	1569	5	B	44 ± 7	16 ± 4	116 ± 4	91 ± 3	26 ± 2	121 ± 5	8 ± 3	791 ± 27	366 ± 20	NM ± NM	1.15 ± 0.08	NM	Whitewater Ridge		
35-WS-231	1570	3	A	101 ± 7	20 ± 3	91 ± 4	74 ± 3	71 ± 2	387 ± 5	19 ± 3	1364 ± 28	604 ± 20	NM ± NM	2.35 ± 0.08	NM	Unknown G		
35-WS-231	1570	3	B	59 ± 6	24 ± 3	113 ± 4	85 ± 3	29 ± 2	117 ± 5	10 ± 3	726 ± 28	356 ± 20	NM ± NM	1.03 ± 0.08	NM	Whitewater Ridge		
35-WS-231	1570	3	C	52 ± 6	20 ± 4	85 ± 4	114 ± 3	17 ± 2	94 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs		
35-WS-231	1570	3	D	60 ± 6	16 ± 4	90 ± 4	112 ± 3	16 ± 2	102 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs		
35-WS-231	1572	5	A	41 ± 6	9 ± 4	92 ± 4	23 ± 3	50 ± 2	86 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes		
35-WS-231	1572	6	—	27 ± 7	14 ± 4	90 ± 4	62 ± 3	24 ± 2	93 ± 5	4 ± 3	511 ± 27	382 ± 20	NM ± NM	0.88 ± 0.08	NM	Juniper Spring 1		
35-WS-231	1575	2	A	54 ± 6	15 ± 4	100 ± 4	96 ± 3	29 ± 2	125 ± 5	7 ± 3	958 ± 28	380 ± 20	NM ± NM	1.28 ± 0.08	NM	Whitewater Ridge?		
35-WS-231	1613	2	A	50 ± 7	20 ± 4	125 ± 4	54 ± 3	44 ± 2	282 ± 5	14 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-231	1614	2	A	40 ± 6	14 ± 3	80 ± 4	93 ± 3	24 ± 2	125 ± 5	6 ± 3	1339 ± 30	391 ± 20	NM ± NM	1.53 ± 0.08	NM	Juniper Spring 2		
35-WS-231	1616	3	A	68 ± 7	21 ± 4	147 ± 5	67 ± 3	45 ± 2	193 ± 5	10 ± 3	801 ± 29	362 ± 20	NM ± NM	1.80 ± 0.08	NM	Quartz Mountain		
35-WS-231	1617	2	A	69 ± 6	28 ± 3	140 ± 4	60 ± 3	42 ± 2	181 ± 5	7 ± 3	676 ± 25	341 ± 20	NM ± NM	1.69 ± 0.08	NM	Quartz Mountain		
35-WS-231	1618	2	A	63 ± 6	17 ± 4	151 ± 4	64 ± 3	42 ± 2	297 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano		
35-WS-231	1619	3	A	77 ± 6	17 ± 4	141 ± 4	60 ± 3	45 ± 2	192 ± 5	8 ± 3	583 ± 25	333 ± 20	NM ± NM	1.61 ± 0.08	NM	Quartz Mountain		
35-WS-231	1620	3	A	36 ± 6	14 ± 3	98 ± 4	66 ± 3	26 ± 2	102 ± 5	4 ± 3	576 ± 25	337 ± 20	NM ± NM	0.91 ± 0.08	NM	Little Bear Cr./Whitewater R./Juniper Sp. 1		
35-WS-231	1620	3	B	89 ± 7	18 ± 4	139 ± 5	67 ± 3	43 ± 2	183 ± 5	11 ± 3	680 ± 27	316 ± 20	NM ± NM	1.60 ± 0.08	NM	Quartz Mountain		
35-WS-231	1620	3	C	47 ± 7	12 ± 4	100 ± 4	89 ± 3	25 ± 2	126 ± 5	10 ± 3	932 ± 27	344 ± 20	NM ± NM	1.19 ± 0.08	NM	Whitewater Ridge		

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	1622	3	A	63 ± 6	21 ± 3	131 ± 4	60 ± 3	44 ± 2	173 ± 5	6 ± 3	630 ± 23	334 ± 20	NM ± NM	1.67 ± 0.08	NM	Quartz Mountain	
35-WS-231	1625	2	A	69 ± 7	20 ± 4	146 ± 5	64 ± 3	43 ± 2	292 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano	
35-WS-231	1625	2	B	35 ± 6	14 ± 3	87 ± 4	97 ± 3	22 ± 2	132 ± 5	8 ± 3	1167 ± 25	393 ± 20	NM ± NM	1.52 ± 0.08	NM	Whitewater Ridge	
35-WS-231	1626	3	A	54 ± 6	19 ± 3	133 ± 4	57 ± 3	41 ± 2	172 ± 5	7 ± 3	646 ± 24	351 ± 20	NM ± NM	1.73 ± 0.08	NM	Quartz Mountain	
35-WS-231	1626	3	B	51 ± 6	15 ± 4	101 ± 4	101 ± 3	29 ± 2	137 ± 5	4 ± 3	1070 ± 29	380 ± 20	NM ± NM	1.41 ± 0.08	NM	Whitewater Ridge	
35-WS-231	1626	3	C	46 ± 7	20 ± 3	105 ± 4	110 ± 3	26 ± 2	142 ± 5	4 ± 3	1196 ± 28	423 ± 20	NM ± NM	1.54 ± 0.08	NM	Unknown H	
35-WS-231	1626	4	—	33 ± 6	15 ± 3	70 ± 4	98 ± 3	15 ± 2	89 ± 5	5 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs	
35-WS-231	1630	3	A	38 ± 6	12 ± 3	84 ± 4	95 ± 3	26 ± 2	132 ± 5	6 ± 3	1290 ± 27	412 ± 20	NM ± NM	1.60 ± 0.08	NM	Juniper Spring 2	
35-WS-231	1630	3	B	44 ± 7	16 ± 4	96 ± 4	107 ± 3	30 ± 2	141 ± 5	5 ± 3	1213 ± 30	386 ± 20	NM ± NM	1.51 ± 0.08	NM	Unknown H	
35-WS-231	1631	2	A	55 ± 7	19 ± 4	112 ± 5	86 ± 3	27 ± 2	117 ± 5	10 ± 3	964 ± 30	367 ± 20	NM ± NM	1.18 ± 0.08	NM	Whitewater Ridge	
35-WS-231	1631	2	B	35 ± 6	12 ± 4	97 ± 4	63 ± 3	27 ± 2	100 ± 5	10 ± 3	794 ± 30	386 ± 20	NM ± NM	1.08 ± 0.08	NM	Little Bear Cr./Whitewater R./Juniper Sp. 1	
35-WS-231	1632	3	A	41 ± 6	18 ± 3	92 ± 4	24 ± 3	53 ± 2	92 ± 5	13 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes	
35-WS-231	1632	3	B	33 ± 7	14 ± 4	94 ± 4	89 ± 3	26 ± 2	125 ± 5	10 ± 3	902 ± 27	357 ± 20	NM ± NM	1.23 ± 0.08	NM	Whitewater Ridge	
35-WS-231	1632	3	C	63 ± 7	14 ± 4	98 ± 4	35 ± 3	53 ± 2	126 ± 5	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	NM	Cougar Mountain	
35-WS-231	1633	1	A	51 ± 6	16 ± 3	96 ± 4	99 ± 3	27 ± 2	134 ± 5	9 ± 3	1130 ± 27	379 ± 20	NM ± NM	1.39 ± 0.08	NM	Juniper Spring 2	
35-WS-231	1634	1	A	42 ± 6	12 ± 3	89 ± 4	95 ± 3	23 ± 2	127 ± 5	4 ± 3	1099 ± 26	381 ± 20	NM ± NM	1.40 ± 0.08	NM	Juniper Spring 2	
35-WS-231	1634	1	B	60 ± 6	19 ± 3	129 ± 4	57 ± 3	43 ± 2	173 ± 5	6 ± 3	677 ± 25	355 ± 20	NM ± NM	1.75 ± 0.08	NM	Quartz Mountain	
35-WS-231	1638	3	—	57 ± 6	20 ± 3	122 ± 4	53 ± 3	39 ± 2	166 ± 5	7 ± 3	586 ± 25	360 ± 20	NM ± NM	1.59 ± 0.08	NM	Quartz Mountain	
35-WS-231	1670	1	—	42 ± 6	15 ± 3	116 ± 4	51 ± 3	37 ± 2	178 ± 5	6 ± 3	1083 ± 27	371 ± 20	NM ± NM	1.73 ± 0.08	NM	McKay Butte	
35-WS-231	1869	1	A	61 ± 5	16 ± 3	121 ± 4	54 ± 3	41 ± 2	165 ± 5	6 ± 3	572 ± 24	343 ± 20	NM ± NM	1.68 ± 0.08	NM	Quartz Mountain	
35-WS-231	1869	1	B	55 ± 7	16 ± 4	142 ± 5	3 ± 3	82 ± 2	88 ± 5	10 ± 3	453 ± 21	467 ± 20	NM ± NM	0.79 ± 0.08	NM	Potato Hills	
35-WS-231	1869	1	C	70 ± 7	27 ± 4	143 ± 5	66 ± 3	46 ± 2	185 ± 5	9 ± 3	639 ± 27	332 ± 20	NM ± NM	1.68 ± 0.08	NM	Quartz Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations*											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	1872	2	A	82 ± 6	19 ± 3	136 ± 4	57 ± 3	41 ± 2	177 ± 5	7 ± 3	618 ± 24	299 ± 20	NM ± NM	1.49 ± 0.08	NM	Quartz Mountain	
35-WS-231	1964	2	A	53 ± 6	15 ± 4	124 ± 4	55 ± 3	43 ± 2	262 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-WS-231	2037	3	A	33 ± 7	14 ± 4	91 ± 4	93 ± 3	24 ± 2	129 ± 5	8 ± 3	1001 ± 28	364 ± 20	NM ± NM	1.30 ± 0.08	NM	Juniper Spring 2	
35-WS-231	2137	3	A	79 ± 7	22 ± 4	123 ± 4	4 ± 3	57 ± 2	345 ± 5	15 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Silver Lake/Sycan Marsh		
35-WS-231	2173	1	A	71 ± 7	20 ± 4	138 ± 5	62 ± 3	40 ± 2	177 ± 5	13 ± 3	642 ± 28	298 ± 20	NM ± NM	1.51 ± 0.08	NM	Quartz Mountain	
35-WS-231	2224	3	A	74 ± 7	30 ± 4	140 ± 5	63 ± 3	46 ± 2	181 ± 5	6 ± 3	711 ± 26	325 ± 20	NM ± NM	1.55 ± 0.08	NM	Quartz Mountain	
35-WS-231	2231	2	A	98 ± 7	14 ± 4	113 ± 4	7 ± 3	62 ± 2	437 ± 6	23 ± 3	1319 ± 29	714 ± 20	NM ± NM	2.45 ± 0.08	NM	Riley	
35-WS-231	2282	3	A	79 ± 7	27 ± 4	148 ± 5	64 ± 3	45 ± 2	187 ± 5	9 ± 3	665 ± 27	318 ± 20	NM ± NM	1.58 ± 0.08	NM	Quartz Mountain	
35-WS-231	2289	3	A	63 ± 7	13 ± 4	100 ± 4	99 ± 3	29 ± 2	138 ± 5	9 ± 3	977 ± 35	354 ± 20	NM ± NM	1.26 ± 0.08	NM	Whitewater Ridge?	
35-WS-231	2324	3	A	57 ± 7	16 ± 4	93 ± 4	25 ± 3	57 ± 2	95 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Glass Buttes		
35-WS-231	2324	3	B	53 ± 8	25 ± 4	149 ± 5	64 ± 3	47 ± 3	297 ± 6	18 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	Newberry Volcano		
35-WS-231	2330	1	A	93 ± 6	17 ± 3	72 ± 4	118 ± 3	43 ± 2	323 ± 5	23 ± 3	1522 ± 32	667 ± 20	NM ± NM	2.90 ± 0.08	NM	Unknown M	
35-WS-231	2330	1	B	97 ± 6	24 ± 3	74 ± 4	126 ± 3	44 ± 2	327 ± 5	19 ± 3	1375 ± 32	595 ± 20	NM ± NM	2.62 ± 0.08	NM	Unknown M	
35-WS-231	2332	1	A	67 ± 7	20 ± 4	119 ± 4	25 ± 3	56 ± 2	303 ± 5	19 ± 3	1088 ± 30	433 ± 20	NM ± NM	1.67 ± 0.08	NM	Silver Lake/Sycan Marsh	
35-WS-231	2332	1	B	86 ± 8	21 ± 4	122 ± 5	25 ± 3	57 ± 3	300 ± 5	24 ± 3	1030 ± 34	404 ± 20	NM ± NM	1.57 ± 0.08	NM	Silver Lake/Sycan Marsh	
35-WS-231	2357	3	A	75 ± 7	17 ± 4	98 ± 4	33 ± 3	57 ± 2	124 ± 5	11 ± 3	832 ± NA	378 ± NA	NM ± NM	1.16 ± NA	NM	Cougar Mountain	
35-WS-231	2357	3	B	32 ± 6	15 ± 3	92 ± 4	73 ± 3	27 ± 2	107 ± 5	4 ± 3	NM ± 24	NM ± 20	NM ± NM	NM ± 0.08	NM	Little Bear Cr./Whitewater R./Juniper Sp. 2	
35-WS-231	2412	3	A	67 ± 7	12 ± 4	105 ± 4	67 ± 3	29 ± 2	104 ± 5	5 ± 3	572 ± 27	335 ± 20	NM ± NM	0.91 ± 0.08	NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	2412	3	B	41 ± 6	16 ± 3	94 ± 4	59 ± 3	26 ± 2	98 ± 5	6 ± 3	746 ± 28	388 ± 20	NM ± NM	1.09 ± 0.08	NM	Little Bear Creek/Juniper Spring 1	
35-WS-231	2436	3	A	40 ± 7	17 ± 3	94 ± 4	81 ± 3	28 ± 2	120 ± 5	6 ± 3	978 ± 28	367 ± 20	NM ± NM	1.28 ± 0.08	NM	Juniper Spring 2/Whitewater Ridge?	
35-WS-231	2457	4	A	32 ± 6	17 ± 3	98 ± 4	64 ± 3	28 ± 2	99 ± 5	7 ± 3	826 ± 27	394 ± 20	NM ± NM	1.11 ± 0.08	NM	Little Bear Cr./Whitewater R./Juniper Sp. 1	
35-WS-231	2457	4	B	71 ± 6	26 ± 3	136 ± 4	60 ± 3	44 ± 2	180 ± 5	8 ± 3	732 ± 24	350 ± 20	NM ± NM	1.76 ± 0.08	NM	Quartz Mountain	

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Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Fe <sub>2</sub> O <sub>3</sub>	Ratio Fe/Mn	Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba				
35-WS-231	2457	4	C	76 ± 6	20 ± 3	106 ± 4	23 ± 3	57 ± 2	283 ± 5	20 ± 3	1228 ± 28	443 ± 20	NM ± NM	NM ± NM	1.81 ± 0.08	NM	Chickahominy
35-WS-231	2461	3	A	59 ± 7	24 ± 4	150 ± 5	69 ± 3	44 ± 2	302 ± 5	17 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	2465	2	A	56 ± 7	9 ± 5	94 ± 4	26 ± 3	59 ± 2	98 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Glass Buttes
35-WS-231	2477	2	A	58 ± 6	20 ± 3	129 ± 4	58 ± 3	42 ± 2	166 ± 5	7 ± 3	685 ± 26	304 ± 20	NM ± NM	NM ± NM	1.54 ± 0.08	NM	Quartz Mountain
35-WS-231	2480	3	A	46 ± 7	18 ± 4	79 ± 4	106 ± 3	15 ± 2	93 ± 5	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-WS-231	2489	2	A	94 ± 7	19 ± 4	137 ± 5	63 ± 3	46 ± 2	183 ± 5	5 ± 3	628 ± 27	318 ± 20	NM ± NM	NM ± NM	1.59 ± 0.08	NM	Quartz Mountain
35-WS-231	2490	3	A	52 ± 6	18 ± 3	75 ± 4	124 ± 3	30 ± 2	165 ± 5	5 ± 3	1956 ± 30	508 ± 20	NM ± NM	NM ± NM	2.22 ± 0.08	NM	Unknown N
35-WS-231	2516	2	A	63 ± 7	17 ± 4	89 ± 4	113 ± 4	19 ± 2	100 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-WS-231	2520	1	A	73 ± 7	19 ± 4	135 ± 5	62 ± 3	46 ± 2	189 ± 5	9 ± 3	649 ± 25	305 ± 20	NM ± NM	NM ± NM	1.51 ± 0.08	NM	Quartz Mountain
35-WS-231	2589	3	A	80 ± 7	19 ± 4	102 ± 4	38 ± 3	55 ± 2	132 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Cougar Mountain
35-WS-231	2591	2	A	82 ± 7	23 ± 4	149 ± 5	68 ± 3	43 ± 2	189 ± 5	7 ± 3	620 ± 26	309 ± 20	NM ± NM	NM ± NM	1.52 ± 0.08	NM	Quartz Mountain
35-WS-231	2622	4	A	40 ± 8	13 ± 5	92 ± 5	107 ± 4	29 ± 2	140 ± 5	4 ± 3	1219 ± 33	371 ± 20	NM ± NM	NM ± NM	1.47 ± 0.08	NM	Whitewater Ridge?
35-WS-231	2624	3	A	60 ± 6	19 ± 3	128 ± 4	55 ± 3	41 ± 2	173 ± 5	11 ± 3	687 ± 24	334 ± 20	NM ± NM	NM ± NM	1.66 ± 0.08	NM	Quartz Mountain
35-WS-231	2624	3	B	46 ± 6	15 ± 3	86 ± 4	99 ± 3	25 ± 2	133 ± 5	8 ± 3	1221 ± 28	415 ± 20	NM ± NM	NM ± NM	1.60 ± 0.08	NM	Juniper Spring 2
35-WS-231	2624	3	C	64 ± 6	15 ± 4	140 ± 5	62 ± 3	44 ± 2	289 ± 5	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Newberry Volcano
35-WS-231	2636	4	A	43 ± 6	13 ± 4	109 ± 4	72 ± 3	28 ± 2	107 ± 5	11 ± 3	610 ± 25	332 ± 20	NM ± NM	NM ± NM	0.96 ± 0.08	NM	Little Bear Creek/Whitewater Ridge
35-WS-231	2637	2	A	36 ± 7	17 ± 3	92 ± 4	103 ± 3	28 ± 2	127 ± 5	7 ± 3	1010 ± 29	358 ± 20	NM ± NM	NM ± NM	1.37 ± 0.08	NM	Whitewater Ridge?
35-WS-231	2684	1	A	48 ± 6	19 ± 3	82 ± 4	113 ± 3	16 ± 2	96 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-WS-231	2684	1	B	55 ± 7	16 ± 4	83 ± 4	107 ± 3	14 ± 2	95 ± 5	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-WS-231	2690	3	A	53 ± 7	19 ± 4	100 ± 4	123 ± 4	16 ± 2	101 ± 5	6 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	NM	Obsidian Cliffs
35-WS-231	2711	4	A	46 ± 7	10 ± 4	89 ± 4	99 ± 3	23 ± 2	138 ± 5	6 ± 3	1286 ± 28	389 ± 20	NM ± NM	NM ± NM	1.55 ± 0.08	NM	Juniper Spring 2
35-WS-231	2712	4	A	34 ± 6	19 ± 3	95 ± 4	80 ± 3	25 ± 2	115 ± 5	5 ± 3	986 ± 26	410 ± 20	NM ± NM	NM ± NM	1.32 ± 0.08	NM	Little Bear Cr./Whitewater R./Juniper Sp. 2

C.1-301

Appendix C.1 Results of Northwest Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Trace Element Concentrations <sup>a</sup>											Ratio		Artifact Source/Chemical Type
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe <sub>2</sub> O <sub>3</sub>	Fe/Mn		
35-WS-231	2712	4	B	41 ± 7	17 ± 3	105 ± 4	69 ± 3	28 ± 2	100 ± 5	5 ± 3	691 ± 28	353 ± 20	NM ± NM	0.96 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	2712	4	C	46 ± 7	20 ± 4	114 ± 5	73 ± 3	29 ± 2	111 ± 5	8 ± 3	620 ± 28	346 ± 20	NM ± NM	0.98 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	2712	4	D	47 ± 6	18 ± 3	112 ± 4	73 ± 3	29 ± 2	109 ± 5	8 ± 3	702 ± 26	428 ± 20	NM ± NM	1.06 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	2717	1	—	23 ± 7	13 ± 3	79 ± 4	81 ± 3	23 ± 2	111 ± 5	4 ± 3	942 ± 26	399 ± 20	1134 ± 14	1.27 ± 0.08	NM NM	Juniper Spring 2/Whitewater Ridge	
35-WS-231	2718	1	—	35 ± 6	15 ± 3	89 ± 4	75 ± 3	25 ± 2	106 ± 5	6 ± 3	891 ± 26	405 ± 20	1208 ± 14	1.18 ± 0.08	NM NM	Little Bear Creek/Whitewater Ridge	
35-WS-231	2720	3	A	41 ± 6	13 ± 3	81 ± 4	105 ± 3	17 ± 2	91 ± 5	7 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-232	24	7	—	65 ± 5	15 ± 3	103 ± 5	19 ± 3	50 ± 2	279 ± 4	19 ± 2	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Chickahominy?	
35-WS-232	24	8	—	39 ± 5	14 ± 3	102 ± 5	51 ± 3	30 ± 2	94 ± 4	11 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Little Bear Creek/Juniper Spring 2	
35-WS-232	25	2	—	71 ± 7	21 ± 4	147 ± 5	62 ± 3	44 ± 2	289 ± 5	19 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-233	18	1	—	59 ± 5	15 ± 3	125 ± 5	56 ± 3	42 ± 2	196 ± 4	12 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
35-WS-233	20	1	A	62 ± 8	28 ± 4	145 ± 6	63 ± 3	48 ± 2	298 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-233	20	1	B	78 ± 7	15 ± 4	150 ± 6	63 ± 3	47 ± 2	285 ± 5	18 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-233	21	1	—	58 ± 7	22 ± 3	142 ± 5	58 ± 3	46 ± 2	292 ± 5	20 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Newberry Volcano	
35-WS-233	21	2	—	36 ± 6	14 ± 3	77 ± 5	96 ± 3	14 ± 2	90 ± 4	10 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Obsidian Cliffs	
35-WS-233	25	1	—	89 ± 7	10 ± 4	106 ± 5	7 ± 3	63 ± 2	434 ± 6	26 ± 5	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Riley?	
35-WS-233	26	1	—	53 ± 5	23 ± 3	189 ± 5	25 ± 3	45 ± 2	120 ± 4	21 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	
35-WS-239	22	1	—	NM ± NM	NM ± NM	92 ± 4	82 ± 12	17 ± 4	122 ± 7	8 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge	
OR-JE-5	4	1	—	84 ± 7	21 ± 4	156 ± 5	63 ± 3	45 ± 2	194 ± 5	17 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Quartz Mountain/McKay Butte	
PEP 5-76	2	2	A	44 ± 5	17 ± 3	120 ± 5	85 ± 3	26 ± 2	125 ± 4	9 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Whitewater Ridge	
PEP 5-76	2	2	B	191 ± 11	23 ± 5	43 ± 5	273 ± 6	56 ± 3	246 ± 6	22 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Not Obsidian	
PEP 6-23	3	1	—	34 ± 5	14 ± 3	84 ± 5	21 ± 3	49 ± 2	83 ± 4	10 ± 3	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Glass Buttes	
PEP 6-23	4	1	—	39 ± 6	15 ± 3	71 ± 5	43 ± 3	48 ± 2	111 ± 4	13 ± 4	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM NM	Unknown A	

C.1-302



Appendix C.2 Results of California Obsidian Characterization Studies.

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-CCO-129	4	1	Napa Valley	83 ±8	20 ±4	213 ±5	7 ±3	51 ±5	238 ±3	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-129	5	1	Napa Valley	84 ±7	21 ±4	206 ±5	7 ±2	52 ±5	235 ±3	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-129	6	1	Napa Valley	70 ±6	18 ±3	165 ±5	6 ±2	47 ±5	206 ±3	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-129	7	1	Napa Valley	75 ±6	27 ±4	197 ±5	4 ±2	51 ±5	229 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-129	8	1	Napa Valley	69 ±6	21 ±3	188 ±5	5 ±2	49 ±5	229 ±3	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-129	9	1	Napa Valley	78 ±6	12 ±3	198 ±5	5 ±2	50 ±5	234 ±3	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	1	1	Annadel	77 ±6	18 ±4	143 ±4	51 ±2	54 ±5	280 ±3	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	2	1	Napa Valley	72 ±6	20 ±4	200 ±5	6 ±2	48 ±5	248 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	3	1	Bodie Hills	41 ±6	19 ±3	180 ±5	96 ±2	12 ±5	99 ±3	16 ±3	NM ±NM	NM ±NM	NM ±NM	614 ±NA	NM
CA-CCO-368	11	1	A Napa Valley	86 ±8	20 ±4	223 ±5	6 ±3	50 ±5	243 ±3	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	11	1	B Napa Valley	76 ±7	23 ±4	183 ±5	4 ±3	51 ±5	224 ±3	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	12	1	Napa Valley	87 ±8	23 ±4	216 ±5	6 ±3	53 ±5	249 ±4	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	14	1	Unknown A	29 ±6	16 ±3	126 ±4	58 ±2	21 ±5	124 ±3	9 ±3	NM ±NM	NM ±NM	NM ±NM	844 ±NA	NM
CA-CCO-368	22	452	Napa Valley	81 ±8	25 ±4	208 ±5	4 ±3	52 ±3	249 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	466	A Napa Valley	98 ±8	16 ±4	187 ±5	4 ±3	47 ±3	221 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	466	B Napa Valley	82 ±8	19 ±4	166 ±5	7 ±3	46 ±3	212 ±5	11 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	470	Napa Valley	71 ±7	19 ±4	192 ±5	5 ±3	46 ±2	234 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	476	Napa Valley	64 ±6	21 ±3	197 ±5	9 ±3	52 ±2	238 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	488	Napa Valley	106 ±9	27 ±4	211 ±6	5 ±3	46 ±3	226 ±3	40 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	632	Napa Valley	78 ±11	19 ±6	186 ±6	7 ±3	40 ±3	230 ±3	4 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	659	Napa Valley	73 ±7	21 ±4	198 ±5	6 ±3	53 ±2	240 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	782	A Napa Valley	60 ±7	19 ±4	190 ±5	7 ±3	46 ±2	231 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	782	B Napa Valley	88 ±8	23 ±4	207 ±5	6 ±3	48 ±3	259 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-1

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-CCO-368	22	782 C	Napa Valley	101 ±7	24 ±4	211 ±5	8 ±3	53 ±2	247 ±5	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	787	Napa Valley	66 ±8	29 ±4	210 ±5	9 ±3	51 ±3	236 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	809	Napa Valley	81 ±11	20 ±5	205 ±6	6 ±3	50 ±3	234 ±3	3 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	829	Napa Valley	65 ±6	25 ±3	181 ±5	7 ±3	49 ±2	234 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	22	840	Napa Valley	100 ±8	21 ±4	213 ±5	6 ±3	46 ±3	244 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	32	1	Napa Valley	85 ±7	20 ±4	199 ±5	6 ±2	47 ±5	236 ±3	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	33	1	Napa Valley	97 ±8	30 ±4	213 ±5	6 ±3	43 ±5	237 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	35	1	Napa Valley	63 ±6	22 ±3	182 ±5	5 ±2	48 ±5	227 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	120	1	Napa Valley	78 ±7	17 ±4	191 ±5	5 ±2	49 ±5	233 ±3	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	193	1 A	Napa Valley	69 ±7	15 ±4	191 ±5	9 ±2	51 ±5	230 ±3	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	194	1	Napa Valley	116 ±8	22 ±3	206 ±5	9 ±3	52 ±5	236 ±3	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	200	1	Napa Valley	57 ±6	19 ±3	182 ±5	9 ±2	45 ±5	232 ±3	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	201	1	Napa Valley	113 ±8	25 ±4	213 ±5	12 ±3	51 ±5	240 ±4	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	216	1	Napa Valley	85 ±7	17 ±4	187 ±5	8 ±2	50 ±5	222 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	218	1	Napa Valley	69 ±6	17 ±3	194 ±5	19 ±2	49 ±5	232 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	239	3	Mono Glass Mountain	70 ±7	19 ±4	207 ±5	3 ±2	33 ±5	94 ±3	24 ±3	NM ±NM	290 ±NM	0.77 ±NM	NM ±NM	NM
CA-CCO-368	246	1	Casa Diablo (Lookout Mountain)	61 ±8	21 ±4	162 ±5	94 ±2	17 ±5	186 ±3	18 ±3	NM ±NM	NM ±NM	NM ±NM	1026 ±NA	NM
CA-CCO-368	247	1	Annadel	125 ±8	17 ±5	149 ±5	73 ±3	52 ±5	283 ±4	9 ±3	NM ±NM	NM ±NM	NM ±NM	624 ±NA	NM
CA-CCO-368	251	1	Unknown B	38 ±7	15 ±3	145 ±5	47 ±2	15 ±5	93 ±3	19 ±3	NM ±NM	NM ±NM	NM ±NM	57 ±NA	NM
CA-CCO-368	276	1 A	Napa Valley	81 ±7	23 ±4	189 ±5	7 ±2	47 ±5	231 ±3	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	276	1 B	Napa Valley	75 ±6	19 ±3	194 ±5	5 ±2	48 ±5	224 ±3	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	283	4 A	Napa Valley	65 ±6	16 ±3	183 ±5	15 ±2	49 ±5	218 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	283	4 B	Napa Valley	85 ±7	17 ±4	186 ±5	26 ±2	51 ±5	228 ±3	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-2

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-CCO-368	284	2	Napa Valley	81 ±7	20 ±4	204 ±5	8 ±2	48 ±5	228 ±3	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	286	3	Napa Valley	64 ±6	22 ±4	186 ±5	10 ±2	48 ±5	235 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	290	3	Napa Valley	78 ±7	18 ±4	186 ±5	14 ±2	47 ±5	233 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	344	2	Napa Valley	78 ±6	22 ±3	188 ±5	8 ±2	45 ±5	227 ±3	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	357	5 A	Napa Valley	101 ±9	20 ±5	201 ±6	9 ±3	45 ±5	247 ±3	17 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	357	5 B	Napa Valley	66 ±8	20 ±4	185 ±5	6 ±3	49 ±5	239 ±4	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	366	1	Napa Valley	82 ±5	23 ±3	192 ±5	5 ±2	49 ±5	238 ±3	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	368	4	Napa Valley	67 ±6	22 ±3	196 ±5	6 ±2	50 ±5	237 ±3	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	368	5	Annadel	70 ±6	19 ±3	136 ±4	49 ±2	54 ±5	274 ±3	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-CCO-368	379	1	Bodie Hills	37 ±6	15 ±3	177 ±4	96 ±2	14 ±5	98 ±3	13 ±3	NM ±NM	NM ±NM	NM ±NM	588 ±NA	NM
CA-CCO-368	399	3	Borax Lake	64 ±8	22 ±4	235 ±5	13 ±3	49 ±5	98 ±4	16 ±3	823 ±NA	183 ±NA	1.23 ±NA	NM ±NM	NM
CA-CCO-368	401	2	Annadel	78 ±6	19 ±3	134 ±5	45 ±2	50 ±5	264 ±3	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	5	Borax Lake	NM ±NM	NM ±NM	218 ±2	10 ±6	41 ±2	103 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	6	Borax Lake	NM ±NM	NM ±NM	212 ±2	11 ±6	44 ±2	102 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	265	Borax Lake	NM ±NM	NM ±NM	220 ±3	18 ±6	44 ±2	102 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	269	Mt. Konocti	NM ±NM	NM ±NM	209 ±3	70 ±6	39 ±2	198 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	270 A	Napa Valley	NM ±NM	NM ±NM	196 ±3	8 ±6	50 ±3	234 ±7	1 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	270 B	Napa Valley	NM ±NM	NM ±NM	189 ±4	7 ±6	38 ±3	226 ±8	17 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	270 C	Napa Valley	NM ±NM	NM ±NM	206 ±4	6 ±6	43 ±3	273 ±8	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	270 D	Napa Valley	NM ±NM	NM ±NM	196 ±3	6 ±6	50 ±2	233 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	270 E	Napa Valley	NM ±NM	NM ±NM	214 ±3	6 ±6	45 ±3	258 ±8	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	270 F	Borax Lake	NM ±NM	NM ±NM	240 ±3	13 ±6	42 ±2	106 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	270 G	Napa Valley	NM ±NM	NM ±NM	190 ±3	8 ±6	44 ±2	233 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-3

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-COL-165	49	270 H	Napa Valley	NM ±NM	NM ±NM	192 ±3	7 ±6	44 ±2	247 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	270 I	Napa Valley	NM ±NM	NM ±NM	203 ±3	5 ±6	42 ±2	241 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	275 A	Napa Valley	NM ±NM	NM ±NM	200 ±3	7 ±6	46 ±2	236 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	275 B	Napa Valley	NM ±NM	NM ±NM	188 ±4	9 ±6	51 ±3	264 ±8	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	275 C	Borax Lake	NM ±NM	NM ±NM	210 ±3	38 ±6	43 ±2	106 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	275 D	Napa Valley	NM ±NM	NM ±NM	174 ±3	8 ±6	45 ±2	231 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	275 E	Napa Valley	NM ±NM	NM ±NM	188 ±2	7 ±6	43 ±2	232 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	275 F	Napa Valley	NM ±NM	NM ±NM	184 ±2	4 ±6	46 ±2	227 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	275 G	Napa Valley	NM ±NM	NM ±NM	190 ±2	6 ±6	44 ±2	240 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	275 H	Borax Lake	NM ±NM	NM ±NM	222 ±2	8 ±6	43 ±2	100 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 A	Napa Valley	NM ±NM	NM ±NM	181 ±3	6 ±6	39 ±2	221 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 B	Borax Lake	NM ±NM	NM ±NM	225 ±3	12 ±6	40 ±2	100 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 C	Napa Valley	NM ±NM	NM ±NM	198 ±3	7 ±6	45 ±2	228 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 D	Napa Valley	NM ±NM	NM ±NM	185 ±3	7 ±6	44 ±2	242 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 E	Borax Lake	NM ±NM	NM ±NM	239 ±3	17 ±6	44 ±2	105 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 F	Napa Valley	NM ±NM	NM ±NM	198 ±3	6 ±6	44 ±2	237 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 G	Napa Valley	NM ±NM	NM ±NM	196 ±2	5 ±6	46 ±2	246 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 H	Napa Valley	NM ±NM	NM ±NM	208 ±3	5 ±6	47 ±2	249 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 I	Napa Valley	NM ±NM	NM ±NM	196 ±3	6 ±6	44 ±2	238 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 J	Napa Valley	NM ±NM	NM ±NM	201 ±2	5 ±6	46 ±2	251 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 K	Napa Valley	NM ±NM	NM ±NM	189 ±3	7 ±6	39 ±2	230 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	278 L	Napa Valley	NM ±NM	NM ±NM	187 ±3	6 ±6	41 ±2	229 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	284	Napa Valley	NM ±NM	NM ±NM	135 ±3	5 ±6	30 ±2	156 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-4

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-COL-165	49	284 A	Napa Valley	NM ±NM	NM ±NM	207 ±3	9 ±6	43 ±2	233 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	284 B	Napa Valley	NM ±NM	NM ±NM	169 ±2	6 ±6	42 ±2	237 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	284 C	Napa Valley	NM ±NM	NM ±NM	183 ±2	6 ±6	42 ±2	231 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	305 A	Napa Valley	NM ±NM	NM ±NM	204 ±4	9 ±6	45 ±3	241 ±8	16 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	305 B	Napa Valley	NM ±NM	NM ±NM	189 ±3	6 ±6	43 ±2	236 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	305 C	Napa Valley	NM ±NM	NM ±NM	205 ±3	5 ±6	44 ±2	235 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	305 D	Napa Valley	NM ±NM	NM ±NM	194 ±2	8 ±6	46 ±2	241 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	305 E	Napa Valley? (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	305 F	Napa Valley	NM ±NM	NM ±NM	202 ±2	6 ±6	47 ±2	250 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	305 G	Napa Valley	NM ±NM	NM ±NM	203 ±2	5 ±6	48 ±2	249 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	305 H	Napa Valley	NM ±NM	NM ±NM	197 ±2	8 ±6	47 ±2	243 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	309 A	Napa Valley	NM ±NM	NM ±NM	193 ±3	6 ±6	42 ±2	230 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	309 B	Napa Valley	NM ±NM	NM ±NM	209 ±3	6 ±6	46 ±2	242 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	309 C	Napa Valley	NM ±NM	NM ±NM	196 ±2	6 ±6	44 ±2	244 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	314	Napa Valley	NM ±NM	NM ±NM	187 ±2	7 ±6	46 ±2	241 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	315 A	Napa Valley	NM ±NM	NM ±NM	193 ±2	5 ±6	46 ±2	256 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	315 B	Napa Valley	NM ±NM	NM ±NM	220 ±3	7 ±6	49 ±2	258 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	315 C	Napa Valley	NM ±NM	NM ±NM	209 ±2	6 ±6	52 ±2	257 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	319 A	Napa Valley	NM ±NM	NM ±NM	193 ±3	8 ±6	43 ±2	238 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	319 B	Napa Valley	NM ±NM	NM ±NM	208 ±3	8 ±6	47 ±2	258 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	319 C	Napa Valley	NM ±NM	NM ±NM	199 ±3	6 ±6	48 ±2	244 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	319 D	Napa Valley	NM ±NM	NM ±NM	209 ±3	6 ±6	44 ±2	247 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	322 A	Napa Valley	NM ±NM	NM ±NM	216 ±4	7 ±6	43 ±3	232 ±8	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-5

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-COL-165	49	322	B	Borax Lake	NM ±NM	NM ±NM	205 ±3	28 ±6	37 ±2	105 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	322	C	Napa Valley	NM ±NM	NM ±NM	192 ±4	5 ±6	45 ±3	224 ±8	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	323	A	Napa Valley	NM ±NM	NM ±NM	146 ±4	6 ±6	27 ±3	156 ±8	2 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	323	B	Napa Valley	NM ±NM	NM ±NM	160 ±5	5 ±6	34 ±3	180 ±8	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	323	C	Napa Valley	NM ±NM	NM ±NM	183 ±4	5 ±6	33 ±3	202 ±8	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-165	49	323	D	Borax Lake	NM ±NM	NM ±NM	227 ±4	20 ±6	39 ±3	97 ±7	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	5	A	Napa Valley	NM ±NM	NM ±NM	204 ±3	5 ±6	52 ±2	253 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	5	B	Borax Lake	NM ±NM	NM ±NM	228 ±3	17 ±6	42 ±2	106 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	7		Mt. Konocti	NM ±NM	NM ±NM	216 ±4	79 ±6	38 ±3	187 ±8	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	11		Napa Valley	NM ±NM	NM ±NM	176 ±3	6 ±6	41 ±2	221 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	34		Borax Lake	NM ±NM	NM ±NM	214 ±4	12 ±6	36 ±3	99 ±8	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	41		Napa Valley	NM ±NM	NM ±NM	210 ±3	6 ±6	45 ±2	252 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	43		Borax Lake	NM ±NM	NM ±NM	233 ±4	14 ±6	44 ±3	104 ±7	3 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	48	A	Borax Lake	NM ±NM	NM ±NM	219 ±5	9 ±6	36 ±3	87 ±8	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	48	B	Napa Valley	NM ±NM	NM ±NM	189 ±5	5 ±6	35 ±4	200 ±8	11 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	52		Napa Valley	NM ±NM	NM ±NM	185 ±4	10 ±6	37 ±3	208 ±8	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	53		Borax Lake	NM ±NM	NM ±NM	228 ±4	20 ±6	44 ±3	95 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	54	A	Napa Valley	NM ±NM	NM ±NM	210 ±5	6 ±6	33 ±4	211 ±8	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	54	B	Mt. Konocti	NM ±NM	NM ±NM	220 ±4	60 ±6	29 ±3	174 ±8	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	55	A	Napa Valley	NM ±NM	NM ±NM	186 ±2	7 ±6	45 ±2	239 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	55	B	Napa Valley	NM ±NM	NM ±NM	187 ±3	5 ±6	49 ±2	252 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	55	C	Borax Lake	NM ±NM	NM ±NM	219 ±3	24 ±6	44 ±2	107 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	57		Napa Valley	NM ±NM	NM ±NM	196 ±4	9 ±6	50 ±3	223 ±8	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-6

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-COL-178	31	62	A	Napa Valley	NM ±NM	NM ±NM	184 ±2	6 ±6	47 ±2	233 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	62	B	Borax Lake	NM ±NM	NM ±NM	226 ±3	8 ±6	45 ±2	105 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	62	C	Borax Lake	NM ±NM	NM ±NM	241 ±3	14 ±6	46 ±2	106 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	68	A	Napa Valley	NM ±NM	NM ±NM	228 ±3	8 ±6	53 ±2	263 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	68	B	Mt. Konocti	NM ±NM	NM ±NM	216 ±3	69 ±6	36 ±2	194 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	82		Napa Valley	NM ±NM	NM ±NM	168 ±3	9 ±6	43 ±2	223 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	89		Borax Lake	NM ±NM	NM ±NM	251 ±4	8 ±6	39 ±3	105 ±7	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	93		Napa Valley	NM ±NM	NM ±NM	188 ±2	8 ±6	43 ±2	239 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	110		Napa Valley	NM ±NM	NM ±NM	198 ±3	8 ±6	46 ±2	244 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	113		Borax Lake	NM ±NM	NM ±NM	227 ±3	10 ±6	44 ±2	103 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	121		Tuscan	42 ±7	16 ±4	80 ±4	86 ±3	15 ±2	66 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	2		Grasshopper Group	NM ±NM	NM ±NM	139 ±3	76 ±12	27 ±3	194 ±7	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	29	A	Glass Mountain	NM ±NM	NM ±NM	152 ±4	114 ±12	26 ±4	221 ±8	6 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	29	B	Grasshopper Group	NM ±NM	NM ±NM	147 ±4	72 ±12	27 ±4	189 ±7	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	31	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	31	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	31	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	40		Grasshopper Group	NM ±NM	NM ±NM	152 ±2	79 ±6	29 ±2	215 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	54	A	Grasshopper Group	NM ±NM	NM ±NM	152 ±4	83 ±12	28 ±4	203 ±8	8 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	59	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	59	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	95		Cowhead Lake	NM ±NM	NM ±NM	127 ±2	12 ±6	28 ±2	88 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1810
CA-MOD-77	38	101	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-7

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-77	38	101 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	101 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	101 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	101 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	110 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	110 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	110 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	110 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	110 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	112	Grasshopper Group	NM ±NM	NM ±NM	131 ±2	64 ±6	24 ±2	181 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	125	Cowhead Lake	NM ±NM	NM ±NM	114 ±2	11 ±6	25 ±1	87 ±7	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1721
CA-MOD-77	38	143	Cowhead Lake	NM ±NM	NM ±NM	120 ±2	10 ±6	26 ±1	87 ±7	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1788
CA-MOD-77	38	150	Blue Mountain	NM ±NM	NM ±NM	59 ±2	3 ±6	72 ±2	362 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	156	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	68 ±6	26 ±2	181 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	163	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	71 ±6	27 ±1	200 ±7	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	164 A	Grasshopper Group	NM ±NM	NM ±NM	148 ±4	75 ±12	29 ±4	201 ±7	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	164 B	Grasshopper Group?	NM ±NM	NM ±NM	124 ±5	68 ±12	29 ±4	178 ±8	7 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	164 C	Grasshopper Group	NM ±NM	NM ±NM	146 ±4	71 ±12	31 ±3	178 ±7	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	164 D	Cougar Butte	NM ±NM	NM ±NM	153 ±2	4 ±6	64 ±2	152 ±7	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4451
CA-MOD-77	38	164 E	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	79 ±6	29 ±2	215 ±7	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	272 A	Grasshopper Group	38 ±5	18 ±2	146 ±2	76 ±7	27 ±1	198 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	272 B	Blue Mountain	171 ±6	26 ±2	65 ±2	4 ±7	69 ±2	370 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	272 C	Glass Mountain	53 ±6	21 ±3	147 ±3	103 ±7	25 ±2	214 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-8



Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-77	38	272 D	Spodue Mountain	55 ±6	21 ±3	110 ±3	47 ±7	23 ±2	123 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	290 A	Spodue Mountain	47 ±5	11 ±2	95 ±3	45 ±7	24 ±2	118 ±6	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	290 B	Blue Mountain	186 ±7	34 ±3	64 ±3	4 ±8	73 ±2	379 ±6	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	290 C	Unknown A	38 ±6	17 ±3	103 ±3	102 ±7	15 ±2	146 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-MOD-77	38	290 D	Grasshopper Group	41 ±5	15 ±3	164 ±3	79 ±7	28 ±2	208 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	294	Grasshopper Group	83 ±6	12 ±3	128 ±3	65 ±7	27 ±2	177 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	295	Blue Mountain	189 ±9	32 ±4	61 ±3	5 ±8	69 ±2	343 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	323 A	Glass Mountain	50 ±5	15 ±2	142 ±2	105 ±7	25 ±1	211 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	323 B	Grasshopper Group	60 ±5	14 ±2	168 ±3	85 ±7	29 ±2	219 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	323 C	Blue Mountain	193 ±8	23 ±3	63 ±3	5 ±7	69 ±2	370 ±6	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	323 D	Glass Mountain	39 ±7	16 ±4	136 ±3	100 ±8	25 ±2	204 ±6	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 A	Blue Mountain	167 ±5	27 ±2	63 ±2	4 ±7	73 ±2	377 ±6	18 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 B	Grasshopper Group	45 ±6	15 ±3	154 ±3	80 ±7	29 ±2	212 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 C	Grasshopper Group	37 ±5	11 ±2	147 ±3	53 ±7	30 ±2	169 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 D	Grasshopper Group	45 ±5	20 ±3	159 ±3	82 ±7	33 ±2	218 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 E	Grasshopper Group	54 ±7	21 ±3	170 ±4	84 ±8	30 ±2	213 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 F	Grasshopper Group	37 ±4	7 ±2	151 ±2	75 ±7	32 ±1	207 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 G	Grasshopper Group	41 ±5	13 ±2	152 ±3	79 ±7	30 ±2	210 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 H	Blue Mountain	163 ±7	30 ±3	58 ±3	5 ±7	68 ±2	356 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	333 I	Blue Mountain	152 ±7	27 ±4	63 ±3	9 ±7	70 ±2	377 ±6	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	337	Blue Mountain	186 ±9	20 ±5	66 ±4	2 ±3	82 ±3	393 ±6	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	340 A	Cougar Butte	81 ±5	23 ±2	166 ±3	8 ±7	65 ±2	159 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	340 B	Cougar Butte	61 ±6	10 ±3	141 ±3	6 ±7	64 ±2	142 ±6	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-9

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-77	38	340 C	Blue Mountain	201 ±7	25 ±3	67 ±3	5 ±7	73 ±2	384 ±6	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	340 D	Grasshopper Group	42 ±6	11 ±3	134 ±3	75 ±7	24 ±2	195 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	340 E	Grasshopper Group	46 ±6	9 ±2	144 ±3	77 ±7	32 ±2	200 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	340 F	Blue Mountain	160 ±7	30 ±3	60 ±2	4 ±7	70 ±2	355 ±6	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	340 G	Blue Mountain	202 ±9	22 ±4	62 ±3	6 ±8	65 ±2	343 ±6	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	361 A	Grasshopper Group	34 ±6	14 ±3	160 ±3	82 ±7	31 ±2	221 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	361 B	Grasshopper Group	53 ±7	13 ±4	177 ±4	86 ±8	40 ±2	228 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	361 C	Buck Mountain	42 ±6	13 ±3	128 ±3	79 ±7	17 ±2	105 ±6	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	23
CA-MOD-77	38	361 D	Drews Creek/Butcher Flat	51 ±7	16 ±3	133 ±3	16 ±7	26 ±2	80 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	23
CA-MOD-77	38	381	Spodue Mountain	52 ±6	17 ±4	106 ±4	44 ±3	24 ±2	119 ±5	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	392	Spodue Mountain	38 ±6	13 ±3	97 ±4	41 ±3	23 ±2	107 ±5	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-77	38	413	East Medicine Lake	42 ±6	17 ±3	142 ±4	72 ±3	32 ±2	199 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-77	38	414	East Medicine Lake	65 ±8	15 ±4	142 ±5	78 ±3	29 ±2	194 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-MOD-77	38	498	GF/LIW/RS	29 ±7	15 ±3	136 ±4	75 ±3	27 ±2	175 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-MOD-77	38	615	East Medicine Lake	46 ±8	21 ±4	151 ±5	69 ±3	33 ±2	182 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-MOD-128	40	8	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	40	13	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-128	40	14	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-128	40	27	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-128	40	30	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	62	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	82 ±6	27 ±2	221 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	103	Spodue Mountain	NM ±NM	NM ±NM	96 ±2	42 ±6	22 ±2	123 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	234	Unknown D	NM ±NM	NM ±NM	107 ±2	82 ±6	20 ±2	114 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-10

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-129	41	290	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	75 ±6	26 ±2	209 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	315	Blue Mountain	NM ±NM	NM ±NM	64 ±2	3 ±6	74 ±2	387 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	316	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	357 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 B	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	73 ±5	26 ±1	204 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 G	Grasshopper Group	NM ±NM	NM ±NM	161 ±2	81 ±5	29 ±1	217 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	385 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

C.2-11

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

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Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn	
CA-MOD-129	41	410 A	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 B	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 C	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 D	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 E	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 F	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 G	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 H	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 I	Blue Mountain (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 J	Blue Mountain (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 K	Blue Mountain (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	410 L	Blue Mountain (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	416	Grasshopper Group	NM	NM	146	74	34	208	4	NM	NM	NM	NM	NM	NM
				±NM	±NM	±3	±6	±2	±7	±2	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	417	Blue Mountain	NM	NM	63	8	70	363	16	NM	NM	NM	NM	NM	NM
				±NM	±NM	±2	±6	±2	±8	±2	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 A	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 B	Grasshopper Group	NM	NM	143	75	30	200	9	NM	NM	NM	NM	NM	NM
				±NM	±NM	±2	±5	±1	±5	±2	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 C	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 D	Grasshopper Group	NM	NM	139	73	30	204	9	NM	NM	NM	NM	NM	NM
				±NM	±NM	±2	±5	±1	±4	±2	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 E	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 F	Grasshopper Group	NM	NM	147	75	28	208	10	NM	NM	NM	NM	NM	NM
				±NM	±NM	±2	±5	±1	±5	±2	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 G	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 H	Grasshopper Group	NM	NM	NA	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NA	±NA	±NA	±NA	±NA	±NM	±NM	±NM	±NM	±NM	NM
CA-MOD-129	41	418 I	Grasshopper Group	NM	NM	NA	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM
				±NM	±NM	±NA	±NA	±NA	±NA	±NA	±NM	±NM	±NM	±NM	±NM	NM

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>												Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-129	41	418 J	Blue Mountain	NM ±NM	NM ±NM	60 ±2	3 ±5	76 ±1	369 ±5	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	418 K	Blue Mountain (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	418 L	Blue Mountain	NM ±NM	NM ±NM	62 ±1	0 ±0	77 ±1	374 ±5	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	418 M	Blue Mountain	NM ±NM	NM ±NM	64 ±2	2 ±5	76 ±2	377 ±5	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	452	Grasshopper Group	NM ±NM	NM ±NM	149 ±3	78 ±6	31 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	453	McComb Butte	NM ±NM	NM ±NM	94 ±2	69 ±6	20 ±2	73 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	455	Cowhead Lake/Drews Creek-Butcher Flat	NM ±NM	NM ±NM	132 ±2	9 ±6	28 ±2	93 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	457	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	72 ±5	26 ±1	204 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	461	Blue Mountain	NM ±NM	NM ±NM	64 ±2	2 ±6	79 ±2	393 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	468	Buck Mountain/Coglan Buttes	NM ±NM	NM ±NM	111 ±2	62 ±6	17 ±2	105 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	41	469	Glass Mountain	NM ±NM	NM ±NM	149 ±2	112 ±6	25 ±2	233 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	83	1 A	Sugar Hill	65 ±7	19 ±4	160 ±5	63 ±3	26 ±2	130 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	83	1 B	Glass Mountain	59 ±6	14 ±4	150 ±5	118 ±3	27 ±2	225 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	70	
CA-MOD-129	84	4 A	Cougar Butte	83 ±6	19 ±4	181 ±5	5 ±3	75 ±2	159 ±5	20 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	84	4 B	Glass Mountain	56 ±6	15 ±4	152 ±5	120 ±4	32 ±2	237 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	73	
CA-MOD-129	85	1 B	Buck Mountain	49 ±7	14 ±4	112 ±5	70 ±3	20 ±2	69 ±5	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	86	2	East Medicine Lake	49 ±7	15 ±4	139 ±5	74 ±3	31 ±2	203 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61	
CA-MOD-129	86	4 B	Cougar Butte	78 ±7	20 ±4	160 ±5	5 ±3	71 ±2	152 ±5	24 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	87	1 A	Blue Mountain	179 ±10	19 ±5	61 ±5	7 ±3	77 ±2	364 ±5	20 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-129	87	1 B	East Medicine Lake	82 ±8	22 ±4	159 ±5	82 ±4	33 ±3	208 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55	
CA-MOD-129	87	1 C	East Medicine Lake	44 ±7	19 ±4	158 ±5	75 ±4	31 ±2	205 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58	
CA-MOD-129	88	3	East Medicine Lake	28 ±7	16 ±3	149 ±4	75 ±3	31 ±2	215 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58	
CA-MOD-129	88	4 A	East Medicine Lake	52 ±7	15 ±4	148 ±5	76 ±3	30 ±2	212 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-129	89	2	East Medicine Lake	50 ±6	18 ±3	154 ±4	74 ±3	29 ±2	210 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-MOD-129	89	3	Cougar Butte	81 ±6	21 ±3	156 ±5	3 ±3	72 ±2	149 ±5	19 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	90	1	A East Medicine Lake	44 ±5	17 ±3	147 ±4	77 ±3	31 ±2	208 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-129	90	1	B GF/LIW/RS	47 ±6	16 ±3	140 ±4	63 ±3	28 ±2	174 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-MOD-129	91	2	B Warner Mts. Rhyodacite	29 ±7	19 ±3	127 ±4	79 ±3	23 ±2	140 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	37
CA-MOD-129	91	2	C GF/LIW/RS	43 ±5	14 ±3	136 ±4	61 ±3	27 ±2	174 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-MOD-129	92	1	A East Medicine Lake	58 ±7	16 ±4	169 ±5	82 ±3	32 ±2	220 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-129	92	1	B GF/LIW/RS	62 ±7	15 ±4	156 ±5	71 ±4	30 ±2	186 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-MOD-129	93	1	A Sugar Hill	40 ±7	22 ±4	151 ±5	58 ±3	25 ±2	126 ±5	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	93	1	B Drews Creek/Butcher Flat	45 ±6	16 ±4	136 ±5	11 ±3	29 ±2	85 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	15
CA-MOD-129	94	1	B East Medicine Lake	72 ±9	19 ±4	164 ±5	89 ±4	31 ±3	218 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-129	94	1	C Unknown A	59 ±8	25 ±4	141 ±5	30 ±3	26 ±2	93 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	95	1	B East Medicine Lake	64 ±7	21 ±4	172 ±4	82 ±4	32 ±2	209 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-129	95	1	C GF/LIW/RS	37 ±6	16 ±3	145 ±4	50 ±3	30 ±2	162 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-MOD-129	96	1	A Buck Mountain	40 ±6	18 ±3	115 ±4	68 ±3	18 ±2	100 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	96	1	B East Medicine Lake	40 ±6	16 ±3	147 ±4	78 ±3	29 ±2	204 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-129	97	1	Cougar Butte	75 ±6	17 ±3	151 ±5	4 ±3	66 ±2	140 ±5	18 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	98	1	A East Medicine Lake	44 ±6	13 ±4	143 ±5	77 ±3	27 ±2	206 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-129	98	1	B East Medicine Lake	63 ±7	14 ±5	184 ±5	92 ±4	32 ±3	226 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-129	99	1	A GF/LIW/RS	56 ±8	21 ±4	171 ±5	70 ±4	31 ±3	198 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-MOD-129	99	1	B East Medicine Lake	61 ±8	11 ±6	173 ±5	83 ±4	29 ±3	224 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-129	100	1	A GF/LIW/RS	76 ±8	20 ±5	173 ±5	81 ±4	28 ±3	197 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-MOD-129	100	1	B Buck Mountain	42 ±8	10 ±6	104 ±5	66 ±3	15 ±2	91 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-129	101	1	A	Unknown B	63 ±7	20 ±4	172 ±5	46 ±3	28 ±3	111 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	101	1	B	Unknown C	78 ±8	17 ±4	178 ±5	81 ±4	27 ±3	113 ±5	17 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	B	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	79 ±6	28 ±2	214 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	C	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	80 ±6	29 ±2	214 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	D	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	78 ±6	29 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	E	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	78 ±6	29 ±2	212 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	G	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	82 ±6	28 ±2	218 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	H	Grasshopper Group	NM ±NM	NM ±NM	158 ±2	79 ±6	29 ±2	214 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	I	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	70 ±6	27 ±2	204 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	59	J	Unknown A	NM ±NM	NM ±NM	64 ±4	31 ±7	7 ±5	75 ±9	7 ±6	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	A	Grasshopper Group	NM ±NM	NM ±NM	161 ±2	85 ±6	30 ±2	220 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	B	Cougar Butte	NM ±NM	NM ±NM	164 ±2	4 ±6	73 ±2	159 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4320
CA-MOD-1205	42	68	C	Grasshopper Group	NM ±NM	NM ±NM	159 ±2	84 ±6	29 ±2	213 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	D	Grasshopper Group	NM ±NM	NM ±NM	161 ±3	81 ±6	30 ±2	211 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	E	Grasshopper Group	NM ±NM	NM ±NM	163 ±3	89 ±6	26 ±2	208 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	68	J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	112		Grasshopper Group	NM ±NM	NM ±NM	150 ±2	75 ±5	28 ±1	209 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-1205	42	188	Grasshopper Group	NM ±NM	NM ±NM	133 ±2	72 ±5	26 ±1	192 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 A	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	79 ±6	27 ±2	213 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 B	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	76 ±6	29 ±2	206 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 C	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	75 ±6	27 ±2	209 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 D	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	77 ±6	29 ±2	210 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 E	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	76 ±6	28 ±2	210 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 F	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	72 ±6	28 ±2	201 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 G	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±6	30 ±2	209 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 H	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	79 ±6	26 ±2	208 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	192 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	227	Blue Mountain	NM ±NM	NM ±NM	66 ±3	6 ±12	78 ±3	390 ±8	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	263	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	71 ±6	26 ±2	205 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	268	Blue Mountain	NM ±NM	NM ±NM	62 ±3	6 ±12	80 ±3	415 ±8	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	274	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	80 ±6	25 ±2	216 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	275	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	78 ±6	26 ±2	211 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	276	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	79 ±6	32 ±2	214 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	277	Blue Mountain	NM ±NM	NM ±NM	65 ±2	3 ±5	74 ±1	372 ±5	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	279	Cowhead Lake	NM ±NM	NM ±NM	128 ±2	9 ±6	28 ±2	89 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1870
CA-MOD-1205	42	283	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	74 ±6	27 ±2	206 ±7	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	286	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	79 ±6	28 ±2	214 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	294	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	77 ±6	28 ±2	212 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	297	Grasshopper Group	NM ±NM	NM ±NM	146 ±4	73 ±12	29 ±3	198 ±7	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-1205	42	299	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±6	25 ±2	209 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1205	42	305	Buck Mountain	NM ±NM	NM ±NM	108 ±2	64 ±5	16 ±1	99 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2532
CA-MOD-1206/07	43	122	Cowhead Lake	NM ±NM	NM ±NM	127 ±2	9 ±6	28 ±2	90 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1883
CA-MOD-1206/07	43	156	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	72 ±6	31 ±2	188 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	171 A	Grasshopper Group	37 ±5	10 ±2	154 ±3	78 ±7	32 ±2	217 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	171 B	Grasshopper Group	45 ±5	13 ±2	153 ±3	78 ±7	31 ±2	222 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	171 C	Cougar Butte	132 ±6	27 ±3	171 ±3	9 ±7	65 ±2	154 ±6	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	172 A	Cougar Butte	113 ±7	24 ±4	188 ±4	8 ±7	76 ±2	171 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	172 B	Grasshopper Group	45 ±12	7 ±5	154 ±5	80 ±8	25 ±3	174 ±7	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	174 A	Grasshopper Group	48 ±5	15 ±2	155 ±3	82 ±7	30 ±2	216 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	174 B	Grasshopper Group	57 ±6	13 ±3	165 ±3	88 ±7	32 ±2	222 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	174 C	Unknown A	73 ±8	14 ±4	131 ±3	7 ±7	47 ±2	125 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	174 D	Cougar Butte	101 ±7	25 ±4	159 ±3	8 ±7	60 ±2	148 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	176	Blue Mountain	193 ±9	25 ±5	66 ±3	3 ±8	69 ±2	357 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	179	Grasshopper Group	45 ±5	14 ±3	155 ±3	78 ±7	25 ±2	215 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	181	Grasshopper Group	54 ±6	22 ±3	182 ±3	92 ±7	32 ±2	228 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 A	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	76 ±5	32 ±1	217 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 B	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	76 ±5	29 ±1	209 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-1206/07	43	182 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	182 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 A	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	79 ±5	28 ±1	211 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 E	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	77 ±5	31 ±1	210 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 F	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	73 ±5	29 ±1	205 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 G	Grasshopper Group	NM ±NM	NM ±NM	135 ±2	70 ±5	29 ±1	201 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	393 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 A	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	71 ±5	28 ±1	204 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 C	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	75 ±5	33 ±1	207 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 I	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	80 ±5	30 ±1	217 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	402 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-1206/07	43	463	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	73 ±6	30 ±2	206 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	466	Cougar Butte	NM ±NM	NM ±NM	161 ±2	4 ±6	68 ±2	163 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4710
CA-MOD-1206/07	43	470	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	78 ±6	28 ±2	213 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	477	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	80 ±6	28 ±2	221 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	481	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±6	25 ±2	211 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	484	Blue Mountain	NM ±NM	NM ±NM	63 ±2	3 ±6	73 ±2	372 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	486	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	78 ±6	28 ±2	208 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	488	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	77 ±5	31 ±1	216 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	494	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	78 ±5	30 ±1	209 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	495	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	78 ±5	30 ±1	208 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	496	Cougar Butte	NM ±NM	NM ±NM	161 ±2	5 ±6	69 ±2	160 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4340
CA-MOD-1206/07	43	529	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	72 ±6	29 ±2	202 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	547	Blue Mountain	NM ±NM	NM ±NM	56 ±2	3 ±6	72 ±2	368 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	617	Buck Mountain	NM ±NM	NM ±NM	111 ±2	64 ±5	18 ±1	94 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2271
CA-MOD-1206/07	43	634	Blue Mountain	NM ±NM	NM ±NM	57 ±2	5 ±6	72 ±2	368 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	638	Cougar Butte	NM ±NM	NM ±NM	163 ±2	4 ±6	67 ±2	161 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4589
CA-MOD-1206/07	43	648	Glass Mountain	NM ±NM	NM ±NM	164 ±3	118 ±6	25 ±2	238 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	649	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	75 ±6	27 ±2	210 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	664 A	Grasshopper Group	45 ±5	22 ±3	150 ±3	73 ±7	29 ±2	213 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	664 B	Cougar Butte	73 ±5	18 ±2	161 ±3	7 ±7	64 ±2	155 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	664 C	Cougar Butte	82 ±5	20 ±2	168 ±3	5 ±7	73 ±2	161 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	664 D	Grasshopper Group	39 ±5	17 ±2	147 ±3	81 ±7	30 ±2	207 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	664 E	Grasshopper Group	48 ±5	15 ±2	146 ±3	78 ±7	30 ±2	211 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-1206/07	43	670 A	Cougar Butte	91 ±6	26 ±3	179 ±3	5 ±7	66 ±2	162 ±6	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	670 B	Grasshopper Group	46 ±5	15 ±3	163 ±3	81 ±7	28 ±2	214 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	670 C	Grasshopper Group	34 ±5	13 ±2	143 ±2	74 ±7	27 ±1	207 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	670 D	Grasshopper Group	47 ±5	13 ±2	159 ±3	80 ±7	32 ±2	216 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	670 E	Grasshopper Group	40 ±5	16 ±2	155 ±3	83 ±7	32 ±2	226 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	676 A	Grasshopper Group	43 ±5	16 ±2	157 ±3	85 ±7	32 ±2	223 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	676 B	Grasshopper Group	36 ±5	14 ±2	153 ±3	82 ±7	28 ±2	216 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	676 C	Grasshopper Group	39 ±5	15 ±2	158 ±3	80 ±7	31 ±2	216 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	676 D	Grasshopper Group	39 ±5	15 ±2	162 ±3	78 ±7	32 ±1	215 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	676 E	Glass Mountain	45 ±5	17 ±2	195 ±3	102 ±7	29 ±2	247 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	682 A	Grasshopper Group	50 ±5	14 ±2	179 ±3	88 ±7	30 ±2	234 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	682 B	Cougar Butte	77 ±5	20 ±2	165 ±2	5 ±7	69 ±2	159 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	682 C	Glass Mountain	65 ±6	21 ±3	170 ±3	118 ±8	24 ±2	224 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	682 D	Grasshopper Group	45 ±5	11 ±2	151 ±3	75 ±7	27 ±2	207 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	682 E	Grasshopper Group	51 ±5	14 ±2	151 ±3	77 ±7	29 ±2	213 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	687	Blue Mountain	NM ±NM	NM ±NM	62 ±2	0 ±0	74 ±1	375 ±5	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	693	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	75 ±6	27 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	703	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	98 ±6	25 ±2	229 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	708	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	78 ±6	29 ±2	215 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	709	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	80 ±6	29 ±2	220 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	710	Grasshopper Group	NM ±NM	NM ±NM	146 ±3	73 ±6	28 ±2	205 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	711	Glass Mountain	NM ±NM	NM ±NM	145 ±2	108 ±6	27 ±2	227 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	714	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-1206/07	43	721	Cowhead Lake	NM ±NM	NM ±NM	132 ±2	9 ±6	27 ±2	90 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1584
CA-MOD-1206/07	43	722	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	82 ±6	30 ±2	216 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 A	Glass Mountain?	NM ±NM	NM ±NM	157 ±2	112 ±5	25 ±1	230 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 B	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	74 ±5	28 ±1	206 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 C	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	74 ±5	30 ±1	208 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 D	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±5	27 ±1	212 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 F	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	74 ±5	32 ±1	201 ±5	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	725 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	732	Buck Mountain	NM ±NM	NM ±NM	101 ±2	63 ±5	15 ±1	92 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2531
CA-MOD-1206/07	43	733	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	76 ±6	28 ±2	209 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	739	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	741	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-1206/07	43	743	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743	I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	743	J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	1	Glass Mountain	NM ±NM	NM ±NM	146 ±2	103 ±6	25 ±2	228 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	10	Glass Mountain	NM ±NM	NM ±NM	163 ±2	117 ±6	23 ±2	233 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	11	Glass Mountain	NM ±NM	NM ±NM	164 ±2	120 ±6	26 ±2	239 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	12	Glass Mountain	NM ±NM	NM ±NM	160 ±2	101 ±6	24 ±2	225 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	13	Glass Mountain	NM ±NM	NM ±NM	168 ±3	123 ±6	24 ±2	234 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	14	Glass Mountain	NM ±NM	NM ±NM	179 ±3	129 ±6	27 ±2	247 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	15	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	94 ±6	27 ±2	217 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	16	Glass Mountain	NM ±NM	NM ±NM	170 ±2	123 ±6	28 ±2	243 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	17	Glass Mountain	NM ±NM	NM ±NM	150 ±2	109 ±6	25 ±2	227 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	18	Glass Mountain	NM ±NM	NM ±NM	165 ±2	122 ±6	27 ±2	241 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	19	Glass Mountain	NM ±NM	NM ±NM	172 ±3	117 ±6	23 ±2	241 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	2	Glass Mountain	NM ±NM	NM ±NM	180 ±3	132 ±6	31 ±2	247 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	20	Glass Mountain	NM ±NM	NM ±NM	160 ±3	115 ±6	30 ±2	233 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	3	Glass Mountain	NM ±NM	NM ±NM	174 ±3	123 ±6	22 ±2	239 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	4	Glass Mountain	NM ±NM	NM ±NM	168 ±3	128 ±6	23 ±2	244 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	5	Glass Mountain	NM ±NM	NM ±NM	149 ±2	111 ±6	25 ±2	227 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	6	Grasshopper Group	NM ±NM	NM ±NM	145 ±3	76 ±6	27 ±2	209 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	7	Glass Mountain	NM ±NM	NM ±NM	151 ±2	103 ±6	26 ±2	231 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	8	Glass Mountain	NM ±NM	NM ±NM	193 ±3	134 ±6	26 ±2	253 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751	9	Glass Mountain	NM ±NM	NM ±NM	162 ±2	122 ±6	26 ±2	235 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-1206/07	43	751 A	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	83 ±6	30 ±2	217 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751 B	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	79 ±6	26 ±2	214 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751 C	Cougar Butte	NM ±NM	NM ±NM	158 ±2	5 ±6	67 ±2	161 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4256
CA-MOD-1206/07	43	751 D	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	73 ±6	29 ±2	205 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751 E	Glass Mountain	NM ±NM	NM ±NM	184 ±3	129 ±6	27 ±2	246 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751 F	Cougar Butte	NM ±NM	NM ±NM	174 ±3	3 ±6	75 ±2	162 ±7	23 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3965
CA-MOD-1206/07	43	751 G	Grasshopper Group	NM ±NM	NM ±NM	160 ±2	83 ±6	28 ±2	218 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751 H	Glass Mountain	NM ±NM	NM ±NM	176 ±3	127 ±6	30 ±2	243 ±7	3 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751 I	Glass Mountain	NM ±NM	NM ±NM	159 ±3	108 ±6	20 ±2	220 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	751 J	Sugar Hill	NM ±NM	NM ±NM	140 ±2	58 ±6	21 ±2	125 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	760	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±6	26 ±2	206 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	780	Glass Mountain	NM ±NM	NM ±NM	148 ±2	110 ±6	24 ±2	226 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	781	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	82 ±6	27 ±2	206 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	786	Glass Mountain	NM ±NM	NM ±NM	151 ±2	113 ±6	23 ±2	232 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	796	Grasshopper Group	NM ±NM	NM ±NM	160 ±2	80 ±6	26 ±2	218 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	828	Blue Mountain	NM ±NM	NM ±NM	63 ±2	3 ±6	72 ±2	381 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1039	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	74 ±6	29 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1040	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	70 ±6	25 ±2	187 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1043	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	82 ±6	29 ±2	218 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1044	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±6	28 ±2	209 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1045	Glass Mountain	NM ±NM	NM ±NM	154 ±2	104 ±6	25 ±2	234 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1048	Unknown B	NM ±NM	NM ±NM	124 ±2	79 ±6	20 ±2	150 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1049	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	71 ±5	26 ±1	191 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-1206/07	43	1050	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	75 ±6	30 ±2	215 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1051	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	76 ±6	29 ±2	207 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1052	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	79 ±6	28 ±2	217 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1053	Unknown C	NM ±NM	NM ±NM	92 ±2	219 ±6	16 ±2	165 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1103	Cougar Butte	NM ±NM	NM ±NM	169 ±2	5 ±6	66 ±2	166 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4298
CA-MOD-1206/07	43	1109	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	72 ±6	27 ±2	206 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1119	Blue Mountain	NM ±NM	NM ±NM	59 ±2	2 ±6	73 ±2	372 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1199	Cougar Butte	NM ±NM	NM ±NM	147 ±2	5 ±6	64 ±2	154 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4389
CA-MOD-1206/07	43	1202	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	75 ±6	28 ±2	211 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1203	Blue Mountain	NM ±NM	NM ±NM	56 ±2	3 ±6	71 ±2	368 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1204	Blue Mountain	NM ±NM	NM ±NM	62 ±2	2 ±6	74 ±2	367 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1205	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	69 ±6	26 ±2	200 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1206	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	74 ±6	28 ±2	211 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1213	Cougar Butte	NM ±NM	NM ±NM	164 ±2	5 ±6	69 ±2	156 ±7	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	5176
CA-MOD-1206/07	43	1214 A	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	79 ±6	28 ±2	212 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1214 B	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	74 ±6	28 ±2	205 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1214 C	Grasshopper Group	NM ±NM	NM ±NM	160 ±2	81 ±6	30 ±2	221 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1214 D	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	80 ±6	30 ±2	213 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1214 E	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	79 ±6	29 ±2	215 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1214 F	Grasshopper Group	NM ±NM	NM ±NM	160 ±2	83 ±6	30 ±2	219 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1214 G	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±6	28 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1214 H	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	79 ±6	31 ±2	212 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1214 I	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	78 ±6	29 ±2	216 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>												Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn	
CA-MOD-1206/07	43	1214 J	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	80 ±6	28 ±2	215 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 A	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	78 ±6	24 ±2	210 ±7	4 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 B	Grasshopper Group	NM ±NM	NM ±NM	167 ±3	87 ±6	30 ±2	215 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 C	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	77 ±6	27 ±2	211 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 D	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	72 ±6	28 ±2	205 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 E	Grasshopper Group	NM ±NM	NM ±NM	158 ±3	82 ±6	28 ±2	213 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 F	Grasshopper Group	NM ±NM	NM ±NM	159 ±2	80 ±6	29 ±2	216 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 G	Grasshopper Group	NM ±NM	NM ±NM	165 ±3	82 ±6	31 ±2	215 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 H	Grasshopper Group	NM ±NM	NM ±NM	154 ±3	76 ±6	28 ±3	194 ±8	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 I	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	75 ±6	30 ±2	212 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1236 J	Grasshopper Group	NM ±NM	NM ±NM	151 ±3	81 ±6	31 ±2	213 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1250	Blue Mountain	NM ±NM	NM ±NM	66 ±2	4 ±6	74 ±8	380 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1341	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	75 ±5	24 ±1	192 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1410 A	Cougar Butte	91 ±5	19 ±3	179 ±3	5 ±7	71 ±2	160 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1410 B	Grasshopper Group	49 ±5	15 ±3	165 ±3	78 ±7	29 ±2	221 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1410 C	Grasshopper Group	36 ±4	14 ±2	149 ±2	72 ±7	28 ±1	205 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1410 D	Grasshopper Group	45 ±5	15 ±2	162 ±3	80 ±7	28 ±2	219 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1410 E	Grasshopper Group	36 ±5	14 ±2	160 ±3	82 ±7	30 ±2	224 ±6	14 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1413 A	Grasshopper Group	40 ±5	17 ±2	158 ±3	83 ±7	29 ±2	225 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1413 B	Grasshopper Group	36 ±5	14 ±2	149 ±3	79 ±7	31 ±1	213 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1413 C	Grasshopper Group	41 ±5	16 ±2	157 ±3	79 ±7	29 ±2	213 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1413 D	Grasshopper Group	39 ±5	13 ±2	155 ±3	81 ±7	30 ±1	219 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-1206/07	43	1413 E	Glass Mountain	41 ±5	16 ±2	189 ±3	108 ±7	27 ±2	247 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-1206/07	43	1416 A	Grasshopper Group	55 ±5	14 ±2	176 ±3	90 ±7	33 ±2	231 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1416 B	Cougar Butte	72 ±5	19 ±2	163 ±2	6 ±7	69 ±2	158 ±6	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1416 C	Unknown D	61 ±8	16 ±4	148 ±4	121 ±8	23 ±2	200 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	71
CA-MOD-1206/07	43	1416 D	Grasshopper Group	32 ±6	18 ±3	152 ±3	82 ±7	31 ±2	211 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1416 E	Grasshopper Group	54 ±6	9 ±3	144 ±3	81 ±7	28 ±2	196 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1459	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	80 ±6	28 ±2	211 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1467	Cougar Butte	NM ±NM	NM ±NM	169 ±2	5 ±6	69 ±2	163 ±7	23 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4701
CA-MOD-1206/07	43	1468	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	74 ±6	28 ±2	212 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1527	Grasshopper Group	NM ±NM	NM ±NM	132 ±2	68 ±6	27 ±2	198 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1541	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±6	28 ±2	211 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1553 A	Grasshopper Group	39 ±5	14 ±2	160 ±3	81 ±7	31 ±2	216 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1553 B	Cougar Butte	80 ±5	18 ±2	163 ±3	6 ±7	70 ±2	163 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1553 C	Grasshopper Group	34 ±5	17 ±2	143 ±3	75 ±7	31 ±2	207 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1553 D	Grasshopper Group	40 ±5	11 ±2	147 ±2	79 ±7	31 ±1	207 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1553 E	Cougar Butte	84 ±6	17 ±3	158 ±3	5 ±7	66 ±2	154 ±6	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1559 A	Grasshopper Group	39 ±4	15 ±2	153 ±3	78 ±7	26 ±2	213 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1559 B	Grasshopper Group	36 ±5	11 ±2	149 ±2	78 ±7	26 ±1	212 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1559 C	Grasshopper Group	35 ±5	15 ±2	158 ±3	81 ±7	32 ±2	213 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1559 D	Grasshopper Group	38 ±4	11 ±2	146 ±2	81 ±7	28 ±1	211 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1559 E	Grasshopper Group	40 ±5	6 ±2	147 ±3	74 ±7	28 ±2	212 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1567 A	Grasshopper Group	40 ±5	15 ±3	175 ±3	90 ±7	32 ±2	230 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1567 B	Cougar Butte	90 ±6	25 ±3	170 ±3	10 ±7	73 ±2	161 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1567 C	Grasshopper Group	42 ±5	14 ±2	169 ±3	84 ±7	31 ±2	223 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-1206/07	43	1567 D	Grasshopper Group	45 ±5	11 ±3	157 ±3	83 ±7	33 ±2	216 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1567 E	Cougar Butte	91 ±6	30 ±3	175 ±3	7 ±7	67 ±2	162 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1626	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	79 ±6	27 ±2	205 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1731 A	Cougar Butte	85 ±5	15 ±2	173 ±3	12 ±7	71 ±2	163 ±6	26 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1731 B	Cougar Butte	71 ±5	16 ±2	165 ±3	5 ±7	65 ±2	167 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1731 C	Cougar Butte	80 ±6	22 ±3	166 ±3	8 ±7	65 ±2	159 ±6	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1731 D	Cougar Butte	74 ±5	16 ±2	173 ±3	5 ±7	68 ±2	164 ±6	17 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1731 E	Grasshopper Group	38 ±5	13 ±2	157 ±3	77 ±7	30 ±2	215 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1733	Cougar Butte	74 ±5	15 ±2	161 ±3	4 ±7	68 ±2	156 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1734	Cougar Butte	84 ±6	24 ±3	157 ±3	8 ±7	66 ±2	153 ±6	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1814	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	77 ±5	31 ±1	213 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1816	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	73 ±5	30 ±1	208 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1817	Sugar Hill	25 ±6	18 ±3	122 ±4	48 ±3	25 ±2	108 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43	1857	South Warners	42 ±6	14 ±3	170 ±4	61 ±3	22 ±2	97 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	39	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	79 ±6	28 ±2	205 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	45	Buck Mountain	NM ±NM	NM ±NM	109 ±2	70 ±6	17 ±2	101 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2414
CA-MOD-1461	44	46	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	80 ±6	30 ±2	215 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	47	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	77 ±6	25 ±2	218 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	48	Cougar Butte	NM ±NM	NM ±NM	157 ±2	3 ±6	65 ±2	162 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3510
CA-MOD-1461	44	50	Cougar Butte	NM ±NM	NM ±NM	160 ±2	4 ±6	70 ±2	159 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4125
CA-MOD-1461	44	51	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	78 ±6	26 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	59	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	83 ±6	27 ±2	209 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	67	Grasshopper Group	NM ±NM	NM ±NM	140 ±3	78 ±6	29 ±2	204 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-1461	44	78	Glass Mountain	NM ±NM	NM ±NM	156 ±2	109 ±6	27 ±2	232 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	79	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±6	29 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	80	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	83 ±6	28 ±2	209 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	81	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	77 ±6	30 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	82	Buck Mountain	NM ±NM	NM ±NM	113 ±2	64 ±6	17 ±2	103 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2035
CA-MOD-1461	44	83	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	75 ±6	26 ±2	207 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	84	Glass Mountain	NM ±NM	NM ±NM	154 ±2	114 ±6	25 ±2	233 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85 1	Unknown A	NM ±NM	NM ±NM	134 ±2	6 ±6	62 ±2	171 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3784
CA-MOD-1461	44	85 10	Unknown A	NM ±NM	NM ±NM	136 ±3	8 ±6	58 ±2	174 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4286
CA-MOD-1461	44	85 11	Glass Mountain	NM ±NM	NM ±NM	171 ±3	127 ±6	28 ±3	235 ±8	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85 12	Cougar Butte	NM ±NM	NM ±NM	158 ±2	4 ±6	65 ±2	156 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4029
CA-MOD-1461	44	85 13	Glass Mountain	NM ±NM	NM ±NM	157 ±3	111 ±6	25 ±2	234 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85 14	Glass Mountain	NM ±NM	NM ±NM	135 ±2	153 ±6	25 ±2	231 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85 15	Glass Mountain	NM ±NM	NM ±NM	150 ±2	114 ±6	26 ±2	231 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85 16	Unknown A	NM ±NM	NM ±NM	152 ±2	6 ±6	62 ±2	186 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3380
CA-MOD-1461	44	85 17	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	109 ±6	25 ±2	228 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85 18	Unknown A	NM ±NM	NM ±NM	140 ±2	7 ±6	60 ±2	176 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3546
CA-MOD-1461	44	85 19	Cougar Butte	NM ±NM	NM ±NM	163 ±2	5 ±6	71 ±2	165 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4326
CA-MOD-1461	44	85 2	Unknown A	NM ±NM	NM ±NM	131 ±2	8 ±6	61 ±2	172 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3937
CA-MOD-1461	44	85 20	Cougar Butte	NM ±NM	NM ±NM	161 ±2	5 ±6	67 ±2	157 ±7	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4195
CA-MOD-1461	44	85 21	Cougar Butte	NM ±NM	NM ±NM	142 ±2	8 ±6	62 ±2	180 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3745
CA-MOD-1461	44	85 22	Glass Mountain	NM ±NM	NM ±NM	171 ±3	116 ±6	27 ±2	236 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	7248
CA-MOD-1461	44	85 23	Unknown A	NM ±NM	NM ±NM	154 ±3	8 ±6	66 ±2	183 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3155

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-1461	44	85	24	Unknown A	NM ±NM	NM ±NM	145 ±2	6 ±6	64 ±2	174 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3526
CA-MOD-1461	44	85	25	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	74 ±6	27 ±2	180 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	26	Glass Mountain	NM ±NM	NM ±NM	161 ±2	115 ±6	28 ±2	230 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	27	Glass Mountain	NM ±NM	NM ±NM	174 ±3	125 ±6	29 ±2	237 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	28	Glass Mountain	NM ±NM	NM ±NM	153 ±2	110 ±6	27 ±2	228 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	29	Glass Mountain	NM ±NM	NM ±NM	142 ±2	108 ±6	23 ±2	223 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	3	Unknown A	NM ±NM	NM ±NM	146 ±2	7 ±6	62 ±2	180 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3517
CA-MOD-1461	44	85	30	Cougar Butte	NM ±NM	NM ±NM	144 ±2	6 ±6	63 ±2	146 ±7	24 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	5027
CA-MOD-1461	44	85	31	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	78 ±6	26 ±2	206 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	32	Unknown A	NM ±NM	NM ±NM	147 ±2	7 ±6	63 ±2	174 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4338
CA-MOD-1461	44	85	33	Cougar Butte	NM ±NM	NM ±NM	163 ±2	4 ±6	66 ±2	156 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4074
CA-MOD-1461	44	85	34	Cougar Butte	NM ±NM	NM ±NM	154 ±2	3 ±6	63 ±2	154 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4244
CA-MOD-1461	44	85	35	Glass Mountain	NM ±NM	NM ±NM	162 ±2	110 ±6	24 ±2	229 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	4	Cougar Butte	NM ±NM	NM ±NM	171 ±2	6 ±6	67 ±2	160 ±7	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4674
CA-MOD-1461	44	85	5	Grasshopper Group	NM ±NM	NM ±NM	164 ±3	118 ±6	25 ±2	232 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	6	Unknown A	NM ±NM	NM ±NM	163 ±3	8 ±6	69 ±2	190 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3447
CA-MOD-1461	44	85	7	Glass Mountain	NM ±NM	NM ±NM	165 ±2	112 ±6	23 ±2	230 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	8	Grasshopper Group	NM ±NM	NM ±NM	168 ±3	121 ±6	26 ±2	237 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	9	Unknown A	NM ±NM	NM ±NM	144 ±2	8 ±6	63 ±2	172 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3534
CA-MOD-1461	44	85	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	85	D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn	
CA-MOD-1461	44	85 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	89 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	89 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	89 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	89 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	89 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	91	Glass Mountain	NM ±NM	NM ±NM	158 ±3	117 ±6	26 ±2	229 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	96	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	76 ±6	30 ±2	210 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	97	Cougar Butte	NM ±NM	NM ±NM	160 ±2	8 ±6	68 ±2	159 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4627
CA-MOD-1461	44	98	Cougar Butte	NM ±NM	NM ±NM	165 ±2	5 ±6	69 ±2	160 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4242
CA-MOD-1461	44	99	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	77 ±6	31 ±2	188 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	100	Sugar Hill	NM ±NM	NM ±NM	132 ±2	60 ±6	20 ±2	127 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	103 A	Glass Mountain	NM ±NM	NM ±NM	162 ±2	109 ±5	27 ±1	229 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	103 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	103 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	103 D	Glass Mountain	NM ±NM	NM ±NM	170 ±2	120 ±5	29 ±1	238 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	103 E	Glass Mountain	NM ±NM	NM ±NM	172 ±2	100 ±5	28 ±1	233 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	103 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	103 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	103 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	139	Glass Mountain	NM ±NM	NM ±NM	153 ±2	111 ±6	24 ±2	233 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	141 A	Glass Mountain	NM ±NM	NM ±NM	150 ±2	113 ±6	25 ±2	233 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	141 B	Glass Mountain	NM ±NM	NM ±NM	156 ±2	115 ±6	27 ±2	229 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-1461	44	141 C	Glass Mountain	NM ±NM	NM ±NM	159 ±2	116 ±6	24 ±2	233 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	141 D	Glass Mountain	NM ±NM	NM ±NM	151 ±2	114 ±6	26 ±2	225 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	141 E	Glass Mountain	NM ±NM	NM ±NM	155 ±2	114 ±6	26 ±2	233 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	151	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	81 ±6	27 ±2	216 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	170	Glass Mountain	NM ±NM	NM ±NM	163 ±3	123 ±6	33 ±2	244 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	177	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	79 ±6	27 ±2	207 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	193	Unknown B	NM ±NM	NM ±NM	107 ±2	70 ±6	19 ±2	111 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	195	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	74 ±6	25 ±2	212 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	196	Grasshopper Group	NM ±NM	NM ±NM	134 ±3	70 ±6	29 ±2	203 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	200	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±6	27 ±2	209 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	218	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	75 ±5	30 ±1	204 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	228	Glass Mountain	NM ±NM	NM ±NM	143 ±2	109 ±6	24 ±2	220 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	233	Cougar Butte	NM ±NM	NM ±NM	149 ±2	9 ±6	66 ±2	180 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4130
CA-MOD-1461	44	235	Sugar Hill	NM ±NM	NM ±NM	141 ±2	56 ±6	26 ±2	130 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	236	Cougar Butte	NM ±NM	NM ±NM	169 ±2	3 ±6	71 ±2	161 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4224
CA-MOD-1461	44	237	Buck Mountain	NM ±NM	NM ±NM	122 ±2	73 ±6	18 ±2	109 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2883
CA-MOD-1461	44	238	Buck Mountain	NM ±NM	NM ±NM	113 ±3	69 ±6	16 ±3	112 ±7	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3282
CA-MOD-1461	44	293	Cougar Butte	NM ±NM	NM ±NM	154 ±2	6 ±6	65 ±2	154 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3432
CA-MOD-1461	44	296	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	72 ±6	30 ±2	183 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	307	Grasshopper Group?	NM ±NM	NM ±NM	130 ±2	79 ±6	24 ±2	155 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	312	Buck Mountain	NM ±NM	NM ±NM	113 ±2	65 ±6	16 ±2	102 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3092
CA-MOD-1461	44	327	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	74 ±6	27 ±2	214 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	335	Glass Mountain	NM ±NM	NM ±NM	154 ±2	111 ±6	25 ±2	228 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-1461	44	356	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	71 ±6	28 ±2	208 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	360	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±6	29 ±2	217 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	369	Glass Mountain	NM ±NM	NM ±NM	146 ±2	105 ±6	24 ±2	223 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	397	Cougar Butte	NM ±NM	NM ±NM	153 ±2	4 ±6	66 ±2	155 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4512
CA-MOD-1461	44	409	Basalt	NM ±NM	NM ±NM	89 ±2	302 ±6	44 ±2	319 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	413	Basalt	NM ±NM	NM ±NM	85 ±2	296 ±6	44 ±2	314 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	415	Cougar Butte	NM ±NM	NM ±NM	172 ±2	5 ±6	68 ±2	161 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4772
CA-MOD-1461	44	446	Glass Mountain	NM ±NM	NM ±NM	154 ±3	111 ±6	28 ±2	230 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	447	Unknown B	NM ±NM	NM ±NM	103 ±2	73 ±6	17 ±2	106 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	451	Glass Mountain	NM ±NM	NM ±NM	148 ±2	110 ±6	24 ±2	229 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	452	Cougar Butte	NM ±NM	NM ±NM	159 ±2	8 ±6	68 ±2	162 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3873
CA-MOD-1461	44	453	Unknown A	NM ±NM	NM ±NM	152 ±2	8 ±6	62 ±2	182 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2623
CA-MOD-1461	44	457	Glass Mountain	NM ±NM	NM ±NM	158 ±2	113 ±6	27 ±2	235 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	458	Glass Mountain	NM ±NM	NM ±NM	156 ±2	109 ±6	25 ±2	236 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	471	Cougar Butte	NM ±NM	NM ±NM	172 ±3	6 ±6	69 ±2	164 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4143
CA-MOD-1461	44	488	Unknown B	NM ±NM	NM ±NM	106 ±2	70 ±6	19 ±2	109 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	490	Glass Mountain	NM ±NM	NM ±NM	147 ±2	102 ±6	25 ±2	226 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	492	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±6	29 ±2	191 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	500	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	76 ±6	29 ±2	211 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	506	Glass Mountain	NM ±NM	NM ±NM	146 ±2	106 ±6	24 ±2	227 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	518	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	77 ±6	26 ±2	217 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	519	Grasshopper Group	NM ±NM	NM ±NM	140 ±3	72 ±6	23 ±2	202 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	529	South Warners	NM ±NM	NM ±NM	174 ±2	65 ±6	21 ±2	104 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-1461	44	544	Glass Mountain	NM ±NM	NM ±NM	153 ±2	108 ±6	25 ±2	233 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	546 A	Glass Mountain	NM ±NM	NM ±NM	148 ±2	110 ±6	25 ±2	230 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	546 B	Glass Mountain	NM ±NM	NM ±NM	150 ±2	111 ±6	25 ±2	227 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	546 C	Glass Mountain	NM ±NM	NM ±NM	157 ±2	114 ±6	26 ±2	237 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	548	Buck Mountain	NM ±NM	NM ±NM	105 ±2	72 ±6	18 ±2	110 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2599
CA-MOD-1461	44	556	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	78 ±6	26 ±2	210 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	576	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	78 ±6	29 ±2	214 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	580	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	74 ±5	28 ±1	211 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	581	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	79 ±6	27 ±2	211 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	590	Unknown C	NM ±NM	NM ±NM	108 ±3	82 ±6	26 ±3	294 ±8	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	592	Unknown D	NM ±NM	NM ±NM	116 ±4	14 ±6	48 ±3	137 ±8	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	633	Basalt	NM ±NM	NM ±NM	78 ±2	285 ±6	40 ±2	303 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	634	Basalt	NM ±NM	NM ±NM	82 ±2	320 ±6	47 ±2	320 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	635	Basalt	NM ±NM	NM ±NM	78 ±2	270 ±6	40 ±2	306 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	636	Basalt	NM ±NM	NM ±NM	75 ±2	290 ±6	40 ±2	296 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	637	Basalt	NM ±NM	NM ±NM	82 ±2	273 ±6	39 ±2	318 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	638	Basalt	NM ±NM	NM ±NM	75 ±2	244 ±6	43 ±2	303 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	639	Basalt	NM ±NM	NM ±NM	75 ±2	256 ±6	38 ±2	307 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	640	Basalt	NM ±NM	NM ±NM	81 ±2	300 ±6	45 ±2	319 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	641	Basalt	NM ±NM	NM ±NM	79 ±2	263 ±6	45 ±2	308 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	642	Basalt	NM ±NM	NM ±NM	77 ±2	279 ±6	40 ±2	298 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	643	Basalt	NM ±NM	NM ±NM	80 ±2	286 ±6	40 ±2	313 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	644	Basalt	NM ±NM	NM ±NM	79 ±2	292 ±6	46 ±2	300 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-1461	44	645	Basalt	NM ±NM	NM ±NM	88 ±2	243 ±6	42 ±2	336 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	646	Basalt	NM ±NM	NM ±NM	84 ±2	244 ±6	44 ±2	325 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	647	Basalt	NM ±NM	NM ±NM	78 ±2	270 ±6	40 ±2	304 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	648	Basalt	NM ±NM	NM ±NM	76 ±2	266 ±6	39 ±2	308 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	649	Basalt	NM ±NM	NM ±NM	85 ±2	285 ±6	41 ±2	318 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	650	Basalt	NM ±NM	NM ±NM	81 ±2	218 ±6	38 ±2	319 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	651	Basalt	NM ±NM	NM ±NM	80 ±2	225 ±6	40 ±2	319 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	652	Basalt	NM ±NM	NM ±NM	76 ±2	284 ±6	40 ±2	296 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	653	Basalt	NM ±NM	NM ±NM	81 ±2	245 ±6	42 ±2	317 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	654	Basalt	NM ±NM	NM ±NM	76 ±2	276 ±6	37 ±2	305 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	655	Basalt	NM ±NM	NM ±NM	77 ±2	291 ±6	44 ±2	314 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1461	44	656	Basalt	NM ±NM	NM ±NM	77 ±2	241 ±6	40 ±2	319 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	11	Cougar Butte	NM ±NM	NM ±NM	162 ±3	7 ±12	68 ±3	150 ±7	16 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4033
CA-MOD-2555	12	19	Grasshopper Group	NM ±NM	NM ±NM	152 ±4	77 ±12	26 ±3	201 ±7	7 ±6	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 A	Grasshopper Group	NM ±NM	NM ±NM	155 ±4	85 ±12	23 ±4	202 ±7	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 B	Grasshopper Group	NM ±NM	NM ±NM	140 ±3	73 ±12	25 ±3	192 ±7	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 C	Grasshopper Group	NM ±NM	NM ±NM	145 ±4	73 ±12	21 ±4	179 ±7	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 D	Grasshopper Group	NM ±NM	NM ±NM	133 ±3	75 ±12	23 ±3	189 ±7	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 E	Grasshopper Group	NM ±NM	NM ±NM	152 ±3	80 ±12	27 ±3	205 ±7	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 F	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±5	29 ±1	209 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 G	Grasshopper Group?	NM ±NM	NM ±NM	161 ±2	82 ±5	30 ±1	215 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 H	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	76 ±5	28 ±1	202 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	20 I	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±5	29 ±1	196 ±3	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn	
CA-MOD-2555	12	20	J	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	77 ±5	30 ±1	207 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	21		Grasshopper Group	NM ±NM	NM ±NM	144 ±3	76 ±12	25 ±3	203 ±7	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	24		Grasshopper Group	NM ±NM	NM ±NM	155 ±3	83 ±12	27 ±3	211 ±7	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	31		Unknown A	NM ±NM	NM ±NM	156 ±4	64 ±12	15 ±4	84 ±7	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	36	A	Grasshopper Group	NM ±NM	NM ±NM	164 ±2	86 ±5	29 ±1	214 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	36	B	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	79 ±5	27 ±1	211 ±3	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	36	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	36	D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	36	E	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	74 ±5	28 ±1	197 ±3	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	36	F	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	73 ±5	27 ±1	194 ±3	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	36	G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	36	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	56	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	56	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	56	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	94		Buck Mountain	NM ±NM	NM ±NM	112 ±3	69 ±12	17 ±3	92 ±7	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	131		Grasshopper Group	NM ±NM	NM ±NM	143 ±4	69 ±12	27 ±3	172 ±7	5 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	132		Blue Mountain	NM ±NM	NM ±NM	64 ±3	4 ±14	71 ±3	380 ±8	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	133		Grasshopper Group	NM ±NM	NM ±NM	146 ±3	80 ±12	32 ±3	206 ±7	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	135		Cougar Butte	80 ±6	15 ±3	159 ±4	4 ±3	69 ±2	151 ±5	17 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	310		Cougar Butte	82 ±6	19 ±4	165 ±5	3 ±3	73 ±2	160 ±5	19 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	359	A	Cougar Butte	72 ±5	20 ±2	167 ±3	5 ±7	66 ±2	161 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	359	B	Cougar Butte	87 ±5	24 ±2	165 ±3	7 ±7	65 ±2	165 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2555	12	359 C	Cougar Butte	79 ±5	26 ±2	169 ±3	5 ±7	68 ±2	166 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	359 D	Cougar Butte	80 ±5	18 ±2	178 ±3	6 ±7	73 ±2	167 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	359 E	Cougar Butte	80 ±5	22 ±2	174 ±3	4 ±7	67 ±2	162 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	362 A	Cougar Butte	80 ±5	19 ±2	168 ±3	5 ±7	70 ±2	159 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	362 B	Cougar Butte	80 ±5	19 ±2	174 ±3	5 ±7	71 ±2	165 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	362 C	Cougar Butte	76 ±5	17 ±2	174 ±3	7 ±7	72 ±2	164 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	362 D	Cougar Butte	68 ±5	11 ±2	162 ±3	7 ±7	66 ±2	159 ±6	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	362 E	Cougar Butte	87 ±5	20 ±2	180 ±3	7 ±7	72 ±2	165 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	366 A	Cougar Butte	84 ±5	31 ±2	167 ±3	9 ±7	69 ±2	164 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	366 B	Cougar Butte	68 ±5	16 ±2	167 ±3	4 ±7	69 ±2	160 ±6	24 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	366 C	Cougar Butte	80 ±6	15 ±3	175 ±3	6 ±7	69 ±2	163 ±6	23 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	366 D	Cougar Butte	68 ±5	18 ±2	160 ±2	5 ±7	70 ±2	159 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	366 E	Cougar Butte	77 ±5	18 ±2	165 ±3	6 ±7	68 ±2	159 ±6	18 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	369 A	Cougar Butte	79 ±5	26 ±3	173 ±3	5 ±7	73 ±2	168 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	369 B	Cougar Butte	68 ±5	22 ±2	160 ±3	7 ±7	64 ±2	156 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	369 C	Cougar Butte	80 ±5	21 ±2	170 ±3	5 ±7	71 ±2	165 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	372 A	Cougar Butte	78 ±5	22 ±2	168 ±3	7 ±7	69 ±2	161 ±6	24 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	372 B	Cougar Butte	82 ±5	20 ±2	175 ±3	5 ±7	68 ±2	164 ±6	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	404 A	Grasshopper Group	31 ±5	9 ±2	145 ±3	79 ±7	33 ±2	209 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	404 B	Cougar Butte	94 ±6	23 ±3	198 ±3	7 ±7	80 ±2	172 ±6	24 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	404 C	Cougar Butte	74 ±5	26 ±2	183 ±3	7 ±7	71 ±2	165 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	404 D	Cougar Butte	94 ±5	19 ±2	174 ±3	5 ±7	70 ±2	160 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	404 E	Cougar Butte	80 ±5	17 ±2	162 ±2	5 ±7	64 ±2	158 ±5	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>												Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2555	12	404 F	Cougar Butte	78 ±5	24 ±2	170 ±3	6 ±7	69 ±2	160 ±6	24 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	404 G	Cougar Butte	77 ±5	21 ±2	170 ±3	7 ±7	71 ±2	162 ±6	25 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	404 H	Cougar Butte	114 ±6	30 ±3	194 ±3	6 ±7	80 ±2	172 ±6	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	404 I	Cougar Butte	81 ±5	21 ±3	171 ±3	5 ±7	72 ±2	163 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	404 J	Cougar Butte	81 ±5	23 ±2	183 ±3	5 ±7	69 ±2	159 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	410	Cougar Butte	96 ±7	20 ±4	162 ±5	4 ±3	69 ±2	152 ±5	20 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	412 A	Cougar Butte	70 ±5	16 ±2	163 ±3	5 ±7	66 ±2	159 ±6	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	412 B	Cougar Butte	76 ±5	21 ±2	171 ±3	5 ±7	67 ±2	159 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	412 C	Cougar Butte	100 ±6	21 ±3	185 ±3	7 ±7	73 ±2	166 ±6	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	412 D	Cougar Butte	102 ±5	19 ±2	186 ±3	6 ±7	69 ±2	166 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	412 E	Cougar Butte	93 ±5	22 ±2	180 ±3	6 ±7	70 ±2	166 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	416 A	Cougar Butte	79 ±5	19 ±2	170 ±3	5 ±7	72 ±2	162 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	416 B	Cougar Butte	74 ±5	15 ±2	165 ±3	6 ±7	71 ±2	158 ±6	24 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	416 C	Grasshopper Group	43 ±5	17 ±2	163 ±3	84 ±7	31 ±2	216 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	416 D	Cougar Butte	102 ±5	21 ±2	177 ±3	6 ±7	72 ±2	166 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	416 E	Cougar Butte	101 ±6	26 ±3	202 ±3	6 ±7	75 ±2	172 ±6	23 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	419 A	Cougar Butte	135 ±9	35 ±5	204 ±4	7 ±8	68 ±3	177 ±6	22 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	419 B	Cougar Butte	72 ±7	20 ±3	160 ±3	6 ±7	65 ±2	154 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	419 C	Cougar Butte	102 ±7	28 ±4	185 ±4	9 ±7	76 ±2	170 ±6	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	419 D	Grasshopper Group	73 ±8	22 ±4	188 ±4	88 ±8	30 ±3	231 ±6	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	419 E	Cougar Butte	119 ±9	24 ±5	181 ±4	8 ±8	75 ±3	165 ±6	24 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	479	Cougar Butte	81 ±8	19 ±4	173 ±5	5 ±3	71 ±3	152 ±5	19 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2555	12	530 A	Grasshopper Group	42 ±5	12 ±2	150 ±3	77 ±7	30 ±1	220 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2555	12	530 B	Grasshopper Group	39 ±5	12 ±2	148 ±3	76 ±7	29 ±2	208 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	530 C	Grasshopper Group	32 ±5	12 ±2	142 ±2	76 ±7	27 ±1	210 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	530 D	Grasshopper Group	53 ±5	13 ±2	164 ±3	82 ±7	32 ±2	217 ±6	15 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	530 E	Grasshopper Group	41 ±5	18 ±2	156 ±3	82 ±7	30 ±2	213 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	537 A	Grasshopper Group	33 ±5	18 ±2	157 ±3	81 ±7	29 ±2	215 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	537 B	Cougar Butte	84 ±5	20 ±3	168 ±3	4 ±7	71 ±2	151 ±6	24 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	537 C	Cougar Butte	66 ±5	18 ±2	155 ±3	4 ±7	64 ±2	150 ±6	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	537 D	Grasshopper Group	33 ±5	11 ±2	139 ±3	76 ±7	27 ±2	202 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	537 E	Cougar Butte	82 ±5	16 ±2	173 ±3	6 ±7	67 ±2	158 ±6	17 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	542 A	Cougar Butte	80 ±5	19 ±2	165 ±3	7 ±7	65 ±2	156 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	542 B	Grasshopper Group	37 ±5	10 ±2	151 ±3	73 ±7	30 ±2	213 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	542 C	Grasshopper Group	42 ±5	14 ±2	161 ±3	83 ±7	30 ±2	220 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	542 D	Grasshopper Group	45 ±5	16 ±2	159 ±3	79 ±7	26 ±2	216 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	542 E	Grasshopper Group	40 ±5	20 ±2	156 ±3	79 ±7	29 ±2	211 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	544 A	Cougar Butte	69 ±5	20 ±2	157 ±3	6 ±7	63 ±2	155 ±6	16 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	544 B	Cougar Butte	80 ±5	21 ±2	171 ±3	5 ±7	70 ±2	159 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	544 C	Cougar Butte	68 ±6	15 ±3	166 ±3	6 ±7	65 ±2	154 ±6	23 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	544 D	Cougar Butte	97 ±5	13 ±2	176 ±3	9 ±7	71 ±2	165 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2555	12	544 E	Grasshopper Group	49 ±6	23 ±3	176 ±3	89 ±7	30 ±2	228 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	3 A	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	78 ±5	27 ±1	206 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	3 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	23 A	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	79 ±5	32 ±1	202 ±3	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	23 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-2556	13	23	C	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	77 ±5	29 ±1	207 ±3	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	23	D	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±5	29 ±1	206 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	23	E	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	74 ±5	29 ±1	203 ±3	6 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	23	F	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	82 ±5	30 ±1	201 ±3	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	23	G	Grasshopper Group	NM ±NM	NM ±NM	174 ±2	87 ±5	30 ±2	209 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	23	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	32		Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	33		Grasshopper Group	NM ±NM	NM ±NM	148 ±2	78 ±6	28 ±2	215 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	41	A	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±5	28 ±1	203 ±3	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	41	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	41	C	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	76 ±5	28 ±1	197 ±3	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	41	D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	41	E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	63		Grasshopper Group	NM ±NM	NM ±NM	148 ±3	76 ±6	31 ±2	206 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	76		Grasshopper Group	NM ±NM	NM ±NM	153 ±3	76 ±6	28 ±2	207 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	77		Grasshopper Group	NM ±NM	NM ±NM	154 ±2	81 ±6	29 ±2	212 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	84		Grasshopper Group	NM ±NM	NM ±NM	151 ±2	79 ±6	27 ±2	215 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	85		Grasshopper Group	NM ±NM	NM ±NM	143 ±2	74 ±5	27 ±1	204 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	87		Grasshopper Group	NM ±NM	NM ±NM	142 ±2	76 ±6	28 ±2	212 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	88		Unknown A	NM ±NM	NM ±NM	143 ±2	7 ±6	63 ±2	179 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4199
CA-MOD-2556	13	91		Grasshopper Group	NM ±NM	NM ±NM	150 ±2	74 ±6	29 ±2	217 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2556	13	93		Grasshopper Group	NM ±NM	NM ±NM	154 ±3	79 ±5	29 ±2	206 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	4	A	Grasshopper Group	NM ±NM	NM ±NM	153 ±3	75 ±6	25 ±2	207 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn		
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba	
CA-MOD-2557	19	4	B	Grasshopper Group	NM ±NM	NM ±NM	146 ±3	75 ±6	27 ±2	209 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	4	C	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	73 ±6	28 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	4	D	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	80 ±6	28 ±2	213 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	4	E	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	75 ±6	30 ±2	212 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	11	A	Grasshopper Group	NM ±NM	NM ±NM	152 ±3	84 ±6	25 ±2	207 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	11	B	Grasshopper Group	NM ±NM	NM ±NM	157 ±3	87 ±6	33 ±2	218 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	11	C	Grasshopper Group	NM ±NM	NM ±NM	160 ±3	81 ±6	31 ±2	215 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	11	D	Grasshopper Group	NM ±NM	NM ±NM	164 ±3	85 ±6	31 ±2	221 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	11	E	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	79 ±6	28 ±2	221 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	A	Grasshopper Group	NM ±NM	NM ±NM	146 ±3	82 ±6	30 ±2	217 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	B	Grasshopper Group	NM ±NM	NM ±NM	167 ±3	83 ±6	33 ±2	223 ±8	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	C	Grasshopper Group	NM ±NM	NM ±NM	141 ±3	78 ±6	35 ±2	208 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	D	Grasshopper Group	NM ±NM	NM ±NM	145 ±3	76 ±6	30 ±2	205 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	E	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	80 ±6	26 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	F	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±6	28 ±2	213 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	G	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	76 ±6	28 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	H	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	75 ±6	28 ±2	217 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	I	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	77 ±6	27 ±2	204 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	20	J	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	72 ±6	27 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	21	A	Grasshopper Group	NM ±NM	NM ±NM	159 ±3	79 ±6	25 ±2	207 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	21	B	Grasshopper Group	NM ±NM	NM ±NM	150 ±3	75 ±6	30 ±2	208 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	21	C	Grasshopper Group	NM ±NM	NM ±NM	165 ±2	85 ±6	31 ±2	217 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2557	19	21	D	Grasshopper Group	NM ±NM	NM ±NM	159 ±2	85 ±6	29 ±2	216 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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### Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2557	19	21 E	Grasshopper Group	NM ± NM	NM ± NM	159 ± 2	79 ± 6	30 ± 2	221 ± 7	8 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2557	19	21 F	Grasshopper Group	NM ± NM	NM ± NM	155 ± 2	81 ± 6	29 ± 2	218 ± 7	9 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2557	19	21 G	Grasshopper Group	NM ± NM	NM ± NM	156 ± 2	80 ± 6	27 ± 2	217 ± 7	9 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2557	19	21 H	Grasshopper Group	NM ± NM	NM ± NM	138 ± 2	76 ± 6	31 ± 2	207 ± 7	9 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2557	19	21 I	Grasshopper Group	NM ± NM	NM ± NM	147 ± 2	76 ± 6	31 ± 2	213 ± 7	11 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2557	19	21 J	Grasshopper Group	NM ± NM	NM ± NM	136 ± 2	75 ± 6	26 ± 2	206 ± 7	7 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2557	19	27	Blue Mountain	NM ± NM	NM ± NM	71 ± 2	3 ± 6	81 ± 2	410 ± 7	19 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2558	20	3 A	Grasshopper Group	NM ± NM	NM ± NM	153 ± 3	80 ± 6	27 ± 2	217 ± 7	6 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2558	20	3 B	Grasshopper Group	NM ± NM	NM ± NM	166 ± 4	78 ± 6	28 ± 3	219 ± 8	8 ± 3	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2558	20	3 C	Grasshopper Group	NM ± NM	NM ± NM	141 ± 3	74 ± 6	26 ± 2	200 ± 7	8 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2558	20	3 D	Grasshopper Group	NM ± NM	NM ± NM	144 ± 2	77 ± 6	29 ± 2	216 ± 7	6 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2558	20	3 E	Grasshopper Group	NM ± NM	NM ± NM	165 ± 2	84 ± 6	31 ± 2	227 ± 7	10 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2558	20	10	Blue Mountain	NM ± NM	NM ± NM	57 ± 2	3 ± 6	71 ± 2	359 ± 7	20 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2558	20	11	Grasshopper Group	NM ± NM	NM ± NM	154 ± 2	82 ± 6	25 ± 2	213 ± 7	12 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	3	Grasshopper Group	NM ± NM	NM ± NM	148 ± 3	79 ± 6	27 ± 2	206 ± 7	11 ± 2	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	33 A	Grasshopper Group (V)	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	33 B	Grasshopper Group (V)	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	33 C	Grasshopper Group (V)	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	33 D	Grasshopper Group	NM ± NM	NM ± NM	158 ± 2	81 ± 5	29 ± 1	211 ± 3	10 ± 1	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	33 E	Grasshopper Group (V)	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	33 F	Grasshopper Group	NM ± NM	NM ± NM	151 ± 2	74 ± 5	28 ± 1	205 ± 3	12 ± 1	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	33 G	Grasshopper Group (V)	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM ± NM	NM	
CA-MOD-2559	21	33 H	Grasshopper Group	NM ± NM	NM ± NM	160 ± 2	81 ± 5	30 ± 1	207 ± 3	10 ± 1	NM ± NM	NM ± NM	NM ± NM	NM	

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2559	21	33 I	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	78 ±5	29 ±1	204 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	33 J	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	73 ±5	28 ±1	199 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	35	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	71 ±5	27 ±1	205 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 A	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±5	30 ±1	210 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 B	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	74 ±5	29 ±1	205 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 C	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	73 ±5	29 ±1	208 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 D	Grasshopper Group	NM ±NM	NM ±NM	158 ±2	81 ±5	31 ±1	214 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 E	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	79 ±5	32 ±1	210 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 F	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±5	31 ±1	205 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 G	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	77 ±5	30 ±1	206 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 H	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	79 ±5	28 ±1	197 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 I	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	78 ±5	27 ±1	206 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	110 J	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	73 ±5	29 ±1	207 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	215	Unknown A	NM ±NM	NM ±NM	108 ±2	75 ±6	17 ±2	105 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	223	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	74 ±5	27 ±1	208 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	329	Blue Mountain	NM ±NM	NM ±NM	64 ±2	5 ±6	75 ±2	385 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	358	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±5	26 ±1	208 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	400	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	73 ±5	31 ±1	207 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	404	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	79 ±6	27 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	415	Cougar Butte	NM ±NM	NM ±NM	141 ±2	7 ±6	62 ±2	176 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3316
CA-MOD-2559	21	416	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	79 ±6	28 ±2	216 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	422	Cougar Butte	NM ±NM	NM ±NM	111 ±2	62 ±6	18 ±2	100 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2494
CA-MOD-2559	21	423	Blue Mountain	NM ±NM	NM ±NM	62 ±2	2 ±6	75 ±2	381 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2559	21	424	Grasshopper Group	NM ±NM	NM ±NM	128 ±2	49 ±5	24 ±1	121 ±4	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	425	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	75 ±5	29 ±1	209 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	426	Blue Mountain	NM ±NM	NM ±NM	58 ±2	3 ±5	70 ±2	370 ±5	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	427	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±5	29 ±1	203 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	429	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	69 ±6	30 ±2	201 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	431	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±5	29 ±1	207 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	433	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	74 ±5	30 ±1	205 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	435	Blue Mountain	NM ±NM	NM ±NM	63 ±2	2 ±5	76 ±1	382 ±5	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	442	Cougar Butte	NM ±NM	NM ±NM	158 ±2	4 ±6	67 ±2	158 ±7	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4364
CA-MOD-2559	21	448	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	72 ±5	29 ±1	207 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	450	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	78 ±5	28 ±1	215 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	463	Cougar Butte	NM ±NM	NM ±NM	153 ±2	4 ±6	66 ±2	154 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3764
CA-MOD-2559	21	464	Cougar Butte	NM ±NM	NM ±NM	163 ±2	4 ±6	67 ±2	161 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4109
CA-MOD-2559	21	465	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	73 ±6	28 ±2	204 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	470	Cougar Butte	NM ±NM	NM ±NM	166 ±2	5 ±6	70 ±2	162 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4110
CA-MOD-2559	21	471	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	74 ±6	29 ±2	206 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	480	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	73 ±5	29 ±1	206 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	530 A	Grasshopper Group	50 ±5	17 ±2	153 ±3	79 ±7	30 ±2	215 ±6	6 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	530 B	Grasshopper Group	36 ±5	11 ±2	145 ±3	72 ±7	28 ±2	210 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	530 C	Grasshopper Group	51 ±5	17 ±2	164 ±3	82 ±7	33 ±2	224 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	530 D	Grasshopper Group	39 ±5	12 ±2	149 ±3	74 ±7	30 ±2	208 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	530 E	Grasshopper Group	41 ±5	13 ±2	152 ±3	76 ±7	31 ±2	213 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	535 A	Grasshopper Group	39 ±5	13 ±2	150 ±3	76 ±7	29 ±2	211 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*												Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2559	21	535 B	Grasshopper Group	33 ±6	8 ±3	155 ±3	84 ±7	30 ±2	210 ±6	4 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	535 C	Grasshopper Group	42 ±5	9 ±2	156 ±3	79 ±7	29 ±2	214 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	535 D	Grasshopper Group	42 ±4	15 ±2	149 ±2	74 ±7	29 ±1	213 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	535 E	Grasshopper Group	39 ±5	15 ±2	154 ±3	81 ±7	30 ±2	219 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	537 A	Grasshopper Group	45 ±5	14 ±3	170 ±3	87 ±7	31 ±2	223 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	537 B	Grasshopper Group	43 ±6	12 ±3	166 ±3	80 ±7	28 ±2	218 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	537 C	Grasshopper Group	34 ±6	19 ±3	161 ±3	84 ±7	32 ±2	218 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	537 D	Grasshopper Group	37 ±5	19 ±2	157 ±3	86 ±7	30 ±2	218 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	537 E	Grasshopper Group	45 ±6	15 ±3	153 ±3	78 ±7	31 ±2	207 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	597	East Medicine Lake	40 ±6	15 ±4	144 ±4	75 ±3	32 ±2	207 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57	
CA-MOD-2559	21	690	Spodue Mountain	40 ±6	15 ±3	99 ±4	42 ±3	22 ±2	113 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	719 A	Grasshopper Group	39 ±5	9 ±2	147 ±3	74 ±7	29 ±2	205 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	719 B	Grasshopper Group	46 ±5	12 ±2	150 ±3	79 ±7	31 ±2	210 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	719 C	Grasshopper Group	44 ±5	12 ±2	149 ±2	76 ±7	30 ±1	211 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	719 D	Grasshopper Group	40 ±5	12 ±2	144 ±3	73 ±7	31 ±2	210 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	719 E	Grasshopper Group	40 ±5	16 ±2	145 ±2	81 ±7	30 ±1	208 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	728 A	Cougar Butte	66 ±5	19 ±2	154 ±3	7 ±7	62 ±2	153 ±6	25 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	728 B	Grasshopper Group	46 ±5	16 ±2	162 ±3	85 ±7	33 ±2	223 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	728 C	Grasshopper Group	30 ±5	14 ±2	149 ±3	79 ±7	35 ±2	211 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	728 D	Grasshopper Group	52 ±5	15 ±2	149 ±3	78 ±7	30 ±2	207 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	728 E	Grasshopper Group	37 ±5	8 ±2	151 ±3	75 ±7	27 ±2	209 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	734 A	Cougar Butte	83 ±5	20 ±2	168 ±3	6 ±7	67 ±2	162 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2559	21	734 B	Grasshopper Group	42 ±6	12 ±2	163 ±3	83 ±7	30 ±2	217 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2559	21	734 C	Grasshopper Group	60 ±6	15 ±4	172 ±4	89 ±8	29 ±2	236 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	734 D	Cougar Butte	93 ±6	15 ±3	175 ±3	4 ±7	69 ±2	159 ±6	23 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	734 E	Grasshopper Group	43 ±5	7 ±2	161 ±3	82 ±7	32 ±2	220 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	735 A	Grasshopper Group	42 ±5	14 ±2	158 ±3	78 ±7	28 ±2	214 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	735 B	Grasshopper Group	37 ±5	17 ±2	141 ±3	76 ±7	30 ±2	207 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	735 C	Grasshopper Group	39 ±5	8 ±2	153 ±3	85 ±7	29 ±2	210 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	735 D	Grasshopper Group	48 ±5	17 ±2	155 ±3	84 ±7	28 ±2	214 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	735 E	Grasshopper Group	43 ±5	16 ±2	148 ±3	77 ±7	29 ±2	205 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	741 A	Grasshopper Group	43 ±5	17 ±2	155 ±3	81 ±7	31 ±2	215 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	741 B	Grasshopper Group	35 ±5	14 ±2	153 ±3	81 ±7	29 ±2	207 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	741 C	Grasshopper Group	36 ±5	14 ±2	159 ±3	79 ±7	29 ±2	219 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	741 D	Grasshopper Group	36 ±5	13 ±2	154 ±3	82 ±7	28 ±2	216 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	741 E	Grasshopper Group	42 ±5	14 ±2	156 ±3	81 ±7	27 ±2	208 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	780 A	Cougar Butte	81 ±5	21 ±2	165 ±3	5 ±7	70 ±2	155 ±6	18 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	780 B	Grasshopper Group	40 ±5	16 ±2	152 ±3	80 ±7	29 ±2	209 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	780 C	Grasshopper Group	36 ±5	12 ±2	151 ±3	77 ±7	31 ±1	208 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	780 D	Cougar Butte	84 ±5	20 ±2	171 ±3	7 ±7	66 ±2	163 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	780 E	Grasshopper Group	46 ±5	16 ±2	165 ±3	86 ±7	31 ±2	224 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	783 A	Grasshopper Group	38 ±5	17 ±2	153 ±3	81 ±7	30 ±2	224 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	783 B	Grasshopper Group	37 ±4	12 ±2	150 ±2	80 ±7	30 ±1	210 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	783 C	Grasshopper Group	32 ±5	16 ±2	158 ±3	83 ±7	31 ±2	218 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	783 D	Grasshopper Group	45 ±5	12 ±2	151 ±3	82 ±7	30 ±2	214 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	783 E	Grasshopper Group	41 ±6	15 ±3	164 ±3	80 ±7	30 ±2	211 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2559	21	789	East Medicine Lake	35 ±6	12 ±3	137 ±4	70 ±3	29 ±2	193 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-MOD-2559	21	807 A	Grasshopper Group	35 ±5	13 ±2	152 ±3	79 ±7	31 ±2	211 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	807 B	Grasshopper Group	32 ±6	3 ±2	129 ±3	66 ±7	28 ±2	186 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	807 C	Grasshopper Group	40 ±5	8 ±2	154 ±3	79 ±7	27 ±2	209 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	807 D	Grasshopper Group	44 ±5	20 ±2	160 ±3	83 ±7	32 ±2	220 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	807 E	Grasshopper Group	61 ±5	18 ±2	163 ±3	83 ±7	32 ±2	211 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	809 A	Cougar Butte	77 ±5	17 ±2	164 ±3	6 ±7	68 ±2	158 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	809 B	Grasshopper Group	35 ±5	18 ±2	144 ±3	80 ±7	30 ±2	205 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	809 C	Grasshopper Group	35 ±5	12 ±2	151 ±3	77 ±7	29 ±2	204 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	809 D	Grasshopper Group	41 ±5	18 ±2	159 ±3	84 ±7	32 ±1	216 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	809 E	Grasshopper Group	50 ±6	17 ±3	165 ±3	80 ±7	29 ±2	215 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	826	East Medicine Lake	36 ±6	17 ±3	137 ±4	70 ±3	28 ±2	193 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2559	21	835	Cougar Butte	83 ±6	15 ±3	157 ±4	3 ±3	71 ±2	144 ±5	17 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	838	East Medicine Lake	42 ±6	16 ±3	144 ±4	74 ±3	32 ±2	201 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2559	21	866	East Medicine Lake	27 ±6	13 ±3	139 ±4	70 ±3	27 ±2	196 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2560	27	13 A	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	75 ±5	28 ±1	214 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	13 B	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	72 ±5	26 ±1	204 ±5	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	13 C	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	71 ±5	30 ±1	202 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	13 D	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	72 ±5	29 ±1	204 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	13 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	13 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	27	Cougar Butte	NM ±NM	NM ±NM	160 ±2	5 ±6	68 ±2	155 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3906
CA-MOD-2560	27	31	Glass Mountain	NM ±NM	NM ±NM	144 ±2	112 ±6	29 ±2	231 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>														Ratio Fe/Ni
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba				
CA-MOD-2560	27	52	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	79 ±6	31 ±2	214 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	56	Cougar Butte	NM ±NM	NM ±NM	163 ±3	6 ±6	71 ±2	159 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3994		
CA-MOD-2560	27	191	Cougar Butte	NM ±NM	NM ±NM	166 ±2	6 ±6	69 ±2	158 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4392		
CA-MOD-2560	27	217 A	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	81 ±5	32 ±1	214 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 B	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	79 ±5	29 ±1	212 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 D	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±5	30 ±1	216 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	217 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	222 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	222 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	222 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	222 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	222 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	222 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	222 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	250	Grasshopper Group	NM ±NM	NM ±NM	145 ±3	73 ±6	27 ±2	204 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	256 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2560	27	256 B	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±5	30 ±1	214 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2560	27	256 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 H	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	78 ±5	29 ±1	213 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 K	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	76 ±6	27 ±2	210 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 L	Grasshopper Group?	NM ±NM	NM ±NM	169 ±2	86 ±6	31 ±2	235 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	256 M	Grasshopper Group	NM ±NM	NM ±NM	165 ±2	83 ±6	30 ±2	223 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	289	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	76 ±6	28 ±2	210 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	343	Cougar Butte	NM ±NM	NM ±NM	160 ±2	10 ±6	74 ±2	163 ±7	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	5336
CA-MOD-2560	27	351	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	78 ±6	28 ±2	216 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	352	Buck Mountain	NM ±NM	NM ±NM	114 ±2	70 ±6	19 ±2	108 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2517
CA-MOD-2560	27	353	Unknown A	NM ±NM	NM ±NM	104 ±2	65 ±6	19 ±2	104 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	354	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	77 ±6	28 ±2	216 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	389 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	389 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	389 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	389 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	389 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	389 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn	
CA-MOD-2560	27	392 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	392 B	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	431	Glass Mountain	NM ±NM	NM ±NM	172 ±3	125 ±6	25 ±2	244 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	438	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±6	32 ±2	217 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	439	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	76 ±6	28 ±2	207 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	452	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	77 ±5	31 ±1	208 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	462	Glass Mountain	NM ±NM	NM ±NM	162 ±2	116 ±6	27 ±2	237 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	477	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	78 ±5	30 ±1	214 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	485	Cougar Butte	NM ±NM	NM ±NM	150 ±2	4 ±6	64 ±2	152 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4076
CA-MOD-2560	27	492	Glass Mountain	NM ±NM	NM ±NM	166 ±5	100 ±6	27 ±2	236 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	515	Glass Mountain	NM ±NM	NM ±NM	162 ±2	110 ±6	25 ±2	235 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	519	Cowhead Lake	NM ±NM	NM ±NM	131 ±2	9 ±6	28 ±2	92 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1720
CA-MOD-2560	27	532	Grasshopper Group	NM ±NM	NM ±NM	136 ±3	70 ±6	31 ±2	203 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	535	Unknown A	NM ±NM	NM ±NM	113 ±3	75 ±6	17 ±2	98 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	6233
CA-MOD-2560	27	552	Cougar Butte	NM ±NM	NM ±NM	168 ±2	15 ±6	67 ±2	156 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4540
CA-MOD-2560	27	587	Unknown A	NM ±NM	NM ±NM	108 ±2	68 ±6	19 ±2	103 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	591	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±6	27 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	592	Sugar Hill?	NM ±NM	NM ±NM	134 ±2	54 ±6	23 ±2	126 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	595	Spodue Mountain	NM ±NM	NM ±NM	103 ±2	44 ±6	22 ±2	125 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	601	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	74 ±6	27 ±2	209 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	606	Buck Mountain	NM ±NM	NM ±NM	123 ±2	63 ±6	21 ±2	98 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2081
CA-MOD-2560	27	607	Grasshopper Group	NM ±NM	NM ±NM	153 ±3	82 ±6	30 ±2	213 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	609	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	78 ±6	27 ±2	209 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2560	27	612	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	77 ±6	28 ±2	217 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	613	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±6	30 ±2	216 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	614	Cougar Butte	NM ±NM	NM ±NM	170 ±2	5 ±6	69 ±2	164 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3874
CA-MOD-2560	27	615	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	77 ±6	28 ±2	216 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	616	Cougar Butte	NM ±NM	NM ±NM	154 ±2	5 ±6	67 ±2	152 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4679
CA-MOD-2560	27	618	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±6	28 ±2	214 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	621	Glass Mountain	NM ±NM	NM ±NM	157 ±2	100 ±6	25 ±2	225 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	623	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	79 ±6	29 ±2	218 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	624	Unknown A	NM ±NM	NM ±NM	107 ±2	66 ±6	20 ±2	107 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	627	Glass Mountain	NM ±NM	NM ±NM	156 ±2	113 ±6	26 ±2	234 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	628	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	78 ±6	26 ±2	217 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	629	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	79 ±6	27 ±2	218 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	630	Glass Mountain	NM ±NM	NM ±NM	146 ±2	129 ±6	26 ±2	242 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	650	East Medicine Lake	31 ±7	10 ±4	133 ±4	65 ±3	28 ±2	188 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2560	27	651	Buck Mountain	40 ±7	13 ±4	105 ±4	65 ±3	20 ±2	97 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	656	East Medicine Lake	37 ±6	17 ±3	135 ±4	68 ±3	29 ±2	190 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-MOD-2560	27	657	Glass Mountain	58 ±6	17 ±4	176 ±5	118 ±3	29 ±2	235 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	659	Spodue Mountain	46 ±6	16 ±3	95 ±4	40 ±3	25 ±2	106 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	681	East Medicine Lake	38 ±6	19 ±3	144 ±4	74 ±3	28 ±2	202 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2560	27	691	East Medicine Lake	40 ±6	17 ±3	144 ±4	68 ±3	30 ±2	194 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2560	27	713	Buck Mountain	40 ±6	17 ±3	115 ±4	65 ±3	16 ±2	96 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	737	East Medicine Lake	45 ±6	18 ±3	140 ±4	73 ±3	29 ±2	200 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2560	27	748	East Medicine Lake	47 ±6	15 ±3	146 ±4	73 ±3	29 ±2	206 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2560	27	751	East Medicine Lake	46 ±6	14 ±4	151 ±4	79 ±3	31 ±2	205 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-MOD-2560	27	753	East Medicine Lake	42 ±7	20 ±3	138 ±5	66 ±3	29 ±2	181 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-MOD-2560	27	760	East Medicine Lake	43 ±6	12 ±4	155 ±5	77 ±3	31 ±2	209 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-MOD-2560	27	763 A	Grasshopper Group	36 ±5	11 ±2	134 ±3	72 ±7	29 ±2	195 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	763 B	Grasshopper Group	42 ±5	11 ±2	172 ±3	85 ±7	30 ±2	218 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	763 C	Grasshopper Group	54 ±5	12 ±2	146 ±3	74 ±7	28 ±2	206 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	763 D	Grasshopper Group	49 ±5	20 ±2	162 ±3	84 ±7	32 ±2	214 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	763 E	Grasshopper Group	39 ±5	14 ±2	155 ±3	82 ±7	31 ±2	216 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	772 A	Grasshopper Group	38 ±5	17 ±2	151 ±3	79 ±7	31 ±2	211 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	772 B	Grasshopper Group	40 ±5	11 ±2	155 ±3	78 ±7	28 ±1	209 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	772 C	Glass Mountain	44 ±5	18 ±2	153 ±3	119 ±7	25 ±2	230 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	772 D	Grasshopper Group	43 ±5	12 ±2	148 ±3	79 ±7	29 ±2	204 ±6	15 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	772 E	Grasshopper Group	40 ±5	16 ±2	157 ±3	80 ±7	30 ±2	213 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	775 A	Grasshopper Group	41 ±5	14 ±2	156 ±3	85 ±7	30 ±2	215 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	775 B	Grasshopper Group	44 ±6	18 ±3	172 ±3	84 ±7	34 ±2	223 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	775 C	Glass Mountain	50 ±5	20 ±3	168 ±3	125 ±7	25 ±2	242 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	775 D	Grasshopper Group	48 ±6	14 ±3	166 ±3	86 ±7	31 ±2	223 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	775 E	Glass Mountain	67 ±6	19 ±3	168 ±3	126 ±8	29 ±2	238 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	775 F	Grasshopper Group	58 ±5	21 ±3	154 ±3	78 ±7	30 ±2	213 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	775 G	Glass Mountain	47 ±6	20 ±4	162 ±3	136 ±8	27 ±2	227 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	775 H	Grasshopper Group	46 ±7	25 ±4	166 ±4	87 ±8	28 ±2	218 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	777 A	Glass Mountain	57 ±6	32 ±4	185 ±3	128 ±8	31 ±2	235 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	777 B	Grasshopper Group	91 ±9	21 ±5	167 ±4	80 ±8	28 ±3	204 ±6	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2560	27	788	East Medicine Lake	48 ±7	26 ±3	146 ±5	74 ±3	32 ±2	180 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-MOD-2560	27	825	East Medicine Lake	46 ±7	16 ±4	150 ±5	74 ±3	32 ±2	206 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2560	27	842	East Medicine Lake	50 ±6	17 ±4	134 ±5	69 ±3	27 ±2	180 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-MOD-2560	27	848	Glass Mountain	49 ±6	17 ±3	150 ±4	109 ±3	27 ±2	220 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	849	East Medicine Lake	49 ±6	14 ±4	142 ±4	69 ±3	28 ±2	185 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-MOD-2560	27	883	East Medicine Lake	26 ±7	12 ±3	127 ±4	60 ±3	27 ±2	179 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-MOD-2560	27	905	Unknown B	59 ±6	19 ±3	103 ±4	15 ±3	36 ±2	214 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	386 ±14	NM
CA-MOD-2560	27	912	East Medicine Lake	38 ±6	20 ±3	150 ±5	74 ±3	32 ±2	208 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2560	27	919	East Medicine Lake	38 ±6	16 ±3	130 ±4	67 ±3	31 ±2	183 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2560	27	925	East Medicine Lake	45 ±6	20 ±3	146 ±5	75 ±3	30 ±2	214 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2560	27	930	Unknown C	35 ±6	12 ±4	149 ±4	55 ±3	18 ±2	86 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	341 ±14	NM
CA-MOD-2560	27	948	Buck Mountain	35 ±7	13 ±4	102 ±4	58 ±3	20 ±2	80 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	949	East Medicine Lake	48 ±6	14 ±3	152 ±4	75 ±3	31 ±2	205 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2560	27	953	East Medicine Lake	40 ±6	17 ±3	139 ±4	68 ±3	29 ±2	194 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2560	27	954	East Medicine Lake	49 ±7	16 ±4	143 ±5	73 ±3	30 ±2	195 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2560	27	964	East Medicine Lake	43 ±6	16 ±4	149 ±4	77 ±3	32 ±2	203 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-MOD-2560	27	973 A	Grasshopper Group	43 ±5	12 ±2	147 ±3	76 ±7	30 ±2	209 ±6	14 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	973 B	Grasshopper Group	60 ±6	23 ±3	182 ±3	98 ±8	31 ±2	224 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2560	27	973 C	Grasshopper Group	38 ±6	12 ±2	147 ±3	80 ±7	30 ±2	212 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	973 D	Grasshopper Group	41 ±6	15 ±3	155 ±3	79 ±7	29 ±2	210 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	973 E	Grasshopper Group	44 ±7	8 ±3	128 ±3	79 ±7	29 ±2	178 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	974 A	Grasshopper Group	52 ±7	19 ±4	162 ±4	86 ±8	32 ±2	204 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	974 B	Grasshopper Group	42 ±6	15 ±3	164 ±3	87 ±7	28 ±2	222 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>												Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2560	27	974 C	Cougar Butte	69 ±6	17 ±3	160 ±3	7 ±7	67 ±2	195 ±6	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	974 D	Grasshopper Group	50 ±7	13 ±3	170 ±3	91 ±8	30 ±2	218 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	974 E	Cougar Butte	92 ±7	30 ±4	187 ±4	9 ±7	66 ±2	190 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1025	Buck Mountain	35 ±6	14 ±3	96 ±4	58 ±3	16 ±2	89 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1028 A	Grasshopper Group	43 ±6	24 ±3	172 ±3	91 ±7	29 ±2	223 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	66	
CA-MOD-2560	27	1028 B	Cougar Butte	78 ±5	11 ±2	163 ±3	7 ±7	68 ±2	160 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1028 C	Glass Mountain	42 ±5	19 ±2	184 ±3	128 ±7	28 ±2	246 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1028 D	Glass Mountain	34 ±6	20 ±3	150 ±3	108 ±7	23 ±2	215 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1028 E	Glass Mountain	49 ±5	16 ±2	161 ±3	117 ±7	27 ±2	230 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1031 A	Grasshopper Group	45 ±5	18 ±2	175 ±3	85 ±7	30 ±2	221 ±6	14 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1031 B	Cougar Butte	69 ±5	23 ±2	158 ±3	10 ±7	66 ±2	183 ±6	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1031 C	Cougar Butte	79 ±5	19 ±3	159 ±3	6 ±7	64 ±2	148 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1031 D	Grasshopper Group	35 ±6	21 ±3	132 ±3	70 ±7	29 ±2	186 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1031 E	Grasshopper Group	45 ±8	10 ±4	149 ±4	72 ±8	27 ±2	203 ±6	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1043	East Medicine Lake	28 ±6	16 ±3	140 ±4	70 ±3	31 ±2	199 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55	
CA-MOD-2560	27	1065 A	Grasshopper Group	44 ±5	14 ±2	160 ±3	83 ±7	29 ±2	214 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1065 B	Grasshopper Group	38 ±5	12 ±2	159 ±3	80 ±7	27 ±2	217 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1065 C	Grasshopper Group	50 ±5	15 ±2	155 ±3	82 ±7	30 ±2	216 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1065 D	Grasshopper Group	39 ±5	17 ±2	160 ±3	81 ±7	32 ±2	218 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1065 E	Grasshopper Group	43 ±5	15 ±2	161 ±3	79 ±7	31 ±2	216 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1066	East Medicine Lake	44 ±6	17 ±3	141 ±4	68 ±3	32 ±2	185 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56	
CA-MOD-2560	27	1068 A	Glass Mountain	45 ±5	14 ±2	162 ±3	116 ±7	26 ±2	233 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2560	27	1068 B	Grasshopper Group	48 ±5	19 ±3	175 ±3	91 ±7	33 ±2	224 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2560	27	1068 C	Grasshopper Group	60 ±5	21 ±2	176 ±3	93 ±7	31 ±2	229 ±6	14 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1068 D	Glass Mountain	51 ±6	19 ±3	160 ±3	121 ±7	28 ±2	230 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1068 E	Glass Mountain	65 ±6	22 ±3	188 ±4	130 ±8	32 ±2	245 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1068 F	Glass Mountain	46 ±5	12 ±2	160 ±3	121 ±7	29 ±2	232 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1070 A	Glass Mountain	51 ±6	19 ±3	172 ±3	110 ±7	25 ±2	225 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1070 B	Grasshopper Group	41 ±8	19 ±4	145 ±4	82 ±8	29 ±2	199 ±6	1 ±12	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1070 C	Grasshopper Group	59 ±6	27 ±4	179 ±4	90 ±8	33 ±2	219 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1070 D	Grasshopper Group	56 ±7	21 ±4	175 ±4	88 ±8	27 ±2	212 ±6	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1070 E	Grasshopper Group?	82 ±10	33 ±7	150 ±5	76 ±8	28 ±3	173 ±7	10 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1070 F	Glass Mountain	43 ±8	26 ±5	160 ±4	104 ±8	24 ±3	217 ±6	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1070 G	Grasshopper Group	61 ±7	7 ±4	177 ±4	90 ±8	26 ±2	209 ±6	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1071 A	Glass Mountain	61 ±5	25 ±3	183 ±3	127 ±7	27 ±2	241 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1071 B	Glass Mountain	46 ±6	15 ±3	165 ±3	112 ±7	25 ±2	234 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 A	Cougar Butte	81 ±5	27 ±2	180 ±3	6 ±7	73 ±2	167 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 B	Grasshopper Group	44 ±5	16 ±2	149 ±3	76 ±7	30 ±2	206 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 C	Grasshopper Group	37 ±5	15 ±2	150 ±3	79 ±7	30 ±1	215 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 D	Grasshopper Group	34 ±5	11 ±2	147 ±3	74 ±7	28 ±2	204 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 E	Cougar Butte	92 ±6	23 ±3	174 ±3	10 ±7	68 ±2	167 ±6	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 F	Grasshopper Group	45 ±5	19 ±2	143 ±3	76 ±7	29 ±2	209 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 G	Cougar Butte	73 ±6	18 ±3	161 ±3	6 ±7	68 ±2	148 ±6	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 H	Grasshopper Group	42 ±5	14 ±2	153 ±3	77 ±7	27 ±2	208 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 I	Grasshopper Group	46 ±5	16 ±2	149 ±3	79 ±7	29 ±2	205 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1117 J	Grasshopper Group	38 ±5	13 ±2	152 ±3	79 ±7	29 ±2	208 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2560	27	1120 A	Grasshopper Group	50 ±5	9 ±2	165 ±3	84 ±7	28 ±2	223 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1120 B	Grasshopper Group	41 ±5	15 ±2	158 ±3	84 ±7	31 ±2	218 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1120 C	Grasshopper Group	40 ±5	17 ±2	161 ±3	87 ±7	29 ±2	216 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1120 D	Grasshopper Group	52 ±5	15 ±2	151 ±3	80 ±7	30 ±2	214 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1120 E	Grasshopper Group	50 ±5	11 ±2	150 ±3	84 ±7	35 ±2	212 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1121	East Medicine Lake	45 ±6	15 ±3	152 ±4	74 ±3	32 ±2	205 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2560	27	1122 A	Grasshopper Group	38 ±5	17 ±2	158 ±3	78 ±7	32 ±2	218 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1122 B	Grasshopper Group	47 ±5	15 ±2	167 ±3	88 ±7	34 ±2	224 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2560	27	1122 C	Grasshopper Group	41 ±6	16 ±3	172 ±3	93 ±7	36 ±2	228 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2560	27	1122 D	Grasshopper Group	48 ±5	15 ±2	156 ±3	82 ±7	29 ±2	215 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2560	27	1122 E	Grasshopper Group	48 ±5	18 ±2	152 ±3	78 ±7	30 ±2	210 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 A	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	76 ±5	29 ±1	212 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 B	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	75 ±5	31 ±1	209 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 C	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±5	30 ±1	209 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 D	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	73 ±5	29 ±1	208 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 E	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	79 ±5	30 ±1	212 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 G	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	78 ±5	30 ±1	212 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 H	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	75 ±5	30 ±1	213 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 I	Grasshopper Group	NM ±NM	NM ±NM	160 ±2	82 ±5	32 ±1	216 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 J	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	75 ±5	29 ±1	210 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 K	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	80 ±6	25 ±2	220 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2561	24	66 L	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	76 ±6	29 ±2	218 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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### Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*														Ratio Fe/Mn
				Zn	Ga	Rb	Str	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba				
CA-MOD-2561	24	66	M	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	79 ±6	28 ±2	213 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	66	N	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±6	28 ±2	216 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	A	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	72 ±5	28 ±1	201 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	B	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	75 ±5	29 ±1	213 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	D	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	75 ±5	29 ±1	207 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	I	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±5	29 ±1	208 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2561	24	86	J	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	75 ±5	30 ±1	213 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	I		Grasshopper Group	NM ±NM	NM ±NM	127 ±2	70 ±6	29 ±2	198 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	A	Grasshopper Group	38 ±5	14 ±2	150 ±3	80 ±7	29 ±1	211 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	B	Grasshopper Group	42 ±5	12 ±2	146 ±3	79 ±7	33 ±2	210 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	C	Grasshopper Group	40 ±5	14 ±2	157 ±3	80 ±7	30 ±2	218 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	D	Grasshopper Group	40 ±5	10 ±2	150 ±3	77 ±7	30 ±2	210 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	E	Grasshopper Group	36 ±5	15 ±2	152 ±3	77 ±7	31 ±2	217 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	F	Grasshopper Group	40 ±5	16 ±2	164 ±3	86 ±7	31 ±2	225 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	G	Grasshopper Group	32 ±5	12 ±2	150 ±3	77 ±7	31 ±2	211 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	H	Grasshopper Group	41 ±5	21 ±2	164 ±3	83 ±7	30 ±2	219 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	I	Grasshopper Group	28 ±6	12 ±3	138 ±3	71 ±7	23 ±2	192 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		
CA-MOD-2562	25	18	J	Grasshopper Group	49 ±5	19 ±2	149 ±2	76 ±7	29 ±1	206 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM		



Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2562	25	29	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	76 ±6	29 ±2	214 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	31	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	79 ±6	27 ±2	218 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	34	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±6	25 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	50	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	77 ±6	28 ±2	206 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	51	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	75 ±6	27 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 A	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	77 ±5	29 ±1	210 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 C	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	77 ±5	26 ±1	205 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 D	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	72 ±5	29 ±1	202 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 F	Grasshopper Group	NM ±NM	NM ±NM	159 ±2	79 ±5	30 ±1	217 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 G	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	72 ±5	30 ±1	206 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 I	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	76 ±5	28 ±1	207 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	52 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	56	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	74 ±6	28 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	57	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	71 ±6	28 ±2	207 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	58	Buck Mountain	NM ±NM	NM ±NM	115 ±2	68 ±6	16 ±2	106 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2086
CA-MOD-2562	25	66 A	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	73 ±5	29 ±1	207 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	66 B	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	73 ±5	28 ±1	203 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	66 C	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	74 ±5	30 ±1	201 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	66 D	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	71 ±5	30 ±1	205 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	66 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2562	25	66	F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	66	G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	66	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	66	I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	66	J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	B	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	77 ±5	30 ±1	210 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	G	Cougar Butte	NM ±NM	NM ±NM	159 ±2	3 ±5	70 ±1	155 ±4	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4272
CA-MOD-2562	25	74	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	74	J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	83	A	Grasshopper Group	42 ±5	18 ±2	157 ±3	81 ±7	31 ±1	212 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	83	B	Grasshopper Group	33 ±5	8 ±2	144 ±2	76 ±7	27 ±1	204 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	83	C	Grasshopper Group	37 ±5	6 ±2	144 ±2	78 ±7	31 ±1	208 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	86		Grasshopper Group	NM ±NM	NM ±NM	145 ±2	74 ±6	27 ±2	211 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	88		Cougar Butte	NM ±NM	NM ±NM	157 ±2	4 ±6	65 ±2	157 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3981
CA-MOD-2562	25	89		Grasshopper Group	NM ±NM	NM ±NM	145 ±2	73 ±6	28 ±2	216 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	90		Grasshopper Group	NM ±NM	NM ±NM	149 ±2	75 ±6	28 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	100	A	Grasshopper Group	39 ±5	12 ±2	153 ±3	80 ±7	30 ±1	217 ±6	14 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2562	25	100 B	Grasshopper Group	35 ±5	17 ±2	155 ±3	80 ±7	31 ±2	213 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	100 C	Grasshopper Group	41 ±5	11 ±2	141 ±3	75 ±7	29 ±2	208 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	117	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	79 ±6	28 ±2	224 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	127 A	Grasshopper Group	32 ±5	12 ±2	145 ±2	75 ±7	29 ±1	204 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	127 B	Grasshopper Group	36 ±5	13 ±2	140 ±3	74 ±7	27 ±2	193 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	127 C	Grasshopper Group	39 ±5	17 ±2	153 ±3	78 ±7	29 ±2	209 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	127 D	Grasshopper Group	47 ±5	17 ±2	171 ±3	89 ±7	31 ±2	227 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	129 A	Grasshopper Group	48 ±5	18 ±2	153 ±3	81 ±7	28 ±2	213 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	129 B	Grasshopper Group	41 ±5	17 ±2	152 ±3	75 ±7	28 ±1	207 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	129 C	Grasshopper Group	54 ±5	20 ±2	165 ±3	83 ±7	28 ±2	224 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	131 A	Grasshopper Group	42 ±5	15 ±3	156 ±3	83 ±7	31 ±2	208 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	131 B	Grasshopper Group	64 ±7	7 ±3	139 ±3	72 ±7	24 ±2	193 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	131 C	Grasshopper Group	41 ±5	16 ±2	147 ±3	79 ±7	31 ±2	210 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	132 A	Grasshopper Group	36 ±5	15 ±2	157 ±3	82 ±7	27 ±2	213 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	132 B	Grasshopper Group	41 ±5	11 ±2	148 ±2	80 ±7	27 ±1	212 ±6	6 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	132 C	Grasshopper Group	34 ±5	23 ±2	145 ±3	76 ±7	30 ±2	202 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	132 D	Grasshopper Group	59 ±6	12 ±3	158 ±3	85 ±7	28 ±2	208 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	141	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	72 ±6	27 ±2	209 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 A	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	75 ±5	28 ±1	202 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 B	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	76 ±5	31 ±1	212 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 C	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±5	27 ±1	208 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 D	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	78 ±5	31 ±1	211 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 E	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	74 ±5	29 ±1	204 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2562	25	147 F	Grasshopper Group	NM ±NM	NM ±NM	163 ±2	84 ±5	30 ±1	224 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 G	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	74 ±5	28 ±1	209 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 H	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	72 ±5	28 ±1	205 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	147 J	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	72 ±5	28 ±1	218 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	189	Cougar Butte	NM ±NM	NM ±NM	162 ±2	3 ±6	67 ±2	160 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4005
CA-MOD-2562	25	190	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	191	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	72 ±6	27 ±2	202 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	192	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	193	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±6	28 ±2	216 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	194	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	77 ±6	28 ±2	213 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	195	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	82 ±6	30 ±2	214 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	196	Unknown A	NM ±NM	NM ±NM	103 ±2	66 ±6	17 ±2	105 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	198	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±6	28 ±2	209 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	199	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	80 ±6	29 ±2	217 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	200	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	75 ±6	28 ±2	215 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	202	Buck Mountain	NM ±NM	NM ±NM	112 ±2	66 ±6	21 ±2	106 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2450
CA-MOD-2562	25	203	Buck Mountain	NM ±NM	NM ±NM	108 ±2	69 ±6	18 ±2	104 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2630
CA-MOD-2562	25	204	Grasshopper Group	NM ±NM	NM ±NM	158 ±2	82 ±6	31 ±2	224 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	205	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	75 ±6	27 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	206	Cougar Butte	NM ±NM	NM ±NM	155 ±2	4 ±6	65 ±2	156 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4254
CA-MOD-2562	25	207	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	76 ±6	29 ±2	209 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	209	Tucker Hill	NM ±NM	NM ±NM	118 ±2	47 ±6	19 ±2	89 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2562	25	210	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	79 ±6	29 ±2	219 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	211	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	77 ±6	27 ±2	211 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	212	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	76 ±6	29 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	215	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	81 ±6	29 ±2	216 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	216	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	73 ±6	30 ±2	202 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	217	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	78 ±6	29 ±2	213 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	218	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	77 ±6	29 ±2	216 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	221	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	72 ±5	29 ±1	205 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	223	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	73 ±5	31 ±1	207 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	225	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	77 ±6	27 ±2	207 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	226	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	74 ±6	25 ±2	209 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	229	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	77 ±5	28 ±1	210 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	230	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	75 ±6	30 ±2	211 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	231	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	79 ±6	29 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	232	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	75 ±5	28 ±1	209 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	236	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	74 ±5	26 ±1	206 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	238	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	73 ±6	26 ±2	190 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	239	Glass Mountain	NM ±NM	NM ±NM	150 ±2	114 ±6	26 ±2	232 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	240	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	73 ±6	28 ±2	203 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	242	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	72 ±5	27 ±1	212 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	243	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	77 ±6	27 ±2	208 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	244	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	76 ±5	30 ±1	205 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	245	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	73 ±6	27 ±2	205 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2562	25	246	Rainbow Mines	NM ±NM	NM ±NM	123 ±2	77 ±6	17 ±2	144 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	247	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	78 ±6	31 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	251	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	72 ±5	29 ±1	202 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	253	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	78 ±6	26 ±2	204 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	254	Unknown A	NM ±NM	NM ±NM	112 ±2	67 ±6	18 ±2	105 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	255	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	78 ±5	30 ±1	207 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	256	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	75 ±5	28 ±1	206 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	257	Buck Mountain	NM ±NM	NM ±NM	111 ±2	61 ±6	20 ±2	101 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2631
CA-MOD-2562	25	259	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	72 ±6	26 ±2	202 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	265	Buck Mountain	NM ±NM	NM ±NM	116 ±2	66 ±6	15 ±2	102 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2518
CA-MOD-2562	25	266	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	80 ±6	29 ±2	215 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	269	East Medicine Lake	39 ±6	12 ±3	139 ±4	73 ±3	28 ±2	192 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2562	25	271	East Medicine Lake	49 ±5	16 ±3	148 ±4	74 ±3	30 ±2	207 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-MOD-2562	25	283 A	Grasshopper Group	43 ±5	9 ±2	151 ±3	80 ±7	28 ±2	215 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	283 B	Grasshopper Group	39 ±5	16 ±2	160 ±3	79 ±7	31 ±2	218 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	283 C	Grasshopper Group	67 ±5	11 ±2	144 ±3	76 ±7	28 ±2	200 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	283 D	Grasshopper Group	42 ±5	16 ±2	167 ±3	83 ±7	32 ±1	222 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	283 E	Grasshopper Group	39 ±5	14 ±2	155 ±3	80 ±7	31 ±2	213 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	287 A	Grasshopper Group	45 ±5	16 ±2	155 ±3	79 ±7	31 ±2	218 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	287 B	Grasshopper Group	46 ±5	15 ±3	163 ±3	84 ±7	29 ±2	211 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	287 C	Grasshopper Group	39 ±5	15 ±2	148 ±3	75 ±7	30 ±2	206 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	287 D	Grasshopper Group	38 ±5	11 ±2	150 ±3	75 ±7	31 ±2	207 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	287 E	Grasshopper Group	45 ±6	16 ±3	149 ±3	70 ±7	26 ±2	188 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2562	25	310	A	Grasshopper Group	37 ±5	14 ±2	153 ±3	79 ±7	29 ±1	213 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	310	B	Grasshopper Group	35 ±5	12 ±2	149 ±3	76 ±7	29 ±2	212 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	310	C	Grasshopper Group	41 ±5	13 ±2	160 ±3	81 ±7	34 ±2	217 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	310	D	Grasshopper Group	48 ±5	19 ±2	154 ±3	79 ±7	29 ±2	206 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	310	E	Grasshopper Group	41 ±5	19 ±2	165 ±3	86 ±7	29 ±2	218 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	313	A	Grasshopper Group	37 ±5	16 ±2	156 ±3	79 ±7	30 ±2	213 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	313	B	Grasshopper Group	47 ±5	20 ±2	163 ±3	85 ±7	33 ±2	217 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	313	C	Grasshopper Group	58 ±6	15 ±3	162 ±3	77 ±7	28 ±2	204 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	313	D	Grasshopper Group	39 ±5	11 ±2	166 ±3	83 ±7	29 ±2	219 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	313	E	Grasshopper Group	38 ±5	8 ±2	142 ±3	74 ±7	26 ±2	202 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	362	A	Grasshopper Group	41 ±5	12 ±2	150 ±3	77 ±7	28 ±1	208 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	362	B	Grasshopper Group	41 ±4	18 ±2	149 ±2	77 ±7	29 ±1	205 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	362	C	Grasshopper Group	43 ±5	21 ±3	157 ±3	77 ±7	30 ±2	201 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	364	A	Grasshopper Group	40 ±5	11 ±2	149 ±3	77 ±7	29 ±2	207 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	364	B	Grasshopper Group	35 ±5	14 ±2	148 ±3	81 ±7	31 ±2	207 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	364	C	Grasshopper Group	40 ±5	14 ±2	150 ±3	76 ±7	28 ±2	208 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	365	A	Grasshopper Group	37 ±5	16 ±2	153 ±3	76 ±7	28 ±2	214 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	365	B	Grasshopper Group	24 ±6	10 ±2	129 ±3	71 ±7	27 ±2	194 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	365	C	Grasshopper Group	58 ±5	13 ±3	160 ±3	87 ±7	28 ±2	215 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	366		Grasshopper Group	48 ±7	21 ±4	158 ±3	71 ±7	33 ±2	195 ±6	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	371	A	Grasshopper Group	38 ±5	20 ±2	142 ±3	75 ±7	27 ±2	206 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	371	B	Grasshopper Group	42 ±5	22 ±2	159 ±3	80 ±7	31 ±2	213 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	371	C	Grasshopper Group	45 ±5	16 ±2	151 ±3	76 ±7	30 ±1	212 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-2562	25	372 A	Grasshopper Group	46 ±5	10 ±2	141 ±3	73 ±7	32 ±2	203 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	372 B	Grasshopper Group	36 ±5	14 ±2	158 ±3	82 ±7	29 ±2	217 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	372 C	Grasshopper Group	40 ±5	9 ±2	146 ±3	76 ±7	28 ±2	206 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	374 A	Grasshopper Group	35 ±5	14 ±2	148 ±3	78 ±7	31 ±2	206 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	374 B	Grasshopper Group	65 ±6	10 ±3	160 ±3	86 ±7	34 ±2	221 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	374 C	Unknown B	66 ±7	17 ±4	115 ±3	94 ±8	30 ±2	303 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2562	25	374 D	Grasshopper Group	55 ±7	9 ±4	134 ±3	67 ±7	27 ±2	184 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 A	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±5	28 ±1	214 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 AA	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	79 ±5	28 ±1	211 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 BB	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±5	30 ±1	210 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 D	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	76 ±5	29 ±1	212 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 F	Grasshopper Group	NM ±NM	NM ±NM	158 ±2	83 ±5	28 ±1	217 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 G	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	75 ±5	30 ±1	205 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	68 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	71 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82 A	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	78 ±5	29 ±1	210 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82 B	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±5	30 ±1	207 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82 C	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	75 ±5	29 ±1	206 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2563	26	82	D	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	74 ±5	28 ±1	207 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82	E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82	F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82	G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82	I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	82	J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	89		Grasshopper Group	NM ±NM	NM ±NM	139 ±2	72 ±6	26 ±2	206 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	91		Grasshopper Group	NM ±NM	NM ±NM	138 ±3	77 ±6	26 ±2	208 ±7	9 ±8	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	94		Grasshopper Group	NM ±NM	NM ±NM	144 ±2	75 ±6	27 ±2	211 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	A	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	73 ±5	27 ±1	206 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	C	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	73 ±5	27 ±1	200 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	D	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	73 ±5	27 ±1	200 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	F	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	77 ±5	31 ±1	214 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	G	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±5	27 ±1	207 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	H	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	75 ±5	26 ±1	213 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	I	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	78 ±5	27 ±1	209 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	95	J	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	80 ±5	29 ±1	219 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	106		Grasshopper Group	NM ±NM	NM ±NM	144 ±2	76 ±6	28 ±2	213 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	125		Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±6	27 ±2	211 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	139	A	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	79 ±5	30 ±1	205 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	7018

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2563	26	139 B	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	74 ±5	30 ±1	203 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	7589
CA-MOD-2563	26	139 C	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	78 ±5	32 ±1	210 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	6249
CA-MOD-2563	26	139 D	Grasshopper Group	NM ±NM	NM ±NM	161 ±2	82 ±5	33 ±1	210 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	6626
CA-MOD-2563	26	143 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 D	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	76 ±5	27 ±1	210 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	143 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	149	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	78 ±6	29 ±2	205 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	150	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	75 ±6	28 ±2	207 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	151 A	Grasshopper Group	42 ±5	15 ±2	145 ±3	73 ±7	28 ±2	205 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	151 A	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	76 ±5	32 ±1	210 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	151 B	Grasshopper Group	41 ±5	16 ±2	148 ±2	78 ±7	29 ±1	211 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	151 C	Grasshopper Group	38 ±5	17 ±2	154 ±3	79 ±7	33 ±1	214 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	151 D	Grasshopper Group	44 ±5	8 ±2	149 ±3	77 ±7	31 ±1	212 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	151 E	Grasshopper Group	41 ±5	10 ±2	151 ±3	78 ±7	29 ±2	212 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	159 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	159 B	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	75 ±5	31 ±1	207 ±5	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2563	26	159 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	159 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	159 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	164 A	Grasshopper Group	NM ±NM	NM ±NM	165 ±2	83 ±5	32 ±1	216 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	169 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	169 B	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	75 ±5	29 ±1	215 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	169 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	169 D	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	80 ±5	30 ±1	213 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	172	Cougar Butte	NM ±NM	NM ±NM	160 ±2	4 ±6	67 ±2	158 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4834
CA-MOD-2563	26	175 A	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	79 ±5	31 ±1	212 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	181	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	71 ±6	29 ±2	208 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	195	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	70 ±6	28 ±2	204 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	205	Unknown A	NM ±NM	NM ±NM	102 ±2	78 ±6	18 ±2	112 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	323	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	78 ±6	29 ±2	213 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	357	Buck Mountain	NM ±NM	NM ±NM	117 ±2	61 ±6	17 ±2	99 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2637
CA-MOD-2563	26	381	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	75 ±6	28 ±2	207 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	439	Cougar Butte	NM ±NM	NM ±NM	152 ±2	5 ±6	71 ±2	156 ±7	23 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4742
CA-MOD-2563	26	466	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	75 ±6	28 ±2	209 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	479	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	77 ±6	30 ±2	208 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	497	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±6	27 ±2	209 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	511	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	77 ±6	28 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	522	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	74 ±6	29 ±2	203 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	532	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	73 ±6	28 ±2	211 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2563	26	534	Unknown A	NM ±NM	NM ±NM	106 ±2	66 ±6	19 ±2	104 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	552	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	72 ±6	27 ±2	206 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	591	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	77 ±6	28 ±2	209 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	593	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	74 ±6	29 ±2	208 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	594	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	76 ±6	30 ±2	217 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	596	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	81 ±6	27 ±2	217 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	597	Cougar Butte	NM ±NM	NM ±NM	158 ±2	3 ±6	65 ±2	159 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4166
CA-MOD-2563	26	598	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	77 ±6	29 ±2	207 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	599	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	74 ±6	27 ±2	208 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	600	Buck Mountain	NM ±NM	NM ±NM	115 ±2	69 ±6	18 ±2	109 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2688
CA-MOD-2563	26	602	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	72 ±6	26 ±2	210 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	604	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	74 ±6	26 ±2	207 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	605	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	75 ±6	26 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	607	Grasshopper Group	NM ±NM	NM ±NM	129 ±2	68 ±6	26 ±2	200 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	610	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	72 ±6	30 ±2	210 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	611	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	78 ±6	30 ±2	216 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	612	Grasshopper Group	NM ±NM	NM ±NM	158 ±2	83 ±6	30 ±2	222 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	613	Buck Mountain	NM ±NM	NM ±NM	114 ±2	69 ±6	19 ±2	108 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2787
CA-MOD-2563	26	615	Unknown A	NM ±NM	NM ±NM	101 ±2	68 ±6	18 ±2	107 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	616	Unknown A	NM ±NM	NM ±NM	109 ±2	79 ±6	22 ±2	113 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	617	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±6	28 ±2	217 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	618	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	73 ±6	31 ±2	205 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	619	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±6	28 ±2	207 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2563	26	623	Cougar Butte	NM ±NM	NM ±NM	167 ±2	5 ±6	70 ±2	163 ±7	23 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4319
CA-MOD-2563	26	626	Buck Mountain	NM ±NM	NM ±NM	107 ±2	61 ±6	19 ±2	97 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2282
CA-MOD-2563	26	627	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±6	30 ±2	207 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	628	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	71 ±6	29 ±2	208 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	629	Blue Mountain	NM ±NM	NM ±NM	65 ±2	3 ±6	80 ±2	392 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	631	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	76 ±6	28 ±2	210 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	635	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±5	32 ±1	207 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	639	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	77 ±6	26 ±2	208 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	644	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±5	27 ±1	212 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	649	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	73 ±6	30 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	653	Sugar Hill	NM ±NM	NM ±NM	132 ±2	52 ±6	25 ±2	125 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	656	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	74 ±5	30 ±1	207 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	665	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	75 ±5	28 ±1	205 ±5	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	677	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	74 ±6	24 ±2	213 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	678	Unknown A	NM ±NM	NM ±NM	150 ±2	3 ±6	66 ±2	156 ±7	24 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	6868
CA-MOD-2563	26	683	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	78 ±6	30 ±2	212 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	687	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	71 ±6	29 ±2	195 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	693	GF/LIW/RS	32 ±6	14 ±3	138 ±4	65 ±3	29 ±2	172 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-MOD-2563	26	713 A	Grasshopper Group	33 ±6	22 ±3	158 ±3	83 ±7	29 ±2	215 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	713 B	Grasshopper Group	48 ±5	7 ±2	157 ±3	81 ±7	31 ±2	216 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	713 C	Grasshopper Group	41 ±5	16 ±3	153 ±3	81 ±7	29 ±2	207 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	713 D	Grasshopper Group	46 ±5	5 ±2	135 ±3	72 ±7	28 ±2	193 ±6	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	713 E	Grasshopper Group	51 ±5	22 ±3	166 ±3	85 ±7	29 ±2	212 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2563	26	715	Buck Mountain	45 ±7	16 ±4	117 ±5	65 ±3	19 ±2	91 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	716 A	Grasshopper Group	47 ±6	12 ±3	171 ±3	90 ±7	30 ±2	216 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	716 B	Grasshopper Group	51 ±6	17 ±3	151 ±3	76 ±7	30 ±2	210 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	716 C	Grasshopper Group	43 ±6	23 ±3	172 ±3	86 ±7	28 ±2	220 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	716 D	Grasshopper Group	42 ±8	14 ±4	134 ±3	64 ±8	27 ±2	181 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	716 E	Grasshopper Group?	27 ±11	1 ±2	98 ±4	48 ±8	22 ±3	141 ±6	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	748 A	Grasshopper Group	45 ±5	12 ±2	148 ±3	76 ±7	29 ±2	208 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	748 B	Grasshopper Group	68 ±5	21 ±3	171 ±3	87 ±7	32 ±2	217 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	748 C	Grasshopper Group	40 ±5	13 ±2	148 ±3	76 ±7	28 ±2	206 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	748 D	Grasshopper Group	35 ±5	14 ±2	151 ±3	80 ±7	28 ±2	214 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	748 E	Grasshopper Group	42 ±5	14 ±2	155 ±3	79 ±7	29 ±2	210 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	751 A	Grasshopper Group	47 ±5	23 ±2	169 ±3	85 ±7	32 ±2	222 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	751 B	Grasshopper Group	36 ±6	16 ±3	152 ±3	78 ±7	31 ±2	205 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	751 C	Grasshopper Group	49 ±5	19 ±3	179 ±3	94 ±7	31 ±2	229 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	69
CA-MOD-2563	26	751 D	Grasshopper Group	42 ±7	22 ±4	164 ±4	76 ±8	31 ±2	196 ±6	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2563	26	751 E	Grasshopper Group	34 ±6	7 ±2	151 ±3	76 ±7	26 ±2	205 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	11	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	76 ±5	27 ±1	205 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	13	Unknown A	NM ±NM	NM ±NM	109 ±2	86 ±6	17 ±2	115 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	14	Grasshopper Group	NM ±NM	NM ±NM	149 ±3	78 ±6	29 ±2	209 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	22 A	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	73 ±5	29 ±1	207 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	22 B	Grasshopper Group	NM ±NM	NM ±NM	164 ±2	76 ±5	27 ±1	212 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	22 C	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±5	29 ±1	212 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	22 D	Grasshopper Group?	NM ±NM	NM ±NM	134 ±3	68 ±5	21 ±2	179 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2564	33	22	E	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	72 ±5	25 ±1	204 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	33		Grasshopper Group	NM ±NM	NM ±NM	143 ±2	78 ±6	27 ±2	210 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	A	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	78 ±5	31 ±1	209 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	B	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	81 ±5	28 ±1	215 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	C	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	77 ±5	29 ±1	205 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	D	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	75 ±5	30 ±1	205 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	E	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	72 ±5	28 ±1	200 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	F	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	73 ±5	29 ±1	200 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	G	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	69 ±5	26 ±1	194 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	H	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	76 ±5	28 ±1	203 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	I	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±5	29 ±1	209 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	34	J	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±5	29 ±1	209 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	A	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±5	26 ±1	204 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	B	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±5	29 ±1	207 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	C	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	70 ±5	26 ±1	193 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	D	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	75 ±5	28 ±1	208 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	E	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	80 ±5	32 ±1	215 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	F	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	75 ±5	25 ±1	194 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	G	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	74 ±5	30 ±1	204 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	H	Grasshopper Group	NM ±NM	NM ±NM	160 ±2	79 ±5	31 ±1	209 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	I	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	72 ±5	32 ±1	201 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	38	J	Blue Mountain	NM ±NM	NM ±NM	63 ±2	2 ±6	72 ±1	351 ±5	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	51		Grasshopper Group	NM ±NM	NM ±NM	147 ±2	81 ±6	29 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2564	33	54	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	77 ±6	27 ±2	218 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	59	Buck Mountain	37 ±6	15 ±3	104 ±4	62 ±3	19 ±2	94 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2564	33	65	East Medicine Lake	45 ±6	16 ±3	140 ±4	73 ±3	34 ±2	197 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-MOD-2564	33	75	East Medicine Lake	32 ±6	14 ±3	134 ±4	67 ±3	25 ±2	191 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-MOD-2564	33	219	Tucker Hill	38 ±6	16 ±3	100 ±4	48 ±3	23 ±2	69 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	271 ±13	NM
CA-MOD-2565	14	93 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	93 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	95 A	Grasshopper Group	35 ±5	12 ±2	147 ±3	76 ±7	33 ±2	213 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	95 B	Grasshopper Group	45 ±5	8 ±2	149 ±3	78 ±7	28 ±2	210 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	95 C	Grasshopper Group	41 ±5	14 ±2	166 ±3	87 ±7	32 ±2	224 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	95 D	Grasshopper Group	35 ±5	8 ±2	148 ±3	78 ±7	28 ±2	211 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	95 E	Grasshopper Group	43 ±5	15 ±2	154 ±3	77 ±7	31 ±1	210 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	102	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	104 ±6	24 ±2	218 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	105 A	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	71 ±5	27 ±1	195 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	105 B	Grasshopper Group	NM ±NM	NM ±NM	159 ±2	79 ±5	30 ±1	211 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2565	14	105 C	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	73 ±5	30 ±1	198 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	105 D	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	72 ±5	27 ±1	205 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	105 E	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	76 ±5	31 ±1	198 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	105 F	Grasshopper Group	NM ±NM	NM ±NM	134 ±2	69 ±5	27 ±1	194 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	105 G	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	80 ±5	33 ±1	210 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	105 H	Cougar Butte	NM ±NM	NM ±NM	161 ±2	3 ±5	71 ±1	147 ±5	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4770
CA-MOD-2565	14	105 I	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	77 ±5	29 ±1	201 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	105 J	Grasshopper Group	NM ±NM	NM ±NM	161 ±2	80 ±5	31 ±1	213 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	114 A	Grasshopper Group	63 ±5	24 ±3	163 ±3	83 ±7	30 ±2	217 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	114 B	Grasshopper Group	35 ±5	18 ±2	149 ±3	77 ±7	28 ±2	207 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	114 C	Grasshopper Group	43 ±5	14 ±2	145 ±3	74 ±7	28 ±2	205 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	114 D	Cougar Butte	87 ±5	24 ±2	170 ±3	6 ±7	70 ±2	163 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	114 E	Grasshopper Group	43 ±5	12 ±2	154 ±3	79 ±7	28 ±1	212 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	118 A	Grasshopper Group	38 ±5	17 ±2	153 ±3	82 ±7	31 ±2	215 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	118 B	Cougar Butte	71 ±5	14 ±3	143 ±3	7 ±7	60 ±2	145 ±6	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	118 C	Grasshopper Group	38 ±5	14 ±2	151 ±3	77 ±7	27 ±2	211 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	118 D	Cougar Butte	80 ±5	13 ±2	159 ±3	5 ±7	67 ±2	154 ±6	18 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	118 E	Grasshopper Group	41 ±5	11 ±2	162 ±3	81 ±7	27 ±2	227 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	130 A	Blue Mountain	158 ±6	21 ±2	62 ±2	4 ±7	71 ±2	376 ±6	23 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	130 B	Grasshopper Group	37 ±5	14 ±2	146 ±3	79 ±7	31 ±1	209 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	130 C	Cowhead Lake	42 ±5	17 ±2	124 ±2	10 ±7	29 ±1	87 ±6	14 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	14
CA-MOD-2565	14	130 D	Blue Mountain	173 ±6	31 ±2	65 ±2	4 ±7	71 ±2	375 ±6	15 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	130 E	Grasshopper Group	51 ±5	15 ±2	142 ±3	74 ±7	29 ±2	203 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2565	14	133 A	Grasshopper Group	36 ±6	19 ±3	133 ±3	71 ±7	28 ±2	193 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	133 B	Grasshopper Group	30 ±5	16 ±2	150 ±2	79 ±7	30 ±1	213 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	136 A	Grasshopper Group	42 ±6	15 ±3	138 ±3	74 ±7	25 ±2	200 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	136 B	Grasshopper Group	43 ±6	15 ±3	150 ±3	82 ±7	30 ±2	205 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	136 C	Grasshopper Group	60 ±6	19 ±4	160 ±4	88 ±8	30 ±2	206 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	139 A	Grasshopper Group	40 ±5	18 ±2	146 ±3	80 ±7	27 ±2	211 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	139 B	Grasshopper Group	37 ±5	18 ±2	168 ±3	86 ±7	29 ±2	221 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	139 C	Grasshopper Group	39 ±5	15 ±2	144 ±3	81 ±7	29 ±2	205 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	139 D	Grasshopper Group	43 ±6	14 ±3	169 ±3	89 ±7	31 ±2	216 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	139 E	Grasshopper Group	53 ±6	13 ±3	171 ±3	84 ±7	30 ±2	213 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	141 A	Grasshopper Group	48 ±5	13 ±2	168 ±3	84 ±7	28 ±2	216 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	141 B	Grasshopper Group	53 ±5	16 ±3	144 ±3	78 ±7	31 ±2	205 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	141 C	Grasshopper Group	35 ±6	9 ±2	133 ±3	74 ±7	30 ±2	198 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	141 D	Grasshopper Group	34 ±5	8 ±2	162 ±3	82 ±7	28 ±2	215 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	141 E	Grasshopper Group	54 ±6	27 ±3	143 ±3	73 ±7	25 ±2	200 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	153	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	154	Blue Mountain	NM ±NM	NM ±NM	63 ±2	2 ±6	75 ±2	384 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	156	Drews Creek/Butcher Flat	NM ±NM	NM ±NM	133 ±2	21 ±6	27 ±2	92 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2831
CA-MOD-2565	14	157	Blue Mountain	NM ±NM	NM ±NM	57 ±2	NM ±NM	72 ±2	365 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	158	Unknown A	NM ±NM	NM ±NM	152 ±2	5 ±6	66 ±2	152 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	6216
CA-MOD-2565	14	159	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	75 ±6	27 ±2	213 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	160	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	162	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2565	14	166	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	171	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	73 ±6	27 ±2	188 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	175	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	75 ±6	27 ±2	206 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	176	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	177	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±6	26 ±2	211 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	178	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	181	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	74 ±6	28 ±2	209 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	182	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2565	14	229	Blue Mountain	181 ±7	21 ±3	59 ±4	4 ±3	77 ±2	369 ±5	18 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 A	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	84 ±5	30 ±1	214 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 B	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	73 ±5	27 ±1	196 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 C	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	78 ±5	29 ±1	211 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 D	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	74 ±5	31 ±1	206 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 E	Unknown A	NM ±NM	NM ±NM	152 ±2	107 ±5	27 ±1	221 ±5	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 F	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	76 ±5	31 ±1	205 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 G	Unknown A	NM ±NM	NM ±NM	146 ±2	109 ±5	24 ±1	217 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 H	Grasshopper Group	NM ±NM	NM ±NM	160 ±2	82 ±5	30 ±1	222 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	37 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	50 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	50 B	Grasshopper Group	NM ±NM	NM ±NM	154 ±2	80 ±5	31 ±1	206 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	50 C	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	76 ±5	27 ±1	200 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	50 D	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	80 ±5	31 ±1	211 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*													Ratio Fe/Mn									
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba												
CA-MOD-2566/67	32	50	E	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM		
CA-MOD-2566/67	32	50	F	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
CA-MOD-2566/67	32	50	G	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CA-MOD-2566/67	32	50	H	Grasshopper Group	NM	NM	157	81	29	214	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
CA-MOD-2566/67	32	50	I	Grasshopper Group	NM	NM	145	73	28	208	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
CA-MOD-2566/67	32	50	J	Grasshopper Group	NM	NM	163	81	30	218	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
CA-MOD-2566/67	32	74	A	Grasshopper Group	NM	NM	142	56	25	129	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
CA-MOD-2566/67	32	74	B	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CA-MOD-2566/67	32	74	C	Grasshopper Group	NM	NM	142	72	31	202	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
CA-MOD-2566/67	32	74	D	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CA-MOD-2566/67	32	74	E	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CA-MOD-2566/67	32	74	F	Grasshopper Group	NM	NM	146	75	27	207	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
CA-MOD-2566/67	32	74	G	Grasshopper Group	NM	NM	155	79	29	218	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
CA-MOD-2566/67	32	91	A	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CA-MOD-2566/67	32	91	B	Grasshopper Group	NM	NM	147	77	28	197	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
CA-MOD-2566/67	32	91	C	Grasshopper Group	NM	NM	147	72	28	204	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
CA-MOD-2566/67	32	91	D	Grasshopper Group	NM	NM	153	74	30	205	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
CA-MOD-2566/67	32	91	E	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CA-MOD-2566/67	32	91	F	Grasshopper Group (V)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CA-MOD-2566/67	32	91	G	Grasshopper Group	NM	NM	153	78	30	207	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
CA-MOD-2566/67	32	91	H	Grasshopper Group	NM	NM	136	77	27	204	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
CA-MOD-2566/67	32	91	I	Grasshopper Group	NM	NM	146	77	31	208	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
CA-MOD-2566/67	32	91	J	Grasshopper Group	NM	NM	146	75	31	208	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2566/67	32	96	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	76 ±5	30 ±1	205 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 D	Grasshopper Group	NM ±NM	NM ±NM	156 ±2	77 ±5	29 ±1	210 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 F	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	73 ±5	28 ±1	209 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	112 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	130	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	68 ±5	31 ±1	191 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	279	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	73 ±5	27 ±1	205 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	377	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	71 ±5	28 ±1	204 ±5	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	379	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	76 ±5	29 ±1	205 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	381	Witham Creek	NM ±NM	NM ±NM	213 ±2	3 ±6	98 ±2	1096 ±8	98 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	395	McComb Butte	NM ±NM	NM ±NM	102 ±2	70 ±6	22 ±2	76 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	415	Unknown B	NM ±NM	NM ±NM	91 ±2	102 ±6	16 ±2	83 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	419	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	73 ±5	27 ±1	202 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	426	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	79 ±6	27 ±2	217 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	427	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	430	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	432	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	74 ±6	28 ±2	215 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-2566/67	32	439	Cougar Butte	NM ±NM	NM ±NM	155 ±2	4 ±6	70 ±2	158 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4250
CA-MOD-2566/67	32	448	Cowhead Lake	NM ±NM	NM ±NM	110 ±2	19 ±6	19 ±2	90 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1633
CA-MOD-2566/67	32	449	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	70 ±6	30 ±2	183 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	458	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	73 ±6	29 ±2	207 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	478	Blue Mountain (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	485	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	78 ±5	29 ±1	211 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	660	Cowhead Lake	68 ±7	20 ±4	120 ±5	7 ±3	33 ±2	81 ±5	17 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	10
CA-MOD-2566/67	32	691 A	Glass Mountain	47 ±6	19 ±3	143 ±3	118 ±7	25 ±2	211 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	691 B	Grasshopper Group	47 ±5	18 ±3	173 ±3	88 ±7	33 ±2	220 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	691 C	Cougar Butte	92 ±7	14 ±3	150 ±3	9 ±7	63 ±2	154 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	691 D	Glass Mountain	44 ±6	20 ±3	142 ±3	118 ±8	25 ±2	225 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	67
CA-MOD-2566/67	32	691 E	Grasshopper Group?	46 ±8	4 ±3	115 ±4	62 ±8	21 ±2	157 ±6	2 ±6	NM ±NM	NM ±NM	NM ±NM	NM ±NM	67
CA-MOD-2566/67	32	695 A	Grasshopper Group	50 ±5	18 ±2	158 ±3	84 ±7	30 ±2	211 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	695 B	Grasshopper Group	42 ±5	11 ±2	158 ±3	81 ±7	31 ±2	215 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	695 C	Grasshopper Group	30 ±6	12 ±2	161 ±3	81 ±7	29 ±2	213 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	695 D	Grasshopper Group	48 ±6	9 ±3	130 ±3	72 ±7	30 ±2	192 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	696 A	Blue Mountain	181 ±6	26 ±3	63 ±2	4 ±7	72 ±2	391 ±6	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	696 B	Grasshopper Group	42 ±5	15 ±2	142 ±3	70 ±7	29 ±2	194 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	696 C	Cougar Butte	94 ±5	19 ±3	174 ±3	7 ±7	70 ±2	167 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	696 D	Grasshopper Group	50 ±5	12 ±2	171 ±3	84 ±7	33 ±2	219 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	65
CA-MOD-2566/67	32	696 E	Blue Spring/Mosquito Lake	96 ±5	21 ±2	133 ±3	35 ±7	35 ±2	207 ±6	22 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	703 A	Grasshopper Group	41 ±5	14 ±2	147 ±3	78 ±7	31 ±2	205 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	703 B	Cougar Butte	80 ±5	20 ±2	165 ±3	6 ±7	69 ±2	160 ±6	21 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2566/67	32	703	C	Grasshopper Group	43 ±5	19 ±2	162 ±3	83 ±7	27 ±2	211 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	703	D	Grasshopper Group	42 ±5	18 ±2	158 ±3	83 ±7	30 ±2	217 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	703	E	Grasshopper Group	39 ±5	14 ±2	165 ±3	83 ±7	30 ±2	221 ±6	4 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	709	A	Grasshopper Group	39 ±5	15 ±2	158 ±3	83 ±7	27 ±2	217 ±6	15 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	709	B	Grasshopper Group	40 ±5	13 ±2	150 ±2	79 ±7	29 ±1	211 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	709	C	Grasshopper Group	41 ±5	16 ±3	171 ±3	89 ±7	30 ±2	222 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	709	D	Sugar Hill	47 ±5	13 ±2	144 ±3	56 ±7	24 ±2	124 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	709	E	Grasshopper Group	62 ±6	15 ±2	163 ±3	82 ±7	31 ±2	215 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	713	A	Grasshopper Group	37 ±5	15 ±2	155 ±3	77 ±7	27 ±2	211 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	713	B	Grasshopper Group	49 ±6	12 ±3	164 ±3	85 ±8	28 ±2	215 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	713	C	Buck Mountain	43 ±6	19 ±3	121 ±3	70 ±7	16 ±2	105 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	23
CA-MOD-2566/67	32	713	D	Grasshopper Group	54 ±5	19 ±3	142 ±3	77 ±7	30 ±2	199 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	713	E	Grasshopper Group	45 ±8	10 ±4	157 ±3	77 ±7	30 ±2	193 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	714	A	Unknown C	42 ±5	16 ±2	102 ±2	109 ±7	22 ±1	129 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	25
CA-MOD-2566/67	32	714	B	Grasshopper Group	58 ±6	18 ±3	155 ±3	80 ±7	30 ±2	208 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	714	C	Grasshopper Group	55 ±6	19 ±3	162 ±3	78 ±7	27 ±2	205 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	714	D	Grasshopper Group	42 ±5	15 ±2	165 ±3	83 ±7	30 ±2	221 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	714	E	Grasshopper Group	41 ±5	13 ±2	164 ±3	83 ±7	29 ±2	216 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	716	A	Grasshopper Group	40 ±5	13 ±2	157 ±3	79 ±7	30 ±2	210 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	716	B	Cougar Butte	82 ±7	22 ±3	154 ±3	6 ±7	65 ±2	148 ±6	27 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	718		Grasshopper Group	34 ±5	14 ±2	158 ±3	81 ±7	30 ±2	211 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	857	A	Grasshopper Group	40 ±5	7 ±2	149 ±3	75 ±7	27 ±2	205 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	857	B	Cougar Butte	77 ±5	17 ±2	167 ±3	6 ±7	68 ±2	157 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2566/67	32	857 C	Grasshopper Group	56 ±5	16 ±3	167 ±3	91 ±7	35 ±2	222 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	857 D	Grasshopper Group	53 ±6	18 ±3	175 ±3	90 ±7	31 ±2	228 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	857 E	Grasshopper Group	41 ±6	7 ±2	149 ±3	77 ±7	27 ±2	199 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	861 A	Grasshopper Group	46 ±5	13 ±2	148 ±3	80 ±7	29 ±2	214 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	861 B	Grasshopper Group	45 ±5	19 ±3	144 ±3	76 ±7	29 ±2	202 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	861 C	Grasshopper Group	44 ±5	10 ±2	136 ±3	71 ±7	29 ±2	193 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	861 D	Grasshopper Group	45 ±6	6 ±2	149 ±3	79 ±7	28 ±2	203 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	861 E	Grasshopper Group	43 ±6	13 ±2	144 ±3	77 ±7	31 ±2	208 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	867 A	Grasshopper Group	54 ±5	18 ±2	164 ±3	84 ±7	27 ±2	220 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	867 B	Grasshopper Group	58 ±6	14 ±3	170 ±3	89 ±7	29 ±2	216 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	867 C	Grasshopper Group	48 ±5	16 ±3	155 ±3	80 ±7	29 ±2	203 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	867 D	Grasshopper Group	52 ±6	8 ±3	127 ±3	67 ±7	25 ±2	187 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	867 E	Buck Mountain	39 ±6	14 ±3	115 ±3	73 ±7	19 ±2	104 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	23
CA-MOD-2566/67	32	916	East Medicine Lake	46 ±6	16 ±3	144 ±4	72 ±3	29 ±2	195 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2566/67	32	939 A	Cougar Butte	87 ±5	15 ±2	167 ±3	4 ±7	70 ±2	160 ±6	20 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	939 B	Cougar Butte	107 ±7	34 ±4	193 ±4	6 ±7	68 ±2	159 ±6	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	939 C	Grasshopper Group	41 ±5	15 ±2	152 ±3	74 ±7	25 ±2	211 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	939 D	Grasshopper Group	49 ±6	14 ±3	149 ±3	75 ±7	26 ±2	192 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	939 E	Grasshopper Group	45 ±5	11 ±2	146 ±3	76 ±7	28 ±2	213 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	942 A	Blue Mountain	173 ±6	25 ±2	66 ±2	6 ±7	76 ±2	379 ±6	17 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	942 B	Grasshopper Group	33 ±7	20 ±4	135 ±3	70 ±7	29 ±2	185 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	942 C	Grasshopper Group	49 ±6	25 ±4	151 ±3	76 ±7	26 ±2	192 ±6	2 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2566/67	32	942 D	Glass Mountain	45 ±6	17 ±3	148 ±3	109 ±7	24 ±2	224 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2566/67	32	967	Spodue Mountain	44 ±6	17 ±3	102 ±4	44 ±3	24 ±2	119 ±5	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	3 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	3 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	3 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	3 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	3 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	14 A	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	81 ±5	27 ±1	210 ±3	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	14 B	Grasshopper Group	NM ±NM	NM ±NM	149 ±1	76 ±5	27 ±1	201 ±3	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	14 C	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	78 ±5	29 ±1	206 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	14 D	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	79 ±5	28 ±1	207 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	14 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	16 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	16 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	16 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	16 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	16 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	18 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	18 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	18 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	18 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2568	34	18 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	10 A	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	76 ±5	28 ±1	204 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	10 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-2569	28	10	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	10	D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	10	E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	16	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	16	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	16	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	16	D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	56		Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	57		Spodue Mountain?	NM ±NM	NM ±NM	101 ±2	43 ±6	21 ±2	130 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	58		Grasshopper Group	NM ±NM	NM ±NM	144 ±2	74 ±5	29 ±1	207 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	59		Grasshopper Group	NM ±NM	NM ±NM	138 ±2	71 ±5	29 ±1	204 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2569	28	60		Grasshopper Group	NM ±NM	NM ±NM	143 ±2	74 ±5	30 ±1	207 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	17		Grasshopper Group	NM ±NM	NM ±NM	137 ±2	70 ±6	28 ±2	180 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	98		Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±5	29 ±1	205 ±3	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	100		Cowhead Lake	NM ±NM	NM ±NM	137 ±2	11 ±6	29 ±2	95 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1722
CA-MOD-2570	15	106		Cougar Butte	NM ±NM	NM ±NM	156 ±2	4 ±6	69 ±2	158 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4033
CA-MOD-2570	15	108		Grasshopper Group	NM ±NM	NM ±NM	143 ±2	74 ±6	28 ±2	212 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	112		Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	120		Unknown A	NM ±NM	NM ±NM	109 ±2	76 ±6	16 ±2	110 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	252 A		Grasshopper Group	NM ±NM	NM ±NM	159 ±2	83 ±5	32 ±1	212 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	252 B		Grasshopper Group	NM ±NM	NM ±NM	162 ±2	82 ±5	31 ±1	213 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	252 C		Grasshopper Group	NM ±NM	NM ±NM	155 ±2	82 ±5	30 ±1	208 ±3	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	252 D		Grasshopper Group	NM ±NM	NM ±NM	167 ±2	86 ±5	30 ±1	220 ±3	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2570	15	252 E	Grasshopper Group	NM ±NM	NM ±NM	169 ±2	86 ±5	28 ±2	212 ±4	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	268 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	268 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	268 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	268 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	268 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	273	Cougar Butte	NM ±NM	NM ±NM	146 ±2	7 ±6	64 ±2	177 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3413
CA-MOD-2570	15	307	Unknown B	NM ±NM	NM ±NM	159 ±2	4 ±6	71 ±1	157 ±4	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	371 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	371 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	371 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	371 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	371 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	383 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	383 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	383 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	383 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	383 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	427 A	Unknown C	49 ±7	20 ±4	121 ±3	101 ±8	20 ±2	187 ±6	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	76
CA-MOD-2570	15	427 B	Grasshopper Group	64 ±6	11 ±3	147 ±3	77 ±8	31 ±2	201 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	427 C	Grasshopper Group	57 ±7	16 ±4	165 ±4	77 ±8	25 ±2	202 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	427 D	Grasshopper Group	54 ±7	19 ±4	169 ±4	90 ±8	30 ±2	215 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	429 A	Grasshopper Group	46 ±5	10 ±2	160 ±3	83 ±7	32 ±2	220 ±6	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2570	15	429 B	Grasshopper Group	37 ±4	13 ±2	150 ±3	78 ±7	30 ±1	215 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	429 C	Grasshopper Group	56 ±6	6 ±3	141 ±3	72 ±7	28 ±2	200 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	429 D	Grasshopper Group	51 ±6	23 ±3	183 ±3	92 ±8	32 ±2	223 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	429 E	Grasshopper Group	40 ±7	13 ±3	167 ±4	86 ±8	29 ±2	217 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	431 A	Grasshopper Group	45 ±5	12 ±2	152 ±3	76 ±7	30 ±2	214 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	431 B	Grasshopper Group	38 ±7	21 ±4	151 ±3	79 ±8	25 ±2	199 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	431 C	Grasshopper Group	57 ±8	19 ±5	150 ±4	75 ±8	23 ±3	196 ±6	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	431 D	Grasshopper Group	55 ±6	16 ±3	148 ±3	76 ±7	26 ±2	212 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	432 A	Grasshopper Group	59 ±5	13 ±2	159 ±3	79 ±7	31 ±2	211 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	432 B	Grasshopper Group	68 ±7	19 ±4	167 ±4	88 ±8	25 ±2	198 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	432 C	Grasshopper Group	38 ±7	13 ±3	149 ±3	77 ±7	26 ±2	201 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	432 D	Grasshopper Group	41 ±6	15 ±3	147 ±3	79 ±7	29 ±2	201 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	432 E	Grasshopper Group	53 ±7	4 ±3	163 ±3	82 ±8	32 ±2	209 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	432 F	Grasshopper Group	34 ±9	9 ±4	99 ±4	54 ±8	22 ±3	152 ±6	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2570	15	436	Grasshopper Group	36 ±7	10 ±3	139 ±3	72 ±8	22 ±2	181 ±6	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	29 A	Grasshopper Group	NM ±NM	NM ±NM	161 ±2	81 ±5	28 ±1	213 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	29 B	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±5	30 ±1	206 ±3	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	29 C	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	78 ±5	31 ±1	213 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	29 D	Grasshopper Group	NM ±NM	NM ±NM	155 ±2	78 ±5	29 ±1	206 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	29 E	Grasshopper Group	NM ±NM	NM ±NM	160 ±2	83 ±5	30 ±1	218 ±3	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	68 A	Grasshopper Group	NM ±NM	NM ±NM	162 ±2	84 ±6	32 ±2	225 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	68 B	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	80 ±6	29 ±2	213 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	68 C	Cougar Butte	NM ±NM	NM ±NM	164 ±3	2 ±6	71 ±2	165 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4175

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-2571	29	68	D	Grasshopper Group	NM ±NM	NM ±NM	164 ±3	86 ±6	31 ±2	227 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	68	E	Cougar Butte	NM ±NM	NM ±NM	166 ±3	5 ±6	69 ±2	158 ±7	22 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4757
CA-MOD-2571	29	109	A	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±6	29 ±2	213 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	109	B	Cougar Butte	NM ±NM	NM ±NM	159 ±2	3 ±6	69 ±2	159 ±7	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	3981
CA-MOD-2571	29	109	C	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	82 ±6	32 ±2	214 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	109	D	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±6	29 ±2	218 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	109	E	Grasshopper Group	NM ±NM	NM ±NM	163 ±3	80 ±6	32 ±2	224 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	119	A	Grasshopper Group	NM ±NM	NM ±NM	158 ±3	82 ±6	27 ±2	213 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	119	B	Grasshopper Group	NM ±NM	NM ±NM	172 ±3	88 ±6	31 ±2	232 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	119	C	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±6	29 ±2	209 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	119	D	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	83 ±6	29 ±2	220 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	119	E	Blue Mountain	NM ±NM	NM ±NM	60 ±2	5 ±6	77 ±2	386 ±8	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	135		Grasshopper Group	NM ±NM	NM ±NM	151 ±2	76 ±6	29 ±2	209 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	136		Cougar Butte	NM ±NM	NM ±NM	158 ±2	5 ±6	69 ±2	158 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4160
CA-MOD-2571	29	138		Grasshopper Group	NM ±NM	NM ±NM	147 ±2	77 ±6	28 ±2	211 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	139		Buck Mountain	NM ±NM	NM ±NM	58 ±2	1 ±6	72 ±2	380 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	146		Grasshopper Group	NM ±NM	NM ±NM	137 ±2	75 ±6	29 ±2	207 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	150		Grasshopper Group	NM ±NM	NM ±NM	143 ±2	75 ±6	28 ±2	203 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	151		Grasshopper Group	NM ±NM	NM ±NM	142 ±2	74 ±5	27 ±1	200 ±3	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	152		Blue Mountain	NM ±NM	NM ±NM	61 ±2	3 ±6	77 ±2	374 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	155		Grasshopper Group	NM ±NM	NM ±NM	140 ±2	73 ±6	27 ±2	202 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2571	29	156		Sugar Hill	NM ±NM	NM ±NM	131 ±2	52 ±6	23 ±2	129 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	35	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2572	30	35	B	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±5	28 ±1	200 ±3	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	35	C	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	78 ±5	32 ±1	206 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	35	D	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	78 ±5	29 ±1	206 ±3	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	37	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	57	A	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	76 ±5	27 ±1	206 ±3	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	57	B	Grasshopper Group	NM ±NM	NM ±NM	178 ±2	90 ±5	30 ±1	221 ±3	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	57	C	Grasshopper Group	NM ±NM	NM ±NM	149 ±1	112 ±5	25 ±1	220 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	57	D	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	77 ±5	28 ±1	206 ±3	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	84	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	84	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	84	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	84	D	Grasshopper Group	NM ±NM	NM ±NM	138 ±1	73 ±5	29 ±1	192 ±3	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	104		Grasshopper Group	NM ±NM	NM ±NM	142 ±2	77 ±6	28 ±2	213 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	121	A	Grasshopper Group	NM ±NM	NM ±NM	163 ±2	84 ±5	30 ±1	217 ±3	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	130	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	141	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	141	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	141	C	Grasshopper Group	NM ±NM	NM ±NM	159 ±2	79 ±5	31 ±1	213 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	143		Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	189		Grasshopper Group	NM ±NM	NM ±NM	150 ±2	79 ±6	30 ±2	213 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	190		Buck Mountain	NM ±NM	NM ±NM	111 ±2	69 ±6	13 ±2	106 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2439
CA-MOD-2572	30	195		Rainbow Mines	NM ±NM	NM ±NM	130 ±2	83 ±6	20 ±2	149 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	196		Blue Mountain	NM ±NM	NM ±NM	66 ±2	3 ±6	77 ±2	380 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2572	30	232	East Medicine Lake	34 ±6	20 ±3	145 ±4	72 ±3	31 ±2	194 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2572	30	273	East Medicine Lake	47 ±7	11 ±4	148 ±5	76 ±3	34 ±2	203 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-MOD-2572	30	298 A	Grasshopper Group	45 ±5	14 ±3	162 ±3	87 ±7	27 ±2	218 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	298 B	Grasshopper Group	43 ±5	17 ±2	145 ±3	74 ±7	29 ±2	204 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	298 C	Grasshopper Group	49 ±6	17 ±3	164 ±3	77 ±7	25 ±2	219 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	298 D	Grasshopper Group	36 ±5	11 ±2	152 ±3	77 ±7	31 ±1	209 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	298 E	Grasshopper Group	35 ±5	14 ±2	150 ±3	79 ±7	29 ±2	205 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	300 A	Grasshopper Group	43 ±6	15 ±3	155 ±3	75 ±7	28 ±2	207 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	300 B	Grasshopper Group	56 ±7	11 ±3	166 ±3	85 ±7	31 ±2	219 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	300 C	Grasshopper Group	59 ±6	24 ±3	170 ±3	90 ±7	30 ±2	221 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	300 D	Grasshopper Group	33 ±5	13 ±2	158 ±3	80 ±7	27 ±2	212 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	300 E	Grasshopper Group	44 ±6	22 ±4	161 ±3	77 ±7	32 ±2	201 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	301 A	Grasshopper Group	35 ±5	14 ±2	156 ±3	80 ±7	29 ±1	216 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	301 B	Grasshopper Group	40 ±5	15 ±2	168 ±3	85 ±7	31 ±2	221 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	301 C	Grasshopper Group	46 ±6	19 ±3	155 ±3	82 ±7	28 ±2	210 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	302 A	Grasshopper Group	46 ±5	14 ±2	171 ±3	84 ±7	32 ±2	222 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	302 B	Grasshopper Group	44 ±6	18 ±3	162 ±3	85 ±7	28 ±2	221 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	309 A	Grasshopper Group	49 ±5	11 ±2	146 ±3	78 ±7	30 ±2	212 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	309 B	Grasshopper Group	35 ±6	13 ±3	162 ±3	81 ±7	31 ±2	211 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	309 C	Grasshopper Group	45 ±5	22 ±3	164 ±3	86 ±7	28 ±2	225 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	309 D	Grasshopper Group	35 ±5	12 ±2	154 ±3	78 ±7	28 ±2	209 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	309 E	Grasshopper Group	40 ±5	20 ±3	164 ±3	81 ±7	30 ±2	218 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	311 A	Grasshopper Group	41 ±6	16 ±3	174 ±3	90 ±7	36 ±2	231 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2572	30	311 B	Grasshopper Group	60 ±6	10 ±3	169 ±3	92 ±7	30 ±2	227 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	311 C	Grasshopper Group	40 ±7	24 ±4	139 ±3	72 ±7	26 ±2	198 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	311 D	Grasshopper Group	52 ±6	11 ±3	147 ±3	77 ±7	26 ±2	204 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	311 E	Grasshopper Group	43 ±5	20 ±3	158 ±3	83 ±7	29 ±2	214 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	314 A	Grasshopper Group	42 ±5	14 ±2	156 ±3	82 ±7	30 ±2	219 ±6	14 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	314 B	Grasshopper Group	57 ±6	21 ±3	154 ±3	76 ±7	25 ±2	210 ±6	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	314 C	Grasshopper Group	45 ±6	22 ±3	154 ±3	78 ±7	30 ±2	208 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	314 D	Grasshopper Group	49 ±6	21 ±3	180 ±3	88 ±7	29 ±2	217 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2572	30	314 E	Grasshopper Group	48 ±6	3 ±2	122 ±3	62 ±7	26 ±2	177 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	67
CA-MOD-2573	1	1	East Medicine Lake	36 ±6	18 ±3	147 ±4	74 ±3	30 ±2	201 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2573	2	1	Spodue Mountain	34 ±6	19 ±3	94 ±4	42 ±3	26 ±2	115 ±5	16 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2573	11	5	East Medicine Lake	60 ±7	18 ±4	149 ±5	76 ±3	32 ±2	209 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2573	171	1 B	East Medicine Lake	53 ±6	20 ±3	149 ±5	75 ±3	31 ±2	204 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	66
CA-MOD-2573	171	1 C	East Medicine Lake	37 ±6	15 ±3	148 ±4	73 ±3	29 ±2	200 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2573	171	1 D	East Medicine Lake	44 ±5	17 ±3	146 ±4	75 ±3	28 ±2	204 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2573	172	1 A	East Medicine Lake	50 ±6	15 ±3	150 ±4	80 ±3	32 ±2	209 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2573	173	1 B	East Medicine Lake	62 ±7	15 ±4	165 ±5	80 ±4	29 ±2	215 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2573	173	1 C	East Medicine Lake	52 ±7	18 ±4	175 ±5	79 ±4	29 ±2	222 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2573	175	2 B	Glass Mountain	50 ±7	16 ±4	160 ±5	111 ±4	25 ±2	231 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	70
CA-MOD-2573	175	2 C	East Medicine Lake	50 ±6	15 ±4	144 ±5	74 ±3	28 ±2	201 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2573	175	2 D	East Medicine Lake	57 ±7	15 ±4	156 ±5	75 ±3	28 ±2	207 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-MOD-2573	177	1	East Medicine Lake	36 ±6	18 ±3	140 ±4	72 ±3	27 ±2	193 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2573	177	2 C	East Medicine Lake	67 ±8	26 ±4	181 ±5	92 ±4	39 ±3	227 ±5	8 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2573	178	1	A	East Medicine Lake	50 ±6	16 ±3	153 ±4	77 ±3	26 ±2	205 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2573	179	1	A	East Medicine Lake	35 ±7	12 ±4	140 ±5	70 ±3	34 ±2	198 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2573	179	1	B	East Medicine Lake	63 ±7	15 ±4	175 ±5	80 ±3	32 ±2	220 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2573	180	1		East Medicine Lake	49 ±7	18 ±4	168 ±5	88 ±3	28 ±2	216 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2573	181	1	A	Drews Creek/Butcher Flat	48 ±6	15 ±4	123 ±5	9 ±3	25 ±2	79 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	16
CA-MOD-2573	181	1	C	East Medicine Lake	61 ±7	21 ±4	169 ±5	84 ±3	32 ±2	214 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2573	182	1		Cougar Butte	74 ±6	19 ±3	157 ±4	5 ±3	73 ±2	150 ±5	16 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2573	183	1	A	East Medicine Lake	51 ±7	17 ±3	153 ±4	76 ±3	31 ±2	209 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-MOD-2573	184	1	A	East Medicine Lake	53 ±7	14 ±4	157 ±5	80 ±3	30 ±2	209 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2573	184	1	B	East Medicine Lake	50 ±7	20 ±4	157 ±5	83 ±3	32 ±2	217 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2573	185	1	A	East Medicine Lake	48 ±7	16 ±4	168 ±5	81 ±3	30 ±2	213 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2573	185	1	C	East Medicine Lake	55 ±8	18 ±4	178 ±5	91 ±4	30 ±3	220 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2573	185	1	D	East Medicine Lake	54 ±7	17 ±4	160 ±5	87 ±4	28 ±2	206 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2573	188	1	A	East Medicine Lake	77 ±7	18 ±4	175 ±5	87 ±4	28 ±3	207 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2573	188	1	B	East Medicine Lake	34 ±6	14 ±3	148 ±5	73 ±3	30 ±2	201 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2573	189	1	A	East Medicine Lake?	57 ±6	16 ±4	147 ±5	76 ±3	33 ±2	197 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	70
CA-MOD-2573	189	1	B	Blue Mountain	216 ±10	28 ±4	70 ±5	5 ±3	76 ±3	377 ±5	13 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2573	192	1		East Medicine Lake	61 ±6	14 ±4	175 ±5	90 ±3	35 ±2	221 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2574	36	57		Cowhead Lake	NM ±NM	NM ±NM	131 ±2	10 ±6	32 ±2	91 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1591
CA-MOD-2574	36	69		Unknown A	NM ±NM	NM ±NM	115 ±2	17 ±6	55 ±2	346 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	77		Grasshopper Group	NM ±NM	NM ±NM	150 ±2	80 ±6	30 ±2	218 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	85		Unknown B	NM ±NM	NM ±NM	85 ±2	94 ±6	17 ±2	95 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	108		Grasshopper Group	NM ±NM	NM ±NM	144 ±2	77 ±6	27 ±2	211 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2574	36	109	Grasshopper Group	NM ±NM	NM ±NM	145 ±2	74 ±6	32 ±2	213 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	111	Cougar Butte	NM ±NM	NM ±NM	171 ±2	6 ±6	71 ±2	166 ±7	24 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	5003
CA-MOD-2574	36	112	Cowhead Lake	NM ±NM	NM ±NM	129 ±2	11 ±6	26 ±2	91 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1976
CA-MOD-2574	36	113	Spodue Mountain	NM ±NM	NM ±NM	106 ±2	48 ±6	24 ±2	125 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	115	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	77 ±6	26 ±2	214 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	117	Sugar Hill?	NM ±NM	NM ±NM	130 ±2	50 ±6	25 ±2	122 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	118	Buck Mountain	NM ±NM	NM ±NM	110 ±2	69 ±6	19 ±2	108 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2080
CA-MOD-2574	36	143 A	Grasshopper Group	46 ±5	16 ±3	145 ±3	75 ±7	29 ±2	202 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	143 B	Glass Mountain	69 ±6	13 ±3	153 ±3	102 ±7	22 ±2	215 ±6	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	80
CA-MOD-2574	36	143 C	Glass Mountain	49 ±6	13 ±3	153 ±3	116 ±7	27 ±2	228 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	78
CA-MOD-2574	36	143 D	Glass Mountain	52 ±6	22 ±4	162 ±4	137 ±8	29 ±2	241 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	143 E	Glass Mountain	43 ±6	20 ±3	145 ±3	107 ±7	27 ±2	221 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	145 A	Glass Mountain	39 ±6	18 ±3	161 ±3	114 ±7	27 ±2	233 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	145 B	Grasshopper Group	50 ±7	17 ±4	151 ±3	77 ±8	33 ±2	200 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	145 C	Glass Mountain	48 ±6	10 ±3	140 ±3	109 ±7	27 ±2	216 ±6	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	145 D	Unknown C	40 ±8	12 ±4	97 ±3	94 ±8	17 ±2	168 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	71
CA-MOD-2574	36	145 E	Glass Mountain	64 ±6	15 ±3	148 ±3	112 ±8	27 ±2	218 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	150 A	Grasshopper Group	50 ±7	22 ±4	168 ±4	85 ±8	29 ±2	213 ±6	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	150 B	Grasshopper Group	48 ±5	12 ±2	160 ±3	80 ±7	32 ±2	219 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	150 C	Glass Mountain	54 ±6	12 ±3	145 ±3	130 ±8	26 ±2	233 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	150 D	Glass Mountain	58 ±6	9 ±3	159 ±3	109 ±8	28 ±2	235 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	150 E	Glass Mountain	62 ±7	12 ±4	129 ±3	115 ±8	22 ±2	204 ±6	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	79
CA-MOD-2574	36	152	Drews Creek/Butcher Flat	52 ±7	18 ±4	134 ±5	9 ±3	29 ±2	84 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	15

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2574	36	154 A	Grasshopper Group	47 ±5	17 ±2	155 ±3	82 ±7	27 ±2	215 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	154 B	Grasshopper Group	38 ±5	11 ±2	141 ±3	73 ±7	29 ±2	197 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	154 C	Glass Mountain	93 ±7	22 ±3	151 ±3	119 ±8	28 ±2	221 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	154 D	Glass Mountain	75 ±6	20 ±3	150 ±3	130 ±8	26 ±2	233 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	154 E	Grasshopper Group	42 ±6	12 ±3	144 ±3	76 ±7	29 ±2	202 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	157 A	Glass Mountain	51 ±6	27 ±3	156 ±3	114 ±8	22 ±2	229 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	157 B	Glass Mountain	75 ±7	15 ±3	149 ±3	110 ±8	26 ±2	217 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	157 C	Glass Mountain	44 ±6	11 ±3	153 ±3	114 ±7	29 ±2	230 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	157 D	Glass Mountain?	40 ±9	11 ±5	139 ±3	102 ±8	28 ±2	211 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	77
CA-MOD-2574	36	157 E	Grasshopper Group?	50 ±8	9 ±4	127 ±4	92 ±8	29 ±2	199 ±6	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	74
CA-MOD-2574	36	159 A	Blue Mountain	165 ±6	28 ±3	62 ±2	6 ±7	76 ±2	379 ±6	19 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	159 B	Glass Mountain	38 ±7	16 ±3	139 ±3	102 ±7	21 ±2	211 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	159 C	Not Obsidian	54 ±7	11 ±4	101 ±3	109 ±8	28 ±2	282 ±6	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	159 D	Not Obsidian	76 ±6	14 ±3	110 ±3	252 ±8	28 ±2	290 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	159 E	Glass Mountain	79 ±6	15 ±3	150 ±3	111 ±7	27 ±2	226 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	163	Cougar Butte	81 ±6	22 ±3	155 ±4	2 ±3	69 ±2	147 ±5	20 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2574	36	175	East Medicine Lake	41 ±7	15 ±4	144 ±5	73 ±3	34 ±2	203 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2575	1	1	Glass Mountain	58 ±7	16 ±4	148 ±5	110 ±4	26 ±2	219 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2575	4	1	East Medicine Lake	38 ±6	18 ±3	143 ±4	74 ±3	29 ±2	201 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2575	17	1	East Medicine Lake	50 ±7	13 ±5	164 ±5	81 ±4	33 ±2	213 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2575	34	1	Buck Mountain	36 ±6	15 ±4	115 ±4	52 ±3	22 ±2	86 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	3 A	Cougar Butte	79 ±6	18 ±4	166 ±5	9 ±3	71 ±2	152 ±5	22 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	5 A	Glass Mountain	55 ±7	19 ±4	157 ±5	111 ±4	29 ±2	228 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn	
CA-MOD-2575	37	5	B	Spodue Mountain	105 ±8	27 ±4	123 ±5	49 ±3	23 ±3	124 ±5	10 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	19		Blue Mountain	NM ±NM	NM ±NM	63 ±2	3 ±6	77 ±2	394 ±7	19 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	20		Grasshopper Group	NM ±NM	NM ±NM	146 ±2	76 ±6	30 ±2	211 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	A	East Medicine Lake	36 ±6	18 ±3	143 ±5	75 ±3	30 ±2	203 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2575	37	21	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	D	East Medicine Lake	41 ±6	17 ±3	139 ±4	70 ±3	28 ±2	196 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2575	37	21	D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	I	East Medicine Lake	49 ±7	16 ±4	159 ±5	76 ±3	34 ±2	215 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2575	37	21	I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	21	J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	29	A	East Medicine Lake	37 ±6	16 ±3	154 ±5	78 ±3	27 ±2	206 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2575	37	29	B	Glass Mountain	65 ±7	18 ±4	155 ±5	111 ±4	27 ±2	234 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	67
CA-MOD-2575	37	34		GF/LJW/RS	38 ±6	14 ±3	141 ±4	63 ±3	31 ±2	177 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-MOD-2575	37	35	A	Cougar Butte	82 ±6	18 ±3	153 ±5	3 ±3	70 ±2	144 ±5	21 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	35	B	GF/LJW/RS	45 ±6	15 ±4	141 ±5	70 ±3	31 ±2	189 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-MOD-2575	37	42		East Medicine Lake	39 ±6	18 ±3	149 ±4	74 ±3	30 ±2	210 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2575	37	42		Grasshopper Group	NM ±NM	NM ±NM	144 ±2	74 ±6	27 ±2	209 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2575	37	43	Blue Mountain	175 ±7	19 ±3	65 ±4	2 ±3	79 ±2	383 ±5	16 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	37	43	Blue Mountain	NM ±NM	NM ±NM	64 ±2	3 ±6	76 ±2	388 ±7	17 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	43	1	Cougar Butte	76 ±6	21 ±3	153 ±4	2 ±3	67 ±2	141 ±5	17 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2575	49	1	East Medicine Lake	33 ±6	16 ±3	139 ±4	69 ±3	29 ±2	193 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2627	39	9	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	73 ±5	29 ±1	201 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	17 A	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±5	30 ±1	210 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	19 A	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	77 ±5	26 ±1	209 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	29	Grasshopper Group?	NM ±NM	NM ±NM	155 ±2	81 ±5	30 ±1	219 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	32 A	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±5	28 ±1	204 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	49 A	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	74 ±5	28 ±1	205 ±5	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	49 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	49 C	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	72 ±5	28 ±1	199 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	73	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	75 ±6	30 ±2	210 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	75 A	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	75 ±5	29 ±1	210 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	87	Grasshopper Group	NM ±NM	NM ±NM	159 ±2	77 ±6	32 ±2	219 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	88 A	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	77 ±5	29 ±1	200 ±5	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	97	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	75 ±6	28 ±2	210 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	164	Blue Mountain	NM ±NM	NM ±NM	63 ±2	2 ±6	74 ±2	377 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	236	Grasshopper Group	NM ±NM	NM ±NM	162 ±2	82 ±6	31 ±2	220 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	278 A	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	278 B	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	278 C	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	278 D	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2627	39	289	Grasshopper Group	NM ±NM	NM ±NM	134 ±2	67 ±6	26 ±2	183 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	292 A	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	292 B	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	314 A	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	341	Blue Mountain	NM ±NM	NM ±NM	64 ±2	6 ±6	75 ±2	388 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	375	Cowhead Lake	NM ±NM	NM ±NM	131 ±2	9 ±6	27 ±2	93 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1520
CA-MOD-2627	39	377	Cowhead Lake	NM ±NM	NM ±NM	135 ±2	11 ±6	27 ±2	95 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1762
CA-MOD-2627	39	378	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±6	31 ±2	212 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	379	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	70 ±6	27 ±2	205 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	380	Spodue Mountain	NM ±NM	NM ±NM	104 ±2	45 ±6	22 ±2	128 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	383	Buck Mountain	NM ±NM	NM ±NM	102 ±2	64 ±6	17 ±2	104 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2279
CA-MOD-2627	39	384	Cowhead Lake	NM ±NM	NM ±NM	132 ±2	11 ±6	30 ±2	91 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1636
CA-MOD-2627	39	385	Spodue Mountain	NM ±NM	NM ±NM	99 ±2	44 ±6	23 ±2	125 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	386	Spodue Mountain	NM ±NM	NM ±NM	106 ±2	47 ±6	25 ±2	128 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	391	Cougar Butte	NM ±NM	NM ±NM	146 ±2	5 ±6	61 ±2	152 ±7	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	4283
CA-MOD-2627	39	394	Cowhead Lake	NM ±NM	NM ±NM	135 ±2	9 ±6	27 ±2	94 ±7	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	1647
CA-MOD-2627	39	465	Spodue Mountain	50 ±6	19 ±3	105 ±4	42 ±3	26 ±2	126 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	473	Cougar Butte	81 ±7	14 ±4	164 ±4	11 ±7	69 ±2	146 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	474 A	Glass Mountain	40 ±7	8 ±3	142 ±3	113 ±8	26 ±2	195 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	77
CA-MOD-2627	39	474 B	Grasshopper Group	57 ±7	15 ±4	152 ±3	77 ±8	28 ±2	204 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	476 A	Glass Mountain	41 ±8	15 ±4	125 ±4	105 ±8	22 ±2	198 ±6	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	476 B	Glass Mountain	37 ±8	16 ±4	137 ±4	121 ±8	24 ±2	210 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2627	39	478	Glass Mountain	38 ±8	16 ±4	141 ±4	123 ±8	24 ±2	218 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>												Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2627	39	509	Blue Mountain	170 ±10	12 ±4	56 ±3	6 ±8	62 ±3	313 ±6	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2627	39	510 A	Grasshopper Group	40 ±5	10 ±2	163 ±3	88 ±7	32 ±2	220 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2627	39	510 B	Cougar Butte	70 ±6	23 ±3	150 ±3	6 ±7	65 ±2	152 ±6	20 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2627	39	512 A	Grasshopper Group	41 ±5	9 ±2	135 ±3	72 ±7	30 ±2	201 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2627	39	512 B	Grasshopper Group	33 ±7	16 ±3	149 ±3	80 ±7	32 ±2	200 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2627	39	512 C	Grasshopper Group	41 ±6	14 ±3	154 ±3	77 ±8	26 ±2	202 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2627	39	514	Blue Mountain	173 ±8	26 ±3	65 ±3	7 ±7	73 ±2	385 ±6	21 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	12	East Medicine Lake	36 ±7	20 ±4	149 ±5	76 ±3	28 ±2	207 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55	
CA-MOD-2646	17	14	Grasshopper Group	58 ±5	14 ±2	168 ±3	86 ±7	31 ±2	216 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	14 A	Grasshopper Group	55 ±5	15 ±2	152 ±3	77 ±7	28 ±2	212 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	14 B	Grasshopper Group	42 ±5	16 ±2	154 ±3	79 ±7	31 ±2	214 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	14 C	Grasshopper Group	53 ±6	15 ±3	178 ±3	92 ±7	30 ±2	225 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	14 D	Grasshopper Group	37 ±5	25 ±3	161 ±3	83 ±7	31 ±2	214 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	18	Grasshopper Group	43 ±5	17 ±2	152 ±3	80 ±7	29 ±2	215 ±6	5 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	18 A	Grasshopper Group	39 ±5	19 ±2	151 ±3	79 ±7	31 ±2	212 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	18 B	Grasshopper Group	43 ±4	8 ±2	158 ±3	80 ±7	30 ±2	217 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	18 C	Grasshopper Group	40 ±5	13 ±2	152 ±3	81 ±7	29 ±2	222 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	18 D	Grasshopper Group	34 ±5	10 ±2	149 ±3	77 ±7	27 ±2	207 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	22	Grasshopper Group	41 ±5	17 ±3	150 ±3	81 ±7	29 ±2	211 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	22 A	Grasshopper Group	50 ±6	8 ±3	176 ±3	92 ±7	32 ±2	218 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	22 B	Grasshopper Group	45 ±7	17 ±4	167 ±4	81 ±8	32 ±2	217 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	22 C	Grasshopper Group	42 ±5	12 ±2	157 ±3	81 ±7	30 ±2	217 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2646	17	22 D	Grasshopper Group	49 ±7	22 ±3	161 ±3	78 ±7	33 ±2	208 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2646	17	24	Grasshopper Group	43 ±5	13 ±2	144 ±3	78 ±7	28 ±2	206 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	24 A	Grasshopper Group	34 ±5	15 ±2	146 ±3	76 ±7	25 ±2	211 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	24 B	Grasshopper Group	37 ±5	13 ±2	154 ±3	83 ±7	29 ±1	212 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	24 C	Grasshopper Group	37 ±5	17 ±2	170 ±3	89 ±7	32 ±2	223 ±6	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	24 D	Grasshopper Group	43 ±5	15 ±2	160 ±3	84 ±7	30 ±2	217 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	29	Grasshopper Group	49 ±6	11 ±3	180 ±3	88 ±7	29 ±2	231 ±6	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	29 A	Grasshopper Group	51 ±5	13 ±2	150 ±3	78 ±7	32 ±2	213 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	29 B	Grasshopper Group	37 ±5	13 ±2	149 ±3	76 ±7	25 ±2	212 ±6	8 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	29 C	Grasshopper Group	43 ±5	11 ±2	152 ±3	79 ±7	28 ±1	210 ±6	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	29 D	Grasshopper Group	53 ±5	18 ±3	168 ±3	85 ±7	34 ±2	228 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	34 A	Grasshopper Group	37 ±5	6 ±2	151 ±3	79 ±7	30 ±2	212 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	34 B	Grasshopper Group	35 ±5	14 ±2	152 ±3	79 ±7	30 ±2	217 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	34 C	Grasshopper Group	49 ±6	12 ±3	161 ±3	85 ±7	30 ±2	226 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	35 A	Grasshopper Group	43 ±7	22 ±3	166 ±4	86 ±8	27 ±2	218 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2646	17	35 B	Grasshopper Group	49 ±9	8 ±4	153 ±4	79 ±8	29 ±3	197 ±7	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	100 A	Grasshopper Group	51 ±5	16 ±2	156 ±3	76 ±7	31 ±2	190 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	100 B	Grasshopper Group	42 ±5	12 ±2	149 ±3	75 ±7	32 ±2	192 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	100 C	Grasshopper Group	44 ±5	10 ±2	130 ±3	68 ±7	30 ±2	180 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	100 D	Grasshopper Group	38 ±5	11 ±2	143 ±3	77 ±7	29 ±2	205 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-SHA-1838/H	45	100 E	Grasshopper Group	39 ±5	11 ±2	150 ±3	74 ±7	29 ±2	204 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	112 A	Grasshopper Group	33 ±5	14 ±2	143 ±3	73 ±7	33 ±1	194 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1838/H	45	112 B	Grasshopper Group	51 ±5	17 ±2	170 ±3	80 ±7	36 ±2	198 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-SHA-1838/H	45	112 C	Grasshopper Group	43 ±5	19 ±2	159 ±3	79 ±7	33 ±2	205 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-1838/H	45	112 D	Grasshopper Group	46 ±5	18 ±2	150 ±3	75 ±7	31 ±2	198 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-SHA-1838/H	45	112 E	Grasshopper Group	47 ±5	20 ±2	163 ±3	77 ±7	31 ±2	200 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	122 A	Grasshopper Group	42 ±5	17 ±2	152 ±3	74 ±7	31 ±2	199 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	122 B	Grasshopper Group	40 ±5	14 ±2	157 ±3	77 ±7	31 ±2	194 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	122 C	Grasshopper Group	40 ±5	15 ±2	153 ±3	76 ±7	32 ±2	193 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	122 D	Grasshopper Group	39 ±5	14 ±2	144 ±3	71 ±7	28 ±2	186 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	122 E	Grasshopper Group	41 ±6	11 ±3	168 ±3	83 ±7	32 ±2	219 ±6	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	129 A	Grasshopper Group	41 ±5	17 ±2	148 ±3	71 ±7	29 ±2	189 ±6	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	129 B	Grasshopper Group	37 ±6	15 ±3	133 ±3	63 ±7	27 ±2	175 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	129 C	Grasshopper Group	43 ±6	28 ±3	150 ±3	79 ±7	29 ±2	186 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	129 D	Grasshopper Group	46 ±7	24 ±4	136 ±3	68 ±8	31 ±2	166 ±6	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	134 A	Grasshopper Group	51 ±6	16 ±3	162 ±3	80 ±7	30 ±2	196 ±6	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	134 B	Grasshopper Group	35 ±7	15 ±3	143 ±3	68 ±7	31 ±2	188 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	134 C	Grasshopper Group	47 ±7	19 ±4	152 ±4	79 ±8	29 ±2	195 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	134 D	Grasshopper Group	49 ±8	13 ±4	136 ±4	66 ±8	25 ±3	178 ±6	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	134 E	Grasshopper Group	39 ±9	5 ±4	133 ±4	70 ±8	30 ±3	176 ±6	19 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	136 A	Grasshopper Group	42 ±6	13 ±3	132 ±3	71 ±7	29 ±2	177 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	136 B	Grasshopper Group	54 ±7	5 ±3	132 ±3	66 ±7	28 ±2	168 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	138	Grasshopper Group	56 ±7	23 ±4	171 ±4	76 ±8	31 ±2	201 ±6	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	140	Grasshopper Group	46 ±6	19 ±3	151 ±3	72 ±7	26 ±2	177 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	145	Grasshopper Group	50 ±8	16 ±5	135 ±4	71 ±8	27 ±3	174 ±6	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	146	Grasshopper Group	42 ±5	15 ±2	168 ±3	80 ±7	31 ±2	198 ±6	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	150 A	Grasshopper Group	39 ±5	14 ±2	140 ±3	74 ±7	29 ±2	185 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-SHA-1838/H	45	150 B	Grasshopper Group	41 ±5	16 ±2	144 ±3	70 ±7	31 ±2	186 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	154 A	Grasshopper Group	42 ±6	10 ±3	162 ±3	74 ±7	33 ±2	197 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	154 B	Grasshopper Group	45 ±6	10 ±3	149 ±3	77 ±7	33 ±2	194 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	155 A	Grasshopper Group	38 ±6	24 ±3	154 ±3	73 ±7	30 ±2	193 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	155 B	Grasshopper Group	52 ±6	14 ±3	162 ±3	75 ±8	29 ±2	195 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	156	Grasshopper Group	47 ±5	15 ±3	156 ±3	77 ±7	30 ±2	190 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	317 A	Grasshopper Group	43 ±5	13 ±2	152 ±3	76 ±7	30 ±2	198 ±6	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	317 B	Grasshopper Group	46 ±7	22 ±4	147 ±4	72 ±8	24 ±2	187 ±6	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	320	Grasshopper Group	39 ±5	13 ±2	149 ±3	73 ±7	30 ±2	194 ±6	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	324	Grasshopper Group	36 ±6	17 ±3	150 ±3	76 ±7	32 ±2	193 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	325	Grasshopper Group	45 ±6	14 ±3	155 ±3	78 ±7	28 ±2	208 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	573 A	Grasshopper Group	40 ±5	12 ±2	154 ±3	74 ±7	28 ±2	190 ±6	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	573 B	Grasshopper Group	41 ±7	8 ±3	145 ±3	75 ±7	29 ±2	185 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	573 C	Grasshopper Group	43 ±5	9 ±2	142 ±3	73 ±7	32 ±2	185 ±6	15 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	573 D	Grasshopper Group	40 ±6	21 ±3	157 ±3	77 ±7	29 ±2	188 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	573 E	Grasshopper Group	48 ±7	12 ±3	167 ±3	83 ±8	29 ±2	217 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	582 A	Grasshopper Group	63 ±9	6 ±4	158 ±4	70 ±8	28 ±3	185 ±6	18 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	582 B	Grasshopper Group	61 ±10	26 ±5	166 ±5	83 ±8	19 ±3	202 ±7	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	582 C	Grasshopper Group	51 ±9	30 ±5	163 ±4	79 ±8	27 ±3	180 ±6	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	582 D	Grasshopper Group	56 ±11	31 ±7	150 ±5	66 ±8	26 ±3	176 ±7	5 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	582 E	Grasshopper Group	53 ±9	9 ±4	168 ±5	78 ±8	29 ±3	187 ±7	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	586 A	Grasshopper Group	43 ±6	22 ±3	157 ±3	80 ±7	26 ±2	219 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	586 B	Grasshopper Group	38 ±11	23 ±6	137 ±4	64 ±8	19 ±3	165 ±6	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-1838/H	45	586 C	Grasshopper Group	112 ±10	33 ±6	182 ±5	91 ±8	35 ±3	191 ±7	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	586 D	Grasshopper Group	76 ±7	17 ±4	167 ±4	81 ±8	32 ±2	197 ±6	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	586 E	Grasshopper Group	61 ±10	23 ±5	162 ±4	78 ±8	39 ±3	212 ±7	21 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	591 A	Grasshopper Group	44 ±6	9 ±3	149 ±3	73 ±7	29 ±2	187 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	591 B	Grasshopper Group	50 ±7	26 ±4	158 ±3	77 ±8	29 ±2	196 ±6	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	591 C	Grasshopper Group	36 ±7	15 ±3	138 ±3	68 ±7	30 ±2	184 ±6	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	591 D	Grasshopper Group	49 ±7	14 ±4	140 ±4	74 ±8	22 ±2	179 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	591 E	Grasshopper Group	70 ±8	17 ±5	181 ±4	87 ±8	37 ±3	202 ±6	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	596 A	Grasshopper Group	68 ±7	20 ±4	142 ±3	69 ±7	28 ±2	177 ±6	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-SHA-1838/H	45	596 B	Grasshopper Group	52 ±8	13 ±4	171 ±4	82 ±8	27 ±3	178 ±6	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838/H	45	596 C	Grasshopper Group	59 ±8	12 ±5	157 ±4	68 ±8	31 ±3	185 ±6	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	596 D	Buck Mountain	44 ±9	9 ±4	119 ±4	59 ±8	15 ±3	98 ±6	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	24
CA-SHA-1838/H	45	596 E	Grasshopper Group	66 ±9	28 ±5	169 ±4	84 ±8	25 ±3	190 ±6	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	1	Buck Mountain	NM ±NM	NM ±NM	106 ±2	67 ±6	21 ±2	102 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2410
CA-SHA-68/H	47	13	Grasshopper Group	NM ±NM	NM ±NM	140 ±2	69 ±6	29 ±2	186 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 D	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	72 ±5	30 ±1	194 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-SHA-68/H	47	39 I	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	73 ±5	31 ±1	193 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	39 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	43	Grasshopper Group?	NM ±NM	NM ±NM	119 ±3	61 ±6	25 ±2	168 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	78	Grasshopper Group	NM ±NM	NM ±NM	135 ±2	71 ±6	29 ±2	184 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	107	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±6	29 ±2	197 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	108	Unknown A	NM ±NM	NM ±NM	107 ±2	75 ±6	17 ±2	108 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	109	Grasshopper Group	NM ±NM	NM ±NM	139 ±3	70 ±6	25 ±2	184 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	111	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	72 ±6	27 ±2	192 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	124	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	68 ±6	27 ±2	176 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	125	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	68 ±6	29 ±2	184 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	154	Grasshopper Group	NM ±NM	NM ±NM	137 ±2	69 ±6	27 ±2	186 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 A	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	75 ±5	30 ±1	205 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 C	Buck Mountain	NM ±NM	NM ±NM	110 ±2	64 ±5	18 ±1	102 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	170 J	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	183	Tuscan	NM ±NM	NM ±NM	87 ±2	95 ±6	17 ±2	79 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>												Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-SHA-68/H	47	186 B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 F	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 G	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 H	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 I	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	186 J	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	75 ±5	30 ±1	187 ±5	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	247 A	Unknown A	NM ±NM	NM ±NM	109 ±2	69 ±6	18 ±2	107 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	261	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	74 ±6	31 ±2	191 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	267	Tuscan	NM ±NM	NM ±NM	92 ±2	83 ±6	16 ±2	74 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	346	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	77 ±6	28 ±2	212 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	350	Grasshopper Group	NM ±NM	NM ±NM	130 ±2	66 ±6	29 ±2	180 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	352	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	68 ±6	28 ±2	187 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	364	GF/LIW/RS	37 ±6	17 ±3	142 ±4	58 ±3	30 ±2	169 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-68/H	47	367	East Medicine Lake	35 ±7	15 ±4	133 ±4	69 ±3	34 ±2	181 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	368	Unknown B	39 ±6	17 ±3	111 ±4	50 ±3	18 ±2	86 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	454 ±14	NM	
CA-SHA-68/H	47	382	East Medicine Lake	31 ±8	15 ±4	143 ±5	70 ±3	30 ±2	184 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	49
CA-SHA-68/H	47	480	GF/LIW/RS	38 ±6	17 ±3	139 ±4	67 ±3	28 ±2	175 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	46
CA-SHA-68/H	47	492	East Medicine Lake	44 ±8	11 ±5	141 ±5	67 ±3	30 ±2	180 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	56
CA-SHA-68/H	47	595	Buck Mountain	49 ±6	17 ±3	106 ±4	66 ±3	15 ±2	96 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-68/H	47	665	Tuscan	47 ±5	17 ±3	83 ±4	88 ±3	15 ±2	66 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-68/H	47	719	Buck Mountain	42 ±6	15 ±3	111 ±4	69 ±3	18 ±2	100 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	748	East Medicine Lake	33 ±6	15 ±3	135 ±4	67 ±3	31 ±2	178 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	776	East Medicine Lake	50 ±8	17 ±5	142 ±5	68 ±4	31 ±2	183 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	788	Buck Mountain	36 ±6	14 ±3	102 ±4	65 ±3	18 ±2	92 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	806	GF/LIW/RS	33 ±6	15 ±3	132 ±4	64 ±3	29 ±2	170 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	824	GF/LIW/RS	33 ±6	17 ±3	141 ±4	68 ±3	30 ±2	176 ±5	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	837	GF/LIW/RS	30 ±6	19 ±3	132 ±4	64 ±3	31 ±2	175 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-68/H	47	850	East Medicine Lake	44 ±8	20 ±4	159 ±5	79 ±4	30 ±2	215 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-SHA-68/H	47	852	East Medicine Lake	48 ±6	17 ±3	136 ±4	67 ±3	30 ±2	177 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	869 A	GF/LIW/RS	35 ±6	18 ±3	142 ±4	70 ±3	28 ±2	173 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	869 B	East Medicine Lake	38 ±6	26 ±3	153 ±5	74 ±3	34 ±2	191 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	869 C	East Medicine Lake	49 ±6	18 ±4	156 ±5	76 ±3	34 ±2	192 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	869 D	East Medicine Lake	48 ±7	19 ±4	155 ±5	77 ±3	36 ±2	187 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	869 E	GF/LIW/RS	29 ±7	10 ±3	139 ±5	69 ±3	30 ±2	172 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-68/H	47	882 A	GF/LIW/RS	31 ±6	15 ±3	131 ±4	65 ±3	30 ±2	168 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-68/H	47	882 B	GF/LIW/RS	34 ±6	20 ±4	140 ±4	68 ±3	28 ±2	171 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	882 C	East Medicine Lake	42 ±7	16 ±4	153 ±5	75 ±3	31 ±2	206 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-68/H	47	882 D	East Medicine Lake	43 ±6	13 ±4	148 ±4	76 ±3	30 ±2	198 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-68/H	47	882 E	East Medicine Lake	40 ±6	14 ±4	144 ±5	71 ±3	33 ±2	183 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	895 A	GF/LIW/RS	51 ±7	21 ±4	140 ±5	70 ±3	30 ±2	172 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	44
CA-SHA-68/H	47	895 B	GF/LIW/RS	39 ±7	17 ±4	130 ±5	69 ±3	29 ±2	167 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	45
CA-SHA-68/H	47	895 C	East Medicine Lake	53 ±7	17 ±4	155 ±5	71 ±3	26 ±2	198 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	895 D	GF/LIW/RS	40 ±7	19 ±4	139 ±4	69 ±3	32 ±2	171 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	43

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-68/H	47	895 E	East Medicine Lake	69 ±7	20 ±4	168 ±5	75 ±3	33 ±2	190 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	953	East Medicine Lake	53 ±7	22 ±4	149 ±5	72 ±3	31 ±2	191 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	954	East Medicine Lake	37 ±8	14 ±4	137 ±5	64 ±3	31 ±2	180 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	984 A	East Medicine Lake	39 ±6	15 ±3	134 ±4	70 ±3	30 ±2	179 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	984 B	East Medicine Lake	41 ±6	18 ±3	151 ±5	77 ±3	29 ±2	209 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	984 C	GF/LTW/RS	36 ±7	14 ±4	135 ±4	64 ±3	29 ±2	169 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	44
CA-SHA-68/H	47	984 D	East Medicine Lake	57 ±6	19 ±4	151 ±5	73 ±3	35 ±2	193 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	984 E	East Medicine Lake	50 ±7	22 ±3	150 ±5	73 ±3	30 ±2	190 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1001 A	GF/LTW/RS	45 ±6	14 ±4	133 ±5	63 ±3	31 ±2	170 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	1001 B	GF/LTW/RS	46 ±8	17 ±5	133 ±5	67 ±4	35 ±3	164 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	44
CA-SHA-68/H	47	1001 C	GF/LTW/RS	46 ±6	17 ±4	133 ±5	65 ±3	32 ±2	173 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-68/H	47	1001 D	East Medicine Lake	40 ±6	19 ±3	143 ±4	68 ±3	29 ±2	181 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	1001 E	East Medicine Lake	48 ±7	16 ±4	160 ±5	70 ±3	32 ±2	182 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	1010 A	GF/LTW/RS	37 ±6	18 ±3	135 ±4	65 ±3	28 ±2	168 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-68/H	47	1010 B	East Medicine Lake	58 ±7	9 ±5	145 ±5	69 ±3	27 ±2	189 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-68/H	47	1010 C	East Medicine Lake	46 ±6	17 ±3	141 ±4	70 ±3	34 ±2	184 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1010 D	East Medicine Lake	47 ±7	17 ±4	152 ±5	74 ±3	30 ±2	184 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	1010 E	East Medicine Lake	45 ±7	18 ±4	149 ±5	74 ±3	31 ±2	192 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1039 A	East Medicine Lake	38 ±6	17 ±3	141 ±5	69 ±3	29 ±2	181 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	1039 B	East Medicine Lake	41 ±6	16 ±3	154 ±4	69 ±3	28 ±2	189 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	1039 C	East Medicine Lake	39 ±7	17 ±4	149 ±5	71 ±3	29 ±2	183 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1039 D	GF/LTW/RS	43 ±7	13 ±4	134 ±5	96 ±3	28 ±2	172 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	45
CA-SHA-68/H	47	1039 E	East Medicine Lake	58 ±7	13 ±4	160 ±5	80 ±3	34 ±2	190 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-SHA-68/H	47	1047 A	East Medicine Lake	39 ±7	14 ±4	151 ±5	70 ±3	31 ±2	187 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	1047 B	East Medicine Lake	46 ±7	15 ±4	137 ±5	67 ±3	34 ±2	183 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	1047 C	GF/LIW/RS	45 ±6	13 ±4	136 ±5	65 ±3	27 ±2	171 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-68/H	47	1047 D	GF/LIW/RS	42 ±6	15 ±3	134 ±4	65 ±3	30 ±2	171 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	1047 E	East Medicine Lake	42 ±6	17 ±4	154 ±5	74 ±3	27 ±2	205 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1057 A	East Medicine Lake	39 ±6	13 ±4	150 ±4	72 ±3	33 ±2	185 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	1057 B	East Medicine Lake	52 ±7	22 ±4	160 ±5	79 ±3	35 ±2	194 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1057 C	GF/LIW/RS	70 ±7	13 ±4	146 ±5	68 ±3	30 ±2	171 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	42
CA-SHA-68/H	47	1057 D	East Medicine Lake	44 ±8	15 ±4	153 ±5	75 ±3	34 ±2	187 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	1057 E	GF/LIW/RS	64 ±7	14 ±4	142 ±5	70 ±3	30 ±2	173 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	1153 A	East Medicine Lake	43 ±7	14 ±4	151 ±5	75 ±3	35 ±2	181 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1153 B	East Medicine Lake	59 ±8	15 ±5	148 ±5	73 ±4	32 ±2	187 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-SHA-68/H	47	1153 C	East Medicine Lake	39 ±7	13 ±4	141 ±5	69 ±3	33 ±2	183 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	1153 D	GF/LIW/RS	35 ±9	16 ±4	134 ±5	69 ±4	30 ±2	170 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	42
CA-SHA-68/H	47	1153 E	GF/LIW/RS	36 ±6	15 ±4	143 ±4	70 ±3	34 ±2	170 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	44
CA-SHA-68/H	47	1198 A	GF/LIW/RS	42 ±6	18 ±3	145 ±4	71 ±3	31 ±2	172 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	44
CA-SHA-68/H	47	1198 B	GF/LIW/RS	39 ±6	9 ±4	132 ±4	65 ±3	26 ±2	170 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-68/H	47	1198 C	GF/LIW/RS	37 ±6	16 ±3	138 ±4	65 ±3	32 ±2	168 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	39
CA-SHA-68/H	47	1198 D	GF/LIW/RS	44 ±6	18 ±3	140 ±4	72 ±3	32 ±2	167 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	42
CA-SHA-68/H	47	1198 E	East Medicine Lake	40 ±7	17 ±4	143 ±5	65 ±3	30 ±2	183 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1222 A	East Medicine Lake	54 ±6	16 ±4	154 ±5	76 ±3	34 ±2	189 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	1222 B	East Medicine Lake	65 ±8	21 ±4	159 ±5	76 ±4	33 ±3	189 ±5	9 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	1222 C	East Medicine Lake	52 ±8	23 ±4	157 ±5	72 ±4	29 ±2	180 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-68/H	47	1225 A	GF/LIW/RS	49 ±7	21 ±4	128 ±5	60 ±3	26 ±2	157 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-68/H	47	1225 B	GF/LIW/RS	48 ±7	17 ±4	139 ±5	63 ±3	29 ±2	171 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	1332	Buck Mountain	35 ±5	15 ±3	107 ±4	63 ±3	18 ±2	90 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	1333	Tuscan	53 ±6	18 ±3	82 ±4	87 ±3	18 ±2	67 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	1343	Buck Mountain	43 ±7	12 ±4	108 ±5	69 ±3	23 ±2	97 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	1413	East Medicine Lake	39 ±8	18 ±4	150 ±5	70 ±3	32 ±2	190 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2020 A	East Medicine Lake	38 ±6	15 ±4	144 ±4	74 ±3	29 ±2	182 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	2020 B	GF/LIW/RS	38 ±6	18 ±3	136 ±4	65 ±3	29 ±2	170 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	2020 C	Glass Mountain	43 ±6	15 ±3	154 ±4	111 ±3	28 ±2	228 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	66
CA-SHA-68/H	47	2020 D	East Medicine Lake	47 ±6	16 ±4	151 ±5	69 ±3	31 ±2	190 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	2020 E	East Medicine Lake	57 ±6	18 ±3	155 ±5	76 ±3	32 ±2	191 ±5	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2034 A	East Medicine Lake	41 ±6	16 ±3	144 ±4	71 ±3	32 ±2	189 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-68/H	47	2034 B	East Medicine Lake	35 ±8	17 ±4	141 ±5	70 ±3	31 ±2	184 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2034 C	East Medicine Lake	50 ±7	23 ±4	150 ±5	73 ±3	29 ±2	185 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	2034 D	East Medicine Lake	51 ±6	17 ±4	147 ±5	69 ±3	32 ±2	182 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2034 E	East Medicine Lake	41 ±7	16 ±4	151 ±5	69 ±3	30 ±2	188 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-68/H	47	2056 A	GF/LIW/RS	43 ±6	15 ±4	138 ±4	70 ±3	31 ±2	172 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	42
CA-SHA-68/H	47	2056 B	GF/LIW/RS	35 ±6	12 ±4	126 ±4	63 ±3	28 ±2	170 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	41
CA-SHA-68/H	47	2056 C	GF/LIW/RS	43 ±6	17 ±3	149 ±4	72 ±3	26 ±2	173 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	44
CA-SHA-68/H	47	2056 D	East Medicine Lake	43 ±5	18 ±4	154 ±5	73 ±3	29 ±2	183 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2056 E	GF/LIW/RS	55 ±9	16 ±5	135 ±5	66 ±4	31 ±3	156 ±5	12 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	41
CA-SHA-68/H	47	2079	Tuscan	40 ±6	13 ±3	78 ±4	86 ±3	20 ±2	66 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-68/H	47	2112	East Medicine Lake	59 ±7	12 ±4	148 ±5	76 ±3	35 ±2	210 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-68/H	47	2127	GF/LIW/RS	35 ±6	13 ±3	137 ±4	67 ±3	30 ±2	179 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-68/H	47	2137 A	East Medicine Lake	45 ±7	16 ±4	143 ±5	74 ±3	29 ±2	210 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-68/H	47	2137 B	GF/LIW/RS	48 ±6	18 ±3	140 ±4	67 ±3	28 ±2	171 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-68/H	47	2137 C	East Medicine Lake	37 ±7	25 ±4	148 ±5	75 ±3	34 ±2	186 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2137 D	East Medicine Lake	64 ±6	14 ±4	146 ±5	69 ±3	30 ±2	185 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2137 E	East Medicine Lake	44 ±7	16 ±4	140 ±5	70 ±3	30 ±2	181 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-68/H	47	2143 A	GF/LIW/RS	52 ±9	10 ±6	164 ±5	73 ±4	32 ±3	172 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	43
CA-SHA-68/H	47	2143 B	GF/LIW/RS	44 ±8	14 ±5	139 ±5	68 ±3	32 ±2	168 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	2143 C	GF/LIW/RS	42 ±6	15 ±4	133 ±4	65 ±3	30 ±2	171 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	2143 D	East Medicine Lake	59 ±9	31 ±5	162 ±5	82 ±4	32 ±3	193 ±5	8 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-68/H	47	2143 E	GF/LIW/RS	42 ±8	17 ±5	133 ±5	76 ±4	34 ±2	165 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	42
CA-SHA-68/H	47	2150 A	East Medicine Lake	53 ±7	11 ±4	160 ±5	81 ±3	31 ±2	192 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	2150 B	GF/LIW/RS	40 ±5	15 ±4	131 ±4	66 ±3	26 ±2	170 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	2150 C	GF/LIW/RS	48 ±5	19 ±4	144 ±5	69 ±3	28 ±2	170 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-68/H	47	2150 D	GF/LIW/RS	52 ±7	15 ±4	123 ±5	65 ±3	27 ±2	172 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-68/H	47	2150 E	East Medicine Lake	45 ±7	23 ±4	132 ±5	68 ±3	27 ±2	180 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-68/H	47	2168	GF/LIW/RS	29 ±7	14 ±3	125 ±4	59 ±3	26 ±2	159 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2175	East Medicine Lake	39 ±6	20 ±3	151 ±4	70 ±3	29 ±2	188 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2177	East Medicine Lake	43 ±6	15 ±4	148 ±5	70 ±3	30 ±2	184 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-68/H	47	2179	GF/LIW/RS	58 ±7	13 ±4	132 ±5	68 ±3	30 ±2	176 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-68/H	47	2253	GF/LIW/RS	33 ±6	19 ±3	135 ±4	64 ±3	30 ±2	171 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1474	272	1712	East Medicine Lake	47 ±6	16 ±3	141 ±4	72 ±3	28 ±2	182 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1474	272	1712 A	East Medicine Lake	56 ±6	18 ±4	158 ±5	77 ±3	31 ±2	195 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-SHA-1474	272	1712 B	East Medicine Lake	53 ±7	20 ±4	158 ±5	77 ±3	32 ±2	192 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1474	272	1712 C	East Medicine Lake	47 ±8	17 ±4	139 ±5	66 ±4	35 ±2	184 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-1474	272	1712 D	Tuscan	48 ±6	11 ±4	92 ±4	94 ±3	19 ±2	69 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	14
CA-SHA-1474	272	1725	East Medicine Lake	56 ±7	16 ±4	159 ±5	76 ±3	32 ±2	192 ±5	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1474	272	1725 A	GF/LIW/RS	31 ±6	14 ±3	126 ±4	63 ±3	29 ±2	165 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-1474	272	1725 B	East Medicine Lake	42 ±6	12 ±3	135 ±4	65 ±3	30 ±2	178 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1474	272	1725 C	East Medicine Lake	38 ±6	15 ±3	141 ±4	71 ±3	29 ±2	179 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1474	272	1725 D	East Medicine Lake	33 ±7	12 ±4	156 ±5	90 ±3	30 ±2	204 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-1474	272	1732	East Medicine Lake	56 ±8	21 ±4	150 ±5	82 ±3	32 ±2	190 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1474	272	1732 A	East Medicine Lake	33 ±6	17 ±3	131 ±4	66 ±3	25 ±2	183 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1474	272	1732 B	Buck Mountain	43 ±7	21 ±4	121 ±5	72 ±3	20 ±2	106 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	23
CA-SHA-1474	272	1732 C	East Medicine Lake	41 ±7	18 ±4	159 ±5	76 ±3	32 ±2	189 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1474	272	1732 D	East Medicine Lake	53 ±6	13 ±4	149 ±5	73 ±3	32 ±2	190 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1474	272	1736	East Medicine Lake	57 ±6	13 ±4	141 ±4	76 ±3	30 ±2	200 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-SHA-1474	272	1736 A	East Medicine Lake	52 ±6	13 ±3	140 ±4	72 ±3	29 ±2	191 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-1474	272	1736 B	East Medicine Lake	75 ±7	18 ±4	160 ±5	86 ±3	33 ±2	210 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-SHA-1474	272	1736 C	East Medicine Lake	35 ±6	19 ±3	141 ±5	69 ±3	32 ±2	183 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1474	272	1736 D	East Medicine Lake	51 ±6	17 ±4	147 ±5	78 ±3	33 ±2	191 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1474	272	1754	East Medicine Lake	79 ±7	13 ±4	144 ±5	76 ±3	59 ±2	185 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-1474	272	1754 A	East Medicine Lake	50 ±6	14 ±4	147 ±4	73 ±3	29 ±2	190 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1474	272	1754 B	East Medicine Lake	64 ±8	20 ±5	160 ±5	79 ±4	32 ±3	200 ±5	12 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-SHA-1474	272	1754 C	East Medicine Lake	56 ±8	11 ±5	148 ±5	76 ±4	29 ±3	205 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1474	272	1754 D	East Medicine Lake	72 ±9	11 ±6	156 ±5	75 ±4	29 ±3	195 ±5	9 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-SHA-1474	272	1760 A	East Medicine Lake	59 ±7	15 ±4	155 ±5	78 ±3	36 ±2	197 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-1474	272	1760 B	East Medicine Lake	64 ±8	22 ±4	160 ±5	82 ±4	32 ±3	202 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1836	22	1	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	73 ±6	29 ±2	192 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1836	22	2	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	71 ±6	30 ±2	188 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1836	22	3	Grasshopper Group	NM ±NM	NM ±NM	141 ±2	77 ±6	30 ±2	209 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	1	Grasshopper Group	NM ±NM	NM ±NM	144 ±2	71 ±6	27 ±2	208 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	2	Cougar Butte	NM ±NM	NM ±NM	142 ±2	7 ±6	63 ±2	183 ±7	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	3	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±6	30 ±2	210 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	4	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±6	30 ±2	209 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	5	Grasshopper Group	NM ±NM	NM ±NM	150 ±2	76 ±6	28 ±2	213 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	6	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	80 ±6	30 ±2	215 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	7	Grasshopper Group	NM ±NM	NM ±NM	145 ±3	75 ±6	28 ±2	207 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	8	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	73 ±6	30 ±2	191 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	9	Grasshopper Group	NM ±NM	NM ±NM	141 ±3	66 ±6	28 ±2	192 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	10	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	73 ±6	27 ±2	197 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	11	Grasshopper Group	NM ±NM	NM ±NM	158 ±3	78 ±6	28 ±2	190 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	12	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	71 ±6	26 ±2	203 ±7	4 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	13	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	78 ±6	28 ±2	206 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	14	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±6	30 ±2	188 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	15	Grasshopper Group	NM ±NM	NM ±NM	137 ±3	69 ±6	28 ±2	181 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	16	Grasshopper Group	NM ±NM	NM ±NM	157 ±3	81 ±6	32 ±2	198 ±7	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	17	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	69 ±6	28 ±2	189 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	18	Grasshopper Group	NM ±NM	NM ±NM	153 ±3	77 ±6	28 ±2	199 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-1837	23	19	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	71 ±6	30 ±2	187 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	20	Grasshopper Group	NM ±NM	NM ±NM	149 ±3	78 ±6	29 ±2	215 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	21	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±6	30 ±2	196 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	22	Grasshopper Group	NM ±NM	NM ±NM	151 ±2	69 ±6	28 ±2	184 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	23	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	70 ±6	27 ±2	188 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1837	23	24	East Medicine Lake	41 ±6	15 ±3	139 ±4	69 ±3	32 ±2	183 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1838/H	45	1	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	2	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	4	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	5	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	7	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	10	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	11	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	13	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	21	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	26	GF/LTW/RS	38 ±6	16 ±3	134 ±4	65 ±3	29 ±2	172 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SHA-1838/H	45	29	GF/LTW/RS	29 ±7	18 ±3	130 ±4	65 ±3	28 ±2	172 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1838/H	45	33	Buck Mountain	38 ±7	19 ±3	110 ±4	62 ±3	20 ±2	98 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1838/H	45	64	East Medicine Lake	47 ±6	15 ±4	143 ±4	68 ±3	32 ±2	186 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838/H	45	139	East Medicine Lake	34 ±6	13 ±3	147 ±4	73 ±3	29 ±2	204 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1838/H	45	395	East Medicine Lake	48 ±7	17 ±4	146 ±5	68 ±3	32 ±2	185 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838/H	45	513	Buck Mountain	44 ±5	14 ±3	109 ±4	62 ±3	19 ±2	95 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	6	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-SHA-1839/H	46	8	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	10	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	11	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	12	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	13	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	16	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	17	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 A	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 B	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 C	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 D	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 E	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 F	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 G	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 H	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 I	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	18 J	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	20 A	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	20 B	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	20 C	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	20 D	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	20 E	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	24	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn	
CA-SHA-1839/H	46	25	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	26	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	27	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	28	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	29	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	30	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	31	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	32	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	33 A	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	35	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1839/H	46	47	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	6	5	Tuscan	54 ±6	19 ±3	92 ±4	71 ±3	17 ±2	71 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	9	5	Kelly Mountain	31 ±6	15 ±3	148 ±4	67 ±3	27 ±2	202 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	82
CA-SHA-1841	11	5	Tuscan	52 ±6	18 ±3	88 ±4	80 ±3	20 ±2	66 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	13	5	Tuscan	47 ±6	16 ±3	89 ±4	91 ±3	20 ±2	70 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	14	5	Tuscan	46 ±6	13 ±3	91 ±4	78 ±3	18 ±2	67 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	70	1 A	Tuscan	43 ±6	11 ±4	83 ±4	90 ±3	19 ±2	68 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	70	1 B	Tuscan	66 ±7	18 ±4	101 ±5	97 ±4	19 ±2	71 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	73	1	Tuscan	51 ±6	17 ±3	96 ±4	95 ±4	18 ±2	71 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	75	2	Tuscan	55 ±7	17 ±4	92 ±4	94 ±3	19 ±2	72 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	78	1 A	East Medicine Lake	44 ±7	17 ±4	159 ±5	77 ±3	31 ±2	188 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	51
CA-SHA-1841	78	1 B	Tuscan	49 ±5	15 ±3	86 ±4	95 ±3	18 ±2	75 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SHA-1841	81	1	Tuscan	48 ±7	16 ±4	88 ±4	90 ±3	18 ±2	72 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-1841	85	2	Tuscan	62 ±6	13 ±4	95 ±4	85 ±3	19 ±2	67 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	92	1 A	Tuscan	45 ±7	14 ±4	94 ±4	84 ±3	18 ±2	70 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	92	1 B	Tuscan	60 ±6	13 ±4	103 ±4	104 ±3	20 ±2	85 ±5	3 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	95	1	East Medicine Lake	50 ±6	16 ±4	152 ±5	75 ±3	34 ±2	194 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	96	1	East Medicine Lake	49 ±6	17 ±4	152 ±5	74 ±3	33 ±2	193 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1841	96	2	Tuscan	69 ±7	15 ±4	104 ±5	89 ±4	20 ±2	65 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	96	5	Tuscan	46 ±6	17 ±3	87 ±4	91 ±3	17 ±2	70 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	97	1	Tuscan	55 ±6	16 ±4	90 ±4	96 ±3	20 ±2	72 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	98	1 A	Tuscan	74 ±7	14 ±4	103 ±5	108 ±4	20 ±2	96 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	98	1 B	Tuscan	57 ±7	17 ±4	100 ±4	100 ±4	14 ±2	66 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	105	1	Tuscan	60 ±6	15 ±3	86 ±4	94 ±3	19 ±2	76 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	111	1	Tuscan	52 ±6	16 ±3	90 ±4	93 ±3	18 ±2	68 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	13	1	Tuscan	49 ±5	10 ±3	83 ±4	87 ±3	17 ±2	63 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	17	1	Tuscan	79 ±5	15 ±3	82 ±4	83 ±3	16 ±2	71 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	22	1	Tuscan	49 ±6	15 ±3	104 ±4	90 ±3	16 ±2	75 ±5	2 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	31	1	Tuscan	54 ±6	18 ±3	86 ±4	88 ±3	17 ±2	66 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	62	1	Tuscan	45 ±6	16 ±3	86 ±4	89 ±3	16 ±2	67 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	77	1	East Medicine Lake	53 ±6	17 ±4	148 ±5	70 ±3	30 ±2	193 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1842	166	5 A	Tuscan	41 ±7	15 ±3	94 ±4	78 ±3	17 ±2	63 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	166	5 B	Tuscan	45 ±7	20 ±4	96 ±4	84 ±3	19 ±2	74 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	167	2 A	Tuscan	46 ±6	15 ±3	92 ±4	92 ±3	17 ±2	70 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	167	3	Tuscan	60 ±6	17 ±4	103 ±4	94 ±3	18 ±2	79 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	168	2	Tuscan	56 ±6	17 ±3	93 ±4	81 ±3	16 ±2	69 ±5	3 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-1842	168	3	Tuscan	45 ±7	20 ±4	92 ±4	80 ±3	20 ±2	61 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	168	4	East Medicine Lake	50 ±7	16 ±4	144 ±5	70 ±3	33 ±2	184 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1842	168	8	A Tuscan	60 ±6	17 ±3	92 ±4	94 ±3	21 ±2	72 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	168	8	B Tuscan	48 ±6	18 ±3	91 ±4	80 ±3	21 ±2	66 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	169	2	Tuscan	63 ±6	17 ±3	110 ±4	84 ±3	19 ±2	72 ±5	2 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	169	4	Tuscan	40 ±3	13 ±3	81 ±4	84 ±3	18 ±2	69 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	169	6	A East Medicine Lake	51 ±6	16 ±3	189 ±5	75 ±2	30 ±2	192 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1842	170	3	Tuscan	56 ±6	18 ±3	95 ±4	82 ±3	18 ±2	72 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	170	4	Tuscan	51 ±6	19 ±3	83 ±4	88 ±3	20 ±2	74 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	170	5	Tuscan	55 ±6	16 ±3	90 ±4	92 ±3	17 ±2	74 ±5	3 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	170	7	A Tuscan	46 ±6	21 ±3	96 ±4	94 ±3	17 ±2	72 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	171	3	Tuscan	50 ±6	11 ±4	89 ±4	91 ±3	21 ±2	67 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	171	4	East Medicine Lake	37 ±6	17 ±3	142 ±4	69 ±3	30 ±2	184 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1842	171	5	East Medicine Lake	30 ±6	17 ±3	145 ±4	69 ±3	30 ±2	183 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1842	171	6	Tuscan	47 ±6	17 ±3	87 ±4	90 ±3	17 ±2	68 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	171	7	Tuscan	40 ±6	20 ±3	85 ±4	88 ±3	18 ±2	68 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	173	2	Tuscan	45 ±6	14 ±3	89 ±4	76 ±3	17 ±2	63 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	173	3	Tuscan	44 ±5	16 ±3	83 ±4	89 ±3	18 ±2	72 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	173	8	A East Medicine Lake	40 ±6	20 ±3	148 ±4	73 ±3	33 ±2	190 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1842	173	8	B East Medicine Lake	59 ±6	17 ±3	177 ±5	68 ±3	32 ±2	188 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1842	174	3	A Tuscan	56 ±6	16 ±3	98 ±4	101 ±3	18 ±2	76 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	175	1	Tuscan	44 ±6	20 ±3	89 ±4	91 ±3	17 ±2	63 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	175	4	A Tuscan	55 ±6	14 ±3	92 ±4	96 ±3	19 ±2	75 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-SHA-1842	176	2	A	Tuscan	51 ±6	19 ±3	94 ±4	91 ±3	19 ±2	68 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	176	2	B	Tuscan	43 ±6	15 ±3	88 ±4	97 ±3	15 ±2	74 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	177	1		Tuscan	44 ±5	13 ±3	85 ±4	74 ±3	17 ±2	65 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	177	6	A	East Medicine Lake	58 ±6	18 ±3	146 ±4	72 ±3	31 ±2	186 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1842	177	7		Tuscan	55 ±6	17 ±3	115 ±4	87 ±3	20 ±2	66 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	177	8		Tuscan	45 ±5	14 ±3	85 ±4	89 ±3	18 ±2	71 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-1842	178	4		GF/LIW/RS?	43 ±6	18 ±6	143 ±4	68 ±3	28 ±2	178 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	179	4	A	GF/LIW/RS	37 ±6	11 ±4	135 ±4	64 ±3	27 ±2	170 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1842	179	4	B	Tuscan	82 ±6	16 ±3	93 ±4	96 ±3	20 ±2	79 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	180	2	A	Tuscan	51 ±6	17 ±3	93 ±4	95 ±3	19 ±2	71 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	181	1		Tuscan	44 ±6	13 ±3	86 ±4	89 ±3	18 ±2	69 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	181	3	A	East Medicine Lake	45 ±6	10 ±4	132 ±4	67 ±3	28 ±2	177 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-1842	181	3	B	East Medicine Lake	102 ±7	19 ±4	161 ±5	75 ±3	29 ±2	195 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1842	182	2		East Medicine Lake	53 ±8	16 ±4	164 ±5	76 ±4	32 ±2	192 ±5	10 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1842	183	2	A	East Medicine Lake	45 ±6	15 ±3	140 ±4	67 ±3	28 ±2	178 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1842	183	2	B	Tuscan	53 ±6	18 ±3	92 ±4	94 ±3	16 ±2	69 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	183	2	C	Tuscan	56 ±7	21 ±4	96 ±4	100 ±3	19 ±2	75 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	185	1		Tuscan	51 ±6	16 ±3	93 ±4	91 ±3	17 ±2	71 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	187	1	A	East Medicine Lake	46 ±6	17 ±3	137 ±4	69 ±3	29 ±2	181 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1842	187	1	B	Tuscan	57 ±6	16 ±4	91 ±4	98 ±3	20 ±2	70 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	187	1	C	East Medicine Lake	47 ±6	8 ±4	141 ±5	70 ±3	26 ±2	177 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1842	187	2		Tuscan	60 ±6	18 ±3	93 ±4	91 ±3	20 ±2	76 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	189	2	A	Tuscan	45 ±7	14 ±4	85 ±4	88 ±3	16 ±2	64 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-SHA-1842	189	2	B	East Medicine Lake	55 ±7	19 ±4	158 ±5	77 ±3	29 ±2	190 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1842	224	1		Tuscan	41 ±6	12 ±3	84 ±4	85 ±3	17 ±2	73 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	224	4		Tuscan	44 ±6	19 ±3	85 ±4	95 ±3	18 ±2	81 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	255	1		Tuscan	41 ±5	17 ±3	85 ±4	75 ±3	16 ±2	65 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1842	265	2		Tuscan	92 ±7	23 ±3	92 ±4	94 ±3	17 ±2	72 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	2	1		Tuscan	43 ±6	17 ±3	86 ±4	76 ±3	19 ±2	67 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	3	1		Tuscan	46 ±6	21 ±3	88 ±4	89 ±3	18 ±2	77 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	5	1		East Medicine Lake	46 ±6	18 ±3	146 ±4	69 ±3	31 ±2	185 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-SHA-1843H	6	1		Tuscan	47 ±6	19 ±3	89 ±4	77 ±3	17 ±2	69 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	7	1	A	East Medicine Lake	52 ±6	19 ±3	140 ±5	65 ±3	27 ±2	182 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-1843H	7	1	B	Tuscan	54 ±6	16 ±3	95 ±4	96 ±3	16 ±2	78 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	7	1	C	East Medicine Lake	42 ±6	23 ±3	150 ±5	75 ±3	31 ±2	197 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1843H	7	1	D	East Medicine Lake	55 ±6	18 ±4	146 ±5	72 ±3	32 ±2	189 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-1843H	7	1	E	Tuscan	53 ±6	16 ±3	85 ±4	92 ±3	17 ±2	67 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	7	1	F	Tuscan	82 ±7	16 ±4	99 ±5	97 ±4	19 ±2	79 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	7	1	G	Tuscan	46 ±6	17 ±3	87 ±4	90 ±3	18 ±2	67 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	7	1	H	Tuscan	51 ±6	18 ±3	90 ±4	77 ±3	20 ±2	65 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	7	1	I	Tuscan	55 ±7	22 ±4	97 ±5	97 ±4	20 ±2	72 ±5	3 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	14	1		East Medicine Lake	46 ±7	18 ±4	158 ±5	81 ±4	30 ±2	214 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-SHA-1843H	23	1		East Medicine Lake	37 ±6	17 ±3	137 ±4	68 ±3	30 ±2	181 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1843H	77	1	A	Tuscan	49 ±6	16 ±4	88 ±4	92 ±3	19 ±2	76 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	77	1	B	Tuscan	52 ±6	13 ±3	87 ±4	87 ±3	17 ±2	70 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	77	1	C	Tuscan	60 ±7	17 ±4	69 ±4	95 ±3	19 ±2	73 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn	
CA-SHA-1843H	77	1	D	Tuscan	51 ±6	16 ±4	85 ±4	93 ±4	18 ±2	65 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	82	1		Tuscan	53 ±6	21 ±4	92 ±5	97 ±4	23 ±2	76 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1843H	89	1		Tuscan	42 ±5	17 ±3	84 ±4	86 ±3	18 ±2	69 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	1	1		Tuscan	54 ±6	13 ±3	88 ±4	92 ±3	18 ±2	76 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	4	1		Tuscan	46 ±6	15 ±3	93 ±4	92 ±3	18 ±2	69 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	5	1		East Medicine Lake	32 ±7	16 ±4	139 ±4	71 ±3	31 ±2	182 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-SHA-1891	6	1		Tuscan	52 ±7	15 ±4	83 ±4	91 ±3	20 ±2	66 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	7	1		Tuscan	42 ±6	17 ±3	88 ±4	87 ±3	19 ±2	71 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	11	1		East Medicine Lake	39 ±6	12 ±3	137 ±4	66 ±3	30 ±2	180 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-SHA-1891	12	1		Tuscan	43 ±6	15 ±3	88 ±4	87 ±3	16 ±2	70 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	13	1		Tuscan	48 ±6	15 ±4	91 ±4	96 ±3	19 ±2	80 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	20	1		Tuscan	56 ±7	21 ±4	86 ±4	88 ±3	21 ±2	79 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	29	1		Tuscan	62 ±6	14 ±4	104 ±4	94 ±3	22 ±2	71 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	36	2		Tuscan	56 ±7	19 ±4	97 ±4	95 ±3	21 ±2	70 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	39	1		Tuscan	39 ±6	16 ±3	93 ±4	93 ±3	18 ±2	70 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	39	2		Tuscan	53 ±7	16 ±4	91 ±4	96 ±3	14 ±2	67 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	42	1		Tuscan	46 ±6	17 ±3	88 ±4	88 ±3	16 ±2	69 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	44	1	A	Tuscan	55 ±7	16 ±4	87 ±4	93 ±3	16 ±2	68 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1891	44	1	B	Tuscan	51 ±5	13 ±3	81 ±4	85 ±3	18 ±2	65 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	13	A	Grasshopper Group	NM ±NM	NM ±NM	138 ±3	74 ±6	29 ±2	189 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	13	B	Grasshopper Group	NM ±NM	NM ±NM	121 ±2	64 ±6	24 ±2	168 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	13	C	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	71 ±6	29 ±2	190 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	13	D	Grasshopper Group	NM ±NM	NM ±NM	136 ±2	69 ±6	28 ±2	186 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-SIS-1552	18	13	E	Grasshopper Group	NM ±NM	NM ±NM	138 ±2	72 ±6	29 ±2	188 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	26		Grasshopper Group	NM ±NM	NM ±NM	162 ±2	77 ±5	31 ±1	196 ±3	12 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	27		Grasshopper Group	NM ±NM	NM ±NM	146 ±2	74 ±5	28 ±1	187 ±3	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	28	A	Grasshopper Group	NM ±NM	NM ±NM	133 ±3	77 ±6	30 ±2	181 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	28	B	Grasshopper Group	NM ±NM	NM ±NM	142 ±3	72 ±6	28 ±2	175 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	28	C	Grasshopper Group	NM ±NM	NM ±NM	146 ±3	71 ±6	28 ±2	183 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	28	D	Grasshopper Group	NM ±NM	NM ±NM	156 ±3	76 ±6	29 ±2	193 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	28	E	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	72 ±6	26 ±2	191 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	34	A	Grasshopper Group	NM ±NM	NM ±NM	145 ±3	69 ±6	32 ±2	189 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	34	B	Grasshopper Group	NM ±NM	NM ±NM	158 ±3	81 ±6	31 ±2	190 ±7	4 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	34	C	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	72 ±6	30 ±2	194 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	34	D	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	75 ±6	30 ±2	197 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	34	E	Grasshopper Group	NM ±NM	NM ±NM	142 ±2	69 ±6	31 ±2	186 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	61	A	Grasshopper Group	NM ±NM	NM ±NM	165 ±3	79 ±6	27 ±2	194 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	61	B	Grasshopper Group	NM ±NM	NM ±NM	146 ±3	73 ±6	28 ±2	188 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	61	C	Grasshopper Group	NM ±NM	NM ±NM	151 ±3	77 ±6	23 ±2	186 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	61	D	Grasshopper Group	NM ±NM	NM ±NM	146 ±2	75 ±6	32 ±2	196 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	61	E	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	72 ±6	29 ±2	191 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	75	A	Grasshopper Group	NM ±NM	NM ±NM	145 ±4	70 ±6	33 ±3	173 ±8	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	75	B	Grasshopper Group	NM ±NM	NM ±NM	156 ±3	75 ±6	28 ±2	193 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	75	C	Grasshopper Group	NM ±NM	NM ±NM	154 ±3	81 ±6	31 ±2	199 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	75	D	Grasshopper Group	NM ±NM	NM ±NM	158 ±3	76 ±6	27 ±2	185 ±7	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	75	E	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	76 ±6	29 ±2	195 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-SIS-1552	18	104	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	105	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	106	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	107	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	108	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	109	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	110	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	111	Grasshopper Group	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1552	18	132	Buck Mountain	33 ±6	16 ±3	106 ±4	61 ±3	19 ±2	93 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	NM
CA-SIS-1552	18	183 A	GF/LIW/RS	40 ±6	15 ±3	138 ±4	62 ±3	28 ±2	170 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	48
CA-SIS-1552	18	183 B	GF/LIW/RS	36 ±6	19 ±3	143 ±4	69 ±3	28 ±2	172 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	42
CA-SIS-1552	18	183 C	GF/LIW/RS	38 ±6	17 ±3	137 ±4	65 ±3	25 ±2	170 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	49
CA-SIS-1552	18	183 D	GF/LIW/RS	34 ±7	16 ±4	142 ±5	67 ±3	32 ±2	170 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	46
CA-SIS-1552	18	183 E	East Medicine Lake	46 ±7	21 ±4	167 ±5	78 ±3	32 ±2	197 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	50
CA-SIS-1552	18	184 A	GF/LIW/RS	32 ±6	17 ±3	130 ±4	64 ±3	28 ±2	168 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	49
CA-SIS-1552	18	184 B	East Medicine Lake	43 ±6	14 ±4	147 ±4	70 ±3	32 ±2	184 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	49
CA-SIS-1552	18	184 C	East Medicine Lake	50 ±7	15 ±4	155 ±5	71 ±3	32 ±2	183 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	49
CA-SIS-1552	18	184 D	East Medicine Lake	44 ±6	14 ±4	143 ±5	68 ±3	30 ±2	184 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	48
CA-SIS-1552	18	184 E	East Medicine Lake	55 ±7	10 ±4	142 ±5	69 ±3	33 ±2	181 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	49
CA-SIS-1552	18	185 A	East Medicine Lake	39 ±6	15 ±3	145 ±4	70 ±3	32 ±2	185 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	48
CA-SIS-1552	18	185 B	GF/LIW/RS	42 ±6	15 ±3	131 ±4	65 ±3	29 ±2	173 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	45
CA-SIS-1552	18	185 C	GF/LIW/RS	31 ±6	13 ±3	134 ±4	67 ±3	28 ±2	172 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	47
CA-SIS-1552	18	185 D	East Medicine Lake	45 ±6	19 ±3	151 ±5	74 ±3	29 ±2	185 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	49

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SIS-1552	18	185 E	East Medicine Lake	46 ±7	18 ±4	168 ±5	78 ±3	27 ±2	200 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SIS-1552	18	187 A	GF/LIW/RS	38 ±5	14 ±3	130 ±4	62 ±3	29 ±2	167 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SIS-1552	18	187 B	East Medicine Lake	38 ±6	13 ±4	143 ±4	71 ±3	33 ±2	185 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	187 C	East Medicine Lake	48 ±6	14 ±4	144 ±4	72 ±3	32 ±2	181 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SIS-1552	18	187 D	East Medicine Lake	48 ±6	14 ±3	147 ±4	66 ±3	31 ±2	182 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	187 E	East Medicine Lake	46 ±6	19 ±3	136 ±4	70 ±3	27 ±2	178 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SIS-1552	18	189 A	East Medicine Lake	47 ±6	20 ±3	152 ±5	74 ±3	29 ±2	184 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	189 B	East Medicine Lake	47 ±7	20 ±4	160 ±5	72 ±3	31 ±2	182 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	189 C	East Medicine Lake	44 ±7	16 ±4	149 ±5	74 ±3	31 ±2	193 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SIS-1552	18	189 D	East Medicine Lake	76 ±7	21 ±4	162 ±5	79 ±3	36 ±2	191 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SIS-1552	18	189 E	East Medicine Lake	67 ±7	13 ±4	158 ±5	72 ±3	34 ±2	185 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	213 A	East Medicine Lake	53 ±7	16 ±4	142 ±5	66 ±3	29 ±2	179 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	213 B	GF/LIW/RS	31 ±6	16 ±3	128 ±4	60 ±3	29 ±2	167 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SIS-1552	18	213 C	East Medicine Lake	53 ±9	26 ±4	155 ±5	71 ±4	35 ±3	187 ±5	10 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	213 D	East Medicine Lake	51 ±7	19 ±4	151 ±5	72 ±3	35 ±2	186 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SIS-1552	18	213 E	GF/LIW/RS	38 ±6	17 ±3	136 ±4	66 ±3	30 ±2	170 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SIS-1552	18	218 A	East Medicine Lake	47 ±6	18 ±3	148 ±5	70 ±3	31 ±2	180 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	218 B	East Medicine Lake	48 ±6	19 ±4	155 ±5	76 ±3	32 ±2	197 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SIS-1552	18	218 C	GF/LIW/RS	36 ±6	14 ±3	132 ±4	65 ±3	29 ±2	173 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	45
CA-SIS-1552	18	218 D	East Medicine Lake	40 ±6	16 ±3	140 ±4	70 ±3	33 ±2	182 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	218 E	East Medicine Lake	36 ±6	20 ±3	135 ±4	70 ±3	29 ±2	192 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SIS-1552	18	228 A	East Medicine Lake	48 ±6	16 ±3	150 ±4	73 ±3	31 ±2	192 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	228 B	GF/LIW/RS	42 ±5	14 ±3	128 ±4	60 ±3	27 ±2	164 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	44

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SIS-1552	18	228 C	East Medicine Lake	44 ±6	16 ±4	145 ±5	68 ±3	34 ±2	180 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SIS-1552	18	228 D	GF/LIW/RS	36 ±6	14 ±3	135 ±4	67 ±3	28 ±2	169 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	228 E	GF/LIW/RS	37 ±6	15 ±3	130 ±4	61 ±3	29 ±2	171 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SIS-1552	18	247 A	East Medicine Lake	39 ±6	17 ±3	149 ±4	68 ±3	32 ±2	183 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	247 B	East Medicine Lake	49 ±7	17 ±4	158 ±5	74 ±3	33 ±2	190 ±5	12 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SIS-1552	18	247 C	East Medicine Lake	39 ±7	16 ±4	144 ±5	65 ±3	28 ±2	182 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SIS-1552	18	247 D	GF/LIW/RS	46 ±6	14 ±3	132 ±4	65 ±3	30 ±2	172 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	46
CA-SIS-1552	18	247 E	East Medicine Lake	42 ±6	14 ±4	145 ±5	70 ±3	33 ±2	179 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SIS-1553	17	1	Grasshopper Group	NM ±NM	NM ±NM	157 ±2	76 ±6	33 ±2	199 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	3	Grasshopper Group	NM ±NM	NM ±NM	149 ±2	74 ±6	30 ±2	196 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	9	Buck Mountain	NM ±NM	NM ±NM	118 ±2	68 ±6	20 ±2	102 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	2166
CA-SIS-1553	17	18	Grasshopper Group	NM ±NM	NM ±NM	135 ±2	71 ±6	31 ±2	192 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	19 A	Grasshopper Group	NM ±NM	NM ±NM	153 ±2	77 ±6	29 ±2	195 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	19 B	Grasshopper Group	NM ±NM	NM ±NM	147 ±2	75 ±6	30 ±2	191 ±7	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	19 C	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	74 ±6	27 ±2	192 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	19 D	Grasshopper Group	NM ±NM	NM ±NM	148 ±2	76 ±6	27 ±2	193 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	19 E	Grasshopper Group	NM ±NM	NM ±NM	152 ±2	77 ±6	27 ±2	195 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	29	Grasshopper Group	NM ±NM	NM ±NM	164 ±2	81 ±6	31 ±2	206 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	30 A	Grasshopper Group	NM ±NM	NM ±NM	139 ±2	71 ±6	31 ±2	184 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	30 B	Grasshopper Group	NM ±NM	NM ±NM	143 ±2	73 ±6	28 ±2	189 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	30 C	Grasshopper Group	NM ±NM	NM ±NM	158 ±2	74 ±6	31 ±2	198 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	30 D	Grasshopper Group	NM ±NM	NM ±NM	133 ±2	66 ±6	29 ±2	181 ±7	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	30 E	Grasshopper Group	NM ±NM	NM ±NM	132 ±2	65 ±6	26 ±2	179 ±7	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SIS-1553	17	31	A	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	31	B	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	31	C	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	31	D	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SIS-1553	17	31	E	Grasshopper Group (V)	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	1		Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	3		Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	4		Napa Valley	NM ±NM	NM ±NM	195 ±3	11 ±6	42 ±2	228 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	6		Not Obsidian	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	10	A	Napa Valley	NM ±NM	NM ±NM	175 ±3	8 ±6	37 ±2	214 ±7	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	10	B	Napa Valley	NM ±NM	NM ±NM	148 ±3	5 ±6	32 ±2	169 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	16		Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	23	A	Napa Valley	NM ±NM	NM ±NM	198 ±3	11 ±6	45 ±2	238 ±7	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	23	B	Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	30		Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	31		Napa Valley	NM ±NM	NM ±NM	215 ±4	4 ±6	44 ±3	266 ±8	14 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	32		Napa Valley	NM ±NM	NM ±NM	172 ±3	6 ±6	36 ±2	223 ±7	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-347	55	33		Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-348	17	1		Napa Valley	62 ±5	17 ±3	184 ±4	6 ±3	47 ±2	226 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-348	58	1		Annadel	88 ±6	21 ±3	156 ±5	53 ±3	54 ±2	297 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-348	61	1		Napa Valley	60 ±6	18 ±3	181 ±5	6 ±3	44 ±2	229 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-348	148	1		Napa Valley	73 ±6	18 ±3	193 ±5	6 ±3	50 ±2	246 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-348	186	1		Napa Valley	94 ±8	22 ±4	211 ±5	8 ±3	53 ±3	242 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-SOL-348	187	1	Napa Valley	69 ±6	20 ±3	184 ±5	6 ±3	49 ±2	228 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	39	Napa Valley	NM ±NM	NM ±NM	195 ±2	6 ±6	47 ±2	231 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	39 A	Napa Valley	NM ±NM	NM ±NM	193 ±3	6 ±6	39 ±2	229 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	48	Napa Valley	NM ±NM	NM ±NM	203 ±3	7 ±6	44 ±2	227 ±7	14 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	48 A	Napa Valley	NM ±NM	NM ±NM	199 ±3	8 ±6	48 ±2	229 ±7	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	76	Napa Valley	NM ±NM	NM ±NM	196 ±3	8 ±6	45 ±2	243 ±7	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 A	Napa Valley	NM ±NM	NM ±NM	210 ±2	7 ±5	46 ±2	221 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 B	Napa Valley	NM ±NM	NM ±NM	192 ±2	7 ±5	44 ±1	235 ±3	9 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 C	Napa Valley	NM ±NM	NM ±NM	185 ±2	5 ±5	42 ±1	235 ±3	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 D	Napa Valley	NM ±NM	NM ±NM	179 ±2	9 ±5	43 ±1	225 ±3	7 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 E	Napa Valley	NM ±NM	NM ±NM	195 ±2	7 ±5	48 ±1	235 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 F	Napa Valley	NM ±NM	NM ±NM	192 ±2	5 ±5	47 ±1	240 ±3	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 G	Napa Valley	NM ±NM	NM ±NM	187 ±2	6 ±5	48 ±1	226 ±3	11 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 H	Napa Valley	NM ±NM	NM ±NM	195 ±2	6 ±5	45 ±1	235 ±3	14 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 I	Napa Valley	NM ±NM	NM ±NM	199 ±2	7 ±5	48 ±1	235 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	77 J	Napa Valley	NM ±NM	NM ±NM	205 ±2	6 ±5	48 ±1	240 ±3	13 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SOL-351	52	111	Napa Valley	NM ±NM	NM ±NM	177 ±2	6 ±5	46 ±1	232 ±3	10 ±1	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	99 A	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	99 B	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	99 C	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	99 D	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	126 A	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	126 B	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-TEH-1528	31	128	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	147 A	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	147 B	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	147 C	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	152 A	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	152 B	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	206 A	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	206 B	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	206 C	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	206 D	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	222 A	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	222 B	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	222 C	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	222 D	No source determined	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	102 A	Tuscan	49 ±5	15 ±3	82 ±4	88 ±3	17 ±2	65 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	102 B	East Medicine Lake	54 ±7	18 ±4	148 ±5	73 ±3	30 ±2	183 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-TEH-1529/H	32	102 C	Tuscan	42 ±6	18 ±3	85 ±4	88 ±3	18 ±2	65 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	102 D	East Medicine Lake	56 ±6	14 ±4	144 ±5	70 ±3	31 ±2	187 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-TEH-1529/H	32	102 E	Tuscan	53 ±7	18 ±4	89 ±4	98 ±4	19 ±2	73 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	102 F	Tuscan	49 ±7	15 ±4	84 ±4	96 ±3	18 ±2	72 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	120 A	Tuscan	95 ±7	20 ±4	97 ±4	105 ±4	19 ±2	94 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	120 B	Tuscan	66 ±7	20 ±4	100 ±5	100 ±4	17 ±2	79 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	120 C	Tuscan	69 ±7	17 ±4	102 ±5	105 ±4	19 ±2	80 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-TEH-1529/H	32	120 D	Tuscan	51 ±7	15 ±4	89 ±4	97 ±4	14 ±2	75 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	138 A	Tuscan	47 ±6	16 ±3	91 ±4	93 ±3	18 ±2	76 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	138 B	Tuscan	42 ±6	14 ±3	86 ±4	72 ±3	17 ±2	63 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	138 C	Tuscan	50 ±6	18 ±4	89 ±4	91 ±3	20 ±2	68 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	138 D	Tuscan	57 ±7	16 ±4	96 ±4	96 ±3	17 ±2	68 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	138 E	Tuscan	47 ±6	16 ±4	92 ±4	84 ±3	17 ±2	69 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	154 A	Tuscan	58 ±7	20 ±4	104 ±5	100 ±4	19 ±2	96 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	154 B	East Medicine Lake	58 ±7	12 ±4	145 ±5	75 ±3	33 ±2	185 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-TEH-1529/H	32	154 C	Tuscan	73 ±8	21 ±4	99 ±5	104 ±4	17 ±2	73 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	154 D	Tuscan	61 ±8	20 ±4	103 ±5	90 ±4	16 ±2	70 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	154 E	Tuscan	75 ±7	20 ±4	103 ±5	107 ±4	20 ±2	71 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	287 A	Tuscan	42 ±5	15 ±3	85 ±4	76 ±3	17 ±2	70 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	287 B	Tuscan	44 ±6	12 ±4	88 ±4	78 ±3	18 ±2	61 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	287 C	East Medicine Lake	45 ±7	17 ±4	160 ±5	68 ±3	33 ±2	204 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-TEH-1529/H	32	287 D	East Medicine Lake?	39 ±7	12 ±4	161 ±5	78 ±3	28 ±2	215 ±5	11 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-TEH-1529/H	32	287 E	Tuscan	69 ±7	20 ±4	90 ±4	95 ±4	19 ±2	69 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	325 A	East Medicine Lake	49 ±7	21 ±4	160 ±5	79 ±3	32 ±2	203 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-TEH-1529/H	32	325 B	Tuscan	34 ±6	16 ±3	81 ±4	72 ±3	17 ±2	58 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	325 C	East Medicine Lake	53 ±7	15 ±4	151 ±5	75 ±3	31 ±2	189 ±5	13 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-TEH-1529/H	32	325 D	Tuscan	53 ±6	16 ±3	87 ±4	92 ±3	20 ±2	74 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	325 E	Tuscan	52 ±6	17 ±4	95 ±4	99 ±3	18 ±2	82 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	371 A	Tuscan	71 ±8	16 ±4	100 ±5	103 ±4	16 ±2	68 ±5	7 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	371 B	Tuscan	62 ±7	19 ±4	99 ±5	100 ±4	20 ±2	70 ±5	6 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-TEH-1529/H	32	371 C	Tuscan	51 ±6	15 ±4	93 ±4	92 ±3	19 ±2	67 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	371 D	Tuscan	54 ±6	14 ±4	94 ±4	98 ±3	18 ±2	70 ±5	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	371 E	East Medicine Lake	90 ±8	20 ±5	166 ±5	85 ±4	34 ±3	202 ±5	12 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-TEH-1529/H	32	400 A	Tuscan	50 ±7	19 ±4	95 ±5	97 ±4	18 ±2	76 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	400 B	Tuscan	65 ±7	19 ±4	90 ±5	91 ±4	14 ±2	66 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	400 C	Tuscan	73 ±9	15 ±5	104 ±5	105 ±4	16 ±3	80 ±5	7 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	400 D	Tuscan	47 ±6	14 ±4	87 ±4	85 ±3	17 ±2	61 ±5	4 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1529/H	32	400 E	Tuscan	73 ±9	24 ±4	111 ±5	116 ±4	17 ±3	73 ±5	9 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-YOL-161	50	4	Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-YOL-161	50	6	Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-YOL-161	50	10	Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-YOL-161	50	20	Napa Valley	NM ±NM	NM ±NM	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NA ±NA	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-129	41	316	East Medicine Lake	55 ±8	11 ±5	147 ±4	75 ±4	27 ±2	203 ±4	3 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-1206/07	43	1724 A	Cougar Butte	80 ±5	17 ±3	160 ±3	5 ±3	72 ±2	150 ±4	18 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-1206/07	43 61	1724 B	East Medicine Lake		38	17	145	72	27	202	8	NM	NM	NM	NM
CA-MOD-1206/07	43 63	1724 C	East Medicine Lake		40	14	146	74	30	203	6	NM	NM	NM	NM
CA-MOD-1206/07	43 NM	1724 D	Cougar Butte		85	22	162	4	70	153	20	NM	NM	NM	NM
CA-MOD-1206/07	43 NM	1724 E	Cougar Butte		96	30	169	5	73	153	23	NM	NM	NM	NM
CA-MOD-1206/07	43 NM	1728 A	Cougar Butte		86	19	163	3	70	151	20	NM	NM	NM	NM
CA-MOD-1206/07	43 63	1728 B	East Medicine Lake		42	15	143	74	28	198	8	NM	NM	NM	NM
CA-MOD-1206/07	43 NM	1728 C	Cougar Butte		80	18	152	3	70	148	17	NM	NM	NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-MOD-1206/07	43	1728	D	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	NM
	63		East Medicine Lake	44	19	149	75	29	206	8	NM	NM	NM	NM	
CA-MOD-1206/07	43	1728 E	Cougar Butte	±6	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	NM
				78	19	159	4	67	148	19	NM	NM	NM	NM	
CA-MOD-2565	14	153	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	60
				46	13	139	73	30	197	9	NM	NM	NM	NM	
CA-MOD-2565	14	160	East Medicine Lake	±7	±4	±4	±3	±2	±4	±2	±NM	±NM	±NM	±NM	61
				43	16	149	76	31	199	6	NM	NM	NM	NM	
CA-MOD-2565	14	166	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	61
				38	15	140	72	27	200	7	NM	NM	NM	NM	
CA-MOD-2565	14	176	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	57
				50	19	144	73	32	206	7	NM	NM	NM	NM	
CA-MOD-2565	14	178	East Medicine Lake	±6	±3	±4	±3	±2	±4	±2	±NM	±NM	±NM	±NM	61
				45	16	146	75	31	209	7	NM	NM	NM	NM	
CA-MOD-2565	14	182	East Medicine Lake	±7	±4	±4	±3	±2	±4	±2	±NM	±NM	±NM	±NM	61
				55	15	156	77	29	205	7	NM	NM	NM	NM	
CA-MOD-2566/7	32	427	GF/LIW/RS	±6	±4	±4	±3	±2	±4	±2	±NM	±NM	±NM	±NM	54
				40	11	140	68	28	181	8	NM	NM	NM	NM	
CA-MOD-2566/7	32	755 A	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	58
				46	15	140	71	32	190	9	NM	NM	NM	NM	
CA-MOD-2566/7	32	755 B	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	60
				53	18	167	83	32	219	6	NM	NM	NM	NM	
CA-MOD-2566/7	32	755 C	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	59
				52	17	156	80	30	204	7	NM	NM	NM	NM	
CA-MOD-2566-7	32	755 D	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	64
				59	19	155	77	32	215	9	NM	NM	NM	NM	
CA-MOD-2566-7	32	755 E	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	62
				54	21	170	84	32	216	6	NM	NM	NM	NM	
CA-MOD-2566-7	32	760 B	Drews Creek/Butcher Flat	±6	±4	±4	±3	±2	±4	±2	±NM	±NM	±NM	±NM	18
				91	19	133	10	29	83	14	NM	NM	NM	NM	
CA-MOD-2566/7	32	760 C	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	62
				48	18	155	76	29	207	8	NM	NM	NM	NM	
CA-MOD-2566/7	32	760 D	East Medicine Lake	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	61
				69	26	181	87	32	224	6	NM	NM	NM	NM	
CA-MOD-2566/7	32	760 E	East Medicine Lake	±6	±3	±4	±3	±2	±4	±2	±NM	±NM	±NM	±NM	57
				51	17	156	78	32	210	6	NM	NM	NM	NM	
CA-MOD-2566/7	32	763 A	Buck Mountain	±5	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	26
				59	20	127	78	19	101	10	NM	NM	NM	NM	
CA-MOD-2566/7	32	763 B	Buck Mountain	±6	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	23
				55	24	132	81	20	107	11	NM	NM	NM	NM	
CA-MOD-2566/7	32	763 C	East Medicine Lake	±6	±3	±3	±3	±2	±4	±2	±NM	±NM	±NM	±NM	64
				58	17	164	81	30	218	8	NM	NM	NM	NM	
CA-MOD-2566/7	32	763 E	East Medicine Lake	±5	±3	±4	±3	±2	±4	±2	±NM	±NM	±NM	±NM	63
				78	18	169	85	32	226	7	NM	NM	NM	NM	
				±6	±3	±4	±3	±2	±4	±2	±NM	±NM	±NM	±NM	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2566/7	32	768	A	East Medicine Lake	49 ±5	13 ±3	158 ±3	78 ±3	32 ±2	217 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2566-7	32	768	B	East Medicine Lake	59 ±5	19 ±3	182 ±4	89 ±3	34 ±2	226 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2566/7	32	768	C	East Medicine Lake	46 ±5	20 ±3	157 ±3	80 ±3	34 ±2	218 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2566/7	32	770	E	Blue Spring	67 ±5	24 ±3	127 ±3	29 ±3	34 ±2	193 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	678 ±17	20
CA-SIS-1552	18	105		Buck Mountain	46 ±6	19 ±3	128 ±4	57 ±3	24 ±2	89 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	18
CA-SIS-1552	18	106		GF/LIW/RS	52 ±6	18 ±3	146 ±4	72 ±3	30 ±2	183 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SIS-1552	18	107		East Medicine Lake	45 ±6	17 ±3	157 ±4	78 ±3	31 ±2	211 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-SIS-1552	18	212		GF/LIW/RS	43 ±5	11 ±3	135 ±3	67 ±3	29 ±2	172 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SIS-1552	18	241		East Medicine Lake	46 ±5	15 ±3	145 ±3	71 ±3	30 ±2	203 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SIS-1552	18	242		GF/LIW/RS	58 ±5	15 ±3	144 ±4	71 ±3	32 ±2	181 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-MOD-2561	24	33	A	East Medicine Lake	36 ±6	14 ±3	139 ±3	73 ±3	30 ±2	197 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2561	24	33	B	East Medicine Lake	40 ±11	20 ±6	149 ±4	68 ±4	29 ±2	186 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	33	C	East Medicine Lake	43 ±6	17 ±3	149 ±4	75 ±3	29 ±2	200 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	33	D	East Medicine Lake	54 ±7	13 ±4	151 ±4	76 ±3	33 ±2	203 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2561	24	33	E	East Medicine Lake	45 ±7	13 ±4	161 ±4	85 ±3	32 ±2	219 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	38	A	East Medicine Lake	57 ±7	21 ±4	161 ±4	85 ±4	33 ±2	215 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	38	B	East Medicine Lake	44 ±6	13 ±3	149 ±4	75 ±3	30 ±2	204 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	38	C	East Medicine Lake	51 ±6	17 ±4	166 ±4	86 ±3	33 ±2	220 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	38	D	East Medicine Lake	74 ±8	21 ±5	152 ±4	74 ±4	30 ±2	187 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	38	E	East Medicine Lake	48 ±7	17 ±4	158 ±4	76 ±3	28 ±2	205 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	44	A	East Medicine Lake	50 ±7	13 ±4	146 ±4	75 ±3	32 ±2	214 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2561	24	44	B	East Medicine Lake	62 ±9	19 ±5	157 ±4	79 ±4	27 ±2	209 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	44	C	East Medicine Lake	53 ±8	23 ±4	155 ±4	74 ±4	32 ±2	208 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>												Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-MOD-2561	24	46 A	East Medicine Lake	42 ±7	13 ±4	137 ±4	70 ±3	30 ±2	200 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57	
CA-MOD-2561	24	46 B	East Medicine Lake	36 ±8	13 ±4	149 ±4	74 ±3	30 ±2	204 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56	
CA-MOD-2561	24	115 A	East Medicine Lake	41 ±7	19 ±3	150 ±4	73 ±3	32 ±2	201 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58	
CA-MOD-2561	24	115 B	East Medicine Lake	52 ±8	22 ±5	159 ±4	85 ±4	32 ±2	214 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57	
CA-MOD-2561	24	115 C	East Medicine Lake	41 ±7	13 ±4	149 ±4	71 ±3	32 ±2	203 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57	
CA-MOD-2561	24	115 D	East Medicine Lake	42 ±8	11 ±4	161 ±4	82 ±3	32 ±2	213 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59	
CA-MOD-2561	24	115 E	East Medicine Lake	50 ±8	7 ±6	164 ±4	85 ±4	34 ±2	222 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56	
CA-MOD-2568	34	95-1 A	East Medicine Lake	52 ±8	17 ±4	154 ±4	87 ±4	30 ±2	211 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61	
CA-MOD-2568	34	95-1 B	East Medicine Lake	56 ±7	17 ±4	147 ±4	77 ±3	26 ±2	197 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63	
CA-MOD-2568	34	95-1 C	East Medicine Lake	46 ±7	8 ±4	139 ±4	73 ±3	30 ±2	197 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58	
CA-MOD-2568	34	95-1 D	East Medicine Lake	58 ±8	20 ±4	159 ±4	83 ±4	31 ±2	211 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64	
CA-MOD-2568	34	95-1 E	East Medicine Lake	57 ±7	13 ±4	155 ±4	76 ±3	32 ±2	211 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59	
CA-MOD-2568	34	97-1 A	East Medicine Lake	42 ±9	18 ±4	158 ±4	88 ±4	32 ±2	219 ±4	3 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58	
CA-MOD-2568	34	97-1 B	East Medicine Lake	61 ±8	17 ±4	144 ±4	79 ±4	30 ±2	198 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57	
CA-MOD-2568	34	97-1 C	East Medicine Lake	66 ±8	4 ±9	143 ±4	70 ±4	24 ±2	193 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63	
CA-MOD-2568	34	97-1 D	East Medicine Lake	50 ±11	9 ±7	147 ±4	78 ±4	29 ±3	209 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57	
CA-MOD-2568	34	100-1	Blue Mountain	178 ±11	13 ±7	71 ±4	7 ±3	75 ±3	381 ±6	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-MOD-2904	27	6-1	East Medicine Lake	47 ±7	19 ±4	137 ±4	69 ±3	27 ±2	186 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64	
CA-SHA-68/H	47	374	GF/LIW/RS	38 ±8	15 ±4	126 ±4	61 ±3	27 ±2	166 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52	
CA-SHA-68/H	47	381	East Medicine Lake	44 ±7	24 ±3	137 ±4	66 ±3	29 ±2	186 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57	
CA-SHA-68/H	47	493	East Medicine Lake	38 ±8	22 ±4	146 ±4	74 ±3	28 ±2	199 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57	
CA-SHA-68/H	47	628	GF/LIW/RS	43 ±6	13 ±4	133 ±4	69 ±3	29 ±2	172 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53	
CA-SHA-68/H	47	1457	GF/LIW/RS	47 ±6	17 ±4	132 ±4	64 ±3	30 ±2	174 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-SHA-68/H	47	1464	GF/LIW/RS	46 ±9	17 ±5	138 ±4	70 ±4	30 ±2	171 ±4	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-68/H	47	2167	GF/LIW/RS	38 ±7	11 ±4	135 ±4	69 ±3	27 ±2	166 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-68/H	47	2294	GF/LIW/RS	47 ±6	16 ±3	140 ±4	65 ±3	29 ±2	173 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1838/H	45	365 A	East Medicine Lake	63 ±7	13 ±5	158 ±4	84 ±4	32 ±2	213 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-1838/H	45	365 B	East Medicine Lake	39 ±8	17 ±4	146 ±4	71 ±3	33 ±2	188 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-SHA-1838/H	45	365 C	GF/LIW/RS	56 ±8	17 ±4	126 ±4	66 ±4	32 ±2	163 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1838/H	45	377	GF/LIW/RS	42 ±7	18 ±3	130 ±4	65 ±3	26 ±2	174 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838/H	45	379 A	GF/LIW/RS	48 ±6	13 ±4	142 ±4	71 ±3	30 ±2	172 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838/H	45	379 B	GF/LIW/RS	61 ±8	17 ±4	148 ±4	77 ±3	34 ±2	171 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838/H	45	379 C	GF/LIW/RS	53 ±6	13 ±4	159 ±4	78 ±3	31 ±2	176 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1838/H	45	382	Blue Spring	76 ±6	21 ±3	121 ±3	24 ±3	53 ±2	191 ±4	34 ±2	NM ±NM	NM ±NM	NM ±NM	498 ±15	34
CA-SHA-1838/H	45	390 A	GF/LIW/RS	58 ±7	17 ±4	160 ±4	80 ±3	33 ±2	176 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838/H	45	390 B	GF/LIW/RS	49 ±7	13 ±4	159 ±4	76 ±3	34 ±2	168 ±4	4 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838/H	45	390 C	GF/LIW/RS	42 ±8	16 ±4	149 ±4	75 ±3	29 ±2	170 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838/H	45	393 A	GF/LIW/RS	51 ±6	15 ±4	146 ±4	72 ±3	31 ±2	178 ±4	31 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-1838/H	45	393 B	GF/LIW/RS	51 ±6	12 ±4	142 ±4	74 ±3	32 ±2	171 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838/H	45	466 A	East Medicine Lake	49 ±6	16 ±3	151 ±4	77 ±3	31 ±2	202 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-SHA-1883/H	45	466 B	Bordwell Spring	120 ±8	18 ±4	153 ±4	0 ±5	55 ±2	343 ±5	16 ±2	NM ±NM	NM ±NM	NM ±NM	0 ±14	62
CA-SHA-1838/H	45	470 A	GF/LIW/RS	55 ±6	14 ±3	133 ±3	69 ±3	31 ±2	168 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1838/H	45	470 B	GF/LIW/RS	54 ±7	20 ±4	142 ±4	70 ±3	33 ±2	170 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-1838/H	45	470 C	GF/LIW/RS	52 ±7	14 ±4	153 ±4	77 ±3	29 ±2	174 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-MOD-1206/07	90	43-1211	Cougar Butte	71 ±5	19 ±3	152 ±4	3 ±3	67 ±2	145 ±5	18 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	93	34-1	Tuscan	48 ±6	15 ±3	86 ±4	88 ±3	17 ±2	75 ±5	5 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-COL-178	31	119	Napa Valley	97 ±5	21 ±3	210 ±3	7 ±3	52 ±2	255 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	122	Mt. Konocti	71 ±7	21 ±4	235 ±4	82 ±3	41 ±2	213 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	124	Mt. Konocti	48 ±5	20 ±3	222 ±3	68 ±3	39 ±2	196 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	132	Napa Valley	107 ±7	25 ±4	209 ±4	6 ±3	47 ±2	250 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	183	Mt. Konocti	63 ±6	17 ±4	229 ±4	81 ±3	36 ±2	201 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	187	Napa Valley	91 ±6	20 ±4	208 ±4	8 ±3	50 ±2	239 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	207	Napa Valley	89 ±5	24 ±3	209 ±3	6 ±3	51 ±2	238 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	210 A	Napa Valley	74 ±5	19 ±3	201 ±3	5 ±3	48 ±2	240 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	210 B	Mt. Konocti	51 ±7	17 ±4	187 ±4	61 ±3	33 ±2	176 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	694 ±16	NM
CA-COL-178	31	214	Borax Lake	52 ±5	21 ±3	210 ±3	24 ±3	45 ±2	98 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	216	Borax Lake	94 ±6	21 ±3	231 ±4	19 ±3	45 ±2	102 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	218 A	Napa Valley	87 ±5	19 ±3	198 ±3	5 ±3	53 ±2	245 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	218 B	Napa Valley	78 ±7	26 ±4	210 ±4	6 ±3	45 ±2	217 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	218 C	Borax Lake	89 ±6	25 ±3	233 ±4	17 ±3	50 ±2	102 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-COL-178	31	220	Napa Valley	108 ±6	30 ±3	198 ±4	8 ±3	45 ±2	256 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2559	21	323 A	East Medicine Lake	40 ±6	18 ±3	140 ±4	71 ±3	29 ±2	197 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2559	21	323 B	East Medicine Lake	39 ±6	15 ±3	135 ±4	68 ±3	27 ±2	188 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2559	21	323 C	Cougar Butte	73 ±5	20 ±3	150 ±4	3 ±3	66 ±2	140 ±4	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	38
CA-MOD-2559	21	323 D	East Medicine Lake	49 ±6	16 ±3	147 ±4	77 ±3	32 ±2	206 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2559	21	323 E	East Medicine Lake	51 ±8	19 ±4	154 ±4	80 ±4	35 ±2	216 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2559	21	326 A	East Medicine Lake	46 ±6	14 ±3	138 ±4	69 ±3	31 ±2	194 ±4	3 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2559	21	326 B	East Medicine Lake	46 ±6	14 ±3	145 ±4	72 ±3	30 ±2	205 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2559	21	326 C	East Medicine Lake	46 ±6	14 ±4	149 ±4	72 ±3	31 ±2	198 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2559	21	326 D	East Medicine Lake	46 ±8	17 ±4	135 ±4	69 ±3	28 ±2	185 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2559	21	326 E	East Medicine Lake	54 ±7	19 ±4	151 ±4	76 ±3	30 ±2	204 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2559	21	332 A	East Medicine Lake	39 ±6	12 ±4	143 ±4	68 ±3	28 ±2	109 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2559	21	332 B	East Medicine Lake	36 ±6	14 ±3	138 ±4	71 ±3	30 ±2	197 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2559	21	332 C	East Medicine Lake	45 ±6	16 ±3	143 ±4	70 ±3	32 ±2	197 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2559	21	332 D	East Medicine Lake	43 ±6	21 ±3	147 ±4	71 ±3	33 ±2	203 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2559	21	332 E	East Medicine Lake	36 ±7	13 ±4	139 ±4	71 ±3	29 ±2	194 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2559	21	347 A	East Medicine Lake	44 ±6	20 ±3	141 ±4	67 ±3	33 ±2	200 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2559	21	347 B	East Medicine Lake	39 ±6	14 ±3	137 ±4	71 ±3	29 ±2	194 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2559	21	347 C	East Medicine Lake	43 ±6	20 ±3	142 ±4	73 ±3	31 ±2	202 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2559	21	347 D	East Medicine Lake	40 ±6	15 ±3	147 ±4	71 ±3	32 ±2	206 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2559	21	347 E	East Medicine Lake	47 ±6	13 ±3	145 ±4	69 ±3	30 ±2	209 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2559	21	364 A	East Medicine Lake	40 ±7	19 ±3	147 ±4	76 ±3	31 ±2	203 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2559	21	364 B	East Medicine Lake	43 ±6	19 ±3	149 ±4	75 ±3	31 ±2	207 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2559	21	364 C	East Medicine Lake	44 ±7	18 ±4	144 ±4	74 ±3	27 ±2	204 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2559	21	364 D	East Medicine Lake	44 ±6	17 ±4	137 ±4	69 ±3	27 ±2	192 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2559	21	364 E	East Medicine Lake	48 ±8	20 ±4	154 ±4	80 ±4	29 ±2	217 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2559	21	509 A	East Medicine Lake	56 ±5	14 ±3	147 ±3	75 ±3	29 ±2	210 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2559	21	509 B	East Medicine Lake	54 ±5	19 ±3	150 ±3	79 ±3	29 ±2	209 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2559	21	509 C	East Medicine Lake	59 ±6	19 ±3	151 ±4	80 ±3	29 ±2	209 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2559	21	509 D	East Medicine Lake	52 ±6	14 ±4	150 ±4	78 ±3	29 ±2	207 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2559	21	509 E	East Medicine Lake	53 ±6	23 ±3	152 ±4	81 ±3	34 ±2	214 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2560	27	982	East Medicine Lake	38 ±7	14 ±4	148 ±4	75 ±3	28 ±2	205 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-MOD-2560	27	993	East Medicine Lake	44 ±10	16 ±5	151 ±4	72 ±4	30 ±2	212 ±5	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2560	27	1008	East Medicine Lake	45 ±6	17 ±3	148 ±4	69 ±3	28 ±2	192 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2560	27	1009	East Medicine Lake	38 ±6	16 ±3	150 ±4	76 ±3	29 ±2	209 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2560	27	1011 A	East Medicine Lake	45 ±6	14 ±3	151 ±4	73 ±3	30 ±2	202 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2560	27	1011 B	East Medicine Lake	38 ±6	22 ±3	149 ±4	75 ±3	28 ±2	198 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2560	27	1011 C	East Medicine Lake	40 ±6	19 ±3	146 ±4	72 ±3	30 ±2	202 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2560	27	1011 D	East Medicine Lake	52 ±6	17 ±3	148 ±4	77 ±3	32 ±2	215 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2560	27	1011 E	East Medicine Lake	40 ±7	19 ±3	151 ±4	75 ±3	30 ±2	209 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2560	27	1016 A	East Medicine Lake	48 ±6	12 ±4	145 ±4	72 ±3	31 ±2	201 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2560	27	1016 B	East Medicine Lake	38 ±6	20 ±3	146 ±4	71 ±3	29 ±2	198 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2560	27	1016 C	East Medicine Lake	57 ±7	21 ±4	150 ±4	78 ±3	33 ±2	213 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2560	27	1016 D	East Medicine Lake	49 ±6	15 ±3	149 ±4	76 ±3	29 ±2	207 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2560	27	1016 E	East Medicine Lake	50 ±8	16 ±4	153 ±4	75 ±4	34 ±2	209 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2560	27	1017 A	East Medicine Lake	44 ±6	19 ±3	146 ±4	75 ±3	30 ±2	202 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2560	27	1017 B	East Medicine Lake	44 ±6	15 ±3	144 ±4	74 ±3	29 ±2	200 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2560	27	1017 C	East Medicine Lake	44 ±6	10 ±4	139 ±4	72 ±3	31 ±2	195 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2560	27	1017 D	East Medicine Lake	56 ±7	18 ±4	150 ±4	77 ±3	33 ±2	215 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2560	27	1017 E	East Medicine Lake	50 ±7	16 ±4	147 ±4	79 ±3	31 ±2	205 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2560	27	1018 A	East Medicine Lake	61 ±6	22 ±3	154 ±4	74 ±3	33 ±2	210 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2560	27	1018 B	East Medicine Lake	57 ±6	18 ±3	150 ±4	74 ±3	33 ±2	207 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	62
CA-MOD-2560	27	1018 C	East Medicine Lake	56 ±6	19 ±3	150 ±3	80 ±3	30 ±2	201 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2560	27	1018 D	East Medicine Lake	44 ±6	16 ±4	151 ±4	79 ±3	32 ±2	206 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2560	27	1018 E	East Medicine Lake	42 ±5	16 ±3	150 ±3	75 ±3	32 ±2	206 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2566/7	32	659	Rainbow Mines	37 ±6	16 ±3	123 ±3	78 ±3	20 ±2	140 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	933 ±15	NM
CA-MOD-2568	34	40-1	East Medicine Lake	47 ±6	13 ±4	143 ±4	74 ±3	29 ±2	197 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2568	34	41-1	East Medicine Lake	50 ±7	17 ±4	150 ±4	77 ±3	30 ±2	196 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	65
CA-MOD-2561	24	33 A	East Medicine Lake	36 ±6	14 ±3	139 ±3	73 ±3	30 ±2	197 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	60
CA-MOD-2561	24	33 B	East Medicine Lake	40 ±11	20 ±6	149 ±4	68 ±4	29 ±2	186 ±5	10 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	33 C	East Medicine Lake	43 ±6	17 ±3	149 ±4	75 ±3	29 ±2	200 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	33 D	East Medicine Lake	54 ±7	13 ±4	151 ±4	76 ±3	33 ±2	203 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2561	24	33 E	East Medicine Lake	45 ±7	13 ±4	161 ±4	85 ±3	32 ±2	219 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	38 A	East Medicine Lake	57 ±7	21 ±4	161 ±4	85 ±4	33 ±2	215 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	38 B	East Medicine Lake	44 ±6	13 ±3	149 ±4	75 ±3	30 ±2	204 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	38 C	East Medicine Lake	51 ±6	17 ±4	166 ±4	86 ±3	33 ±2	220 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	38 D	East Medicine Lake	74 ±8	21 ±5	152 ±4	74 ±4	30 ±2	187 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	38 E	East Medicine Lake	48 ±7	17 ±4	158 ±4	76 ±3	28 ±2	205 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	44 A	East Medicine Lake	50 ±7	13 ±4	146 ±4	75 ±3	32 ±2	214 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2561	24	44 B	East Medicine Lake	62 ±9	19 ±5	157 ±4	79 ±4	27 ±2	209 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	44 C	East Medicine Lake	53 ±8	23 ±4	155 ±4	74 ±4	32 ±2	208 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2561	24	46 A	East Medicine Lake	43 ±7	13 ±4	137 ±4	70 ±3	30 ±2	200 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	46 B	East Medicine Lake	36 ±8	13 ±4	149 ±4	74 ±3	30 ±2	204 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-MOD-2561	24	115 A	East Medicine Lake	41 ±7	19 ±3	150 ±4	73 ±3	32 ±2	201 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2561	24	115 B	East Medicine Lake	52 ±8	22 ±5	159 ±4	85 ±4	32 ±2	214 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	115 C	East Medicine Lake	41 ±7	13 ±4	149 ±4	71 ±3	32 ±2	203 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2561	24	115 D	East Medicine Lake	42 ±8	11 ±4	161 ±4	82 ±3	32 ±2	213 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2561	24	115 E	East Medicine Lake	50 ±8	7 ±6	164 ±4	85 ±4	34 ±2	222 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-MOD-2568	34	95-1 A	East Medicine Lake	52 ±8	17 ±4	154 ±4	87 ±4	30 ±2	211 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	61
CA-MOD-2568	34	95-1 B	East Medicine Lake	56 ±7	17 ±4	147 ±4	77 ±3	26 ±2	197 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2568	34	95-1 C	East Medicine Lake	46 ±7	8 ±4	139 ±4	73 ±3	30 ±2	197 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2568	34	95-1 D	East Medicine Lake	58 ±8	20 ±4	159 ±4	83 ±4	31 ±2	211 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-MOD-2568	34	95-1 E	East Medicine Lake	57 ±7	13 ±4	155 ±4	76 ±3	32 ±2	211 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-MOD-2568	34	97-1 A	East Medicine Lake	42 ±9	18 ±4	158 ±4	88 ±4	32 ±2	219 ±4	3 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-MOD-2568	34	97-1 B	East Medicine Lake	61 ±8	17 ±4	144 ±4	79 ±4	30 ±2	198 ±5	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2568	34	97-1 C	East Medicine Lake	66 ±8	4 ±9	143 ±4	70 ±4	24 ±2	193 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	63
CA-MOD-2568	34	97-1 D	East Medicine Lake	50 ±11	9 ±7	147 ±4	78 ±4	29 ±3	209 ±5	9 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-MOD-2568	34	100-1	Blue Mountain	178 ±11	13 ±7	71 ±4	7 ±3	75 ±3	381 ±6	15 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-MOD-2904	27	6-1	East Medicine Lake	47 ±7	19 ±4	137 ±4	69 ±3	27 ±2	186 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	64
CA-SHA-68/H	47	374	GF/LIW/RS	38 ±8	15 ±4	126 ±4	61 ±3	27 ±2	166 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-68/H	47	381	East Medicine Lake	44 ±7	24 ±3	137 ±4	66 ±3	29 ±2	186 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-SHA-68/H	47	493	East Medicine Lake	38 ±8	22 ±4	146 ±4	74 ±3	28 ±2	199 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-SHA-68/H	47	628	GF/LIW/RS	43 ±6	13 ±4	133 ±4	69 ±3	29 ±2	172 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-68/H	47	1457	GF/LIW/RS	47 ±6	17 ±4	132 ±4	64 ±3	30 ±2	174 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-68/H	47	1464	GF/LIW/RS	46 ±9	17 ±5	138 ±4	70 ±4	30 ±2	171 ±4	8 ±3	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-68/H	47	2167	GF/LIW/RS	38 ±7	11 ±4	135 ±4	69 ±3	27 ±2	166 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54
CA-SHA-68/H	47	2294	GF/LIW/RS	47 ±6	16 ±3	140 ±4	65 ±3	29 ±2	173 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1838/H	45	365 A	East Medicine Lake	63 ±7	13 ±5	158 ±4	84 ±4	32 ±2	213 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-1838/H	45	365 B	East Medicine Lake	39 ±8	17 ±4	146 ±4	71 ±3	33 ±2	188 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-SHA-1838/H	45	365 C	GF/LIW/RS	56 ±8	17 ±4	126 ±4	66 ±4	32 ±2	163 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1838/H	45	377	GF/LIW/RS	42 ±7	18 ±3	130 ±4	65 ±3	26 ±2	174 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-SHA-1838/H	45	379 A	GF/LIW/RS	48 ±6	13 ±4	142 ±4	71 ±3	30 ±2	172 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838/H	45	379 B	GF/LIW/RS	61 ±8	17 ±4	148 ±4	77 ±3	34 ±2	171 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838/H	45	379 C	GF/LIW/RS	53 ±6	13 ±4	159 ±4	78 ±3	31 ±2	176 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1838/H	45	382	Blue Spring	76 ±6	21 ±3	121 ±3	24 ±3	53 ±2	191 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	498 ±15	34
CA-SHA-1838/H	45	390 A	GF/LIW/RS	58 ±7	17 ±4	160 ±4	80 ±3	33 ±2	176 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838/H	45	390 B	GF/LIW/RS	49 ±7	13 ±4	159 ±4	76 ±3	34 ±2	168 ±4	4 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838/H	45	390 C	GF/LIW/RS	42 ±8	16 ±4	149 ±4	75 ±3	29 ±2	170 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838/H	45	393 A	GF/LIW/RS	51 ±6	15 ±4	146 ±4	72 ±3	31 ±2	178 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-1838/H	45	393 B	GF/LIW/RS	51 ±6	12 ±4	142 ±4	74 ±3	32 ±2	171 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838/H	45	466 A	East Medicine Lake	49 ±6	16 ±3	151 ±4	77 ±3	31 ±2	202 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-SHA-1838/H	45	466 B	Bordwell Spring	120 ±8	18 ±4	153 ±4	0 ±5	55 ±2	343 ±5	16 ±2	NM ±NM	NM ±NM	NM ±NM	0 ±14	62
CA-SHA-1838/H	45	470 A	GF/LIW/RS	55 ±6	14 ±3	133 ±3	69 ±3	31 ±2	168 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1838/H	45	470 B	GF/LIW/RS	54 ±7	20 ±4	142 ±4	70 ±3	33 ±2	170 ±4	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	47
CA-SHA-1838/H	45	470 C	GF/LIW/RS	52 ±7	14 ±4	153 ±4	77 ±3	29 ±2	174 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-MOD-2564	33	55	East Medicine Lake	31 ±6	18 ±3	129 ±3	70 ±3	28 ±2	189 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	58
CA-SHA-1838	45	85 A	GF/LIW/RS	58 ±5	20 ±3	158 ±3	83 ±3	31 ±2	178 ±4	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1838	45	85 B	East Medicine Lake	45 ±3	16 ±3	146 ±3	76 ±3	31 ±2	207 ±3	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-SHA-1838	45	85 C	GF/LIW/RS	43 ±6	19 ±4	153 ±4	78 ±3	31 ±2	181 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1838	45	85 E	GF/LIW/RS	62 ±5	12 ±4	144 ±3	74 ±3	30 ±2	180 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1838	45	88 A	GF/LIW/RS	45 ±5	16 ±4	153 ±4	77 ±3	33 ±2	181 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838	45	88 B	East Medicine Lake	61 ±5	19 ±4	166 ±4	82 ±3	36 ±2	203 ±4	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-SHA-1838	45	88 C	GF/LIW/RS	53 ±4	20 ±3	143 ±3	74 ±3	29 ±2	180 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838	45	88 D	GF/LIW/RS	51 ±5	18 ±3	138 ±3	69 ±3	30 ±2	185 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec	Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio	
					Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-SHA-1838	45	88	E	GF/LIW/RS	47 ±4	22 ±3	146 ±3	76 ±3	31 ±2	180 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-SHA-1838	45	295	A	East Medicine Lake	44 ±5	17 ±4	157 ±3	80 ±3	32 ±2	210 ±4	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	59
CA-SHA-1838	45	295	B	GF/LIW/RS	38 ±5	15 ±3	138 ±3	66 ±3	31 ±2	172 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1838	45	295	C	East Medicine Lake	52 ±6	21 ±4	159 ±4	81 ±3	34 ±2	200 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-1838	45	295	D	GF/LIW/RS	40 ±6	14 ±4	141 ±3	72 ±3	31 ±2	180 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838	45	296		GF/LIW/RS	41 ±3	16 ±3	134 ±3	68 ±3	30 ±2	177 ±3	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1838	45	355		GF/LIW/RS	44 ±4	20 ±3	133 ±3	65 ±3	30 ±2	171 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1838	45	361	B	GF/LIW/RS	54 ±4	20 ±3	157 ±3	78 ±3	30 ±2	179 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838	45	361	D	GF/LIW/RS	61 ±5	24 ±4	157 ±4	88 ±3	35 ±2	179 ±4	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1838	45	361	E	GF/LIW/RS	66 ±5	20 ±3	174 ±4	84 ±3	33 ±2	181 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1838	45	439		GF/LIW/RS	47 ±4	13 ±3	136 ±3	69 ±3	31 ±2	175 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838	45	477	B	East Medicine Lake	57 ±4	16 ±3	160 ±3	78 ±3	34 ±2	203 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56
CA-SHA-1838	45	477	C	GF/LIW/RS	78 ±5	17 ±4	164 ±4	82 ±3	33 ±2	181 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838	45	477	D	GF/LIW/RS	90 ±5	21 ±3	157 ±3	80 ±3	35 ±2	180 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838	45	477	E	GF/LIW/RS	59 ±5	20 ±3	169 ±3	80 ±3	32 ±2	176 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1838	45	482	B	East Medicine Lake	69 ±5	20 ±4	165 ±4	80 ±3	36 ±2	202 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-SHA-1838	45	484	B	GF/LIW/RS	57 ±5	16 ±4	146 ±3	72 ±3	32 ±2	181 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1841	19	617		Tuscan	53 ±4	17 ±3	83 ±3	88 ±3	18 ±2	60 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1841	19	625	A	GF/LIW/RS	66 ±6	20 ±4	160 ±4	79 ±3	33 ±2	179 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1841	19	625	B	GF/LIW/RS	69 ±6	15 ±4	164 ±4	83 ±3	31 ±2	178 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1841	19	625	C	GF/LIW/RS	70 ±6	15 ±4	156 ±4	76 ±3	33 ±2	175 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-SHA-1841	19	631		East Medicine Lake	46 ±4	16 ±3	154 ±3	82 ±3	30 ±2	214 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	57
CA-SHA-1841	19	634		GF/LIW/RS	74 ±5	21 ±4	167 ±4	84 ±3	33 ±2	181 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>												Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba		
CA-SHA-1841	19	662	GF/LIW/RS	47 ±4	14 ±3	130 ±3	63 ±3	25 ±2	169 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50	
CA-SHA-1841	19	664	East Medicine Lake?	77 ±5	21 ±4	160 ±4	79 ±3	34 ±2	197 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53	
CA-SHA-1841	19	695 A	Tuscan	64 ±4	17 ±3	92 ±3	99 ±3	18 ±2	77 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-SHA-1841	19	695 B	GF/LIW/RS	103 ±6	19 ±4	153 ±4	70 ±3	33 ±2	180 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51	
CA-SHA-1841	19	709	GF/LIW/RS?	45 ±5	18 ±3	150 ±3	71 ±3	28 ±2	187 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48	
CA-SHA-1841	19	720 A	East Medicine Lake?	78 ±5	20 ±3	152 ±3	77 ±3	35 ±2	193 ±4	9 ±4	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55	
CA-SHA-1841	19	720 B	Tuscan	108 ±6	19 ±3	95 ±3	104 ±3	17 ±2	71 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	14	
CA-SHA-1841	19	723	GF/LIW/RS	106 ±7	20 ±4	147 ±4	84 ±3	30 ±2	182 ±4	16 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49	
CA-SHA-1841	19	732	GF/LIW/RS	57 ±5	15 ±4	137 ±4	71 ±3	31 ±2	181 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48	
CA-SHA-1841	19	1069 A	GF/LIW/RS	49 ±4	13 ±4	127 ±3	62 ±3	27 ±2	169 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55	
CA-SHA-1841	19	1069 B	Tuscan	82 ±5	20 ±3	90 ±3	95 ±3	19 ±2	68 ±3	4 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-SHA-1841	19	1081 A	GF/LIW/RS	51 ±3	15 ±3	127 ±3	64 ±3	29 ±2	168 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49	
CA-SHA-1841	19	1081 B	GF/LIW/RS	69 ±5	18 ±3	142 ±4	75 ±3	34 ±2	184 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52	
CA-SHA-1841	19	1081 C	Tuscan	73 ±4	18 ±3	99 ±3	105 ±3	20 ±2	71 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-SHA-1841	19	1094	Tuscan	100 ±4	18 ±3	103 ±3	92 ±3	21 ±2	70 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-SHA-1841	19	1112 A	GF/LIW/RS	47 ±4	16 ±3	146 ±3	74 ±3	33 ±2	180 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52	
CA-SHA-1841	19	1112 B	GF/LIW/RS	53 ±5	16 ±4	150 ±3	77 ±3	34 ±2	181 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	54	
CA-SHA-1841	19	1115	GF/LIW/RS	82 ±6	13 ±4	143 ±4	72 ±3	31 ±2	184 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52	
CA-SHA-1841	19	1127	South Warners	66 ±3	17 ±3	161 ±3	64 ±3	19 ±2	92 ±3	11 ±2	NM ±NM	NM ±NM	NM ±NM	377 ±13	NM	
CA-SHA-1841	19	1130	GF/LIW/RS	55 ±4	16 ±3	143 ±3	71 ±3	31 ±2	182 ±3	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53	
CA-SHA-1841	19	1140 A	GF/LIW/RS	62 ±5	20 ±3	153 ±3	72 ±3	29 ±2	181 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52	
CA-SHA-1841	19	1140 B	Tuscan	87 ±5	17 ±3	108 ±3	93 ±3	22 ±2	71 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM	
CA-SHA-1841	19	1147 A	East Medicine Lake	99 ±4	21 ±3	165 ±3	80 ±3	31 ±2	200 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	56	

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-SHA-1841	19	1147 B	Tuscan	77 ±5	21 ±3	97 ±3	105 ±3	17 ±2	69 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1966	8	60 A	GF/LIW/RS	47 ±4	16 ±3	138 ±3	68 ±3	29 ±2	177 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1966	8	60 B	GF/LIW/RS	50 ±4	15 ±3	149 ±3	70 ±3	32 ±2	179 ±4	12 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-SHA-1966	8	60 C	Tuscan	57 ±4	19 ±3	93 ±3	98 ±3	19 ±2	67 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1966	8	60 D	GF/LIW/RS	65 ±6	15 ±4	143 ±4	73 ±3	31 ±2	179 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49
CA-SHA-1966	8	60 E	East Medicine Lake	49 ±4	14 ±3	146 ±3	75 ±3	30 ±2	190 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-SHA-1966	8	67 A	East Medicine Lake	45 ±3	17 ±3	153 ±3	81 ±3	31 ±2	218 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-SHA-1966	8	67 B	South Warners	60 ±4	16 ±3	178 ±3	71 ±3	21 ±2	102 ±3	12 ±2	NM ±NM	NM ±NM	NM ±NM	382 ±13	NM
CA-SHA-1966	8	67 C	Tuscan	74 ±5	18 ±4	107 ±3	104 ±3	19 ±2	66 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1966	8	67 D	GF/LIW/RS	78 ±5	18 ±4	152 ±4	76 ±3	31 ±2	181 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1966	8	67 E	GF/LIW/RS	57 ±4	18 ±3	149 ±3	72 ±3	27 ±2	174 ±4	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-SHA-1966	8	76 A	Tuscan	52 ±3	19 ±3	98 ±3	101 ±3	19 ±2	72 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1966	8	76 B	South Warners	51 ±4	21 ±3	190 ±3	76 ±3	25 ±2	111 ±3	15 ±2	NM ±NM	NM ±NM	NM ±NM	355 ±13	NM
CA-SHA-1966	8	76 C	Tuscan	66 ±3	19 ±3	102 ±3	106 ±3	19 ±2	70 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1966	8	76 D	Tuscan	58 ±4	17 ±3	100 ±3	102 ±3	21 ±2	70 ±3	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1966	8	76 E	Tuscan	60 ±4	19 ±3	92 ±3	84 ±3	19 ±2	66 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1966	96	2	Tuscan	51 ±4	16 ±3	89 ±3	94 ±3	19 ±2	66 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-SHA-1966	98	1 A	GF/LIW/RS	69 ±5	22 ±4	144 ±4	79 ±3	34 ±2	176 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-SHA-1966	98	1 B	Tuscan	75 ±5	22 ±3	111 ±3	113 ±3	66 ±2	71 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	341 A	Tuscan	84 ±5	16 ±3	99 ±3	110 ±3	20 ±2	68 ±3	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	341 B	Tuscan	59 ±4	16 ±3	97 ±3	101 ±3	17 ±2	70 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	341 C	Tuscan	79 ±5	22 ±3	102 ±3	91 ±3	19 ±2	63 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	341 D	Tuscan	87 ±5	16 ±4	100 ±3	99 ±3	17 ±2	68 ±4	3 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations <sup>a</sup>										Ratio Fe/Mn	
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>		Ba
CA-TEH-1528	31	341 E	Tuscan	69 ±4	18 ±3	99 ±3	103 ±3	19 ±2	72 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	351 A	Tuscan	51 ±4	12 ±3	94 ±3	95 ±3	18 ±2	73 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	351 B	Tuscan	65 ±4	21 ±3	99 ±3	107 ±3	19 ±2	73 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	351 C	Kelly Mountain	55 ±4	19 ±3	178 ±3	75 ±3	30 ±2	223 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	77
CA-TEH-1528	31	351 D	Tuscan	65 ±4	22 ±3	111 ±3	93 ±3	22 ±2	76 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	351 E	Tuscan	77 ±4	20 ±3	103 ±3	105 ±3	19 ±2	79 ±3	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	363 A	Tuscan	89 ±5	23 ±3	100 ±3	104 ±3	18 ±32	75 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	363 B	GF/LIW/RS	47 ±4	14 ±3	141 ±3	69 ±3	30 ±2	180 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	51
CA-TEH-1528	31	363 C	Tuscan	73 ±5	15 ±3	97 ±3	102 ±3	20 ±2	69 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	369 A	East Medicine Lake	56 ±3	15 ±3	156 ±3	77 ±3	31 ±2	196 ±3	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	55
CA-TEH-1528	31	369 B	Tuscan	65 ±4	18 ±3	101 ±3	106 ±3	19 ±2	75 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	374 A	Tuscan	83 ±5	21 ±3	106 ±3	111 ±3	18 ±2	74 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	374 B	Tuscan	61 ±3	17 ±3	89 ±3	80 ±3	19 ±2	67 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	380 A	Tuscan	109 ±5	20 ±3	104 ±3	84 ±3	22 ±2	64 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	380 B	Tuscan	71 ±4	18 ±3	98 ±3	103 ±3	20 ±2	70 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	380 C	Tuscan	63 ±4	17 ±3	90 ±3	84 ±3	19 ±2	62 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	536 A	GF/LIW/RS	66 ±4	20 ±3	146 ±3	70 ±3	34 ±2	174 ±4	13 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	53
CA-TEH-1528	31	536 B	Tuscan	70 ±4	16 ±3	101 ±3	112 ±3	20 ±2	75 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	536 C	Tuscan	101 ±4	22 ±3	106 ±3	94 ±3	20 ±2	71 ±3	2 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	536 D	Tuscan	65 ±3	16 ±3	93 ±3	84 ±3	20 ±2	64 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	536 E	GF/LIW/RS	58 ±4	17 ±3	144 ±3	78 ±3	33 ±2	178 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-TEH-1528	31	841 A	GF/LIW/RS	62 ±5	24 ±3	142 ±3	78 ±3	32 ±2	177 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48
CA-TEH-1528	31	841 B	GF/LIW/RS	62 ±5	17 ±4	146 ±4	74 ±3	33 ±2	173 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	48

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio Fe/Mn
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	
CA-TEH-1528	31	841 C	GF/LIW/RS	69 ±5	17 ±4	142 ±3	75 ±3	33 ±2	177 ±4	10 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	52
CA-TEH-1528	31	854 A	Tuscan	60 ±4	19 ±3	101 ±3	86 ±3	20 ±2	71 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	854 B	Tuscan	50 ±3	15 ±3	86 ±3	92 ±3	18 ±2	66 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	931 A	Tuscan	70 ±4	17 ±3	83 ±3	110 ±3	18 ±2	61 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	931 B	Tuscan	67 ±4	16 ±3	89 ±3	95 ±3	19 ±2	66 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	931 D	Tuscan	50 ±4	16 ±3	91 ±3	83 ±3	19 ±2	65 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1528	31	931 E	Tuscan	65 ±4	19 ±3	98 ±3	105 ±3	17 ±2	75 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	75	Tuscan	66 ±4	16 ±3	96 ±3	90 ±3	21 ±2	61 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	193 A	Tuscan	58 ±4	11 ±3	88 ±3	93 ±3	17 ±2	61 ±3	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	193 B	Tuscan	70 ±4	21 ±3	91 ±3	98 ±3	18 ±2	70 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	193 C	Tuscan	68 ±5	20 ±3	116 ±3	106 ±3	15 ±2	74 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	193 D	Tuscan	74 ±4	19 ±3	101 ±3	103 ±3	17 ±2	74 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	193 E	GF/LIW/RS	61 ±4	18 ±3	146 ±3	70 ±3	32 ±2	178 ±4	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	50
CA-TEH-1611	34	215 A	Tuscan	56 ±3	17 ±3	89 ±3	80 ±3	19 ±2	65 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	215 B	Tuscan	48 ±5	18 ±4	93 ±3	80 ±3	15 ±2	65 ±4	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	215 C	Tuscan	72 ±4	19 ±3	103 ±3	108 ±3	18 ±2	74 ±3	8 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	218	Buck Mountain	40 ±4	14 ±3	115 ±3	54 ±3	21 ±2	84 ±3	11 ±2	NM ±NM	NM ±NM	NM ±NM	530 ±13	NM
CA-TEH-1611	34	229 A	Tuscan	50 ±3	15 ±3	83 ±3	88 ±3	17 ±2	67 ±3	9 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	229 B	Tuscan	56 ±4	19 ±3	90 ±3	97 ±3	18 ±2	66 ±3	5 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	234 A	Tuscan	53 ±4	16 ±3	97 ±3	99 ±3	20 ±2	72 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	234 B	Tuscan	60 ±4	16 ±3	98 ±3	100 ±3	19 ±2	70 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	234 C	Tuscan	71 ±5	20 ±3	106 ±3	110 ±3	20 ±2	71 ±4	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	246 A	GF/LIW/RS	63 ±5	19 ±3	135 ±3	77 ±3	34 ±2	174 ±4	11 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	49

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Appendix C.2 Results of California Obsidian Characterization Studies (continued).

Site	Lot	Spec Item	Source	Trace Element Concentrations*											Ratio
				Zn	Ga	Rb	Sr	Y	Zr	Nb	Ti	Mn	Fe <sub>2</sub> O <sub>3</sub>	Ba	Fe/Mn
CA-TEH-1611	34	246 C	Tuscan	53 ±5	15 ±3	95 ±3	82 ±3	19 ±2	69 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	246 D	Tuscan	62 ±4	14 ±3	97 ±3	88 ±3	20 ±2	65 ±3	6 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	250 A	Tuscan	53 ±4	13 ±3	96 ±3	102 ±3	20 ±2	72 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM
CA-TEH-1611	34	250 B	Tuscan	60 ±5	17 ±3	100 ±3	87 ±3	17 ±2	60 ±3	7 ±2	NM ±NM	NM ±NM	NM ±NM	NM ±NM	NM

\*All trace element values in parts per million: ± = pooled estimate (in ppm) of x-ray counting uncertainty and regression fitting error; NA = not available; NM = not measured.

### Appendix C.3 Results of Northwest PEP Obsidian Studies.

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
10-BY-444	134	2	A	EXU (50S/52E)	0.00	-13.00	DEB Unknown A	NVB ±NM	NM ±NM	No visible band
10-BY-444	135	2	A	EXU (50S/52E)	-13.00	-23.00	DEB Obsidian Cliff, Wyoming	1.7 ± 0.1	NM ±NM	—
35-CR-626	3	1	A	SCP 3	0.00	0.00	DEB Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-CR-626	4	1	A	SCU 1	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-CR-626	4	1	B	SCU 1	0.00	0.00	DEB Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-CR-626	4	1	C	SCU 1	0.00	0.00	DEB Newberry Volcano	3.9 ± 0.1	NM ±NM	—
35-CR-626	4	1	D	SCU 1	0.00	0.00	DEB McKay Butte	4.2 ±NM	NM ±NM	—
35-CR-626	4	1	E	SCU 1	0.00	0.00	DEB Quartz Mountain/McKay Butte	3.8 ±NM	NM ±NM	—
35-CR-626	4	1	F	SCU 1	0.00	0.00	DEB McKay Butte	3.6 ± 0.1	NM ±NM	—
35-CR-626	4	1	G	SCU 1	0.00	0.00	DEB Quartz Mountain/McKay Butte	3.2 ± 0.1	NM ±NM	—
35-CR-626	4	1	H	SCU 1	0.00	0.00	DEB Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-CR-626	4	1	I	SCU 1	0.00	0.00	DEB Newberry Volcano	4.3 ±NM	NM ±NM	—
35-CR-626	4	1	J	SCU 1	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-CR-626	5	1	A	SCU 2	0.00	0.00	DEB Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-CR-626	5	1	B	SCU 2	0.00	0.00	DEB Quartz Mountain/McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-CR-626	5	1	C	SCU 2	0.00	0.00	DEB Quartz Mountain/McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-CR-626	5	1	D	SCU 2	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-CR-626	6	1	A	SCU 3	0.00	0.00	DEB Newberry Volcano	3.9 ± 0.1	NM ±NM	—
35-CR-626	6	1	B	SCU 3	0.00	0.00	DEB Newberry Volcano	3.9 ± 0.1	NM ±NM	—
35-CR-626	6	1	C	SCU 3	0.00	0.00	DEB Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-CR-626	6	1	D	SCU 3	0.00	0.00	DEB Newberry Volcano	4.3 ± 0.1	NM ±NM	—
35-CR-626	6	1	E	SCU 3	0.00	0.00	DEB Newberry Volcano	4.1 ±NM	NM ±NM	—
35-CR-626	7	1	A	SCU 4	0.00	0.00	DEB Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-CR-626	7	1	B	SCU 4	0.00	0.00	DEB Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-CR-626	7	1	C	SCU 4	0.00	0.00	DEB Newberry Volcano	3.2 ±NM	3.7 ±NM	2 hydration bands
35-CR-626	7	1	D	SCU 4	0.00	0.00	DEB Newberry Volcano	4.5 ± 0.2	NM ±NM	—
35-CR-626	7	1	E	SCU 4	0.00	0.00	DEB Obsidian Cliffs	4.9 ± 0.1	NM ±NM	—
35-CR-626	7	1	F	SCU 4	0.00	0.00	DEB Newberry Volcano	4.7 ± 0.1	NM ±NM	—
35-CR-626	7	1	G	SCU 4	0.00	0.00	DEB Obsidian Cliffs	4.2 ±NM	NM ±NM	—
35-CR-626	8	1	A	SCU 5	0.00	0.00	DEB Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-CR-626	8	1	B	SCU 5	0.00	0.00	DEB Newberry Volcano	3.8 ± 0.1	NM ±NM	—
35-CR-626	8	1	C	SCU 5	0.00	0.00	DEB Newberry Volcano	3.2 ±NM	NM ±NM	—
35-CR-626	8	1	D	SCU 5	0.00	0.00	DEB Newberry Volcano	3.8 ± 0.1	NM ±NM	—
35-CR-626	8	1	E	SCU 5	0.00	0.00	DEB Newberry Volcano	3.8 ± 0.1	NM ±NM	—
35-CR-626	8	1	F	SCU 5	0.00	0.00	DEB Newberry Volcano	3.2 ± 0.2	NM ±NM	—
35-CR-626	8	1	G	SCU 5	0.00	0.00	DEB Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-CR-626	8	1	H	SCU 5	0.00	0.00	DEB Newberry Volcano	3.6 ±NM	NM ±NM	—
35-CR-626	8	1	I	SCU 5	0.00	0.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-CR-626	8	1	J	SCU 5	0.00	0.00	DEB Newberry Volcano	4.2 ±NM	NM ±NM	—

### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-CR-626	8	1	K	SCU 5	0.00	0.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-CR-626	8	1	L	SCU 5	0.00	0.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-CR-626	9	1	A	SCU 6	0.00	0.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-CR-626	34	1	A	SHP 6	-60.00	-80.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-CR-626	49	1	A	SHP 10	-20.00	-40.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—
35-CR-626	68	1	A	SHP 14	0.00	-20.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-CR-626	69	1	A	SHP 14	-20.00	-40.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-CR-626	78	1	A	SHP 16	0.00	-20.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-CR-626	131	1	A	SON 1	-10.00	-20.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-CR-626	132	1	A	SON 1	-20.00	-30.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-CR-626	132	1	B	SON 1	-20.00	-30.00	DEB	Newberry Volcano	3.1 ± NM	NM ± NM	—
35-CR-626	132	1	C	SON 1	-20.00	-30.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-CR-626	132	1	D	SON 1	-20.00	-30.00	DEB	Newberry Volcano?	3.2 ± NM	NM ± NM	—
35-CR-626	132	1	E	SON 1	-20.00	-30.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-CR-626	133	1	A	SON 1	-30.00	-40.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-CR-626	133	1	B	SON 1	-30.00	-40.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-CR-626	133	1	C	SON 1	-30.00	-40.00	DEB	Newberry Volcano	3.3 ± NM	NM ± NM	—
35-CR-626	133	1	D	SON 1	-30.00	-40.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-CR-626	133	1	E	SON 1	-30.00	-40.00	DEB	Newberry Volcano	3.3 ± 0.2	NM ± NM	—
35-CR-626	133	1	F	SON 1	-30.00	-40.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-CR-626	134	1	—	SON 1	-40.00	-50.00	BIF	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-CR-626	134	2	A	SON 1	-40.00	-50.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-CR-626	134	2	B	SON 1	-40.00	-50.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-CR-626	135	1	A	SON 1	-50.00	-60.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-CR-626	143	1	A	SON 2	-20.00	-30.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ± NM	—
35-CR-626	144	1	A	SON 2	-30.00	-40.00	DEB	Quartz Mountain/McKay Butte	3.3 ± 0.1	NM ± NM	—
35-CR-626	147	1	A	SON 2	-60.00	-70.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-CR-626	155	1	A	TEU 1	0.00	-10.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-CR-626	155	1	B	TEU 1	0.00	-10.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-CR-626	155	1	C	TEU 1	0.00	-10.00	DEB	Newberry Volcano	3.7 ± NM	NM ± NM	—
35-CR-626	157	1	A	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-CR-626	157	1	B	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-CR-626	157	1	C	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-CR-626	157	1	D	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-CR-626	157	3	—	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.7 ± NM	NM ± NM	—
35-CR-626	158	1	A	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-CR-626	158	1	B	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-CR-626	159	1	—	TEU 1	-20.00	-30.00	PPT	Quartz Mountain	3.5 ± 0.1	NM ± NM	—
35-CR-626	159	2	A	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-CR-626	159	2	B	TEU 1	-20.00 -30.00	DEB	Newberry Volcano	3.3 ±NM	NM ±NM	—
35-CR-626	159	2	C	TEU 1	-20.00 -30.00	DEB	Newberry Volcano	3.5 ±NM	NM ±NM	—
35-CR-626	160	1	—	TEU 1	-20.00 -30.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-CR-626	161	1	A	TEU 1	-30.00 -40.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-CR-626	161	1	B	TEU 1	-30.00 -40.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-CR-626	161	1	C	TEU 1	-30.00 -40.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-CR-626	161	1	D	TEU 1	-30.00 -40.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-CR-626	161	1	E	TEU 1	-30.00 -40.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-CR-626	162	1	A	TEU 1	-30.00 -40.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-CR-626	162	1	B	TEU 1	-30.00 -40.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-CR-626	162	1	C	TEU 1	-30.00 -40.00	DEB	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-CR-626	163	1	A	TEU 1	-40.00 -50.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-CR-626	163	1	B	TEU 1	-40.00 -50.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-CR-626	165	1	A	TEU 1	-50.00 -60.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-CR-626	167	1	A	TEU 1	-60.00 -70.00	DEB	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-CR-626	175	1	A	TEU 2	0.00 -10.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-CR-626	176	1	—	TEU 2	0.00 -10.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-CR-626	177	1	A	TEU 2	-10.00 -20.00	DEB	Newberry Volcano	3.5 ± 0.2	NM ±NM	—
35-CR-626	177	1	B	TEU 2	-10.00 -20.00	DEB	Newberry Volcano	2.0 ±NM	NM ±NM	—
35-CR-626	179	1	A	TEU 2	-20.00 -30.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-CR-626	179	1	B	TEU 2	-20.00 -30.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-CR-626	179	1	C	TEU 2	-20.00 -30.00	DEB	Newberry Volcano	3.5 ± 0.2	NM ±NM	—
35-CR-626	181	1	—	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-CR-626	181	2	A	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	3.3 ±NM	NM ±NM	—
35-CR-626	181	2	B	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-CR-626	181	2	C	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-CR-626	187	1	A	TEU 2	-60.00 -70.00	DEB	Quartz Mountain	2.8 ± 0.1	NM ±NM	—
35-CR-626	188	1	A	TEU 2	-60.00 -70.00	DEB	Quartz Mountain/McKay Butte	3.3 ± 0.1	NM ±NM	—
35-CR-627	5	1	A	SCP 5	0.00 0.00	DEB	Unknown A	4.2 ± 0.2	NM ±NM	—
35-CR-627	6	1	—	SCP 6	0.00 0.00	PPT	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-CR-627	8	3	—	SCU 1	0.00 0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-CR-627	106	1	—	TEU 1	-27.00 -27.00	PPT	Obsidian Cliffs	3.2 ±NM	3.1 ±NM	2 OH measurements for reuse check
35-DS-33	1	1	—	SCP 1	0.00 0.00	PPT	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-DS-33	2	1	—	SCP 2	0.00 0.00	BIF	Spodue Mountain	3.6 ± 0.1	NM ±NM	—
35-DS-33	4	1	—	SCP 4	0.00 0.00	PPT	Newberry Volcano	1.7 ±NM	NM ±NM	—
35-DS-33	87	5	—	SHP 20	-20.00 -40.00	UFT	Newberry Volcano	1.9 ± 0.1	3.0 ± 0.1	2 hydration bands
35-DS-33	182	1	A	SHP 43	0.00 -20.00	DEB	Newberry Volcano	4.2 ±NM	NM ±NM	—
35-DS-33	182	1	B	SHP 43	0.00 -20.00	DEB	Newberry Volcano	2.7 ± 0.2	NM ±NM	—
35-DS-33	182	1	C	SHP 43	0.00 -20.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration

C.3-3



Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact	Source/Chemical	Hydration Rims <sup>a</sup>		Comments
										Rim 1	Rim 2	
35-DS-33	182	1	D	SHP 43	0.00	-20.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	182	1	E	SHP 43	0.00	-20.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	183	1	A	SHP 43	-20.00	-40.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered
35-DS-33	183	1	B	SHP 43	-20.00	-40.00	DEB	Newberry	Volcano	3.0 ±NM	NM ±NM	—
35-DS-33	184	1	A	SHP 43	-40.00	-60.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	184	1	B	SHP 43	-40.00	-60.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	210	3	—	SHP 49	-20.00	-40.00	DEB	Newberry	Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	267	1	—	SHP 62	-20.00	-40.00	UFT	Newberry	Volcano	1.3 ± 0.1	NM ±NM	—
35-DS-33	331	1	A	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	2.3 ±NM	NM ±NM	Weathered
35-DS-33	331	1	B	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	1.6 ± 0.1	NM ±NM	—
35-DS-33	331	1	C	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	331	1	D	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	331	1	E	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	331	1	F	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	1.8 ±NM	NM ±NM	—
35-DS-33	331	1	G	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	331	1	H	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	331	1	I	SHP 78	-20.00	-40.00	DEB	Newberry	Volcano	2.1 ± 0.1	NM ±NM	Weathered
35-DS-33	337	1	—	SHP 79	-20.00	-40.00	BIF	Newberry	Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	419	1	—	SHP 101	0.00	-20.00	UFT	Newberry	Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-33	617	3	—	SHP 147	0.00	-20.00	UFT	Newberry	Volcano	1.2 ± 0.1	NM ±NM	—
35-DS-33	628	3	—	SHP 149	0.00	-20.00	DEB	Newberry	Volcano	3.6 ± 0.1	NM ±NM	—
35-DS-33	834	2	A	SHP 196	0.00	-20.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	834	2	B	SHP 196	0.00	-20.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	835	1	A	SHP 196	-20.00	-40.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	835	1	B	SHP 196	-20.00	-40.00	DEB	Newberry	Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	835	1	C	SHP 196	-20.00	-40.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	835	1	D	SHP 196	-20.00	-40.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	836	1	A	SHP 196	-40.00	-60.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	1104	2	A	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	1104	2	B	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	1104	2	C	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	2.0 ± 0.1	NM ±NM	Weathered
35-DS-33	1104	2	D	TEU 1	-10.00	-20.00	DEB	Obsidian	Cliffs	2.0 ±NM	NM ±NM	Weathered
35-DS-33	1104	2	E	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	1.7 ±NM	NM ±NM	Weathered
35-DS-33	1104	2	F	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	1.5 ± 0.2	NM ±NM	—
35-DS-33	1104	2	G	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	1104	2	H	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	1104	2	I	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	1104	2	J	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	3.4 ± 0.2	NM ±NM	Weathered
35-DS-33	1104	2	K	TEU 1	-10.00	-20.00	DEB	Newberry	Volcano	3.1 ± 0.1	NM ±NM	—

C.3-4

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	1105	2	A	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-33	1105	2	B	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	3.0 ± NM	NM ± NM	—
35-DS-33	1105	2	C	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	2.9 ± NM	NM ± NM	Weathered
35-DS-33	1105	2	D	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	1160	3	—	TEU 3	-20.00	-30.00	BIF	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-DS-33	1163	3	—	TEU 3	-30.00	-40.00	UFT	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	1179	3	—	TEU 4	3.00	-10.00	PPT	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	1182	2	A	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ± NM	—
35-DS-33	1182	2	B	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-DS-33	1182	2	C	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	1182	2	D	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	1182	2	E	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	1182	2	F	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	Weathered
35-DS-33	1182	2	G	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	1182	2	H	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-DS-33	1182	2	I	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	1182	3	—	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	1182	4	—	TEU 4	-20.00	-30.00	DEB	Unknown A	DH ± NM	NM ± NM	Diffuse hydration
35-DS-33	1183	2	A	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-DS-33	1183	2	B	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	1183	2	C	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	1183	2	D	TEU 4	-20.00	-30.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	1183	5	—	TEU 4	-20.00	-30.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	1184	4	—	TEU 4	-30.00	-40.00	UFT	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-DS-33	1202	2	A	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	1202	2	B	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	1202	2	C	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.3 ± NM	NM ± NM	—
35-DS-33	1202	2	D	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-DS-33	1202	2	E	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± 0.2	NM ± NM	—
35-DS-33	1202	2	F	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	1202	2	G	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	1202	2	H	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-DS-33	1202	2	I	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	1202	2	J	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.5 ± NM	NM ± NM	—
35-DS-33	1202	2	K	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	1202	2	L	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	1202	2	M	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	1202	3	—	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	1.4 ± 0.1	NM ± NM	—
35-DS-33	1202	4	—	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	2.1 ± NM	NM ± NM	—

C.3-5

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	1202	5	—	TEU 5	-10.00	-20.00	BIF	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-DS-33	1203	3	—	TEU 5	-10.00	-20.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-DS-33	1204	3	—	TEU 5	-20.00	-30.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	1204	4	—	TEU 5	-20.00	-30.00	BIF	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-33	1224	1	A	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	1224	1	B	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	Weathered; Diffuse hydration
35-DS-33	1224	1	C	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	1224	1	D	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	1224	1	E	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	1224	1	F	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	1224	1	G	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-33	1224	1	H	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-DS-33	1224	1	I	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	1224	1	J	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	1224	1	K	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	Weathered
35-DS-33	1224	1	L	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	2.6 ± NM	NM ± NM	—
35-DS-33	1224	1	M	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	1224	1	N	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	1224	1	O	TEU 6	-10.00	-20.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	1224	4	—	TEU 6	-10.00	-20.00	BIF	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	1225	4	—	TEU 6	-20.00	-30.00	UFT	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-DS-33	1225	5	—	TEU 6	-20.00	-30.00	PPT	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	1225	6	—	TEU 6	-20.00	-30.00	PFT	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-DS-33	1226	4	—	TEU 6	-30.00	-40.00	UFT	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-DS-33	1237	1	A	TEU 7	-10.00	-20.00	DEB	Quartz Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	1237	1	B	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-DS-33	1237	1	C	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-33	1237	1	D	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-33	1237	1	E	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-33	1237	1	F	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	Weathered
35-DS-33	1237	1	G	TEU 7	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	2.6 ± 0.1	NM ± NM	—
35-DS-33	1237	1	H	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-33	1237	1	I	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	1238	1	A	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	1238	1	B	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-33	1238	1	C	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	1238	1	D	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± 0.1	NO ± NM	—
35-DS-33	1238	1	E	TEU 7	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	1.8 ± NM	NM ± NM	—
35-DS-33	1238	1	F	TEU 7	-10.00	-20.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—

C.3-6

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	1259	1	—	TEU 7	-120.00 -130.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	1374	2	—	SHP 533 (366S/530E)	-40.00 -60.00	BIF	Newberry Volcano	2.6 ±NM	NM ±NM	—
35-DS-33	1393	1	—	SHP 539 (380S/525E)	-40.00 -60.00	PPT	Unknown X?	1.7 ± 0.1	NM ±NM	Weathered
35-DS-33	1396	2	—	SHP 544 (380S/520E)	-40.00 -60.00	UFT	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	1517	1	—	SHP 588 (441S/530E)	-40.00 -60.00	PPT	Unknown B	2.3 ±NM	NM ±NM	—
35-DS-33	1521	2	—	SHP 590 (451S/530E)	0.00 -20.00	BIF	Newberry Volcano	1.6 ± 0.1	NM ±NM	—
35-DS-33	1533	2	—	SHP 594 (525S/510E)	0.00 -20.00	BIF	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	1695	1	—	SHP 646 (581S/520E)	-20.00 -40.00	BIF	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	1698	2	—	SHP 647 (585S/520E)	-20.00 -40.00	UFT	Newberry Volcano	2.4 ± 0.2	3.5 ± 0.1	2 hydration bands
35-DS-33	1760	4	—	SHP 663 (621S/530E)	-60.00 -80.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	1770	2	—	SHP 666 (635S/530E)	-20.00 -40.00	BIF	Obsidian Cliffs	2.7 ± 0.1	NM ±NM	—
35-DS-33	1796	2	—	SHP 674 (625S/525E)	-40.00 -60.00	BIF	Unknown X?	1.9 ± 0.1	NM ±NM	—
35-DS-33	1799	3	—	SHP 675 (630S/525E)	-20.00 -40.00	UFT	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	1826	2	—	SHP 683 (555S/520E)	-40.00 -60.00	BIF	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	1881	2	—	SHP 704 (620S/495E)	0.00 -20.00	UFT	Newberry Volcano	1.1 ±NM	NM ±NM	—
35-DS-33	1918	2	—	SHP 716 (647S/525E)	0.00 -20.00	BIF	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	1958	2	—	SHP 730 (253S/510E)	-40.00 -60.00	PPT	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-DS-33	1968	2	—	SHP 734 (355S/530E)	0.00 -20.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2007	4	—	STU 201 (647S/485E)	0.00 -10.00	BIF	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-DS-33	2008	3	—	STU 201 (647S/485E)	-10.00 -20.00	BIF	Obsidian Cliffs	1.8 ± 0.1	NM ±NM	—
35-DS-33	2008	4	—	STU 201 (647S/485E)	-10.00 -20.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2010	4	—	STU 203 (647S/486E)	0.00 -10.00	BIF	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2010	5	—	STU 203 (647S/486E)	0.00 -10.00	BIF	Newberry Volcano	VW ±NM	NM ±NM	Weathered; Variable width
35-DS-33	2011	1	—	STU 203 (647S/486E)	-9.00 -9.00	PPT	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-33	2012	4	—	STU 203 (647S/486E)	-10.00 -20.00	UFT	Newberry Volcano	2.8 ±NM	NM ±NM	—
35-DS-33	2041	2	—	EXU (364S/527E)	-8.00 -18.00	BIF	Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-33	2042	3	—	EXU (364S/527E)	-18.00 -28.00	BIF	Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-33	2044	1	A	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	0.9 ± 0.1	NM ±NM	Weathered
35-DS-33	2044	1	B	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2044	1	C	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2044	1	D	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2044	1	E	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	Weathered
35-DS-33	2044	1	F	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2044	1	G	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2045	1	A	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2045	1	B	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2045	1	C	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2045	1	D	EXU (364S/528E)	2.00 -10.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2046	1	A	EXU (364S/528E)	-10.00 -20.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2046	1	B	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2046	1	C	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2046	1	D	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2046	1	E	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	Weathered
35-DS-33	2046	1	F	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2047	1	A	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-DS-33	2047	1	B	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-DS-33	2047	1	C	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	1.5 ± 0.2	NM ±NM	—
35-DS-33	2047	1	D	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2047	1	E	EXU (364S/528E)	-10.00	-20.00	DEB Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2047	2	—	EXU (364S/528E)	-10.00	-20.00	BIF Newberry Volcano	1.2 ±NM	NM ±NM	—
35-DS-33	2048	1	A	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2048	1	B	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	2048	1	C	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2048	1	D	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2048	1	E	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2048	2	—	EXU (364S/528E)	-20.00	-30.00	PPT Silver Lake/Sycan Marsh	3.3 ± 0.1	NM ±NM	—
35-DS-33	2048	3	—	EXU (364S/528E)	-20.00	-30.00	BIF Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2049	1	A	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2049	1	B	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-33	2049	1	C	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-DS-33	2049	1	D	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2049	1	E	EXU (364S/528E)	-20.00	-30.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2050	1	A	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.9 ±NM	NM ±NM	Weathered
35-DS-33	2050	1	B	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2050	1	C	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2050	1	D	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2050	1	E	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2051	1	A	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	1.3 ± 0.1	NM ±NM	Weathered
35-DS-33	2051	1	B	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2051	1	C	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2051	1	D	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2051	1	E	EXU (364S/528E)	-30.00	-40.00	DEB Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2052	1	A	EXU (364S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2052	1	B	EXU (364S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2052	1	C	EXU (364S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2052	1	D	EXU (364S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2052	1	E	EXU (364S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2052	3	—	EXU (364S/528E)	-40.00	-50.00	BIF Newberry Volcano	2.2 ±NM	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2053	1	A	EXU (364S/528E)	-40.00	-50.00	DEB Newberry Volcano	1.7 ± 0.1	NM ±NM	Weathered
35-DS-33	2053	1	B	EXU (364S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2054	1	A	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2054	1	B	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	1.2 ±NM	NM ±NM	Weathered
35-DS-33	2054	1	C	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	1.9 ±NM	NM ±NM	—
35-DS-33	2054	1	D	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2054	1	E	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	Weathered
35-DS-33	2055	1	A	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2055	1	B	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2055	1	C	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-33	2055	1	D	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2055	1	E	EXU (365S/528E)	2.00	-10.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2056	1	A	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2056	1	B	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	2056	1	C	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2056	1	D	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.5 ±NM	NM ±NM	—
35-DS-33	2056	1	E	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2056	1	F	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2056	1	G	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2056	2	—	EXU (365S/528E)	-10.00	-20.00	BIF Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2057	1	A	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	1.9 ±NM	NM ±NM	—
35-DS-33	2057	1	B	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2057	1	C	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2057	1	D	EXU (365S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2058	1	A	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.5 ±NM	NM ±NM	—
35-DS-33	2058	1	B	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2058	1	C	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2058	1	D	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2058	1	E	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	1.8 ±NM	NM ±NM	—
35-DS-33	2058	1	F	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2058	1	G	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2059	1	A	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2059	1	B	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	Weathered
35-DS-33	2059	1	C	EXU (365S/528E)	-20.00	-30.00	DEB Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2060	1	A	EXU (365S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2060	1	B	EXU (365S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ±NM	NM ±NM	—
35-DS-33	2060	1	C	EXU (365S/528E)	-30.00	-40.00	DEB Newberry Volcano	4.5 ± 0.1	NM ±NM	—
35-DS-33	2060	1	D	EXU (365S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2061	1	A	EXU (365S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2061	1	B	EXU (365S/528E)	-30.00	-40.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2062	1	A	EXU (365S/528E)	-30.00	-40.00	DEB	Newberry Volcano	2.2 ± 0.2	NM ± NM	—
35-DS-33	2062	1	B	EXU (365S/528E)	-30.00	-40.00	DEB	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-DS-33	2062	1	C	EXU (365S/528E)	-30.00	-40.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2062	1	D	EXU (365S/528E)	-30.00	-40.00	DEB	Newberry Volcano	3.0 ± NM	NM ± NM	—
35-DS-33	2062	1	E	EXU (365S/528E)	-30.00	-40.00	DEB	Newberry Volcano	2.7 ± NM	NM ± NM	—
35-DS-33	2064	1	A	EXU (365S/528E)	-40.00	-50.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	Weathered
35-DS-33	2064	1	B	EXU (365S/528E)	-40.00	-50.00	DEB	Newberry Volcano?	2.5 ± 0.1	NM ± NM	—
35-DS-33	2064	1	C	EXU (365S/528E)	-40.00	-50.00	DEB	Newberry Volcano	2.1 ± NM	NM ± NM	—
35-DS-33	2064	1	D	EXU (365S/528E)	-40.00	-50.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	2065	1	A	EXU (365S/528E)	-40.00	-50.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2065	1	B	EXU (365S/528E)	-40.00	-50.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	Weathered
35-DS-33	2065	1	C	EXU (365S/528E)	-40.00	-50.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2065	1	D	EXU (365S/528E)	-40.00	-50.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-DS-33	2066	1	A	EXU (366S/529E)	0.00	-10.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-33	2066	1	B	EXU (366S/529E)	0.00	-10.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2066	1	C	EXU (366S/529E)	0.00	-10.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	Weathered
35-DS-33	2066	1	D	EXU (366S/529E)	0.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2066	1	E	EXU (366S/529E)	0.00	-10.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	2067	1	A	EXU (366S/529E)	0.00	-10.00	DEB	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-DS-33	2067	1	B	EXU (366S/529E)	0.00	-10.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2067	1	C	EXU (366S/529E)	0.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-33	2067	2	—	EXU (366S/529E)	0.00	-10.00	PPT	Silver Lake/Sycan Marsh	2.2 ± 0.1	NM ± NM	—
35-DS-33	2069	1	A	EXU (366S/529E)	-10.00	-20.00	DEB	Unknown X?	2.4 ± 0.1	NM ± NM	—
35-DS-33	2069	1	B	EXU (366S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2069	1	C	EXU (366S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	2069	1	D	EXU (366S/529E)	-10.00	-20.00	DEB	Unknown X?	NVB ± NM	NM ± NM	No visible band
35-DS-33	2069	1	E	EXU (366S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-33	2069	1	F	EXU (366S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2069	1	G	EXU (366S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.1 ± NM	NM ± NM	—
35-DS-33	2069	2	—	EXU (366S/529E)	-10.00	-20.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2070	1	A	EXU (366S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-DS-33	2070	1	B	EXU (366S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2071	1	A	EXU (366S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2071	1	B	EXU (366S/529E)	-20.00	-30.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-33	2071	1	C	EXU (366S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-DS-33	2071	1	D	EXU (366S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± NM	NM ± NM	—
35-DS-33	2071	1	E	EXU (366S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2071	1	F	EXU (366S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2072	1	A	EXU (366S/529E)	-20.00	-30.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2072	1	B	EXU (366S/529E)	-20.00	-30.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2072	1	C	EXU (366S/529E)	-20.00	-30.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2072	1	D	EXU (366S/529E)	-20.00	-30.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2072	1	E	EXU (366S/529E)	-20.00	-30.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	Weathered
35-DS-33	2072	1	F	EXU (366S/529E)	-20.00	-30.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2073	1	A	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2073	1	B	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2073	1	C	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2073	1	D	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.7 ±NM	NM ±NM	Weathered
35-DS-33	2073	1	E	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2073	1	F	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.6 ±NM	NM ±NM	—
35-DS-33	2073	1	G	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2074	1	A	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ±NM	NM ±NM	—
35-DS-33	2074	1	B	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2074	1	C	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2074	1	D	EXU (366S/529E)	-30.00	-40.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2083	1	—	EXU (367S/529E)	-37.00	-37.00	BIF Newberry Volcano	2.2 ±NM	NM ±NM	—
35-DS-33	2084	2	—	EXU (367S/529E)	-40.00	-50.00	BIF Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2093	2	—	EXU (367S/528E)	0.00	-10.00	PPT Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2097	2	—	EXU (450S/529E)	4.00	-11.00	PFT Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2101	2	—	EXU (450S/529E)	-21.00	-31.00	PFT Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	2107	1	A	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	3.5 ± 0.1	NM ±NM	Weathered
35-DS-33	2107	1	B	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2107	1	C	EXU (451S/520E)	1.00	-10.00	DEB Obsidian Cliffs	1.5 ±NM	NM ±NM	—
35-DS-33	2107	1	D	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2107	1	E	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2107	1	F	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2107	1	G	EXU (451S/520E)	1.00	-10.00	DEB McKay Butte	2.3 ± 0.1	NM ±NM	—
35-DS-33	2107	1	H	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2107	3	—	EXU (451S/520E)	1.00	-10.00	BIF Big Obsidian Flow	1.7 ± 0.1	NM ±NM	—
35-DS-33	2108	1	A	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-DS-33	2108	1	B	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2108	1	C	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2108	1	D	EXU (451S/520E)	1.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2109	1	A	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-DS-33	2109	1	B	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-33	2109	1	C	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	2.8 ±NM	NM ±NM	—
35-DS-33	2109	1	D	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—



Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2109	1	E	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	1.6 ± 0.1	NM ±NM	—
35-DS-33	2109	3	—	EXU (451S/520E)	-10.00	-20.00	UFT Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2110	1	A	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-33	2110	1	B	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	2.8 ± 0.4	NM ±NM	—
35-DS-33	2110	1	C	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2110	1	D	EXU (451S/520E)	-10.00	-20.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2111	1	A	EXU (451S/520E)	-20.00	-30.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2111	1	B	EXU (451S/520E)	-20.00	-30.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-33	2111	1	C	EXU (451S/520E)	-20.00	-30.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2111	1	E	EXU (451S/520E)	-20.00	-30.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2111	1	F	EXU (451S/520E)	-20.00	-30.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2111	3	—	EXU (451S/520E)	-20.00	-30.00	BIF Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-DS-33	2112	1	A	EXU (451S/520E)	-20.00	-30.00	DEB Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-33	2112	1	B	EXU (451S/520E)	-20.00	-30.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2112	1	C	EXU (451S/520E)	-20.00	-30.00	DEB Newberry Volcano	2.1 ± 0.1	NM ±NM	Weathered
35-DS-33	2113	1	A	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2113	1	B	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2113	1	C	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	2.9 ±NM	NM ±NM	—
35-DS-33	2113	1	D	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	2.9 ±NM	NM ±NM	—
35-DS-33	2113	1	E	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-33	2113	1	F	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-DS-33	2114	1	A	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2114	1	B	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2114	1	C	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2114	1	D	EXU (451S/520E)	-30.00	-40.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2115	1	A	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2115	1	B	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2115	1	C	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2115	1	D	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	3.6 ± 0.2	NM ±NM	—
35-DS-33	2115	1	E	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2115	1	F	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-DS-33	2115	1	G	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2115	1	H	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	2.7 ±NM	NM ±NM	—
35-DS-33	2115	1	I	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	2.9 ± 0.2	NM ±NM	—
35-DS-33	2115	1	J	EXU (451S/520E)	-40.00	-50.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-33	2117	1	A	EXU (453S/524E)	0.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2117	1	B	EXU (453S/524E)	0.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-33	2117	1	C	EXU (453S/524E)	0.00	-10.00	DEB Newberry Volcano	0.9 ± 0.1	NM ±NM	Weathered
35-DS-33	2117	1	D	EXU (453S/524E)	0.00	-10.00	DEB Newberry Volcano	1.5 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2117	1	E	EXU (453S/524E)	0.00 -10.00	DEB	Newberry	Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2117	1	F	EXU (453S/524E)	0.00 -10.00	DEB	Newberry	Volcano	1.2 ±NM	NM ±NM	—
35-DS-33	2117	1	G	EXU (453S/524E)	0.00 -10.00	DEB	Newberry	Volcano	1.5 ± 0.1	NM ±NM	—
35-DS-33	2117	1	H	EXU (453S/524E)	0.00 -10.00	DEB	Newberry	Volcano	1.6 ± 0.1	NM ±NM	—
35-DS-33	2117	1	I	EXU (453S/524E)	0.00 -10.00	DEB	Newberry	Volcano	3.5 ± 0.1	NM ±NM	—
35-DS-33	2117	1	J	EXU (453S/524E)	0.00 -10.00	DEB	Newberry	Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2118	1	A	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2118	1	B	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2118	1	C	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-33	2118	1	D	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2118	1	E	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2118	1	F	EXU (453S/524E)	-10.00 -20.00	DEB	Obsidian	Cliffs	1.8 ±NM	NM ±NM	—
35-DS-33	2118	1	G	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2118	1	H	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	1.7 ±NM	NM ±NM	—
35-DS-33	2118	1	I	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2118	1	J	EXU (453S/524E)	-10.00 -20.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2119	1	A	EXU (453S/524E)	-20.00 -30.00	DEB	Obsidian	Cliffs	2.5 ± 0.1	NM ±NM	—
35-DS-33	2119	1	B	EXU (453S/524E)	-20.00 -30.00	DEB	Newberry	Volcano	1.5 ± 0.1	NM ±NM	—
35-DS-33	2119	1	C	EXU (453S/524E)	-20.00 -30.00	DEB	Newberry	Volcano	2.5 ±NM	NM ±NM	—
35-DS-33	2119	1	D	EXU (453S/524E)	-20.00 -30.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2119	1	E	EXU (453S/524E)	-20.00 -30.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2119	1	F	EXU (453S/524E)	-20.00 -30.00	DEB	Newberry	Volcano	1.7 ±NM	NM ±NM	—
35-DS-33	2119	1	G	EXU (453S/524E)	-20.00 -30.00	DEB	Obsidian	Cliffs	2.2 ± 0.1	NM ±NM	—
35-DS-33	2119	1	H	EXU (453S/524E)	-20.00 -30.00	DEB	Newberry	Volcano?	1.8 ±NM	NM ±NM	—
35-DS-33	2119	1	I	EXU (453S/524E)	-20.00 -30.00	DEB	Newberry	Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2119	1	J	EXU (453S/524E)	-20.00 -30.00	DEB	Obsidian	Cliffs	2.7 ± 0.1	NM ±NM	—
35-DS-33	2119	2	—	EXU (453S/524E)	-20.00 -30.00	BIF	Newberry	Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2120	1	A	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	2.2 ±NM	NM ±NM	—
35-DS-33	2120	1	B	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2120	1	C	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	1.9 ±NM	NM ±NM	Weathered
35-DS-33	2120	1	D	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2120	1	E	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2120	1	F	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2120	1	G	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	2.4 ± 0.2	NM ±NM	—
35-DS-33	2120	1	H	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2120	1	I	EXU (453S/524E)	-30.00 -40.00	DEB	Newberry	Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2120	1	J	EXU (453S/524E)	-30.00 -40.00	DEB	Obsidian	Cliffs	2.5 ± 0.1	NM ±NM	—
35-DS-33	2120	1	K	EXU (453S/524E)	-30.00 -40.00	DEB	Obsidian	Cliffs	2.8 ± 0.1	NM ±NM	—
35-DS-33	2120	1	L	EXU (453S/524E)	-30.00 -40.00	DEB	Obsidian	Cliffs	1.4 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2120	1	M	EXU (453S/524E)	-30.00	-40.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	Weathered
35-DS-33	2120	2	—	EXU (453S/524E)	-30.00	-40.00	BIF	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2120	3	—	EXU (453S/524E)	-30.00	-40.00	PPT	Juniper Spring I	1.5 ± 0.1	NM ± NM	—
35-DS-33	2121	1	A	EXU (453S/524E)	-40.00	-50.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2121	1	B	EXU (453S/524E)	-40.00	-50.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-DS-33	2121	1	C	EXU (453S/524E)	-40.00	-50.00	DEB	Obsidian Cliffs	2.5 ± 0.1	NM ± NM	—
35-DS-33	2121	1	D	EXU (453S/524E)	-40.00	-50.00	DEB	Newberry Volcano	1.5 ± NM	NM ± NM	—
35-DS-33	2121	1	E	EXU (453S/524E)	-40.00	-50.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-33	2121	1	F	EXU (453S/524E)	-40.00	-50.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-33	2129	3	—	EXU (454S/524E)	-30.00	-40.00	UFT	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2129	4	—	EXU (454S/524E)	-30.00	-40.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	2129	5	—	EXU (454S/524E)	-30.00	-40.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2144	2	—	EXU (535S/529E)	0.00	-10.00	BIF	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-33	2154	2	—	EXU (366S/528E)	-18.00	-28.00	BIF	Obsidian Cliffs	2.1 ± 0.2	NM ± NM	—
35-DS-33	2155	1	—	EXU (366S/528E)	-26.00	-26.00	PPT	Obsidian Cliffs	1.7 ± 0.1	NM ± NM	—
35-DS-33	2174	2	—	EXU (536S/528E)	-30.00	-40.00	BIF	Newberry Volcano	1.7 ± 0.1	NM ± NM	—
35-DS-33	2176	1	A	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2176	1	B	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2176	1	C	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2176	1	D	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2176	1	E	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2176	1	F	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2177	1	A	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ± NM	Weathered
35-DS-33	2177	1	B	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2177	1	C	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	1.0 ± NM	NM ± NM	Weathered
35-DS-33	2177	1	D	EXU (536S/529E)	5.00	-10.00	DEB	Newberry Volcano	1.0 ± 0.1	NM ± NM	Weathered
35-DS-33	2178	1	A	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-33	2178	1	B	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.4 ± 0.1	NM ± NM	—
35-DS-33	2178	1	C	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-33	2178	1	D	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2178	1	E	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	3.7 ± NM	NM ± NM	—
35-DS-33	2178	1	F	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± NM	NM ± NM	—
35-DS-33	2178	2	—	EXU (536S/529E)	-10.00	-20.00	BIF	Newberry Volcano	1.2 ± 0.1	NM ± NM	—
35-DS-33	2178	3	—	EXU (536S/529E)	-10.00	-20.00	PPT	Newberry Volcano	1.0 ± 0.1	NM ± NM	Weathered
35-DS-33	2179	1	A	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2179	1	B	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	—
35-DS-33	2179	1	C	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.7 ± NM	NM ± NM	—
35-DS-33	2179	1	D	EXU (536S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-DS-33	2180	1	A	EXU (536S/529E)	-20.00	-30.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2180	1	B	EXU (536S/529E)	-20.00 -30.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2180	1	C	EXU (536S/529E)	-20.00 -30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2180	1	D	EXU (536S/529E)	-20.00 -30.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2180	1	E	EXU (536S/529E)	-20.00 -30.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2180	1	F	EXU (536S/529E)	-20.00 -30.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2180	2	—	EXU (536S/529E)	-20.00 -30.00	BIF	Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	2181	1	A	EXU (536S/529E)	-20.00 -30.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2181	1	B	EXU (536S/529E)	-20.00 -30.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-DS-33	2181	1	C	EXU (536S/529E)	-20.00 -30.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2181	1	D	EXU (536S/529E)	-20.00 -30.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-33	2182	1	A	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-33	2182	1	B	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2182	1	C	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2182	1	D	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2182	1	E	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	VW ±NM	NM ±NM	Weathered; Variable width
35-DS-33	2183	1	A	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2183	1	B	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2183	1	C	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2183	1	D	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	Weathered
35-DS-33	2183	1	E	EXU (536S/529E)	-30.00 -40.00	DEB	Newberry Volcano	2.1 ±NM	NM ±NM	—
35-DS-33	2184	3	—	EXU (537S/528E)	4.00 -10.00	PPT	Newberry Volcano	1.1 ± 0.1	NM ±NM	—
35-DS-33	2186	3	—	EXU (537S/528E)	-20.00 -30.00	PPT	Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2188	1	A	EXU (537S/529E)	2.00 -10.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2188	1	B	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2188	1	C	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2188	1	D	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2188	1	E	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2188	1	F	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2188	1	G	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2188	1	H	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	1.1 ± 0.1	NM ±NM	Weathered
35-DS-33	2188	1	I	EXU (537S/529E)	2.00 -10.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2188	1	J	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	1.1 ± 0.1	NM ±NM	—
35-DS-33	2188	1	K	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano?	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2188	1	L	EXU (537S/529E)	2.00 -10.00	DEB	Newberry Volcano	2.7 ± 0.2	NM ±NM	—
35-DS-33	2189	1	A	EXU (537S/529E)	-10.00 -20.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2189	1	B	EXU (537S/529E)	-10.00 -20.00	DEB	Newberry Volcano	0.8 ±NM	NM ±NM	—
35-DS-33	2189	1	C	EXU (537S/529E)	-10.00 -20.00	DEB	Newberry Volcano	0.8 ± 0.1	NM ±NM	—
35-DS-33	2189	1	D	EXU (537S/529E)	-10.00 -20.00	DEB	Newberry Volcano	0.8 ±NM	NM ±NM	Weathered
35-DS-33	2189	1	E	EXU (537S/529E)	-10.00 -20.00	DEB	Newberry Volcano	0.9 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2189	1	F	EXU (537S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2189	1	G	EXU (537S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-DS-33	2189	1	H	EXU (537S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	Weathered
35-DS-33	2189	1	I	EXU (537S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-DS-33	2189	4	—	EXU (537S/529E)	-10.00	-20.00	DEB	Newberry Volcano/Unknown X	1.5 ± 0.1	NM ±NM	—
35-DS-33	2189	5	—	EXU (537S/529E)	-10.00	-20.00	UFT	Newberry Volcano?	1.7 ± 0.1	NM ±NM	—
35-DS-33	2189	6	—	EXU (537S/529E)	-10.00	-20.00	BIF	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2189	7	—	EXU (537S/529E)	-10.00	-20.00	UFT	Brooks Canyon?	2.3 ±NM	NM ±NM	—
35-DS-33	2189	8	—	EXU (537S/529E)	-10.00	-20.00	PPT	Newberry Volcano	1.5 ±NM	NM ±NM	—
35-DS-33	2190	1	A	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2190	1	B	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2190	1	C	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-DS-33	2190	1	D	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	1.2 ± 0.1	NM ±NM	—
35-DS-33	2190	1	E	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-DS-33	2190	1	F	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2190	1	G	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2190	1	H	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2190	1	I	EXU (537S/529E)	-20.00	-30.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-DS-33	2191	1	A	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2191	1	B	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2191	1	C	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2191	1	D	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano	1.2 ± 0.1	NM ±NM	—
35-DS-33	2191	1	E	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2191	1	F	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano?	2.4 ±NM	NM ±NM	—
35-DS-33	2191	1	G	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	Weathered
35-DS-33	2191	1	H	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2192	1	A	EXU (537S/529E)	-30.00	-40.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-DS-33	2194	1	A	EXU (537S/529E)	-40.00	-50.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ±NM	Weathered
35-DS-33	2194	1	B	EXU (537S/529E)	-40.00	-50.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2194	1	C	EXU (537S/529E)	-40.00	-50.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-DS-33	2194	1	D	EXU (537S/529E)	-40.00	-50.00	DEB	Newberry Volcano	2.2 ± 0.2	NM ±NM	—
35-DS-33	2194	1	E	EXU (537S/529E)	-40.00	-50.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2202	2	—	EXU (561S/529E)	5.00	-10.00	BIF	Newberry Volcano	1.6 ± 0.1	NM ±NM	—
35-DS-33	2206	1	—	EXU (561S/529E)	-40.00	-40.00	UFT	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-DS-33	2208	1	A	EXU (594S/516E)	2.00	-10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2208	1	B	EXU (594S/516E)	2.00	-10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2208	1	C	EXU (594S/516E)	2.00	-10.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2208	1	D	EXU (594S/516E)	2.00	-10.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	Weathered
35-DS-33	2208	1	E	EXU (594S/516E)	2.00	-10.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2208	1	F	EXU (594S/516E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2209	1	A	EXU (594S/516E)	2.00 -10.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2209	1	B	EXU (594S/516E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2209	1	C	EXU (594S/516E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2209	1	D	EXU (594S/516E)	2.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	—
35-DS-33	2209	1	E	EXU (594S/516E)	2.00 -10.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-DS-33	2210	1	A	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	1.6 ±NM	NM ±NM	—
35-DS-33	2210	1	B	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2210	1	C	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2210	1	D	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-DS-33	2210	1	E	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-DS-33	2211	1	A	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-33	2211	1	B	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	Weathered
35-DS-33	2211	1	C	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2211	1	D	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-DS-33	2211	1	E	EXU (594S/516E)	-10.00 -20.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-DS-33	2212	1	A	EXU (594S/516E)	-20.00 -30.00	DEB	Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2212	1	B	EXU (594S/516E)	-20.00 -30.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2212	1	C	EXU (594S/516E)	-20.00 -30.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2212	1	D	EXU (594S/516E)	-20.00 -30.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ±NM	—
35-DS-33	2212	1	E	EXU (594S/516E)	-20.00 -30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2213	2	—	EXU (594S/516E)	-20.00 -30.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-DS-33	2214	1	A	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2214	1	B	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	2.3 ±NM	NM ±NM	Weathered
35-DS-33	2214	1	C	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	1.7 ±NM	NM ±NM	—
35-DS-33	2214	1	D	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	Weathered
35-DS-33	2214	1	E	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2214	1	F	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2214	1	G	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—
35-DS-33	2214	1	H	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	2.7 ±NM	NM ±NM	—
35-DS-33	2214	1	I	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-DS-33	2214	1	J	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-DS-33	2215	1	A	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2215	1	B	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2215	1	C	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2215	1	D	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2215	1	E	EXU (594S/516E)	-30.00 -40.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	Weathered
35-DS-33	2216	1	A	EXU (594S/516E)	-40.00 -50.00	DEB	Obsidian Cliffs	4.1 ± 0.1	NM ±NM	—
35-DS-33	2216	1	B	EXU (594S/516E)	-40.00 -50.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2216	1	C	EXU (594S/516E)	-40.00 -50.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	2216	1	D	EXU (594S/516E)	-40.00 -50.00	DEB	Newberry Volcano	3.0 ± NM	NM ± NM	—
35-DS-33	2216	1	E	EXU (594S/516E)	-40.00 -50.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-DS-33	2217	1	A	EXU (594S/516E)	-40.00 -50.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-DS-33	2217	1	B	EXU (594S/516E)	-40.00 -50.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-33	2217	1	C	EXU (594S/516E)	-40.00 -50.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2217	1	D	EXU (594S/516E)	-40.00 -50.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-33	2221	3	—	EXU (594S/517E)	-30.00 -40.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-DS-33	2222	2	—	EXU (594S/517E)	-40.00 -50.00	BIF	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-33	2223	2	—	EXU (611S/529E)	0.00 -11.00	BIF	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	2227	3	—	EXU (611S/529E)	-21.00 -31.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2234	2	—	EXU (615S/523E)	-8.00 -18.00	UFT	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	2241	2	—	EXU (616S/525E)	-14.00 -24.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2244	2	—	EXU (616S/525E)	-34.00 -44.00	PPT	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	2247	1	A	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	2247	1	B	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2247	1	C	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2247	1	D	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2247	1	E	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano?	2.5 ± NM	NM ± NM	—
35-DS-33	2247	1	F	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	—
35-DS-33	2247	1	G	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano/Unknown X?	2.4 ± NM	NM ± NM	—
35-DS-33	2247	1	H	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	2247	1	I	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	2247	1	J	EXU (617S/528E)	5.00 -11.00	DEB	Newberry Volcano/Unknown X?	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2248	1	A	EXU (617S/528E)	-11.00 -21.00	DEB	Newberry Volcano/Unknown X?	2.3 ± NM	NM ± NM	—
35-DS-33	2248	1	B	EXU (617S/528E)	-11.00 -21.00	DEB	McKay Butte	DH ± NM	NM ± NM	—
35-DS-33	2248	1	C	EXU (617S/528E)	-11.00 -21.00	DEB	McKay Butte	DH ± NM	NM ± NM	—
35-DS-33	2248	1	D	EXU (617S/528E)	-11.00 -21.00	DEB	McKay Butte	DH ± NM	NM ± NM	—
35-DS-33	2248	1	E	EXU (617S/528E)	-11.00 -21.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	—
35-DS-33	2248	1	F	EXU (617S/528E)	-11.00 -21.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	2248	1	G	EXU (617S/528E)	-11.00 -21.00	DEB	Obsidian Cliffs	1.8 ± NM	NM ± NM	—
35-DS-33	2248	1	H	EXU (617S/528E)	-11.00 -21.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2248	1	I	EXU (617S/528E)	-11.00 -21.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2248	1	J	EXU (617S/528E)	-11.00 -21.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2248	1	K	EXU (617S/528E)	-11.00 -21.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	2248	5	—	EXU (617S/528E)	-11.00 -21.00	UFT	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2248	6	—	EXU (617S/528E)	-11.00 -21.00	UFT	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	2248	7	—	EXU (617S/528E)	-11.00 -21.00	UFT	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2248	8	—	EXU (617S/528E)	-11.00 -21.00	BIF	Newberry Volcano	1.9 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-DS-33	2248	9	—	EXU (617S/528E)	-11.00	-21.00	PPT	Obsidian Cliffs	2.4 ±NM	NM ±NM	—
35-DS-33	2249	1	A	EXU (617S/528E)	-21.00	-31.00	DEB	McKay Butte	3.8 ± 0.1	NM ±NM	—
35-DS-33	2249	1	B	EXU (617S/528E)	-21.00	-31.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2249	1	C	EXU (617S/528E)	-21.00	-31.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2249	1	D	EXU (617S/528E)	-21.00	-31.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2249	1	E	EXU (617S/528E)	-21.00	-31.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-33	2249	1	F	EXU (617S/528E)	-21.00	-31.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	2249	1	G	EXU (617S/528E)	-21.00	-31.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2249	1	H	EXU (617S/528E)	-21.00	-31.00	DEB	Big Obsidian Flow	1.6 ± 0.1	NM ±NM	Weathered
35-DS-33	2249	1	I	EXU (617S/528E)	-21.00	-31.00	DEB	McKay Butte	NVB ±NM	NM ±NM	No visible band
35-DS-33	2249	1	J	EXU (617S/528E)	-21.00	-31.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2249	6	—	EXU (617S/528E)	-21.00	-31.00	PPT	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2250	1	A	EXU (617S/528E)	-31.00	-41.00	DEB	McKay Butte	NVB ±NM	NM ±NM	No visible band
35-DS-33	2250	1	B	EXU (617S/528E)	-31.00	-41.00	DEB	Newberry Volcano	2.8 ±NM	NM ±NM	—
35-DS-33	2250	1	C	EXU (617S/528E)	-31.00	-41.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-DS-33	2250	1	D	EXU (617S/528E)	-31.00	-41.00	DEB	Newberry Volcano	VW ±NM	NM ±NM	Weathered; Variable width
35-DS-33	2250	1	E	EXU (617S/528E)	-31.00	-41.00	DEB	Newberry Volcano	VW ±NM	NM ±NM	Weathered; Variable width
35-DS-33	2250	1	F	EXU (617S/528E)	-31.00	-41.00	DEB	Newberry Volcano	3.1 ±NM	NM ±NM	—
35-DS-33	2250	1	G	EXU (617S/528E)	-31.00	-41.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2250	1	H	EXU (617S/528E)	-31.00	-41.00	DEB	McKay Butte	4.3 ± 0.1	NM ±NM	—
35-DS-33	2250	1	I	EXU (617S/528E)	-31.00	-41.00	DEB	Newberry Volcano	2.2 ±NM	NM ±NM	—
35-DS-33	2250	1	J	EXU (617S/528E)	-31.00	-41.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2251	1	A	EXU (617S/528E)	-41.00	-51.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2251	1	B	EXU (617S/528E)	-41.00	-51.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2251	1	C	EXU (617S/528E)	-41.00	-51.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2251	1	D	EXU (617S/528E)	-41.00	-51.00	DEB	McKay Butte	NVB ±NM	NM ±NM	No visible band
35-DS-33	2251	1	E	EXU (617S/528E)	-41.00	-51.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2251	1	F	EXU (617S/528E)	-41.00	-51.00	DEB	McKay Butte	4.4 ± 0.1	NM ±NM	Weathered
35-DS-33	2251	1	G	EXU (617S/528E)	-41.00	-51.00	DEB	Newberry Volcano/Unknown X?	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2251	1	H	EXU (617S/528E)	-41.00	-51.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-DS-33	2251	1	I	EXU (617S/528E)	-41.00	-51.00	DEB	Newberry Volcano	2.5 ± 0.2	NM ±NM	—
35-DS-33	2252	3	—	EXU (617S/529E)	2.00	-6.00	BIF	Newberry Volcano/Unknown X?	2.4 ±NM	NM ±NM	—
35-DS-33	2256	1	—	EXU (617S/529E)	-8.00	-8.00	BIF	Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-DS-33	2265	1	A	EXU (618S/528E)	-30.00	-40.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-DS-33	2265	1	B	EXU (618S/528E)	-30.00	-40.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2265	1	C	EXU (618S/528E)	-30.00	-40.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2265	1	D	EXU (618S/528E)	-30.00	-40.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-33	2265	1	E	EXU (618S/528E)	-30.00	-40.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2265	1	F	EXU (618S/528E)	-30.00	-40.00	DEB	Newberry Volcano	2.2 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2265	1	G	EXU (618S/528E)	-30.00	-40.00	DEB Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-DS-33	2265	1	H	EXU (618S/528E)	-30.00	-40.00	DEB Newberry Volcano	1.9 ±NM	NM ±NM	—
35-DS-33	2265	1	I	EXU (618S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2266	1	—	EXU (618S/528E)	-36.00	-36.00	PPT Silver Lake/Sycan Marsh	2.9 ± 0.1	NM ±NM	—
35-DS-33	2268	1	A	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2268	1	B	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2268	1	C	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2268	1	D	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2268	1	E	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2268	1	F	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2268	1	G	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2268	1	H	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2268	1	I	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	1.6 ±NM	NM ±NM	—
35-DS-33	2268	1	J	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	1.3 ± 0.1	NM ±NM	Weathered
35-DS-33	2268	1	K	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	2.3 ±NM	NM ±NM	Weathered
35-DS-33	2268	1	L	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	2268	1	M	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2268	1	N	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2268	1	O	EXU (618S/528E)	0.00	-10.00	DEB Big Obsidian Flow	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2268	1	P	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2268	1	Q	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	3.2 ± 0.1	NM ±NM	Weathered
35-DS-33	2268	1	R	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	1.3 ± 0.1	NM ±NM	Weathered
35-DS-33	2268	1	S	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	1.1 ±NM	NM ±NM	—
35-DS-33	2268	1	T	EXU (618S/528E)	0.00	-10.00	DEB Newberry Volcano	3.0 ±NM	NM ±NM	—
35-DS-33	2268	4	—	EXU (618S/528E)	0.00	-10.00	BIF Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2268	5	—	EXU (618S/528E)	0.00	-10.00	UFT Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2268	6	—	EXU (618S/528E)	0.00	-10.00	UFT Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2268	8	—	EXU (618S/528E)	0.00	-10.00	PPT Obsidian Cliffs	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2269	1	A	EXU (618S/528E)	-10.00	-20.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2269	1	B	EXU (618S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2269	1	C	EXU (618S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2269	1	D	EXU (618S/528E)	-10.00	-20.00	DEB Big Obsidian Flow	1.5 ± 0.1	NM ±NM	—
35-DS-33	2269	1	E	EXU (618S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.1 ±NM	NM ±NM	Weathered
35-DS-33	2269	1	F	EXU (618S/528E)	-10.00	-20.00	DEB Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-DS-33	2269	1	G	EXU (618S/528E)	-10.00	-20.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2269	1	H	EXU (618S/528E)	-10.00	-20.00	DEB Newberry Volcano	1.9 ±NM	NM ±NM	—
35-DS-33	2270	1	A	EXU (618S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2270	1	B	EXU (618S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2270	1	C	EXU (618S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2270	1	D	EXU (618S/528E)	-20.00 -30.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-DS-33	2270	1	E	EXU (618S/528E)	-20.00 -30.00	DEB	Newberry Volcano	2.6 ± NM	NM ± NM	—
35-DS-33	2270	1	F	EXU (618S/528E)	-20.00 -30.00	DEB	Newberry Volcano	2.6 ± NM	NM ± NM	—
35-DS-33	2270	1	G	EXU (618S/528E)	-20.00 -30.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	2270	1	H	EXU (618S/528E)	-20.00 -30.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2270	5	—	EXU (618S/528E)	-20.00 -30.00	BIF	Quartz Mountain	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	2270	6	—	EXU (618S/528E)	-20.00 -30.00	PPT	Obsidian Cliffs	1.6 ± 0.1	NM ± NM	Weathered
35-DS-33	2271	1	—	EXU (618S/528E)	-30.00 -30.00	BIF	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-DS-33	2272	1	A	EXU (618S/528E)	-40.00 -50.00	DEB	Newberry Volcano/Unknown X?	2.7 ± 0.1	NM ± NM	—
35-DS-33	2272	1	B	EXU (618S/528E)	-40.00 -50.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2272	1	C	EXU (618S/528E)	-40.00 -50.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	2272	1	D	EXU (618S/528E)	-40.00 -50.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	2272	1	E	EXU (618S/528E)	-40.00 -50.00	DEB	Newberry Volcano	2.8 ± NM	NM ± NM	—
35-DS-33	2272	1	F	EXU (618S/528E)	-40.00 -50.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-DS-33	2272	1	G	EXU (618S/528E)	-40.00 -50.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-33	2272	1	H	EXU (618S/528E)	-40.00 -50.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-DS-33	2272	3	—	EXU (618S/528E)	-40.00 -50.00	UFT	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	2273	1	A	EXU (618S/528E)	-50.00 -60.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	Weathered
35-DS-33	2273	1	B	EXU (618S/528E)	-50.00 -60.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2273	1	C	EXU (618S/528E)	-50.00 -60.00	DEB	Big Obsidian Flow	1.3 ± 0.1	NM ± NM	—
35-DS-33	2273	1	D	EXU (618S/528E)	-50.00 -60.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	2273	1	E	EXU (618S/528E)	-50.00 -60.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-DS-33	2273	1	F	EXU (618S/528E)	-50.00 -60.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-33	2273	1	G	EXU (618S/528E)	-50.00 -60.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	Weathered
35-DS-33	2273	1	H	EXU (618S/528E)	-50.00 -60.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-DS-33	2275	1	A	EXU (618S/528E)	-60.00 -70.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-33	2275	1	B	EXU (618S/528E)	-60.00 -70.00	DEB	Newberry Volcano	3.2 ± 0.2	NM ± NM	—
35-DS-33	2275	1	C	EXU (618S/528E)	-60.00 -70.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	Weathered
35-DS-33	2275	1	D	EXU (618S/528E)	-60.00 -70.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-33	2276	1	A	EXU (618S/528E)	-60.00 -70.00	DEB	Newberry Volcano	3.3 ± 0.2	NM ± NM	—
35-DS-33	2277	2	—	EXU (618S/529E)	0.00 -10.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2281	3	—	EXU (618S/529E)	-20.00 -30.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	—
35-DS-33	2281	4	—	EXU (618S/529E)	-20.00 -30.00	BIF	Quartz Mountain	2.1 ± 0.1	NM ± NM	—
35-DS-33	2282	5	—	EXU (618S/529E)	-20.00 -30.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Weathered
35-DS-33	2297	1	A	EXU (619S/529E)	0.00 -10.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	—
35-DS-33	2297	1	B	EXU (619S/529E)	0.00 -10.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	Weathered
35-DS-33	2297	1	C	EXU (619S/529E)	0.00 -10.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	—
35-DS-33	2297	1	D	EXU (619S/529E)	0.00 -10.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ± NM	—
35-DS-33	2297	1	E	EXU (619S/529E)	0.00 -10.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	Weathered

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2298	1	A	EXU (619S/529E)	0.00	-10.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-33	2298	1	B	EXU (619S/529E)	0.00	-10.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	Weathered
35-DS-33	2298	1	C	EXU (619S/529E)	0.00	-10.00	DEB	Big Obsidian Flow	1.5 ± 0.1	NM ± NM	—
35-DS-33	2298	1	D	EXU (619S/529E)	0.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2298	1	E	EXU (619S/529E)	0.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2299	1	A	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-33	2299	1	B	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	2299	1	C	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.1 ± 0.2	NM ± NM	—
35-DS-33	2299	1	D	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.1 ± NM	NM ± NM	Weathered
35-DS-33	2299	1	E	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2299	1	F	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano/Unknown X?	2.3 ± 0.1	NM ± NM	Weathered
35-DS-33	2299	1	G	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2299	1	H	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2300	1	A	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± 0.2	NM ± NM	Weathered
35-DS-33	2300	1	B	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	Weathered
35-DS-33	2300	1	C	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	—
35-DS-33	2300	1	D	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-33	2300	1	E	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	2300	1	F	EXU (619S/529E)	-10.00	-20.00	DEB	Newberry Volcano/Unknown X?	1.4 ± 0.1	NM ± NM	Weathered
35-DS-33	2301	1	A	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2301	1	B	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2301	1	C	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2301	1	D	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-DS-33	2301	1	E	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2301	1	F	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2301	1	G	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano/Unknown X?	2.0 ± 0.2	NM ± NM	—
35-DS-33	2301	1	H	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± NM	NM ± NM	—
35-DS-33	2301	1	I	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2301	1	J	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	Weathered
35-DS-33	2301	2	—	EXU (619S/529E)	-20.00	-30.00	UFT	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-33	2302	1	A	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2302	1	B	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	2302	1	C	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-33	2302	1	D	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2302	1	E	EXU (619S/529E)	-20.00	-30.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-DS-33	2303	1	A	EXU (619S/529E)	-30.00	-40.00	DEB	Newberry Volcano	2.2 ± NM	NM ± NM	—
35-DS-33	2303	1	B	EXU (619S/529E)	-30.00	-40.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-33	2303	1	C	EXU (619S/529E)	-30.00	-40.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2303	1	D	EXU (619S/529E)	-30.00	-40.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2303	1	E	EXU (619S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2304	1	A	EXU (619S/529E)	-30.00	-40.00	DEB Newberry Volcano/Unknown X?	2.3 ± 0.1	NM ±NM	—
35-DS-33	2304	1	B	EXU (619S/529E)	-30.00	-40.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2304	1	C	EXU (619S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2304	1	D	EXU (619S/529E)	-30.00	-40.00	DEB Newberry Volcano/Unknown X?	3.7 ± 0.1	NM ±NM	Weathered
35-DS-33	2304	1	E	EXU (619S/529E)	-30.00	-40.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2305	1	A	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	4.0 ± 0.1	NM ±NM	—
35-DS-33	2305	1	B	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2305	1	C	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2305	1	D	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	1.6 ± 0.1	NM ±NM	—
35-DS-33	2305	1	E	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2306	1	A	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2306	1	B	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2306	1	C	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2306	1	D	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2306	1	E	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2306	1	F	EXU (619S/529E)	-40.00	-50.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2307	1	A	EXU (619S/529E)	-50.00	-60.00	DEB Newberry Volcano	2.1 ±NM	NM ±NM	—
35-DS-33	2307	1	B	EXU (619S/529E)	-50.00	-60.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2307	1	C	EXU (619S/529E)	-50.00	-60.00	DEB Newberry Volcano	3.0 ± 0.2	NM ±NM	—
35-DS-33	2308	1	A	EXU (619S/529E)	-50.00	-60.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-33	2308	1	B	EXU (619S/529E)	-50.00	-60.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2308	1	C	EXU (619S/529E)	-50.00	-60.00	DEB Newberry Volcano	VW ±NM	NM ±NM	Weathered; Variable width
35-DS-33	2310	1	A	EXU (619S/529E)	-50.00	-57.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	Weathered
35-DS-33	2310	1	B	EXU (619S/529E)	-50.00	-57.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2310	1	C	EXU (619S/529E)	-50.00	-57.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2310	2	—	EXU (619S/529E)	-50.00	-57.00	BIF Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2324	2	—	EXU (620S/528E)	0.00	-10.00	BIF Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2334	2	—	EXU (621S/529E)	-10.00	-20.00	UFT Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-33	2335	3	—	EXU (621S/529E)	-20.00	-30.00	PPT McKay Butte	2.4 ± 0.1	NM ±NM	—
35-DS-33	2336	3	—	EXU (621S/529E)	-20.00	-30.00	BIF Newberry Volcano	2.5 ±NM	NM ±NM	—
35-DS-33	2341	2	—	EXU (623S/523E)	6.00	-6.00	BIF Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2341	3	—	EXU (623S/523E)	6.00	-6.00	PPT McKay Butte	1.1 ± 0.1	NM ±NM	Weathered
35-DS-33	2341	4	—	EXU (623S/523E)	6.00	-6.00	PPT McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2342	3	—	EXU (623S/523E)	-6.00	-16.00	BIF Newberry Volcano	1.4 ±NM	NM ±NM	Weathered
35-DS-33	2347	5	—	EXU (648S/485E)	7.00	0.00	UFT Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2347	6	—	EXU (648S/485E)	7.00	0.00	UFT Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	2347	7	—	EXU (648S/485E)	7.00	0.00	BIF Unknown X?	2.4 ±NM	NM ±NM	—
35-DS-33	2347	8	—	EXU (648S/485E)	7.00	0.00	BIF Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2348	1	—	EXU (648S/485E)	4.00	4.00	BIF	Silver Lake/Sycan Marsh	3.2 ± NM	NM ± NM	Weathered
35-DS-33	2349	1	—	EXU (648S/485E)	3.00	3.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2351	5	—	EXU (648S/485E)	0.00	-10.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2351	6	—	EXU (648S/485E)	0.00	-10.00	UFT	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2351	7	—	EXU (648S/485E)	0.00	-10.00	BIF	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-DS-33	2351	9	—	EXU (648S/485E)	0.00	-10.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2351	10	—	EXU (648S/485E)	0.00	-10.00	PPT	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2352	1	—	EXU (648S/485E)	-10.00	-10.00	BIF	Newberry Volcano	2.3 ± NM	NM ± NM	—
35-DS-33	2353	1	—	EXU (648S/485E)	-10.00	-10.00	BIF	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	2354	3	—	EXU (648S/485E)	-10.00	-20.00	BIF	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	2364	4	—	EXU (649S/485E)	7.00	0.00	BIF	Newberry Volcano	2.6 ± NM	NM ± NM	Weathered
35-DS-33	2366	2	—	EXU (649S/485E)	0.00	-10.00	BIF	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-DS-33	2366	3	—	EXU (649S/485E)	0.00	-10.00	BIF	Spodue Mountain	2.0 ± NM	NM ± NM	—
35-DS-33	2367	1	—	EXU (649S/485E)	-8.00	-8.00	BIF	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2368	4	—	EXU (649S/485E)	-10.00	-20.00	PFT	Newberry Volcano	2.4 ± 0.1	NM ± NM	Weathered
35-DS-33	2368	5	—	EXU (649S/485E)	-10.00	-20.00	BIF	Obsidian Cliffs	2.5 ± NM	NM ± NM	—
35-DS-33	2370	4	—	EXU (650S/485E)	5.00	-10.00	BIF	Newberry Volcano	2.9 ± NM	NM ± NM	—
35-DS-33	2370	5	—	EXU (650S/485E)	5.00	-10.00	BIF	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-33	2370	6	—	EXU (650S/485E)	5.00	-10.00	BIF	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-33	2370	7	—	EXU (650S/485E)	5.00	-10.00	PPT	Quartz Mountain	2.5 ± NM	NM ± NM	—
35-DS-33	2371	1	—	EXU (650S/485E)	-9.00	-9.00	BIF	Newberry Volcano	1.9 ± NM	NM ± NM	—
35-DS-33	2372	3	—	EXU (650S/485E)	-10.00	-20.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2383	1	—	EXU (357S/529E)	4.00	-10.00	BIF	Obsidian Cliffs	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2390	1	—	EXU (363S/526E)	-24.00	-34.00	PFT	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2393	1	—	EXU (363S/527E)	-10.00	-20.00	PPT	Silver Lake/Sycan Marsh	1.3 ± NM	NM ± NM	—
35-DS-33	2429	1	—	EXU (455S/521E)	-12.00	-22.00	BIF	McKay Butte	2.4 ± 0.1	NM ± NM	—
35-DS-33	2430	1	—	EXU (455S/521E)	-22.00	-32.00	PPT	Newberry Volcano	1.3 ± 0.1	NM ± NM	—
35-DS-33	2430	2	—	EXU (455S/521E)	-22.00	-32.00	UFT	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2432	1	—	EXU (455S/521E)	-32.00	-42.00	BIF	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-33	2442	3	—	EXU (540S/526E)	-13.00	-23.00	UFT	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2442	4	—	EXU (540S/526E)	-13.00	-23.00	UFT	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2465	1	A	EXU (592S/520E)	3.00	-6.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-DS-33	2465	1	B	EXU (592S/520E)	3.00	-6.00	DEB	Newberry Volcano	3.1 ± NM	NM ± NM	Weathered
35-DS-33	2465	1	C	EXU (592S/520E)	3.00	-6.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	2465	1	D	EXU (592S/520E)	3.00	-6.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ± NM	—
35-DS-33	2465	1	E	EXU (592S/520E)	3.00	-6.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	2465	1	F	EXU (592S/520E)	3.00	-6.00	DEB	Newberry Volcano	1.1 ± 0.1	NM ± NM	Weathered
35-DS-33	2465	1	G	EXU (592S/520E)	3.00	-6.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2465	1	H	EXU (592S/520E)	3.00	-6.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2466	1	A	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	2.7 ±NM	NM ±NM	—
35-DS-33	2466	1	B	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2466	1	C	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	1.8 ±NM	NM ±NM	—
35-DS-33	2466	1	D	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2466	1	E	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	1.1 ± 0.1	NM ±NM	—
35-DS-33	2466	1	F	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	VW ±NM	NM ±NM	Weathered; Variable width
35-DS-33	2466	1	G	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-33	2466	1	H	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2466	1	I	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	1.6 ±NM	NM ±NM	—
35-DS-33	2466	1	J	EXU (592S/520E)	-6.00 -16.00	DEB	Newberry	Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2467	2	—	EXU (592S/520E)	-16.00 -26.00	DEB	McKay	Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-33	2467	2	A	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2467	2	B	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2467	2	C	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2467	2	D	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2467	2	E	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2467	2	F	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2467	2	G	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2467	2	H	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-33	2467	2	I	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2467	2	J	EXU (592S/520E)	-16.00 -26.00	DEB	Newberry	Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2468	1	A	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2468	1	B	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2468	1	C	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-33	2468	1	D	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2468	1	E	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2468	1	F	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2468	1	G	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-33	2468	1	H	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-33	2468	1	I	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2468	1	J	EXU (592S/520E)	-26.00 -36.00	DEB	Newberry	Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-33	2468	3	—	EXU (592S/520E)	-26.00 -36.00	PFT	Newberry	Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-33	2469	1	A	EXU (592S/520E)	-36.00 -46.00	DEB	Newberry	Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2469	1	B	EXU (592S/520E)	-36.00 -46.00	DEB	Newberry	Volcano	2.8 ± 0.2	NM ±NM	—
35-DS-33	2476	1	—	EXU (593S/520E)	-24.00 -34.00	BIF	Newberry	Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2476	2	—	EXU (593S/520E)	-24.00 -34.00	COR	Newberry	Volcano/Unknown X?	2.3 ±NM	NM ±NM	—
35-DS-33	2486	2	—	EXU (597S/517E)	-44.00 -54.00	PPT	Newberry	Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2488	4	—	EXU (615S/527E)	-11.00 -21.00	UFT	Newberry	Volcano	1.4 ±NM	NM ±NM	—
35-DS-33	2491	1	—	EXU (616S/526E)	2.00 -9.00	PPT	Newberry	Volcano	1.7 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2505	2	—	EXU (616S/528E)	-13.00	-23.00	UFT	Newberry Volcano	2.0 ±NM	NM ±NM	—
35-DS-33	2505	3	—	EXU (616S/528E)	-13.00	-23.00	PPT	Obsidian Cliffs	2.2 ± 0.1	NM ±NM	—
35-DS-33	2509	2	—	EXU (616S/528E)	-33.00	-43.00	UFT	Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2512	4	—	EXU (617S/526E)	-15.00	-25.00	BIF	Newberry Volcano	2.3 ±NM	NM ±NM	—
35-DS-33	2513	4	—	EXU (617S/526E)	-25.00	-35.00	BIF	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-33	2517	4	—	EXU (617S/527E)	2.00	-6.00	BIF	Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-DS-33	2520	1	—	EXU (617S/527E)	-16.00	-26.00	BIF	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-33	2534	4	—	EXU (618S/526E)	-30.00	-40.00	UFT	McKay Butte	NVB ±NM	NM ±NM	No visible band
35-DS-33	2538	1	—	EXU (618S/527E)	2.00	-7.00	BIF	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2539	5	—	EXU (618S/527E)	-7.00	-17.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ±NM	Weathered
35-DS-33	2540	5	—	EXU (618S/527E)	-17.00	-27.00	BIF	McKay Butte	1.9 ± 0.1	NM ±NM	—
35-DS-33	2540	6	—	EXU (618S/527E)	-17.00	-27.00	UFT	Obsidian Cliffs	1.7 ± 0.1	NM ±NM	—
35-DS-33	2542	2	—	EXU (618S/527E)	-37.00	-47.00	UFT	Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-33	2554	1	—	EXU (619S/527E)	-10.00	-20.00	PPT	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2555	1	—	EXU (619S/527E)	-13.00	-13.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2560	1	—	EXU (619S/528E)	0.00	-10.00	UFT	Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-DS-33	2561	1	—	EXU (619S/528E)	-6.00	-6.00	BIF	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-DS-33	2563	1	A	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2563	1	B	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2563	1	C	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2563	1	D	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	Weathered
35-DS-33	2563	1	E	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-33	2563	1	F	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2563	1	G	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	2.1 ±NM	NM ±NM	—
35-DS-33	2563	1	H	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2563	1	I	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-DS-33	2563	1	J	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	1.4 ± 0.1	NM ±NM	—
35-DS-33	2563	1	K	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2563	1	L	EXU (619S/528E)	-10.00	-20.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2565	1	A	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2565	1	B	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-33	2565	1	C	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-33	2565	1	D	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-33	2565	1	E	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-33	2565	1	F	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-33	2565	1	G	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-33	2565	1	H	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-33	2565	1	I	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	2.5 ± 0.2	NM ±NM	—
35-DS-33	2565	1	J	EXU (619S/528E)	-20.00	-30.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-33	2565	1	K	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	2565	1	L	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano/Unknown X?	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2565	1	M	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	3.2 ± 0.1	NM ± NM	Weathered
35-DS-33	2565	1	N	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2565	1	O	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.2 ± 0.1	NM ± NM	Weathered
35-DS-33	2565	1	P	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano/Unknown X?	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2565	1	Q	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-33	2565	1	R	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2565	1	S	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	VW ± NM	NM ± NM	Weathered; Variable width
35-DS-33	2565	1	T	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.6 ± NM	NM ± NM	—
35-DS-33	2565	1	U	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.6 ± NM	NM ± NM	—
35-DS-33	2565	1	V	EXU (619S/528E)	-20.00	-30.00	DEB Newberry Volcano	2.3 ± NM	NM ± NM	—
35-DS-33	2567	1	A	EXU (619S/528E)	-30.00	-40.00	DEB Newberry Volcano/Unknown X?	3.3 ± 0.1	NM ± NM	—
35-DS-33	2567	1	B	EXU (619S/528E)	-30.00	-40.00	DEB Unknown X?	1.9 ± NM	NM ± NM	—
35-DS-33	2567	1	C	EXU (619S/528E)	-30.00	-40.00	DEB Newberry Volcano	1.9 ± NM	NM ± NM	—
35-DS-33	2567	1	D	EXU (619S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	2567	1	E	EXU (619S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-DS-33	2567	1	F	EXU (619S/528E)	-30.00	-40.00	DEB Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2569	1	—	EXU (619S/528E)	-36.00	-36.00	BIF Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-33	2570	1	A	EXU (619S/528E)	-40.00	-50.00	DEB McKay Butte	2.6 ± 0.1	NM ± NM	—
35-DS-33	2570	1	B	EXU (619S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-DS-33	2570	1	C	EXU (619S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.6 ± NM	NM ± NM	—
35-DS-33	2570	1	D	EXU (619S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-33	2570	3	—	EXU (619S/528E)	-40.00	-50.00	BIF Quartz Mountain	3.1 ± 0.1	NM ± NM	—
35-DS-33	2571	1	A	EXU (619S/528E)	-40.00	-50.00	DEB Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2571	1	B	EXU (619S/528E)	-40.00	-50.00	DEB McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2571	1	C	EXU (619S/528E)	-40.00	-50.00	DEB Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-33	2571	1	D	EXU (619S/528E)	-40.00	-50.00	DEB Newberry Volcano	1.7 ± NM	NM ± NM	—
35-DS-33	2571	1	E	EXU (619S/528E)	-40.00	-50.00	DEB Newberry Volcano	1.7 ± 0.1	NM ± NM	—
35-DS-33	2575	1	A	EXU (619S/528E)	-48.00	-48.00	DEB Newberry Volcano	2.6 ± NM	NM ± NM	—
35-DS-33	2576	1	A	EXU (619S/528E)	-50.00	-60.00	DEB Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2576	1	B	EXU (619S/528E)	-50.00	-60.00	DEB Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2578	1	A	EXU (619S/528E)	-50.00	-60.00	DEB Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2578	1	B	EXU (619S/528E)	-50.00	-60.00	DEB Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2579	1	A	EXU (619S/528E)	-52.00	-52.00	DEB Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-33	2580	1	A	EXU (619S/528E)	-56.00	-56.00	DEB McKay Butte	2.4 ± NM	NM ± NM	—
35-DS-33	2582	1	A	EXU (619S/528E)	-59.00	-59.00	DEB Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-33	2584	1	A	EXU (619S/528E)	-60.00	-70.00	DEB Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2586	2	—	EXU (620S/526E)	4.00	-4.00	BIF Newberry Volcano	NVB ± NM	NM ± NM	No visible band

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-33	2590	2	—	EXU (452S/524E)	2.00	-9.00	PPT	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-33	2600	2	—	EXU (533S/529E)	5.00	-5.00	BIF	Quartz Mountain	2.2 ± NM	NM ± NM	—
35-DS-33	2601	2	—	EXU (533S/529E)	-5.00	-15.00	BIF	Newberry Volcano	1.7 ± NM	NM ± NM	—
35-DS-33	2605	1	—	EXU (539S/529E)	-5.00	-5.00	PPT	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2612	3	—	EXU (618S/525E)	-11.00	-21.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2710	1	A	SON 200 (676S/523E)	0.00	-10.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-33	2716	1	A	SON 200 (676S/523E)	-20.00	-30.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	Weathered
35-DS-33	2719	1	A	SON 200 (676S/523E)	-30.00	-40.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ± NM	—
35-DS-33	2719	1	B	SON 200 (676S/523E)	-30.00	-40.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-DS-33	2722	1	A	SON 200 (676S/523E)	-40.00	-50.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	Weathered
35-DS-33	2722	1	B	SON 200 (676S/523E)	-40.00	-50.00	DEB	Newberry Volcano	1.1 ± NM	NM ± NM	Weathered
35-DS-33	2725	1	A	SON 200 (676S/523E)	-50.00	-60.00	DEB	Newberry Volcano	VW ± NM	NM ± NM	Weathered; Variable width
35-DS-33	2725	1	B	SON 200 (676S/523E)	-50.00	-60.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2725	1	C	SON 200 (676S/523E)	-50.00	-60.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	Weathered
35-DS-33	2725	1	D	SON 200 (676S/523E)	-50.00	-60.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-33	2728	1	A	SON 200 (676S/523E)	-60.00	-70.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2728	1	B	SON 200 (676S/523E)	-60.00	-70.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2728	1	C	SON 200 (676S/523E)	-60.00	-70.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-33	2728	1	D	SON 200 (676S/523E)	-60.00	-70.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-33	2728	1	E	SON 200 (676S/523E)	-60.00	-70.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-33	2731	1	A	SON 200 (676S/523E)	-70.00	-80.00	DEB	McKay Butte	2.5 ± 0.1	NM ± NM	—
35-DS-116	1	1	A	SCU 3	0.00	0.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	Weathered
35-DS-116	1	1	B	SCU 3	0.00	0.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-116	1	1	C	SCU 3	0.00	0.00	DEB	Newberry Volcano	3.7 ± 1.4	NM ± NM	Weathered
35-DS-116	1	1	D	SCU 3	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-116	1	1	E	SCU 3	0.00	0.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	Weathered
35-DS-116	1	1	F	SCU 3	0.00	0.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	Weathered
35-DS-116	1	1	G	SCU 3	0.00	0.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	Weathered
35-DS-116	1	1	H	SCU 3	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-116	1	1	I	SCU 3	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-116	1	1	J	SCU 3	0.00	0.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ± NM	Weathered
35-DS-116	1	1	K	SCU 3	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-116	1	1	L	SCU 3	0.00	0.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	Weathered
35-DS-116	1	1	M	SCU 3	0.00	0.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ± NM	Weathered
35-DS-116	1	1	N	SCU 3	0.00	0.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	Weathered
35-DS-116	3	1	—	SCP 1	0.00	0.00	BIF	Obsidian Cliffs	1.5 ± 0.1	NM ± NM	—
35-DS-116	4	1	—	SCP 2	0.00	0.00	PPT	Obsidian Cliffs	2.2 ± 0.1	NM ± NM	—
35-DS-116	5	1	—	SCP 3	0.00	0.00	PPT	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-116	6	1	—	SCP 4	0.00	0.00	UFT	Newberry Volcano	1.9 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot Spec Item Unit			Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-DS-116	346	1	A	SON 3	0.00	-10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-116	346	1	B	SON 3	0.00	-10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-116	352	3	—	SON 3	-60.00	-70.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-116	355	1	A	SON 3	-90.00	-100.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	Weathered
35-DS-116	355	1	B	SON 3	-90.00	-100.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	Weathered
35-DS-116	355	1	C	SON 3	-90.00	-100.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	Weathered
35-DS-116	355	1	D	SON 3	-90.00	-100.00	DEB	Newberry Volcano	2.3 ±NM	NM ±NM	Weathered
35-DS-116	355	1	E	SON 3	-90.00	-100.00	DEB	Newberry Volcano	2.7 ±NM	NM ±NM	Weathered
35-DS-116	372	1	A	SON 5	-60.00	-70.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	Weathered
35-DS-116	372	1	B	SON 5	-60.00	-70.00	DEB	Newberry Volcano	2.6 ±NM	NM ±NM	Weathered
35-DS-116	372	1	C	SON 5	-60.00	-70.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-116	372	1	D	SON 5	-60.00	-70.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-116	372	1	E	SON 5	-60.00	-70.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	Weathered
35-DS-116	372	1	F	SON 5	-60.00	-70.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	Weathered
35-DS-116	372	1	G	SON 5	-60.00	-70.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	Weathered
35-DS-116	373	1	A	SON 5	-70.00	-80.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	Weathered
35-DS-116	373	1	B	SON 5	-70.00	-80.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	Weathered
35-DS-116	373	1	C	SON 5	-70.00	-80.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-116	373	1	D	SON 5	-70.00	-80.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-116	373	1	E	SON 5	-70.00	-80.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-116	373	1	F	SON 5	-70.00	-80.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	Weathered
35-DS-116	373	1	G	SON 5	-70.00	-80.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-116	420	1	—	SCP 1001 (110S/103E)	0.00	0.00	BIF	Spodue Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-DS-116	536	1	—	SHP (108S/115E)	0.00	-20.00	BIF	Quartz Mountain	NVB ±NM	NM ±NM	No visible band
35-DS-116	737	2	—	EXU (87S/112E)	-40.00	-50.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-116	765	2	—	EXU (179S/117E)	-60.00	-70.00	BIF	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-263	21	1	—	SCP 21	0.00	0.00	PPT	Obsidian Cliffs	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	59	1	—	SCP 59	0.00	0.00	PPT	Cougar Mountain	1.2 ±NM	NM ±NM	Weathered
35-DS-263	106	1	A	SCU 1	0.00	0.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-263	106	1	B	SCU 1	0.00	0.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-263	106	1	C	SCU 1	0.00	0.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-263	106	1	D	SCU 1	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	106	1	E	SCU 1	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	106	1	F	SCU 1	0.00	0.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-263	106	1	G	SCU 1	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	106	1	H	SCU 1	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	106	1	I	SCU 1	0.00	0.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-263	106	1	J	SCU 1	0.00	0.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-263	106	1	K	SCU 1	0.00	0.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	Weathered

C.3-29

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-263	106	1	L	SCU 1	0.00	0.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-DS-263	106	1	M	SCU 1	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	106	1	N	SCU 1	0.00	0.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-263	106	1	O	SCU 1	0.00	0.00	DEB	Newberry Volcano	1.9 ±NM	NM ±NM	Weathered
35-DS-263	110	1	A	SCU 5	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	110	1	B	SCU 5	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	110	1	C	SCU 5	0.00	0.00	DEB	Newberry Volcano	4.4 ±NM	NM ±NM	—
35-DS-263	110	1	D	SCU 5	0.00	0.00	DEB	McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-263	110	1	E	SCU 5	0.00	0.00	DEB	Newberry Volcano	3.9 ± 0.1	NM ±NM	—
35-DS-263	110	1	F	SCU 5	0.00	0.00	DEB	Unknown A	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	110	1	G	SCU 5	0.00	0.00	DEB	McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-263	110	1	H	SCU 5	0.00	0.00	DEB	McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-263	110	1	I	SCU 5	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	110	1	J	SCU 5	0.00	0.00	DEB	McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-263	110	1	K	SCU 5	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	110	1	L	SCU 5	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	110	1	M	SCU 5	0.00	0.00	DEB	McKay Butte	3.8 ±NM	NM ±NM	Weathered
35-DS-263	110	1	N	SCU 5	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	110	1	O	SCU 5	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	113	1	A	SCU 8	0.00	0.00	DEB	McKay Butte	5.4 ± 0.1	NM ±NM	—
35-DS-263	113	1	B	SCU 8	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-DS-263	113	1	C	SCU 8	0.00	0.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ±NM	Weathered
35-DS-263	113	1	D	SCU 8	0.00	0.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-263	113	1	E	SCU 8	0.00	0.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-263	113	1	F	SCU 8	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	113	1	G	SCU 8	0.00	0.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ±NM	Weathered
35-DS-263	114	1	A	SCU 9	0.00	0.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ±NM	Weathered
35-DS-263	114	1	B	SCU 9	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	114	1	C	SCU 9	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	114	1	D	SCU 9	0.00	0.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ±NM	Weathered
35-DS-263	114	1	E	SCU 9	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-263	114	1	F	SCU 9	0.00	0.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-DS-263	115	1	A	SCU 10	0.00	0.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-263	115	1	B	SCU 10	0.00	0.00	DEB	Newberry Volcano	2.1 ± 0.2	NM ±NM	—
35-DS-263	115	1	C	SCU 10	0.00	0.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-263	115	1	D	SCU 10	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-263	115	1	E	SCU 10	0.00	0.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-263	115	1	F	SCU 10	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-263	115	1	G	SCU 10	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration

C.3-30

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-263	116	1	A	SCU 11	0.00	0.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-263	116	1	B	SCU 11	0.00	0.00	DEB	Newberry Volcano	3.6 ± 0.2	NM ± NM	—
35-DS-263	116	1	C	SCU 11	0.00	0.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-263	116	1	D	SCU 11	0.00	0.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-DS-263	116	1	E	SCU 11	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	116	1	F	SCU 11	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	116	1	G	SCU 11	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	116	1	H	SCU 11	0.00	0.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-DS-263	851	1	A	TEU 2	-70.00	-80.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	851	1	B	TEU 2	-70.00	-80.00	DEB	Unknown X	3.4 ± 0.1	NM ± NM	—
35-DS-263	851	1	C	TEU 2	-70.00	-80.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-263	851	1	D	TEU 2	-70.00	-80.00	DEB	Unknown X	3.6 ± 0.1	NM ± NM	—
35-DS-263	851	1	E	TEU 2	-70.00	-80.00	DEB	Unknown X	3.8 ± NM	NM ± NM	—
35-DS-263	851	1	F	TEU 2	-70.00	-80.00	DEB	Unknown X	3.7 ± NM	NM ± NM	—
35-DS-263	851	1	G	TEU 2	-70.00	-80.00	DEB	Unknown X	3.7 ± 0.1	4.2 ± 0.1	2 hydration bands
35-DS-263	851	1	H	TEU 2	-70.00	-80.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	851	1	I	TEU 2	-70.00	-80.00	DEB	Not Obsidian	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	851	1	J	TEU 2	-70.00	-80.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-DS-263	851	1	K	TEU 2	-70.00	-80.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-DS-263	851	1	L	TEU 2	-70.00	-80.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-DS-263	851	1	M	TEU 2	-70.00	-80.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-263	851	1	N	TEU 2	-70.00	-80.00	DEB	Newberry Volcano	3.8 ± 0.2	NM ± NM	—
35-DS-263	851	1	O	TEU 2	-70.00	-80.00	DEB	McKay Butte	6.1 ± 0.1	NM ± NM	—
35-DS-263	902	2	A	TEU 3	-70.00	-80.00	DEB	Unknown X	3.2 ± NM	NM ± NM	—
35-DS-263	902	2	B	TEU 3	-70.00	-80.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	903	1	A	TEU 3	-70.00	-80.00	DEB	Unknown X	4.4 ± 0.1	NM ± NM	—
35-DS-263	903	3	A	TEU 3	-70.00	-80.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	903	7	—	TEU 3	-70.00	-80.00	BIF	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	904	1	A	TEU 3	-70.00	-80.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	904	4	A	TEU 3	-70.00	-80.00	DEB	Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-263	904	5	—	TEU 3	-70.00	-80.00	DEB	Unknown X	3.6 ± 0.1	NM ± NM	Weathered
35-DS-263	905	4	A	TEU 3	-70.00	-80.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	905	4	B	TEU 3	-70.00	-80.00	DEB	McKay Butte	5.5 ± 0.1	NM ± NM	—
35-DS-263	906	1	—	TEU 3	-76.00	-76.00	BIF	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	907	7	—	TEU 3	-80.00	-90.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-263	907	8	—	TEU 3	-80.00	-90.00	BIF	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	907	9	—	TEU 3	-80.00	-90.00	UFT	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	908	1	A	TEU 3	-80.00	-90.00	DEB	Unknown X	4.3 ± 0.1	NM ± NM	—
35-DS-263	908	1	B	TEU 3	-80.00	-90.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-263	908	1	C	TEU 3	-80.00 -90.00	DEB	McKay Butte	5.7 ± 0.2	NM ± NM	—
35-DS-263	908	1	D	TEU 3	-80.00 -90.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	908	1	E	TEU 3	-80.00 -90.00	DEB	McKay Butte	6.2 ± 0.1	NM ± NM	—
35-DS-263	908	1	F	TEU 3	-80.00 -90.00	DEB	Newberry Volcano	3.3 ± NM	NM ± NM	—
35-DS-263	908	1	G	TEU 3	-80.00 -90.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	908	1	H	TEU 3	-80.00 -90.00	DEB	McKay Butte	6.4 ± 0.1	NM ± NM	—
35-DS-263	908	1	I	TEU 3	-80.00 -90.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	908	1	J	TEU 3	-80.00 -90.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	908	1	K	TEU 3	-80.00 -90.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-263	908	1	L	TEU 3	-80.00 -90.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	908	1	M	TEU 3	-80.00 -90.00	DEB	Unknown X	4.0 ± 0.1	NM ± NM	—
35-DS-263	908	1	N	TEU 3	-80.00 -90.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	908	1	O	TEU 3	-80.00 -90.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	909	1	A	TEU 3	-90.00 -100.00	DEB	McKay Butte	6.3 ± NM	NM ± NM	—
35-DS-263	909	1	B	TEU 3	-90.00 -100.00	DEB	McKay Butte	6.2 ± 0.1	NM ± NM	—
35-DS-263	909	1	C	TEU 3	-90.00 -100.00	DEB	McKay Butte	6.5 ± 0.1	NM ± NM	—
35-DS-263	910	1	A	TEU 3	-90.00 -100.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	910	1	B	TEU 3	-90.00 -100.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	910	4	A	TEU 3	-90.00 -100.00	DEB	McKay Butte	6.0 ± 0.1	NM ± NM	—
35-DS-263	910	4	B	TEU 3	-90.00 -100.00	DEB	McKay Butte	6.3 ± 0.1	NM ± NM	—
35-DS-263	910	5	—	TEU 3	-90.00 -100.00	DEB	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	936	1	A	TEU 4	-90.00 -100.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-DS-263	936	1	B	TEU 4	-90.00 -100.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-263	936	1	C	TEU 4	-90.00 -100.00	DEB	Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	936	1	D	TEU 4	-90.00 -100.00	DEB	Unknown X	3.8 ± NM	NM ± NM	—
35-DS-263	936	1	E	TEU 4	-90.00 -100.00	DEB	Newberry Volcano	3.4 ± 0.2	NM ± NM	—
35-DS-263	936	1	F	TEU 4	-90.00 -100.00	DEB	McKay Butte	6.4 ± 0.2	NM ± NM	—
35-DS-263	936	1	G	TEU 4	-90.00 -100.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-263	936	1	H	TEU 4	-90.00 -100.00	DEB	Newberry Volcano	3.1 ± NM	NM ± NM	—
35-DS-263	936	1	I	TEU 4	-90.00 -100.00	DEB	Newberry Volcano	4.1 ± 0.3	NM ± NM	—
35-DS-263	936	1	J	TEU 4	-90.00 -100.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-DS-263	936	1	K	TEU 4	-90.00 -100.00	DEB	Unknown X	3.4 ± 0.1	NM ± NM	—
35-DS-263	936	1	L	TEU 4	-90.00 -100.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	936	1	M	TEU 4	-90.00 -100.00	DEB	Unknown X	3.4 ± 0.1	NM ± NM	—
35-DS-263	936	1	N	TEU 4	-90.00 -100.00	DEB	Unknown X	3.6 ± NM	NM ± NM	—
35-DS-263	936	1	O	TEU 4	-90.00 -100.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1093	1	A	EXU (118S/136E)	-81.00 -91.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-263	1093	1	B	EXU (118S/136E)	-81.00 -91.00	DEB	Big Obsidian Flow	2.5 ± NM	NM ± NM	—
35-DS-263	1094	1	A	EXU (118S/136E)	-91.00 -101.00	DEB	Unknown X	3.4 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-263	1094	1	B	EXU (118S/136E)	-91.00 -101.00	DEB	Unknown X	4.4 ± 0.1	NM ± NM	—
35-DS-263	1094	1	C	EXU (118S/136E)	-91.00 -101.00	DEB	Unknown X	3.6 ± 0.1	NM ± NM	—
35-DS-263	1094	1	D	EXU (118S/136E)	-91.00 -101.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1094	1	E	EXU (118S/136E)	-91.00 -101.00	DEB	Newberry Volcano?	3.5 ± 0.1	NM ± NM	—
35-DS-263	1094	1	F	EXU (118S/136E)	-91.00 -101.00	DEB	Unknown X	3.4 ± 0.1	NM ± NM	—
35-DS-263	1094	1	G	EXU (118S/136E)	-91.00 -101.00	DEB	Big Obsidian Flow	2.6 ± 0.1	NM ± NM	—
35-DS-263	1094	1	H	EXU (118S/136E)	-91.00 -101.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-263	1094	1	I	EXU (118S/136E)	-91.00 -101.00	DEB	Unknown X	2.9 ± 0.1	NM ± NM	—
35-DS-263	1094	1	J	EXU (118S/136E)	-91.00 -101.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-263	1094	1	K	EXU (118S/136E)	-91.00 -101.00	DEB	Unknown X	3.0 ± 0.1	NM ± NM	—
35-DS-263	1094	1	L	EXU (118S/136E)	-91.00 -101.00	DEB	Newberry Volcano?	4.4 ± NM	NM ± NM	—
35-DS-263	1094	1	M	EXU (118S/136E)	-91.00 -101.00	DEB	Unknown X?	3.6 ± NM	NM ± NM	—
35-DS-263	1095	2	A	EXU (118S/136E)	-101.00 -111.00	DEB	Unknown X	4.0 ± 0.1	NM ± NM	—
35-DS-263	1095	2	B	EXU (118S/136E)	-101.00 -111.00	DEB	Unknown X	3.6 ± NM	NM ± NM	—
35-DS-263	1095	2	C	EXU (118S/136E)	-101.00 -111.00	DEB	Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-263	1095	2	D	EXU (118S/136E)	-101.00 -111.00	DEB	Unknown X?	3.8 ± NM	NM ± NM	—
35-DS-263	1095	2	E	EXU (118S/136E)	-101.00 -111.00	DEB	Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-263	1095	2	F	EXU (118S/136E)	-101.00 -111.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-263	1095	2	G	EXU (118S/136E)	-101.00 -111.00	DEB	Big Obsidian Flow	3.4 ± 0.1	NM ± NM	—
35-DS-263	1095	2	H	EXU (118S/136E)	-101.00 -111.00	DEB	Unknown X?	6.1 ± 0.1	NM ± NM	—
35-DS-263	1095	2	I	EXU (118S/136E)	-101.00 -111.00	DEB	Big Obsidian Flow	3.2 ± NM	NM ± NM	—
35-DS-263	1096	1	A	EXU (118S/136E)	-111.00 -121.00	DEB	Newberry Volcano	3.7 ± NM	NM ± NM	—
35-DS-263	1104	1	A	EXU (119S/137E)	-81.00 -91.00	DEB	McKay Butte	5.4 ± NM	NM ± NM	—
35-DS-263	1104	1	B	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1104	1	C	EXU (119S/137E)	-81.00 -91.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-DS-263	1105	1	A	EXU (119S/137E)	-81.00 -91.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-DS-263	1106	1	A	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1106	1	B	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.2 ± 0.1	NM ± NM	—
35-DS-263	1106	1	C	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-263	1106	1	D	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-263	1106	1	E	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-263	1106	1	F	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.6 ± NM	NM ± NM	—
35-DS-263	1106	3	—	EXU (119S/137E)	-81.00 -91.00	UFT	Unknown X	3.2 ± 0.1	NM ± NM	—
35-DS-263	1106	4	—	EXU (119S/137E)	-81.00 -91.00	BIF	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1107	1	A	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1107	1	B	EXU (119S/137E)	-81.00 -91.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1107	1	C	EXU (119S/137E)	-81.00 -91.00	DEB	Newberry Volcano	3.2 ± NM	3.8 ± 0.1	2 hydration bands
35-DS-263	1108	1	A	EXU (119S/137E)	-91.00 -101.00	DEB	McKay Butte	5.6 ± NM	NM ± NM	—
35-DS-263	1108	1	B	EXU (119S/137E)	-91.00 -101.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-263	1108	1	C	EXU (119S/137E)	-91.00 -101.00	DEB	Big Obsidian Flow	2.7 ± 0.1	NM ± NM	—
35-DS-263	1108	2	—	EXU (119S/137E)	-91.00 -101.00	BIF	Unknown X	4.3 ± 0.1	NM ± NM	—
35-DS-263	1108	3	—	EXU (119S/137E)	-91.00 -101.00	BIF	Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-263	1109	1	A	EXU (119S/137E)	-91.00 -101.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1109	1	B	EXU (119S/137E)	-91.00 -101.00	DEB	Unknown X	6.2 ± 0.1	NM ± NM	—
35-DS-263	1109	1	C	EXU (119S/137E)	-91.00 -101.00	DEB	Big Obsidian Flow	3.4 ± 0.1	NM ± NM	—
35-DS-263	1110	1	A	EXU (119S/137E)	-101.00 -111.00	DEB	Unknown X	4.0 ± 0.1	NM ± NM	—
35-DS-263	1110	1	B	EXU (119S/137E)	-101.00 -111.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1110	1	C	EXU (119S/137E)	-101.00 -111.00	DEB	Unknown X	3.6 ± NM	NM ± NM	—
35-DS-263	1110	1	D	EXU (119S/137E)	-101.00 -111.00	DEB	Unknown X	4.3 ± 0.1	NM ± NM	—
35-DS-263	1111	1	A	EXU (119S/137E)	-101.00 -111.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1111	1	B	EXU (119S/137E)	-101.00 -111.00	DEB	Unknown X	4.4 ± 0.1	NM ± NM	—
35-DS-263	1117	2	—	EXU (119S/138E)	-91.00 -101.00	NOD	Big Obsidian Flow	6.9 ± 0.1	NM ± NM	Non-cultural OH rim
35-DS-263	1117	3	—	EXU (119S/138E)	-91.00 -101.00	UFT	McKay Butte	6.6 ± 0.2	NM ± NM	—
35-DS-263	1127	1	A	EXU (120S/137E)	-67.00 -82.00	DEB	Unknown X	3.4 ± 0.1	NM ± NM	—
35-DS-263	1129	1	A	EXU (120S/137E)	-82.00 -92.00	DEB	Unknown X	3.6 ± NM	NM ± NM	—
35-DS-263	1129	1	B	EXU (120S/137E)	-82.00 -92.00	DEB	Unknown X	3.2 ± NM	NM ± NM	—
35-DS-263	1129	1	C	EXU (120S/137E)	-82.00 -92.00	DEB	Unknown X	4.2 ± NM	NM ± NM	—
35-DS-263	1129	1	D	EXU (120S/137E)	-82.00 -92.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1129	1	E	EXU (120S/137E)	-82.00 -92.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1129	1	F	EXU (120S/137E)	-82.00 -92.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1129	1	G	EXU (120S/137E)	-82.00 -92.00	DEB	Unknown X	3.2 ± NM	NM ± NM	—
35-DS-263	1129	1	H	EXU (120S/137E)	-82.00 -92.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1129	1	I	EXU (120S/137E)	-82.00 -92.00	DEB	McKay Butte	5.6 ± 0.1	NM ± NM	—
35-DS-263	1129	1	J	EXU (120S/137E)	-82.00 -92.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-DS-263	1130	1	A	EXU (120S/137E)	-92.00 -102.00	DEB	Unknown X	4.6 ± 0.1	NM ± NM	—
35-DS-263	1130	1	B	EXU (120S/137E)	-92.00 -102.00	DEB	Unknown X	3.6 ± NM	NM ± NM	—
35-DS-263	1130	1	C	EXU (120S/137E)	-92.00 -102.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-263	1130	1	D	EXU (120S/137E)	-92.00 -102.00	DEB	Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-263	1130	1	E	EXU (120S/137E)	-92.00 -102.00	DEB	Unknown X	4.7 ± 0.2	NM ± NM	—
35-DS-263	1130	1	F	EXU (120S/137E)	-92.00 -102.00	DEB	Newberry Volcano?	4.2 ± 0.2	NM ± NM	—
35-DS-263	1130	1	G	EXU (120S/137E)	-92.00 -102.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-263	1130	1	H	EXU (120S/137E)	-92.00 -102.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-DS-263	1130	1	I	EXU (120S/137E)	-92.00 -102.00	DEB	McKay Butte	5.6 ± 0.1	NM ± NM	—
35-DS-263	1130	1	J	EXU (120S/137E)	-92.00 -102.00	DEB	McKay Butte	6.3 ± NM	NM ± NM	—
35-DS-263	1131	1	A	EXU (120S/137E)	-102.00 -112.00	DEB	Unknown X	4.2 ± 0.2	NM ± NM	—
35-DS-263	1131	1	B	EXU (120S/137E)	-102.00 -112.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-263	1131	1	C	EXU (120S/137E)	-102.00 -112.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-263	1131	1	D	EXU (120S/137E)	-102.00 -112.00	DEB	Unknown X	4.1 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical	Type	Hydration Rims <sup>a</sup>		Comments
										Rim 1	Rim 2	
35-DS-263	1148	2	—	EXU (121S/135E)	-103.00 -113.00	BIF	Unknown	X		4.1 ± 0.1	NM ± NM	—
35-DS-263	1151	1	A	EXU (121S/137E)	-65.00 -82.00	DEB	McKay	Butte		DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	1152	1	A	EXU (121S/137E)	-82.00 -92.00	DEB	Unknown	X		3.6 ± 0.1	NM ± NM	—
35-DS-263	1152	1	B	EXU (121S/137E)	-82.00 -92.00	DEB	Unknown	X		3.7 ± 0.1	NM ± NM	—
35-DS-263	1152	1	C	EXU (121S/137E)	-82.00 -92.00	DEB	Unknown	X		4.2 ± NM	NM ± NM	—
35-DS-263	1152	1	D	EXU (121S/137E)	-82.00 -92.00	DEB	Newberry	Volcano		3.8 ± 0.1	NM ± NM	—
35-DS-263	1152	1	E	EXU (121S/137E)	-82.00 -92.00	DEB	Newberry	Volcano		3.7 ± 0.1	NM ± NM	—
35-DS-263	1153	1	A	EXU (121S/137E)	-82.00 -92.00	DEB	Unknown	X		3.7 ± 0.1	NM ± NM	—
35-DS-263	1153	1	B	EXU (121S/137E)	-82.00 -92.00	DEB	Unknown	X		3.7 ± 0.1	NM ± NM	—
35-DS-263	1153	1	C	EXU (121S/137E)	-82.00 -92.00	DEB	Unknown	X		3.7 ± 0.1	NM ± NM	—
35-DS-263	1153	1	D	EXU (121S/137E)	-82.00 -92.00	DEB	Unknown	X		3.6 ± NM	NM ± NM	—
35-DS-263	1153	1	E	EXU (121S/137E)	-82.00 -92.00	DEB	McKay	Butte		DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1154	1	A	EXU (121S/137E)	-92.00 -102.00	DEB	Newberry	Volcano		3.7 ± NM	NM ± NM	—
35-DS-263	1154	1	B	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		3.8 ± 0.1	NM ± NM	—
35-DS-263	1154	1	C	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		3.6 ± NM	NM ± NM	—
35-DS-263	1154	1	D	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		3.9 ± 0.1	NM ± NM	—
35-DS-263	1154	1	E	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		4.2 ± NM	NM ± NM	—
35-DS-263	1154	1	F	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		3.8 ± NM	NM ± NM	—
35-DS-263	1154	1	G	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		3.7 ± NM	NM ± NM	—
35-DS-263	1154	1	H	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		3.8 ± 0.1	NM ± NM	—
35-DS-263	1154	1	I	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		4.2 ± 0.1	NM ± NM	—
35-DS-263	1154	1	J	EXU (121S/137E)	-92.00 -102.00	DEB	Unknown	X		4.0 ± 0.1	NM ± NM	—
35-DS-263	1154	1	K	EXU (121S/137E)	-92.00 -102.00	DEB	McKay	Butte		5.2 ± 0.1	NM ± NM	—
35-DS-263	1155	1	A	EXU (121S/137E)	-102.00 -112.00	DEB	McKay	Butte		6.5 ± 0.1	NM ± NM	—
35-DS-263	1155	1	B	EXU (121S/137E)	-102.00 -112.00	DEB	Unknown	X		3.6 ± NM	NM ± NM	—
35-DS-263	1155	1	C	EXU (121S/137E)	-102.00 -112.00	DEB	Unknown	X		4.2 ± 0.1	NM ± NM	—
35-DS-263	1170	1	A	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		2.8 ± 0.1	NM ± NM	—
35-DS-263	1171	1	A	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		3.4 ± 0.1	NM ± NM	—
35-DS-263	1171	1	B	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		3.0 ± 0.1	NM ± NM	—
35-DS-263	1171	1	C	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		3.2 ± 0.1	NM ± NM	—
35-DS-263	1171	1	D	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		3.2 ± 0.1	NM ± NM	—
35-DS-263	1171	1	E	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		3.6 ± NM	NM ± NM	—
35-DS-263	1171	1	F	EXU (139S/136E)	-86.00 -96.00	DEB	Newberry	Volcano		3.2 ± NM	NM ± NM	—
35-DS-263	1171	1	G	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		3.2 ± NM	NM ± NM	—
35-DS-263	1171	1	H	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		3.2 ± NM	NM ± NM	—
35-DS-263	1171	1	I	EXU (139S/136E)	-86.00 -96.00	DEB	McKay	Butte		5.6 ± NM	NM ± NM	—
35-DS-263	1171	1	J	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		3.1 ± 0.1	NM ± NM	—
35-DS-263	1171	3	—	EXU (139S/136E)	-86.00 -96.00	DEB	Unknown	X		5.0 ± 0.1	NM ± NM	—
35-DS-263	1173	1	—	EXU (139S/136E)	-96.00 -106.00	BIF	Unknown	X		3.2 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical	Type	Hydration Rims <sup>a</sup>		Comments
										Rim 1	Rim 2	
35-DS-263	1173	2	A	EXU (139S/136E)	-96.00 -106.00	DEB	Unknown	X		3.0 ± NM	NM ± NM	—
35-DS-263	1173	2	B	EXU (139S/136E)	-96.00 -106.00	DEB	McKay	Butte		6.3 ± 0.2	NM ± NM	—
35-DS-263	1173	2	C	EXU (139S/136E)	-96.00 -106.00	DEB	Unknown	X		3.1 ± 0.1	NM ± NM	—
35-DS-263	1173	2	D	EXU (139S/136E)	-96.00 -106.00	DEB	Unknown	X		3.8 ± NM	NM ± NM	—
35-DS-263	1173	2	E	EXU (139S/136E)	-96.00 -106.00	DEB	Unknown	X		3.6 ± 0.1	NM ± NM	—
35-DS-263	1173	2	F	EXU (139S/136E)	-96.00 -106.00	DEB	Unknown	X		3.2 ± NM	NM ± NM	—
35-DS-263	1173	2	G	EXU (139S/136E)	-96.00 -106.00	DEB	McKay	Butte		DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1173	2	H	EXU (139S/136E)	-96.00 -106.00	DEB	McKay	Butte		4.8 ± 0.1	NM ± NM	—
35-DS-263	1173	2	I	EXU (139S/136E)	-96.00 -106.00	DEB	Unknown	X		3.2 ± NM	NM ± NM	—
35-DS-263	1173	2	J	EXU (139S/136E)	-96.00 -106.00	DEB	Unknown	X		3.1 ± 0.1	NM ± NM	—
35-DS-263	1174	1	A	EXU (139S/136E)	-106.00 -116.00	DEB	Unknown	X		3.2 ± NM	NM ± NM	—
35-DS-263	1174	1	B	EXU (139S/136E)	-106.00 -116.00	DEB	Unknown	X		3.6 ± NM	NM ± NM	—
35-DS-263	1174	1	C	EXU (139S/136E)	-106.00 -116.00	DEB	Unknown	X		3.5 ± 0.1	NM ± NM	—
35-DS-263	1174	1	D	EXU (139S/136E)	-106.00 -116.00	DEB	Unknown	X		3.8 ± NM	NM ± NM	Weathered
35-DS-263	1185	1	A	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		3.6 ± NM	NM ± NM	—
35-DS-263	1185	1	B	EXU (141S/134E)	-82.00 -92.00	DEB	McKay	Butte		DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1186	1	A	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		3.6 ± 0.1	NM ± NM	—
35-DS-263	1186	1	B	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		3.1 ± 0.1	NM ± NM	—
35-DS-263	1186	1	C	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		2.9 ± 0.1	NM ± NM	—
35-DS-263	1186	1	D	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		2.8 ± 0.1	NM ± NM	—
35-DS-263	1186	1	E	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		2.9 ± 0.1	NM ± NM	—
35-DS-263	1186	1	F	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		3.2 ± NM	NM ± NM	—
35-DS-263	1186	1	G	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		2.6 ± 0.1	NM ± NM	—
35-DS-263	1186	1	H	EXU (141S/134E)	-82.00 -92.00	DEB	McKay	Butte		4.4 ± NM	NM ± NM	—
35-DS-263	1186	1	I	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		4.2 ± NM	NM ± NM	—
35-DS-263	1186	1	J	EXU (141S/134E)	-82.00 -92.00	DEB	Unknown	X		3.0 ± 0.1	NM ± NM	—
35-DS-263	1186	2	—	EXU (141S/134E)	-82.00 -92.00	BIF	Unknown	X		3.0 ± NM	NM ± NM	—
35-DS-263	1187	1	A	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		3.3 ± 0.1	NM ± NM	—
35-DS-263	1187	1	B	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		3.0 ± NM	NM ± NM	—
35-DS-263	1187	1	C	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		3.1 ± 0.1	NM ± NM	—
35-DS-263	1187	1	D	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		2.8 ± 0.1	NM ± NM	—
35-DS-263	1187	1	E	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		3.6 ± 0.1	NM ± NM	—
35-DS-263	1187	1	F	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		3.6 ± NM	NM ± NM	—
35-DS-263	1187	1	G	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		4.1 ± 0.1	NM ± NM	—
35-DS-263	1187	1	H	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		3.5 ± 0.1	NM ± NM	—
35-DS-263	1187	1	I	EXU (141S/134E)	-92.00 -102.00	DEB	Unknown	X		3.0 ± 0.1	NM ± NM	—
35-DS-263	1187	1	J	EXU (141S/134E)	-92.00 -102.00	DEB	McKay	Butte		DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1188	1	A	EXU (141S/134E)	-102.00 -112.00	DEB	Unknown	X		3.4 ± 0.1	NM ± NM	—
35-DS-263	1188	1	B	EXU (141S/134E)	-102.00 -112.00	DEB	Unknown	X		3.9 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-263	1188	1	C	EXU (141S/134E)	-102.00 -112.00	DEB	Unknown	X	3.8 ± 0.1	NM ± NM	—
35-DS-263	1216	1	A	EXU (142S/135E)	-82.00 -92.00	DEB	Newberry	Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-263	1217	1	A	EXU (142S/135E)	-82.00 -92.00	DEB	Unknown	X	3.3 ± NM	NM ± NM	—
35-DS-263	1217	1	B	EXU (142S/135E)	-82.00 -92.00	DEB	Unknown	X	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	1217	1	C	EXU (142S/135E)	-82.00 -92.00	DEB	Unknown	X	2.5 ± 0.1	NM ± NM	—
35-DS-263	1217	1	D	EXU (142S/135E)	-82.00 -92.00	DEB	Unknown	X	3.0 ± 0.1	NM ± NM	—
35-DS-263	1217	1	E	EXU (142S/135E)	-82.00 -92.00	DEB	Unknown	X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1217	1	F	EXU (142S/135E)	-82.00 -92.00	DEB	Unknown	X?	5.6 ± 0.1	NM ± NM	—
35-DS-263	1218	1	A	EXU (142S/135E)	-82.00 -92.00	DEB	McKay	Butte	4.7 ± 0.1	NM ± NM	—
35-DS-263	1218	1	B	EXU (142S/135E)	-82.00 -92.00	DEB	Unknown	X	3.0 ± NM	NM ± NM	—
35-DS-263	1219	1	A	EXU (142S/135E)	-92.00 -102.00	DEB	Unknown	X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1219	1	B	EXU (142S/135E)	-92.00 -102.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1219	1	C	EXU (142S/135E)	-92.00 -102.00	DEB	Unknown	X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1219	1	D	EXU (142S/135E)	-92.00 -102.00	DEB	Newberry	Volcano?	3.0 ± 0.1	NM ± NM	—
35-DS-263	1219	1	E	EXU (142S/135E)	-92.00 -102.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1219	1	F	EXU (142S/135E)	-92.00 -102.00	DEB	Newberry	Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-263	1220	1	A	EXU (142S/135E)	-92.00 -102.00	DEB	Unknown	X	3.1 ± 0.1	NM ± NM	—
35-DS-263	1220	1	B	EXU (142S/135E)	-92.00 -102.00	DEB	Unknown	X	2.7 ± NM	NM ± NM	—
35-DS-263	1220	1	C	EXU (142S/135E)	-92.00 -102.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1221	1	A	EXU (142S/135E)	-102.00 -112.00	DEB	Unknown	X	3.2 ± 0.1	NM ± NM	—
35-DS-263	1221	1	B	EXU (142S/135E)	-102.00 -112.00	DEB	Unknown	X	3.4 ± 0.1	NM ± NM	—
35-DS-263	1221	1	C	EXU (142S/135E)	-102.00 -112.00	DEB	Newberry	Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-263	1221	1	D	EXU (142S/135E)	-102.00 -112.00	DEB	Newberry	Volcano	4.6 ± 0.1	NM ± NM	—
35-DS-263	1222	1	A	EXU (142S/135E)	-102.00 -112.00	DEB	Unknown	X	3.2 ± NM	NM ± NM	—
35-DS-263	1222	1	B	EXU (142S/135E)	-102.00 -112.00	DEB	Unknown	X	4.1 ± 0.1	NM ± NM	Weathered
35-DS-263	1222	1	C	EXU (142S/135E)	-102.00 -112.00	DEB	Unknown	X	3.4 ± 0.1	NM ± NM	—
35-DS-263	1260	1	—	SCP 1001 (159S/133E)	0.00 0.00	BIF	Unknown	X	1.3 ± 0.1	NM ± NM	—
35-DS-263	1324	1	—	EXU (110S/141E)	-101.00 -111.00	BIF	McKay	Butte	6.0 ± 0.1	NM ± NM	—
35-DS-263	1328	1	A	EXU (138S/136E)	-86.00 -96.00	DEB	Unknown	X	2.8 ± 0.2	NM ± NM	—
35-DS-263	1328	1	B	EXU (138S/136E)	-86.00 -96.00	DEB	Unknown	X	3.0 ± 0.1	NM ± NM	—
35-DS-263	1328	1	C	EXU (138S/136E)	-86.00 -96.00	DEB	Newberry	Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	1328	1	D	EXU (138S/136E)	-86.00 -96.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1329	1	A	EXU (138S/136E)	-86.00 -96.00	DEB	McKay	Butte	5.4 ± NM	NM ± NM	—
35-DS-263	1329	1	B	EXU (138S/136E)	-86.00 -96.00	DEB	Unknown	X	2.6 ± 0.1	NM ± NM	—
35-DS-263	1329	1	C	EXU (138S/136E)	-86.00 -96.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1329	1	D	EXU (138S/136E)	-86.00 -96.00	DEB	Unknown	X	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	1330	1	A	EXU (138S/136E)	-96.00 -106.00	DEB	Unknown	X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1330	1	B	EXU (138S/136E)	-96.00 -106.00	DEB	Unknown	X	2.9 ± 0.1	NM ± NM	—
35-DS-263	1330	1	C	EXU (138S/136E)	-96.00 -106.00	DEB	Unknown	X	3.4 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-263	1330	1	D	EXU (138S/136E)	-96.00 -106.00	DEB	Unknown X	3.3 ± 0.1	NM ± NM	—
35-DS-263	1330	1	E	EXU (138S/136E)	-96.00 -106.00	DEB	Unknown X	5.1 ± 0.1	NM ± NM	—
35-DS-263	1330	1	F	EXU (138S/136E)	-96.00 -106.00	DEB	McKay Butte	6.6 ± 0.1	NM ± NM	—
35-DS-263	1330	1	G	EXU (138S/136E)	-96.00 -106.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-263	1330	1	H	EXU (138S/136E)	-96.00 -106.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-263	1330	1	I	EXU (138S/136E)	-96.00 -106.00	DEB	McKay Butte	6.3 ± 0.1	NM ± NM	—
35-DS-263	1331	1	—	EXU (138S/136E)	-106.00 -116.00	BIF	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-263	1331	2	A	EXU (138S/136E)	-106.00 -116.00	DEB	Unknown X	3.4 ± 0.1	NM ± NM	—
35-DS-263	1331	2	B	EXU (138S/136E)	-106.00 -116.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1331	2	C	EXU (138S/136E)	-106.00 -116.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-263	1331	2	D	EXU (138S/136E)	-106.00 -116.00	DEB	Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1331	2	E	EXU (138S/136E)	-106.00 -116.00	DEB	McKay Butte	5.4 ± 0.2	NM ± NM	—
35-DS-263	1331	2	F	EXU (138S/136E)	-106.00 -116.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-263	1331	2	G	EXU (138S/136E)	-106.00 -116.00	DEB	McKay Butte	4.6 ± 0.2	NM ± NM	—
35-DS-263	1331	2	H	EXU (138S/136E)	-106.00 -116.00	DEB	Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-263	1381	1	A	EXU (153S/130E)	2.00 -5.00	DEB	Newberry Volcano	1.1 ± NM	NM ± NM	—
35-DS-263	1381	1	B	EXU (153S/130E)	2.00 -5.00	DEB	Newberry Volcano?	1.4 ± 0.1	NM ± NM	—
35-DS-263	1382	1	—	EXU (153S/130E)	-5.00 -15.00	PPT	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-263	1382	2	A	EXU (153S/130E)	-5.00 -15.00	DEB	Newberry Volcano	2.3 ± 0.2	NM ± NM	—
35-DS-263	1382	2	B	EXU (153S/130E)	-5.00 -15.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-DS-263	1382	2	C	EXU (153S/130E)	-5.00 -15.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-DS-263	1383	1	A	EXU (153S/130E)	-15.00 -25.00	DEB	Newberry Volcano	1.9 ± NM	NM ± NM	—
35-DS-263	1383	1	B	EXU (153S/130E)	-15.00 -25.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-263	1383	1	C	EXU (153S/130E)	-15.00 -25.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ± NM	—
35-DS-263	1384	1	A	EXU (153S/130E)	-25.00 -35.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-263	1384	1	B	EXU (153S/130E)	-25.00 -35.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	Weathered
35-DS-263	1413	1	—	EXU (154S/132E)	-8.00 -18.00	BIF	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-263	1413	4	—	EXU (154S/132E)	-8.00 -18.00	UFT	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-263	1415	1	A	EXU (154S/133E)	2.00 -11.00	DEB	Newberry Volcano?	3.6 ± NM	NM ± NM	—
35-DS-263	1415	1	B	EXU (154S/133E)	2.00 -11.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-263	1416	1	A	EXU (154S/133E)	2.00 -11.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	1416	1	B	EXU (154S/133E)	2.00 -11.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-263	1417	1	A	EXU (154S/133E)	-11.00 -21.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-263	1417	1	B	EXU (154S/133E)	-11.00 -21.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-263	1418	1	A	EXU (154S/133E)	-11.00 -21.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-263	1418	1	B	EXU (154S/133E)	-11.00 -21.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	Weathered
35-DS-263	1419	1	A	EXU (154S/133E)	-21.00 -31.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-263	1420	1	A	EXU (154S/133E)	-21.00 -31.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1425	2	—	EXU (155S/130E)	2.00 -4.00	BIF	Newberry Volcano	1.8 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-263	1426	1	A	EXU (155S/130E)	2.00	-4.00	DEB	Newberry Volcano	1.3 ± NM	NM ± NM	Weathered
35-DS-263	1427	2	A	EXU (155S/130E)	-4.00	-14.00	DEB	Newberry Volcano	1.1 ± 0.1	NM ± NM	Weathered
35-DS-263	1428	1	A	EXU (155S/130E)	-4.00	-14.00	DEB	Newberry Volcano	1.1 ± NM	NM ± NM	Weathered
35-DS-263	1430	1	A	EXU (155S/130E)	-14.00	-24.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-DS-263	1430	1	B	EXU (155S/130E)	-14.00	-24.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-263	1431	1	A	EXU (155S/130E)	-14.00	-24.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	Weathered
35-DS-263	1431	1	B	EXU (155S/130E)	-14.00	-24.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-DS-263	1432	1	A	EXU (155S/130E)	-24.00	-34.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-263	1432	1	B	EXU (155S/130E)	-24.00	-34.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-DS-263	1433	1	A	EXU (155S/130E)	-24.00	-34.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-263	1434	1	A	EXU (155S/131E)	2.00	-6.00	DEB	Newberry Volcano	1.3 ± NM	NM ± NM	Weathered
35-DS-263	1434	1	B	EXU (155S/131E)	2.00	-6.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-263	1435	1	A	EXU (155S/131E)	-6.00	-16.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-263	1435	1	B	EXU (155S/131E)	-6.00	-16.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-263	1435	1	C	EXU (155S/131E)	-6.00	-16.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ± NM	—
35-DS-263	1435	1	D	EXU (155S/131E)	-6.00	-16.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	1435	1	E	EXU (155S/131E)	-6.00	-16.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	1435	2	—	EXU (155S/131E)	-6.00	-16.00	UFT	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-263	1437	1	A	EXU (155S/131E)	-16.00	-26.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-263	1437	1	B	EXU (155S/131E)	-16.00	-26.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-263	1437	1	C	EXU (155S/131E)	-16.00	-26.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-263	1440	1	A	EXU (155S/132E)	0.00	-7.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-263	1440	1	B	EXU (155S/132E)	0.00	-7.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-263	1442	1	A	EXU (155S/132E)	-7.00	-17.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-DS-263	1442	1	B	EXU (155S/132E)	-7.00	-17.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-263	1444	1	—	EXU (155S/132E)	-17.00	-27.00	BIF	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-263	1444	2	A	EXU (155S/132E)	-17.00	-27.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-263	1444	2	B	EXU (155S/132E)	-17.00	-27.00	DEB	Unknown X?	3.2 ± 0.1	NM ± NM	—
35-DS-263	1445	1	A	EXU (155S/132E)	-17.00	-27.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-DS-263	1446	1	A	EXU (155S/132E)	-27.00	-37.00	DEB	Unknown X	3.1 ± 0.1	NM ± NM	—
35-DS-263	1446	2	—	EXU (155S/132E)	-27.00	-37.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-263	1447	1	A	EXU (155S/132E)	-27.00	-37.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-DS-263	1448	1	A	EXU (155S/132E)	-37.00	-47.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-263	1458	1	A	EXU (156S/130E)	3.00	-6.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-DS-263	1458	1	B	EXU (156S/130E)	3.00	-6.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-263	1458	1	C	EXU (156S/130E)	3.00	-6.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-263	1459	1	A	EXU (156S/130E)	-6.00	-16.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-DS-263	1459	1	B	EXU (156S/130E)	-6.00	-16.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-263	1459	1	C	EXU (156S/130E)	-6.00	-16.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration

### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-263	1460	1	A	EXU (156S/130E)	-16.00	-26.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-263	1460	1	B	EXU (156S/130E)	-16.00	-26.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-263	1460	1	C	EXU (156S/130E)	-16.00	-26.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-263	1460	1	D	EXU (156S/130E)	-16.00	-26.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	—
35-DS-263	1462	1	—	EXU (156S/131E)	1.00	-6.00	BIF	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-429	143	1	A	SON 1	0.00	-10.00	DEB	McKay Butte	3.9 ± 0.1	NM ±NM	—
35-DS-429	144	1	A	SON 1	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-429	144	1	B	SON 1	-10.00	-20.00	DEB	McKay Butte	5.2 ± 0.2	NM ±NM	—
35-DS-429	144	1	C	SON 1	-10.00	-20.00	DEB	McKay Butte	DH ±NM	NM ±NM	—
35-DS-429	144	1	D	SON 1	-10.00	-20.00	DEB	McKay Butte	6.4 ± 0.1	NM ±NM	—
35-DS-429	144	3	—	SON 1	-10.00	-20.00	DEB	McKay Butte	5.7 ± 0.2	NM ±NM	—
35-DS-429	145	1	A	SON 1	-20.00	-30.00	DEB	McKay Butte	6.3 ± 0.1	NM ±NM	—
35-DS-429	145	1	B	SON 1	-20.00	-30.00	DEB	McKay Butte	3.4 ± 0.2	NM ±NM	—
35-DS-429	145	1	C	SON 1	-20.00	-30.00	DEB	Quartz Mountain/McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-429	146	1	A	SON 1	-30.00	-40.00	DEB	McKay Butte	6.1 ± 0.1	NM ±NM	—
35-DS-429	146	1	B	SON 1	-30.00	-40.00	DEB	McKay Butte	5.8 ± 0.1	NM ±NM	—
35-DS-429	147	1	A	SON 1	-40.00	-50.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-429	148	1	A	SON 1	-50.00	-60.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-429	148	1	B	SON 1	-50.00	-60.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-429	149	1	A	SON 1	-60.00	-70.00	DEB	Quartz Mountain/McKay Butte	4.9 ± 0.1	NM ±NM	—
35-DS-429	149	2	A	SON 1	-60.00	-70.00	DEB	Quartz Mountain/McKay Butte	5.6 ± 0.1	NM ±NM	—
35-DS-429	149	2	B	SON 1	-60.00	-70.00	DEB	McKay Butte	5.4 ±NM	NM ±NM	—
35-DS-429	149	2	C	SON 1	-60.00	-70.00	DEB	McKay Butte	6.3 ± 0.1	NM ±NM	—
35-DS-429	149	2	D	SON 1	-60.00	-70.00	DEB	Quartz Mountain/McKay Butte	6.4 ± 0.1	NM ±NM	—
35-DS-429	149	2	E	SON 1	-60.00	-70.00	DEB	McKay Butte	6.3 ±NM	NM ±NM	—
35-DS-429	149	2	F	SON 1	-60.00	-70.00	DEB	Quartz Mountain/McKay Butte	6.1 ± 0.1	NM ±NM	—
35-DS-429	149	2	G	SON 1	-60.00	-70.00	DEB	McKay Butte	NVB ±NM	NM ±NM	No visible band
35-DS-429	149	2	H	SON 1	-60.00	-70.00	DEB	Quartz Mountain/McKay Butte	6.4 ± 0.2	NM ±NM	—
35-DS-429	150	1	A	SON 1	-70.00	-80.00	DEB	McKay Butte	VW ±NM	NM ±NM	Variable width
35-DS-429	150	1	B	SON 1	-70.00	-80.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-429	150	1	C	SON 1	-70.00	-80.00	DEB	McKay Butte	5.3 ± 0.1	NM ±NM	—
35-DS-429	150	1	D	SON 1	-70.00	-80.00	DEB	McKay Butte	6.1 ± 0.1	NM ±NM	—
35-DS-429	152	1	A	SON 1	-90.00	-100.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-429	173	1	—	SCP 1	0.00	0.00	PPT	Quartz Mountain/McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	1	1	A	SCP 1	0.00	0.00	DEB	Big Obsidian Flow	1.5 ± 0.1	NM ±NM	—
35-DS-554	2	1	A	SCP 2	0.00	0.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-554	3	1	A	SCP 3	0.00	0.00	DEB	Big Obsidian Flow	1.7 ±NM	NM ±NM	—
35-DS-554	5	1	A	SCP 5	0.00	0.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-554	7	1	A	SCP 7	0.00	0.00	DEB	Big Obsidian Flow	1.8 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-554	8	1	A	SCP 8	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-554	9	1	A	SCP 9	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	10	1	A	SCP 10	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	11	1	—	SCP 11	0.00	0.00	BIF Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-554	12	1	A	SCP 12	0.00	0.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-554	13	1	A	SCP 13	0.00	0.00	DEB Newberry Volcano	2.0 ± 0.1	NM ±NM	Weathered
35-DS-554	14	1	A	SCP 14	0.00	0.00	DEB Newberry Volcano	4.0 ± 0.1	NM ±NM	Weathered
35-DS-554	15	1	A	SCP 15	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	16	1	A	SCP 16	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	17	1	A	SCP 17	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	18	1	A	SCP 18	0.00	0.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	Weathered
35-DS-554	19	1	A	SCP 19	0.00	0.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	Weathered
35-DS-554	20	1	A	SCP 20	0.00	0.00	DEB Big Obsidian Flow	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	22	1	A	SCP 22	0.00	0.00	DEB Big Obsidian Flow	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	23	1	A	SCP 23	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	24	1	A	SCP 24	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	25	1	A	SCP 25	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-554	26	1	A	SCP 26	0.00	0.00	DEB Unknown X	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-555	1	1	—	SCP 1	0.00	0.00	BIF Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-DS-555	2	1	—	SCU 1	0.00	0.00	PFT Newberry Volcano	3.0 ±NM	NM ±NM	—
35-DS-555	2	2	A	SCU 1	0.00	0.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-555	2	2	B	SCU 1	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-555	2	2	C	SCU 1	0.00	0.00	DEB Newberry Volcano	3.4 ± 0.2	NM ±NM	Weathered
35-DS-555	2	2	D	SCU 1	0.00	0.00	DEB Newberry Volcano	1.8 ± 0.1	NM ±NM	Weathered
35-DS-555	2	2	E	SCU 1	0.00	0.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	Weathered
35-DS-555	2	2	F	SCU 1	0.00	0.00	DEB Newberry Volcano	3.4 ± 0.1	NM ±NM	Weathered
35-DS-555	2	2	G	SCU 1	0.00	0.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	Weathered
35-DS-555	2	2	H	SCU 1	0.00	0.00	DEB Newberry Volcano	3.3 ± 0.2	NM ±NM	—
35-DS-555	2	2	I	SCU 1	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-555	2	2	J	SCU 1	0.00	0.00	DEB Newberry Volcano	1.8 ±NM	NM ±NM	Weathered
35-DS-555	2	2	K	SCU 1	0.00	0.00	DEB Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-555	2	2	L	SCU 1	0.00	0.00	DEB Newberry Volcano	5.1 ± 0.1	NM ±NM	—
35-DS-555	2	2	M	SCU 1	0.00	0.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-555	2	2	N	SCU 1	0.00	0.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-555	2	2	O	SCU 1	0.00	0.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-DS-555	3	1	A	SCU 2	0.00	0.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-DS-555	3	1	B	SCU 2	0.00	0.00	DEB Newberry Volcano	4.1 ± 0.1	NM ±NM	Weathered
35-DS-555	3	1	C	SCU 2	0.00	0.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-555	3	1	D	SCU 2	0.00	0.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-555	3	1	E	SCU 2	0.00	0.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ± NM	—
35-DS-555	3	1	F	SCU 2	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	3	1	G	SCU 2	0.00	0.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-555	6	1	—	STU 3	0.00	-10.00	BIF	Newberry Volcano	3.7 ± 0.1	NM ± NM	Weathered
35-DS-555	9	1	—	STU 6	0.00	-10.00	UFT	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-555	14	3	—	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	Weathered
35-DS-555	15	1	A	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.1 ± NM	NM ± NM	—
35-DS-555	15	1	B	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	15	1	C	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	Weathered
35-DS-555	15	1	D	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	Weathered
35-DS-555	15	1	E	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-555	15	1	F	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	5.4 ± 0.1	NM ± NM	—
35-DS-555	15	1	G	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.3 ± 0.2	NM ± NM	—
35-DS-555	15	1	H	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-DS-555	15	1	I	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	15	1	J	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-555	15	1	K	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-555	15	1	L	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.1 ± NM	NM ± NM	—
35-DS-555	15	1	M	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-555	15	1	N	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	15	3	A	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-555	15	4	—	TEU 1	-20.00	-30.00	BIF	Obsidian Cliffs	5.3 ± 0.1	NM ± NM	Weathered
35-DS-555	16	4	—	TEU 1	-30.00	-40.00	PPT	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-555	17	3	—	TEU 1	-40.00	-50.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	41	1	—	SHP 5	-20.00	-40.00	PPT	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	110	1	—	SHP 20	-20.00	-40.00	BIF	Newberry Volcano	2.9 ± 0.2	NM ± NM	—
35-DS-555	484	3	—	SON 4	-30.00	-40.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-555	501	1	—	TEU 2	7.00	0.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	503	2	A	TEU 2	0.00	-10.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	Weathered
35-DS-555	503	2	B	TEU 2	0.00	-10.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-555	504	2	A	TEU 2	-10.00	-20.00	DEB	Newberry Volcano?	4.3 ± 0.1	NM ± NM	—
35-DS-555	507	1	—	TEU 2	-20.00	-30.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-555	507	3	A	TEU 2	-20.00	-30.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Rim approx. 3.5 microns
35-DS-555	507	3	B	TEU 2	-20.00	-30.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-555	507	3	C	TEU 2	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	2.3 ± 0.1	NM ± NM	—
35-DS-555	508	1	—	TEU 2	-30.00	-40.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-555	508	3	A	TEU 2	-30.00	-40.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-DS-555	508	3	B	TEU 2	-30.00	-40.00	DEB	Silver Lake/Sycan Marsh	5.6 ± 0.1	NM ± NM	Weathered
35-DS-555	508	3	C	TEU 2	-30.00	-40.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-555	508	3	D	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	3.9 ± 0.1	NM ±NM	—	
35-DS-555	508	3	E	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ±NM	—	
35-DS-555	508	3	F	TEU 2	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	5.0 ± 0.1	NM ±NM	—	
35-DS-555	508	3	G	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—	
35-DS-555	508	3	H	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—	
35-DS-555	508	3	I	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—	
35-DS-555	508	3	J	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—	
35-DS-555	509	1	A	TEU 2	-30.00 -40.00	DEB	Newberry Volcano	2.6 ±NM	NM ±NM	—	
35-DS-555	510	2	A	TEU 2	-40.00 -50.00	DEB	Newberry Volcano	2.6 ±NM	NM ±NM	—	
35-DS-555	510	2	B	TEU 2	-40.00 -50.00	DEB	Newberry Volcano	2.3 ±NM	NM ±NM	—	
35-DS-555	510	2	C	TEU 2	-40.00 -50.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ±NM	—	
35-DS-555	536	3	—	TEU 3	0.00 -10.00	UFT	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ±NM	—	
35-DS-555	540	2	A	TEU 3	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ±NM	—	
35-DS-555	540	2	B	TEU 3	-20.00 -30.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—	
35-DS-555	540	2	C	TEU 3	-20.00 -30.00	DEB	Inman Creek/Salt Creek A	NVB ±NM	NM ±NM	Weathered; No visible band	
35-DS-555	540	2	D	TEU 3	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	4.0 ± 0.2	NM ±NM	—	
35-DS-555	540	2	E	TEU 3	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	1.6 ± 0.1	NM ±NM	Weathered	
35-DS-555	540	2	F	TEU 3	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	2.4 ± 0.1	NM ±NM	—	
35-DS-555	540	2	G	TEU 3	-20.00 -30.00	DEB	Newberry Volcano	3.0 ± 0.2	NM ±NM	—	
35-DS-555	540	2	H	TEU 3	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	3.5 ± 0.1	NM ±NM	—	
35-DS-555	540	3	A	TEU 3	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	1.8 ± 0.1	NM ±NM	—	
35-DS-555	545	3	—	TEU 3	-40.00 -50.00	UFT	Obsidian Cliffs	2.9 ±NM	NM ±NM	—	
35-DS-555	546	2	—	TEU 3	-50.00 -60.00	PPT	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ±NM	—	
35-DS-555	771	1	—	SCP 1001	0.00 0.00	BIF	Newberry Volcano	1.2 ±NM	NM ±NM	—	
35-DS-555	666	1	—	SHP (75S/75E)	-20.00 -40.00	BIF	Newberry Volcano	3.4 ± 0.1	NM ±NM	—	
35-DS-555	723	1	A	EXU (72S/71E)	0.00 -10.00	DEB	Newberry Volcano	1.0 ±NM	NM ±NM	Weathered	
35-DS-555	723	1	B	EXU (72S/71E)	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ±NM	—	
35-DS-555	723	1	C	EXU (72S/71E)	0.00 -10.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ±NM	—	
35-DS-555	723	1	D	EXU (72S/71E)	0.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration	
35-DS-555	724	1	A	EXU (72S/71E)	-10.00 -20.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	Weathered	
35-DS-555	724	1	B	EXU (72S/71E)	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	5.1 ± 0.1	NM ±NM	—	
35-DS-555	724	1	C	EXU (72S/71E)	-10.00 -20.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	—	
35-DS-555	725	1	A	EXU (72S/71E)	-20.00 -30.00	DEB	Newberry Volcano	2.6 ±NM	NM ±NM	—	
35-DS-555	725	1	B	EXU (72S/71E)	-20.00 -30.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—	
35-DS-555	725	2	—	EXU (72S/71E)	-20.00 -30.00	UFT	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration	
35-DS-555	726	1	A	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	—	
35-DS-555	726	1	B	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	—	
35-DS-555	726	1	C	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano?	2.9 ±NM	NM ±NM	—	
35-DS-555	726	1	D	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano	3.3 ±NM	NM ±NM	—	

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-555	726	1	E	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-DS-555	726	1	F	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-555	726	1	G	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-555	726	1	H	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	726	1	I	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano?	3.1 ± 0.1	NM ± NM	—
35-DS-555	726	1	J	EXU (72S/71E)	-30.00 -40.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-DS-555	726	2	—	EXU (72S/71E)	-30.00 -40.00	BIF	Newberry Volcano	2.4 ± NM	NM ± NM	Weathered
35-DS-555	726	3	—	EXU (72S/71E)	-30.00 -40.00	PPT	Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ± NM	—
35-DS-555	728	1	A	EXU (72S/71E)	-40.00 -50.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-555	728	1	B	EXU (72S/71E)	-40.00 -50.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-555	728	1	C	EXU (72S/71E)	-40.00 -50.00	DEB	Newberry Volcano?	3.7 ± 0.1	NM ± NM	—
35-DS-555	728	1	D	EXU (72S/71E)	-40.00 -50.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-555	728	1	E	EXU (72S/71E)	-40.00 -50.00	DEB	Newberry Volcano	3.9 ± 0.1	NM ± NM	—
35-DS-555	729	1	A	EXU (72S/71E)	-50.00 -60.00	DEB	Newberry Volcano?	3.2 ± 0.1	NM ± NM	—
35-DS-555	729	1	B	EXU (72S/71E)	-50.00 -60.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-DS-555	731	1	A	EXU (72S/70E)	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	731	1	B	EXU (72S/70E)	0.00 -10.00	DEB	Newberry Volcano?	3.0 ± NM	NM ± NM	—
35-DS-555	731	1	C	EXU (72S/70E)	0.00 -10.00	DEB	Newberry Volcano?	1.7 ± 0.1	NM ± NM	—
35-DS-555	732	1	A	EXU (72S/70E)	-10.00 -20.00	DEB	Newberry Volcano	3.3 ± NM	NM ± NM	Weathered
35-DS-555	732	1	B	EXU (72S/70E)	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-555	732	1	C	EXU (72S/70E)	-10.00 -20.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-555	733	1	A	EXU (72S/70E)	-20.00 -30.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-DS-555	734	2	—	EXU (72S/70E)	-30.00 -40.00	UFT	Newberry Volcano	2.4 ± NM	NM ± NM	Weathered
35-DS-555	735	1	A	EXU (72S/70E)	-40.00 -50.00	DEB	Newberry Volcano	2.7 ± NM	NM ± NM	Weathered
35-DS-555	738	1	A	EXU (72S/72E)	0.00 -10.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-555	738	2	—	EXU (72S/72E)	0.00 -10.00	PPT	Obsidian Cliffs	1.1 ± NM	NM ± NM	—
35-DS-555	739	1	A	EXU (72S/72E)	-10.00 -20.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-555	739	1	B	EXU (72S/72E)	-10.00 -20.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Rim approx. 2.2 microns
35-DS-555	739	1	C	EXU (72S/72E)	-10.00 -20.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	—
35-DS-555	740	1	A	EXU (72S/72E)	-20.00 -30.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-555	740	1	B	EXU (72S/72E)	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	2.9 ± 0.1	NM ± NM	—
35-DS-555	740	1	C	EXU (72S/72E)	-20.00 -30.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Rim approx. 2.2 microns
35-DS-555	741	2	—	EXU (72S/72E)	-30.00 -40.00	UFT	Newberry Volcano	3.3 ± NM	NM ± NM	—
35-DS-555	742	1	A	EXU (72S/72E)	-40.00 -50.00	DEB	Newberry Volcano?	3.3 ± 0.1	NM ± NM	—
35-DS-555	743	1	A	EXU (72S/72E)	-50.00 -60.00	DEB	Newberry Volcano?	3.5 ± 0.2	NM ± NM	—
35-DS-555	743	1	B	EXU (72S/72E)	-50.00 -60.00	DEB	Newberry Volcano/Unknown X?	2.7 ± NM	NM ± NM	—
35-DS-555	751	2	—	EXU (75S/73E)	4.00 -10.00	UFT	Newberry Volcano	DH ± NM	NM ± NM	Weathered
35-DS-555	752	2	—	EXU (75S/73E)	-10.00 -20.00	UFT	Newberry Volcano/Unknown X?	1.7 ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	1	1	—	SCP 1	0.00 0.00	PPT	Quartz Mountain	2.8 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	2	1	—	SCP 2	0.00	0.00	BIF Quartz Mountain	2.7 ± 0.1	NM ± NM	—
35-DS-557	4	1	—	SCP 4	0.00	0.00	PPT Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-557	6	1	—	SCP 6	0.00	0.00	BIF McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	7	1	—	SCP 7	0.00	0.00	BIF McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	8	1	—	SCP 8	0.00	0.00	BIF Unknown X	1.4 ± NM	NM ± NM	—
35-DS-557	9	1	—	SCP 9	0.00	0.00	UFT McKay Butte	2.7 ± 0.1	NM ± NM	—
35-DS-557	10	1	—	SCP 10	0.00	0.00	BIF Big Obsidian Flow	1.9 ± NM	NM ± NM	—
35-DS-557	11	1	—	SCP 11	0.00	0.00	BIF Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	12	1	—	SCP 12	0.00	0.00	BIF Big Obsidian Flow	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-557	13	1	A	SCU 1	0.00	0.00	DEB Unknown A	2.0 ± NM	NM ± NM	—
35-DS-557	13	1	B	SCU 1	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	—
35-DS-557	13	1	C	SCU 1	0.00	0.00	DEB Unknown X	3.7 ± 0.1	4.4 ± 0.1	2 hydration bands
35-DS-557	13	1	D	SCU 1	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	13	1	E	SCU 1	0.00	0.00	DEB Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-DS-557	13	1	F	SCU 1	0.00	0.00	DEB Newberry Volcano	1.8 ± 0.1	NM ± NM	Weathered
35-DS-557	13	1	G	SCU 1	0.00	0.00	DEB Newberry Volcano	3.8 ± NM	NM ± NM	—
35-DS-557	13	1	H	SCU 1	0.00	0.00	DEB Newberry Volcano	1.2 ± NM	NM ± NM	—
35-DS-557	13	1	I	SCU 1	0.00	0.00	DEB Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-DS-557	13	1	J	SCU 1	0.00	0.00	DEB McKay Butte	2.6 ± 0.1	NM ± NM	—
35-DS-557	13	1	K	SCU 1	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-557	13	1	L	SCU 1	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	13	1	M	SCU 1	0.00	0.00	DEB Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-557	13	1	N	SCU 1	0.00	0.00	DEB Newberry Volcano	3.9 ± 0.1	NM ± NM	—
35-DS-557	13	1	O	SCU 1	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	14	1	—	SCU 1	0.00	0.00	PPT McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	18	1	A	SCU 5	0.00	0.00	DEB Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-557	18	1	B	SCU 5	0.00	0.00	DEB Newberry Volcano	4.1 ± 0.1	NM ± NM	—
35-DS-557	18	1	C	SCU 5	0.00	0.00	DEB Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-DS-557	18	1	D	SCU 5	0.00	0.00	DEB Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	18	1	E	SCU 5	0.00	0.00	DEB Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	18	1	F	SCU 5	0.00	0.00	DEB Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-DS-557	18	1	G	SCU 5	0.00	0.00	DEB Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-557	18	1	H	SCU 5	0.00	0.00	DEB Newberry Volcano	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	18	1	I	SCU 5	0.00	0.00	DEB Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-DS-557	18	1	J	SCU 5	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-557	18	1	K	SCU 5	0.00	0.00	DEB Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-DS-557	18	1	L	SCU 5	0.00	0.00	DEB Newberry Volcano	2.1 ± 0.1	NM ± NM	Weathered
35-DS-557	18	1	M	SCU 5	0.00	0.00	DEB Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-557	18	1	N	SCU 5	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	Weathered; No visible band

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	18	1	O	SCU 5	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	28	1	A	SCU 15	0.00	0.00	DEB McKay Butte	7.2 ± 0.2	NM ±NM	Weathered
35-DS-557	28	1	B	SCU 15	0.00	0.00	DEB McKay Butte	3.6 ± 0.1	NM ±NM	Weathered
35-DS-557	28	1	C	SCU 15	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	28	1	D	SCU 15	0.00	0.00	DEB Unknown X	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	28	1	E	SCU 15	0.00	0.00	DEB Newberry Volcano	4.0 ± 0.1	NM ±NM	—
35-DS-557	28	1	F	SCU 15	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	28	1	G	SCU 15	0.00	0.00	DEB Newberry Volcano	4.4 ± 0.1	NM ±NM	—
35-DS-557	28	1	H	SCU 15	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	28	1	I	SCU 15	0.00	0.00	DEB McKay Butte	3.2 ± 0.1	NM ±NM	Weathered
35-DS-557	28	1	J	SCU 15	0.00	0.00	DEB McKay Butte	7.0 ± 0.1	NM ±NM	Weathered
35-DS-557	28	1	K	SCU 15	0.00	0.00	DEB McKay Butte	7.4 ± 0.1	NM ±NM	Weathered
35-DS-557	28	1	L	SCU 15	0.00	0.00	DEB McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-557	28	1	M	SCU 15	0.00	0.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-557	28	1	N	SCU 15	0.00	0.00	DEB Newberry Volcano	3.5 ±NM	NM ±NM	—
35-DS-557	28	1	O	SCU 15	0.00	0.00	DEB Newberry Volcano	3.8 ± 0.1	NM ±NM	—
35-DS-557	42	1	A	SCU 29	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	42	1	B	SCU 29	0.00	0.00	DEB McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-557	42	1	C	SCU 29	0.00	0.00	DEB McKay Butte	3.0 ± 0.1	NM ±NM	Weathered
35-DS-557	42	1	D	SCU 29	0.00	0.00	DEB Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-557	42	1	E	SCU 29	0.00	0.00	DEB Quartz Mountain	2.0 ±NM	NM ±NM	—
35-DS-557	42	1	F	SCU 29	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	42	1	G	SCU 29	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	42	1	H	SCU 29	0.00	0.00	DEB McKay Butte	3.0 ± 0.1	NM ±NM	Weathered
35-DS-557	42	1	I	SCU 29	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	42	1	J	SCU 29	0.00	0.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-557	42	1	K	SCU 29	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	42	1	L	SCU 29	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	42	1	M	SCU 29	0.00	0.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-557	42	1	N	SCU 29	0.00	0.00	DEB McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-557	42	1	O	SCU 29	0.00	0.00	DEB Glass Buttes	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	47	1	A	SCU 34	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	47	1	B	SCU 34	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	47	1	C	SCU 34	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	47	1	D	SCU 34	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	47	1	E	SCU 34	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	47	1	F	SCU 34	0.00	0.00	DEB Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-DS-557	47	1	G	SCU 34	0.00	0.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-DS-557	47	1	H	SCU 34	0.00	0.00	DEB McKay Butte	2.0 ± 0.1	NM ±NM	Weathered

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	47	1	I	SCU 34	0.00	0.00	DEB Newberry Volcano	2.0 ± 0.1	NM ±NM	Weathered
35-DS-557	47	1	J	SCU 34	0.00	0.00	DEB Newberry Volcano	1.4 ± 0.1	NM ±NM	Weathered
35-DS-557	47	1	K	SCU 34	0.00	0.00	DEB Newberry Volcano	2.7 ±NM	NM ±NM	Weathered
35-DS-557	47	1	L	SCU 34	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	47	1	M	SCU 34	0.00	0.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	Weathered
35-DS-557	47	1	N	SCU 34	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	47	1	O	SCU 34	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	57	1	A	SCU 44	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	57	1	B	SCU 44	0.00	0.00	DEB McKay Butte	8.0 ± 0.1	NM ±NM	—
35-DS-557	57	1	C	SCU 44	0.00	0.00	DEB Unknown X	4.3 ± 0.1	NM ±NM	—
35-DS-557	57	1	D	SCU 44	0.00	0.00	DEB Newberry Volcano	2.6 ±NM	NM ±NM	—
35-DS-557	57	1	E	SCU 44	0.00	0.00	DEB McKay Butte	NVB ±NM	NM ±NM	No visible band
35-DS-557	57	1	F	SCU 44	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	57	1	G	SCU 44	0.00	0.00	DEB Unknown X	4.8 ± 0.1	NM ±NM	—
35-DS-557	57	1	H	SCU 44	0.00	0.00	DEB Newberry Volcano	4.1 ± 0.1	NM ±NM	—
35-DS-557	57	1	I	SCU 44	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	57	1	J	SCU 44	0.00	0.00	DEB Unknown X	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	57	1	K	SCU 44	0.00	0.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-557	57	1	L	SCU 44	0.00	0.00	DEB McKay Butte	2.5 ± 0.1	NM ±NM	—
35-DS-557	57	1	M	SCU 44	0.00	0.00	DEB Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-DS-557	57	5	A	SCU 44	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	—
35-DS-557	57	5	B	SCU 44	0.00	0.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	57	6	—	SCU 44	0.00	0.00	BIF Unknown X	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	57	7	—	SCU 44	0.00	0.00	UFT Newberry Volcano	3.9 ± 0.1	NM ±NM	—
35-DS-557	57	8	—	SCU 44	0.00	0.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	58	1	—	SCU 44	0.00	0.00	PPT Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	59	4	—	SCU 45	0.00	0.00	PPT McKay Butte	4.1 ± 0.1	NM ±NM	—
35-DS-557	63	3	—	SCU 49	0.00	0.00	BIF Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-557	63	4	—	SCU 49	0.00	0.00	BIF McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	64	1	—	SCU 49	0.00	0.00	PPT Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	65	5	—	SCU 50	0.00	0.00	BIF Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	66	1	—	SCU 50	0.00	0.00	PPT Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-557	67	4	—	SCU 51	0.00	0.00	UFT Big Obsidian Flow	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	68	1	—	SCU 51	0.00	0.00	PFT McKay Butte	7.2 ± 0.1	NM ±NM	—
35-DS-557	70	1	—	SCU 52	0.00	0.00	PPT McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	929	4	—	SHP 135	0.00	-20.00	UFT Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	1261	2	A	TEU 1	-60.00	-70.00	DEB McKay Butte	5.5 ± 0.1	NM ±NM	—
35-DS-557	1261	2	B	TEU 1	-60.00	-70.00	DEB Unknown X	4.0 ± 0.1	NM ±NM	—
35-DS-557	1261	2	C	TEU 1	-60.00	-70.00	DEB Unknown X	3.5 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-557	1261	2	D	TEU 1	-60.00	-70.00	DEB	Unknown X	3.3 ± 0.1	NM ± NM	—
35-DS-557	1261	2	E	TEU 1	-60.00	-70.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-557	1261	2	F	TEU 1	-60.00	-70.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-557	1261	2	G	TEU 1	-60.00	-70.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1261	2	H	TEU 1	-60.00	-70.00	DEB	McKay Butte	3.9 ± 0.2	NM ± NM	—
35-DS-557	1261	2	I	TEU 1	-60.00	-70.00	DEB	McKay Butte	6.1 ± 0.1	NM ± NM	—
35-DS-557	1262	2	A	TEU 1	-60.00	-70.00	DEB	Unknown X	3.6 ± 0.1	NM ± NM	—
35-DS-557	1262	2	B	TEU 1	-60.00	-70.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1262	2	C	TEU 1	-60.00	-70.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1262	2	D	TEU 1	-60.00	-70.00	DEB	Unknown X	3.8 ± NM	NM ± NM	—
35-DS-557	1262	2	E	TEU 1	-60.00	-70.00	DEB	Newberry Volcano	5.7 ± 0.1	NM ± NM	—
35-DS-557	1262	2	F	TEU 1	-60.00	-70.00	DEB	McKay Butte	3.4 ± 0.1	NM ± NM	—
35-DS-557	1281	2	A	TEU 2	0.00	-10.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-557	1281	2	B	TEU 2	0.00	-10.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-DS-557	1281	2	C	TEU 2	0.00	-10.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ± NM	Weathered
35-DS-557	1281	2	D	TEU 2	0.00	-10.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-557	1282	2	A	TEU 2	0.00	-10.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-DS-557	1283	1	A	TEU 2	-10.00	-20.00	DEB	Unknown X	1.5 ± NM	NM ± NM	—
35-DS-557	1283	1	B	TEU 2	-10.00	-20.00	DEB	Unknown X	1.4 ± NM	NM ± NM	—
35-DS-557	1285	2	A	TEU 2	-20.00	-30.00	DEB	Unknown X	NVB ± NM	NM ± NM	No visible band
35-DS-557	1287	2	A	TEU 2	-30.00	-40.00	DEB	Newberry Volcano	2.9 ± 2.0	NM ± NM	—
35-DS-557	1287	2	B	TEU 2	-30.00	-40.00	DEB	Unknown X	1.5 ± 0.1	NM ± NM	—
35-DS-557	1288	1	A	TEU 2	-30.00	-40.00	DEB	Newberry Volcano/Unknown X	1.3 ± 0.1	NM ± NM	—
35-DS-557	1288	1	B	TEU 2	-30.00	-40.00	DEB	Newberry Volcano/Unknown X	2.4 ± 0.1	NM ± NM	—
35-DS-557	1289	2	A	TEU 2	-40.00	-50.00	DEB	Unknown B	NVB ± NM	NM ± NM	No visible band
35-DS-557	1289	2	B	TEU 2	-40.00	-50.00	DEB	Newberry Volcano	2.6 ± NM	NM ± NM	—
35-DS-557	1290	1	—	TEU 2	-40.00	-50.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	Weathered
35-DS-557	1305	5	—	TEU 3	-50.00	-60.00	PPT	Newberry Volcano/Unknown X	2.7 ± NM	NM ± NM	—
35-DS-557	1309	2	A	TEU 3	-66.00	-70.00	DEB	McKay Butte	8.4 ± 0.1	NM ± NM	—
35-DS-557	1309	2	B	TEU 3	-66.00	-70.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ± NM	—
35-DS-557	1309	2	C	TEU 3	-66.00	-70.00	DEB	McKay Butte	5.0 ± 0.1	NM ± NM	—
35-DS-557	1309	2	D	TEU 3	-66.00	-70.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-557	1309	2	E	TEU 3	-66.00	-70.00	DEB	McKay Butte	5.9 ± 0.1	NM ± NM	—
35-DS-557	1309	2	F	TEU 3	-66.00	-70.00	DEB	McKay Butte	7.5 ± 0.1	NM ± NM	—
35-DS-557	1309	2	G	TEU 3	-66.00	-70.00	DEB	Newberry Volcano	3.3 ± 0.2	NM ± NM	—
35-DS-557	1309	2	H	TEU 3	-66.00	-70.00	DEB	Newberry Volcano	3.0 ± NM	NM ± NM	—
35-DS-557	1309	2	I	TEU 3	-66.00	-70.00	DEB	McKay Butte	7.0 ± 0.1	NM ± NM	—
35-DS-557	1309	2	J	TEU 3	-66.00	-70.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1309	2	K	TEU 3	-66.00	-70.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	1309	2	L	TEU 3	-66.00 -70.00	DEB	McKay Butte	7.3 ± 0.1	NM ± NM	—
35-DS-557	1309	2	M	TEU 3	-66.00 -70.00	DEB	McKay Butte	6.9 ± 0.1	NM ± NM	—
35-DS-557	1309	3	—	TEU 3	-66.00 -70.00	BIF	Unknown X	3.6 ± 0.1	NM ± NM	—
35-DS-557	1310	2	A	TEU 3	-66.00 -70.00	DEB	Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1310	2	B	TEU 3	-66.00 -70.00	DEB	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	1310	2	C	TEU 3	-66.00 -70.00	DEB	McKay Butte	2.7 ± NM	NM ± NM	—
35-DS-557	1337	2	—	EXU (250S/409E)	-68.00 -78.00	BIF	Unknown X	4.4 ± 0.1	NM ± NM	—
35-DS-557	1338	3	—	EXU (250S/409E)	-68.00 -78.00	BIF	Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1350	3	—	EXU (250S/410E)	-78.00 -88.00	BIF	Unknown X	5.5 ± 0.1	NM ± NM	—
35-DS-557	1406	1	A	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte/Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1406	1	B	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.9 ± 0.1	NM ± NM	—
35-DS-557	1406	1	C	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1406	1	D	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano/Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-557	1406	1	E	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1406	1	F	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.8 ± 0.2	NM ± NM	—
35-DS-557	1406	1	G	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.7 ± NM	NM ± NM	—
35-DS-557	1406	1	H	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	6.1 ± 0.1	NM ± NM	—
35-DS-557	1406	1	I	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1406	1	J	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte?	3.8 ± 0.1	NM ± NM	—
35-DS-557	1406	1	K	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte?	3.7 ± 0.1	NM ± NM	—
35-DS-557	1406	1	L	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte?	3.7 ± 0.1	NM ± NM	—
35-DS-557	1406	1	M	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.8 ± 0.2	NM ± NM	—
35-DS-557	1406	1	N	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1406	1	O	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano/Unknown X	3.6 ± NM	NM ± NM	—
35-DS-557	1406	1	P	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	4.5 ± 0.1	NM ± NM	—
35-DS-557	1406	1	Q	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.6 ± 0.1	NM ± NM	—
35-DS-557	1406	1	R	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-557	1406	1	S	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1406	1	T	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	7.7 ± 0.1	NM ± NM	—
35-DS-557	1406	1	U	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.8 ± NM	NM ± NM	—
35-DS-557	1406	1	V	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.6 ± NM	NM ± NM	—
35-DS-557	1406	1	W	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-557	1406	1	X	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	4.2 ± 0.2	NM ± NM	—
35-DS-557	1406	1	Y	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano/Unknown X	3.9 ± 0.1	NM ± NM	—
35-DS-557	1408	1	A	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1408	1	B	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-557	1408	1	C	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.4 ± 0.2	NM ± NM	—
35-DS-557	1408	1	D	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1408	1	E	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.8 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	1408	1	F	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	5.0 ± 0.1	NM ±NM	—
35-DS-557	1408	1	G	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.2 ±NM	NM ±NM	—
35-DS-557	1408	1	H	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte/Unknown X	3.3 ± 0.2	NM ±NM	—
35-DS-557	1408	1	I	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.7 ± 0.1	NM ±NM	—
35-DS-557	1408	1	J	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	6.4 ± 0.1	NM ±NM	—
35-DS-557	1408	1	K	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.6 ±NM	NM ±NM	—
35-DS-557	1408	1	L	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.6 ± 0.1	NM ±NM	—
35-DS-557	1408	1	M	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.8 ±NM	NM ±NM	—
35-DS-557	1408	1	N	EXU (271S/399E)	-62.00 -75.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1408	1	O	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	4.1 ± 0.1	NM ±NM	—
35-DS-557	1408	1	P	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-DS-557	1408	1	Q	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano/Unknown X	3.4 ± 0.1	NM ±NM	—
35-DS-557	1408	1	R	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-DS-557	1408	1	S	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano/Unknown X	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1408	1	T	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano/Unknown X	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1408	1	U	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano/Unknown X	2.8 ± 0.1	NM ±NM	—
35-DS-557	1408	1	V	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-DS-557	1408	1	W	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.5 ± 0.1	NM ±NM	—
35-DS-557	1408	1	X	EXU (271S/399E)	-62.00 -75.00	DEB	Newberry Volcano/Unknown X	NVB ±NM	NM ±NM	No visible band
35-DS-557	1409	1	A	EXU (271S/399E)	-62.00 -75.00	DEB	Unknown X	3.7 ± 0.1	NM ±NM	—
35-DS-557	1415	2	—	EXU (272S/399E)	-65.00 -75.00	BIF	Unknown X	3.5 ± 0.1	NM ±NM	—
35-DS-557	1416	3	—	EXU (272S/399E)	-65.00 -75.00	BIF	Unknown X	4.3 ± 0.1	NM ±NM	—
35-DS-557	1421	1	—	EXU (272S/401E)	-60.00 -70.00	UFT	Unknown X	4.3 ± 0.1	NM ±NM	—
35-DS-557	1426	2	—	EXU (283S/410E)	-60.00 -68.00	COR	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1427	3	—	EXU (283S/410E)	-68.00 -78.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1428	1	—	EXU (283S/410E)	-78.00 -88.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1442	2	—	EXU (284S/415E)	-63.00 -69.00	BIF	McKay Butte	5.7 ± 0.1	NM ±NM	—
35-DS-557	1443	1	—	EXU (284S/415E)	-67.00 -68.00	UFT	McKay Butte	6.8 ± 0.1	NM ±NM	—
35-DS-557	1449	1	A	EXU (284S/417E)	-61.00 -71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1449	1	B	EXU (284S/417E)	-61.00 -71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1449	1	C	EXU (284S/417E)	-61.00 -71.00	DEB	Unknown X	3.1 ± 0.1	NM ±NM	—
35-DS-557	1449	1	D	EXU (284S/417E)	-61.00 -71.00	DEB	Newberry Volcano/Unknown X	3.0 ± 0.1	NM ±NM	—
35-DS-557	1449	1	E	EXU (284S/417E)	-61.00 -71.00	DEB	McKay Butte	5.6 ± 0.2	NM ±NM	—
35-DS-557	1449	1	F	EXU (284S/417E)	-61.00 -71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1449	1	G	EXU (284S/417E)	-61.00 -71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1449	1	H	EXU (284S/417E)	-61.00 -71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1449	1	I	EXU (284S/417E)	-61.00 -71.00	DEB	Unknown X	3.4 ± 0.1	NM ±NM	—
35-DS-557	1449	3	—	EXU (284S/417E)	-61.00 -71.00	UFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1449	4	—	EXU (284S/417E)	-61.00 -71.00	PPT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-557	1450	1	A	EXU (284S/417E)	-71.00	-81.00	DEB	Unknown X	3.2 ± 0.1	NM ± NM	—
35-DS-557	1465	3	—	EXU (285S/414E)	-59.00	-62.00	BIF	McKay Butte/Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-557	1474	2	—	EXU (285S/418E)	-64.00	-74.00	BIF	Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1476	1	A	EXU (285S/418E)	-64.00	-74.00	DEB	McKay Butte	5.8 ± 0.1	NM ± NM	—
35-DS-557	1476	1	B	EXU (285S/418E)	-64.00	-74.00	DEB	McKay Butte	6.0 ± NM	6.5 ± 0.1	2 hydration bands
35-DS-557	1476	1	C	EXU (285S/418E)	-64.00	-74.00	DEB	McKay Butte	5.0 ± NM	NM ± NM	—
35-DS-557	1476	1	D	EXU (285S/418E)	-64.00	-74.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1476	1	E	EXU (285S/418E)	-64.00	-74.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1476	3	—	EXU (285S/418E)	-64.00	-74.00	UFT	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1477	2	—	EXU (285S/418E)	-64.00	-74.00	PPT	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1479	1	A	EXU (285S/418E)	-74.00	-84.00	DEB	Newberry Volcano/Unknown X	3.3 ± 0.1	NM ± NM	—
35-DS-557	1479	1	B	EXU (285S/418E)	-74.00	-84.00	DEB	McKay Butte	5.3 ± 0.1	NM ± NM	—
35-DS-557	1492	1	A	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	6.9 ± 0.1	NM ± NM	—
35-DS-557	1492	1	B	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	6.8 ± 0.1	NM ± NM	—
35-DS-557	1492	1	C	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	D	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	E	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	F	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	6.4 ± 0.1	NM ± NM	—
35-DS-557	1492	1	G	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	7.2 ± NM	NM ± NM	—
35-DS-557	1492	1	H	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	6.8 ± 0.1	NM ± NM	—
35-DS-557	1492	1	I	EXU (286S/410E)	-68.00	-78.00	DEB	Unknown X	3.6 ± NM	NM ± NM	—
35-DS-557	1492	1	J	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	K	EXU (286S/410E)	-68.00	-78.00	DEB	Unknown X	4.3 ± NM	NM ± NM	—
35-DS-557	1492	1	L	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	M	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	N	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	6.7 ± 0.1	NM ± NM	—
35-DS-557	1492	1	O	EXU (286S/410E)	-68.00	-78.00	DEB	Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	P	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte/Unknown X	6.5 ± 0.2	NM ± NM	—
35-DS-557	1492	1	Q	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	R	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	7.5 ± 0.1	NM ± NM	—
35-DS-557	1492	1	S	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	T	EXU (286S/410E)	-68.00	-78.00	DEB	Unknown X	4.6 ± 0.1	NM ± NM	—
35-DS-557	1492	1	U	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1492	1	V	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-557	1492	1	W	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	1492	1	X	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	6.9 ± 0.1	NM ± NM	—
35-DS-557	1492	1	Y	EXU (286S/410E)	-68.00	-78.00	DEB	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	1492	3	—	EXU (286S/410E)	-68.00	-78.00	COR	McKay Butte/Unknown X	4.6 ± 0.1	NM ± NM	—
35-DS-557	1518	1	A	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-DS-557	1518	1	B	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	C	EXU (288S/415E)	-61.00	-71.00	DEB	Unknown X	3.4 ± 0.1	NM ±NM	—
35-DS-557	1518	1	D	EXU (288S/415E)	-61.00	-71.00	DEB	Unknown X	3.2 ± 0.1	NM ±NM	—
35-DS-557	1518	1	E	EXU (288S/415E)	-61.00	-71.00	DEB	Unknown X	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	F	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	7.2 ± 0.1	NM ±NM	—
35-DS-557	1518	1	G	EXU (288S/415E)	-61.00	-71.00	DEB	Unknown X	3.9 ± 0.1	NM ±NM	—
35-DS-557	1518	1	H	EXU (288S/415E)	-61.00	-71.00	DEB	Unknown X	2.8 ± 0.1	NM ±NM	—
35-DS-557	1518	1	I	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	J	EXU (288S/415E)	-61.00	-71.00	DEB	Unknown X	3.6 ±NM	NM ±NM	—
35-DS-557	1518	1	K	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	L	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	M	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	6.3 ± 0.2	NM ±NM	—
35-DS-557	1518	1	N	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	O	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	P	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	Q	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	6.2 ±NM	NM ±NM	—
35-DS-557	1518	1	R	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	6.9 ± 0.1	NM ±NM	—
35-DS-557	1518	1	S	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	T	EXU (288S/415E)	-61.00	-71.00	DEB	Unknown X	3.4 ±NM	NM ±NM	—
35-DS-557	1518	1	U	EXU (288S/415E)	-61.00	-71.00	DEB	Unknown X	4.1 ± 0.1	NM ±NM	—
35-DS-557	1518	1	V	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	W	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	X	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	1	Y	EXU (288S/415E)	-61.00	-71.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	3	—	EXU (288S/415E)	-61.00	-71.00	BIF	McKay Butte?	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1518	4	—	EXU (288S/415E)	-61.00	-71.00	BIF	McKay Butte	8.3 ± 0.1	NM ±NM	—
35-DS-557	1520	1	A	EXU (288S/415E)	-71.00	-81.00	DEB	Unknown X	4.9 ± 0.1	NM ±NM	—
35-DS-557	1520	1	B	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	C	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	7.1 ± 0.2	NM ±NM	—
35-DS-557	1520	1	D	EXU (288S/415E)	-71.00	-81.00	DEB	Unknown X	4.7 ± 0.1	NM ±NM	—
35-DS-557	1520	1	E	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	1520	1	F	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	6.7 ± 0.1	NM ±NM	—
35-DS-557	1520	1	G	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	1520	1	H	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	6.7 ± 0.1	NM ±NM	Weathered
35-DS-557	1520	1	I	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	7.2 ±NM	NM ±NM	—
35-DS-557	1520	1	J	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	K	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	L	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	7.3 ± 0.1	NM ±NM	—
35-DS-557	1520	1	M	EXU (288S/415E)	-71.00	-81.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	1520	1	N	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte	7.2 ±NM	NM ±NM	—
35-DS-557	1520	1	O	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	P	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte/Unknown X?	7.5 ± 0.1	NM ±NM	—
35-DS-557	1520	1	Q	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	R	EXU (288S/415E)	-71.00	-81.00	DEB Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-DS-557	1520	1	S	EXU (288S/415E)	-71.00	-81.00	DEB Silver Lake/Sycan Marsh?	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	T	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	U	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	V	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte	7.3 ± 0.1	NM ±NM	—
35-DS-557	1520	1	W	EXU (288S/415E)	-71.00	-81.00	DEB Newberry Volcano/Unknown X	4.2 ± 0.1	NM ±NM	—
35-DS-557	1520	1	X	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	1	Y	EXU (288S/415E)	-71.00	-81.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1520	3	—	EXU (288S/415E)	-71.00	-81.00	BIF McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1526	3	—	EXU (239S/417E)	-61.00	-71.00	DEB Unknown X	3.9 ±NM	NM ±NM	—
35-DS-557	1526	4	—	EXU (289S/417E)	-61.00	-71.00	UFT McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1534	3	—	EXU (293S/419E)	-60.00	-70.00	BIF McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1534	4	—	EXU (293S/419E)	-60.00	-70.00	BIF Unknown X	3.1 ± 0.1	NM ±NM	—
35-DS-557	1547	2	—	EXU (298S/400E)	-74.00	-84.00	UFT McKay Butte	6.5 ± 0.1	NM ±NM	—
35-DS-557	1553	4	—	EXU (301S/400E)	-64.00	-74.00	UFT McKay Butte	6.3 ± 0.1	NM ±NM	—
35-DS-557	1560	2	—	EXU (304S/398E)	-22.00	-32.00	UFT McKay Butte	5.0 ±NM	NM ±NM	—
35-DS-557	1570	1	A	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	1.5 ± 0.1	NM ±NM	Weathered
35-DS-557	1570	1	B	EXU (306S/400E)	0.00	-9.00	DEB McKay Butte/Unknown X?	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-557	1570	1	C	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	1.5 ±NM	NM ±NM	—
35-DS-557	1570	1	D	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	1.5 ±NM	NM ±NM	—
35-DS-557	1570	1	E	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-557	1570	1	F	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-557	1570	1	G	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-557	1570	1	H	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1570	1	I	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-557	1570	1	J	EXU (306S/400E)	0.00	-9.00	DEB Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-DS-557	1571	1	A	EXU (306S/400E)	-9.00	-19.00	DEB Newberry Volcano	1.3 ±NM	NM ±NM	—
35-DS-557	1571	1	B	EXU (306S/400E)	-9.00	-19.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	1571	1	C	EXU (306S/400E)	-9.00	-19.00	DEB Newberry Volcano	DH ± 2.0	NM ±NM	Weathered; Diffuse hydration
35-DS-557	1571	1	D	EXU (306S/400E)	-9.00	-19.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1571	1	E	EXU (306S/400E)	-9.00	-19.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1571	1	F	EXU (306S/400E)	-9.00	-19.00	DEB Unknown X	2.7 ± 0.1	NM ±NM	—
35-DS-557	1571	1	G	EXU (306S/400E)	-9.00	-19.00	DEB McKay Butte	3.0 ± 0.1	NM ±NM	—
35-DS-557	1571	1	H	EXU (306S/400E)	-9.00	-19.00	DEB McKay Butte/Unknown X?	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1571	1	I	EXU (306S/400E)	-9.00	-19.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-557	1571	1	J	EXU (306S/400E)	-9.00	-19.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1585	1	—	SCP 101	0.00	0.00	BIF	Newberry Volcano	1.7 ±NM	NM ±NM	—
35-DS-557	1586	1	—	SCP 102	0.00	0.00	PPT	Silver Lake/Sycan Marsh	3.1 ± 0.1	NM ±NM	—
35-DS-557	1587	1	—	SCP 103	0.00	0.00	PPT	Big Obsidian Flow	1.1 ±NM	NM ±NM	—
35-DS-557	1588	1	—	SCP 104	0.00	0.00	PPT	Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-557	1590	1	—	SCP 106	0.00	0.00	PPT	Newberry Volcano?	4.2 ± 0.1	NM ±NM	—
35-DS-557	1591	2	—	SCU 551	0.00	0.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1592	1	—	SCU 552	0.00	0.00	BIF	Unknown X	3.7 ±NM	NM ±NM	—
35-DS-557	1592	2	—	SCU 552	0.00	0.00	COR	McKay Butte	8.0 ± 0.1	NM ±NM	—
35-DS-557	1641	1	—	SHP 524 (270S/430E)	0.00	-20.00	UFT	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-557	1653	2	—	SHP 530 (313S/399E)	0.00	-20.00	BIF	Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-DS-557	1718	2	—	SHP 562 (285S/411E)	0.00	-20.00	UFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1813	2	—	SHP 610 (245S/402E)	0.00	-20.00	BIF	McKay Butte	6.1 ± 0.1	NM ±NM	—
35-DS-557	1822	2	—	SHP 615 (245S/411E)	15.00	0.00	UFT	Unknown X	3.6 ± 0.1	NM ±NM	—
35-DS-557	1834	5	—	EXU (248S/410E)	-56.00	-67.00	BIF	Big Obsidian Flow	3.2 ± 0.1	NM ±NM	—
35-DS-557	1837	3	—	EXU (248S/410E)	-77.00	-87.00	UFT	Unknown X	3.5 ± 0.1	NM ±NM	—
35-DS-557	1846	3	—	EXU (249S/410E)	-58.00	-68.00	BIF	McKay Butte	7.1 ± 0.1	NM ±NM	—
35-DS-557	1846	4	—	EXU (249S/410E)	-58.00	-68.00	UFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1850	4	—	EXU (249S/410E)	-68.00	-78.00	UFT	Unknown X	4.2 ± 0.1	NM ±NM	—
35-DS-557	1850	5	—	EXU (249S/410E)	-68.00	-78.00	UFT	Unknown X	5.0 ± 0.1	NM ±NM	—
35-DS-557	1850	6	—	EXU (249S/410E)	-68.00	-78.00	UFT	Unknown X	4.4 ± 0.1	NM ±NM	—
35-DS-557	1859	1	A	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.1 ± 0.1	NM ±NM	—
35-DS-557	1859	1	B	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	4.2 ± 0.1	NM ±NM	—
35-DS-557	1859	1	C	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.9 ±NM	NM ±NM	—
35-DS-557	1859	1	D	EXU (249S/411E)	-56.00	-68.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1859	1	E	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	4.0 ± 0.1	NM ±NM	—
35-DS-557	1859	1	F	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	4.3 ±NM	NM ±NM	—
35-DS-557	1859	1	G	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.6 ± 0.1	NM ±NM	—
35-DS-557	1859	1	H	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.7 ± 0.1	NM ±NM	—
35-DS-557	1859	1	I	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.6 ± 0.1	NM ±NM	—
35-DS-557	1859	1	J	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.1 ± 0.1	NM ±NM	—
35-DS-557	1859	1	K	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.7 ± 0.1	NM ±NM	—
35-DS-557	1859	1	L	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.5 ± 0.1	NM ±NM	—
35-DS-557	1859	1	M	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.8 ± 0.1	NM ±NM	—
35-DS-557	1859	1	N	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	3.7 ±NM	NM ±NM	—
35-DS-557	1859	1	O	EXU (249S/411E)	-56.00	-68.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1859	1	P	EXU (249S/411E)	-56.00	-68.00	DEB	McKay Butte	6.8 ± 0.1	NM ±NM	—
35-DS-557	1859	1	Q	EXU (249S/411E)	-56.00	-68.00	DEB	Unknown X	4.3 ±NM	NM ±NM	—
35-DS-557	1859	1	R	EXU (249S/411E)	-56.00	-68.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	1859	1	S	EXU (249S/411E)	-56.00	-68.00	DEB Unknown X	4.0 ± 0.1	NM ± NM	—
35-DS-557	1859	1	T	EXU (249S/411E)	-56.00	-68.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1859	1	U	EXU (249S/411E)	-56.00	-68.00	DEB Unknown X	3.0 ± 0.1	NM ± NM	—
35-DS-557	1859	1	V	EXU (249S/411E)	-56.00	-68.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1859	1	W	EXU (249S/411E)	-56.00	-68.00	DEB Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-557	1859	1	X	EXU (249S/411E)	-56.00	-68.00	DEB Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-557	1859	1	Y	EXU (249S/411E)	-56.00	-68.00	DEB Unknown X	3.7 ± NM	NM ± NM	—
35-DS-557	1859	3	—	EXU (249S/411E)	-56.00	-68.00	BIF McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	A	EXU (249S/411E)	-68.00	-78.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	B	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-557	1861	1	C	EXU (249S/411E)	-68.00	-78.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	D	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1861	1	E	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	F	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	3.6 ± NM	NM ± NM	—
35-DS-557	1861	1	G	EXU (249S/411E)	-68.00	-78.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	H	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-557	1861	1	I	EXU (249S/411E)	-68.00	-78.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	J	EXU (249S/411E)	-68.00	-78.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	K	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	3.4 ± 0.1	NM ± NM	—
35-DS-557	1861	1	L	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-557	1861	1	M	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	4.0 ± 0.1	NM ± NM	—
35-DS-557	1861	1	N	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	4.3 ± NM	NM ± NM	—
35-DS-557	1861	1	O	EXU (249S/411E)	-68.00	-78.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	P	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	3.6 ± 0.1	NM ± NM	—
35-DS-557	1861	1	Q	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	3.7 ± NM	NM ± NM	—
35-DS-557	1861	1	R	EXU (249S/411E)	-68.00	-78.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	S	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	3.9 ± 0.1	NM ± NM	—
35-DS-557	1861	1	T	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1861	1	U	EXU (249S/411E)	-68.00	-78.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1861	1	V	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	4.3 ± 0.1	NM ± NM	—
35-DS-557	1861	1	W	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-557	1861	1	X	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	4.0 ± NM	NM ± NM	—
35-DS-557	1861	1	Y	EXU (249S/411E)	-68.00	-78.00	DEB Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1861	4	—	EXU (249S/411E)	-68.00	-78.00	BIF Unknown X	4.2 ± NM	NM ± NM	—
35-DS-557	1861	6	—	EXU (249S/411E)	-68.00	-78.00	UFT Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-557	1861	7	—	EXU (249S/411E)	-68.00	-78.00	UFT McKay Butte	4.0 ± NM	NM ± NM	—
35-DS-557	1861	8	—	EXU (249S/411E)	-68.00	-78.00	UFT Unknown X	4.3 ± 0.1	NM ± NM	—
35-DS-557	1861	9	—	EXU (249S/411E)	-68.00	-78.00	BIF Unknown X	4.3 ± 0.1	NM ± NM	—
35-DS-557	1863	1	A	EXU (249S/411E)	-78.00	-88.00	DEB Unknown X	4.0 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-557	1863	1	B	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.0 ± 0.1	NM ± NM	—
35-DS-557	1863	1	C	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.1 ± NM	NM ± NM	—
35-DS-557	1863	1	D	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	3.9 ± NM	NM ± NM	—
35-DS-557	1863	1	E	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	5.4 ± 0.1	NM ± NM	—
35-DS-557	1863	1	F	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.5 ± 0.1	NM ± NM	—
35-DS-557	1863	1	G	EXU (249S/411E)	-78.00	-88.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-557	1863	1	H	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.0 ± 0.1	NM ± NM	—
35-DS-557	1863	1	I	EXU (249S/411E)	-78.00	-88.00	DEB	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	1863	1	J	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.2 ± NM	NM ± NM	—
35-DS-557	1863	1	K	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-557	1863	1	L	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1863	1	M	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.6 ± NM	NM ± NM	—
35-DS-557	1863	1	N	EXU (249S/411E)	-78.00	-88.00	DEB	Newberry Volcano	4.1 ± NM	NM ± NM	—
35-DS-557	1863	1	O	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.3 ± 0.1	NM ± NM	—
35-DS-557	1863	1	P	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	3.4 ± 0.1	NM ± NM	—
35-DS-557	1863	1	Q	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.8 ± 0.1	NM ± NM	—
35-DS-557	1863	1	R	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.7 ± 0.1	NM ± NM	—
35-DS-557	1863	1	S	EXU (249S/411E)	-78.00	-88.00	DEB	McKay Butte	5.2 ± 0.1	NM ± NM	—
35-DS-557	1863	1	T	EXU (249S/411E)	-78.00	-88.00	DEB	McKay Butte	7.8 ± 0.1	NM ± NM	—
35-DS-557	1863	1	U	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1863	1	V	EXU (249S/411E)	-78.00	-88.00	DEB	Newberry Volcano/Unknown X	4.5 ± 0.1	NM ± NM	—
35-DS-557	1863	1	W	EXU (249S/411E)	-78.00	-88.00	DEB	Newberry Volcano/Unknown X	5.2 ± 0.1	NM ± NM	—
35-DS-557	1863	1	X	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	3.5 ± 0.1	NM ± NM	—
35-DS-557	1863	1	Y	EXU (249S/411E)	-78.00	-88.00	DEB	Unknown X	4.6 ± 0.1	NM ± NM	—
35-DS-557	1865	3	—	EXU (250S/411E)	-58.00	-67.00	COR	Unknown X	4.4 ± 0.1	NM ± NM	—
35-DS-557	1866	2	—	EXU (250S/411E)	-67.00	-77.00	UFT	Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-557	1867	4	—	EXU (250S/411E)	-67.00	-77.00	BIF	Unknown X	2.9 ± 0.1	NM ± NM	—
35-DS-557	1869	3	—	EXU (250S/411E)	-77.00	-87.00	BIF	Unknown X	4.7 ± 0.1	NM ± NM	—
35-DS-557	1902	2	—	EXU (271S/398E)	-75.00	-85.00	BIF	McKay Butte	5.1 ± 0.1	NM ± NM	—
35-DS-557	1910	2	—	EXU (271S/411E)	-86.00	-96.00	UFT	McKay Butte	5.0 ± 0.1	NM ± NM	—
35-DS-557	1937	1	—	EXU (285S/409E)	-64.00	-64.00	UFT	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1944	2	—	EXU (285S/410E)	-68.00	-78.00	UFT	Unknown X	4.1 ± 0.1	NM ± NM	—
35-DS-557	1945	3	—	EXU (285S/410E)	-68.00	-78.00	BIF	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	1972	1	A	EXU (286S/400E)	-59.00	-69.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1972	1	B	EXU (286S/400E)	-59.00	-69.00	DEB	McKay Butte	4.5 ± 0.1	NM ± NM	—
35-DS-557	1972	1	C	EXU (286S/400E)	-59.00	-69.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1972	1	D	EXU (286S/400E)	-59.00	-69.00	DEB	Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1972	1	E	EXU (286S/400E)	-59.00	-69.00	DEB	Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	1972	1	F	EXU (286S/400E)	-59.00	-69.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	1972	1	G	EXU (286S/400E)	-59.00 -69.00	DEB	McKay Butte/Unknown X?	7.1 ± 0.2	NM ±NM	—
35-DS-557	1972	1	H	EXU (286S/400E)	-59.00 -69.00	DEB	McKay Butte	3.8 ± 0.1	NM ±NM	—
35-DS-557	1972	1	I	EXU (286S/400E)	-59.00 -69.00	DEB	Unknown X	7.1 ± 0.1	NM ±NM	—
35-DS-557	1972	1	J	EXU (286S/400E)	-59.00 -69.00	DEB	McKay Butte	4.4 ± 0.1	NM ±NM	—
35-DS-557	1972	1	K	EXU (286S/400E)	-59.00 -69.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1972	1	L	EXU (286S/400E)	-59.00 -69.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1972	1	M	EXU (286S/400E)	-59.00 -69.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1973	1	A	EXU (286S/400E)	-59.00 -69.00	DEB	McKay Butte	4.0 ±NM	NM ±NM	—
35-DS-557	1975	1	A	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	6.7 ± 0.1	NM ±NM	—
35-DS-557	1975	1	B	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1975	1	C	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	4.8 ±NM	NM ±NM	—
35-DS-557	1975	1	D	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1975	1	E	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	4.3 ±NM	NM ±NM	—
35-DS-557	1975	1	F	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	4.3 ±NM	NM ±NM	—
35-DS-557	1977	1	A	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1977	1	B	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	5.5 ± 0.1	NM ±NM	—
35-DS-557	1978	1	A	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1978	1	B	EXU (286S/400E)	-69.00 -79.00	DEB	Unknown X	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1978	1	C	EXU (286S/400E)	-69.00 -79.00	DEB	McKay Butte	6.7 ± 0.1	NM ±NM	—
35-DS-557	1992	5	—	EXU (287S/410E)	-68.00 -78.00	UFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	1994	1	—	EXU (287S/410E)	-73.00 -73.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2009	2	—	EXU (287S/412E)	-58.00 -68.00	BIF	McKay Butte	6.3 ± 0.1	NM ±NM	—
35-DS-557	2009	3	—	EXU (287S/412E)	-58.00 -68.00	BIF	Unknown X	5.2 ± 0.1	NM ±NM	—
35-DS-557	2010	3	—	EXU (287S/412E)	-68.00 -78.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2015	2	—	EXU (287S/414E)	-58.00 -68.00	BIF	McKay Butte	7.3 ± 0.1	NM ±NM	—
35-DS-557	2015	3	—	EXU (287S/414E)	-58.00 -68.00	UFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2024	3	—	EXU (288S/410E)	-58.00 -68.00	UFT	Unknown X	3.9 ± 0.1	NM ±NM	—
35-DS-557	2032	2	—	EXU (288S/411E)	-68.00 -78.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2032	3	—	EXU (288S/411E)	-68.00 -78.00	BIF	McKay Butte	8.2 ± 0.2	NM ±NM	—
35-DS-557	2037	3	—	EXU (288S/412E)	-48.00 -58.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2041	5	—	EXU (288S/412E)	-68.00 -78.00	COR	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2042	1	—	EXU (288S/412E)	-70.00 -70.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2049	3	—	EXU (288S/413E)	-68.00 -78.00	UFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2049	4	—	EXU (288S/413E)	-68.00 -78.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2054	3	—	EXU (289S/412E)	-47.00 -58.00	DEB	McKay Butte	7.4 ± 0.1	NM ±NM	—
35-DS-557	2057	1	A	EXU (289S/412E)	-58.00 -68.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	B	EXU (289S/412E)	-58.00 -68.00	DEB	Unknown X	NVB ±NM	NM ±NM	No visible band
35-DS-557	2057	1	C	EXU (289S/412E)	-58.00 -68.00	DEB	McKay Butte	6.2 ± 0.1	NM ±NM	—
35-DS-557	2057	1	D	EXU (289S/412E)	-58.00 -68.00	DEB	McKay Butte	6.3 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-557	2057	1	E	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	F	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	G	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	H	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	I	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	J	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	7.2 ± 0.1	NM ±NM	—
35-DS-557	2057	1	K	EXU (289S/412E)	-58.00	-68.00	DEB Unknown X	3.9 ± 0.1	NM ±NM	—
35-DS-557	2057	1	L	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	M	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	N	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	O	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	P	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	6.8 ± 0.1	NM ±NM	—
35-DS-557	2057	1	Q	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	R	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	S	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2057	1	T	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	6.8 ± 0.1	NM ±NM	—
35-DS-557	2057	1	U	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	6.8 ±NM	NM ±NM	—
35-DS-557	2057	1	V	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	2057	1	W	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	7.0 ± 0.1	NM ±NM	—
35-DS-557	2057	1	X	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	7.0 ± 0.1	NM ±NM	—
35-DS-557	2057	1	Y	EXU (289S/412E)	-58.00	-68.00	DEB McKay Butte	6.2 ± 0.1	NM ±NM	—
35-DS-557	2058	1	A	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.6 ± 0.1	NM ±NM	—
35-DS-557	2058	1	B	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	6.9 ± 0.1	NM ±NM	—
35-DS-557	2058	1	C	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.4 ± 0.1	NM ±NM	—
35-DS-557	2058	1	D	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.6 ± 0.1	NM ±NM	—
35-DS-557	2058	1	E	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	6.4 ± 0.1	NM ±NM	—
35-DS-557	2058	1	F	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2058	1	G	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.7 ± 0.1	NM ±NM	—
35-DS-557	2058	1	H	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.7 ±NM	NM ±NM	—
35-DS-557	2058	1	I	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2058	1	J	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.7 ± 0.1	NM ±NM	—
35-DS-557	2058	1	K	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-557	2058	1	L	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.8 ±NM	NM ±NM	—
35-DS-557	2058	1	M	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	6.3 ± 0.1	NM ±NM	—
35-DS-557	2058	1	N	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.9 ±NM	NM ±NM	—
35-DS-557	2058	1	O	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2058	1	P	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.9 ± 0.1	NM ±NM	—
35-DS-557	2058	1	Q	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	7.2 ± 0.1	NM ±NM	—
35-DS-557	2058	1	R	EXU (289S/412E)	-68.00	-78.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical	Type	Hydration Rims <sup>a</sup>		Comments
										Rim 1	Rim 2	
35-DS-557	2058	1	S	EXU (289S/412E)	-68.00	-78.00	DEB	McKay	Butte	7.6 ± 0.1	NM ± NM	—
35-DS-557	2058	1	T	EXU (289S/412E)	-68.00	-78.00	DEB	McKay	Butte	8.7 ± 0.1	NM ± NM	—
35-DS-557	2058	1	U	EXU (289S/412E)	-68.00	-78.00	DEB	McKay	Butte	6.4 ± 0.1	NM ± NM	—
35-DS-557	2058	1	V	EXU (289S/412E)	-68.00	-78.00	DEB	McKay	Butte	7.6 ± 0.1	NM ± NM	—
35-DS-557	2058	1	W	EXU (289S/412E)	-68.00	-78.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2058	1	X	EXU (289S/412E)	-68.00	-78.00	DEB	McKay	Butte	7.7 ± 0.1	NM ± NM	—
35-DS-557	2058	1	Y	EXU (289S/412E)	-68.00	-78.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2058	7	—	EXU (289S/412E)	-68.00	-78.00	UFT	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2058	8	—	EXU (289S/412E)	-68.00	-78.00	UFT	McKay	Butte	7.2 ± 0.1	NM ± NM	—
35-DS-557	2059	1	A	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.8 ± NM	NM ± NM	—
35-DS-557	2059	1	B	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2059	1	C	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2059	1	D	EXU (289S/412E)	-78.00	-88.00	DEB	Unknown	X	3.7 ± NM	NM ± NM	—
35-DS-557	2059	1	E	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	8.0 ± 0.1	NM ± NM	—
35-DS-557	2059	1	F	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	NVB ± NM	NM ± NM	Weathered; No visible band
35-DS-557	2059	1	G	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.7 ± 0.1	NM ± NM	—
35-DS-557	2059	1	H	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.8 ± NM	NM ± NM	—
35-DS-557	2059	1	I	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	8.0 ± 0.1	NM ± NM	—
35-DS-557	2059	1	J	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2059	1	K	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	8.0 ± NM	NM ± NM	—
35-DS-557	2059	1	L	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2059	1	M	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2059	1	N	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.1 ± 0.1	NM ± NM	—
35-DS-557	2059	1	O	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.2 ± 0.1	NM ± NM	—
35-DS-557	2059	1	P	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.3 ± NM	NM ± NM	—
35-DS-557	2059	1	Q	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.3 ± 0.2	NM ± NM	—
35-DS-557	2059	1	R	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2059	1	S	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2059	1	T	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.0 ± 0.1	NM ± NM	—
35-DS-557	2059	1	U	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	6.9 ± 0.1	NM ± NM	—
35-DS-557	2059	1	V	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	7.2 ± 0.2	NM ± NM	—
35-DS-557	2059	1	W	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2059	1	X	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	6.6 ± 0.1	NM ± NM	—
35-DS-557	2059	1	Y	EXU (289S/412E)	-78.00	-88.00	DEB	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2068	4	—	EXU (289S/414E)	-71.00	-81.00	BIF	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2068	5	—	EXU (289S/414E)	-71.00	-81.00	BIF	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2093	2	—	EXU (292S/414E)	-50.00	-60.00	UFT	Unknown	X	3.5 ± 0.1	NM ± NM	—
35-DS-557	2094	2	—	EXU (292S/414E)	-60.00	-70.00	UFT	McKay	Butte	7.3 ± 0.1	NM ± NM	—
35-DS-557	2095	1	—	EXU (292S/414E)	-69.00	-69.00	BIF	McKay	Butte	8.4 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-DS-557	2108	1	A	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	7.2 ± 0.1	NM ± NM	—
35-DS-557	2108	1	B	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	7.8 ± 0.1	NM ± NM	—
35-DS-557	2108	1	C	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-557	2108	1	D	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	E	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	F	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	G	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	2108	1	H	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	I	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	7.1 ± 0.1	NM ± NM	—
35-DS-557	2108	1	J	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	K	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	L	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	7.8 ± 0.1	NM ± NM	—
35-DS-557	2108	1	M	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	N	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	O	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	P	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	Q	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	R	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	S	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2108	1	T	EXU (293S/416E)	-61.00	-71.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	A	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	B	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	C	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-557	2110	1	D	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	E	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	F	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	G	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	H	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	I	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	J	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	K	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	L	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	M	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	N	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	O	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	P	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-557	2110	1	Q	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	8.4 ± 0.1	NM ± NM	—
35-DS-557	2110	1	R	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-557	2110	1	S	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-DS-557	2110	1	T	EXU (293S/416E)	-71.00	-81.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2110	4	—	EXU (293S/416E)	-71.00	-81.00	PFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2113	1	A	EXU (293S/416E)	-81.00	-91.00	DEB	Newberry Volcano	2.6 ±NM	NM ±NM	Weathered
35-DS-557	2113	1	B	EXU (293S/416E)	-81.00	-91.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	Weathered
35-DS-557	2113	1	C	EXU (293S/416E)	-81.00	-91.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-557	2113	1	D	EXU (293S/416E)	-81.00	-91.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	Weathered
35-DS-557	2113	1	E	EXU (293S/416E)	-81.00	-91.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2113	1	F	EXU (293S/416E)	-81.00	-91.00	DEB	Unknown A	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2113	1	G	EXU (293S/416E)	-81.00	-91.00	DEB	Newberry Volcano	1.7 ±NM	NM ±NM	Weathered
35-DS-557	2113	1	H	EXU (293S/416E)	-81.00	-91.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-557	2113	1	I	EXU (293S/416E)	-81.00	-91.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-557	2113	1	J	EXU (293S/416E)	-81.00	-91.00	DEB	Newberry Volcano	1.4 ± 0.1	NM ±NM	Weathered
35-DS-557	2117	2	—	EXU (293S/417E)	-60.00	-70.00	BIF	Obsidian Cliffs	3.7 ± 0.1	NM ±NM	—
35-DS-557	2117	3	—	EXU (293S/417E)	-60.00	-70.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2117	4	—	EXU (293S/417E)	-60.00	-70.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2125	2	—	EXU (294S/416E)	-50.00	-60.00	UFT	McKay Butte	7.5 ± 0.1	NM ±NM	—
35-DS-557	2136	3	—	EXU (295S/409E)	-67.00	-77.00	UFT	McKay Butte	6.4 ± 0.1	NM ±NM	—
35-DS-557	2171	1	—	EXU (297S/416E)	-64.00	-74.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-557	2210	3	—	EXU (308S/399E)	1.00	-5.00	BIF	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-DS-557	2213	1	A	EXU (308S/399E)	-15.00	-25.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ±NM	Weathered
35-DS-557	2213	1	B	EXU (308S/399E)	-15.00	-25.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	Weathered
35-DS-557	2213	1	C	EXU (308S/399E)	-15.00	-25.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ±NM	Weathered
35-DS-557	2213	1	D	EXU (308S/399E)	-15.00	-25.00	DEB	McKay Butte	1.5 ± 0.1	NM ±NM	Weathered
35-DS-557	2213	1	E	EXU (308S/399E)	-15.00	-25.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ±NM	Weathered
35-DS-557	2213	1	F	EXU (308S/399E)	-15.00	-25.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	Weathered
35-DS-557	2235	3	—	EXU (289S/415E)	-58.00	-68.00	BIF	Unknown X	3.6 ± 0.1	NM ±NM	—
35-DS-557	2236	1	—	EXU (289S/415E)	-67.00	-67.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-558	1	1	—	SCP 1	0.00	0.00	UFT	Quartz Mountain/McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-558	2	1	—	SCP 2	0.00	0.00	UFT	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-DS-558	3	1	A	SCU 1	0.00	0.00	DEB	Quartz Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-DS-558	3	1	B	SCU 1	0.00	0.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ±NM	—
35-DS-558	3	1	C	SCU 1	0.00	0.00	DEB	Quartz Mountain/McKay Butte	3.0 ± 0.1	NM ±NM	—
35-DS-558	3	1	D	SCU 1	0.00	0.00	DEB	Quartz Mountain	3.7 ± 0.1	NM ±NM	—
35-DS-558	3	1	E	SCU 1	0.00	0.00	DEB	Quartz Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-DS-558	3	1	F	SCU 1	0.00	0.00	DEB	Quartz Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-DS-558	3	1	G	SCU 1	0.00	0.00	DEB	Quartz Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-DS-558	3	1	H	SCU 1	0.00	0.00	DEB	Quartz Mountain/McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-558	4	1	A	SCU 2	0.00	0.00	DEB	Quartz Mountain/McKay Butte	1.6 ± 0.1	NM ±NM	—
35-DS-558	4	1	B	SCU 2	0.00	0.00	DEB	Quartz Mountain	4.7 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-558	4	1	C	SCU 2	0.00	0.00	DEB Quartz Mountain/McKay Butte	3.6 ± NM	NM ± NM	—
35-DS-558	4	1	D	SCU 2	0.00	0.00	DEB Quartz Mountain/McKay Butte	3.5 ± 0.1	NM ± NM	—
35-DS-558	4	1	E	SCU 2	0.00	0.00	DEB Quartz Mountain/McKay Butte	2.9 ± 0.1	NM ± NM	—
35-DS-558	4	1	F	SCU 2	0.00	0.00	DEB McKay Butte	3.0 ± 0.1	NM ± NM	—
35-DS-558	4	1	G	SCU 2	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-558	9	2	—	SCU 7	0.00	0.00	DEB Quartz Mountain	3.0 ± NM	NM ± NM	—
35-DS-558	13	1	A	SCU 11	0.00	0.00	DEB Quartz Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-DS-558	13	1	B	SCU 11	0.00	0.00	DEB Quartz Mountain/McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-558	13	1	C	SCU 11	0.00	0.00	DEB Quartz Mountain/McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-558	13	1	D	SCU 11	0.00	0.00	DEB Quartz Mountain	2.9 ± NM	NM ± NM	—
35-DS-558	13	1	E	SCU 11	0.00	0.00	DEB Quartz Mountain/McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-558	13	1	F	SCU 11	0.00	0.00	DEB Quartz Mountain/McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-558	13	1	G	SCU 11	0.00	0.00	DEB Quartz Mountain	3.0 ± 0.1	NM ± NM	—
35-DS-558	13	1	H	SCU 11	0.00	0.00	DEB Quartz Mountain/McKay Butte	2.3 ± 0.1	NM ± NM	—
35-DS-558	13	1	I	SCU 11	0.00	0.00	DEB Quartz Mountain	4.2 ± 0.2	NM ± NM	—
35-DS-558	13	1	J	SCU 11	0.00	0.00	DEB Quartz Mountain	3.1 ± 0.1	NM ± NM	—
35-DS-558	13	1	K	SCU 11	0.00	0.00	DEB Quartz Mountain	3.2 ± NM	NM ± NM	—
35-DS-558	13	1	L	SCU 11	0.00	0.00	DEB Quartz Mountain	3.2 ± NM	NM ± NM	—
35-DS-558	13	1	M	SCU 11	0.00	0.00	DEB Quartz Mountain/McKay Butte	3.4 ± 0.1	NM ± NM	—
35-DS-558	13	1	N	SCU 11	0.00	0.00	DEB Quartz Mountain	3.4 ± 0.2	NM ± NM	—
35-DS-558	13	1	O	SCU 11	0.00	0.00	DEB Quartz Mountain	2.7 ± NM	NM ± NM	—
35-DS-559	1	1	—	SCP 1	0.00	0.00	PPT Unknown A	5.3 ± 0.1	NM ± NM	—
35-DS-559	2	1	—	SCP 2	0.00	0.00	PPT Obsidian Cliffs	3.4 ± 0.1	NM ± NM	—
35-DS-559	3	1	—	SCP 3	0.00	0.00	PPT Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-DS-559	5	1	—	SCP 5	0.00	0.00	BIF Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-DS-559	6	1	—	SCP 6	0.00	0.00	PPT Cougar Mountain	DH ± NM	NM ± NM	Weathered
35-DS-559	7	1	—	SCP 7	0.00	0.00	PPT Quartz Mountain	4.5 ± 0.1	NM ± NM	—
35-DS-559	8	1	—	SCP 8	0.00	0.00	BIF Newberry Volcano	5.0 ± 0.1	NM ± NM	—
35-DS-559	9	1	—	SCP 9	0.00	0.00	BIF Unknown B	1.8 ± 0.1	NM ± NM	—
35-DS-559	10	1	—	SCP 10	0.00	0.00	PPT McKay Butte	3.4 ± 0.1	NM ± NM	—
35-DS-559	11	1	—	SCP 11	0.00	0.00	PPT Obsidian Cliffs	3.8 ± 0.1	NM ± NM	—
35-DS-559	12	1	—	SCP 12	0.00	0.00	BIF Unknown C	DH ± NM	NM ± NM	Diffuse hydration
35-DS-559	14	1	—	SCP 14	0.00	0.00	PPT Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-559	15	1	—	SCP 15	0.00	0.00	PPT Obsidian Cliffs	6.1 ± NM	NM ± NM	—
35-DS-559	16	1	—	SCP 16	0.00	0.00	PPT McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-559	17	1	—	SCP 17	0.00	0.00	BIF Obsidian Cliffs	DH ± NM	NM ± NM	Diffuse hydration
35-DS-559	18	1	—	SCP 18	0.00	0.00	PPT Unknown D	2.6 ± 0.1	NM ± NM	—
35-DS-559	20	1	—	SCP 20	0.00	0.00	BIF Quartz Mountain/McKay Butte	4.7 ± 0.1	NM ± NM	—
35-DS-559	21	1	—	SCP 21	0.00	0.00	PPT Unknown E	7.0 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-559	22	1	—	SCP 22	0.00	0.00	PPT	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-DS-559	25	1	—	SCP 25	0.00	0.00	BIF	Quartz Mountain	3.0 ± 0.1	NM ±NM	—
35-DS-559	26	1	—	SCP 26	0.00	0.00	PPT	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-559	27	1	—	SCP 27	0.00	0.00	PPT	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-DS-559	32	1	—	SCP 32	0.00	0.00	PPT	Quartz Mountain	4.2 ± 0.1	NM ±NM	—
35-DS-559	34	2	A	SCU 2	0.00	0.00	DEB	Quartz Mountain/McKay Butte	3.5 ± 0.1	NM ±NM	—
35-DS-559	34	2	B	SCU 2	0.00	0.00	DEB	Quartz Mountain	3.0 ± 0.1	NM ±NM	—
35-DS-559	34	2	C	SCU 2	0.00	0.00	DEB	Quartz Mountain	4.5 ± 0.1	NM ±NM	—
35-DS-559	34	2	D	SCU 2	0.00	0.00	DEB	Quartz Mountain	4.4 ± 0.1	NM ±NM	—
35-DS-559	35	2	A	SCU 3	0.00	0.00	DEB	Quartz Mountain	4.3 ± 0.1	NM ±NM	—
35-DS-559	35	2	B	SCU 3	0.00	0.00	DEB	Glass Buttes	4.1 ± 0.1	NM ±NM	—
35-DS-559	35	2	C	SCU 3	0.00	0.00	DEB	Quartz Mountain/McKay Butte	3.7 ± 0.1	NM ±NM	—
35-DS-559	35	3	—	SCU 3	0.00	0.00	UFT	Obsidian Cliffs	4.7 ± 0.1	NM ±NM	—
35-DS-559	37	2	A	SCU 5	0.00	0.00	DEB	Obsidian Cliffs	2.6 ± 0.1	NM ±NM	—
35-DS-559	37	2	B	SCU 5	0.00	0.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-559	37	2	C	SCU 5	0.00	0.00	DEB	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-DS-559	37	2	D	SCU 5	0.00	0.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-559	37	2	E	SCU 5	0.00	0.00	DEB	Newberry Volcano	3.5 ± 0.2	NM ±NM	—
35-DS-559	37	2	F	SCU 5	0.00	0.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ±NM	—
35-DS-559	37	2	G	SCU 5	0.00	0.00	DEB	Newberry Volcano	2.9 ± 0.2	NM ±NM	—
35-DS-559	37	2	H	SCU 5	0.00	0.00	DEB	Obsidian Cliffs	2.3 ± 0.1	NM ±NM	—
35-DS-559	37	2	I	SCU 5	0.00	0.00	DEB	Obsidian Cliffs	2.8 ± 0.2	NM ±NM	—
35-DS-559	37	2	J	SCU 5	0.00	0.00	DEB	Newberry Volcano	5.0 ± 0.2	NM ±NM	—
35-DS-559	37	2	K	SCU 5	0.00	0.00	DEB	Obsidian Cliffs	2.4 ±NM	NM ±NM	—
35-DS-559	38	2	A	SCU 6	0.00	0.00	DEB	Newberry Volcano	4.8 ±NM	NM ±NM	—
35-DS-559	38	2	B	SCU 6	0.00	0.00	DEB	Newberry Volcano	3.9 ± 0.1	NM ±NM	—
35-DS-559	41	3	—	SCU 9	0.00	0.00	BIF	Obsidian Cliffs	2.4 ±NM	NM ±NM	—
35-DS-559	42	2	A	SCU 10	0.00	0.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ±NM	—
35-DS-559	42	2	B	SCU 10	0.00	0.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ±NM	—
35-DS-559	42	2	C	SCU 10	0.00	0.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-DS-559	45	2	A	SCU 13	0.00	0.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ±NM	—
35-DS-559	45	2	B	SCU 13	0.00	0.00	DEB	Obsidian Cliffs	4.2 ± 0.1	NM ±NM	—
35-DS-559	45	2	C	SCU 13	0.00	0.00	DEB	Obsidian Cliffs	4.3 ±NM	NM ±NM	—
35-DS-559	45	2	D	SCU 13	0.00	0.00	DEB	Obsidian Cliffs	4.2 ±NM	NM ±NM	—
35-DS-559	45	2	E	SCU 13	0.00	0.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ±NM	—
35-DS-808	2	1	—	SCP 2	0.00	0.00	PPT	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-DS-808	47	1	—	SHP 3	0.00	-20.00	UFT	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-808	175	1	A-A	SHP 35	0.00	-20.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-DS-808	176	1	C-A	SHP 35	-20.00	-40.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-808	176	1	F-C	SHP 35	-20.00 -40.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	Weathered
35-DS-808	176	1	G-B	SHP 35	-20.00 -40.00	DEB	Newberry	Volcano	1.8 ± 0.1	NM ±NM	—
35-DS-808	177	2	B-A	SHP 35	-40.00 -60.00	DEB	Newberry	Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-808	178	1	B-A	SHP 35	-60.00 -80.00	DEB	Newberry	Volcano	3.0 ±NM	NM ±NM	—
35-DS-808	179	1	A-A	SHP 35	-80.00 -100.00	DEB	Newberry	Volcano	3.7 ± 0.1	NM ±NM	—
35-DS-808	180	1	A-A	SHX 35	-100.00 -120.00	DEB	Newberry	Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-808	180	1	B-B	SHX 35	-100.00 -120.00	DEB	Newberry	Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-808	180	1	C-C	SHX 35	-100.00 -120.00	DEB	Newberry	Volcano	1.7 ± 0.1	NM ±NM	Weathered
35-DS-808	395	1	A	SCU 10	0.00 0.00	DEB	Newberry	Volcano	2.5 ± 0.1	NM ±NM	Weathered
35-DS-808	395	1	B	SCU 10	0.00 0.00	DEB	Newberry	Volcano	3.1 ± 0.1	NM ±NM	—
35-DS-808	395	1	C	SCU 10	0.00 0.00	DEB	Newberry	Volcano	2.3 ± 0.1	NM ±NM	—
35-DS-808	395	1	D	SCU 10	0.00 0.00	DEB	Newberry	Volcano	1.5 ± 0.1	NM ±NM	Weathered
35-DS-808	395	1	E	SCU 10	0.00 0.00	DEB	Newberry	Volcano	2.9 ± 0.1	NM ±NM	—
35-DS-808	395	1	F	SCU 10	0.00 0.00	DEB	Newberry	Volcano	1.8 ±NM	NM ±NM	—
35-DS-808	395	1	G	SCU 10	0.00 0.00	DEB	Newberry	Volcano	2.7 ± 0.1	NM ±NM	—
35-DS-808	395	1	H	SCU 10	0.00 0.00	DEB	Newberry	Volcano	3.4 ± 0.1	NM ±NM	—
35-DS-808	395	1	I	SCU 10	0.00 0.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-808	395	1	J	SCU 10	0.00 0.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-808	395	1	K	SCU 10	0.00 0.00	DEB	Newberry	Volcano	2.5 ± 0.1	NM ±NM	—
35-DS-808	395	1	L	SCU 10	0.00 0.00	DEB	Newberry	Volcano	1.9 ± 0.1	NM ±NM	Weathered
35-DS-808	395	1	M	SCU 10	0.00 0.00	DEB	Newberry	Volcano	2.4 ± 0.1	NM ±NM	Weathered
35-DS-808	395	1	N	SCU 10	0.00 0.00	DEB	Newberry	Volcano	2.1 ± 0.1	NM ±NM	—
35-DS-808	395	1	O	SCU 10	0.00 0.00	DEB	Newberry	Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-808	398	3	A	SCU 13	0.00 0.00	DEB	Big Obsidian	Flow	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-808	398	3	B	SCU 13	0.00 0.00	DEB	Newberry	Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-808	398	3	C	SCU 13	0.00 0.00	DEB	Newberry	Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-808	398	4	A	SCU 13	0.00 0.00	DEB	Newberry	Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-808	399	1	A	SCU 14	0.00 0.00	DEB	Newberry	Volcano	2.0 ± 0.1	NM ±NM	Weathered
35-DS-808	399	1	B	SCU 14	0.00 0.00	DEB	Newberry	Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-808	399	1	C	SCU 14	0.00 0.00	DEB	Newberry	Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-808	400	2	A	SCU 15	0.00 0.00	DEB	Newberry	Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-808	401	1	A	SCU 15	0.00 0.00	DEB	Newberry	Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-808	401	1	B	SCU 15	0.00 0.00	DEB	McKay Butte		DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-808	401	1	C	SCU 15	0.00 0.00	DEB	Newberry	Volcano	2.2 ± 0.1	NM ±NM	—
35-DS-808	401	1	D	SCU 15	0.00 0.00	DEB	Newberry	Volcano	2.6 ± 0.1	NM ±NM	—
35-DS-808	401	1	E	SCU 15	0.00 0.00	DEB	Silver Lake/Sycan Marsh		1.7 ±NM	NM ±NM	—
35-DS-808	401	1	F	SCU 15	0.00 0.00	DEB	Newberry	Volcano	1.7 ± 0.1	NM ±NM	—
35-DS-808	401	1	G	SCU 15	0.00 0.00	DEB	McKay Butte		DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-808	401	1	H	SCU 15	0.00 0.00	DEB	Newberry	Volcano	1.5 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-808	401	1	I	SCU 15	0.00	0.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-DS-808	401	1	J	SCU 15	0.00	0.00	DEB	Silver Lake/Sycan Marsh	1.8 ± 0.1	NM ± NM	—
35-DS-809	1	1	A-A	SCP 1	0.00	0.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-DS-809	2	1	A-A	SCP 2	0.00	0.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-DS-809	3	1	A-A	SCP 3	0.00	0.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-DS-809	3	1	B-B	SCP 3	0.00	0.00	DEB	Newberry Volcano	2.7 ± NM	NM ± NM	—
35-DS-809	5	1	A-A	SCP 5	0.00	0.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-DS-809	7	1	—	SCP 7	0.00	0.00	BIF	McKay Butte	2.6 ± NM	NM ± NM	—
35-DS-809	8	1	A	SCP 8	0.00	0.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-DS-809	9	1	A	SCP 9	0.00	0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-809	10	1	A	SCP 10	0.00	0.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-DS-809	12	1	A	SCP 12	0.00	0.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-DS-809	13	1	A	SCP 13	0.00	0.00	DEB	Newberry Volcano	3.8 ± NM	NM ± NM	—
35-DS-865	1	1	—	SCP 1	0.00	0.00	PPT	Obsidian Cliffs	3.3 ± 0.1	NM ± NM	—
35-DS-865	2	1	—	SCP 2	0.00	0.00	BIF	Cougar Mountain	5.9 ± 0.1	NM ± NM	—
35-DS-865	3	1	—	SCP 3	0.00	0.00	PPT	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-DS-865	4	1	A	SCP 4	0.00	0.00	DEB	Quartz Mountain/McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-865	5	1	A	SCP 5	0.00	0.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-865	6	1	A	SCP 6	0.00	0.00	DEB	Unknown A	DH ± NM	NM ± NM	Diffuse hydration
35-DS-865	8	1	A	SCP 8	0.00	0.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-865	9	1	A	SCP 9	0.00	0.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-865	10	1	A	SCP 10	0.00	0.00	DEB	Quartz Mountain	4.9 ± 0.1	NM ± NM	—
35-DS-865	11	1	A	SCP 11	0.00	0.00	DEB	McKay Butte	6.6 ± 2.5	NM ± NM	—
35-DS-865	13	1	A	SCP 13	0.00	0.00	DEB	Cougar Mountain	2.2 ± 0.1	NM ± NM	—
35-DS-865	15	1	A	SCP 15	0.00	0.00	DEB	Big Obsidian Flow	NVB ± NM	NM ± NM	No visible band
35-DS-865	17	1	A	SCP 17	0.00	0.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-865	18	1	A	SCP 18	0.00	0.00	DEB	Unknown X	6.2 ± 0.1	NM ± NM	—
35-DS-865	19	1	A	SCP 19	0.00	0.00	DEB	Unknown B	NVB ± NM	NM ± NM	No visible band
35-DS-865	20	1	A	SCP 20	0.00	0.00	DEB	Quartz Mountain/McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-865	21	1	A	SCP 21	0.00	0.00	DEB	Quartz Mountain	5.6 ± 0.1	NM ± NM	—
35-DS-865	23	1	A	SCP 23	0.00	0.00	DEB	Unknown B	NVB ± NM	NM ± NM	No visible band
35-DS-865	24	1	A	SCP 24	0.00	0.00	DEB	McKay Butte	3.5 ± 0.2	NM ± NM	—
35-DS-865	25	1	A	SCP 25	0.00	0.00	DEB	Unknown C	NVB ± NM	NM ± NM	No visible band
35-DS-865	26	1	A	SCP 26	0.00	0.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-865	27	1	A	SCP 27	0.00	0.00	DEB	McKay Butte	2.4 ± 0.1	NM ± NM	—
35-DS-866	1	1	A	SCP 1	0.00	0.00	DEB	McKay Butte	4.3 ± 0.1	NM ± NM	—
35-DS-866	2	1	A	SCP 2	0.00	0.00	DEB	McKay Butte	6.5 ± 0.1	NM ± NM	—
35-DS-866	3	1	A	SCP 4	0.00	0.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-866	4	1	A	SCP 5	0.00	0.00	DEB	McKay Butte	5.1 ± 0.2	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-866	5	1	—	SCP 6	0.00	0.00	DEB Quartz Mountain	6.0 ± 0.1	NM ± NM	—
35-DS-866	6	1	A	SCP 7	0.00	0.00	DEB Quartz Mountain/McKay Butte	5.5 ± 0.1	NM ± NM	—
35-DS-866	7	1	A	SCP 8	0.00	0.00	DEB Quartz Mountain/McKay Butte	5.0 ± 0.1	NM ± NM	—
35-DS-866	8	1	A	SCP 9	0.00	0.00	DEB Cougar Mountain	4.1 ± 0.2	NM ± NM	—
35-DS-866	9	1	A	SCP 10	0.00	0.00	DEB Cougar Mountain	5.5 ± 0.1	NM ± NM	—
35-DS-866	10	1	A	SCP 11	0.00	0.00	DEB McKay Butte	4.2 ± 0.1	NM ± NM	—
35-DS-866	11	1	A	SCP 12	0.00	0.00	DEB Quartz Mountain/McKay Butte	5.0 ± 0.1	NM ± NM	—
35-DS-866	12	1	A	SCP 13	0.00	0.00	DEB Cougar Mountain	6.8 ± 0.1	NM ± NM	—
35-DS-866	13	1	A	SCU 1	0.00	0.00	DEB Cougar Mountain	6.1 ± 0.1	NM ± NM	—
35-DS-866	13	1	B	SCU 1	0.00	0.00	DEB Unknown A	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-866	13	1	C	SCU 1	0.00	0.00	DEB Big Obsidian Flow	5.1 ± 0.1	NM ± NM	—
35-DS-866	13	1	D	SCU 1	0.00	0.00	DEB McKay Butte	5.0 ± 0.1	NM ± NM	—
35-DS-866	13	1	E	SCU 1	0.00	0.00	DEB Unknown B	DH ± NM	NM ± NM	Diffuse hydration
35-DS-866	14	1	A	SCU 2	0.00	0.00	DEB Big Obsidian Flow	5.0 ± 0.1	NM ± NM	—
35-DS-866	14	1	B	SCU 2	0.00	0.00	DEB McKay Butte	5.5 ± 0.1	NM ± NM	—
35-DS-866	14	1	C	SCU 2	0.00	0.00	DEB McKay Butte	5.0 ± 0.1	NM ± NM	—
35-DS-866	14	1	D	SCU 2	0.00	0.00	DEB Cougar Mountain	3.5 ± 0.1	NM ± NM	—
35-DS-866	14	1	E	SCU 2	0.00	0.00	DEB Cougar Mountain	6.0 ± 0.1	NM ± NM	—
35-DS-866	14	1	F	SCU 2	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-866	14	1	G	SCU 2	0.00	0.00	DEB McKay Butte	3.7 ± 0.1	NM ± NM	—
35-DS-866	51	1	A	SON 1	-40.00	-50.00	DEB Unknown C	5.8 ± 0.2	NM ± NM	—
35-DS-917	22	2	A	SCU 2	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	22	2	B	SCU 2	0.00	0.00	DEB McKay Butte	6.3 ± 0.1	NM ± NM	—
35-DS-917	22	2	C	SCU 2	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	22	2	D	SCU 2	0.00	0.00	DEB Not obsidian	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	22	2	E	SCU 2	0.00	0.00	DEB Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	22	2	F	SCU 2	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	22	2	G	SCU 2	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	22	2	H	SCU 2	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	22	2	I	SCU 2	0.00	0.00	DEB McKay Butte	7.2 ± 0.2	NM ± NM	—
35-DS-917	22	2	J	SCU 2	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	22	2	K	SCU 2	0.00	0.00	DEB Unknown X	NVB ± NM	NM ± NM	No visible band
35-DS-917	22	2	L	SCU 2	0.00	0.00	DEB McKay Butte	7.4 ± 0.1	NM ± NM	—
35-DS-917	22	2	M	SCU 2	0.00	0.00	DEB McKay Butte	7.3 ± 0.1	NM ± NM	—
35-DS-917	22	2	N	SCU 2	0.00	0.00	DEB Unknown X	5.3 ± 0.1	NM ± NM	—
35-DS-917	22	2	O	SCU 2	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	22	2	P	SCU 2	0.00	0.00	DEB Unknown X	NVB ± NM	NM ± NM	No visible band
35-DS-917	22	2	Q	SCU 2	0.00	0.00	DEB Unknown X	NVB ± NM	NM ± NM	No visible band
35-DS-917	25	2	A	SCU 5	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-917	25	2	B	SCU 5	0.00	0.00	DEB McKay Butte	6.3 ± 0.2	NM ± NM	—
35-DS-917	25	2	C	SCU 5	0.00	0.00	DEB Unknown X	NVB ± NM	NM ± NM	No visible band
35-DS-917	25	2	D	SCU 5	0.00	0.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	25	2	E	SCU 5	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	25	2	F	SCU 5	0.00	0.00	DEB McKay Butte	8.0 ± NM	NM ± NM	—
35-DS-917	25	2	G	SCU 5	0.00	0.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	25	2	H	SCU 5	0.00	0.00	DEB McKay Butte	3.6 ± 0.1	NM ± NM	—
35-DS-917	25	3	—	SCU 5	0.00	0.00	BIF Unknown X	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-917	25	4	—	SCU 5	0.00	0.00	BIF McKay Butte	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-DS-917	214	2	A	SON 1	0.00	-10.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	214	2	B	SON 1	0.00	-10.00	DEB McKay Butte	6.3 ± 0.1	NM ± NM	—
35-DS-917	214	2	C	SON 1	0.00	-10.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	214	2	D	SON 1	0.00	-10.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	214	2	E	SON 1	0.00	-10.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	214	2	F	SON 1	0.00	-10.00	DEB Quartz Mountain/McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	214	2	G	SON 1	0.00	-10.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	214	2	H	SON 1	0.00	-10.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	214	2	I	SON 1	0.00	-10.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	214	2	J	SON 1	0.00	-10.00	DEB McKay Butte	6.3 ± 0.1	NM ± NM	—
35-DS-917	215	2	B	SON 1	-10.00	-20.00	DEB McKay Butte	6.0 ± 0.1	NM ± NM	—
35-DS-917	215	2	C	SON 1	-10.00	-20.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	215	2	D	SON 1	-10.00	-20.00	DEB McKay Butte	5.1 ± 0.1	NM ± NM	—
35-DS-917	215	2	E	SON 1	-10.00	-20.00	DEB McKay Butte	5.3 ± 0.1	NM ± NM	—
35-DS-917	215	2	F	SON 1	-10.00	-20.00	DEB Unknown X	3.7 ± 0.1	NM ± NM	—
35-DS-917	215	2	G	SON 1	-10.00	-20.00	DEB McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-917	215	2	H	SON 1	-10.00	-20.00	DEB McKay Butte	6.5 ± 0.1	NM ± NM	—
35-DS-917	215	2	I	SON 1	-10.00	-20.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	215	2	J	SON 1	-10.00	-20.00	DEB McKay Butte	1.8 ± NM	NM ± NM	—
35-DS-917	215	3	A	SON 1	-10.00	-20.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	216	2	A	SON 1	-20.00	-30.00	DEB McKay Butte	6.6 ± 0.2	NM ± NM	—
35-DS-917	216	2	B	SON 1	-20.00	-30.00	DEB Unknown X	4.4 ± 0.1	NM ± NM	—
35-DS-917	216	2	C	SON 1	-20.00	-30.00	DEB McKay Butte	7.3 ± 0.1	NM ± NM	—
35-DS-917	216	2	D	SON 1	-20.00	-30.00	DEB McKay Butte	7.6 ± NM	NM ± NM	—
35-DS-917	216	2	E	SON 1	-20.00	-30.00	DEB McKay Butte	7.0 ± 0.1	NM ± NM	—
35-DS-917	216	2	F	SON 1	-20.00	-30.00	DEB McKay Butte	7.2 ± NM	NM ± NM	—
35-DS-917	216	2	G	SON 1	-20.00	-30.00	DEB McKay Butte	5.6 ± 0.1	NM ± NM	—
35-DS-917	216	2	H	SON 1	-20.00	-30.00	DEB McKay Butte	7.0 ± 0.2	NM ± NM	—
35-DS-917	216	2	I	SON 1	-20.00	-30.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	216	2	J	SON 1	-20.00	-30.00	DEB McKay Butte	5.8 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-917	217	2	A	SON 1	-30.00	-40.00	DEB McKay Butte	7.1 ± 0.1	NM ± NM	—
35-DS-917	217	2	B	SON 1	-30.00	-40.00	DEB McKay Butte	6.1 ± 0.2	NM ± NM	—
35-DS-917	217	2	C	SON 1	-30.00	-40.00	DEB McKay Butte	8.6 ± 0.1	NM ± NM	—
35-DS-917	217	2	D	SON 1	-30.00	-40.00	DEB McKay Butte	6.2 ± 0.1	NM ± NM	—
35-DS-917	217	2	E	SON 1	-30.00	-40.00	DEB Newberry Volcano	3.6 ± NM	NM ± NM	—
35-DS-917	217	2	F	SON 1	-30.00	-40.00	DEB Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-DS-917	217	2	G	SON 1	-30.00	-40.00	DEB McKay Butte	6.9 ± 0.1	NM ± NM	—
35-DS-917	217	2	H	SON 1	-30.00	-40.00	DEB McKay Butte	5.5 ± 0.1	NM ± NM	—
35-DS-917	217	2	I	SON 1	-30.00	-40.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	217	2	J	SON 1	-30.00	-40.00	DEB McKay Butte	6.0 ± 0.2	NM ± NM	—
35-DS-917	217	3	A	SON 1	-30.00	-40.00	DEB McKay Butte	5.3 ± 0.1	NM ± NM	—
35-DS-917	218	2	B	SON 1	-40.00	-50.00	DEB McKay Butte	5.3 ± 0.2	NM ± NM	—
35-DS-917	218	2	C	SON 1	-40.00	-50.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	218	2	D	SON 1	-40.00	-50.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	218	2	E	SON 1	-40.00	-50.00	DEB Unknown X	4.3 ± NM	NM ± NM	—
35-DS-917	218	2	F	SON 1	-40.00	-50.00	DEB McKay Butte	6.0 ± 0.1	NM ± NM	—
35-DS-917	218	2	G	SON 1	-40.00	-50.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	218	2	H	SON 1	-40.00	-50.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	218	2	I	SON 1	-40.00	-50.00	DEB McKay Butte	7.2 ± 0.1	NM ± NM	—
35-DS-917	218	2	J	SON 1	-40.00	-50.00	DEB McKay Butte	5.5 ± 0.2	NM ± NM	—
35-DS-917	218	3	A	SON 1	-40.00	-50.00	DEB McKay Butte	5.5 ± 0.1	NM ± NM	—
35-DS-917	219	2	A	SON 1	-50.00	-60.00	DEB McKay Butte	7.2 ± 0.1	NM ± NM	—
35-DS-917	219	2	B	SON 1	-50.00	-60.00	DEB Unknown X	4.2 ± 0.1	NM ± NM	—
35-DS-917	219	2	C	SON 1	-50.00	-60.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	219	2	D	SON 1	-50.00	-60.00	DEB McKay Butte	6.2 ± 0.1	NM ± NM	—
35-DS-917	219	2	E	SON 1	-50.00	-60.00	DEB McKay Butte	6.3 ± NM	NM ± NM	—
35-DS-917	219	2	F	SON 1	-50.00	-60.00	DEB McKay Butte	5.7 ± NM	NM ± NM	—
35-DS-917	219	2	G	SON 1	-50.00	-60.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-917	219	2	H	SON 1	-50.00	-60.00	DEB Unknown X	4.7 ± 0.1	NM ± NM	—
35-DS-917	219	2	I	SON 1	-50.00	-60.00	DEB McKay Butte	6.1 ± 0.1	NM ± NM	—
35-DS-917	219	2	J	SON 1	-50.00	-60.00	DEB McKay Butte	5.4 ± 0.2	NM ± NM	—
35-DS-917	220	2	A	SON 1	-60.00	-70.00	DEB McKay Butte	2.4 ± 0.1	NM ± NM	—
35-DS-917	220	2	B	SON 1	-60.00	-70.00	DEB McKay Butte	6.1 ± 0.2	NM ± NM	—
35-DS-917	220	2	C	SON 1	-60.00	-70.00	DEB McKay Butte	5.7 ± 0.1	NM ± NM	—
35-DS-917	220	2	D	SON 1	-60.00	-70.00	DEB McKay Butte	5.5 ± 0.1	NM ± NM	—
35-DS-917	220	2	E	SON 1	-60.00	-70.00	DEB McKay Butte	6.1 ± 0.1	NM ± NM	—
35-DS-917	220	2	F	SON 1	-60.00	-70.00	DEB McKay Butte	6.7 ± 0.1	NM ± NM	—
35-DS-917	220	2	G	SON 1	-60.00	-70.00	DEB Unknown X	3.8 ± 0.1	NM ± NM	—
35-DS-917	220	2	H	SON 1	-60.00	-70.00	DEB Unknown X	3.9 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-DS-917	220	2	I	SON 1	-60.00	-70.00	DEB	Newberry Volcano/Unknown X	3.6 ± 0.1	NM ±NM	—
35-DS-917	220	2	J	SON 1	-60.00	-70.00	DEB	McKay Butte	5.3 ± 0.1	NM ±NM	—
35-DS-917	221	2	A	SON 1	-70.00	-80.00	DEB	McKay Butte	5.1 ±NM	NM ±NM	—
35-DS-917	221	2	B	SON 1	-70.00	-80.00	DEB	McKay Butte	5.0 ± 0.1	NM ±NM	—
35-DS-917	221	2	C	SON 1	-70.00	-80.00	DEB	McKay Butte	5.1 ±NM	NM ±NM	—
35-DS-917	222	2	A	SON 1	-80.00	-90.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-983	2	1	—	SCP 1	0.00	0.00	PPT	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-DS-983	3	1	—	SCP 2	0.00	0.00	DEB	Obsidian Cliffs	3.8 ± 0.1	NM ±NM	—
35-DS-983	4	1	—	SCP 3	0.00	0.00	PPT	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-DS-983	5	1	—	SCP 4	0.00	0.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-DS-983	6	1	—	SCP 5	0.00	0.00	DEB	McKay Butte	NVB ±NM	NM ±NM	Weathered; No visible band
35-DS-983	7	1	—	SCP 6	0.00	0.00	PPT	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-DS-983	11	1	—	SCP 10	0.00	0.00	PPT	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-DS-983	12	1	—	SCP 11	0.00	0.00	PPT	Obsidian Cliffs	3.6 ±NM	NM ±NM	—
35-DS-983	13	1	—	SCP 12	0.00	0.00	BIF	Unknown X	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-DS-983	14	1	—	SCP 13	0.00	0.00	PPT	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-DS-983	16	1	—	SCP 15	0.00	0.00	PPT	Obsidian Cliffs	3.5 ± 0.1	NM ±NM	—
35-DS-983	18	1	—	SCP 17	0.00	0.00	DEB	McKay Butte	5.1 ±NM	NM ±NM	—
35-DS-983	20	1	—	SCP 42	0.00	0.00	DEB	Obsidian Cliffs	4.8 ± 0.1	NM ±NM	—
35-DS-983	21	1	—	SCP 43	0.00	0.00	UFT	Little Bear Creek/Whitewater Ridge (CES)	6.3 ± 0.1	NM ±NM	—
35-DS-983	22	1	—	SCP 19	0.00	0.00	DEB	McKay Butte	4.1 ± 0.1	NM ±NM	Weathered
35-DS-983	23	1	—	SCP 20	0.00	0.00	BIF	Quartz Mountain/McKay Butte	3.3 ±NM	NM ±NM	Weathered
35-DS-983	24	1	—	SCP 21	0.00	0.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-DS-983	25	1	—	SCP 22	0.00	0.00	PPT	Newberry Volcano	4.8 ±NM	NM ±NM	—
35-DS-983	26	1	—	SCP 23	0.00	0.00	DEB	McKay Butte	3.8 ± 0.1	NM ±NM	—
35-DS-983	27	1	A	SCP 24	0.00	0.00	DEB	Newberry Volcano	5.0 ± 0.1	NM ±NM	—
35-DS-983	27	1	B	SCP 24	0.00	0.00	DEB	Newberry Volcano	5.0 ± 0.1	NM ±NM	—
35-DS-983	28	1	A	SCP 25	0.00	0.00	DEB	Newberry Volcano	4.8 ±NM	NM ±NM	—
35-DS-983	28	1	B	SCP 25	0.00	0.00	DEB	Newberry Volcano	4.9 ± 0.1	NM ±NM	—
35-DS-983	29	1	A	SCP 26	0.00	0.00	DEB	McKay Butte	4.3 ±NM	NM ±NM	—
35-DS-983	29	1	B	SCP 26	0.00	0.00	DEB	McKay Butte	4.2 ± 0.1	NM ±NM	—
35-DS-983	30	1	—	SCP 27	0.00	0.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ±NM	—
35-DS-983	31	1	—	SCP 28	0.00	0.00	DEB	Newberry Volcano	4.9 ±NM	NM ±NM	—
35-DS-983	32	1	—	SCP 29	0.00	0.00	PPT	Glass Buttes	3.7 ±NM	NM ±NM	—
35-DS-983	33	1	—	SCP 30	0.00	0.00	UFT	Newberry Volcano	2.4 ± 0.1	NM ±NM	Weathered
35-DS-983	34	1	—	SCP 31	0.00	0.00	BIF	Not Obsidian	NVB ±NM	NM ±NM	No visible band
35-DS-983	36	1	—	SCP 33	0.00	0.00	PPT	McKay Butte	1.8 ±NM	NM ±NM	Weathered
35-DS-983	39	1	—	SCP 36	0.00	0.00	DEB	Newberry Volcano	4.4 ±NM	NM ±NM	—
35-DS-983	42	1	—	SCP 39	0.00	0.00	DEB	McKay Butte	4.8 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-DS-983	43	1	—	SCP 40	0.00	0.00	DEB Quartz Mountain/McKay Butte	4.3 ± 0.1	NM ± NM	—
35-DS-983	44	1	—	SCP 41	0.00	0.00	PPT Unknown A	1.8 ± 0.1	NM ± NM	—
35-DS-983	45	1	—	SCP 44	0.00	0.00	BIF Obsidian Cliffs	3.2 ± NM	NM ± NM	—
35-DS-983	47	1	A	SCU 2	0.00	0.00	DEB Quartz Mountain/McKay Butte	4.8 ± 0.1	NM ± NM	—
35-DS-983	47	1	B	SCU 2	0.00	0.00	DEB McKay Butte	3.7 ± NM	NM ± NM	—
35-DS-985	1	1	—	SCP 1	0.00	0.00	PPT McKay Butte	NVB ± NM	NM ± NM	No visible band
35-DS-985	2	1	—	SCP 2	0.00	0.00	UFT Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-DS-985	3	1	—	SCP 3	0.00	0.00	PPT Obsidian Cliffs	3.4 ± 0.1	NM ± NM	—
35-DS-985	5	1	—	SCP 5	0.00	0.00	BIF McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-DS-985	6	1	—	SCP 6	0.00	0.00	BIF Unknown A	5.0 ± 0.1	NM ± NM	—
35-DS-985	9	1	A	SCP 9	0.00	0.00	DEB Unknown B	NVB ± NM	NM ± NM	No visible band
35-DS-985	15	1	A	SCP 15	0.00	0.00	DEB Newberry Volcano	5.4 ± 0.1	NM ± NM	—
35-DS-985	18	1	A	SCP 18	0.00	0.00	DEB Unknown C	1.1 ± 0.1	NM ± NM	—
35-DS-985	23	1	A	SCP 23	0.00	0.00	DEB Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-DS-985	24	1	A	SCP 24	0.00	0.00	DEB Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-DS-985	25	1	A	SCP 25	0.00	0.00	DEB Newberry Volcano	1.4 ± NM	NM ± NM	—
35-DS-985	26	1	A	SCU 1	0.00	0.00	DEB Newberry Volcano	3.6 ± 0.2	NM ± NM	—
35-DS-985	26	1	B	SCU 1	0.00	0.00	DEB Spodue Mountain	1.4 ± 0.1	NM ± NM	—
35-DS-985	26	1	C	SCU 1	0.00	0.00	DEB Silver Lake/Sycan Marsh	1.8 ± NM	NM ± NM	—
35-DS-985	26	1	D	SCU 1	0.00	0.00	DEB Silver Lake/Sycan Marsh	1.4 ± 0.1	NM ± NM	—
35-DS-985	204	1	A	SHP 35	-40.00	-60.00	DEB Cougar Mountain	VW ± NM	NM ± NM	Variable width (6.0–7.2 microns)
35-GM-25	53	1	—	SON 7	-20.00	-30.00	DEB Whitewater Ridge?	NM ± NM	NM ± NM	No OH measurement
35-GM-25	54	1	—	SON 7	-30.00	-40.00	DEB Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	55	4	A	SON 7	-40.00	-50.00	DEB Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	55	4	B	SON 7	-40.00	-50.00	DEB Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	58	1	—	SON 7	-70.00	-80.00	DEB Little Bear Creek/Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	60	4	—	SON 7	-90.00	-100.00	DEB Little Bear Creek/Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	61	3	—	SON 7	-100.00	-110.00	DEB Unknown A	NM ± NM	NM ± NM	No OH measurement
35-GM-25	66	3	—	SON 8	-30.00	-40.00	DEB Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	70	1	—	SON 8	-70.00	-80.00	DEB Unknown B	NM ± NM	NM ± NM	No OH measurement
35-GM-25	76	1	—	SON 9	-30.00	-40.00	DEB Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	78	1	—	SON 9	-50.00	-60.00	DEB Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	112	1	—	SON 14	-40.00	-50.00	DEB Whitewater Ridge?	NM ± NM	NM ± NM	No OH measurement
35-GM-25	113	1	—	SON 14	-50.00	-60.00	DEB Unknown C	NM ± NM	NM ± NM	No OH measurement
35-GM-25	134	2	—	SCU 2	0.00	0.00	UFT Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	140	1	—	SCP 2	0.00	0.00	BIF Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-GM-25	141	1	—	SCP 3	0.00	0.00	DEB Little Bear Creek/Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-GM-25	161	3	—	AUG 3	0.00	-20.00	DEB Unknown D	NM ± NM	NM ± NM	No OH measurement
35-GM-25	211	2	—	AUG 10	0.00	-20.00	DEB Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-GM-25	243	1	—	TEU 1	-100.00 -110.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	248	12	—	TEU 1	-120.00 -130.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	250	5	—	TEU 1	-130.00 -140.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	262	4	A	TEU 2	-10.00 -20.00	DEB	Whitewater Ridge?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	262	4	B	TEU 2	-10.00 -20.00	DEB	Whitewater Ridge?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	262	4	C	TEU 2	-10.00 -20.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	262	4	D	TEU 2	-10.00 -20.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	262	4	E	TEU 2	-10.00 -20.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	262	4	F	TEU 2	-10.00 -20.00	DEB	Unknown D	NM ±NM	NM ±NM	No OH measurement
35-GM-25	262	4	G	TEU 2	-10.00 -20.00	DEB	Horse Mountain?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	262	8	—	TEU 2	-10.00 -20.00	BIF	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	264	2	A	TEU 2	-20.00 -30.00	DEB	Glass Buttes	NM ±NM	NM ±NM	No OH measurement
35-GM-25	264	2	B	TEU 2	-20.00 -30.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	264	6	—	TEU 2	-20.00 -30.00	BIF	Unknown E	NM ±NM	NM ±NM	No OH measurement
35-GM-25	266	1	—	TEU 2	-30.00 -40.00	PPT	Wolf Creek?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	266	9	A	TEU 2	-30.00 -40.00	DEB	Horse Mountain?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	266	9	B	TEU 2	-30.00 -40.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	268	3	A	TEU 2	-40.00 -50.00	DEB	Little Bear Creek	NM ±NM	NM ±NM	No OH measurement
35-GM-25	268	3	B	TEU 2	-40.00 -50.00	DEB	Chickahominy?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	268	3	D	TEU 2	-40.00 -50.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	268	3	E	TEU 2	-40.00 -50.00	DEB	Quartz Mountain?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	268	9	—	TEU 2	-40.00 -50.00	PFT	Wolf Creek	NM ±NM	NM ±NM	No OH measurement
35-GM-25	270	2	A	TEU 2	-50.00 -60.00	DEB	Unknown F	NM ±NM	NM ±NM	No OH measurement
35-GM-25	270	2	B	TEU 2	-50.00 -60.00	DEB	Whitewater Ridge?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	271	4	A	TEU 2	-50.00 -60.00	DEB	Whitewater Ridge	4.9 ± 0.1	NM ±NM	—
35-GM-25	272	4	A	TEU 2	-60.00 -70.00	DEB	Glass Buttes	NM ±NM	NM ±NM	No OH measurement
35-GM-25	272	4	B	TEU 2	-60.00 -70.00	DEB	Whitewater Ridge?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	272	4	C	TEU 2	-60.00 -70.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	272	4	D	TEU 2	-60.00 -70.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	272	4	E	TEU 2	-60.00 -70.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-GM-25	272	4	F	TEU 2	-60.00 -70.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	275	4	—	TEU 2	-70.00 -80.00	PPT	Little Bear Creek	NM ±NM	NM ±NM	No OH measurement
35-GM-25	275	6	A	TEU 2	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-GM-25	275	6	B	TEU 2	-70.00 -80.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	275	7	A	TEU 2	-70.00 -80.00	DEB	Wolf Creek?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	275	7	B	TEU 2	-70.00 -80.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	275	7	C	TEU 2	-70.00 -80.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	275	7	D	TEU 2	-70.00 -80.00	DEB	Chickahominy?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	275	7	E	TEU 2	-70.00 -80.00	DEB	Unknown H	NM ±NM	NM ±NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-GM-25	276	4	—	TEU 2	-70.00 -80.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	279	10	A	TEU 2	-80.00 -90.00	DEB	Chickahominy?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	279	10	B	TEU 2	-80.00 -90.00	DEB	Chickahominy?	NM ±NM	NM ±NM	No OH measurement
35-GM-25	279	10	C	TEU 2	-80.00 -90.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	279	10	D	TEU 2	-80.00 -90.00	DEB	Little Bear Creek	NM ±NM	NM ±NM	No OH measurement
35-GM-25	282	6	A	TEU 2	-90.00 -100.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-GM-25	282	6	B	TEU 2	-90.00 -100.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	287	2	—	TEU 2	-110.00 -120.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-25	459	2	A	EXU (105S/125E)	-34.00 -44.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-GM-25	461	1	—	EXU (105S/125E)	-44.00 -54.00	BIF	Whitewater Ridge	4.5 ±NM	NM ±NM	—
35-GM-25	468	4	A	EXU (105S/125E)	-74.00 -84.00	DEB	Wolf Creek?	6.8 ± 0.1	NM ±NM	—
35-GM-25	479	1	A	EXU (105S/125E)	-114.00 -124.00	DEB	Whitewater Ridge	4.4 ± 0.1	NM ±NM	—
35-GM-25	486	2	A	EXU (105S/125E)	-144.00 -154.00	DEB	Unknown I	5.0 ± 0.1	NM ±NM	—
35-GM-25	496	4	A	EXU (108S/131E)	-15.00 -25.00	DEB	Whitewater Ridge	5.2 ± 0.1	NM ±NM	—
35-GM-25	496	4	B	EXU (108S/131E)	-15.00 -25.00	DEB	Whitewater Ridge?	5.0 ± 0.1	NM ±NM	—
35-GM-25	500	4	A	EXU (108S/131E)	-35.00 -45.00	DEB	Obsidian Cliffs	5.9 ± 0.1	NM ±NM	—
35-GM-25	500	4	B	EXU (108S/131E)	-35.00 -45.00	DEB	Whitewater Ridge?	4.8 ±NM	NM ±NM	—
35-GM-25	500	4	C	EXU (108S/131E)	-35.00 -45.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-GM-25	503	3	A	EXU (108S/131E)	-45.00 -55.00	DEB	Unknown I	5.8 ± 0.1	NM ±NM	—
35-GM-25	507	3	A	EXU (108S/131E)	-65.00 -75.00	DEB	Whitewater Ridge	4.8 ± 0.2	NM ±NM	—
35-GM-25	519	1	A	EXU (111S/121E)	-37.00 -47.00	DEB	Unknown I	2.5 ± 0.1	NM ±NM	—
35-GM-25	519	1	B	EXU (111S/121E)	-37.00 -47.00	DEB	Whitewater Ridge?	4.3 ± 0.1	NM ±NM	—
35-GM-25	525	2	A	EXU (111S/121E)	-57.00 -67.00	DEB	Unknown J	6.5 ± 0.1	NM ±NM	—
35-GM-25	526	2	A	EXU (111S/121E)	-57.00 -67.00	DEB	Unknown B	6.1 ± 0.1	NM ±NM	—
35-GM-25	529	4	A	EXU (111S/121E)	-67.00 -77.00	DEB	Whitewater Ridge	5.1 ± 0.1	NM ±NM	—
35-GM-25	549	1	A	EXU (111S/121E)	-97.00 -107.00	DEB	Juniper Spring 2/Whitewater Ridge	DH ±NM	NM ±NM	Diffuse hydration
35-GM-25	558	1	A	EXU (111S/121E)	-137.00 -147.00	DEB	Quartz Mountain/McKay Butte	3.5 ± 0.1	5.1 ± 0.1	2 hydration bands
35-GM-25	563	1	A	EXU (105S/125E)	-64.00 -74.00	DEB	Unknown I	5.9 ± 0.1	NM ±NM	—
35-GM-25	642	4	A	EXU (96S/147E)	-108.00 -118.00	DEB	Whitewater Ridge	5.2 ± 0.2	NM ±NM	—
35-GM-25	642	4	B	EXU (96S/147E)	-108.00 -118.00	DEB	Whitewater Ridge	6.1 ± 0.1	NM ±NM	—
35-GM-25	644	3	A	EXU (96S/147E)	-118.00 -128.00	DEB	Whitewater Ridge	5.7 ± 0.1	NM ±NM	—
35-GM-25	644	3	B	EXU (96S/147E)	-118.00 -128.00	DEB	Whitewater Ridge	4.9 ± 0.1	NM ±NM	—
35-GM-25	651	2	A	EXU (97S/147E)	-60.00 -70.00	DEB	Whitewater Ridge	1.2 ± 0.1	3.6 ± 0.1	2 hydration bands
35-GM-25	661	3	A	EXU (97S/147E)	-100.00 -110.00	DEB	Glass Buttes	5.0 ± 0.1	NM ±NM	—
35-GM-25	664	3	A	EXU (97S/147E)	-110.00 -120.00	DEB	Whitewater Ridge	3.9 ± 0.1	NM ±NM	—
35-GM-25	676	3	A	EXU (105S/135E)	-38.00 -48.00	DEB	Glass Buttes	5.4 ± 0.1	NM ±NM	—
35-GM-25	677	3	A	EXU (105S/135E)	-48.00 -58.00	DEB	Unknown F	2.6 ±NM	NM ±NM	—
35-GM-25	678	4	—	EXU (105S/135E)	-48.00 -58.00	BIF	Little Bear Creek/Whitewater Ridge	6.0 ± 0.2	NM ±NM	—
35-GM-25	679	3	A	EXU (105S/135E)	-58.00 -68.00	DEB	Unknown A	5.6 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-GM-25	767	3	A	TRENCH 2 (101S/140E)	47.00 -160.00	DEB	Little Bear Creek/Whitewater Ridge	5.0 ± 0.1	NM ± NM	—
35-GM-25	775	2	A	TRENCH 5 (108S/127E)	60.00 -80.00	DEB	Whitewater Ridge	6.1 ± 0.1	NM ± NM	—
35-GM-25	777	3	—	TRENCH 5 (108S/127E)	00.00 -120.00	BIF	Unknown B	6.0 ± 0.1	NM ± NM	—
35-GM-25	790	3	A	EXU (96S/150E)	-59.00 -69.00	DEB	Unknown D	4.8 ± 0.2	NM ± NM	—
35-GM-25	790	7	—	EXU (96S/150E)	-59.00 -69.00	PPT	Glass Buttes	5.2 ± 0.1	NM ± NM	—
35-GM-25	791	3	A	EXU (96S/150E)	-59.00 -69.00	DEB	Wolf Creek?	DH ± NM	NM ± NM	—
35-GM-25	806	1	—	EXU (96S/150E)	-99.00 -99.00	UFT	Wolf Creek	6.6 ± 0.1	NM ± NM	—
35-GM-25	809	3	A	EXU (96S/150E)	-109.00 -119.00	DEB	Wolf Creek	6.2 ± 0.1	NM ± NM	—
35-GM-25	827	3	A	EXU (99S/135E)	-51.00 -61.00	DEB	Unknown I	6.0 ± 0.1	NM ± NM	—
35-GM-25	831	5	A	EXU (99S/135E)	-71.00 -81.00	DEB	Whitewater Ridge	5.0 ± 0.1	NM ± NM	—
35-GM-25	832	2	A	EXU (99S/135E)	-71.00 -81.00	DEB	Wolf Creek?	6.6 ± 0.1	NM ± NM	—
35-GM-25	835	6	A	EXU (99S/135E)	-91.00 -101.00	DEB	Whitewater Ridge	5.0 ± 0.1	NM ± NM	—
35-GM-25	847	2	A	EXU (99S/135E)	-111.00 -121.00	DEB	Whitewater Ridge	5.1 ± 0.1	NM ± NM	—
35-GM-25	847	2	B	EXU (99S/135E)	-111.00 -121.00	DEB	Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-GM-25	879	3	A	EXU (99S/140E)	-78.00 -88.00	DEB	Unknown J	5.0 ± NM	NM ± NM	—
35-GM-25	883	1	A	EXU (99S/140E)	-98.00 -108.00	DEB	Whitewater Ridge	5.3 ± NM	NM ± NM	—
35-GM-25	904	6	A	EXU (99S/142E)	-64.00 -74.00	DEB	Whitewater Ridge?	5.1 ± 0.2	NM ± NM	—
35-GM-25	904	6	B	EXU (99S/142E)	-64.00 -74.00	DEB	Whitewater Ridge?	5.9 ± 0.1	NM ± NM	—
35-GM-25	906	2	A	EXU (99S/142E)	-74.00 -84.00	DEB	Whitewater Ridge	6.0 ± NM	NM ± NM	—
35-GM-25	906	2	B	EXU (99S/142E)	-74.00 -84.00	DEB	Whitewater Ridge	6.1 ± 0.1	NM ± NM	—
35-GM-25	907	1	A	EXU (99S/142E)	-74.00 -84.00	DEB	Little Bear Creek/Whitewater Ridge	6.1 ± NM	NM ± NM	—
35-GM-25	909	2	A	EXU (99S/142E)	-84.00 -94.00	DEB	Whitewater Ridge?	5.4 ± 0.1	NM ± NM	—
35-GM-25	909	2	B	EXU (99S/142E)	-84.00 -94.00	DEB	Whitewater Ridge	5.7 ± 0.1	NM ± NM	—
35-GM-25	910	3	A	EXU (99S/142E)	-94.00 -104.00	DEB	Whitewater Ridge	4.3 ± 0.1	NM ± NM	—
35-GM-25	910	3	B	EXU (99S/142E)	-94.00 -104.00	DEB	Whitewater Ridge?	5.7 ± 0.2	NM ± NM	—
35-GM-25	915	1	—	EXU (99S/142E)	-104.00 -114.00	PPT	Little Bear Creek/Whitewater Ridge	4.9 ± 0.1	NM ± NM	—
35-GM-25	915	3	A	EXU (99S/142E)	-104.00 -114.00	DEB	Whitewater Ridge?	4.7 ± 0.2	NM ± NM	—
35-GM-25	933	1	—	EXU (99S/147E)	-42.00 -52.00	PPT	Obsidian Cliffs	5.9 ± 0.1	NM ± NM	—
35-GM-25	934	5	—	EXU (99S/147E)	-52.00 -58.00	PPT	Unknown F	4.4 ± 0.1	NM ± NM	—
35-GM-25	938	4	A	EXU (99S/147E)	-58.00 -68.00	DEB	Unknown I	5.8 ± 0.2	NM ± NM	—
35-GM-25	938	4	B	EXU (99S/147E)	-58.00 -68.00	DEB	Glass Buttes	5.6 ± 0.1	NM ± NM	—
35-GM-25	952	2	A	EXU (99S/147E)	-98.00 -108.00	DEB	Unknown K	NVB ± NM	NM ± NM	No visible band
35-GM-25	955	1	—	EXU (99S/147E)	-107.00 -107.00	BIF	Little Bear Creek	5.9 ± 0.1	NM ± NM	—
35-GM-25	958	2	A	EXU (99S/147E)	-108.00 -118.00	DEB	Unknown G	5.0 ± NM	NM ± NM	—
35-GM-25	969	2	A	EXU (101S/144E)	-31.00 -41.00	DEB	Whitewater Ridge	6.5 ± 0.1	NM ± NM	—
35-GM-25	971	3	A	EXU (101S/144E)	-41.00 -51.00	DEB	Whitewater Ridge?	6.0 ± 0.1	NM ± NM	—
35-GM-25	973	1	A	EXU (101S/144E)	-51.00 -61.00	DEB	Little Bear Creek/Whitewater Ridge	4.6 ± 0.1	NM ± NM	—
35-GM-25	973	1	B	EXU (101S/144E)	-51.00 -61.00	DEB	Whitewater Ridge	5.5 ± 0.1	NM ± NM	—
35-GM-25	976	2	A	EXU (101S/144E)	-61.00 -71.00	DEB	Whitewater Ridge	4.6 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-GM-25	978	2	A	EXU (101S/144E)	-71.00 -81.00	DEB	Whitewater Ridge?	4.9 ±NM	NM ±NM	—
35-GM-25	978	2	B	EXU (101S/144E)	-71.00 -81.00	DEB	Whitewater Ridge?	2.2 ± 0.2	NM ±NM	—
35-GM-25	983	1	—	EXU (101S/144E)	-81.00 -91.00	PPT	Wolf Creek	6.4 ± 0.1	NM ±NM	—
35-GM-25	983	3	A	EXU (101S/144E)	-81.00 -91.00	DEB	Whitewater Ridge?	4.7 ± 0.1	NM ±NM	—
35-GM-25	993	1	A	EXU (101S/144E)	-91.00 -101.00	DEB	Whitewater Ridge?	5.1 ± 0.1	NM ±NM	—
35-GM-25	993	1	B	EXU (101S/144E)	-91.00 -101.00	DEB	Unknown L	4.6 ± 0.1	NM ±NM	—
35-GM-25	1010	3	A	EXU (103S/135E)	-19.00 -29.00	DEB	Whitewater Ridge	6.1 ± 0.1	NM ±NM	—
35-GM-25	1111	1	A	EXU (103S/135E)	-29.00 -39.00	DEB	Whitewater Ridge?	5.7 ± 0.1	NM ±NM	—
35-GM-25	1111	1	B	EXU (103S/135E)	-29.00 -39.00	DEB	Whitewater Ridge	5.2 ± 0.1	NM ±NM	—
35-GM-25	1111	1	C	EXU (103S/135E)	-29.00 -39.00	DEB	Little Bear Creek/Whitewater Ridge	4.3 ± 0.1	NM ±NM	—
35-GM-25	1115	4	A	EXU (103S/135E)	-49.00 -59.00	DEB	Little Bear Creek	7.4 ± 0.1	NM ±NM	—
35-GM-25	1119	4	A	EXU (103S/135E)	-59.00 -69.00	DEB	Little Bear Creek/Whitewater Ridge	6.1 ± 0.1	NM ±NM	—
35-GM-25	1119	4	B	EXU (103S/135E)	-59.00 -69.00	DEB	Whitewater Ridge?	5.2 ± 0.2	NM ±NM	—
35-GM-25	1123	1	—	EXU (103S/135E)	-69.00 -79.00	BIF	Little Bear Creek	6.4 ± 0.2	NM ±NM	—
35-GM-25	1123	5	A	EXU (103S/135E)	-69.00 -79.00	DEB	Wolf Creek	6.8 ±NM	NM ±NM	—
35-GM-25	1124	1	—	EXU (103S/135E)	-69.00 -79.00	UFT	Wolf Creek	6.4 ± 0.2	NM ±NM	—
35-GM-25	1124	3	A	EXU (103S/135E)	-69.00 -79.00	DEB	Unknown M	5.5 ± 0.1	NM ±NM	—
35-GM-25	1125	3	A	EXU (103S/135E)	-79.00 -89.00	DEB	Whitewater Ridge	4.6 ± 0.1	NM ±NM	—
35-GM-25	1128	1	A	EXU (103S/135E)	-99.00 -109.00	DEB	Unknown N	6.4 ± 0.1	NM ±NM	—
35-GM-25	1129	2	A	EXU (103S/135E)	-109.00 -119.00	DEB	Whitewater Ridge?	5.2 ± 0.1	NM ±NM	—
35-GM-25	1134	1	A	EXU (103S/140E)	-46.00 -56.00	DEB	Whitewater Ridge?	4.8 ±NM	NM ±NM	—
35-GM-25	1135	2	A	EXU (103S/140E)	-46.00 -56.00	DEB	Unknown G	6.5 ± 0.1	NM ±NM	—
35-GM-25	1136	5	A	EXU (103S/140E)	-56.00 -66.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 2	3.3 ±NM	NM ±NM	—
35-GM-25	1137	1	—	EXU (103S/140E)	-56.00 -66.00	BIF	Whitewater Ridge	4.3 ± 0.1	NM ±NM	—
35-GM-25	1141	2	A	EXU (103S/140E)	-76.00 -86.00	DEB	Whitewater Ridge	5.3 ± 0.2	NM ±NM	—
35-GM-25	1141	2	B	EXU (103S/140E)	-76.00 -86.00	DEB	Whitewater Ridge	4.4 ± 0.1	NM ±NM	—
35-GM-25	1142	2	—	EXU (103S/140E)	-86.00 -96.00	BIF	Quartz Mountain	3.8 ±NM	NM ±NM	—
35-GM-25	1145	1	—	EXU (103S/140E)	-96.00 -106.00	BIF	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-GM-25	1145	7	A	EXU (103S/140E)	-96.00 -106.00	DEB	Whitewater Ridge?	5.2 ± 0.1	NM ±NM	—
35-GM-25	1145	7	B	EXU (103S/140E)	-96.00 -106.00	DEB	Whitewater Ridge	5.0 ± 0.2	NM ±NM	—
35-GM-25	1146	1	A	EXU (103S/140E)	-96.00 -106.00	DEB	Unknown I	4.8 ±NM	NM ±NM	—
35-GM-25	1149	4	A	EXU (103S/140E)	-106.00 -116.00	DEB	Delintment Creek?	4.3 ± 0.1	NM ±NM	—
35-GM-25	1149	4	B	EXU (103S/140E)	-106.00 -116.00	DEB	Unknown N	4.3 ± 0.1	NM ±NM	—
35-GM-25	1150	5	A	EXU (103S/140E)	-106.00 -116.00	DEB	Unknown A	5.7 ± 0.1	NM ±NM	—
35-GM-25	1152	5	A	EXU (103S/140E)	-116.00 -126.00	DEB	Whitewater Ridge	4.3 ± 0.1	NM ±NM	—
35-GM-25	1152	5	B	EXU (103S/140E)	-116.00 -126.00	DEB	Little Bear Creek/Whitewater Ridge	5.7 ±NM	NM ±NM	—
35-GM-25	1156	2	—	EXU (103S/140E)	-126.00 -136.00	BIF	Unknown O	4.9 ± 0.1	NM ±NM	—
35-GM-25	1156	3	A	EXU (103S/140E)	-126.00 -136.00	DEB	Whitewater Ridge	3.9 ±NM	NM ±NM	—
35-GM-25	1156	3	B	EXU (103S/140E)	-126.00 -136.00	DEB	Whitewater Ridge?	4.2 ± 0.2	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-GM-25	1156	3	C	EXU (103S/140E)	-126.00 -136.00	DEB	Delintment Creek?	4.8 ±NM	NM ±NM	—
35-GM-25	1167	1	—	EXU (105S/128E)	-12.00 -22.00	PPT	Whitewater Ridge	5.0 ± 0.1	NM ±NM	—
35-GM-25	1167	4	A	EXU (105S/128E)	-12.00 -22.00	DEB	Whitewater Ridge	6.6 ± 0.1	NM ±NM	—
35-GM-25	1169	2	A	EXU (105S/128E)	-22.00 -32.00	DEB	Whitewater Ridge	5.9 ± 0.1	NM ±NM	—
35-GM-25	1171	1	—	EXU (105S/128E)	-32.00 -42.00	PPT	Whitewater Ridge	5.6 ± 0.1	NM ±NM	—
35-GM-25	1176	2	A	EXU (105S/128E)	-52.00 -62.00	DEB	Unknown I	5.6 ± 0.2	NM ±NM	—
35-GM-25	1176	2	B	EXU (105S/128E)	-52.00 -62.00	DEB	Unknown G	5.1 ± 0.2	NM ±NM	—
35-GM-25	1176	2	C	EXU (105S/128E)	-52.00 -62.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-GM-25	1177	1	A	EXU (105S/128E)	-52.00 -62.00	DEB	Little Bear Creek	6.1 ± 0.1	NM ±NM	—
35-GM-25	1181	1	A	EXU (105S/128E)	-72.00 -82.00	DEB	Little Bear Creek/Whitewater Ridge	4.3 ± 0.1	NM ±NM	—
35-GM-25	1182	4	A	EXU (105S/128E)	-82.00 -92.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-GM-25	1186	5	A	EXU (105S/128E)	-92.00 -102.00	DEB	Newberry Volcano?	3.8 ± 0.1	NM ±NM	—
35-GM-25	1189	4	A	EXU (105S/128E)	-102.00 -112.00	DEB	Whitewater Ridge	5.0 ± 0.1	NM ±NM	—
35-GM-25	1190	2	A	EXU (105S/128E)	-102.00 -112.00	DEB	Whitewater Ridge	4.9 ± 0.1	NM ±NM	—
35-GM-25	1191	3	—	EXU (105S/128E)	-112.00 -122.00	UFT	Newberry Volcano	4.0 ± 0.1	NM ±NM	—
35-GM-25	1191	4	A	EXU (105S/128E)	-112.00 -122.00	DEB	Unknown B	5.5 ± 0.1	NM ±NM	—
35-GM-25	1195	1	A	EXU (105S/128E)	-122.00 -132.00	DEB	Whitewater Ridge	5.2 ± 0.2	NM ±NM	—
35-GM-25	1256	1	—	EXU (110S/113E)	-74.00 -84.00	BIF	Little Bear Creek/Whitewater Ridge	4.3 ± 0.1	NM ±NM	—
35-GM-25	1265	1	—	EXU (110S/113E)	-124.00 -134.00	DEB	Whitewater Ridge?	5.0 ± 0.1	NM ±NM	—
35-GM-25	1279	1	—	EXU (111S/126E)	-32.00 -42.00	BIF	Whitewater Ridge	3.0 ± 0.1	NM ±NM	—
35-GM-25	1283	3	A	EXU (111S/126E)	-52.00 -62.00	DEB	Newberry Volcano?	4.3 ±NM	NM ±NM	—
35-GM-25	1285	2	—	EXU (111S/126E)	-62.00 -72.00	PPT	Little Bear Creek	4.8 ± 0.1	NM ±NM	—
35-GM-25	1285	4	A	EXU (111S/126E)	-62.00 -72.00	DEB	Whitewater Ridge	3.9 ±NM	NM ±NM	—
35-GM-25	1288	1	—	EXU (111S/126E)	-72.00 -82.00	PPT	Whitewater Ridge	4.2 ± 0.1	NM ±NM	—
35-GM-25	1288	4	A	EXU (111S/126E)	-72.00 -82.00	DEB	Little Bear Creek/Whitewater Ridge	6.7 ± 0.1	NM ±NM	—
35-GM-25	1288	4	B	EXU (111S/126E)	-72.00 -82.00	DEB	Quartz Mountain	4.2 ± 0.1	NM ±NM	—
35-GM-25	1290	1	A	EXU (111S/126E)	-82.00 -92.00	DEB	Little Bear Creek?	5.0 ± 0.1	NM ±NM	—
35-GM-25	1290	1	B	EXU (111S/126E)	-82.00 -92.00	DEB	Whitewater Ridge	3.1 ± 0.1	NM ±NM	—
35-GM-25	1292	5	A	EXU (111S/126E)	-92.00 -102.00	DEB	Quartz Mountain	4.0 ± 0.1	NM ±NM	—
35-GM-101	10	1	A	SCP 5	0.00 0.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-101	10	1	B	SCP 5	0.00 0.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-GM-101	15	1	A	SCP 10	0.00 0.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-101	15	1	B	SCP 10	0.00 0.00	DEB	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-GM-101	15	1	C	SCP 10	0.00 0.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-GM-101	19	1	—	SCP 14	0.00 0.00	DEB	Unknown A	NM ±NM	NM ±NM	No OH measurement
35-GM-101	86	3	—	AUG 4	0.00 -20.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-101	108	1	—	AUG 6	-40.00 -60.00	DEB	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-GM-101	118	2	—	AUG 7	-60.00 -80.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-105	35	1	—	SCP 35	0.00 0.00	DEB	Unknown A	NM ±NM	NM ±NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-GM-105	36	1	—	SCP 36	0.00	0.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-GM-105	43	1	—	STU 1	0.00	-10.00	DEB	Horse Mountain?	NM ±NM	NM ±NM	No OH measurement
35-GM-105	50	1	—	STU 3	-20.00	-30.00	DEB	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-GM-110	23	6	—	TEU 5	-30.00	-40.00	BIF	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
OR-JE-5	4	1	—	SCP 2	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	2	1	—	SCP 2	0.00	0.00	BIF	Unknown A	4.2 ± 0.1	NM ±NM	—
35-JE-49	6	1	—	SCP 6	0.00	0.00	UFT	Little Bear Creek?	3.3 ± 0.1	NM ±NM	—
35-JE-49	14	1	—	SCP 14	0.00	0.00	UFT	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-JE-49	31	1	—	SCP 31	0.00	0.00	BIF	Obsidian Cliffs	NM ±NM	NM ±NM	No OH measurement
35-JE-49	35	1	—	SCP 35	0.00	0.00	PPT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	39	6	—	STU 2	0.00	-10.00	PPT	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-JE-49	127	4	—	TEU 1	0.00	-10.00	PPT	Silver Lake/Sycan Marsh	1.5 ± 0.1	1.2 ± 0.1	2 hydration bands
35-JE-49	127	5	—	TEU 1	0.00	-10.00	PPT	Newberry Volcano	1.2 ± 0.1	NM ±NM	—
35-JE-49	127	8	—	TEU 1	0.00	-10.00	UFT	Unknown B	2.0 ± 0.1	NM ±NM	—
35-JE-49	127	9	—	TEU 1	0.00	-10.00	BIF	Not Obsidian	NO ±NM	NM ±NM	Not obsidian
35-JE-49	127	10	—	TEU 1	0.00	-10.00	PPT	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-49	127	14	A	TEU 1	0.00	-10.00	DEB	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-49	127	14	B	TEU 1	0.00	-10.00	DEB	Glass Buttes	3.8 ± 0.1	NM ±NM	—
35-JE-49	127	14	C	TEU 1	0.00	-10.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-JE-49	128	4	—	TEU 1	-10.00	-20.00	BIF	Newberry Volcano	1.4 ± 0.1	NM ±NM	—
35-JE-49	128	5	—	TEU 1	-10.00	-20.00	BIF	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-49	128	6	—	TEU 1	-10.00	-20.00	PPT	Newberry Volcano	1.6 ± 0.1	NM ±NM	—
35-JE-49	128	7	—	TEU 1	-10.00	-20.00	BIF	Unknown C	NM ±NM	NM ±NM	No OH measurement
35-JE-49	128	8	—	TEU 1	-10.00	-20.00	PPT	Not Obsidian	NO ±NM	NM ±NM	Not obsidian
35-JE-49	128	9	—	TEU 1	-10.00	-20.00	BIF	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	128	13	A	TEU 1	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	128	13	B	TEU 1	-10.00	-20.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ±NM	—
35-JE-49	129	4	—	TEU 1	-20.00	-30.00	BIF	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	129	5	—	TEU 1	-20.00	-30.00	PPT	Obsidian Cliffs	2.3 ± 0.1	NM ±NM	—
35-JE-49	129	6	A	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	1.6 ±NM	NM ±NM	—
35-JE-49	129	6	B	TEU 1	-20.00	-30.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	129	6	C	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-JE-49	129	6	D	TEU 1	-20.00	-30.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	130	3	—	TEU 1	-30.00	-40.00	UFT	Obsidian Cliffs	2.6 ± 0.1	NM ±NM	—
35-JE-49	130	10	A	TEU 1	-30.00	-40.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-JE-49	130	10	B	TEU 1	-30.00	-40.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	130	10	C	TEU 1	-30.00	-40.00	DEB	Unknown D	NM ±NM	NM ±NM	No OH measurement
35-JE-49	130	10	D	TEU 1	-30.00	-40.00	DEB	Obsidian Cliffs	2.6 ± 0.1	NM ±NM	—
35-JE-49	131	1	—	TEU 1	-40.00	-50.00	PPT	Newberry Volcano	1.6 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	131	3	—	TEU 1	-40.00 -50.00	BIF	Newberry Volcano	NM ±NM	NM ±NM	No OH measurement
35-JE-49	131	8	A	TEU 1	-40.00 -50.00	DEB	Newberry Volcano	1.3 ± 0.2	NM ±NM	—
35-JE-49	131	8	B	TEU 1	-40.00 -50.00	DEB	Newberry Volcano	1.9 ± 0.2	NM ±NM	—
35-JE-49	131	8	C	TEU 1	-40.00 -50.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-49	132	3	A	TEU 1	-50.00 -60.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	132	3	B	TEU 1	-50.00 -60.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	132	3	C	TEU 1	-50.00 -60.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	135	4	A	TEU 1	-60.00 -70.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	135	4	B	TEU 1	-60.00 -70.00	DEB	Glass Buttes	3.7 ±NM	NM ±NM	—
35-JE-49	135	4	C	TEU 1	-60.00 -70.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-49	136	3	A	TEU 1	-70.00 -80.00	DEB	Obsidian Cliffs	2.1 ± 0.1	NM ±NM	—
35-JE-49	136	3	B	TEU 1	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	137	4	A	TEU 1	-80.00 -90.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	139	6	—	TEU 1	-90.00 -100.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-JE-49	140	5	A	TEU 1	0.00 -100.00	DEB	Newberry Volcano	NM ±NM	NM ±NM	No OH measurement
35-JE-49	140	5	B	TEU 1	0.00 -100.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-JE-49	140	5	C	TEU 1	0.00 -100.00	DEB	Obsidian Cliffs	NM ±NM	NM ±NM	No OH measurement
35-JE-49	143	3	A	TEU 1	-100.00 -110.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	144	1	—	TEU 1	-110.00 -110.00	UFT	Newberry Volcano	2.7 ±NM	2.8 ± 0.1	2 hydration bands
35-JE-49	146	7	—	TEU 1	-110.00 -120.00	PPT	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-49	147	3	—	TEU 1	-120.00 -130.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	149	4	—	TEU 1	-130.00 -140.00	DEB	Quartz Mountain/McKay Butte	3.7 ± 0.2	NM ±NM	—
35-JE-49	151	7	—	TEU 1	-150.00 -160.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-JE-49	176	3	A	TEU 3	-10.00 -20.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-JE-49	176	3	B	TEU 3	-10.00 -20.00	DEB	Quartz Mountain/McKay Butte	1.9 ± 0.1	NM ±NM	—
35-JE-49	176	3	C	TEU 3	-10.00 -20.00	DEB	Unknown E	NM ±NM	NM ±NM	No OH measurement
35-JE-49	178	8	—	TEU 3	-20.00 -30.00	BIF	Obsidian Cliffs	1.8 ±NM	NM ±NM	—
35-JE-49	179	3	—	TEU 3	-30.00 -40.00	DEB	Newberry Volcano	NM ±NM	NM ±NM	No OH measurement
35-JE-49	182	1	—	TEU 3	-33.00 -33.00	UFT	Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-JE-49	183	3	—	TEU 3	-40.00 -50.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-49	183	6	—	TEU 3	-40.00 -50.00	BIF	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	187	3	A	TEU 3	-50.00 -60.00	DEB	Newberry Volcano	2.1 ±NM	NM ±NM	—
35-JE-49	187	3	B	TEU 3	-50.00 -60.00	DEB	Unknown F	NM ±NM	NM ±NM	No OH measurement
35-JE-49	189	3	—	TEU 3	-60.00 -70.00	UFT	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-49	190	3	—	TEU 3	-60.00 -70.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-JE-49	191	3	A	TEU 3	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	191	3	B	TEU 3	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	191	3	C	TEU 3	-70.00 -80.00	DEB	Obsidian Cliffs	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	191	3	D	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	191	3	E	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	NM ±NM	NM ±NM	No OH measurement
35-JE-49	191	3	F	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	NM ±NM	NM ±NM	No OH measurement
35-JE-49	191	3	G	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	2.1 ±NM	NM ±NM	—
35-JE-49	191	3	H	TEU 3	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	191	3	I	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-49	191	3	J	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	191	3	K	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-49	191	3	L	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	NM ±NM	NM ±NM	No OH measurement
35-JE-49	191	3	M	TEU 3	-70.00 -80.00	DEB	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-49	191	8	—	TEU 3	-70.00 -80.00	UFT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	191	9	—	TEU 3	-70.00 -80.00	BIF	Unknown G	NM ±NM	NM ±NM	No OH measurement
35-JE-49	193	3	A	TEU 3	-80.00 -90.00	DEB	Obsidian Cliffs	NVB ±NM	NM ±NM	No visible band
35-JE-49	193	3	B	TEU 3	-80.00 -90.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-49	193	6	—	TEU 3	-80.00 -90.00	PPT	Obsidian Cliffs	2.7 ± 0.1	NM ±NM	—
35-JE-49	194	3	A	TEU 3	-80.00 -90.00	DEB	Potato Hills	NM ±NM	NM ±NM	No OH measurement
35-JE-49	194	3	B	TEU 3	-80.00 -90.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	206	1	—	TEU 4	-40.00 -50.00	DEB	Glass Buttes	3.4 ± 0.1	NM ±NM	—
35-JE-49	208	1	A	TEU 4	-50.00 -60.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	—
35-JE-49	208	1	B	TEU 4	-50.00 -60.00	DEB	Glass Buttes	3.8 ± 0.1	NM ±NM	—
35-JE-49	211	2	—	TEU 4	-60.00 -70.00	DEB	Glass Buttes	3.7 ± 0.1	NM ±NM	—
35-JE-49	213	2	—	TEU 4	-70.00 -80.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-JE-49	227	3	—	TEU 1	-180.00 -190.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-JE-49	232	3	—	TEU 3	-100.00 -110.00	DEB	Unknown H	NM ±NM	NM ±NM	No OH measurement
35-JE-49	234	2	—	TEU 3	-90.00 -100.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-49	235	5	—	TEU 3	-90.00 -100.00	DEB	Glass Buttes	3.8 ± 0.1	NM ±NM	—
35-JE-49	242	7	—	TEU 5	-10.00 -20.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-JE-49	242	8	—	TEU 5	-10.00 -20.00	DEB	Obsidian Cliffs	1.4 ± 0.1	NM ±NM	—
35-JE-49	242	9	—	TEU 5	-10.00 -20.00	UFT	Newberry Volcano	1.4 ± 0.1	NM ±NM	—
35-JE-49	242	10	—	TEU 5	-10.00 -20.00	UFT	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-JE-49	242	11	—	TEU 5	-10.00 -20.00	BIF	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-49	242	20	—	TEU 5	-10.00 -20.00	BIF	Spodue Mountain	2.5 ± 0.1	NM ±NM	—
35-JE-49	242	25	—	TEU 5	-10.00 -20.00	BIF	Juniper Spring 1	NM ±NM	NM ±NM	No OH measurement
35-JE-49	243	1	—	TEU 5	-13.00 -13.00	PPT	Newberry Volcano	NVB ±NM	1.3 ± 0.2	No visible band on Rim 1
35-JE-49	245	8	—	TEU 5	-20.00 -30.00	PPT	Newberry Volcano	3.7 ± 0.1	3.6 ± 0.1	2 hydration bands
35-JE-49	247	2	—	TEU 5	-30.00 -40.00	BIF	Potato Hills?	NM ±NM	NM ±NM	No OH measurement
35-JE-49	250	5	—	TEU 5	-40.00 -50.00	BIF	Obsidian Cliffs	1.5 ± 0.1	NM ±NM	—
35-JE-49	251	1	—	TEU 5	-49.00 -49.00	PPT	Unknown I	NM ±NM	NM ±NM	No OH measurement
35-JE-49	255	5	—	TEU 5	-60.00 -70.00	UFT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-49	255	10	—	TEU 5	-60.00 -70.00	PPT	Newberry Volcano	DH ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-JE-49	261	1	—	TEU 5	-89.00 -89.00	PPT	Obsidian Cliffs		4.9 ± NM	4.9 ± 0.1	2 hydration bands
35-JE-49	264	3	—	TEU 5	12.00 0.00	BIF	Big Obsidian Flow		NM ± NM	NM ± NM	No OH measurement
35-JE-49	264	4	—	TEU 5	12.00 0.00	BIF	Brooks Canyon		NM ± NM	NM ± NM	No OH measurement
35-JE-49	265	1	—	TEU 5	0.00 -10.00	DEB	Obsidian Cliffs		1.7 ± 0.1	NM ± NM	—
35-JE-49	265	2	—	TEU 5	0.00 -10.00	PPT	Quartz Mountain/McKay Butte		NM ± NM	NM ± NM	No OH measurement
35-JE-49	265	3	—	TEU 5	0.00 -10.00	PPT	Quartz Mountain/McKay Butte		NM ± NM	NM ± NM	No OH measurement
35-JE-49	267	2	—	TEU 5	-100.00 -110.00	PPT	Newberry Volcano		1.9 ± NM	NM ± NM	—
35-JE-49	267	3	—	TEU 5	-100.00 -110.00	UFT	Newberry Volcano		DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	270	3	—	TEU 5	0.00 -110.00	PPT	Quartz Mountain/McKay Butte		NM ± NM	NM ± NM	No OH measurement
35-JE-49	270	7	—	TEU 5	0.00 -110.00	DEB	Newberry Volcano		3.2 ± 0.1	NM ± NM	—
35-JE-49	273	3	—	PIT 1	0.00 0.00	UFT	Obsidian Cliffs		3.2 ± NM	NM ± NM	—
35-JE-49	307	1	—	SCP 508	0.00 0.00	PPT	Newberry Volcano		DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	332	1	—	SCP 533	0.00 0.00	BIF	Obsidian Cliffs		2.5 ± 0.1	NM ± NM	—
35-JE-49	349	3	A	SCU (615S/615E)	0.00 0.00	DEB	Obsidian Cliffs		3.4 ± 0.1	NM ± NM	—
35-JE-49	349	3	B	SCU (615S/615E)	0.00 0.00	DEB	Obsidian Cliffs		3.2 ± NM	NM ± NM	—
35-JE-49	351	2	A	EXU (9S/5E)	-66.00 -76.00	DEB	Obsidian Cliffs		3.9 ± 0.2	NM ± NM	—
35-JE-49	364	4	A	EXU (13S/12E)	-210.00 -220.00	DEB	Newberry Volcano		2.4 ± 0.1	NM ± NM	—
35-JE-49	366	2	A	EXU (13S/12E)	-220.00 -230.00	DEB	Quartz Mountain		1.1 ± NM	NM ± NM	—
35-JE-49	366	2	B	EXU (13S/12E)	-220.00 -230.00	DEB	Newberry Volcano		2.6 ± NM	NM ± NM	—
35-JE-49	366	2	C	EXU (13S/12E)	-220.00 -230.00	DEB	Obsidian Cliffs		DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	366	2	D	EXU (13S/12E)	-220.00 -230.00	DEB	Obsidian Cliffs		5.9 ± 0.1	NM ± NM	—
35-JE-49	367	1	A	EXU (13S/12E)	-220.00 -230.00	DEB	Newberry Volcano		2.6 ± NM	NM ± NM	—
35-JE-49	368	3	A	EXU (13S/12E)	-230.00 -240.00	DEB	Glass Buttes		4.1 ± 0.1	NM ± NM	—
35-JE-49	371	3	A	EXU (13S/12E)	-240.00 -250.00	DEB	Newberry Volcano		2.8 ± 0.1	NM ± NM	—
35-JE-49	371	3	B	EXU (13S/12E)	-240.00 -250.00	DEB	Quartz Mountain		3.0 ± 0.1	NM ± NM	—
35-JE-49	373	3	—	EXU (13S/12E)	-240.00 -250.00	BIF	Obsidian Cliffs		3.2 ± 0.1	NM ± NM	—
35-JE-49	376	2	A	EXU (13S/12E)	-260.00 -270.00	DEB	Whitewater Ridge?		2.6 ± 0.1	NM ± NM	—
35-JE-49	378	3	A	EXU (13S/12E)	-270.00 -280.00	DEB	Whitewater Ridge?		3.1 ± 0.1	NM ± NM	—
35-JE-49	379	2	A	EXU (13S/12E)	-270.00 -280.00	DEB	Glass Buttes		4.3 ± NM	NM ± NM	—
35-JE-49	383	1	A	EXU (13S/12E)	-290.00 -300.00	DEB	Obsidian Cliffs (MV)		2.9 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	405	1	A	EXU (14S/12E)	-250.00 -260.00	DEB	Glass Buttes		4.4 ± NM	NM ± NM	—
35-JE-49	407	4	A	EXU (14S/12E)	-260.00 -270.00	DEB	Glass Buttes		3.9 ± 0.1	NM ± NM	—
35-JE-49	409	3	A	EXU (14S/12E)	-270.00 -280.00	DEB	Unknown H		NVB ± NM	NM ± NM	No visible band
35-JE-49	411	2	A	EXU (14S/12E)	-280.00 -290.00	DEB	Unknown (MV)		3.6 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	411	2	B	EXU (14S/12E)	-280.00 -290.00	DEB	Obsidian Cliffs (MV)		3.2 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	421	5	—	EXU (15S/9E)	-120.00 -130.00	BIF	Unknown B		NVB ± NM	NM ± NM	No visible band
35-JE-49	430	2	A	EXU (15S/9E)	-160.00 -170.00	DEB	Newberry Volcano		2.5 ± NM	NM ± NM	—
35-JE-49	438	2	A	EXU (15S/9E)	-200.00 -210.00	DEB	Potato Hills		4.8 ± NM	NM ± NM	—
35-JE-49	440	2	A	EXU (15S/9E)	-210.00 -220.00	DEB	Newberry Volcano		1.9 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	448	1	A	EXU (16S/9E)	-98.00 -108.00	DEB	Quartz Mountain	2.4 ± NM	NM ± NM	—
35-JE-49	450	4	A	EXU (16S/9E)	-108.00 -118.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-JE-49	450	6	—	EXU (16S/9E)	-108.00 -118.00	PPT	Cougar Mountain	1.8 ± 0.1	NM ± NM	—
35-JE-49	452	3	A	EXU (16S/9E)	-118.00 -128.00	DEB	Newberry Volcano	1.3 ± NM	NM ± NM	—
35-JE-49	454	1	A	EXU (16S/9E)	-128.00 -138.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-JE-49	454	1	B	EXU (16S/9E)	-128.00 -138.00	DEB	Obsidian Cliffs	3.9 ± 0.1	NM ± NM	—
35-JE-49	454	1	D	EXU (16S/9E)	-128.00 -138.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	457	3	A	EXU (16S/9E)	-147.00 -157.00	DEB	Newberry Volcano	1.9 ± NM	NM ± NM	—
35-JE-49	459	3	A	EXU (16S/9E)	-157.00 -167.00	DEB	Obsidian Cliffs	2.5 ± 0.1	NM ± NM	—
35-JE-49	460	3	A	EXU (16S/9E)	-167.00 -177.00	DEB	Unknown J	2.5 ± NM	NM ± NM	—
35-JE-49	460	3	B	EXU (16S/9E)	-167.00 -177.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-JE-49	462	3	A	EXU (16S/9E)	-187.00 -197.00	DEB	Brooks Canyon	3.4 ± 0.1	NM ± NM	—
35-JE-49	462	3	B	EXU (16S/9E)	-187.00 -197.00	DEB	Unknown J	1.5 ± 0.1	NM ± NM	—
35-JE-49	472	2	A	EXU (17S/7E)	-99.00 -119.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ± NM	—
35-JE-49	474	3	A	EXU (17S/7E)	-139.00 -149.00	DEB	Unknown J	3.4 ± 0.1	NM ± NM	—
35-JE-49	477	2	A	EXU (17S/7E)	-149.00 -159.00	DEB	Unknown J	3.2 ± NM	NM ± NM	—
35-JE-49	478	3	—	EXU (17S/7E)	-159.00 -179.00	BIF	Unknown K	3.8 ± 0.1	NM ± NM	—
35-JE-49	480	4	A	EXU (18S/11E)	-97.00 -124.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-JE-49	480	4	B	EXU (18S/11E)	-97.00 -124.00	DEB	Glass Buttes	2.6 ± 0.1	NM ± NM	—
35-JE-49	480	4	C	EXU (18S/11E)	-97.00 -124.00	DEB	Little Bear Creek/Whitewater Ridge	3.9 ± 0.1	NM ± NM	—
35-JE-49	480	5	—	EXU (18S/11E)	-97.00 -124.00	UFT	Juniper Spring 2	2.0 ± NM	NM ± NM	—
35-JE-49	482	4	A	EXU (18S/11E)	-124.00 -144.00	DEB	Newberry Volcano	3.8 ± NM	NM ± NM	—
35-JE-49	482	4	B	EXU (18S/11E)	-124.00 -144.00	DEB	Quartz Mountain	1.6 ± 0.1	NM ± NM	—
35-JE-49	482	4	C	EXU (18S/11E)	-124.00 -144.00	DEB	Obsidian Cliffs	2.2 ± 0.1	NM ± NM	—
35-JE-49	482	4	D	EXU (18S/11E)	-124.00 -144.00	DEB	Newberry Volcano	1.9 ± NM	NM ± NM	—
35-JE-49	482	4	E	EXU (18S/11E)	-124.00 -144.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ± NM	—
35-JE-49	482	4	F	EXU (18S/11E)	-124.00 -144.00	DEB	Quartz Mountain	2.6 ± 0.1	5.0 ± 0.1	2 hydration bands
35-JE-49	482	4	G	EXU (18S/11E)	-124.00 -144.00	DEB	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-JE-49	483	3	A	EXU (18S/11E)	-144.00 -164.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-JE-49	483	3	B	EXU (18S/11E)	-144.00 -164.00	DEB	Big Obsidian Flow	1.7 ± NM	NM ± NM	—
35-JE-49	483	3	C	EXU (18S/11E)	-144.00 -164.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ± NM	—
35-JE-49	483	3	D	EXU (18S/11E)	-144.00 -164.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-JE-49	483	3	E	EXU (18S/11E)	-144.00 -164.00	DEB	Little Bear Creek	3.5 ± 0.1	NM ± NM	—
35-JE-49	484	3	A	EXU (18S/11E)	-164.00 -174.00	DEB	Newberry Volcano	1.7 ± NM	NM ± NM	—
35-JE-49	484	4	—	EXU (18S/11E)	-164.00 -174.00	PPT	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-JE-49	485	4	A	EXU (18S/11E)	-174.00 -194.00	DEB	Unknown J	3.2 ± NM	NM ± NM	—
35-JE-49	485	4	B	EXU (18S/11E)	-174.00 -194.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-JE-49	485	4	C	EXU (18S/11E)	-174.00 -194.00	DEB	Potato Hills	4.7 ± 0.1	NM ± NM	—
35-JE-49	492	4	A	EXU (18S/11E)	-224.00 -234.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	498	6	—	EXU (22S/14E)	-200.00 -210.00	BIF	Obsidian Cliffs	1.6 ± 0.1	NM ± NM	—
35-JE-49	502	5	B	EXU (22S/14E)	-220.00 -230.00	DEB	Quartz Mountain	1.4 ± NM	NM ± NM	—
35-JE-49	502	5	C	EXU (22S/14E)	-220.00 -230.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-JE-49	502	6	—	EXU (22S/14E)	-220.00 -230.00	PPT	Quartz Mountain	1.5 ± 0.1	NM ± NM	—
35-JE-49	503	6	—	EXU (22S/14E)	-220.00 -230.00	BIF	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-JE-49	504	4	A	EXU (22S/14E)	-230.00 -240.00	DEB	Quartz Mountain	2.5 ± NM	NM ± NM	—
35-JE-49	504	4	B	EXU (22S/14E)	-230.00 -240.00	DEB	Quartz Mountain	2.5 ± 0.1	NM ± NM	—
35-JE-49	504	4	D	EXU (22S/14E)	-230.00 -240.00	DEB	Obsidian Cliffs	3.6 ± NM	NM ± NM	—
35-JE-49	507	4	A	EXU (22S/14E)	-240.00 -250.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-JE-49	507	4	B	EXU (22S/14E)	-240.00 -250.00	DEB	Newberry Volcano	4.3 ± NM	NM ± NM	—
35-JE-49	507	4	C	EXU (22S/14E)	-240.00 -250.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ± NM	—
35-JE-49	507	4	D	EXU (22S/14E)	-240.00 -250.00	DEB	Newberry Volcano	5.7 ± NM	NM ± NM	—
35-JE-49	507	4	F	EXU (22S/14E)	-240.00 -250.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-JE-49	507	4	G	EXU (22S/14E)	-240.00 -250.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-49	508	3	A	EXU (22S/14E)	-240.00 -250.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered
35-JE-49	508	6	—	EXU (22S/14E)	-240.00 -250.00	PPT	Cougar Mountain	1.8 ± 0.1	3.8 ± 0.1	2 hydration bands
35-JE-49	509	6	A	EXU (22S/16E)	-235.00 -245.00	DEB	Little Bear Creek?	3.2 ± 0.1	NM ± NM	—
35-JE-49	510	3	A	EXU (22S/16E)	-245.00 -255.00	DEB	Obsidian Cliffs	DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	510	3	B	EXU (22S/16E)	-245.00 -255.00	DEB	Quartz Mountain	1.3 ± 0.1	6.0 ± 0.1	2 hydration bands
35-JE-49	513	2	A	EXU (22S/16E)	-255.00 -265.00	DEB	Quartz Mountain	2.3 ± NM	NM ± NM	—
35-JE-49	513	2	B	EXU (22S/16E)	-255.00 -265.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-JE-49	516	3	A	EXU (22S/16E)	-275.00 -285.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-JE-49	517	4	A	EXU (22S/16E)	-285.00 -295.00	DEB	Not Obsidian? (MV)	NO ± NM	NM ± NM	Visual characterization (microscopic)
35-JE-49	517	4	B	EXU (22S/16E)	-285.00 -295.00	DEB	Obsidian Cliffs (MV)	5.2 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	518	3	A	EXU (22S/16E)	-295.00 -305.00	DEB	Quartz Mountain	4.9 ± 0.1	NM ± NM	—
35-JE-49	523	2	A	EXU (22S/16E)	-315.00 -325.00	DEB	Obsidian Cliffs (MV)	2.4 ± NM	NM ± NM	Visual characterization (microscopic)
35-JE-49	601	1	A	EXU (1050S/536E)	0.00 -10.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-JE-49	628	1	A	EXU (1098S/521E)	-20.00 -30.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-JE-49	639	1	A	EXU (1099S/521E)	-10.00 -20.00	DEB	Newberry Volcano	3.9 ± 0.2	NM ± NM	—
35-JE-49	651	6	A	E. TRENCH	0.00 0.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-JE-49	651	6	B	E. TRENCH	0.00 0.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-JE-49	651	6	C	E. TRENCH	0.00 0.00	DEB	Quartz Mountain	3.4 ± 0.1	NM ± NM	—
35-JE-49	651	6	D	E. TRENCH	0.00 0.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-JE-49	651	6	E	E. TRENCH	0.00 0.00	DEB	Glass Buttes	2.1 ± 0.1	4.1 ± 0.1	2 hydration bands
35-JE-49	651	6	F	E. TRENCH	0.00 0.00	DEB	Quartz Mountain	2.4 ± 0.1	NM ± NM	—
35-JE-49	651	6	G	E. TRENCH	0.00 0.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-JE-49	651	6	H	E. TRENCH	0.00 0.00	DEB	Obsidian Cliffs	1.8 ± 0.1	NM ± NM	—
35-JE-49	651	11	—	E. TRENCH	0.00 0.00	PFT	Newberry Volcano	2.3 ± NM	NM ± NM	—
35-JE-49	651	40	—	E. TRENCH	0.00 0.00	PPT	Newberry Volcano	2.7 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-JE-49	651	42	—	E. TRENCH	0.00 0.00	BIF	Newberry Volcano	2.9 ± 0.1	NM ± NM	—	
35-JE-49	651	55	—	E. TRENCH	0.00 0.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration	
35-JE-49	683	1	—	E. TRENCH	-174.00 -174.00	BIF	Newberry Volcano	2.1 ± 0.1	NM ± NM	—	
35-JE-49	705	2	A	EXU (14S/11E)	-139.00 -149.00	DEB	Newberry Volcano	2.3 ± NM	NM ± NM	—	
35-JE-49	710	1	—	EXU (14S/11E)	-159.00 -169.00	PPT	Newberry Volcano	2.2 ± 0.1	6.1 ± 0.1	2 hydration bands	
35-JE-49	715	4	A	EXU (14S/11E)	-179.00 -189.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—	
35-JE-49	715	4	B	EXU (14S/11E)	-179.00 -189.00	DEB	Newberry Volcano	2.5 ± NM	NM ± NM	—	
35-JE-49	718	3	A	EXU (14S/11E)	-189.00 -199.00	DEB	Newberry Volcano	2.2 ± 0.2	NM ± NM	—	
35-JE-49	718	3	B	EXU (14S/11E)	-189.00 -199.00	DEB	Newberry Volcano	2.3 ± NM	NM ± NM	—	
35-JE-49	718	3	C	EXU (14S/11E)	-189.00 -199.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—	
35-JE-49	719	1	—	EXU (14S/11E)	-199.00 -209.00	UFT	Quartz Mountain	2.5 ± 0.1	NM ± NM	—	
35-JE-49	719	7	D	EXU (14S/11E)	-199.00 -209.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—	
35-JE-49	720	5	—	EXU (14S/11E)	-209.00 -219.00	UFT	Quartz Mountain	2.7 ± 0.1	NM ± NM	—	
35-JE-49	721	2	A	EXU (14S/11E)	-209.00 -219.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—	
35-JE-49	722	2	A	EXU (14S/11E)	-219.00 -229.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—	
35-JE-49	725	3	A	EXU (15S/9E)	-250.00 -260.00	DEB	McKay Butte	5.9 ± 0.1	NM ± NM	—	
35-JE-49	737	3	A	EXU (16S/9E)	-260.00 -270.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—	
35-JE-49	759	3	A	EXU (17S/9E)	-270.00 -280.00	DEB	Unknown (MV)	6.3 ± 0.1	NM ± NM	Visual characterization (microscopic)	
35-JE-49	759	3	B	EXU (17S/9E)	-270.00 -280.00	DEB	Unknown (MV)	3.6 ± 0.1	NM ± NM	Visual characterization (microscopic)	
35-JE-49	765	2	A	EXU (17S/9E)	-300.00 -310.00	DEB	Unknown (MV)	7.3 ± 0.1	NM ± NM	Visual characterization (microscopic)	
35-JE-49	773	2	A	EXU (17S/9E)	-330.00 -340.00	DEB	Unknown (MV)	3.8 ± 0.1	NM ± NM	Visual characterization (microscopic)	
35-JE-49	778	4	A	EXU (17S/11E)	-110.00 -120.00	DEB	Newberry Volcano?	2.6 ± 0.1	NM ± NM	—	
35-JE-49	779	4	—	EXU (17S/11E)	-110.00 -120.00	BIF	Newberry Volcano	1.7 ± 0.1	NM ± NM	—	
35-JE-49	780	4	A	EXU (17S/11E)	-120.00 -130.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—	
35-JE-49	782	3	—	EXU (17S/11E)	-130.00 -140.00	UFT	Newberry Volcano	2.9 ± 0.1	NM ± NM	—	
35-JE-49	782	7	A	EXU (17S/11E)	-130.00 -140.00	DEB	Unknown L	2.9 ± 0.1	NM ± NM	—	
35-JE-49	782	7	B	EXU (17S/11E)	-130.00 -140.00	DEB	Quartz Mountain	1.3 ± NM	NM ± NM	—	
35-JE-49	783	2	—	EXU (17S/11E)	-130.00 -140.00	BIF	Not Obsidian	NM ± NM	NM ± NM	No OH measurement	
35-JE-49	791	1	A	EXU (17S/11E)	-170.00 -180.00	DEB	Obsidian Cliffs	3.2 ± NM	NM ± NM	—	
35-JE-49	792	3	A	EXU (17S/11E)	-180.00 -190.00	DEB	Newberry Volcano	2.9 ± NM	NM ± NM	—	
35-JE-49	811	2	A	EXU (17S/11E)	-270.00 -280.00	DEB	Unknown (MV)	4.3 ± NM	NM ± NM	Visual characterization (microscopic)	
35-JE-49	825	3	A	EXU (17S/12E)	-133.00 -143.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ± NM	—	
35-JE-49	826	3	A	EXU (17S/12E)	-143.00 -153.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—	
35-JE-49	826	3	B	EXU (17S/12E)	-143.00 -153.00	DEB	Not Obsidian	NM ± NM	NM ± NM	No OH measurement	
35-JE-49	830	4	A	EXU (17S/12E)	-163.00 -173.00	DEB	Newberry Volcano	1.2 ± 0.1	NM ± NM	Weathered	
35-JE-49	834	2	A	EXU (17S/12E)	-183.00 -193.00	DEB	Unknown J	2.6 ± NM	NM ± NM	—	
35-JE-49	861	2	A	EXU (18S/9E)	-104.00 -114.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—	
35-JE-49	861	2	B	EXU (18S/9E)	-104.00 -114.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ± NM	—	
35-JE-49	866	5	A	EXU (18S/9E)	-134.00 -144.00	DEB	Little Bear Creek	2.6 ± NM	NM ± NM	—	

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	881	2	A	EXU (18S/9E)	-204.00 -214.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ±NM	—
35-JE-49	905	3	A	EXU (18S/9E)	-294.00 -304.00	DEB	Unknown (MV)	8.5 ± 0.1	NM ±NM	Visual characterization (microscopic)
35-JE-49	908	1	—	EXU (18S/9E)	-303.00 -303.00	PPT	Round Top Butte	4.7 ± 0.1	NM ±NM	—
35-JE-49	920	3	A	EXU (18S/10E)	-94.00 -114.00	DEB	Obsidian Cliffs	0.9 ± 0.1	NM ±NM	—
35-JE-49	923	7	A	EXU (18S/10E)	-114.00 -134.00	DEB	Obsidian Cliffs	1.3 ± 0.1	NM ±NM	—
35-JE-49	923	7	B	EXU (18S/10E)	-114.00 -134.00	DEB	Newberry Volcano	1.0 ±NM	NM ±NM	—
35-JE-49	923	7	D	EXU (18S/10E)	-114.00 -134.00	DEB	Quartz Mountain	1.3 ±NM	NM ±NM	—
35-JE-49	924	4	A	EXU (18S/10E)	-134.00 -154.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-JE-49	925	4	A	EXU (18S/10E)	-154.00 -174.00	DEB	Big Obsidian Flow	1.5 ± 0.1	NM ±NM	—
35-JE-49	925	4	B	EXU (18S/10E)	-154.00 -174.00	DEB	Newberry Volcano	1.4 ± 0.1	NM ±NM	—
35-JE-49	925	8	—	EXU (18S/10E)	-154.00 -174.00	BIF	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-49	927	4	A	EXU (18S/10E)	-174.00 -194.00	DEB	Newberry Volcano	1.7 ±NM	NM ±NM	—
35-JE-49	927	4	B	EXU (18S/10E)	-174.00 -194.00	DEB	Glass Buttes	4.2 ± 0.1	NM ±NM	—
35-JE-49	927	4	C	EXU (18S/10E)	-174.00 -194.00	DEB	Newberry Volcano	2.0 ±NM	NM ±NM	—
35-JE-49	936	3	A	EXU (18S/10E)	-224.00 -234.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ±NM	—
35-JE-49	938	8	—	EXU (18S/12E)	-120.00 -140.00	BIF	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-JE-49	938	13	A	EXU (18S/12E)	-120.00 -140.00	DEB	Quartz Mountain	2.2 ± 0.2	NM ±NM	—
35-JE-49	938	13	B	EXU (18S/12E)	-120.00 -140.00	DEB	Newberry Volcano	1.3 ±NM	2.3 ± 0.1	2 hydration bands
35-JE-49	938	13	C	EXU (18S/12E)	-120.00 -140.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-JE-49	938	13	D	EXU (18S/12E)	-120.00 -140.00	DEB	Quartz Mountain/McKay Butte	2.7 ± 0.2	NM ±NM	—
35-JE-49	938	13	E	EXU (18S/12E)	-120.00 -140.00	DEB	Quartz Mountain	1.6 ± 0.1	NM ±NM	—
35-JE-49	938	13	F	EXU (18S/12E)	-120.00 -140.00	DEB	Obsidian Cliffs	1.3 ± 0.1	4.8 ±NM	2 hydration bands
35-JE-49	938	14	—	EXU (18S/12E)	-120.00 -140.00	BIF	Unknown B	NVB ±NM	NM ±NM	No visible band
35-JE-49	939	3	—	EXU (18S/12E)	-140.00 -160.00	BIF	Quartz Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	939	5	A	EXU (18S/12E)	-140.00 -160.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-JE-49	939	5	B	EXU (18S/12E)	-140.00 -160.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-49	939	5	C	EXU (18S/12E)	-140.00 -160.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-JE-49	940	3	A	EXU (18S/12E)	-160.00 -170.00	DEB	Newberry Volcano?	2.6 ± 0.1	NM ±NM	—
35-JE-49	940	3	B	EXU (18S/12E)	-160.00 -170.00	DEB	Unknown J	3.0 ± 0.1	NM ±NM	—
35-JE-49	944	5	A	EXU (18S/12E)	-180.00 -190.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-JE-49	944	5	B	EXU (18S/12E)	-180.00 -190.00	DEB	Potato Hills	4.2 ± 0.1	NM ±NM	—
35-JE-49	946	2	A	EXU (18S/12E)	-190.00 -200.00	DEB	Potato Hills	4.6 ± 0.2	NM ±NM	—
35-JE-49	958	4	—	EXU (18S/13E)	-102.00 -138.00	UFT	Obsidian Cliffs	1.8 ± 0.1	NM ±NM	—
35-JE-49	958	7	C	EXU (18S/13E)	-102.00 -138.00	DEB	Quartz Mountain	1.9 ±NM	NM ±NM	—
35-JE-49	959	3	A	EXU (18S/13E)	-138.00 -150.00	DEB	Newberry Volcano	1.3 ±NM	NM ±NM	OH band approx. 6.7+ microns
35-JE-49	959	3	B	EXU (18S/13E)	-138.00 -150.00	DEB	Obsidian Cliffs	2.2 ± 0.1	NM ±NM	—
35-JE-49	987	1	—	EXU (22S/15E)	-175.00 -190.00	PPT	Obsidian Cliffs	1.5 ± 0.1	NM ±NM	—
35-JE-49	988	4	A	EXU (22S/15E)	-175.00 -190.00	DEB	Potato Hills	4.7 ±NM	NM ±NM	—
35-JE-49	988	4	B	EXU (22S/15E)	-175.00 -190.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	988	4	C	EXU (22S/15E)	-175.00 -190.00	DEB	Newberry Volcano	2.7 ± NM	NM ± NM	—
35-JE-49	988	4	D	EXU (22S/15E)	-175.00 -190.00	DEB	Unknown L	NVB ± NM	NM ± NM	No visible band
35-JE-49	989	1	A	EXU (22S/15E)	-190.00 -200.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-49	989	1	B	EXU (22S/15E)	-190.00 -200.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-49	992	7	A	EXU (22S/15E)	-200.00 -210.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered
35-JE-49	992	7	B	EXU (22S/15E)	-200.00 -210.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	994	5	A	EXU (22S/15E)	-210.00 -220.00	DEB	Quartz Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	994	5	C	EXU (22S/15E)	-210.00 -220.00	DEB	Newberry Volcano	3.0 ± NM	NM ± NM	—
35-JE-49	994	5	D	EXU (22S/15E)	-210.00 -220.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-JE-49	996	5	B	EXU (22S/15E)	-220.00 -230.00	DEB	Quartz Mountain	1.7 ± 0.1	NM ± NM	—
35-JE-49	996	5	E	EXU (22S/15E)	-220.00 -230.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-JE-49	1000	1	—	EXU (22S/15E)	-240.00 -250.00	PPT	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-JE-49	1000	5	A	EXU (22S/15E)	-240.00 -250.00	DEB	Quartz Mountain	1.4 ± 0.1	NM ± NM	—
35-JE-49	1001	6	A	EXU (22S/15E)	-240.00 -250.00	DEB	Quartz Mountain	2.5 ± 0.1	NM ± NM	—
35-JE-49	1004	4	—	EXU (22S/15E)	-260.00 -270.00	PPT	Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-JE-49	1004	11	A	EXU (22S/15E)	-260.00 -270.00	DEB	Unknown J	2.8 ± 0.1	NM ± NM	—
35-JE-49	1007	4	A	EXU (22S/15E)	-270.00 -280.00	DEB	Obsidian Cliffs? (MV)	2.6 ± NM	NM ± NM	Visual characterization (microscopic)
35-JE-49	1007	4	B	EXU (22S/15E)	-270.00 -280.00	DEB	Obsidian Cliffs (MV)	4.6 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1007	4	C	EXU (22S/15E)	-270.00 -280.00	DEB	Obsidian Cliffs (MV)	2.7 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1008	4	A	EXU (22S/15E)	-280.00 -290.00	DEB	Obsidian Cliffs (MV)	5.4 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1015	4	A	EXU (22S/15E)	-300.00 -310.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	1015	4	B	EXU (22S/15E)	-300.00 -310.00	DEB	Obsidian Cliffs (MV)	5.0 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1018	6	A	EXU (22S/15E)	-310.00 -320.00	DEB	Unknown (MV)	4.8 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1018	6	B	EXU (22S/15E)	-310.00 -320.00	DEB	Unknown (MV)	4.6 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1018	6	C	EXU (22S/15E)	-310.00 -320.00	DEB	Unknown (MV)	3.8 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1018	6	D	EXU (22S/15E)	-310.00 -320.00	DEB	Unknown (MV)	7.0 ± NM	NM ± NM	Visual characterization (microscopic)
35-JE-49	1019	3	A	EXU (22S/15E)	-310.00 -320.00	DEB	Obsidian Cliffs (MV)	5.2 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1020	4	A	EXU (22S/15E)	-320.00 -330.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ± NM	—
35-JE-49	1020	4	B	EXU (22S/15E)	-320.00 -330.00	DEB	Not Obsidian? (MV)	NO ± NM	NM ± NM	Visual characterization (microscopic)
35-JE-49	1020	4	C	EXU (22S/15E)	-320.00 -330.00	DEB	Obsidian Cliffs (MV)	5.2 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1027	3	A	EXU (22S/16E)	-260.00 -270.00	DEB	Unknown (MV)	3.4 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1027	3	B	EXU (22S/16E)	-260.00 -270.00	DEB	Obsidian Cliffs? (MV)	4.6 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1027	3	C	EXU (22S/16E)	-260.00 -270.00	DEB	Obsidian Cliffs? (MV)	4.6 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1027	3	D	EXU (22S/16E)	-260.00 -270.00	DEB	Obsidian Cliffs (MV)	4.4 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1027	3	E	EXU (22S/16E)	-260.00 -270.00	DEB	Obsidian Cliffs (MV)	3.7 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1028	4	A	EXU (22S/16E)	-260.00 -270.00	DEB	Obsidian Cliffs (MV)	4.0 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1030	2	A	EXU (22S/16E)	-270.00 -280.00	DEB	Unknown J	3.1 ± 0.1	NM ± NM	—
35-JE-49	1031	5	—	EXU (22S/16E)	-270.00 -280.00	BIF	Unknown (MV)	3.7 ± 0.2	NM ± NM	Visual characterization (microscopic)
35-JE-49	1032	6	A	EXU (22S/16E)	-280.00 -290.00	DEB	Cougar Mountain	4.5 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	1035	3	A	EXU (22S/16E)	-290.00 -300.00	DEB	Whitewater Ridge	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	1035	3	B	EXU (22S/16E)	-290.00 -300.00	DEB	McKay Butte	6.9 ± 0.2	NM ±NM	—
35-JE-49	1040	4	A	EXU (22S/16E)	-310.00 -320.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-49	1041	4	A	EXU (22S/16E)	-310.00 -320.00	DEB	McKay Butte	NVB ±NM	NM ±NM	No visible band
35-JE-49	1050	6	A	EXU (22S/16E)	-320.00 -330.00	DEB	Unknown (MV)	4.3 ±NM	NM ±NM	Visual characterization (microscopic)
35-JE-49	1050	6	B	EXU (22S/16E)	-320.00 -330.00	DEB	Obsidian Cliffs (MV)	5.2 ± 0.1	NM ±NM	Visual characterization (microscopic)
35-JE-49	1050	6	C	EXU (22S/16E)	-320.00 -330.00	DEB	Not Obsidian? (MV)	NO ±NM	NM ±NM	Visual characterization (microscopic)
35-JE-49	1050	6	D	EXU (22S/16E)	-320.00 -330.00	DEB	Unknown (MV)	1.7 ± 0.1	NM ±NM	Visual characterization (microscopic)
35-JE-49	1052	4	A	EXU (26S/21E)	-92.00 -120.00	DEB	Glass Buttes	2.2 ± 0.1	NM ±NM	—
35-JE-49	1054	4	A	EXU (26S/21E)	-140.00 -150.00	DEB	Quartz Mountain	1.2 ±NM	NM ±NM	—
35-JE-49	1054	4	B	EXU (26S/21E)	-140.00 -150.00	DEB	Obsidian Cliffs	2.3 ±NM	NM ±NM	—
35-JE-49	1054	4	C	EXU (26S/21E)	-140.00 -150.00	DEB	Unknown J	3.0 ±NM	NM ±NM	—
35-JE-49	1054	4	D	EXU (26S/21E)	-140.00 -150.00	DEB	Newberry Volcano	3.8 ±NM	NM ±NM	—
35-JE-49	1057	6	A	EXU (26S/21E)	-150.00 -160.00	DEB	Quartz Mountain	2.1 ± 0.1	NM ±NM	—
35-JE-49	1058	1	—	EXU (26S/21E)	-160.00 -170.00	BIF	Quartz Mountain	1.9 ± 0.1	NM ±NM	—
35-JE-49	1058	2	—	EXU (26S/21E)	-160.00 -170.00	BIF	Quartz Mountain	1.8 ±NM	NM ±NM	—
35-JE-49	1058	3	—	EXU (26S/21E)	-160.00 -170.00	PPT	Quartz Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	1058	8	—	EXU (26S/21E)	-160.00 -170.00	UFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	1058	11	A	EXU (26S/21E)	-160.00 -170.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-JE-49	1058	11	B	EXU (26S/21E)	-160.00 -170.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1058	11	C	EXU (26S/21E)	-160.00 -170.00	DEB	Obsidian Cliffs	3.5 ± 0.1	NM ±NM	—
35-JE-49	1058	11	D	EXU (26S/21E)	-160.00 -170.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-JE-49	1058	11	F	EXU (26S/21E)	-160.00 -170.00	DEB	Newberry Volcano?	4.3 ± 0.1	NM ±NM	—
35-JE-49	1058	11	G	EXU (26S/21E)	-160.00 -170.00	DEB	Chickahominy	3.7 ± 0.1	NM ±NM	—
35-JE-49	1058	11	H	EXU (26S/21E)	-160.00 -170.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	1059	1	—	EXU (26S/21E)	-160.00 -170.00	BIF	Obsidian Cliffs	0.9 ± 0.1	NM ±NM	—
35-JE-49	1059	3	B	EXU (26S/21E)	-160.00 -170.00	DEB	Quartz Mountain	1.3 ±NM	NM ±NM	—
35-JE-49	1060	6	—	EXU (26S/21E)	-170.00 -180.00	PPT	Obsidian Cliffs	1.4 ± 0.1	NM ±NM	—
35-JE-49	1060	11	A	EXU (26S/21E)	-170.00 -180.00	DEB	Riley	1.9 ± 0.1	NM ±NM	—
35-JE-49	1060	11	B	EXU (26S/21E)	-170.00 -180.00	DEB	Chickahominy?	1.8 ±NM	NM ±NM	—
35-JE-49	1060	11	C	EXU (26S/21E)	-170.00 -180.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1060	11	E	EXU (26S/21E)	-170.00 -180.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-JE-49	1060	11	F	EXU (26S/21E)	-170.00 -180.00	DEB	Newberry Volcano	1.5 ± 0.2	NM ±NM	—
35-JE-49	1061	2	—	EXU (26S/21E)	-180.00 -190.00	PPT	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-49	1061	3	—	EXU (26S/21E)	-180.00 -190.00	PPT	Cougar Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	1061	13	B	EXU (26S/21E)	-180.00 -190.00	DEB	Quartz Mountain	2.1 ± 0.1	NM ±NM	—
35-JE-49	1061	13	C	EXU (26S/21E)	-180.00 -190.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-JE-49	1061	13	D	EXU (26S/21E)	-180.00 -190.00	DEB	Obsidian Cliffs	3.0 ± 0.1	NM ±NM	—
35-JE-49	1061	13	E	EXU (26S/21E)	-180.00 -190.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	1061	13	F	EXU (26S/21E)	-180.00 -190.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ±NM	—
35-JE-49	1061	13	G	EXU (26S/21E)	-180.00 -190.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-JE-49	1061	13	H	EXU (26S/21E)	-180.00 -190.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-49	1061	13	I	EXU (26S/21E)	-180.00 -190.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-49	1063	3	B	EXU (26S/21E)	-190.00 -200.00	DEB	Newberry Volcano	2.0 ±NM	NM ±NM	—
35-JE-49	1063	3	E	EXU (26S/21E)	-190.00 -200.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	1064	1	—	EXU (26S/21E)	-200.00 -210.00	BIF	Obsidian Cliffs	3.0 ± 0.1	NM ±NM	—
35-JE-49	1064	5	A	EXU (26S/21E)	-200.00 -210.00	DEB	Newberry Volcano	2.6 ±NM	NM ±NM	—
35-JE-49	1064	5	D	EXU (26S/21E)	-200.00 -210.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-JE-49	1064	5	G	EXU (26S/21E)	-200.00 -210.00	DEB	Newberry Volcano	2.8 ± 0.2	NM ±NM	—
35-JE-49	1064	5	H	EXU (26S/21E)	-200.00 -210.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-49	1064	5	I	EXU (26S/21E)	-200.00 -210.00	DEB	Newberry Volcano	2.3 ±NM	NM ±NM	—
35-JE-49	1064	5	J	EXU (26S/21E)	-200.00 -210.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	1065	2	A	EXU (26S/21E)	-210.00 -220.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—
35-JE-49	1065	2	B	EXU (26S/21E)	-210.00 -220.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-JE-49	1067	1	—	EXU (26S/21E)	-220.00 -230.00	BIF	Quartz Mountain	2.6 ±NM	NM ±NM	—
35-JE-49	1067	6	—	EXU (26S/21E)	-220.00 -230.00	UFT	McKay Butte	3.1 ± 0.1	NM ±NM	—
35-JE-49	1068	2	A	EXU (26S/21E)	-220.00 -230.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-JE-49	1070	4	A	EXU (26S/21E)	-230.00 -240.00	DEB	Quartz Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	1070	4	B	EXU (26S/21E)	-230.00 -240.00	DEB	Quartz Mountain	5.3 ± 0.1	NM ±NM	—
35-JE-49	1081	3	A	EXU (26S/22E)	-150.00 -170.00	DEB	Obsidian Cliffs	1.2 ±NM	2.8 ± 0.1	2 hydration bands
35-JE-49	1082	5	A	EXU (26S/22E)	-170.00 -179.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1083	22	A	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	1083	22	B	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—
35-JE-49	1083	22	C	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-JE-49	1083	22	D	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-JE-49	1083	22	E	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-49	1083	22	F	EXU (26S/22E)	-179.00 -220.00	DEB	Quartz Mountain	2.8 ± 0.1	NM ±NM	—
35-JE-49	1083	22	G	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-JE-49	1083	22	H	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-JE-49	1083	22	I	EXU (26S/22E)	-179.00 -220.00	DEB	Glass Buttes	4.6 ± 0.1	NM ±NM	—
35-JE-49	1083	22	J	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-49	1083	22	K	EXU (26S/22E)	-179.00 -220.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-JE-49	1087	4	A	EXU (26S/22E)	-220.00 -230.00	DEB	Newberry Volcano	2.6 ±NM	NM ±NM	—
35-JE-49	1087	4	B	EXU (26S/22E)	-220.00 -230.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—
35-JE-49	1090	3	A	EXU (26S/22E)	-230.00 -240.00	DEB	Obsidian Cliffs	5.0 ±NM	NM ±NM	—
35-JE-49	1090	3	B	EXU (26S/22E)	-230.00 -240.00	DEB	Unknown I	4.4 ±NM	NM ±NM	—
35-JE-49	1090	3	C	EXU (26S/22E)	-230.00 -240.00	DEB	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-JE-49	1091	6	A	EXU (26S/22E)	-240.00 -250.00	DEB	Unknown (MV)	4.9 ± 0.1	NM ±NM	Visual characterization (microscopic)

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	1097	4	A	EXU (26S/22E)	-250.00 -260.00	DEB	Quartz Mountain	NVB ±NM	NM ±NM	No visible band
35-JE-49	1097	4	B	EXU (26S/22E)	-250.00 -260.00	DEB	Obsidian Cliffs (MV)	5.4 ± 0.1	NM ±NM	Visual characterization (microscopic)
35-JE-49	1101	1	A	EXU (26S/22E)	-270.00 -280.00	DEB	Obsidian Cliffs	4.9 ± 0.1	NM ±NM	—
35-JE-49	1107	4	A	EXU (27S/21E)	-150.00 -160.00	DEB	Quartz Mountain	3.8 ± 0.1	NM ±NM	—
35-JE-49	1109	2	—	EXU (27S/21E)	-160.00 -170.00	PPT	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-JE-49	1109	7	A	EXU (27S/21E)	-160.00 -170.00	DEB	Cougar Mountain	3.4 ± 0.2	NM ±NM	—
35-JE-49	1109	7	B	EXU (27S/21E)	-160.00 -170.00	DEB	Newberry Volcano	1.3 ±NM	NM ±NM	—
35-JE-49	1109	7	C	EXU (27S/21E)	-160.00 -170.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-JE-49	1109	7	D	EXU (27S/21E)	-160.00 -170.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-JE-49	1112	1	—	EXU (27S/21E)	-170.00 -180.00	PPT	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-49	1113	2	A	EXU (27S/21E)	-170.00 -180.00	DEB	Obsidian Cliffs	2.2 ± 0.2	3.7 ± 0.1	2 hydration bands
35-JE-49	1115	2	D	EXU (27S/21E)	-180.00 -190.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	1115	2	E	EXU (27S/21E)	-180.00 -190.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-JE-49	1115	5	—	EXU (27S/21E)	-180.00 -190.00	PPT	Obsidian Cliffs	1.9 ±NM	NM ±NM	—
35-JE-49	1117	2	A	EXU (27S/21E)	-180.00 -190.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-JE-49	1119	6	A	EXU (27S/21E)	-190.00 -200.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1119	9	—	EXU (27S/21E)	-190.00 -200.00	BIF	Cougar Mountain	2.6 ± 0.1	NM ±NM	—
35-JE-49	1120	2	A	EXU (27S/21E)	-190.00 -200.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1121	1	B	EXU (27S/21E)	-190.00 -200.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ±NM	—
35-JE-49	1122	2	A	EXU (27S/21E)	-190.00 -200.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-JE-49	1124	1	B	EXU (27S/21E)	-200.00 -210.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	1126	3	A	EXU (27S/21E)	-200.00 -210.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	1128	2	A	EXU (27S/21E)	-210.00 -220.00	DEB	Quartz Mountain	2.2 ± 0.1	NM ±NM	—
35-JE-49	1128	5	—	EXU (27S/21E)	-210.00 -220.00	BIF	Little Bear Creek/Whitewater Ridge	7.3 ±NM	NM ±NM	—
35-JE-49	1129	2	A	EXU (27S/21E)	-210.00 -220.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-49	1131	4	—	EXU (27S/21E)	-220.00 -230.00	PPT	Quartz Mountain	2.3 ± 0.1	NM ±NM	—
35-JE-49	1134	2	A	EXU (27S/21E)	-233.00 -240.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-JE-49	1141	4	A	EXU (27S/21E)	-250.00 -260.00	DEB	Unknown (MV)	3.6 ± 0.1	NM ±NM	Visual characterization (microscopic)
35-JE-49	1141	4	B	EXU (27S/21E)	-250.00 -260.00	DEB	Unknown (MV)	4.9 ± 0.1	NM ±NM	Visual characterization (microscopic)
35-JE-49	1141	4	C	EXU (27S/21E)	-250.00 -260.00	DEB	Unknown (MV)	NO ±NM	NM ±NM	Visual characterization (microscopic)
35-JE-49	1146	4	A	EXU (27S/21E)	-270.00 -280.00	DEB	Obsidian Cliffs (MV)	2.6 ±NM	NM ±NM	Visual characterization (microscopic)
35-JE-49	1150	2	A	EXU (27S/22E)	-114.00 -130.00	DEB	Whitewater Ridge?	3.1 ± 0.1	NM ±NM	—
35-JE-49	1150	2	B	EXU (27S/22E)	-114.00 -130.00	DEB	Newberry Volcano	3.9 ± 0.1	NM ±NM	—
35-JE-49	1151	2	A	EXU (27S/22E)	-130.00 -150.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-JE-49	1151	2	B	EXU (27S/22E)	-130.00 -150.00	DEB	Quartz Mountain	2.4 ±NM	NM ±NM	—
35-JE-49	1151	2	C	EXU (27S/22E)	-130.00 -150.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-JE-49	1151	2	D	EXU (27S/22E)	-130.00 -150.00	DEB	Quartz Mountain	1.6 ±NM	NM ±NM	—
35-JE-49	1151	2	E	EXU (27S/22E)	-130.00 -150.00	DEB	Big Obsidian Flow?	3.7 ±NM	NM ±NM	—
35-JE-49	1151	2	F	EXU (27S/22E)	-130.00 -150.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-49	1151	2	G	EXU (27S/22E)	-130.00 -150.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-JE-49	1151	2	H	EXU (27S/22E)	-130.00 -150.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-JE-49	1151	2	I	EXU (27S/22E)	-130.00 -150.00	DEB	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-JE-49	1151	2	J	EXU (27S/22E)	-130.00 -150.00	DEB	Glass Buttes	2.6 ± 0.1	NM ±NM	—
35-JE-49	1151	2	K	EXU (27S/22E)	-130.00 -150.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band
35-JE-49	1151	7	—	EXU (27S/22E)	-130.00 -150.00	BIF	Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—
35-JE-49	1152	2	A	EXU (27S/22E)	-150.00 -160.00	DEB	Newberry Volcano	1.2 ±NM	NM ±NM	—
35-JE-49	1152	2	B	EXU (27S/22E)	-150.00 -160.00	DEB	Quartz Mountain	NVB ±NM	NM ±NM	No visible band
35-JE-49	1152	2	C	EXU (27S/22E)	-150.00 -160.00	DEB	Newberry Volcano	1.7 ±NM	NM ±NM	—
35-JE-49	1152	2	D	EXU (27S/22E)	-150.00 -160.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-49	1152	2	E	EXU (27S/22E)	-150.00 -160.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-49	1152	8	—	EXU (27S/22E)	-150.00 -160.00	BIF	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-49	1153	2	A	EXU (27S/22E)	-150.00 -160.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-JE-49	1154	1	—	EXU (27S/22E)	-160.00 -160.00	PPT	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	1157	2	A	EXU (27S/22E)	-170.00 -180.00	DEB	Newberry Volcano	2.7 ±NM	NM ±NM	—
35-JE-49	1160	2	A	EXU (27S/22E)	-180.00 -190.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-JE-49	1160	2	B	EXU (27S/22E)	-180.00 -190.00	DEB	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-JE-49	1160	2	C	EXU (27S/22E)	-180.00 -190.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-JE-49	1163	5	A	EXU (27S/22E)	-190.00 -200.00	DEB	Newberry Volcano	4.4 ±NM	NM ±NM	—
35-JE-49	1163	5	B	EXU (27S/22E)	-190.00 -200.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1167	2	A	EXU (27S/22E)	-210.00 -220.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-JE-49	1167	2	B	EXU (27S/22E)	-210.00 -220.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-JE-49	1170	2	A	EXU (27S/22E)	-220.00 -230.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1170	2	B	EXU (27S/22E)	-220.00 -230.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-49	1180	4	A	EXU (28S/22E)	-135.00 -145.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-JE-49	1180	4	B	EXU (28S/22E)	-135.00 -145.00	DEB	Newberry Volcano	2.0 ±NM	NM ±NM	—
35-JE-49	1182	1	—	EXU (28S/22E)	-145.00 -155.00	BIF	Chickahominy	3.6 ± 0.2	NM ±NM	—
35-JE-49	1183	5	A	EXU (28S/22E)	-145.00 -155.00	DEB	Newberry Volcano	2.0 ±NM	NM ±NM	—
35-JE-49	1185	3	A	EXU (28S/22E)	-155.00 -165.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-JE-49	1188	3	A	EXU (28S/22E)	-175.00 -185.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-49	1188	3	B	EXU (28S/22E)	-175.00 -185.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-JE-49	1188	3	C	EXU (28S/22E)	-175.00 -185.00	DEB	Unknown F	4.9 ± 0.1	NM ±NM	—
35-JE-49	1189	4	A	EXU (28S/22E)	-175.00 -185.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1190	2	A	EXU (28S/22E)	-185.00 -195.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1192	3	A	EXU (28S/22E)	-195.00 -205.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1203	2	A	EXU (28S/22E)	-235.00 -245.00	DEB	Unknown (MV)	5.0 ± 0.2	NM ±NM	Visual characterization (microscopic)
35-JE-49	1205	5	A	EXU (29S/22E)	-125.00 -140.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-49	1205	5	B	EXU (29S/22E)	-125.00 -140.00	DEB	Quartz Mountain	2.5 ± 0.1	NM ±NM	—
35-JE-49	1205	5	C	EXU (29S/22E)	-125.00 -140.00	DEB	Newberry Volcano	2.7 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-JE-49	1210	3	A	EXU (29S/22E)	-160.00 -170.00	DEB	Newberry	Volcano	3.0 ± NM	NM ± NM	—
35-JE-49	1216	2	A	EXU (29S/22E)	-190.00 -200.00	DEB	Newberry	Volcano	2.4 ± NM	NM ± NM	—
35-JE-49	1216	2	B	EXU (29S/22E)	-190.00 -200.00	DEB	Newberry	Volcano	2.5 ± NM	NM ± NM	—
35-JE-49	1226	5	A	EXU (29S/22E)	-240.00 -250.00	DEB	Quartz	Mountain	4.9 ± 0.1	NM ± NM	—
35-JE-49	1226	5	B	EXU (29S/22E)	-240.00 -250.00	DEB	Unknown	(MV)	5.1 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1227	3	A	EXU (29S/22E)	-240.00 -250.00	DEB	Unknown	(MV)	NO ± NM	NM ± NM	Visual characterization (microscopic)
35-JE-49	1228	4	A	EXU (29S/22E)	-250.00 -260.00	DEB	Unknown	(MV)	4.9 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1229	2	A	EXU (29S/22E)	-250.00 -260.00	DEB	Unknown	(MV)	4.9 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1230	3	A	EXU (29S/22E)	-260.00 -270.00	DEB	Unknown	(MV)	5.7 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1231	4	A	EXU (29S/22E)	-260.00 -270.00	DEB	Unknown	(MV)	5.3 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1232	2	A	EXU (29S/22E)	-270.00 -280.00	DEB	Unknown	(MV)	4.8 ± 0.1	NM ± NM	Visual characterization (microscopic)
35-JE-49	1306	2	A	EXU (960S/491E)	-70.00 -80.00	DEB	Quartz	Mountain	4.2 ± 0.1	NM ± NM	—
35-JE-49	1319	1	A	EXU (980S/488E)	-30.00 -40.00	DEB	Newberry	Volcano	4.3 ± NM	NM ± NM	—
35-JE-49	1476	16	—	LOOTERS PIT	0.00 0.00	PPT	Quartz	Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-JE-49	1476	17	—	LOOTERS PIT	0.00 0.00	PPT	Quartz	Mountain	1.9 ± 0.1	NM ± NM	—
35-JE-50	67	2	—	SHP 32	0.00 -20.00	DEB	Glass	Buttes	5.2 ± 0.1	NM ± NM	—
35-JE-50	167	2	—	SON 10	-20.00 -30.00	DEB	Glass	Buttes	5.2 ± 0.1	NM ± NM	—
35-JE-50	168	1	—	SON 10	-30.00 -40.00	DEB	Newberry	Volcano	4.7 ± 0.1	NM ± NM	—
35-JE-50	206	2	—	TEU 1	-70.00 -80.00	DEB	Newberry	Volcano	4.7 ± 0.1	NM ± NM	—
35-JE-50	504	1	—	SCP 105	0.00 0.00	BIF	Obsidian	Cliffs	4.2 ± NM	NM ± NM	—
35-JE-50	505	1	—	SCP 106	0.00 0.00	BIF	Glass	Buttes	5.2 ± 0.1	NM ± NM	—
35-JE-50	554	2	—	SHP 111	0.00 -20.00	DEB	Quartz	Mountain	4.2 ± 0.1	NM ± NM	—
35-JE-50	609	1	—	SHP 124	0.00 -20.00	DEB	Newberry	Volcano	2.6 ± 0.1	NM ± NM	—
35-JE-50	643	2	—	SHP 131	0.00 -20.00	BIF	Riley		2.1 ± 0.2	4.7 ± 0.1	2 hydration bands
35-JE-50	828	1	—	EXU (44S/121E)	-70.00 -80.00	PPT	Newberry	Volcano	2.5 ± NM	NM ± NM	—
35-JE-50	839	2	—	EXU (44S/121E)	-120.00 -130.00	DEB	Quartz	Mountain	4.6 ± 0.1	NM ± NM	—
35-JE-50	883	1	—	EXU (46S/116E)	-30.00 -40.00	PPT	Newberry	Volcano	4.5 ± 0.1	NM ± NM	—
35-JE-50	933	3	—	EXU (47S/112E)	-120.00 -130.00	DEB	Newberry	Volcano	3.9 ± NM	NM ± NM	—
35-JE-50	954	1	—	EXU (49S/113E)	-70.00 -80.00	UFT	Glass	Buttes	5.3 ± 0.1	NM ± NM	—
35-JE-50	955	1	—	EXU (49S/113E)	-80.00 -90.00	PPT	McKay	Butte	DH ± NM	NM ± NM	Diffuse hydration
35-JE-50	982	1	—	EXU (56S/128E)	-10.00 -20.00	DEB	Newberry	Volcano	3.9 ± 0.1	NM ± NM	—
35-JE-50	987	1	A	EXU (56S/128E)	-40.00 -50.00	DEB	Obsidian	Cliffs	4.2 ± 0.1	NM ± NM	—
35-JE-50	990	1	—	EXU (56S/128E)	-50.00 -60.00	DEB	Quartz	Mountain	4.8 ± 0.1	NM ± NM	—
35-JE-50	1005	1	—	EXU (56S/110E)	-30.00 -40.00	DEB	Juniper	Spring 2/Whitewater Ridge	3.2 ± NM	NM ± NM	—
35-JE-50	1110	1	A	EXU (44S/118E)	-80.00 -90.00	DEB	Not	Obsidian	NVB ± NM	NM ± NM	No visible band
35-JE-50	1110	1	B	EXU (44S/118E)	-80.00 -90.00	DEB	Quartz	Mountain	4.2 ± NM	NM ± NM	—
35-JE-50	1126	1	—	EXU (47S/111E)	-20.00 -30.00	DEB	Newberry	Volcano	1.5 ± 0.1	NM ± NM	—
35-JE-50	1136	1	—	EXU (47S/111E)	-70.00 -80.00	DEB	Quartz	Mountain	1.5 ± 0.1	NM ± NM	—
35-JE-50	1138	2	—	EXU (47S/111E)	-80.00 -90.00	DEB	Newberry	Volcano	4.1 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-50	1159	1	—	EXU (48S/116E)	-20.00 -30.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-JE-50	1232	2	A	EXU (48S/117E)	-20.00 -30.00	DEB	Glass Buttes	4.1 ± 0.1	NM ±NM	—
35-JE-50	1256	1	—	EXU (48S/117E)	-55.00 -55.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ±NM	—
35-JE-50	1256	2	—	EXU (48S/117E)	-55.00 -55.00	DEB	Newberry Volcano	4.7 ± 0.1	NM ±NM	—
35-JE-50	1259	1	—	EXU (48S/117E)	-68.00 -68.00	BIF	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-JE-50	1265	3	A	EXU (48S/117E)	-70.00 -80.00	DEB	Newberry Volcano	4.4 ±NM	NM ±NM	—
35-JE-50	1265	3	B	EXU (48S/117E)	-70.00 -80.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ±NM	—
35-JE-50	1279	3	—	EXU (48S/118E)	-30.00 -40.00	DEB	Whitewater Ridge	4.8 ± 0.1	NM ±NM	—
35-JE-50	1287	4	—	EXU (48S/118E)	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	4.7 ± 0.1	NM ±NM	—
35-JE-50	1288	1	—	EXU (48S/118E)	-70.00 -80.00	PPT	Newberry Volcano	4.7 ± 0.1	NM ±NM	—
35-JE-50	1342	1	—	EXU (49S/115E)	-20.00 -30.00	BIF	Newberry Volcano	1.8 ±NM	4.9 ± 1.7	2 hydration bands
35-JE-50	1348	3	A	EXU (49S/115E)	-40.00 -50.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-JE-50	1349	1	—	EXU (49S/115E)	-45.00 -45.00	PPT	Whitewater Ridge	2.2 ± 0.1	5.0 ± 0.1	2 hydration rims
35-JE-50	1380	1	—	EXU (49S/116E)	-20.00 -30.00	PPT	Obsidian Cliffs	2.8 ± 0.1	NM ±NM	—
35-JE-50	1404	2	A	EXU (49S/117E)	-60.00 -70.00	DEB	Quartz Mountain	4.7 ± 0.1	NM ±NM	—
35-JE-50	1404	2	B	EXU (49S/117E)	-60.00 -70.00	DEB	Quartz Mountain	4.8 ± 0.1	NM ±NM	—
35-JE-50	1420	2	—	EXU (56S/129E)	-20.00 -30.00	DEB	Quartz Mountain	4.8 ± 0.1	NM ±NM	—
35-JE-50	1443	2	—	EXU (56S/125E)	-60.00 -70.00	DEB	Quartz Mountain	4.2 ± 0.1	NM ±NM	—
35-JE-50	1464	3	—	EXU (57S/125E)	-20.00 -30.00	DEB	Unknown A	5.2 ± 0.1	NM ±NM	—
35-JE-51B	100	2	A	SOX 3	-200.00 -220.00	DEB	Obsidian Cliffs	3.9 ± 0.1	NM ±NM	—
35-JE-51B	100	2	B	SOX 3	-200.00 -220.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—
35-JE-51B	106	1	—	SON 4	-50.00 -60.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-JE-51B	121	2	A	SON 6	-10.00 -20.00	DEB	Obsidian Cliffs	2.5 ± 0.1	NM ±NM	—
35-JE-51B	121	2	B	SON 6	-10.00 -20.00	DEB	Obsidian Cliffs	2.4 ± 0.1	NM ±NM	—
35-JE-51B	131	1	A	SON 7	0.00 -10.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	132	1	—	SON 7	-10.00 -20.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-JE-51B	133	3	—	SON 7	-20.00 -30.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-51B	165	2	—	TEU 1	-130.00 -140.00	PPT	Juniper Spring 2/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	166	1	—	TEU 1	-130.00 -140.00	PPT	Juniper Spring 2/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	190	6	—	TEU 3	-10.00 -20.00	PPT	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	190	8	—	TEU 3	-10.00 -20.00	PPT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	190	9	—	TEU 3	-10.00 -20.00	PPT	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-51B	208	3	—	TEU 3	-100.00 -110.00	BIF	Glass Buttes	2.5 ± 0.1	2.6 ± 0.1	2 hydration bands
35-JE-51B	209	3	—	TEU 3	-110.00 -120.00	BIF	Unknown A	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	215	9	A	TEU 4	-10.00 -20.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-JE-51B	215	9	B	TEU 4	-10.00 -20.00	DEB	Not Obsidian	NO ±NM	NM ±NM	Not obsidian
35-JE-51B	215	9	C	TEU 4	-10.00 -20.00	DEB	Obsidian Cliffs	NVB ±NM	NM ±NM	No visible band
35-JE-51B	215	9	D	TEU 4	-10.00 -20.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	217	6	A	TEU 4	-20.00 -30.00	DEB	Unknown B	NM ±NM	NM ±NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	217	6	B	TEU 4	-20.00	-30.00	DEB Obsidian Cliffs	3.0 ± 0.1	NM ±NM	—
35-JE-51B	217	6	C	TEU 4	-20.00	-30.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-51B	217	6	D	TEU 4	-20.00	-30.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-51B	217	6	E	TEU 4	-20.00	-30.00	DEB Glass Buttes	2.1 ± 0.1	NM ±NM	—
35-JE-51B	217	6	F	TEU 4	-20.00	-30.00	DEB Obsidian Cliffs	2.6 ± 0.1	NM ±NM	—
35-JE-51B	219	3	A	TEU 4	-30.00	-40.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-JE-51B	219	3	B	TEU 4	-30.00	-40.00	DEB Newberry Volcano	4.9 ± 0.1	NM ±NM	—
35-JE-51B	219	3	C	TEU 4	-30.00	-40.00	DEB Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	219	3	D	TEU 4	-30.00	-40.00	DEB Big Obsidian Flow	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	219	3	E	TEU 4	-30.00	-40.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-JE-51B	219	3	F	TEU 4	-30.00	-40.00	DEB Obsidian Cliffs	2.6 ± 0.1	NM ±NM	—
35-JE-51B	221	3	A	TEU 4	-40.00	-50.00	DEB Glass Buttes?	4.6 ± 0.1	NM ±NM	—
35-JE-51B	221	3	B	TEU 4	-40.00	-50.00	DEB Obsidian Cliffs?	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	221	3	C	TEU 4	-40.00	-50.00	DEB Unknown C	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	221	3	D	TEU 4	-40.00	-50.00	DEB Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-JE-51B	221	3	E	TEU 4	-40.00	-50.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-51B	221	3	F	TEU 4	-40.00	-50.00	DEB Obsidian Cliffs	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	221	3	G	TEU 4	-40.00	-50.00	DEB Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-JE-51B	221	3	H	TEU 4	-40.00	-50.00	DEB Newberry Volcano	2.2 ±NM	NM ±NM	—
35-JE-51B	221	3	I	TEU 4	-40.00	-50.00	DEB Obsidian Cliffs	2.3 ± 0.1	NM ±NM	—
35-JE-51B	221	3	J	TEU 4	-40.00	-50.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-51B	221	3	K	TEU 4	-40.00	-50.00	DEB Glass Buttes	3.2 ± 0.1	NM ±NM	—
35-JE-51B	221	3	L	TEU 4	-40.00	-50.00	DEB Obsidian Cliffs	2.9 ± 0.1	NM ±NM	—
35-JE-51B	223	5	A	TEU 4	-50.00	-60.00	DEB Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-JE-51B	223	5	B	TEU 4	-50.00	-60.00	DEB Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-51B	223	5	C	TEU 4	-50.00	-60.00	DEB Glass Buttes	2.5 ± 0.1	NM ±NM	—
35-JE-51B	223	5	D	TEU 4	-50.00	-60.00	DEB Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-JE-51B	223	5	E	TEU 4	-50.00	-60.00	DEB Glass Buttes	2.8 ± 0.1	NM ±NM	—
35-JE-51B	223	5	F	TEU 4	-50.00	-60.00	DEB Obsidian Cliffs	2.2 ± 0.1	NM ±NM	—
35-JE-51B	223	5	G	TEU 4	-50.00	-60.00	DEB Obsidian Cliffs	2.3 ±NM	NM ±NM	—
35-JE-51B	223	5	H	TEU 4	-50.00	-60.00	DEB Obsidian Cliffs	2.3 ± 0.1	NM ±NM	—
35-JE-51B	223	5	I	TEU 4	-50.00	-60.00	DEB Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-51B	223	5	J	TEU 4	-50.00	-60.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-51B	223	5	K	TEU 4	-50.00	-60.00	DEB Obsidian Cliffs	NVB ±NM	NM ±NM	No visible band
35-JE-51B	223	5	L	TEU 4	-50.00	-60.00	DEB Obsidian Cliffs	2.4 ± 0.1	NM ±NM	—
35-JE-51B	223	5	M	TEU 4	-50.00	-60.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-51B	227	2	A	TEU 4	-60.00	-70.00	DEB Obsidian Cliffs	2.6 ± 0.1	NM ±NM	—
35-JE-51B	227	2	B	TEU 4	-60.00	-70.00	DEB Obsidian Cliffs	2.4 ± 0.1	NM ±NM	—
35-JE-51B	227	2	C	TEU 4	-60.00	-70.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	227	2	D	TEU 4	-60.00 -70.00	DEB	Juniper Spring 2	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	227	2	E	TEU 4	-60.00 -70.00	DEB	Juniper Spring 2	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	227	8	—	TEU 4	-60.00 -70.00	BIF	Newberry Volcano/Unknown X?	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	227	9	—	TEU 4	-60.00 -70.00	BIF	Obsidian Cliffs	2.7 ± 0.1	NM ±NM	—
35-JE-51B	231	7	A	TEU 4	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	231	7	B	TEU 4	-70.00 -80.00	DEB	Horse Mountain?	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	231	7	C	TEU 4	-70.00 -80.00	DEB	Glass Buttes	3.2 ± 0.1	NM ±NM	—
35-JE-51B	231	7	D	TEU 4	-70.00 -80.00	DEB	Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—
35-JE-51B	232	3	A	TEU 4	-80.00 -90.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-JE-51B	232	3	B	TEU 4	-80.00 -90.00	DEB	Glass Buttes	3.6 ± 0.1	NM ±NM	—
35-JE-51B	232	3	C	TEU 4	-80.00 -90.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-JE-51B	232	3	D	TEU 4	-80.00 -90.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	232	3	E	TEU 4	-80.00 -90.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	233	3	A	TEU 4	-80.00 -90.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	233	3	B	TEU 4	-80.00 -90.00	DEB	Glass Buttes	3.4 ± 0.1	NM ±NM	—
35-JE-51B	237	2	—	TEU 4	-100.00 -110.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ±NM	—
35-JE-51B	238	5	A	TEU 4	-110.00 -120.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-JE-51B	238	5	B	TEU 4	-110.00 -120.00	DEB	Obsidian Cliffs	3.0 ± 0.1	NM ±NM	—
35-JE-51B	238	5	C	TEU 4	-110.00 -120.00	DEB	Unknown D	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	238	5	D	TEU 4	-110.00 -120.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-51B	241	4	A	TEU 4	-120.00 -130.00	DEB	Chickahominy?	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	241	4	B	TEU 4	-120.00 -130.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-JE-51B	241	4	C	TEU 4	-120.00 -130.00	DEB	Obsidian Cliffs	2.4 ±NM	NM ±NM	—
35-JE-51B	241	4	D	TEU 4	-120.00 -130.00	DEB	Obsidian Cliffs	4.2 ± 0.1	NM ±NM	—
35-JE-51B	241	4	E	TEU 4	-120.00 -130.00	DEB	Obsidian Cliffs	5.4 ± 0.1	NM ±NM	—
35-JE-51B	241	4	F	TEU 4	-120.00 -130.00	DEB	Not Obsidian	NO ±NM	NM ±NM	Not obsidian
35-JE-51B	246	4	—	TEU 4	-140.00 -150.00	PPT	Spodue Mountain?	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	248	6	—	TEU 4	-150.00 -160.00	PPT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-51B	252	2	—	TEX 4	-180.00 -200.00	DEB	Obsidian Cliffs	2.6 ± 0.1	NM ±NM	—
35-JE-51B	343	2	A	SON 102	-20.00 -30.00	DEB	Whitewater Ridge	3.7 ± 0.1	NM ±NM	—
35-JE-51B	498	6	A	EXU (79S/95E)	0.00 -18.00	DEB	Big Obsidian Flow	2.4 ± 0.1	NM ±NM	—
35-JE-51B	498	6	C	EXU (79S/95E)	0.00 -18.00	DEB	McKay Butte	3.0 ± 0.1	NM ±NM	—
35-JE-51B	498	10	—	EXU (79S/95E)	0.00 -18.00	PPT	Juniper Spring 2	2.7 ± 0.1	NM ±NM	—
35-JE-51B	499	6	A	EXU (79S/95E)	-18.00 -38.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-JE-51B	499	6	B	EXU (79S/95E)	-18.00 -38.00	DEB	Quartz Mountain	1.9 ± 0.1	NM ±NM	—
35-JE-51B	499	6	C	EXU (79S/95E)	-18.00 -38.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-51B	499	6	D	EXU (79S/95E)	-18.00 -38.00	DEB	Big Obsidian Flow	2.3 ± 0.1	NM ±NM	—
35-JE-51B	499	6	F	EXU (79S/95E)	-18.00 -38.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-JE-51B	500	4	A	EXU (79S/95E)	-38.00 -58.00	DEB	Obsidian Cliffs	3.1 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	500	4	B	EXU (79S/95E)	-38.00	-58.00	DEB Potato Hills	3.1 ± 0.1	NM ±NM	—
35-JE-51B	500	4	C	EXU (79S/95E)	-38.00	-58.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-JE-51B	500	4	D	EXU (79S/95E)	-38.00	-58.00	DEB Obsidian Cliffs	DH ±NM	NM ±NM	Weathered
35-JE-51B	500	4	E	EXU (79S/95E)	-38.00	-58.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-51B	500	4	F	EXU (79S/95E)	-38.00	-58.00	DEB Obsidian Cliffs	DH ±NM	NM ±NM	Weathered
35-JE-51B	500	4	G	EXU (79S/95E)	-38.00	-58.00	DEB Big Obsidian Flow	2.2 ± 0.1	NM ±NM	—
35-JE-51B	500	4	H	EXU (79S/95E)	-38.00	-58.00	DEB Obsidian Cliffs	1.5 ± 0.1	2.5 ± 0.1	3 bands; Band 3 = 3.3 microns
35-JE-51B	500	12	—	EXU (79S/95E)	-38.00	-58.00	BIF Silver Lake/Sycan Marsh	3.5 ± 0.1	NM ±NM	—
35-JE-51B	500	13	—	EXU (79S/95E)	-38.00	-58.00	PPT Juniper Spring 2	2.2 ± 0.1	NM ±NM	—
35-JE-51B	501	5	A	EXU (79S/95E)	-58.00	-78.00	DEB Quartz Mountain	3.7 ± 0.1	NM ±NM	—
35-JE-51B	501	5	B	EXU (79S/95E)	-58.00	-78.00	DEB Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-JE-51B	501	5	C	EXU (79S/95E)	-58.00	-78.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-JE-51B	501	5	D	EXU (79S/95E)	-58.00	-78.00	DEB Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-JE-51B	501	5	E	EXU (79S/95E)	-58.00	-78.00	DEB Little Bear Creek/Whitewater Ridge	3.1 ± 0.1	NM ±NM	—
35-JE-51B	501	5	F	EXU (79S/95E)	-58.00	-78.00	DEB Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-51B	501	5	G	EXU (79S/95E)	-58.00	-78.00	DEB Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ±NM	—
35-JE-51B	501	5	H	EXU (79S/95E)	-58.00	-78.00	DEB Obsidian Cliffs	2.9 ±NM	NM ±NM	—
35-JE-51B	501	5	I	EXU (79S/95E)	-58.00	-78.00	DEB Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-51B	502	4	A	EXU (79S/95E)	-78.00	-98.00	DEB Little Bear Creek/Whitewater Ridge	2.5 ±NM	NM ±NM	—
35-JE-51B	502	4	B	EXU (79S/95E)	-78.00	-98.00	DEB Newberry Volcano	3.5 ±NM	NM ±NM	—
35-JE-51B	502	4	C	EXU (79S/95E)	-78.00	-98.00	DEB Newberry Volcano	2.7 ± 0.2	NM ±NM	—
35-JE-51B	502	4	D	EXU (79S/95E)	-78.00	-98.00	DEB Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-JE-51B	502	4	E	EXU (79S/95E)	-78.00	-98.00	DEB Big Obsidian Flow	2.6 ± 0.1	NM ±NM	—
35-JE-51B	502	4	F	EXU (79S/95E)	-78.00	-98.00	DEB Quartz Mountain	2.7 ± 0.2	NM ±NM	—
35-JE-51B	506	4	A	EXU (79S/97E)	3.00	-21.00	DEB Newberry Volcano	3.2 ±NM	NM ±NM	—
35-JE-51B	506	4	B	EXU (79S/97E)	3.00	-21.00	DEB Newberry Volcano	2.8 ± 0.1	NM ±NM	—
35-JE-51B	506	4	C	EXU (79S/97E)	3.00	-21.00	DEB Big Obsidian Flow	2.2 ± 0.2	NM ±NM	—
35-JE-51B	506	4	D	EXU (79S/97E)	3.00	-21.00	DEB Newberry Volcano	2.9 ±NM	NM ±NM	—
35-JE-51B	506	4	E	EXU (79S/97E)	3.00	-21.00	DEB Big Obsidian Flow	2.6 ±NM	NM ±NM	—
35-JE-51B	506	4	F	EXU (79S/97E)	3.00	-21.00	DEB Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-JE-51B	506	4	G	EXU (79S/97E)	3.00	-21.00	DEB Newberry Volcano	4.3 ±NM	NM ±NM	—
35-JE-51B	506	13	—	EXU (79S/97E)	3.00	-21.00	BIF Big Obsidian Flow	2.4 ± 0.1	NM ±NM	—
35-JE-51B	507	4	A	EXU (79S/97E)	-21.00	-41.00	DEB Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—
35-JE-51B	507	4	B	EXU (79S/97E)	-21.00	-41.00	DEB Big Obsidian Flow	2.4 ± 0.1	NM ±NM	—
35-JE-51B	508	9	—	EXU (79S/97E)	-41.00	-57.00	BIF Quartz Mountain	3.3 ± 0.1	NM ±NM	—
35-JE-51B	509	4	A	EXU (79S/97E)	-57.00	-77.00	DEB Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-JE-51B	510	4	A	EXU (79S/97E)	-77.00	-97.00	DEB Quartz Mountain	3.0 ± 0.1	NM ±NM	—
35-JE-51B	510	4	B	EXU (79S/97E)	-77.00	-97.00	DEB Big Obsidian Flow	2.7 ± 0.1	NM ±NM	—
35-JE-51B	510	4	C	EXU (79S/97E)	-77.00	-97.00	DEB Quartz Mountain	3.2 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	510	4	D	EXU (79S/97E)	-77.00 -97.00	DEB	Glass Buttes	4.3 ± 0.1	NM ± NM	—
35-JE-51B	511	3	A	EXU (79S/97E)	-97.00 -117.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ± NM	—
35-JE-51B	511	3	B	EXU (79S/97E)	-97.00 -117.00	DEB	Newberry Volcano	3.0 ± NM	NM ± NM	—
35-JE-51B	511	3	C	EXU (79S/97E)	-97.00 -117.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-JE-51B	517	3	A	EXU (80S/91E)	6.00 -14.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-JE-51B	517	3	B	EXU (80S/91E)	6.00 -14.00	DEB	McKay Butte	3.7 ± 0.1	NM ± NM	—
35-JE-51B	519	3	A	EXU (80S/91E)	-34.00 -54.00	DEB	Obsidian Cliffs	2.6 ± 0.1	NM ± NM	—
35-JE-51B	519	3	B	EXU (80S/91E)	-34.00 -54.00	DEB	Obsidian Cliffs	3.3 ± 0.1	NM ± NM	—
35-JE-51B	519	3	C	EXU (80S/91E)	-34.00 -54.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-51B	519	3	D	EXU (80S/91E)	-34.00 -54.00	DEB	Obsidian Cliffs	2.8 ± 0.1	NM ± NM	—
35-JE-51B	521	3	A	EXU (80S/91E)	-74.00 -94.00	DEB	Quartz Mountain	4.1 ± 0.1	NM ± NM	—
35-JE-51B	525	6	A	EXU (80S/93E)	0.00 -22.00	DEB	McKay Butte	4.3 ± 0.1	NM ± NM	—
35-JE-51B	525	6	B	EXU (80S/93E)	0.00 -22.00	DEB	McKay Butte	3.5 ± NM	NM ± NM	—
35-JE-51B	525	6	C	EXU (80S/93E)	0.00 -22.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-51B	525	6	D	EXU (80S/93E)	0.00 -22.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	Weathered
35-JE-51B	525	6	E	EXU (80S/93E)	0.00 -22.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-JE-51B	525	9	—	EXU (80S/93E)	0.00 -22.00	UFT	Big Obsidian Flow	2.1 ± 0.1	NM ± NM	—
35-JE-51B	526	7	A	EXU (80S/93E)	-22.00 -42.00	DEB	McKay Butte	3.3 ± 0.2	NM ± NM	—
35-JE-51B	526	7	B	EXU (80S/93E)	-22.00 -42.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-JE-51B	526	9	—	EXU (80S/93E)	-22.00 -42.00	PPT	Juniper Spring 2	1.2 ± NM	NM ± NM	—
35-JE-51B	527	5	A	EXU (80S/93E)	-42.00 -62.00	DEB	Big Obsidian Flow	2.4 ± NM	NM ± NM	—
35-JE-51B	527	5	B	EXU (80S/93E)	-42.00 -62.00	DEB	Big Obsidian Flow	2.5 ± 0.1	NM ± NM	—
35-JE-51B	527	5	C	EXU (80S/93E)	-42.00 -62.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-JE-51B	527	5	D	EXU (80S/93E)	-42.00 -62.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-JE-51B	527	5	E	EXU (80S/93E)	-42.00 -62.00	DEB	Newberry Volcano	2.7 ± 0.2	NM ± NM	—
35-JE-51B	527	5	F	EXU (80S/93E)	-42.00 -62.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-JE-51B	527	12	—	EXU (80S/93E)	-42.00 -62.00	PPT	Bald Butte	2.5 ± 0.1	NM ± NM	—
35-JE-51B	528	4	A	EXU (80S/93E)	-62.00 -82.00	DEB	Unknown E	3.7 ± 0.1	NM ± NM	—
35-JE-51B	528	4	B	EXU (80S/93E)	-62.00 -82.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-JE-51B	528	4	C	EXU (80S/93E)	-62.00 -82.00	DEB	Potato Hills	3.5 ± 0.1	NM ± NM	—
35-JE-51B	528	4	D	EXU (80S/93E)	-62.00 -82.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-JE-51B	528	4	E	EXU (80S/93E)	-62.00 -82.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-JE-51B	528	4	F	EXU (80S/93E)	-62.00 -82.00	DEB	Big Obsidian Flow	2.3 ± 0.1	NM ± NM	—
35-JE-51B	528	4	G	EXU (80S/93E)	-62.00 -82.00	DEB	Big Obsidian Flow	2.3 ± 0.1	NM ± NM	—
35-JE-51B	528	4	H	EXU (80S/93E)	-62.00 -82.00	DEB	Big Obsidian Flow	2.4 ± NM	NM ± NM	—
35-JE-51B	528	4	I	EXU (80S/93E)	-62.00 -82.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-JE-51B	528	4	J	EXU (80S/93E)	-62.00 -82.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-JE-51B	528	4	K	EXU (80S/93E)	-62.00 -82.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-JE-51B	528	4	L	EXU (80S/93E)	-62.00 -82.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-JE-51B	528	4	M	EXU (80S/93E)	-62.00 -82.00	DEB	Glass Buttes	4.7 ± 0.1	NM ±NM	—	
35-JE-51B	528	4	N	EXU (80S/93E)	-62.00 -82.00	DEB	Obsidian Cliffs	3.3 ± 0.1	NM ±NM	—	
35-JE-51B	528	6	—	EXU (80S/93E)	-62.00 -82.00	PPT	Whitewater Ridge	3.5 ± 0.1	NM ±NM	—	
35-JE-51B	528	9	—	EXU (80S/93E)	-62.00 -82.00	UFT	Newberry Volcano	2.9 ± 0.1	NM ±NM	—	
35-JE-51B	528	10	—	EXU (80S/93E)	-62.00 -82.00	UFT	Newberry Volcano	2.7 ± 0.1	NM ±NM	—	
35-JE-51B	529	3	A	EXU (80S/93E)	-82.00 -102.00	DEB	Newberry Volcano	3.3 ±NM	NM ±NM	—	
35-JE-51B	529	3	B	EXU (80S/93E)	-82.00 -102.00	DEB	Whitewater Ridge	2.4 ± 0.1	NM ±NM	—	
35-JE-51B	529	3	C	EXU (80S/93E)	-82.00 -102.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—	
35-JE-51B	529	6	—	EXU (80S/93E)	-82.00 -102.00	PPT	Obsidian Cliffs	4.2 ± 0.1	NM ±NM	—	
35-JE-51B	532	5	—	EXU (86S/86E)	-43.00 -59.00	PPT	Quartz Mountain/McKay Butte	DH ±NM	NM ±NM	Diffuse hydration	
35-JE-51B	533	2	A	EXU (86S/86E)	-43.00 -59.00	DEB	Big Obsidian Flow	2.1 ±NM	NM ±NM	—	
35-JE-51B	534	4	A	EXU (86S/86E)	-59.00 -69.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ±NM	—	
35-JE-51B	542	3	A	EXU (86S/86E)	-99.00 -109.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—	
35-JE-51B	555	2	A	EXU (86S/86E)	-139.00 -149.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—	
35-JE-51B	557	1	A	EXU (86S/86E)	-149.00 -159.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—	
35-JE-51B	566	1	A	EXU (90S/90E)	-24.00 -34.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band	
35-JE-51B	568	4	A	EXU (90S/90E)	-34.00 -44.00	DEB	Big Obsidian Flow	2.4 ±NM	NM ±NM	—	
35-JE-51B	568	4	B	EXU (90S/90E)	-34.00 -44.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration	
35-JE-51B	569	3	A	EXU (90S/90E)	-34.00 -44.00	DEB	Big Obsidian Flow	2.4 ±NM	NM ±NM	—	
35-JE-51B	572	5	A	EXU (90S/90E)	-54.00 -64.00	DEB	McKay Butte	4.3 ± 0.1	NM ±NM	—	
35-JE-51B	572	6	—	EXU (90S/90E)	-54.00 -64.00	BIF	Big Obsidian Flow	2.1 ± 0.1	NM ±NM	—	
35-JE-51B	574	2	A	EXU (90S/90E)	-64.00 -74.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—	
35-JE-51B	575	2	A	EXU (90S/90E)	-64.00 -74.00	DEB	Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—	
35-JE-51B	576	2	—	EXU (90S/90E)	-74.00 -84.00	PPT	Newberry Volcano	1.9 ±NM	NM ±NM	—	
35-JE-51B	576	3	A	EXU (90S/90E)	-74.00 -84.00	DEB	Big Obsidian Flow	2.3 ±NM	NM ±NM	—	
35-JE-51B	576	3	B	EXU (90S/90E)	-74.00 -84.00	DEB	Quartz Mountain	2.1 ± 0.1	NM ±NM	—	
35-JE-51B	586	5	A	EXU (90S/90E)	-84.00 -94.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—	
35-JE-51B	586	5	B	EXU (90S/90E)	-84.00 -94.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—	
35-JE-51B	586	5	C	EXU (90S/90E)	-84.00 -94.00	DEB	Quartz Mountain	1.4 ± 0.1	NM ±NM	—	
35-JE-51B	587	3	A	EXU (90S/90E)	-84.00 -94.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ±NM	—	
35-JE-51B	587	3	B	EXU (90S/90E)	-84.00 -94.00	DEB	McKay Butte	4.0 ± 0.2	NM ±NM	—	
35-JE-51B	587	3	C	EXU (90S/90E)	-84.00 -94.00	DEB	Cougar Mountain	2.1 ± 0.1	NM ±NM	—	
35-JE-51B	597	3	A	EXU (90S/90E)	-133.00 -144.00	DEB	Whitewater Ridge?	4.8 ±NM	NM ±NM	—	
35-JE-51B	597	3	B	EXU (90S/90E)	-133.00 -144.00	DEB	Glass Buttes	4.5 ± 0.1	NM ±NM	—	
35-JE-51B	629	2	A	EXU (103S/95E)	0.00 -9.00	DEB	Obsidian Cliffs	3.7 ± 0.1	NM ±NM	—	
35-JE-51B	630	4	A	EXU (103S/95E)	-9.00 -19.00	DEB	Little Bear Creek/Whitewater Ridge	2.8 ± 0.1	NM ±NM	—	
35-JE-51B	636	5	A	EXU (103S/95E)	-39.00 -49.00	DEB	Big Obsidian Flow	2.4 ±NM	NM ±NM	—	
35-JE-51B	638	6	—	EXU (103S/95E)	-49.00 -59.00	BIF	Obsidian Cliffs	3.2 ±NM	NM ±NM	—	
35-JE-51B	648	2	A	EXU (103S/95E)	-59.00 -69.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	2.4 ± 0.1	NM ±NM	—	

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	649	5	A	EXU (103S/95E)	-59.00 -69.00	DEB	Glass Buttes	3.4 ± 0.1	NM ± NM	—
35-JE-51B	649	5	B	EXU (103S/95E)	-59.00 -69.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-JE-51B	649	9	—	EXU (103S/95E)	-59.00 -69.00	UFT	Little Bear Creek/Whitewater Ridge	3.1 ± NM	NM ± NM	—
35-JE-51B	655	4	A	EXU (103S/95E)	-69.00 -79.00	DEB	Little Bear Creek/Whitewater Ridge	3.0 ± 0.1	NM ± NM	—
35-JE-51B	655	4	B	EXU (103S/95E)	-69.00 -79.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-JE-51B	658	7	A	EXU (103S/95E)	-79.00 -89.00	DEB	Newberry Volcano	3.3 ± NM	NM ± NM	—
35-JE-51B	662	2	A	EXU (103S/95E)	-99.00 -109.00	DEB	Obsidian Cliffs	3.3 ± 0.1	NM ± NM	—
35-JE-51B	662	2	B	EXU (103S/95E)	-99.00 -109.00	DEB	Obsidian Cliffs	2.5 ± NM	NM ± NM	—
35-JE-51B	663	2	—	EXU (103S/95E)	-109.00 -119.00	BIF	Quartz Mountain	3.4 ± 0.1	NM ± NM	—
35-JE-51B	663	4	A	EXU (103S/95E)	-109.00 -119.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ± NM	—
35-JE-51B	663	4	B	EXU (103S/95E)	-109.00 -119.00	DEB	Newberry Volcano	3.4 ± 0.2	NM ± NM	—
35-JE-51B	665	3	—	EXU (103S/95E)	-119.00 -129.00	BIF	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-JE-51B	665	5	A	EXU (103S/95E)	-119.00 -129.00	DEB	Obsidian Cliffs	3.5 ± 0.1	NM ± NM	—
35-JE-51B	670	3	A	EXU (103S/95E)	-139.00 -149.00	DEB	Whitewater Ridge?	3.7 ± 0.1	NM ± NM	—
35-JE-51B	702	7	A	EXU (103S/99E)	-17.00 -37.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-JE-51B	702	7	B	EXU (103S/99E)	-17.00 -37.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-JE-51B	702	7	C	EXU (103S/99E)	-17.00 -37.00	DEB	Whitewater Ridge	5.8 ± 0.1	NM ± NM	—
35-JE-51B	702	7	D	EXU (103S/99E)	-17.00 -37.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-JE-51B	702	7	E	EXU (103S/99E)	-17.00 -37.00	DEB	Obsidian Cliffs	4.0 ± 0.1	NM ± NM	—
35-JE-51B	703	16	A	EXU (103S/99E)	-37.00 -57.00	DEB	Newberry Volcano	2.7 ± NM	NM ± NM	—
35-JE-51B	703	16	B	EXU (103S/99E)	-37.00 -57.00	DEB	Big Obsidian Flow	2.3 ± 0.2	NM ± NM	—
35-JE-51B	703	16	C	EXU (103S/99E)	-37.00 -57.00	DEB	Big Obsidian Flow	2.5 ± NM	NM ± NM	—
35-JE-51B	704	9	—	EXU (103S/99E)	-57.00 -77.00	PPT	Big Obsidian Flow	5.0 ± 0.1	NM ± NM	—
35-JE-51B	704	12	A	EXU (103S/99E)	-57.00 -77.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-JE-51B	704	12	B	EXU (103S/99E)	-57.00 -77.00	DEB	Potato Hills	3.2 ± NM	NM ± NM	—
35-JE-51B	704	12	C	EXU (103S/99E)	-57.00 -77.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Weathered; Rim approx. 5.5 microns
35-JE-51B	704	12	D	EXU (103S/99E)	-57.00 -77.00	DEB	Obsidian Cliffs	2.9 ± 0.1	NM ± NM	—
35-JE-51B	704	12	E	EXU (103S/99E)	-57.00 -77.00	DEB	Unknown E	2.6 ± 0.1	NM ± NM	—
35-JE-51B	704	12	F	EXU (103S/99E)	-57.00 -77.00	DEB	Obsidian Cliffs	2.2 ± 0.1	3.2 ± NM	2 hydration bands
35-JE-51B	704	12	G	EXU (103S/99E)	-57.00 -77.00	DEB	Obsidian Cliffs	3.0 ± 0.1	NM ± NM	—
35-JE-51B	704	12	H	EXU (103S/99E)	-57.00 -77.00	DEB	Newberry Volcano	3.3 ± NM	NM ± NM	—
35-JE-51B	714	3	A	EXU (103S/99E)	-107.00 -117.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-JE-51B	717	2	A	EXU (103S/99E)	-117.00 -127.00	DEB	Little Bear Creek/Whitewater Ridge	4.8 ± NM	NM ± NM	—
35-JE-51B	718	4	A	EXU (103S/99E)	-117.00 -127.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-JE-51B	739	1	A	EXU (107S/93E)	-42.00 -52.00	DEB	Glass Buttes	4.2 ± NM	NM ± NM	—
35-JE-51B	739	1	B	EXU (107S/93E)	-42.00 -52.00	DEB	Whitewater Ridge?	4.8 ± NM	NM ± NM	—
35-JE-51B	763	1	A	EXU (108S/93E)	-22.00 -32.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-JE-51B	763	1	B	EXU (108S/93E)	-22.00 -32.00	DEB	Newberry Volcano?	3.7 ± 0.1	NM ± NM	—
35-JE-51B	767	3	A	EXU (108S/93E)	-42.00 -52.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	768	1	A	EXU (108S/93E)	-42.00 -52.00	DEB	Whitewater Ridge	5.5 ± 0.1	NM ±NM	—
35-JE-51B	769	2	A	EXU (108S/93E)	-52.00 -62.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-JE-51B	770	1	—	EXU (108S/93E)	-52.00 -62.00	DEB	Whitewater Ridge?	6.2 ± 0.1	NM ±NM	—
35-JE-51B	776	3	A	EXU (108S/93E)	-72.00 -82.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-JE-51B	783	1	A	EXU (108S/93E)	-102.00 -112.00	DEB	Quartz Mountain	4.6 ± 0.2	NM ±NM	—
35-JE-51B	784	1	A	EXU (108S/93E)	-112.00 -122.00	DEB	Glass Buttes	4.7 ±NM	NM ±NM	—
35-JE-51B	786	1	A	EXU (108S/93E)	-122.00 -132.00	DEB	Whitewater Ridge	5.6 ±NM	NM ±NM	—
35-JE-51B	786	1	B	EXU (108S/93E)	-122.00 -132.00	DEB	Little Bear Creek/Whitewater Ridge	4.5 ±NM	NM ±NM	—
35-JE-51B	786	1	C	EXU (108S/93E)	-122.00 -132.00	DEB	Whitewater Ridge	4.5 ± 0.1	NM ±NM	—
35-JE-51B	786	1	D	EXU (108S/93E)	-122.00 -132.00	DEB	Little Bear Creek?	5.6 ± 0.1	NM ±NM	—
35-JE-51B	787	1	A	EXU (108S/93E)	-122.00 -132.00	DEB	Unknown F	5.1 ± 0.2	NM ±NM	—
35-JE-51B	788	1	A	EXU (108S/93E)	-132.00 -142.00	DEB	Whitewater Ridge	4.4 ±NM	NM ±NM	—
35-JE-51B	788	1	B	EXU (108S/93E)	-132.00 -142.00	DEB	Whitewater Ridge	4.9 ± 0.1	NM ±NM	—
35-JE-51B	788	1	C	EXU (108S/93E)	-132.00 -142.00	DEB	Glass Buttes	4.9 ± 0.1	NM ±NM	—
35-JE-51B	788	1	D	EXU (108S/93E)	-132.00 -142.00	DEB	Whitewater Ridge?	4.4 ± 0.1	NM ±NM	—
35-JE-51B	788	1	E	EXU (108S/93E)	-132.00 -142.00	DEB	Quartz Mountain?	5.3 ± 0.1	NM ±NM	—
35-JE-51B	788	1	F	EXU (108S/93E)	-132.00 -142.00	DEB	Glass Buttes	4.4 ± 0.1	NM ±NM	—
35-JE-51B	788	1	G	EXU (108S/93E)	-132.00 -142.00	DEB	Whitewater Ridge?	6.4 ± 0.1	NM ±NM	—
35-JE-51B	788	1	H	EXU (108S/93E)	-132.00 -142.00	DEB	Whitewater Ridge	4.7 ± 0.2	NM ±NM	—
35-JE-51B	788	1	I	EXU (108S/93E)	-132.00 -142.00	DEB	Whitewater Ridge	4.9 ± 0.1	NM ±NM	—
35-JE-51B	788	5	—	EXU (108S/93E)	-132.00 -142.00	UFT	Horse Mountain?	5.0 ±NM	NM ±NM	—
35-JE-51B	790	1	A	EXU (108S/93E)	-142.00 -152.00	DEB	Quartz Mountain?	6.0 ± 0.1	NM ±NM	—
35-JE-51B	796	1	A	EXU (115S/82E)	-75.00 -85.00	DEB	Newberry Volcano?	2.6 ± 0.1	NM ±NM	—
35-JE-51B	796	1	B	EXU (115S/82E)	-75.00 -85.00	DEB	Big Obsidian Flow	2.5 ± 0.1	NM ±NM	—
35-JE-51B	796	1	C	EXU (115S/82E)	-75.00 -85.00	DEB	Big Obsidian Flow	2.4 ±NM	NM ±NM	—
35-JE-51B	797	1	A	EXU (115S/82E)	-75.00 -85.00	DEB	McKay Butte	3.4 ± 0.2	NM ±NM	—
35-JE-51B	797	1	B	EXU (115S/82E)	-75.00 -85.00	DEB	Quartz Mountain/McKay Butte	4.4 ±NM	NM ±NM	—
35-JE-51B	797	1	C	EXU (115S/82E)	-75.00 -85.00	DEB	McKay Butte	4.4 ± 0.1	NM ±NM	—
35-JE-51B	797	1	D	EXU (115S/82E)	-75.00 -85.00	DEB	Quartz Mountain	3.7 ± 0.1	NM ±NM	—
35-JE-51B	798	3	A	EXU (115S/82E)	-85.00 -95.00	DEB	McKay Butte	3.7 ±NM	NM ±NM	—
35-JE-51B	799	2	A	EXU (115S/82E)	-85.00 -95.00	DEB	McKay Butte	3.8 ± 0.1	NM ±NM	—
35-JE-51B	800	2	A	EXU (115S/82E)	-95.00 -105.00	DEB	McKay Butte	3.9 ±NM	NM ±NM	—
35-JE-51B	800	2	B	EXU (115S/82E)	-95.00 -105.00	DEB	Big Obsidian Flow	4.0 ± 0.1	NM ±NM	—
35-JE-51B	804	1	A	EXU (115S/82E)	-115.00 -125.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-JE-51B	832	3	A	EXU (126S/101E)	-19.00 -37.00	DEB	Juniper Spring 2/Whitewater Ridge	2.9 ±NM	NM ±NM	—
35-JE-51B	832	3	B	EXU (126S/101E)	-19.00 -37.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-JE-51B	836	1	—	EXU (126S/101E)	-97.00 -117.00	PPT	Obsidian Cliffs	3.9 ±NM	NM ±NM	—
35-JE-51B	850	8	A	EXU (126S/101E)	-237.00 -247.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-JE-51B	850	8	B	EXU (126S/101E)	-237.00 -247.00	DEB	McKay Butte	7.3 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	878	18	A	EXU (127S/101E)	-243.00 -253.00	DEB	McKay Butte	7.4 ± 0.1	NM ± NM	—
35-JE-51B	879	5	A	EXU (127S/101E)	-243.00 -253.00	DEB	McKay Butte	7.4 ± 0.1	NM ± NM	—
35-JE-51B	894	5	A	EXU (128S/84E)	-35.00 -45.00	DEB	Obsidian Cliffs	1.3 ± NM	4.3 ± 0.1	2 hydration bands
35-JE-51B	899	1	—	EXU (128S/84E)	-45.00 -55.00	BIF	Juniper Spring 2	3.8 ± 0.1	NM ± NM	—
35-JE-51B	901	6	A	EXU (128S/84E)	-55.00 -65.00	DEB	Obsidian Cliffs	4.2 ± NM	NM ± NM	—
35-JE-51B	901	6	B	EXU (128S/84E)	-55.00 -65.00	DEB	Obsidian Cliffs	3.2 ± NM	NM ± NM	—
35-JE-51B	901	6	C	EXU (128S/84E)	-55.00 -65.00	DEB	Obsidian Cliffs	3.2 ± 0.2	NM ± NM	—
35-JE-51B	902	6	A	EXU (128S/84E)	-65.00 -75.00	DEB	Obsidian Cliffs	4.1 ± 0.1	NM ± NM	—
35-JE-51B	902	6	B	EXU (128S/84E)	-65.00 -75.00	DEB	Glass Buttes	5.2 ± 0.2	NM ± NM	—
35-JE-51B	906	4	A	EXU (128S/84E)	-75.00 -85.00	DEB	Obsidian Cliffs	3.3 ± NM	NM ± NM	—
35-JE-51B	909	4	A	EXU (128S/84E)	-85.00 -95.00	DEB	Glass Buttes	4.9 ± NM	NM ± NM	—
35-JE-51B	936	1	—	MEC 2 (107S/75E)	-37.00 -99.00	PPT	Quartz Mountain	2.9 ± 0.1	NM ± NM	—
35-JE-51B	1184	1	A	AUG 209 (150S/81E)	-220.00 -240.00	DEB	Obsidian Cliffs	4.2 ± 0.1	NM ± NM	—
35-JE-51B	1185	1	A	AUG 210 (151S/85E)	0.00 -20.00	DEB	Newberry Volcano	4.1 ± NM	NM ± NM	—
35-JE-51B	1287	1	A	AUG 216 (121S/85E)	-140.00 -160.00	DEB	Glass Buttes	4.9 ± 0.1	NM ± NM	—
35-JE-51B	1287	1	C	AUG 216 (121S/85E)	-140.00 -160.00	DEB	Glass Buttes	4.8 ± 0.1	NM ± NM	—
35-JE-51B	1287	1	D	AUG 216 (121S/85E)	-140.00 -160.00	DEB	Glass Buttes	5.1 ± 0.1	NM ± NM	—
35-JE-51B	1392	1	A	AUG 224 (111S/90E)	-280.00 -300.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-JE-51B	1400	1	A	AUG 225 (116S/90E)	-140.00 -160.00	DEB	Obsidian Cliffs	6.3 ± 0.1	NM ± NM	—
35-JE-51B	1496	1	A	AUG 230 (141S/90E)	-60.00 -80.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ± NM	—
35-JE-51B	1592	1	A	AUG 236 (123S/83E)	-80.00 -100.00	DEB	Quartz Mountain	4.6 ± 0.1	NM ± NM	—
35-JE-51B	1770	2	A	EXU (104S/82E)	-27.00 -37.00	DEB	Big Obsidian Flow	2.9 ± 0.1	NM ± NM	—
35-JE-51B	1871	1	A	EXU (115S/87E)	-109.00 -119.00	DEB	Newberry Volcano	2.9 ± NM	NM ± NM	—
35-JE-51B	1871	1	B	EXU (115S/87E)	-109.00 -119.00	DEB	Newberry Volcano	4.9 ± 0.1	NM ± NM	—
35-JE-51B	1873	1	A	EXU (115S/87E)	-119.00 -129.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-JE-51B	1873	1	B	EXU (115S/87E)	-119.00 -129.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-JE-51B	1873	1	C	EXU (115S/87E)	-119.00 -129.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-JE-51B	1873	1	D	EXU (115S/87E)	-119.00 -129.00	DEB	Whitewater Ridge?	5.7 ± 0.1	NM ± NM	—
35-JE-51B	1873	1	E	EXU (115S/87E)	-119.00 -129.00	DEB	Newberry Volcano	3.3 ± 0.2	NM ± NM	—
35-JE-51B	1873	1	F	EXU (115S/87E)	-119.00 -129.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-JE-51B	1873	1	G	EXU (115S/87E)	-119.00 -129.00	DEB	Newberry Volcano	4.0 ± 0.2	NM ± NM	—
35-JE-51B	1873	1	H	EXU (115S/87E)	-119.00 -129.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-JE-51B	1873	1	I	EXU (115S/87E)	-119.00 -129.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-JE-51B	1875	1	A	EXU (115S/87E)	-129.00 -139.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-51B	1875	1	B	EXU (115S/87E)	-129.00 -139.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-JE-51B	1875	1	C	EXU (115S/87E)	-129.00 -139.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-JE-51B	1875	1	D	EXU (115S/87E)	-129.00 -139.00	DEB	Newberry Volcano	2.9 ± NM	NM ± NM	—
35-JE-51B	1876	8	—	EXU (115S/87E)	-129.00 -139.00	UFT	Glass Buttes	3.2 ± NM	NM ± NM	—
35-JE-51B	1877	1	A	EXU (115S/87E)	-139.00 -149.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	1877	1	B	EXU (115S/87E)	-139.00 -149.00	DEB	Whitewater Ridge?	3.2 ± 0.1	NM ±NM	—
35-JE-51B	1881	1	A	EXU (115S/87E)	-139.00 -149.00	DEB	Newberry Volcano?	2.6 ± 0.1	NM ±NM	—
35-JE-51B	1881	1	B	EXU (115S/87E)	-139.00 -149.00	DEB	Whitewater Ridge?	3.4 ± 0.1	NM ±NM	—
35-JE-51B	1881	1	C	EXU (115S/87E)	-139.00 -149.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-51B	1881	1	D	EXU (115S/87E)	-139.00 -149.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-51B	1881	5	—	EXU (115S/87E)	-139.00 -149.00	BIF	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-JE-51B	1881	6	—	EXU (115S/87E)	-139.00 -149.00	PPT	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-JE-51B	1885	1	A	EXU (115S/87E)	-149.00 -149.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-JE-51B	1886	1	A	EXU (115S/88E)	-113.00 -123.00	DEB	Little Bear Creek/Whitewater Ridge	4.0 ± 0.2	NM ±NM	—
35-JE-51B	1886	1	B	EXU (115S/88E)	-113.00 -123.00	DEB	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-JE-51B	1886	1	C	EXU (115S/88E)	-113.00 -123.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-51B	1887	1	A	EXU (115S/88E)	-113.00 -123.00	DEB	Whitewater Ridge	3.8 ± 0.1	NM ±NM	—
35-JE-51B	1888	1	A	EXU (115S/88E)	-123.00 -136.00	DEB	Juniper Spring 2/Whitewater Ridge	2.4 ±NM	NM ±NM	—
35-JE-51B	1888	1	B	EXU (115S/88E)	-123.00 -136.00	DEB	Glass Buttes	3.2 ±NM	NM ±NM	—
35-JE-51B	1889	1	A	EXU (115S/88E)	-123.00 -136.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-JE-51B	1890	1	A	EXU (115S/88E)	-136.00 -146.00	DEB	Glass Buttes	4.7 ± 0.2	NM ±NM	—
35-JE-51B	1891	1	A	EXU (115S/88E)	-136.00 -146.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-51B	1892	1	A	EXU (115S/88E)	-136.00 -151.00	DEB	Obsidian Cliffs	3.9 ± 0.1	NM ±NM	—
35-JE-51B	1902	1	A	EXU (115S/88E)	-73.00 -83.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-51B	1902	1	B	EXU (115S/88E)	-73.00 -83.00	DEB	Big Obsidian Flow	2.3 ± 0.1	NM ±NM	—
35-JE-51B	1902	1	C	EXU (115S/88E)	-73.00 -83.00	DEB	Glass Buttes	4.7 ± 0.2	NM ±NM	—
35-JE-51B	1902	1	D	EXU (115S/88E)	-73.00 -83.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-JE-51B	1904	1	A	EXU (115S/88E)	-83.00 -93.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ±NM	—
35-JE-51B	1905	1	A	EXU (115S/88E)	-83.00 -93.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-JE-51B	1906	1	A	EXU (115S/88E)	-93.00 -103.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-JE-51B	1913	1	A	EXU (121S/90E)	-241.00 -250.00	DEB	Unknown F	5.2 ± 0.1	NM ±NM	—
35-JE-51B	1913	1	B	EXU (121S/90E)	-241.00 -250.00	DEB	Obsidian Cliffs	5.8 ± 0.1	NM ±NM	—
35-JE-51B	1914	1	A	EXU (121S/90E)	-250.00 -260.00	DEB	Whitewater Ridge?	6.7 ±NM	NM ±NM	—
35-JE-51B	1916	1	A	EXU (121S/90E)	-260.00 -270.00	DEB	Obsidian Cliffs	5.4 ±NM	NM ±NM	—
35-JE-51B	1916	6	—	EXU (121S/90E)	-260.00 -270.00	BIF	Obsidian Cliffs	6.7 ± 0.1	NM ±NM	—
35-JE-51B	1918	1	A	EXU (121S/90E)	-270.00 -280.00	DEB	Newberry Volcano	5.2 ± 0.2	NM ±NM	Pre-Mazama Newberry source
35-JE-51B	1943	1	A	EXU (103S/78E)	-25.00 -35.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-JE-51B	1944	1	A	EXU (103S/78E)	-35.00 -45.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-51B	1999	1	A	EXU (104S/78E)	-21.00 -31.00	DEB	Big Obsidian Flow	2.5 ±NM	NM ±NM	—
35-JE-51B	2040	1	A	EXU (110S/90E)	-53.00 -63.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-51B	2042	1	A	EXU (110S/90E)	-63.00 -73.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-51B	2046	1	—	EXU (110S/90E)	-83.00 -93.00	BIF	McKay Butte	2.0 ±NM	NM ±NM	—
35-JE-51B	2047	1	A	EXU (110S/90E)	-83.00 -93.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-51B	2055	1	A	EXU (110S/90E)	-123.00 -133.00	DEB	Whitewater Ridge	2.4 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	2057	1	A	EXU (110S/90E)	-133.00 -143.00	DEB	Obsidian Cliffs	3.1 ± 0.1	NM ± NM	—
35-JE-51B	2057	6	—	EXU (110S/90E)	-133.00 -143.00	PPT	Obsidian Cliffs	2.4 ± NM	NM ± NM	—
35-JE-51B	2062	1	A	EXU (117S/90E)	-60.00 -70.00	DEB	Glass Buttes	4.6 ± 0.1	NM ± NM	—
35-JE-51B	2062	1	B	EXU (117S/90E)	-60.00 -70.00	DEB	Glass Buttes	4.6 ± 0.2	NM ± NM	—
35-JE-51B	2063	1	A	EXU (117S/90E)	-60.00 -70.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-JE-51B	2064	1	A	EXU (117S/90E)	-70.00 -80.00	DEB	Glass Buttes	4.9 ± 0.1	NM ± NM	—
35-JE-51B	2065	1	A	EXU (117S/90E)	-70.00 -80.00	DEB	Glass Buttes	5.3 ± 0.1	NM ± NM	—
35-JE-51B	2065	1	B	EXU (117S/90E)	-70.00 -80.00	DEB	Obsidian Cliffs	3.9 ± 0.1	NM ± NM	—
35-JE-51B	2066	1	A	EXU (117S/90E)	-80.00 -90.00	DEB	Quartz Mountain	3.8 ± 0.1	NM ± NM	—
35-JE-51B	2070	1	A	EXU (117S/90E)	-100.00 -110.00	DEB	Glass Buttes	4.0 ± 0.1	NM ± NM	—
35-JE-51B	2070	1	B	EXU (117S/90E)	-100.00 -110.00	DEB	Glass Buttes	4.7 ± NM	NM ± NM	—
35-JE-51B	2070	1	C	EXU (117S/90E)	-100.00 -110.00	DEB	Obsidian Cliffs	5.2 ± 0.1	NM ± NM	—
35-JE-51B	2083	4	A	EXU (117S/90E)	-180.00 -190.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-51B	2083	6	—	EXU (117S/90E)	-180.00 -190.00	BIF	Unknown G	NVB ± NM	NM ± NM	No visible band; Too opaque to read OH
35-JE-51B	2102	2	A	EXU (118S/89E)	-94.00 -104.00	DEB	Newberry Volcano	4.7 ± 0.1	NM ± NM	—
35-JE-51B	2106	4	A	EXU (118S/89E)	-105.00 -115.00	DEB	Obsidian Cliffs	3.5 ± 0.1	NM ± NM	—
35-JE-51B	2106	4	B	EXU (118S/89E)	-105.00 -115.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ± NM	—
35-JE-51B	2121	3	A	EXU (119S/89E)	-85.00 -94.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ± NM	—
35-JE-51B	2122	3	A	EXU (119S/89E)	-85.00 -94.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-JE-51B	2124	4	A	EXU (119S/89E)	-94.00 -104.00	DEB	McKay Butte	4.0 ± 0.2	NM ± NM	—
35-JE-51B	2125	4	A	EXU (119S/89E)	-104.00 -114.00	DEB	Glass Buttes	3.9 ± 0.1	NM ± NM	—
35-JE-51B	2129	1	—	EXU (119S/89E)	-119.00 -119.00	PPT	Silver Lake/Sycan Marsh	5.0 ± 0.1	NM ± NM	—
35-JE-51B	2130	1	—	EXU (119S/89E)	-115.00 -115.00	PPT	Obsidian Cliffs	3.6 ± NM	NM ± NM	—
35-JE-51B	2221	2	A	EXU (104S/80E)	-24.00 -34.00	DEB	Glass Buttes	DH ± NM	NM ± NM	Rim approx. 2.5 microns
35-JE-51B	2338	13	A	EXU (112S/90E)	-144.00 -154.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-JE-51B	2265	4	A	EXU (112S/89E)	-54.00 -64.00	DEB	Newberry Volcano	3.3 ± NM	NM ± NM	—
35-JE-51B	2265	6	—	EXU (112S/89E)	-54.00 -64.00	PPT	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-51B	2279	3	A	EXU (112S/89E)	-124.00 -134.00	DEB	Obsidian Cliffs	4.6 ± 0.1	NM ± NM	—
35-JE-51B	2285	3	A	EXU (112S/89E)	-144.00 -150.00	DEB	Big Obsidian Flow	2.7 ± 0.1	NM ± NM	—
35-JE-51B	2285	4	—	EXU (112S/89E)	-144.00 -150.00	PPT	Spodue Mountain	2.7 ± 0.1	NM ± NM	—
35-JE-51B	2306	2	A	EXU (112S/89E)	-174.00 -184.00	DEB	Little Bear Creek/Whitewater Ridge	1.3 ± NM	NM ± NM	—
35-JE-51B	2309	3	A	EXU (112S/89E)	-194.00 -204.00	DEB	Obsidian Cliffs	3.6 ± NM	NM ± NM	—
35-JE-51B	2312	7	A	EXU (112S/89E)	-204.00 -214.00	DEB	Obsidian Cliffs	3.5 ± 0.1	NM ± NM	—
35-JE-51B	2312	7	B	EXU (112S/89E)	-204.00 -214.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-51B	2316	3	A	EXU (112S/89E)	-214.00 -224.00	DEB	Quartz Mountain	4.3 ± 0.1	NM ± NM	—
35-JE-51B	2317	4	A	EXU (112S/89E)	-224.00 -234.00	DEB	Glass Buttes	5.2 ± 0.2	NM ± NM	—
35-JE-51B	2317	4	B	EXU (112S/89E)	-224.00 -234.00	DEB	Glass Buttes	4.7 ± 0.2	NM ± NM	—
35-JE-51B	2344	1	—	EXU (112S/90E)	-148.00 -154.00	PPT	Newberry Volcano	1.3 ± NM	NM ± NM	—
35-JE-51B	2351	4	A	EXU (112S/90E)	-154.00 -164.00	DEB	Unknown H	1.7 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	2351	4	B	EXU (112S/90E)	-154.00 -164.00	DEB	Glass Buttes	2.8 ± 0.1	NM ±NM	—
35-JE-51B	2357	2	A	EXU (112S/90E)	-164.00 -174.00	DEB	Quartz Mountain	2.9 ± 0.1	NM ±NM	—
35-JE-51B	2362	2	A	EXU (112S/90E)	-175.00 -184.00	DEB	Newberry Volcano	3.5 ± 0.2	NM ±NM	—
35-JE-51B	2365	1	—	EXU (112S/90E)	-184.00 -194.00	PPT	Little Bear Creek/Whitewater Ridge	1.8 ± 0.1	NM ±NM	—
35-JE-51B	2378	2	A	EXU (113S/89E)	-145.00 -155.00	DEB	Glass Buttes	4.3 ± 0.1	NM ±NM	—
35-JE-51B	2391	2	A	EXU (113S/89E)	-188.00 -195.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-51B	2391	2	B	EXU (113S/89E)	-188.00 -195.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-JE-51B	2391	2	C	EXU (113S/89E)	-188.00 -195.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-JE-51B	2393	3	A	EXU (113S/89E)	-205.00 -215.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ±NM	—
35-JE-51B	2393	3	B	EXU (113S/89E)	-205.00 -215.00	DEB	Obsidian Cliffs	2.0 ±NM	NM ±NM	—
35-JE-51B	2399	2	A	EXU (113S/90E)	-54.00 -64.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-JE-51B	2400	7	—	EXU (113S/90E)	-64.00 -74.00	PPT	Newberry Volcano	1.5 ± 0.1	NM ±NM	—
35-JE-51B	2408	2	A	EXU (113S/90E)	-104.00 -114.00	DEB	Glass Buttes	3.2 ±NM	NM ±NM	—
35-JE-51B	2412	3	A	EXU (113S/90E)	-124.00 -134.00	DEB	Obsidian Cliffs	3.1 ± 0.1	NM ±NM	—
35-JE-51B	2422	2	A	EXU (113S/90E)	-134.00 -144.00	DEB	Obsidian Cliffs	3.7 ± 0.1	6.4 ± 0.2	2 hydration bands
35-JE-51B	2425	2	A	EXU (113S/90E)	-144.00 -154.00	DEB	Glass Buttes	2.9 ± 0.1	NM ±NM	—
35-JE-51B	2425	2	B	EXU (113S/90E)	-144.00 -154.00	DEB	Glass Buttes	4.0 ± 0.1	NM ±NM	—
35-JE-51B	2437	2	A	EXU (113S/90E)	-164.00 -174.00	DEB	Unknown F	DH ±NM	NM ±NM	Weathered
35-JE-51B	2435	2	A	EXU (113S/90E)	-164.00 -174.00	DEB	Little Bear Creek/Whitewater Ridge	1.8 ±NM	NM ±NM	—
35-JE-51B	2435	2	B	EXU (113S/90E)	-164.00 -174.00	DEB	Little Bear Creek/Whitewater Ridge	3.6 ±NM	NM ±NM	—
35-JE-51B	2435	5	—	EXU (113S/90E)	-164.00 -174.00	BIF	Juniper Spring 2/Whitewater Ridge	3.1 ± 0.1	NM ±NM	—
35-JE-51B	2445	3	A	EXU (113S/90E)	-174.00 -184.00	DEB	Quartz Mountain	3.7 ± 0.1	NM ±NM	—
35-JE-51B	2445	3	B	EXU (113S/90E)	-174.00 -184.00	DEB	Unknown C	1.2 ±NM	NM ±NM	—
35-JE-51B	2445	3	C	EXU (113S/90E)	-174.00 -184.00	DEB	Newberry Volcano?	NVB ±NM	NM ±NM	No visible band
35-JE-51B	2445	3	D	EXU (113S/90E)	-174.00 -184.00	DEB	Newberry Volcano	1.3 ± 0.1	3.9 ± 0.1	2 OH bands; Band 1 weathered
35-JE-51B	2445	3	E	EXU (113S/90E)	-174.00 -184.00	DEB	Obsidian Cliffs	3.9 ± 0.1	NM ±NM	—
35-JE-51B	2445	3	F	EXU (113S/90E)	-174.00 -184.00	DEB	Newberry Volcano?	DH ±NM	NM ±NM	Diffuse hydration
35-JE-51B	2445	3	G	EXU (113S/90E)	-174.00 -184.00	DEB	Obsidian Cliffs	DH ±NM	NM ±NM	Weathered
35-JE-51B	2445	3	H	EXU (113S/90E)	-174.00 -184.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-JE-51B	2445	3	I	EXU (113S/90E)	-174.00 -184.00	DEB	Unknown C	3.0 ± 0.1	NM ±NM	—
35-JE-51B	2445	3	J	EXU (113S/90E)	-174.00 -184.00	DEB	Newberry Volcano	1.1 ± 0.1	NM ±NM	—
35-JE-51B	2448	1	—	EXU (113S/90E)	-177.00 -177.00	PPT	Obsidian Cliffs	1.3 ± 0.1	NM ±NM	—
35-JE-51B	2451	2	A	EXU (113S/90E)	-184.00 -194.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-JE-51B	2469	1	—	EXU (114S/89E)	-121.00 -121.00	PPT	Obsidian Cliffs	2.0 ± 0.1	NM ±NM	—
35-JE-51B	2492	4	A	EXU (114S/90E)	-91.00 -101.00	DEB	Obsidian Cliffs	4.8 ±NM	NM ±NM	—
35-JE-51B	2494	4	A	EXU (114S/90E)	-101.00 -113.00	DEB	Obsidian Cliffs	3.3 ±NM	NM ±NM	—
35-JE-51B	2494	4	B	EXU (114S/90E)	-101.00 -113.00	DEB	Glass Buttes	3.6 ± 0.1	NM ±NM	—
35-JE-51B	2494	6	—	EXU (114S/90E)	-101.00 -113.00	BIF	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-51B	2496	4	A	EXU (114S/90E)	-113.00 -123.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	2496	4	B	EXU (114S/90E)	-113.00 -123.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-51B	2503	4	A	EXU (114S/90E)	-123.00 -133.00	DEB	Obsidian Cliffs	3.5 ± NM	NM ± NM	—
35-JE-51B	2503	4	B	EXU (114S/90E)	-123.00 -133.00	DEB	Glass Buttes	3.1 ± 0.1	NM ± NM	—
35-JE-51B	2503	4	C	EXU (114S/90E)	-123.00 -133.00	DEB	Glass Buttes	2.9 ± 0.1	NM ± NM	—
35-JE-51B	2503	4	D	EXU (114S/90E)	-123.00 -133.00	DEB	Potato Hills	3.6 ± NM	NM ± NM	—
35-JE-51B	2505	3	A	EXU (114S/90E)	-133.00 -143.00	DEB	Newberry Volcano	2.0 ± 0.1	3.0 ± NM	2 hydration bands
35-JE-51B	2505	3	B	EXU (114S/90E)	-133.00 -143.00	DEB	Obsidian Cliffs	3.0 ± NM	NM ± NM	—
35-JE-51B	2505	3	C	EXU (114S/90E)	-133.00 -143.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-51B	2505	3	D	EXU (114S/90E)	-133.00 -143.00	DEB	Little Bear Creek/Whitewater Ridge	4.1 ± 0.1	NM ± NM	—
35-JE-51B	2505	4	A	EXU (114S/90E)	-133.00 -143.00	DEB	Little Bear Creek/Whitewater Ridge	DH ± NM	NM ± NM	Weathered
35-JE-51B	2505	4	B	EXU (114S/90E)	-133.00 -143.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-JE-51B	2505	5	—	EXU (114S/90E)	-133.00 -143.00	PPT	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-51B	2514	2	A	EXU (115S/86E)	-35.00 -47.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-JE-51B	2518	2	A	EXU (115S/86E)	-57.00 -67.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-JE-51B	2522	2	A	EXU (115S/86E)	-77.00 -87.00	DEB	McKay Butte	3.7 ± 0.1	NM ± NM	—
35-JE-51B	2522	2	B	EXU (115S/86E)	-77.00 -87.00	DEB	Whitewater Ridge	3.6 ± 0.1	NM ± NM	—
35-JE-51B	2523	2	A	EXU (115S/86E)	-77.00 -87.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-JE-51B	2526	4	A	EXU (115S/86E)	-97.00 -107.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-JE-51B	2528	2	A	EXU (115S/86E)	-107.00 -117.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-JE-51B	2531	2	A	EXU (115S/86E)	-117.00 -130.00	DEB	Big Obsidian Flow	2.4 ± NM	NM ± NM	—
35-JE-51B	2531	2	B	EXU (115S/86E)	-117.00 -130.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-JE-51B	2534	2	A	EXU (115S/86E)	-140.00 -150.00	DEB	Glass Buttes	3.8 ± 0.1	NM ± NM	—
35-JE-51B	2534	2	B	EXU (115S/86E)	-140.00 -150.00	DEB	Whitewater Ridge?	3.4 ± 0.1	NM ± NM	—
35-JE-51B	2536	2	A	EXU (115S/86E)	-140.00 -150.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	Weathered
35-JE-51B	2543	3	A	EXU (115S/89E)	-103.00 -113.00	DEB	Little Bear Creek/Whitewater Ridge	4.3 ± 0.1	NM ± NM	—
35-JE-51B	2543	3	B	EXU (115S/89E)	-103.00 -113.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	3.3 ± 0.1	NM ± NM	—
35-JE-51B	2547	3	A	EXU (115S/89E)	-113.00 -123.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-JE-51B	2547	3	B	EXU (115S/89E)	-113.00 -123.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-JE-51B	2550	2	A	EXU (115S/89E)	-133.00 -143.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	4.3 ± 0.1	NM ± NM	—
35-JE-51B	2561	3	A	EXU (115S/90E)	-72.00 -82.00	DEB	Obsidian Cliffs	3.9 ± 0.1	NM ± NM	—
35-JE-51B	2562	1	—	EXU (115S/90E)	-82.00 -92.00	PPT	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-JE-51B	2562	3	A	EXU (115S/90E)	-82.00 -92.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-JE-51B	2562	3	B	EXU (115S/90E)	-82.00 -92.00	DEB	Obsidian Cliffs	4.3 ± 0.2	NM ± NM	—
35-JE-51B	2563	2	A	EXU (115S/90E)	-82.00 -92.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-JE-51B	2568	4	A	EXU (115S/90E)	-102.00 -113.00	DEB	Newberry Volcano	3.3 ± NM	NM ± NM	—
35-JE-51B	2582	1	—	EXU (116S/89E)	-70.00 -80.00	PPT	Yreka Butte	5.0 ± 0.1	NM ± NM	—
35-JE-51B	2597	2	A	EXU (116S/89E)	-84.00 -94.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-51B	2600	1	—	EXU (116S/89E)	-98.00 -98.00	PPT	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-51B	2604	2	A	EXU (116S/89E)	-104.00 -114.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	2615	1	—	EXU (116S/90E)	-75.00 -84.00	PPT	Unknown I	DH ±NM	NM ±NM	Diffuse hydration
35-JE-51B	2615	2	—	EXU (116S/90E)	-75.00 -84.00	BIF	Spodue Mountain	2.9 ± 0.1	NM ±NM	—
35-JE-51B	2615	3	—	EXU (116S/90E)	-75.00 -84.00	BIF	Spodue Mountain	2.9 ± 0.1	NM ±NM	—
35-JE-51B	2622	3	A	EXU (116S/90E)	-94.00 -104.00	DEB	Glass Buttes	4.2 ± 0.1	NM ±NM	—
35-JE-51B	2622	3	B	EXU (116S/90E)	-94.00 -104.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-JE-51B	2625	1	—	EXU (116S/90E)	-104.00 -114.00	BIF	Newberry Volcano	3.8 ± 0.1	NM ±NM	—
35-JE-51B	2636	1	—	EXU (117S/89E)	-88.00 -150.00	UFT	Glass Buttes	3.6 ± 0.1	NM ±NM	—
35-JE-51B	2638	2	A	EXU (118S/90E)	-90.00 -98.00	DEB	Obsidian Cliffs	3.7 ± 0.1	NM ±NM	—
35-JE-51B	2638	2	B	EXU (118S/90E)	-90.00 -98.00	DEB	Obsidian Cliffs	3.6 ±NM	NM ±NM	—
35-JE-51B	2654	1	—	EXU (118S/90E)	-288.00 -298.00	BIF	Obsidian Cliffs	5.2 ± 0.1	NM ±NM	—
35-JE-51B	2664	1	—	EXU (119S/90E)	-88.00 -103.00	PPT	Glass Buttes	3.1 ± 0.1	NM ±NM	—
35-JE-51B	2664	4	A	EXU (119S/90E)	-88.00 -103.00	DEB	Little Bear Creek/Whitewater Ridge	3.2 ± 0.2	NM ±NM	—
35-JE-51B	2664	4	B	EXU (119S/90E)	-88.00 -103.00	DEB	Little Bear Creek/Whitewater Ridge	3.4 ± 0.1	NM ±NM	—
35-JE-51B	2664	4	C	EXU (119S/90E)	-88.00 -103.00	DEB	Little Bear Creek/Whitewater Ridge	2.8 ± 0.1	NM ±NM	—
35-JE-51B	2664	4	D	EXU (119S/90E)	-88.00 -103.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	3.0 ±NM	NM ±NM	—
35-JE-51B	2664	4	E	EXU (119S/90E)	-88.00 -103.00	DEB	Little Bear Creek/Whitewater Ridge	3.0 ± 0.2	NM ±NM	—
35-JE-51B	2664	4	F	EXU (119S/90E)	-88.00 -103.00	DEB	Little Bear Creek/Whitewater Ridge	3.1 ± 0.1	NM ±NM	—
35-JE-51B	2664	4	G	EXU (119S/90E)	-88.00 -103.00	DEB	Little Bear Creek/Whitewater Ridge	3.0 ±NM	NM ±NM	—
35-JE-51B	2664	4	H	EXU (119S/90E)	-88.00 -103.00	DEB	Obsidian Cliffs	3.4 ± 0.2	NM ±NM	—
35-JE-51B	2664	4	I	EXU (119S/90E)	-88.00 -103.00	DEB	Unknown J	4.9 ± 0.1	NM ±NM	—
35-JE-51B	2665	2	A	EXU (119S/90E)	-88.00 -103.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-JE-51B	2666	6	A	EXU (119S/90E)	-103.00 -113.00	DEB	Little Bear Creek/Whitewater Ridge	3.0 ± 0.1	NM ±NM	—
35-JE-51B	2666	6	B	EXU (119S/90E)	-103.00 -113.00	DEB	Unknown J	4.8 ± 0.1	NM ±NM	—
35-JE-51B	2666	6	C	EXU (119S/90E)	-103.00 -113.00	DEB	Little Bear Creek	3.1 ± 0.1	NM ±NM	—
35-JE-51B	2666	6	D	EXU (119S/90E)	-103.00 -113.00	DEB	Unknown J	4.8 ± 0.1	NM ±NM	—
35-JE-51B	2703	22	A	EXU (120S/90E)	-261.00 -271.00	DEB	Obsidian Cliffs	7.6 ± 0.1	NM ±NM	—
35-JE-51B	2703	22	B	EXU (120S/90E)	-261.00 -271.00	DEB	Obsidian Cliffs?	4.9 ± 0.1	NM ±NM	—
35-JE-51B	2725	2	A	EXU (121S/89E)	-275.00 -285.00	DEB	Obsidian Cliffs	4.8 ±NM	NM ±NM	—
35-JE-51B	2748	3	A	EXU (123S/82E)	-215.00 -218.00	DEB	Quartz Mountain	2.2 ± 0.1	NM ±NM	—
35-JE-51B	2784	1	—	EXU (124S/83E)	-226.00 -226.00	PPT	Obsidian Cliffs	5.7 ±NM	NM ±NM	—
35-JE-51B	2795	3	A	EXU (124S/84E)	-239.00 -241.00	DEB	Cougar Mountain	4.4 ± 0.1	NM ±NM	—
35-JE-51B	2861	3	A	EXU (125S/82E)	-221.00 -231.00	DEB	Newberry Volcano?	4.2 ±NM	NM ±NM	—
35-JE-51B	2895	9	—	EXU (125S/84E)	-227.00 -237.00	PPT	Newberry Volcano	4.5 ± 0.1	NM ±NM	—
35-JE-51B	2923	5	—	EXU (125S/85E)	-225.00 -235.00	UFT	Quartz Mountain	4.5 ±NM	5.0 ± 0.1	2 hydration bands
35-JE-51B	3671	2	A	EXU (125S/86E)	-166.00 -176.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ±NM	—
35-JE-51B	3671	2	B	EXU (125S/86E)	-166.00 -176.00	DEB	Obsidian Cliffs	4.9 ± 0.1	NM ±NM	—
35-JE-51B	3711	3	A	EXU (125S/86E)	-216.00 -226.00	DEB	Unknown K	4.8 ± 0.1	NM ±NM	—
35-JE-51B	3721	4	A	EXU (125S/87E)	-169.00 -179.00	DEB	Quartz Mountain	1.3 ±NM	NM ±NM	—
35-JE-51B	3747	3	—	EXU (125S/87E)	-189.00 -199.00	BIF	Newberry Volcano	4.9 ± 0.1	NM ±NM	—

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-51B	3817	4	A	EXU (126S/86E)	-176.00 -186.00	DEB	Whitewater Ridge	4.7 ± 0.1	NM ± NM	—
35-JE-281	63	1	—	SCP 9	0.00 0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-281	64	1	—	SCP 10	0.00 0.00	PPT	Obsidian Cliffs	5.1 ± 0.2	NM ± NM	—
35-JE-281	87	1	—	SCP 33	0.00 0.00	DEB	Not Obsidian	NO ± NM	NM ± NM	Not obsidian
35-JE-281	95	1	—	SCP 41	0.00 0.00	PPT	Cougar Mountain	6.5 ± 0.1	NM ± NM	—
35-JE-281	97	1	—	SCP 43	0.00 0.00	PPT	Obsidian Cliffs	3.4 ± 0.1	NM ± NM	—
35-JE-281	111	1	—	SCP 56	0.00 0.00	PPT	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-282	1	1	—	SCU 1	0.00 0.00	NOD	Unknown A	NM ± NM	NM ± NM	No OH measurement; Nodule
35-JE-282	1	10	—	SCU 1	0.00 0.00	DEB	Unknown B	NM ± NM	NM ± NM	No OH measurement
35-JE-282	15	1	—	SCP 10	0.00 0.00	UFT	Glass Buttes	4.8 ± 0.1	NM ± NM	—
35-JE-282	18	1	—	SCP 13	0.00 0.00	DEB	Unknown C	NM ± NM	NM ± NM	No OH measurement
35-JE-282	25	1	—	SCP 20	0.00 0.00	DEB	Glass Buttes	4.0 ± 0.1	NM ± NM	—
35-JE-282	69	2	—	AUG 9	-60.00 -80.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-JE-282	160	1	A	SON 22	0.00 -10.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-JE-282	160	1	B	SON 22	0.00 -10.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-JE-282	215	1	B	TEU 2	-20.00 -30.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-282	220	2	—	TEU 2	-30.00 -40.00	DEB	Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-JE-282	222	2	A	SON 20	-40.00 -50.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-282	222	2	B	SON 20	-40.00 -50.00	DEB	Obsidian Cliffs	NM ± NM	NM ± NM	No OH measurement
35-JE-282	226	1	—	TEU 2	-50.00 -60.00	DEB	Chickahominy?	NM ± NM	NM ± NM	No OH measurement
35-JE-283	6	1	—	SCP 6	0.00 0.00	DEB	Little Bear Creek?	NM ± NM	NM ± NM	No OH measurement
35-JE-283	17	2	—	SCU 11	0.00 0.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ± NM	—
35-JE-283	39	2	—	AUG 3	-100.00 -110.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ± NM	—
35-JE-283	77	1	—	AUG 9	-80.00 -86.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-283	115	1	—	STU 5	0.00 -10.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ± NM	—
35-JE-283	120	2	—	STU 10	0.00 -10.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ± NM	—
35-JE-283	154	3	—	TEU 1	-20.00 -30.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-JE-283	156	4	—	TEU 1	-40.00 -50.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ± NM	—
35-JE-283	157	1	—	TEU 1	-50.00 -60.00	DEB	Obsidian Cliffs	4.5 ± 0.2	NM ± NM	—
35-JE-283	177	1	A	TEU 3	-10.00 -20.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-JE-283	177	1	B	TEU 3	-10.00 -20.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-283	180	1	A	TEU 3	-40.00 -50.00	DEB	Newberry Volcano	4.3 ± NM	NM ± NM	—
35-JE-283	180	1	B	TEU 3	-40.00 -50.00	DEB	Unknown A	4.3 ± NM	NM ± NM	—
35-JE-283	181	1	A	TEU 3	-50.00 -60.00	DEB	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-JE-283	181	1	B	TEU 3	-50.00 -60.00	DEB	Newberry Volcano	4.3 ± NM	NM ± NM	—
35-JE-283	182	1	A	TEU 3	-60.00 -70.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-283	182	1	B	TEU 3	-60.00 -70.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-283	182	1	C	TEU 3	-60.00 -70.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-283	182	1	D	TEU 3	-60.00 -70.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-283	183	1	A	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ±NM	—
35-JE-283	183	1	B	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ±NM	—
35-JE-283	183	1	C	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ±NM	—
35-JE-283	184	1	—	TEU 3	-80.00 -90.00	DEB	Newberry Volcano	4.4 ±NM	NM ±NM	—
35-JE-283	185	1	—	TEU 3	-90.00 -100.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ±NM	—
35-JE-283	186	1	A	TEU 3	-100.00 -110.00	DEB	Newberry Volcano	4.7 ± 0.1	NM ±NM	—
35-JE-283	186	1	B	TEU 3	-100.00 -110.00	DEB	Newberry Volcano	4.1 ± 0.1	NM ±NM	—
35-JE-283	186	1	C	TEU 3	-100.00 -110.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-283	188	1	—	TEU 3	-110.00 -120.00	DEB	Newberry Volcano	4.1 ± 0.2	NM ±NM	—
35-JE-283	192	1	A	TEU 5	2.00 -10.00	DEB	Newberry Volcano	4.4 ± 0.2	NM ±NM	—
35-JE-283	192	1	B	TEU 5	2.00 -10.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ±NM	—
35-JE-283	192	1	C	TEU 5	2.00 -10.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ±NM	—
35-JE-283	201	1	—	TEU 5	-30.00 -40.00	DEB	Newberry Volcano	4.4 ±NM	NM ±NM	—
35-JE-283	210	2	A	TEU 5	-80.00 -90.00	DEB	Newberry Volcano	4.3 ± 0.2	NM ±NM	—
35-JE-283	210	2	B	TEU 5	-80.00 -90.00	DEB	Newberry Volcano?	4.3 ± 0.1	NM ±NM	—
35-JE-283	210	2	C	TEU 5	-80.00 -90.00	DEB	Newberry Volcano	4.2 ±NM	NM ±NM	—
35-JE-283	217	1	—	TEU 5	-100.00 -110.00	DEB	Newberry Volcano	4.3 ±NM	NM ±NM	—
35-JE-283	225	1	—	EXU (78S/95E)	4.00 -10.00	DEB	Not Obsidian	NVB ±NM	NM ±NM	No visible band
35-JE-283	233	1	—	EXU (78S/95E)	-80.00 -90.00	DEB	Obsidian Cliffs?	4.5 ± 0.1	NM ±NM	—
35-JE-283	237	3	—	EXU (90S/91E)	-10.00 -20.00	DEB	Newberry Volcano	4.7 ± 0.1	NM ±NM	—
35-JE-283	241	3	—	EXU (90S/91E)	-50.00 -60.00	DEB	Newberry Volcano	4.5 ± 0.2	NM ±NM	—
35-JE-283	258	1	—	EXU (96S/89E)	-20.00 -30.00	DEB	Newberry Volcano	4.8 ± 0.1	NM ±NM	—
35-JE-283	260	1	—	EXU (96S/89E)	-30.00 -40.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-283	267	3	—	EXU (96S/89E)	-60.00 -70.00	DEB	Newberry Volcano	5.6 ±NM	NM ±NM	—
35-JE-283	303	1	—	EXU (84S/93E)	-30.00 -40.00	DEB	Obsidian Cliffs	5.4 ± 0.1	NM ±NM	—
35-JE-283	316	3	—	EXU (84S/93E)	-80.00 -90.00	DEB	Not Obsidian	NVB ±NM	NM ±NM	No visible band
35-JE-283	334	3	A	EXU (84S/99E)	-80.00 -90.00	DEB	Newberry Volcano	4.2 ±NM	NM ±NM	—
35-JE-283	334	3	B	EXU (84S/99E)	-80.00 -90.00	DEB	Unknown A	6.2 ± 0.1	NM ±NM	—
35-JE-283	336	3	—	EXU (84S/99E)	-90.00 -100.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ±NM	—
35-JE-283	337	3	—	EXU (84S/99E)	-100.00 -110.00	DEB	Newberry Volcano	4.2 ±NM	NM ±NM	—
35-JE-283	376	2	—	EXU (85S/98E)	-80.00 -90.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ±NM	—
35-JE-283	381	1	—	EXU (85S/98E)	-100.00 -110.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ±NM	—
35-JE-283	388	1	—	EXU (86S/103E)	-20.00 -30.00	DEB	Obsidian Cliffs	4.9 ± 0.1	NM ±NM	—
35-JE-283	408	1	A	EXU (87S/92E)	-30.00 -40.00	DEB	Obsidian Cliffs	5.1 ± 0.1	NM ±NM	—
35-JE-283	408	1	B	EXU (87S/92E)	-30.00 -40.00	DEB	Newberry Volcano	4.8 ± 0.1	NM ±NM	—
35-JE-283	413	2	A	EXU (87S/92E)	-80.00 -90.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ±NM	—
35-JE-283	425	3	—	EXU (87S/93E)	-30.00 -40.00	DEB	Newberry Volcano	4.4 ±NM	NM ±NM	—
35-JE-283	428	1	A	EXU (87S/93E)	-40.00 -50.00	DEB	Newberry Volcano	4.5 ± 0.2	NM ±NM	—
35-JE-283	428	1	B	EXU (87S/93E)	-40.00 -50.00	DEB	Newberry Volcano	4.7 ± 0.2	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-283	429	1	—	EXU (87S/93E)	-50.00 -60.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-283	430	1	—	EXU (87S/93E)	-50.00 -60.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-283	433	1	—	EXU (87S/93E)	-70.00 -80.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-JE-283	454	1	—	EXU (89S/107E)	-50.00 -60.00	DEB	Unknown A	4.5 ± 0.2	NM ± NM	Weathered
35-JE-283	455	3	—	EXU (89S/107E)	-60.00 -70.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-283	459	1	A	EXU (89S/107E)	-80.00 -90.00	DEB	Unknown A	5.4 ± 0.2	NM ± NM	—
35-JE-283	474	1	—	EXU (90S/97E)	-10.00 -20.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-JE-283	476	1	—	EXU (90S/97E)	-20.00 -30.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-JE-283	478	1	A	EXU (90S/97E)	-30.00 -40.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-283	480	5	A	EXU (90S/97E)	-40.00 -50.00	DEB	Newberry Volcano	4.8 ± 0.1	NM ± NM	—
35-JE-283	483	1	A	EXU (90S/97E)	-50.00 -60.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—
35-JE-283	487	1	A	EXU (90S/97E)	-70.00 -80.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ± NM	—
35-JE-283	487	1	B	EXU (90S/97E)	-70.00 -80.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—
35-JE-283	488	1	A	EXU (90S/97E)	-80.00 -90.00	DEB	Newberry Volcano	4.3 ± NM	NM ± NM	—
35-JE-283	488	1	B	EXU (90S/97E)	-80.00 -90.00	DEB	Newberry Volcano	4.4 ± NM	NM ± NM	—
35-JE-283	489	2	A	EXU (90S/97E)	-80.00 -90.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ± NM	—
35-JE-283	490	1	—	EXU (90S/97E)	-90.00 -100.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—
35-JE-283	492	1	A	EXU (90S/97E)	-100.00 -110.00	DEB	Newberry Volcano	4.9 ± 0.1	NM ± NM	—
35-JE-283	494	1	—	EXU (90S/97E)	-110.00 -120.00	DEB	Newberry Volcano	4.7 ± 0.1	NM ± NM	—
35-JE-283	506	2	A	EXU (95S/105E)	-40.00 -50.00	DEB	Newberry Volcano	4.9 ± 0.1	NM ± NM	—
35-JE-283	508	1	—	EXU (95S/105E)	-50.00 -60.00	BIF	Newberry Volcano	4.7 ± NM	NM ± NM	—
35-JE-283	509	1	A	EXU (95S/105E)	-50.00 -60.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-283	510	1	A	EXU (95S/105E)	-60.00 -70.00	DEB	Newberry Volcano	4.4 ± 0.2	NM ± NM	—
35-JE-283	510	1	B	EXU (95S/105E)	-60.00 -70.00	DEB	Newberry Volcano	4.6 ± 0.2	NM ± NM	—
35-JE-283	510	1	C	EXU (95S/105E)	-60.00 -70.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-283	510	1	D	EXU (95S/105E)	-60.00 -70.00	DEB	Newberry Volcano	4.7 ± 0.1	NM ± NM	—
35-JE-283	512	1	A	EXU (95S/105E)	-70.00 -80.00	DEB	Unknown A	4.5 ± 0.2	NM ± NM	—
35-JE-283	515	1	A	EXU (95S/105E)	-80.00 -90.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-JE-283	517	1	A	EXU (95S/105E)	-90.00 -100.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-JE-283	527	1	—	EXU (96S/95E)	7.00 0.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-JE-283	527	2	—	EXU (96S/95E)	7.00 0.00	DEB	Obsidian Cliffs	5.5 ± 0.1	NM ± NM	—
35-JE-283	530	2	A	EXU (96S/95E)	-20.00 -30.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-JE-283	555	1	—	SCP 1002	0.00 0.00	PPT	Newberry Volcano	5.2 ± 0.2	NM ± NM	—
35-JE-283	664	2	—	SHX 1016	-80.00 -100.00	BIF	Newberry Volcano	4.3 ± 0.1	NM ± NM	—
35-JE-283	700	1	A	EXU (84S/98E)	-30.00 -40.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-JE-283	704	1	—	EXU (84S/98E)	-50.00 -60.00	DEB	Newberry Volcano	4.8 ± NM	NM ± NM	—
35-JE-283	753	1	A	EXU (85S/99E)	-80.00 -90.00	DEB	Newberry Volcano	4.3 ± 0.2	NM ± NM	—
35-JE-283	793	3	—	EXU (97S/90E)	-30.00 -40.00	DEB	Whitewater Ridge	4.4 ± 0.1	NM ± NM	—
35-JE-283	817	1	A	EXU (84S/94E)	-50.00 -60.00	DEB	Not Obsidian	NVB ± NM	NM ± NM	No visible band

C.3-106

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-283	821	2	—	EXU (84S/94E)	-90.00 -100.00	BIF	Unknown B	4.2 ± NM	NM ± NM	—
35-JE-283	826	2	—	EXU (84S/95E)	-30.00 -40.00	DEB	Newberry Volcano	3.3 ± 0.2	NM ± NM	—
35-JE-283	866	2	—	EXU (84S/97E)	-50.00 -60.00	DEB	Newberry Volcano	4.1 ± 0.1	NM ± NM	—
35-JE-283	869	1	A	EXU (84S/97E)	-60.00 -70.00	DEB	Unknown A	4.0 ± 0.1	NM ± NM	—
35-JE-283	874	1	—	EXU (84S/97E)	-90.00 -100.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-JE-284	5	1	—	SCP 4	0.00 0.00	DEB	Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-JE-284	7	12	A	SCU 1	0.00 0.00	DEB	Riley?	NM ± NM	NM ± NM	No OH measurement
35-JE-284	7	12	B	SCU 1	0.00 0.00	DEB	Newberry Volcano	4.1 ± 0.1	NM ± NM	—
35-JE-284	7	12	C	SCU 1	0.00 0.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-JE-284	8	12	A	SCU 2	0.00 0.00	DEB	Obsidian Cliffs	4.9 ± 0.2	NM ± NM	—
35-JE-284	8	12	B	SCU 2	0.00 0.00	DEB	Little Bear Creek/Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-JE-284	10	3	—	SCU 4	0.00 0.00	DEB	Obsidian Cliffs	5.0 ± 0.1	NM ± NM	—
35-JE-284	296	2	A	SON 5	0.00 -10.00	DEB	Newberry Volcano	4.8 ± 0.1	NM ± NM	—
35-JE-284	296	2	B	SON 5	0.00 -10.00	DEB	Glass Buttes	5.6 ± 0.1	NM ± NM	—
35-JE-284	329	3	—	TEU 1	-30.00 -40.00	DEB	Brooks Canyon?	NM ± NM	NM ± NM	No OH measurement
35-JE-284	332	2	—	TEU 1	-50.00 -60.00	DEB	Brooks Canyon?	NM ± NM	NM ± NM	No OH measurement
35-JE-284	337	2	—	TEU 1	-70.00 -80.00	DEB	Yreka Butte?	NM ± NM	NM ± NM	No OH measurement
35-JE-285	4	1	—	SCP 1	0.00 0.00	BIF	Riley	NM ± NM	NM ± NM	No OH measurement
35-JE-285	10	1	—	SCP 7	0.00 0.00	DEB	Obsidian Cliffs	4.6 ± 0.1	NM ± NM	—
35-JE-285	11	4	A	SCU 1	0.00 0.00	DEB	Newberry Volcano	5.6 ± NM	NM ± NM	—
35-JE-285	11	4	B	SCG 1	0.00 0.00	DEB	Newberry Volcano	5.4 ± 0.1	NM ± NM	—
35-JE-285	11	4	C	SCU 1	0.00 0.00	DEB	Newberry Volcano	5.4 ± 0.1	NM ± NM	—
35-JE-285	11	4	D	SCU 1	0.00 0.00	DEB	Newberry Volcano	4.8 ± 0.1	NM ± NM	—
35-JE-285	11	4	E	SCU 1	0.00 0.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-JE-285	11	4	F	SCU 1	0.00 0.00	DEB	Newberry Volcano	5.1 ± 0.1	NM ± NM	—
35-JE-285	11	4	G	SCU 1	0.00 0.00	DEB	Newberry Volcano	4.9 ± 0.1	NM ± NM	—
35-JE-285	11	4	H	SCU 1	0.00 0.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ± NM	—
35-JE-285	11	4	I	SCU 1	0.00 0.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-285	11	4	J	SCU 1	0.00 0.00	DEB	Not Obsidian	NO ± NM	NM ± NM	Not obsidian
35-JE-285	11	4	K	SCU 1	0.00 0.00	DEB	Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-JE-285	11	4	L	SCU 1	0.00 0.00	DEB	Newberry Volcano	5.2 ± 0.1	NM ± NM	—
35-JE-285	12	4	A	SCU 2	0.00 0.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-285	12	4	B	SCU 2	0.00 0.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-285	77	3	—	SHP 18	0.00 -20.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-JE-285	89	2	—	SHP 22	-20.00 -40.00	DEB	Newberry Volcano	5.0 ± NM	NM ± NM	—
35-JE-286	4	1	—	SCP 1	0.00 0.00	PPT	Glass Buttes	5.7 ± 0.2	5.1 ± 0.1	2 hydration bands
35-JE-287	2	1	—	SCP 2	0.00 0.00	BIF	Newberry Volcano	4.1 ± 0.1	NM ± NM	—
35-JE-287	4	1	—	SCP 4	0.00 0.00	BIF	Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-JE-287	7	5	—	SCU 1	0.00 0.00	DEB	Obsidian Cliffs	DH ± NM	NM ± NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-JE-287	51	1	—	TEU 1	0.00	-10.00	PPT	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-288	60	1	—	SCP 56	0.00	0.00	BIF	Glass Buttes	2.9 ± 0.2	NM ±NM	—
35-JE-288	76	1	—	SCP 72	0.00	0.00	PPT	Glass Buttes	1.4 ± 0.2	NM ±NM	—
35-JE-288	80	1	—	SCP 101	0.00	0.00	PPT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-288	83	1	—	SCP 104	0.00	0.00	PPT	Horse Mountain?	NM ±NM	NM ±NM	No OH measurement
35-JE-288	87	1	—	SCP 108	0.00	0.00	DEB	Glass Buttes	4.6 ± 0.1	NM ±NM	—
35-JE-288	99	1	—	SCP 120	0.00	0.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ±NM	—
35-JE-288	105	3	A	SCU 1	0.00	0.00	DEB	Glass Buttes	6.6 ± 0.1	NM ±NM	—
35-JE-288	105	3	B	SCU 1	0.00	0.00	DEB	Little Bear Creek	NM ±NM	NM ±NM	No OH measurement
35-JE-288	110	13	—	SCU 6	0.00	0.00	PPT	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-288	294	1	—	TEU 2	-120.00	-130.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-JE-289	157	2	—	SON 8	-50.00	-60.00	DEB	Unknown A	NM ±NM	NM ±NM	No OH measurement
35-JE-290	4	1	—	SCP 4	0.00	0.00	BIF	Obsidian Cliffs	2.3 ± 0.1	NM ±NM	—
35-JE-290	22	3	—	STU 4	0.00	-10.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-JE-291	3	1	—	SCP 1	0.00	0.00	PPT	Newberry Volcano	2.4 ±NM	2.5 ± 0.1	2 OH cuts in separate locations
35-JE-291	6	1	—	SCP 4	0.00	0.00	BIF	Newberry Volcano	2.6 ±NM	2.9 ± 0.1	2 OH cuts in separate locations
35-JE-291	16	1	—	SCP 14	0.00	0.00	BIF	Obsidian Cliffs	2.8 ± 0.1	NM ±NM	—
35-JE-291	82	5	A	STU 1	0.00	-10.00	DEB	Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—
35-JE-291	82	5	B	STU 1	0.00	-10.00	DEB	Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—
35-JE-291	82	5	C	STU 1	0.00	-10.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—
35-JE-291	82	5	D	STU 1	0.00	-10.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—
35-JE-291	82	5	E	STU 1	0.00	-10.00	DEB	Glass Buttes	3.5 ± 0.1	NM ±NM	—
35-JE-291	82	5	F	STU 1	0.00	-10.00	DEB	Obsidian Cliffs	3.2 ±NM	NM ±NM	—
35-JE-291	83	5	A	STU 2	0.00	-10.00	DEB	Obsidian Cliffs	3.5 ± 0.1	NM ±NM	—
35-JE-291	83	5	B	STU 2	0.00	-10.00	DEB	Not Obsidian?	NO ±NM	NM ±NM	Not obsidian
35-JE-291	151	1	—	SHX 35	-100.00	-130.00	DEB	Inman Creek/Salt Creek A	NM ±NM	NM ±NM	No OH measurement
35-JE-291	202	1	—	TEU 1	0.00	-10.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-JE-291	221	1	—	TEU 1	-80.00	-90.00	DEB	Newberry Volcano	3.5 ±NM	NM ±NM	—
35-JE-291	239	1	—	TEU 2	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-291	240	1	—	TEU 2	-10.00	-20.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ±NM	—
35-JE-292	19	1	—	SCP 17	0.00	0.00	BIF	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-293	1	1	—	SCP 1	0.00	0.00	PPT	Unknown A	NM ±NM	NM ±NM	No OH measurement
35-JE-293	17	1	—	SCP 17	0.00	0.00	PPT	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-JE-293	21	1	—	SCP 35	0.00	0.00	DEB	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-293	91	3	—	TEU 1	6.00	0.00	BIF	Unknown B	NM ±NM	NM ±NM	No OH measurement
35-JE-293	91	8	—	TEU 1	6.00	0.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ±NM	—
35-JE-293	93	6	—	TEU 1	0.00	-10.00	BIF	Obsidian Cliffs	DH ±NM	NM ±NM	—
35-JE-293	93	10	B	TEU 1	0.00	-10.00	DEB	Not Obsidian	NO ±NM	NM ±NM	Not obsidian
35-JE-293	96	10	—	TEU 1	-10.00	-20.00	BIF	Newberry Volcano	2.1 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-293	96	22	B	TEU 1	-10.00 -20.00	DEB	Not Obsidian	NO ±NM	NM ±NM	Not obsidian
35-JE-293	96	23	—	TEU 1	-10.00 -20.00	BIF	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-293	101	2	B	TEU 1	-20.00 -30.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-JE-293	101	17	—	TEU 1	-20.00 -30.00	PPT	Newberry Volcano	2.2 ± 0.1	2.3 ± 0.1	2 hydration bands
35-JE-293	101	20	—	TEU 1	-20.00 -30.00	BIF	Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-JE-293	107	16	B	TEU 1	-30.00 -40.00	DEB	Obsidian Cliffs	2.9 ± 0.1	NM ±NM	—
35-JE-293	109	1	—	TEU 1	-33.00 -33.00	PPT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-293	116	20	—	TEU 1	-40.00 -50.00	UFT	Quartz Mountain?	NM ±NM	NM ±NM	No OH measurement
35-JE-293	116	22	—	TEU 1	-40.00 -50.00	BIF	Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-JE-293	116	30	B	TEU 1	-40.00 -50.00	DEB	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-293	117	3	—	TEU 1	-50.00 -60.00	PPT	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-293	117	13	B	TEU 1	-50.00 -60.00	DEB	Wolf Creek	NM ±NM	NM ±NM	No OH measurement
35-JE-293	117	14	—	TEU 1	-50.00 -60.00	BIF	Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-JE-293	120	1	—	TEU 1	-50.00 -50.00	PPT	Obsidian Cliffs	2.4 ± 0.1	2.2 ± 0.1	2 hydration bands
35-JE-293	123	6	—	TEU 1	-60.00 -70.00	PPT	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-293	123	10	—	TEU 1	-60.00 -70.00	BIF	Newberry Volcano	2.1 ± 0.1	2.0 ± 0.1	2 hydration bands
35-JE-293	123	11	—	TEU 1	-60.00 -70.00	PPT	Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-JE-293	123	27	B	TEU 1	-60.00 -70.00	DEB	Unknown C	2.2 ± 0.1	NM ±NM	—
35-JE-293	123	27	C	TEU 1	-60.00 -70.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-JE-293	135	3	B	TEU 1	-70.00 -80.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-JE-293	135	3	C	TEU 1	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-293	135	11	—	TEU 1	-70.00 -80.00	BIF	Chickahominy?	NM ±NM	NM ±NM	No OH measurement
35-JE-293	135	16	—	TEU 1	-70.00 -80.00	PPT	Not Obsidian	NO ±NM	NM ±NM	Not obsidian
35-JE-293	136	4	B	TEU 1	-80.00 -90.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-293	137	4	B	TEU 1	-90.00 -100.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-293	138	1	—	TEU 1	-96.00 -96.00	PPT	Silver Lake/Sycan Marsh?	NM ±NM	NM ±NM	No OH measurement
35-JE-293	149	1	—	TEU 3	-50.00 -60.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-293	205	5	B	TEU 1	-100.00 -110.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-293	206	7	B	TEU 1	-110.00 -120.00	DEB	Horse Mountain?	NM ±NM	NM ±NM	No OH measurement
35-JE-293	206	7	C	TEU 1	-110.00 -120.00	DEB	Glass Buttes	3.7 ±NM	NM ±NM	—
35-JE-293	207	9	B	TEU 1	-120.00 -130.00	DEB	Newberry Volcano	3.5 ±NM	NM ±NM	—
35-JE-293	207	9	C	TEU 1	-120.00 -130.00	DEB	Glass Buttes	3.8 ± 0.1	NM ±NM	—
35-JE-293	208	9	B	TEU 1	-130.00 -140.00	DEB	Obsidian Cliffs	3.3 ± 0.1	NM ±NM	—
35-JE-293	208	9	C	TEU 1	-130.00 -140.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-293	209	4	B	TEU 1	-140.00 -150.00	DEB	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-JE-293	209	8	—	TEU 1	-140.00 -150.00	PPT	Newberry Volcano	2.3 ± 0.1	NM ±NM	—
35-JE-293	210	4	B	TEU 1	-150.00 -160.00	DEB	Glass Buttes	3.7 ±NM	NM ±NM	—
35-JE-296	5	1	—	SCP 3	0.00 0.00	DEB	Obsidian Cliffs	4.5 ± 0.2	NM ±NM	—
35-JE-296	65	1	—	AUG 12	-60.00 -80.00	DEB	Unknown C	NM ±NM	NM ±NM	No OH measurement

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-296	66	3	—	AUG 12	-80.00 -90.00	DEB	Obsidian Cliffs	NM ±NM	NM ±NM	No OH measurement
35-JE-296	80	1	—	AUG 15	-40.00 -60.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-296	250	2	—	AUG 41	-100.00 -120.00	PPT	Glass Buttes	3.8 ± 0.2	NM ±NM	—
35-JE-296	250	3	—	AUG 41	-100.00 -120.00	PPT	Unknown A	4.7 ± 0.1	NM ±NM	—
35-JE-296	310	3	—	AUG 47	-60.00 -80.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-296	333	1	—	AUG 50	-100.00 -120.00	DEB	Whitewater Ridge?	NM ±NM	NM ±NM	No OH measurement
35-JE-296	380	1	—	STU 10	0.00 -10.00	DEB	Newberry Volcano	4.1 ± 0.1	NM ±NM	—
35-JE-296	402	1	—	TEU 2	0.00 -10.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-296	408	2	A	TEU 2	-20.00 -30.00	DEB	Glass Buttes	DH ±NM	NM ±NM	Diffuse hydration
35-JE-296	408	2	B	TEU 2	-20.00 -30.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-296	412	1	—	TEU 2	-30.00 -40.00	PPT	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-JE-296	412	2	A	TEU 2	-30.00 -40.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-296	412	2	B	TEU 2	-30.00 -40.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-JE-296	412	2	C	TEU 2	-30.00 -40.00	DEB	Glass Buttes	5.2 ± 0.1	NM ±NM	—
35-JE-296	413	2	A	TEU 2	-30.00 -40.00	DEB	Unknown C	NM ±NM	NM ±NM	No OH measurement
35-JE-296	415	1	—	TEU 2	-40.00 -50.00	PPT	Unknown C	3.5 ± 0.1	NM ±NM	—
35-JE-296	416	2	—	TEU 2	-40.00 -50.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-JE-296	416	5	A	TEU 2	-40.00 -50.00	DEB	Unknown C	NM ±NM	NM ±NM	No OH measurement
35-JE-296	416	5	B	TEU 2	-40.00 -50.00	DEB	Obsidian Cliffs	4.1 ± 0.1	NM ±NM	—
35-JE-296	416	5	C	TEU 2	-40.00 -50.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—
35-JE-296	416	5	D	TEU 2	-40.00 -50.00	DEB	Glass Buttes	3.0 ± 0.1	NM ±NM	—
35-JE-296	419	2	—	TEU 2	-50.00 -60.00	DEB	Obsidian Cliffs	3.1 ± 0.1	NM ±NM	—
35-JE-296	420	2	—	TEU 2	-50.00 -60.00	DEB	Obsidian Cliffs	2.8 ± 0.1	NM ±NM	—
35-JE-296	434	3	—	TEU 2	-80.00 -90.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-JE-296	436	1	—	TEU 2	-81.00 -81.00	COR	Obsidian Cliffs	4.6 ± 0.2	NM ±NM	—
35-JE-296	438	3	A	TEU 2	-90.00 -100.00	DEB	Newberry Volcano?	2.8 ± 0.1	NM ±NM	—
35-JE-296	438	3	B	TEU 2	-90.00 -100.00	DEB	Newberry Volcano	3.7 ±NM	NM ±NM	—
35-JE-296	438	3	C	TEU 2	-90.00 -100.00	DEB	Unknown B	NM ±NM	NM ±NM	No OH measurement
35-JE-296	442	4	—	TEU 2	-100.00 -110.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-JE-296	463	1	—	TEU 3	-20.00 -30.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-296	467	1	A	TEU 3	-60.00 -70.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ±NM	—
35-JE-296	467	1	B	TEU 3	-60.00 -70.00	DEB	Obsidian Cliffs	7.6 ± 0.1	NM ±NM	Weathered
35-JE-296	610	2	—	AUG 6	0.00 -100.00	DEB	Whitewater Ridge	3.6 ±NM	NM ±NM	—
35-JE-296	731	3	—	EXU (150S/81E)	-33.00 -43.00	PPT	Quartz Mountain	2.5 ±NM	NM ±NM	—
35-JE-296	736	2	—	EXU (150S/81E)	-53.00 -63.00	BIF	Quartz Mountain	2.9 ± 0.1	NM ±NM	—
35-JE-296	792	2	—	EXU (170S/81E)	-60.00 -70.00	DEB	Obsidian Cliffs	4.8 ± 0.1	NM ±NM	—
35-JE-296	795	1	—	EXU (170S/81E)	-80.00 -90.00	DEB	Obsidian Cliffs	4.8 ±NM	NM ±NM	—
35-JE-296	818	1	—	EXU (176S/114E)	-109.00 -119.00	DEB	Whitewater Ridge	3.5 ± 0.1	NM ±NM	—
35-JE-296	832	2	A	EXU (180S/83E)	-57.00 -67.00	DEB	Glass Buttes	DH ±NM	NM ±NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-296	833	2	—	EXU (180S/83E)	-67.00 -77.00	DEB	Unknown C	4.5 ± 0.1	NM ±NM	—
35-JE-296	834	2	A	EXU (180S/83E)	-67.00 -77.00	DEB	Glass Buttes	4.8 ±NM	NM ±NM	—
35-JE-296	834	2	B	EXU (180S/83E)	-67.00 -77.00	DEB	Glass Buttes	4.8 ± 0.1	NM ±NM	—
35-JE-296	835	2	A	EXU (180S/83E)	-77.00 -87.00	DEB	Unknown C	4.2 ± 0.1	NM ±NM	—
35-JE-296	835	2	B	EXU (180S/83E)	-77.00 -87.00	DEB	Unknown C	4.7 ± 0.1	NM ±NM	—
35-JE-296	835	2	C	EXU (180S/83E)	-77.00 -87.00	DEB	Obsidian Cliffs	4.8 ±NM	NM ±NM	—
35-JE-296	839	2	—	EXU (180S/83E)	-97.00 -107.00	DEB	Unknown C	4.3 ±NM	NM ±NM	—
35-JE-296	863	1	A	EXU (210S/87E)	-15.00 -25.00	DEB	Glass Buttes	4.4 ± 0.1	NM ±NM	—
35-JE-296	863	2	—	EXU (210S/87E)	-15.00 -25.00	UFT	Little Bear Creek/Whitewater Ridge	4.6 ± 0.1	NM ±NM	—
35-JE-296	867	2	A	EXU (210S/87E)	-35.00 -45.00	DEB	Whitewater Ridge	3.5 ± 0.1	NM ±NM	—
35-JE-296	867	2	B	EXU (210S/87E)	-35.00 -45.00	DEB	Glass Buttes	5.8 ± 0.2	NM ±NM	—
35-JE-296	869	2	—	EXU (210S/87E)	-45.00 -55.00	DEB	Whitewater Ridge	3.6 ±NM	NM ±NM	—
35-JE-296	871	2	—	EXU (210S/87E)	-55.00 -65.00	DEB	Unknown B	3.5 ± 0.1	NM ±NM	—
35-JE-296	872	2	A	EXU (210S/87E)	-55.00 -65.00	DEB	Whitewater Ridge	3.4 ± 0.1	NM ±NM	—
35-JE-296	882	1	—	EXU (215S/88E)	-39.00 -49.00	DEB	Glass Buttes	4.9 ± 0.1	NM ±NM	—
35-JE-296	883	2	A	EXU (215S/88E)	-39.00 -49.00	DEB	Glass Buttes	5.0 ± 0.2	NM ±NM	—
35-JE-296	886	2	—	EXU (215S/88E)	-59.00 -69.00	DEB	Glass Buttes	5.1 ±NM	NM ±NM	—
35-JE-296	897	2	A	EXU (220S/89E)	-43.00 -53.00	DEB	Delintment Creek	5.5 ± 0.1	NM ±NM	—
35-JE-296	899	4	—	EXU (220S/89E)	-53.00 -63.00	DEB	Glass Buttes	5.5 ±NM	NM ±NM	—
35-JE-296	899	5	—	EXU (220S/89E)	-53.00 -63.00	UFT	Quartz Mountain	4.2 ± 0.1	NM ±NM	—
35-JE-296	901	3	A	EXU (220S/89E)	-63.00 -73.00	DEB	Unknown B	2.9 ± 0.1	NM ±NM	—
35-JE-296	901	3	B	EXU (220S/89E)	-63.00 -73.00	DEB	Glass Buttes	5.1 ± 0.1	NM ±NM	—
35-JE-296	901	3	C	EXU (220S/89E)	-63.00 -73.00	DEB	Glass Buttes	5.0 ± 0.1	NM ±NM	—
35-JE-296	902	4	—	EXU (220S/89E)	-63.00 -73.00	DEB	Whitewater Ridge?	4.2 ±NM	NM ±NM	—
35-JE-296	903	2	A	EXU (220S/89E)	-73.00 -83.00	DEB	Glass Buttes	5.0 ±NM	NM ±NM	—
35-JE-296	903	2	B	EXU (220S/89E)	-73.00 -83.00	DEB	Glass Buttes	5.1 ± 0.1	NM ±NM	—
35-JE-296	904	2	—	EXU (220S/89E)	-73.00 -83.00	DEB	Sawmill Creek	5.1 ± 0.1	NM ±NM	—
35-JE-296	919	2	—	EXU (225S/93E)	-35.00 -45.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ±NM	—
35-JE-296	921	2	A	EXU (225S/93E)	-45.00 -55.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ±NM	—
35-JE-296	923	2	A	EXU (225S/93E)	-55.00 -65.00	DEB	Glass Buttes	4.9 ± 0.1	NM ±NM	—
35-JE-296	923	2	B	EXU (225S/93E)	-55.00 -65.00	DEB	Unknown B	4.0 ± 0.1	NM ±NM	—
35-JE-296	925	3	A	EXU (225S/93E)	-65.00 -75.00	DEB	Obsidian Cliffs	5.2 ± 0.1	NM ±NM	—
35-JE-296	925	3	B	EXU (225S/93E)	-65.00 -75.00	DEB	Obsidian Cliffs	4.9 ±NM	NM ±NM	—
35-JE-296	926	2	—	EXU (225S/93E)	-65.00 -75.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ±NM	—
35-JE-296	927	2	—	EXU (225S/93E)	-75.00 -85.00	DEB	Glass Buttes	4.5 ±NM	NM ±NM	—
35-JE-296	966	2	—	EXU (230S/92E)	-21.00 -31.00	DEB	Newberry Volcano	4.3 ± 0.1	NM ±NM	—
35-JE-296	967	2	—	EXU (230S/92E)	-21.00 -31.00	DEB	Obsidian Cliffs	5.0 ± 0.1	NM ±NM	—
35-JE-296	968	3	A	EXU (230S/92E)	-31.00 -41.00	DEB	Chickahominy	5.0 ± 0.1	NM ±NM	—
35-JE-296	968	3	B	EXU (230S/92E)	-31.00 -41.00	DEB	Quartz Mountain	5.5 ±NM	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-JE-296	970	2	A	EXU (230S/92E)	-41.00	-51.00	DEB	Glass Buttes	5.0 ± 0.1	NM ± NM	—
35-JE-296	970	2	B	EXU (230S/92E)	-41.00	-51.00	DEB	Whitewater Ridge?	3.8 ± 0.1	NM ± NM	—
35-JE-296	972	3	A	EXU (230S/92E)	-51.00	-61.00	DEB	Whitewater Ridge?	3.0 ± 0.1	NM ± NM	—
35-JE-296	972	3	B	EXU (230S/92E)	-51.00	-61.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-296	974	2	A	EXU (230S/92E)	-61.00	-71.00	DEB	Obsidian Cliffs	4.8 ± NM	NM ± NM	—
35-JE-296	990	3	—	EXU (230S/96E)	-39.00	-49.00	PPT	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-296	994	2	—	EXU (230S/96E)	-59.00	-69.00	DEB	Unknown B	3.3 ± 0.1	NM ± NM	—
35-JE-296	1007	2	—	EXU (230S/102E)	-38.00	-48.00	DEB	Unknown B	4.3 ± 0.1	NM ± NM	—
35-JE-296	1008	2	—	EXU (230S/102E)	-48.00	-58.00	DEB	Newberry Volcano	3.6 ± NM	4.7 ± 0.1	2 hydration bands
35-JE-296	1015	1	—	EXU (235S/91E)	-20.00	-30.00	UFT	Obsidian Cliffs	4.5 ± 0.2	NM ± NM	—
35-JE-296	1016	1	—	EXU (235S/91E)	-20.00	-30.00	DEB	Quartz Mountain	4.3 ± 0.1	NM ± NM	—
35-JE-296	1030	2	A	EXU (235S/96E)	-23.00	-33.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ± NM	—
35-JE-296	1032	3	A	EXU (235S/96E)	-33.00	-43.00	DEB	Newberry Volcano	4.9 ± 0.1	NM ± NM	—
35-JE-296	1034	2	A	EXU (235S/96E)	-43.00	-53.00	DEB	Newberry Volcano	3.8 ± NM	NM ± NM	—
35-JE-296	1034	2	B	EXU (235S/96E)	-43.00	-53.00	DEB	Unknown D	DH ± NM	NM ± NM	Diffuse hydration
35-JE-296	1034	4	—	EXU (235S/96E)	-43.00	-53.00	BIF	Little Bear Creek/Whitewater Ridge	3.6 ± 0.1	NM ± NM	—
35-JE-296	1061	2	—	EXU (240S/92E)	-19.00	-29.00	UFT	Quartz Mountain	5.0 ± 0.1	NM ± NM	—
35-JE-296	1064	2	A	EXU (240S/92E)	-29.00	-39.00	DEB	Unknown B	4.6 ± 0.1	NM ± NM	—
35-JE-296	1098	2	—	EXU (250S/94E)	-55.00	-65.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-296	1117	2	—	EXU (339S/110E)	-57.00	-67.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-JE-297	7	1	—	SCP 4	0.00	0.00	UFT	Obsidian Cliffs	4.2 ± 0.1	NM ± NM	—
35-JE-297	13	1	—	SCP 10	0.00	0.00	BIF	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-JE-297	16	1	—	SCP 13	0.00	0.00	PPT	Obsidian Cliffs	3.9 ± 0.6	NM ± NM	—
35-JE-297	25	1	—	SCP 22	0.00	0.00	PPT	Obsidian Cliffs	3.2 ± 0.1	3.2 ± NM	2 OH cuts at different locations
35-JE-297	33	1	—	SCP 30	0.00	0.00	BIF	Obsidian Cliffs	3.8 ± 0.1	3.5 ± 0.1	2 OH cuts at different locations
35-JE-297	37	1	—	SCP 34	0.00	0.00	PPT	Unknown B	NM ± NM	NM ± NM	No OH measurement
35-JE-297	44	1	—	SCP 41	0.00	0.00	PPT	Newberry Volcano	3.3 ± NM	3.3 ± 0.1	—
35-JE-297	45	1	—	SCP 42	0.00	0.00	BIF	Little Bear Creek/Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-JE-297	52	1	—	SCP 49	0.00	0.00	BIF	Unknown C	NM ± NM	NM ± NM	No OH measurement
35-JE-297	54	1	—	SCP 51	0.00	0.00	PPT	Newberry Volcano	3.0 ± NM	3.0 ± 0.1	—
35-JE-297	64	1	A	SCU 1	0.00	0.00	DEB	Newberry Volcano	4.7 ± 0.1	NM ± NM	—
35-JE-297	64	1	B	SCU 1	0.00	0.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-JE-297	64	1	C	SCU 1	0.00	0.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—
35-JE-297	64	1	D	SCU 1	0.00	0.00	DEB	Newberry Volcano	4.4 ± NM	NM ± NM	—
35-JE-297	64	1	E	SCU 1	0.00	0.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ± NM	—
35-JE-297	64	1	F	SCU 1	0.00	0.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—
35-JE-297	64	1	G	SCU 1	0.00	0.00	DEB	Obsidian Cliffs	4.3 ± NM	NM ± NM	—
35-JE-297	64	1	H	SCU 1	0.00	0.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-297	64	1	I	SCU 1	0.00	0.00	DEB	Obsidian Cliffs	4.5 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-297	64	1	J SCU 1	0.00	0.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-297	64	1	K SCU 1	0.00	0.00	DEB	Newberry Volcano	4.0 ± 0.2	NM ± NM	—
35-JE-297	64	1	L SCU 1	0.00	0.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—
35-JE-297	64	1	M SCU 1	0.00	0.00	DEB	Obsidian Cliffs	4.4 ± NM	NM ± NM	—
35-JE-297	64	1	N SCU 1	0.00	0.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-297	64	1	O SCU 1	0.00	0.00	DEB	Newberry Volcano	4.0 ± 0.2	NM ± NM	—
35-JE-297	64	1	P SCU 1	0.00	0.00	DEB	Newberry Volcano	4.6 ± 0.1	NM ± NM	—
35-JE-297	64	1	Q SCU 1	0.00	0.00	DEB	Newberry Volcano	4.0 ± 0.1	4.6 ± 0.1	2 hydration bands
35-JE-297	64	1	R SCU 1	0.00	0.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-297	64	1	S SCU 1	0.00	0.00	DEB	Obsidian Cliffs	4.6 ± 0.1	NM ± NM	—
35-JE-297	64	4	— SCU 1	0.00	0.00	DEB	Obsidian Cliffs	5.1 ± 0.1	NM ± NM	—
35-JE-297	64	5	— SCU 1	0.00	0.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-JE-297	68	1	A SCU 2	0.00	0.00	DEB	Obsidian Cliffs	4.4 ± NM	NM ± NM	—
35-JE-297	68	1	B SCU 2	0.00	0.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-297	68	1	C SCU 2	0.00	0.00	DEB	Inman Creek/Salt Creek A	NM ± NM	NM ± NM	No OH measurement
35-JE-297	68	1	D SCU 2	0.00	0.00	DEB	Obsidian Cliffs	4.8 ± NM	NM ± NM	—
35-JE-297	68	1	E SCU 2	0.00	0.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-JE-297	68	1	F SCU 2	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-297	68	1	G SCU 2	0.00	0.00	DEB	Newberry Volcano	4.1 ± 0.1	NM ± NM	—
35-JE-297	68	1	H SCU 2	0.00	0.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-JE-297	68	1	I SCU 2	0.00	0.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-297	68	5	— SCU 2	0.00	0.00	DEB	Obsidian Cliffs	3.7 ± NM	4.2 ± NM	2 hydration bands
35-JE-297	69	1	A SCU 4	0.00	0.00	DEB	Obsidian Cliffs	5.0 ± 0.1	NM ± NM	—
35-JE-297	69	1	B SCU 4	0.00	0.00	DEB	Unknown D	NM ± NM	NM ± NM	No OH measurement
35-JE-297	72	1	A SCU 3	0.00	0.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-297	72	1	B SCU 3	0.00	0.00	DEB	Obsidian Cliffs	5.9 ± 0.1	NM ± NM	—
35-JE-297	72	1	C SCU 3	0.00	0.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-297	72	1	D SCU 3	0.00	0.00	DEB	Obsidian Cliffs	6.1 ± NM	NM ± NM	—
35-JE-297	207	1	— STU 108	0.00	-20.00	BIF	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-JE-297	216	1	A STU 117	0.00	-20.00	DEB	Newberry Volcano	2.9 ± NM	NM ± NM	—
35-JE-297	218	1	A STU 119	0.00	-20.00	DEB	Obsidian Cliffs	3.2 ± 0.1	NM ± NM	—
35-JE-297	218	1	B STU 119	0.00	0.00	DEB	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-JE-297	218	1	C STU 119	0.00	0.00	DEB	Obsidian Cliffs	4.8 ± NM	NM ± NM	—
35-JE-298	88	1	— TEU 3	-10.00	-20.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ± NM	—
35-JE-298	89	6	A TEU 3	-20.00	-30.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-JE-298	89	6	B TEU 3	-20.00	-30.00	DEB	Inman Creek/Salt Creek A	NM ± NM	NM ± NM	No OH measurement
35-JE-298	89	6	C TEU 3	-20.00	-30.00	DEB	Obsidian Cliffs	3.5 ± NM	NM ± NM	—
35-JE-298	90	7	— TEU 3	-30.00	-40.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	91	7	A TEU 3	-40.00	-50.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
									Rim 1	Rim 2		
35-JE-298	91	7	B	TEU	3	-40.00	-50.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-298	92	6	A	TEU	3	-50.00	-60.00	DEB	Obsidian Cliffs	2.1 ± 0.1	NM ± NM	—
35-JE-298	92	6	B	TEU	3	-50.00	-60.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-JE-298	92	6	C	TEU	3	-50.00	-60.00	DEB	Newberry Volcano	2.7 ± NM	NM ± NM	—
35-JE-298	94	6	A	TEU	3	-70.00	-80.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-JE-298	97	3	—	TEU	3	-100.00	-110.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-JE-298	101	1	—	TEU	3	-140.00	-150.00	BIF	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	108	1	—	TEU	4	-10.00	-20.00	BIF	Not Obsidian	NO ± NM	NM ± NM	Not obsidian
35-JE-298	125	4	A	TEU	5	0.00	-20.00	DEB	Obsidian Cliffs	3.8 ± 0.1	NM ± NM	—
35-JE-298	125	4	B	TEU	5	0.00	-20.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	125	4	C	TEU	5	0.00	-20.00	DEB	Not Obsidian	NO ± NM	NM ± NM	Not obsidian
35-JE-298	125	4	D	TEU	5	0.00	-20.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-JE-298	126	3	—	TEU	5	-20.00	-30.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-JE-298	128	2	—	TEU	5	-40.00	-50.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	130	1	—	TEU	5	-60.00	-70.00	PPT	Newberry Volcano	3.0 ± NM	NM ± NM	—
35-JE-298	130	4	A	TEU	5	-60.00	-70.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-JE-298	130	4	B	TEU	5	-60.00	-70.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-JE-298	130	5	—	TEU	5	-60.00	-70.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	132	1	—	TEU	5	-80.00	-90.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	137	2	A	TEU	5	-130.00	-140.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	137	2	B	TEU	5	-130.00	-140.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-JE-298	138	1	—	TEU	5	-140.00	-150.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	141	1	—	SCP	1	0.00	0.00	PPT	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-JE-298	143	1	—	SCP	3	0.00	0.00	BIF	Newberry Volcano	2.6 ± NM	NM ± NM	—
35-JE-298	144	1	—	SCP	4	0.00	0.00	PPT	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-JE-298	145	1	—	SCP	8	0.00	0.00	PPT	Obsidian Cliffs	1.3 ± NM	NM ± NM	—
35-JE-298	148	1	—	SCP	12	0.00	0.00	PPT	Quartz Mountain/McKay Butte	1.3 ± 0.1	1.3 ± NM	2 OH cuts in separate locations
35-JE-298	149	1	—	SCP	13	0.00	0.00	PPT	Delintment Creek	NM ± NM	NM ± NM	No OH measurement
35-JE-298	150	1	—	SCP	16	0.00	0.00	PPT	Chickahominy?	NM ± NM	NM ± NM	No OH measurement
35-JE-298	151	1	—	SCP	17	0.00	0.00	BIF	Unknown B	NM ± NM	NM ± NM	No OH measurement
35-JE-298	152	1	—	SCP	18	0.00	0.00	BIF	Chickahominy?	NM ± NM	NM ± NM	No OH measurement
35-JE-298	161	1	—	SCP	27	0.00	0.00	PFT	Little Bear Creek/Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-JE-298	168	1	—	SCP	38	0.00	0.00	BIF	Obsidian Cliffs	2.6 ± NM	NM ± NM	—
35-JE-298	170	1	—	SCP	40	0.00	0.00	UFT	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-JE-298	171	1	—	SCP	41	0.00	0.00	BIF	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-JE-298	172	1	—	SCP	42	0.00	0.00	BIF	Glass Buttes	NM ± NM	NM ± NM	No OH measurement
35-JE-298	175	1	—	SCP	45	0.00	0.00	BIF	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-JE-298	179	1	—	SCP	49	0.00	0.00	BIF	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-JE-298	196	1	—	SCP	67	0.00	0.00	BIF	Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-JE-298	197	1	—	SCP 68	0.00	0.00	BIF Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-298	207	1	—	SCP 78	0.00	0.00	BIF Unknown B	NM ±NM	NM ±NM	No OH measurement
35-JE-298	219	4	A	STU 9	0.00	-10.00	DEB Newberry Volcano	2.5 ±NM	NM ±NM	—
35-JE-298	219	4	B	STU 9	0.00	-10.00	DEB Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-JE-298	219	5	—	STU 9	0.00	-10.00	BIF Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-JE-298	271	1	—	SHP 30	0.00	0.00	UFT Newberry Volcano	4.3 ±NM	NM ±NM	—
35-JE-298	301	1	A	TEU 3	-180.00	-190.00	DEB Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-JE-298	301	1	B	TEU 3	-180.00	-190.00	DEB Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-JE-298	301	1	C	TEU 3	-180.00	-190.00	DEB Newberry Volcano	3.2 ±NM	NM ±NM	—
35-JE-298	303	2	—	TEU 3	-200.00	-210.00	DEB Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-JE-298	306	3	A	TEU 3	-220.00	-230.00	DEB Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-JE-298	306	3	B	TEU 3	-220.00	-230.00	DEB Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—
35-JE-298	307	3	—	TEU 3	-230.00	-240.00	DEB Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-300	16	1	—	SCP 1	0.00	0.00	BIF Obsidian Cliffs	4.4 ± 0.1	NM ±NM	—
35-JE-301	3	1	—	SCP 3	0.00	0.00	DEB Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-JE-301	5	1	—	SCP 5	0.00	0.00	DEB Obsidian Cliffs	4.2 ± 0.1	NM ±NM	—
35-JE-301	7	1	—	SCP 7	0.00	0.00	DEB Obsidian Cliffs	4.2 ± 0.1	NM ±NM	—
35-JE-301	10	1	—	SCP 10	0.00	0.00	DEB Obsidian Cliffs	4.1 ±NM	NM ±NM	—
35-JE-301	18	1	—	SHP 4	0.00	0.00	DEB Obsidian Cliffs	6.3 ± 0.1	NM ±NM	—
35-JE-302	25	1	—	SHP 12	0.00	-20.00	DEB Obsidian Cliffs	4.9 ± 0.1	NM ±NM	—
35-JE-302	27	1	—	TEU 1	0.00	0.00	DEB Obsidian Cliffs	4.9 ± 0.1	NM ±NM	—
35-JE-302	28	3	—	TEU 1	0.00	-10.00	DEB Obsidian Cliffs	5.3 ± 0.1	NM ±NM	—
35-JE-302	29	3	—	TEU 1	-10.00	-20.00	DEB Obsidian Cliffs	5.2 ± 0.1	NM ±NM	—
35-JE-302	32	2	A	TEU 1	-20.00	-30.00	DEB Obsidian Cliffs	4.4 ± 0.1	NM ±NM	—
35-JE-302	32	2	B	TEU 1	-20.00	-30.00	DEB Obsidian Cliffs	4.4 ± 0.1	NM ±NM	—
35-JE-302	33	3	—	TEU 1	-30.00	-40.00	DEB Obsidian Cliffs	4.8 ± 0.1	NM ±NM	—
35-JE-302	34	3	A	TEU 1	-30.00	-40.00	DEB Obsidian Cliffs	4.6 ± 0.1	NM ±NM	—
35-JE-302	34	3	B	TEU 1	-30.00	-40.00	DEB Obsidian Cliffs	3.5 ±NM	NM ±NM	—
35-JE-302	126	2	—	SHP 105	-20.00	-40.00	DEB Obsidian Cliffs	4.6 ± 0.1	NM ±NM	—
35-JE-302	178	2	A	SHP 116	-20.00	-40.00	DEB Quartz Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-JE-302	202	1	A	SHP 120	-60.00	-80.00	DEB Obsidian Cliffs	4.1 ± 0.2	NM ±NM	—
35-JE-302	307	3	—	EXU (290S/300E)	0.00	-10.00	DEB Obsidian Cliffs	4.9 ± 0.1	NM ±NM	—
35-JE-302	311	2	A	EXU (290S/300E)	-20.00	-30.00	DEB Obsidian Cliffs	4.7 ± 0.2	6.0 ± 0.1	2 hydration bands
35-JE-302	313	3	A	EXU (290S/300E)	-30.00	-40.00	DEB Obsidian Cliffs	4.8 ± 0.1	NM ±NM	—
35-JE-302	315	2	—	EXU (290S/300E)	-40.00	-50.00	DEB Obsidian Cliffs	4.8 ± 0.1	NM ±NM	—
35-JE-302	317	3	A	EXU (290S/300E)	-50.00	-60.00	DEB Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—
35-JE-302	317	3	B	EXU (290S/300E)	-50.00	-60.00	DEB Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-JE-302	323	1	—	EXU (290S/300E)	-80.00	-90.00	DEB Obsidian Cliffs	4.4 ± 0.1	NM ±NM	—
35-JE-302	324	1	—	EXU (290S/300E)	-80.00	-90.00	DEB Obsidian Cliffs	4.1 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-JE-302	331	2	—	EXU (290S/305E)	-10.00	-20.00	DEB	Obsidian Cliffs	4.6 ± 0.1	NM ± NM	—
35-JE-302	355	2	—	EXU (290S/308E)	-20.00	-30.00	DEB	Whitewater Ridge	4.8 ± NM	NM ± NM	—
35-JE-302	357	3	A	EXU (290S/308E)	-30.00	-40.00	DEB	Obsidian Cliffs	5.0 ± NM	NM ± NM	—
35-JE-302	357	3	B	EXU (290S/308E)	-30.00	-40.00	DEB	Obsidian Cliffs	4.9 ± 0.1	NM ± NM	—
35-JE-302	363	3	A	EXU (290S/308E)	-60.00	-70.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ± NM	—
35-JE-302	370	1	—	EXU (290S/308E)	-90.00	-100.00	DEB	Obsidian Cliffs	4.5 ± 0.1	NM ± NM	—
35-JE-302	386	1	—	EXU (290S/312E)	-50.00	-60.00	DEB	Obsidian Cliffs	4.9 ± 0.1	NM ± NM	Weathered
35-JE-302	393	2	—	EXU (290S/312E)	-90.00	-100.00	DEB	Obsidian Cliffs	3.6 ± NM	NM ± NM	—
35-JE-302	396	2	—	EXU (290S/312E)	-100.00	-110.00	DEB	Obsidian Cliffs	4.8 ± 0.1	NM ± NM	—
35-JE-302	407	2	A	EXU (292S/300E)	-40.00	-50.00	DEB	Obsidian Cliffs	5.7 ± 0.1	NM ± NM	—
35-JE-302	409	2	A	EXU (292S/300E)	-50.00	-60.00	DEB	Obsidian Cliffs	4.8 ± 0.2	NM ± NM	—
35-JE-302	411	3	A	EXU (292S/300E)	-60.00	-70.00	DEB	Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-JE-302	413	3	—	EXU (292S/300E)	-70.00	-80.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-302	425	3	A	EXU (293S/307E)	-10.00	-20.00	DEB	Obsidian Cliffs	4.8 ± 0.1	NM ± NM	—
35-JE-302	429	2	A	EXU (293S/307E)	-30.00	-40.00	DEB	Obsidian Cliffs	4.8 ± NM	NM ± NM	—
35-JE-302	429	2	B	EXU (293S/307E)	-30.00	-40.00	DEB	Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-JE-302	429	3	—	EXU (293S/307E)	-30.00	-40.00	PPT	Obsidian Cliffs	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-JE-302	431	2	—	EXU (293S/307E)	-40.00	-50.00	DEB	Obsidian Cliffs	4.8 ± 0.1	NM ± NM	—
35-JE-302	439	2	—	EXU (293S/307E)	-80.00	-90.00	DEB	Obsidian Cliffs	4.0 ± 0.1	NM ± NM	—
35-JE-302	445	2	—	EXU (293S/312E)	3.00	-10.00	DEB	Whitewater Ridge	2.6 ± 0.1	NM ± NM	—
35-JE-302	461	2	—	EXU (293S/312E)	-80.00	-91.00	DEB	Obsidian Cliffs	3.9 ± 0.1	NM ± NM	—
35-JE-302	467	2	—	EXU (295S/300E)	0.00	-10.00	UFT	Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-JE-302	469	2	A	EXU (295S/300E)	-10.00	-20.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-302	469	2	B	EXU (295S/300E)	-10.00	-20.00	DEB	Obsidian Cliffs	5.2 ± 0.1	NM ± NM	—
35-JE-302	469	3	—	EXU (295S/300E)	-10.00	-20.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-302	471	3	A	EXU (295S/300E)	-20.00	-30.00	DEB	Obsidian Cliffs	3.8 ± 0.1	NM ± NM	—
35-JE-302	473	3	—	EXU (295S/300E)	-30.00	-40.00	BIF	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-JE-302	474	2	A	EXU (295S/300E)	-30.00	-40.00	DEB	Obsidian Cliffs	3.5 ± 0.1	NM ± NM	—
35-JE-302	475	2	A	EXU (295S/300E)	-40.00	-50.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-302	477	2	A	EXU (295S/300E)	-50.00	-60.00	DEB	Obsidian Cliffs	4.1 ± 0.1	NM ± NM	—
35-JE-302	491	2	A	EXU (295S/305E)	-20.00	-30.00	DEB	Obsidian Cliffs	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-JE-302	494	2	A	EXU (295S/305E)	-30.00	-40.00	DEB	Obsidian Cliffs	4.8 ± NM	NM ± NM	—
35-JE-302	495	2	—	EXU (295S/305E)	-40.00	-50.00	DEB	Obsidian Cliffs	3.7 ± 0.1	NM ± NM	—
35-JE-302	497	2	—	EXU (295S/305E)	-50.00	-60.00	DEB	Obsidian Cliffs	4.8 ± NM	NM ± NM	—
35-JE-302	510	2	—	EXU (295S/307E)	-10.00	-20.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-302	511	3	A	EXU (295S/307E)	-20.00	-30.00	DEB	Obsidian Cliffs	4.6 ± 0.2	NM ± NM	—
35-JE-302	511	3	B	EXU (295S/307E)	-20.00	-30.00	DEB	Obsidian Cliffs	4.5 ± 0.1	NM ± NM	—
35-JE-302	518	1	A	EXU (295S/307E)	-50.00	-60.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-JE-302	530	2	A	EXU (300S/300E)	0.00	-10.00	DEB	Obsidian Cliffs	4.6 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-JE-302	533	2	—	EXU (300S/300E)	-20.00	-30.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-JE-302	538	1	A	EXU (300S/300E)	-40.00	-50.00	DEB	Obsidian Cliffs	4.4 ± NM	NM ± NM	—
35-JE-302	539	2	—	EXU (300S/300E)	-50.00	-60.00	DEB	Obsidian Cliffs	4.0 ± 0.1	NM ± NM	—
35-JE-302	543	2	—	EXU (300S/300E)	-70.00	-80.00	DEB	Obsidian Cliffs	4.8 ± NM	NM ± NM	—
35-JE-302	548	2	—	EXU (300S/300E)	-90.00	-100.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-302	574	2	A	EXU (300S/310E)	0.00	-10.00	DEB	Obsidian Cliffs	4.2 ± 0.1	NM ± NM	—
35-JE-302	599	3	A	EXU (301S/300E)	-10.00	-20.00	DEB	Obsidian Cliffs	5.1 ± 0.1	NM ± NM	—
35-JE-302	604	3	—	EXU (301S/300E)	-30.00	-40.00	DEB	Obsidian Cliffs	5.4 ± NM	NM ± NM	—
35-JE-302	607	3	A	EXU (301S/300E)	-50.00	-60.00	DEB	Obsidian Cliffs	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-JE-302	607	3	B	EXU (301S/300E)	-50.00	-60.00	DEB	Obsidian Cliffs	4.9 ± 0.1	NM ± NM	—
35-JE-302	609	2	A	EXU (301S/300E)	-60.00	-70.00	DEB	Obsidian Cliffs	3.8 ± 0.1	NM ± NM	—
35-JE-302	617	1	—	EXU (301S/300E)	-100.00	-110.00	PPT	Whitewater Ridge	4.9 ± 0.1	NM ± NM	—
35-JE-302	626	1	A	EXU (307S/300E)	-10.00	-20.00	DEB	Obsidian Cliffs	4.8 ± NM	NM ± NM	—
35-JE-302	627	1	A	EXU (307S/300E)	-20.00	-30.00	DEB	Obsidian Cliffs	4.9 ± 0.1	NM ± NM	—
35-JE-302	627	1	B	EXU (307S/300E)	-20.00	-30.00	DEB	Obsidian Cliffs	4.9 ± 0.1	6.1 ± 0.1	2 hydration bands
35-JE-302	629	1	A	EXU (307S/300E)	-30.00	-40.00	DEB	Obsidian Cliffs	4.4 ± NM	NM ± NM	—
35-JE-302	639	1	A	EXU (309S/300E)	0.00	-10.00	DEB	Obsidian Cliffs	4.8 ± NM	6.2 ± 0.1	2 hydration bands
35-JE-302	639	1	B	EXU (309S/300E)	0.00	-10.00	DEB	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-JE-302	640	1	A	EXU (309S/300E)	0.00	-10.00	DEB	Obsidian Cliffs	3.7 ± 0.1	NM ± NM	—
35-JE-302	644	1	—	EXU (309S/300E)	-20.00	-30.00	DEB	Obsidian Cliffs	5.0 ± 0.1	NM ± NM	—
35-JE-302	657	1	A	EXU (310S/305E)	-20.00	-30.00	DEB	Obsidian Cliffs	4.2 ± 0.1	NM ± NM	—
35-JE-302	658	1	A	EXU (310S/305E)	-20.00	-30.00	DEB	Obsidian Cliffs	4.4 ± 0.2	NM ± NM	—
35-JE-302	662	1	—	EXU (310S/305E)	-40.00	-50.00	DEB	Obsidian Cliffs	4.6 ± 0.1	NM ± NM	—
35-JE-302	674	1	A	EXU (311S/300E)	0.00	-10.00	DEB	Obsidian Cliffs	DH ± NM	NM ± NM	Diffuse hydration
35-JE-302	675	1	A	EXU (311S/300E)	-10.00	-20.00	DEB	Obsidian Cliffs	4.7 ± 0.2	NM ± NM	—
35-JE-302	675	1	B	EXU (311S/300E)	-10.00	-20.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-JE-302	676	1	A	EXU (311S/300E)	-10.00	-20.00	DEB	Little Bear Creek	5.0 ± 0.1	NM ± NM	—
35-JE-302	679	2	A	EXU (311S/300E)	-30.00	-40.00	DEB	Obsidian Cliffs	4.8 ± 0.1	NM ± NM	—
35-JE-304	1	1	—	SCP 1	0.00	0.00	UFT	Chickahominy?	NM ± NM	NM ± NM	No OH measurement
35-JE-304	2	1	—	SCP 2	0.00	0.00	BIF	Chickahominy?	NM ± NM	NM ± NM	No OH measurement
35-JE-304	25	1	—	SHP 11	-50.00	-60.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-JE-304	38	1	—	SHP 20	0.00	0.00	DEB	Chickahominy?	NM ± NM	NM ± NM	No OH measurement
35-JE-305	2	1	—	SCP 2	0.00	0.00	DEB	Not Obsidian	DH ± NM	NM ± NM	—
35-JE-305	10	1	—	SCP 10	0.00	0.00	BIF	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-KL-810	1	1	—	SCP 1	0.00	0.00	BIF	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-KL-810	2	1	—	SCP 2	0.00	0.00	PPT	Newberry Volcano	0.9 ± 0.1	NM ± NM	—
35-KL-810	5	1	—	SCP 5	0.00	0.00	PPT	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-810	6	1	—	SCP 7	0.00	0.00	BIF	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-810	20	1	—	STU 13	0.00	-10.00	UFT	Silver Lake/Sycan Marsh	0.8 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-810	52	1	—	STU 42	-10.00	-20.00	BIF	Spodue Mountain	3.4 ± 0.1	NM ± NM	—
35-KL-810	104	1	—	SON 12	0.00	-20.00	PPT	Spodue Mountain	1.0 ± 0.1	NM ± NM	—
35-KL-810	221	2	A	SON 45	0.00	-20.00	DEB	Silver Lake/Sycan Marsh	4.7 ± 0.1	NM ± NM	—
35-KL-810	221	2	B	SON 45	0.00	-20.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	Weathered
35-KL-810	221	2	C	SON 45	0.00	-20.00	DEB	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-810	221	2	D	SON 45	0.00	-20.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-KL-810	221	2	E	SON 45	0.00	-20.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-810	221	2	F	SON 45	0.00	-20.00	DEB	Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ± NM	—
35-KL-810	222	2	—	SON 45	-20.00	-40.00	BIF	Silver Lake/Sycan Marsh	3.0 ± NM	NM ± NM	—
35-KL-810	222	5	A	SON 45	-20.00	-40.00	PPT	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-810	222	5	B	SON 45	-20.00	-40.00	DEB	Cougar Mountain?	NM ± NM	NM ± NM	No OH measurement
35-KL-810	223	1	A	SON 45	-40.00	-60.00	DEB	Silver Lake/Sycan Marsh	4.0 ± 0.2	NM ± NM	—
35-KL-810	223	1	B	SON 45	-40.00	-60.00	DEB	Silver Lake/Sycan Marsh	4.5 ± 0.2	NM ± NM	—
35-KL-810	224	1	—	SON 45	-60.00	-80.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ± NM	—
35-KL-810	245	1	—	TEU 2	-10.00	-20.00	PPT	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	253	1	—	TEU 3	6.00	0.00	PPT	GF/LIW/RS	NVB ± NM	NM ± NM	No visible band
35-KL-810	253	2	—	TEU 3	6.00	0.00	UFT	Obsidian Cliffs	2.0 ± 0.1	NM ± NM	—
35-KL-810	273	1	A	TEU 6	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	2.4 ± 0.1	NM ± NM	—
35-KL-810	273	1	B	TEU 6	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	273	1	C	TEU 6	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	2.0 ± 0.1	NM ± NM	—
35-KL-810	273	1	D	TEU 6	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	0.9 ± 0.1	NM ± NM	—
35-KL-810	273	1	E	TEU 6	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	1.9 ± 0.1	NM ± NM	—
35-KL-810	273	1	F	TEU 6	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ± NM	—
35-KL-810	273	1	G	TEU 6	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-810	273	1	H	TEU 6	-10.00	-20.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-810	274	1	—	TEU 6	-20.00	-30.00	PPT	Silver Lake/Sycan Marsh	1.1 ± 0.1	NM ± NM	—
35-KL-810	274	2	A	TEU 6	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-810	274	2	B	TEU 6	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-810	274	2	C	TEU 6	-20.00	-30.00	DEB	Spodue Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-810	274	2	D	TEU 6	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-810	274	2	E	TEU 6	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-810	276	1	—	TEU 6	-40.00	-50.00	DEB	Spodue Mountain	1.0 ± NM	NM ± NM	—
35-KL-810	276	2	—	TEU 6	-40.00	-50.00	UFT	Silver Lake/Sycan Marsh	2.2 ± NM	NM ± NM	—
35-KL-810	276	3	—	TEU 6	-40.00	-50.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-810	278	1	—	TEU 6	-50.00	-60.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-KL-810	278	2	—	TEU 6	-50.00	-60.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-810	279	1	—	TEU 6	-60.00	-70.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-810	280	1	A	TEU 6	-70.00	-80.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-810	280	1	B	TEU 6	-70.00	-80.00	DEB	Spodue Mountain	NM ± NM	NM ± NM	No OH measurement

C.3-118

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-810	284	1	—	TEU 6	-110.00 -120.00	DEB	Silver Lake/Sycan Marsh	NM ±NM	NM ±NM	No OH measurement
35-KL-810	351	1	A	TEU 15	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-KL-810	351	1	B	TEU 15	0.00 -10.00	DEB	Spodue Mountain	NM ±NM	NM ±NM	No OH measurement
35-KL-810	351	1	C	TEU 15	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	1.2 ± 0.1	NM ±NM	—
35-KL-810	351	1	D	TEU 15	0.00 -10.00	DEB	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-KL-810	351	1	E	TEU 15	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	2.7 ± 0.1	NM ±NM	—
35-KL-810	351	1	F	TEU 15	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	3.8 ± 0.1	NM ±NM	—
35-KL-810	351	3	—	TEU 15	0.00 -10.00	BIF	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-KL-810	352	1	—	TEU 15	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ±NM	—
35-KL-810	353	1	—	TEU 15	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	4.2 ± 0.1	NM ±NM	—
35-KL-810	354	1	A	TEU 15	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ±NM	—
35-KL-810	354	1	B	TEU 15	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	4.2 ± 0.1	NM ±NM	—
35-KL-810	354	4	—	TEU 15	-30.00 -40.00	BIF	Silver Lake/Sycan Marsh	3.4 ± 0.1	3.7 ± 0.1	3 hydration bands; Rim 3 = 3.6 microns
35-KL-810	354	5	—	TEU 15	-30.00 -40.00	BIF	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-KL-810	355	2	—	TEU 15	-40.00 -50.00	BIF	Silver Lake/Sycan Marsh	2.2 ± 0.1	1.7 ± 0.1	2 hydration bands
35-KL-810	359	2	—	TEU 16	0.00 -10.00	BIF	Spodue Mountain	NVB ±NM	NM ±NM	No visible band
35-KL-810	359	3	—	TEU 16	0.00 -10.00	BIF	Silver Lake/Sycan Marsh	1.0 ± 0.1	NM ±NM	—
35-KL-810	360	1	A	TEU 16	-10.00 -20.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-KL-810	360	1	B	TEU 16	-10.00 -20.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	360	1	C	TEU 16	-10.00 -20.00	DEB	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-KL-810	360	1	D	TEU 16	-10.00 -20.00	DEB	Newberry Volcano	1.7 ±NM	NM ±NM	Weathered
35-KL-810	360	4	—	TEU 16	-10.00 -20.00	BIF	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-KL-810	360	5	—	TEU 16	-10.00 -20.00	PPT	Silver Lake/Sycan Marsh	4.0 ± 0.1	NM ±NM	—
35-KL-810	361	1	—	TEU 16	-20.00 -30.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	Weathered
35-KL-810	361	5	—	TEU 16	-20.00 -30.00	BIF	Silver Lake/Sycan Marsh	3.7 ± 0.1	NM ±NM	—
35-KL-810	362	4	—	TEU 16	-30.00 -40.00	BIF	Spodue Mountain	3.4 ± 0.1	NM ±NM	—
35-KL-810	503	1	—	SHP 1 (490S/525E)	-60.00 -80.00	BIF	Spodue Mountain	3.5 ±NM	NM ±NM	—
35-KL-810	591	1	—	SHP 18 (471S/520E)	-20.00 -40.00	BIF	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	596	1	A	SHP 19 (475S/520E)	0.00 -20.00	DEB	Deer Creek/Burn Butte	2.5 ± 0.2	NM ±NM	—
35-KL-810	600	1	—	SHP 20 (481S/520E)	0.00 -20.00	PPT	Silver Lake/Sycan Marsh	1.9 ± 0.1	NM ±NM	—
35-KL-810	643	1	A	SHP 29 (470S/515E)	0.00 -20.00	DEB	Silver Lake/Sycan Marsh	2.5 ±NM	NM ±NM	—
35-KL-810	795	1	—	EXU (450S/516E)	10.00 0.00	UFT	Spodue Mountain	1.0 ±NM	NM ±NM	—
35-KL-810	796	1	A	EXU (450S/516E)	10.00 0.00	DEB	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-KL-810	812	1	A	EXU (465S/525E)	4.00 -9.00	DEB	Silver Lake/Sycan Marsh	2.0 ± 0.1	NM ±NM	—
35-KL-810	819	1	A	EXU (466S/521E)	2.00 -13.00	DEB	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ±NM	—
35-KL-810	819	1	B	EXU (466S/521E)	2.00 -13.00	DEB	Silver Lake/Sycan Marsh	2.2 ± 0.1	NM ±NM	—
35-KL-810	819	1	C	EXU (466S/521E)	2.00 -13.00	DEB	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-KL-810	819	1	D	EXU (466S/521E)	2.00 -13.00	DEB	Silver Lake/Sycan Marsh	2.9 ± 0.2	NM ±NM	—
35-KL-810	819	1	E	EXU (466S/521E)	2.00 -13.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-810	819	1	F	EXU (466S/521E)	2.00 -13.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	820	1	A	EXU (466S/521E)	-13.00 -23.00	DEB	Silver Lake/Sycan Marsh	5.0 ± 0.1	NM ±NM	—
35-KL-810	820	1	B	EXU (466S/521E)	-13.00 -23.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	820	1	C	EXU (466S/521E)	-13.00 -23.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	820	1	D	EXU (466S/521E)	-13.00 -23.00	DEB	Silver Lake/Sycan Marsh	4.4 ± 0.1	NM ±NM	—
35-KL-810	820	1	E	EXU (466S/521E)	-13.00 -23.00	DEB	Silver Lake/Sycan Marsh	4.2 ±NM	NM ±NM	—
35-KL-810	820	1	F	EXU (466S/521E)	-13.00 -23.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	821	1	A	EXU (466S/521E)	-13.00 -23.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	822	1	A	EXU (466S/521E)	-23.00 -33.00	DEB	Silver Lake/Sycan Marsh	2.6 ±NM	NM ±NM	—
35-KL-810	822	1	B	EXU (466S/521E)	-23.00 -33.00	DEB	Silver Lake/Sycan Marsh	3.3 ± 0.1	NM ±NM	—
35-KL-810	822	1	C	EXU (466S/521E)	-23.00 -33.00	DEB	Unknown B	2.6 ± 0.1	NM ±NM	—
35-KL-810	823	1	A	EXU (466S/521E)	-33.00 -43.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.2	NM ±NM	—
35-KL-810	824	1	A	EXU (466S/522E)	2.00 -5.00	DEB	Silver Lake/Sycan Marsh	2.7 ± 0.1	NM ±NM	—
35-KL-810	825	1	A	EXU (466S/522E)	-5.00 -15.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	826	1	A	EXU (466S/522E)	-15.00 -25.00	DEB	Silver Lake/Sycan Marsh	5.7 ± 0.1	NM ±NM	—
35-KL-810	826	1	B	EXU (466S/522E)	-15.00 -25.00	DEB	Silver Lake/Sycan Marsh	3.4 ± 0.1	NM ±NM	—
35-KL-810	827	1	A	EXU (466S/522E)	-15.00 -25.00	DEB	Silver Lake/Sycan Marsh	3.5 ± 0.1	NM ±NM	—
35-KL-810	829	1	A	EXU (466S/522E)	-25.00 -35.00	DEB	Silver Lake/Sycan Marsh	3.6 ±NM	NM ±NM	—
35-KL-810	829	1	B	EXU (466S/522E)	-25.00 -35.00	DEB	Silver Lake/Sycan Marsh	3.6 ±NM	NM ±NM	—
35-KL-810	833	1	A	EXU (466S/524E)	-2.00 -12.00	DEB	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-KL-810	833	1	B	EXU (466S/524E)	-2.00 -12.00	DEB	Silver Lake/Sycan Marsh	3.7 ± 0.1	NM ±NM	—
35-KL-810	839	1	A	EXU (467S/521E)	5.00 -9.00	DEB	Silver Lake/Sycan Marsh	2.3 ± 0.1	NM ±NM	—
35-KL-810	839	1	B	EXU (467S/521E)	5.00 -9.00	DEB	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-KL-810	839	1	C	EXU (467S/521E)	5.00 -9.00	DEB	Silver Lake/Sycan Marsh	2.1 ± 0.1	NM ±NM	—
35-KL-810	839	1	D	EXU (467S/521E)	5.00 -9.00	DEB	Unknown C	NM ±NM	NM ±NM	No OH measurement; Basaltic glass?
35-KL-810	839	1	E	EXU (467S/521E)	5.00 -9.00	DEB	Deer Creek/Burn Butte	3.4 ± 0.2	NM ±NM	—
35-KL-810	841	1	A	EXU (467S/521E)	-9.00 -19.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	841	1	B	EXU (467S/521E)	-9.00 -19.00	DEB	Silver Lake/Sycan Marsh	3.5 ± 0.1	NM ±NM	—
35-KL-810	841	1	C	EXU (467S/521E)	-9.00 -19.00	DEB	Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ±NM	—
35-KL-810	841	1	D	EXU (467S/521E)	-9.00 -19.00	DEB	Silver Lake/Sycan Marsh	4.4 ± 0.1	NM ±NM	—
35-KL-810	841	1	E	EXU (467S/521E)	-9.00 -19.00	DEB	Silver Lake/Sycan Marsh	4.7 ± 0.1	NM ±NM	—
35-KL-810	847	1	A	EXU (467S/522E)	2.00 -4.00	DEB	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band
35-KL-810	847	1	B	EXU (467S/522E)	2.00 -4.00	DEB	Silver Lake/Sycan Marsh	5.3 ±NM	NM ±NM	—
35-KL-810	847	1	C	EXU (467S/522E)	2.00 -4.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	847	1	D	EXU (467S/522E)	2.00 -4.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	848	1	—	EXU (467S/522E)	-4.00 -14.00	UFT	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-KL-810	849	1	A	EXU (467S/522E)	-14.00 -24.00	DEB	Silver Lake/Sycan Marsh	3.7 ± 0.1	NM ±NM	—
35-KL-810	850	1	A	EXU (467S/522E)	-24.00 -34.00	DEB	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ±NM	—
35-KL-810	853	1	A	EXU (467S/522E)	-24.00 -34.00	DEB	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-810	853	1	B	EXU (467S/522E)	-24.00 -34.00	DEB	Newberry Volcano	2.6 ± NM	NM ± NM	—
35-KL-810	853	1	C	EXU (467S/522E)	-24.00 -34.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-KL-810	855	1	—	EXU (467S/522E)	-34.00 -44.00	BIF	Cougar Mountain	2.6 ± 0.1	NM ± NM	—
35-KL-810	855	2	A	EXU (467S/522E)	-34.00 -44.00	DEB	Silver Lake/Sycan Marsh	3.5 ± 0.1	NM ± NM	—
35-KL-810	866	1	—	EXU (467S/523E)	-14.00 -24.00	BIF	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ± NM	—
35-KL-810	867	1	A	EXU (467S/523E)	-14.00 -24.00	DEB	Silver Lake/Sycan Marsh	1.6 ± 0.2	NM ± NM	—
35-KL-810	869	1	A	EXU (467S/523E)	-24.00 -34.00	DEB	Silver Lake/Sycan Marsh	3.9 ± 0.1	NM ± NM	—
35-KL-810	872	1	A	EXU (467S/523E)	-44.00 -54.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	873	2	A	EXU (467S/523E)	-44.00 -54.00	DEB	Unknown B	2.2 ± 0.1	NM ± NM	—
35-KL-810	877	1	A	EXU (468S/518E)	-4.00 -14.00	DEB	Silver Lake/Sycan Marsh	3.8 ± 0.1	NM ± NM	—
35-KL-810	877	1	B	EXU (468S/518E)	-4.00 -14.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ± NM	—
35-KL-810	878	1	A	EXU (468S/518E)	-14.00 -24.00	DEB	Silver Lake/Sycan Marsh	6.9 ± NM	NM ± NM	—
35-KL-810	879	1	A	EXU (468S/518E)	-24.00 -34.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-810	879	1	B	EXU (468S/518E)	-24.00 -34.00	DEB	Silver Lake/Sycan Marsh	4.1 ± NM	NM ± NM	—
35-KL-810	879	1	C	EXU (468S/518E)	-24.00 -34.00	DEB	Silver Lake/Sycan Marsh	6.1 ± 0.1	NM ± NM	—
35-KL-810	880	1	A	EXU (468S/518E)	-34.00 -44.00	DEB	Silver Lake/Sycan Marsh	3.6 ± 0.1	NM ± NM	—
35-KL-810	882	1	A	EXU (468S/521E)	4.00 -6.00	DEB	Silver Lake/Sycan Marsh	3.7 ± 0.1	NM ± NM	—
35-KL-810	882	1	B	EXU (468S/521E)	4.00 -6.00	DEB	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ± NM	—
35-KL-810	882	1	C	EXU (468S/521E)	4.00 -6.00	DEB	Obsidian Cliffs	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-810	882	1	D	EXU (468S/521E)	4.00 -6.00	DEB	Silver Lake/Sycan Marsh	3.1 ± 0.1	NM ± NM	—
35-KL-810	882	1	E	EXU (468S/521E)	4.00 -6.00	DEB	Silver Lake/Sycan Marsh	2.4 ± 0.1	NM ± NM	—
35-KL-810	883	1	A	EXU (468S/521E)	-6.00 -16.00	DEB	Silver Lake/Sycan Marsh	3.1 ± 0.1	NM ± NM	—
35-KL-810	883	1	B	EXU (468S/521E)	-6.00 -16.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	883	1	C	EXU (468S/521E)	-6.00 -16.00	DEB	Silver Lake/Sycan Marsh	2.2 ± 0.1	NM ± NM	—
35-KL-810	884	1	—	EXU (468S/521E)	-16.00 -26.00	BIF	Silver Lake/Sycan Marsh	2.1 ± 0.1	NM ± NM	—
35-KL-810	884	2	A	EXU (468S/521E)	-16.00 -26.00	DEB	Silver Lake/Sycan Marsh	4.7 ± 0.2	NM ± NM	—
35-KL-810	884	2	B	EXU (468S/521E)	-16.00 -26.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	884	2	C	EXU (468S/521E)	-16.00 -26.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	884	2	D	EXU (468S/521E)	-16.00 -26.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	886	1	A	EXU (469S/517E)	2.00 -7.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	886	1	B	EXU (469S/517E)	2.00 -7.00	DEB	Silver Lake/Sycan Marsh	4.8 ± NM	NM ± NM	—
35-KL-810	888	1	A	EXU (469S/517E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	888	1	B	EXU (469S/517E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-810	888	1	C	EXU (469S/517E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	4.2 ± NM	NM ± NM	—
35-KL-810	888	1	D	EXU (469S/517E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	1.6 ± 0.1	NM ± NM	Weathered
35-KL-810	889	1	—	EXU (469S/517E)	-7.00 -17.00	PPT	Obsidian Cliffs	1.8 ± NM	NM ± NM	—
35-KL-810	889	2	A	EXU (469S/517E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-810	889	2	B	EXU (469S/517E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	3.8 ± 0.1	NM ± NM	—
35-KL-810	890	1	A	EXU (469S/517E)	-17.00 -27.00	DEB	Silver Lake/Sycan Marsh	4.2 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-810	890	1	B	EXU (469S/517E)	-17.00 -27.00	DEB	Silver Lake/Sycan Marsh	4.5 ± 0.1	NM ± NM	—
35-KL-810	892	1	A	EXU (469S/517E)	-27.00 -37.00	DEB	Silver Lake/Sycan Marsh	2.8 ± 0.1	NM ± NM	—
35-KL-810	892	1	B	EXU (469S/517E)	-27.00 -37.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	894	1	A	EXU (469S/517E)	-37.00 -47.00	DEB	Silver Lake/Sycan Marsh	4.2 ± NM	NM ± NM	—
35-KL-810	894	1	B	EXU (469S/517E)	-37.00 -47.00	DEB	Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ± NM	—
35-KL-810	894	1	C	EXU (469S/517E)	-37.00 -47.00	DEB	Silver Lake/Sycan Marsh	3.3 ± 0.1	NM ± NM	—
35-KL-810	897	1	A	EXU (469S/518E)	-8.00 -18.00	DEB	Silver Lake/Sycan Marsh	4.5 ± 0.1	NM ± NM	—
35-KL-810	903	1	A	EXU (470S/516E)	-23.00 -33.00	DEB	Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ± NM	—
35-KL-810	905	1	A	EXU (470S/517E)	8.00 0.00	DEB	Unknown C	DH ± NM	NM ± NM	Weathered; Basaltic glass?
35-KL-810	906	1	A	EXU (470S/517E)	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	1.0 ± NM	NM ± NM	—
35-KL-810	907	1	A	EXU (470S/517E)	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	3.4 ± 0.1	NM ± NM	—
35-KL-810	909	1	A	EXU (470S/520E)	13.00 -2.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	910	1	A	EXU (470S/520E)	13.00 -2.00	DEB	Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ± NM	Weathered
35-KL-810	910	1	B	EXU (470S/520E)	13.00 -2.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	911	1	A	EXU (470S/520E)	-2.00 -12.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	911	1	B	EXU (470S/520E)	-2.00 -12.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	Weathered
35-KL-810	912	1	A	EXU (470S/520E)	-2.00 -12.00	DEB	Silver Lake/Sycan Marsh	1.7 ± NM	NM ± NM	Weathered
35-KL-810	912	1	B	EXU (470S/520E)	-2.00 -12.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	913	1	A	EXU (470S/520E)	-12.00 -22.00	DEB	Silver Lake/Sycan Marsh	3.2 ± 0.1	NM ± NM	—
35-KL-810	913	1	B	EXU (470S/520E)	-12.00 -22.00	DEB	Silver Lake/Sycan Marsh	1.1 ± 0.1	3.1 ± 0.1	—
35-KL-810	914	1	A	EXU (470S/520E)	-12.00 -22.00	DEB	Silver Lake/Sycan Marsh	2.9 ± 0.1	NM ± NM	—
35-KL-810	914	2	—	EXU (470S/520E)	-12.00 -22.00	PPT	Newberry Volcano	4.2 ± 0.1	NM ± NM	—
35-KL-810	915	1	A	EXU (470S/520E)	-22.00 -32.00	DEB	Silver Lake/Sycan Marsh	1.2 ± NM	NM ± NM	—
35-KL-810	915	1	B	EXU (470S/520E)	-22.00 -32.00	DEB	Silver Lake/Sycan Marsh	2.4 ± NM	NM ± NM	—
35-KL-810	915	1	C	EXU (470S/520E)	-22.00 -32.00	DEB	Silver Lake/Sycan Marsh	3.6 ± NM	NM ± NM	—
35-KL-810	915	2	—	EXU (470S/520E)	-22.00 -32.00	BIF	Silver Lake/Sycan Marsh	4.6 ± 0.2	NM ± NM	—
35-KL-810	916	1	A	EXU (470S/520E)	-22.00 -32.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ± NM	—
35-KL-810	917	1	A	EXU (470S/520E)	-32.00 -42.00	DEB	Silver Lake/Sycan Marsh	3.4 ± 0.1	NM ± NM	—
35-KL-810	917	1	B	EXU (470S/520E)	-32.00 -42.00	DEB	Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ± NM	—
35-KL-810	917	1	C	EXU (470S/520E)	-32.00 -42.00	DEB	Silver Lake/Sycan Marsh	3.7 ± 0.1	NM ± NM	—
35-KL-810	921	1	A	EXU (470S/521E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	5.8 ± 0.1	NM ± NM	—
35-KL-810	921	1	B	EXU (470S/521E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	2.1 ± NM	NM ± NM	—
35-KL-810	921	1	C	EXU (470S/521E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	1.2 ± NM	NM ± NM	—
35-KL-810	921	1	D	EXU (470S/521E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	3.4 ± 0.1	NM ± NM	—
35-KL-810	921	1	E	EXU (470S/521E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	2.9 ± 0.1	NM ± NM	—
35-KL-810	921	1	F	EXU (470S/521E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	921	1	G	EXU (470S/521E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	4.7 ± 0.1	NM ± NM	—
35-KL-810	931	1	A	EXU (470S/521E)	-33.00 -43.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ± NM	—
35-KL-810	931	1	B	EXU (470S/521E)	-33.00 -43.00	DEB	Silver Lake/Sycan Marsh	4.5 ± 0.2	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-810	932	1	A	EXU (471S/520E)	3.00 -12.00	DEB	Silver Lake/Sycan Marsh	2.6 ±NM	NM ±NM	—
35-KL-810	934	2	A	EXU (471S/520E)	-12.00 -22.00	DEB	Silver Lake/Sycan Marsh	2.7 ± 0.1	NM ±NM	—
35-KL-810	937	1	A	EXU (471S/520E)	-22.00 -32.00	DEB	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ±NM	—
35-KL-810	937	1	B	EXU (471S/520E)	-22.00 -32.00	DEB	Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ±NM	—
35-KL-810	940	1	A	EXU (471S/520E)	-32.00 -42.00	DEB	Silver Lake/Sycan Marsh	3.4 ± 0.2	NM ±NM	—
35-KL-810	942	1	A	EXU (471S/521E)	4.00 -9.00	DEB	Silver Lake/Sycan Marsh	2.4 ±NM	NM ±NM	—
35-KL-810	942	1	B	EXU (471S/521E)	4.00 -9.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	943	1	A	EXU (471S/521E)	-9.00 -19.00	DEB	Silver Lake/Sycan Marsh	1.9 ±NM	NM ±NM	—
35-KL-810	943	1	B	EXU (471S/521E)	-9.00 -19.00	DEB	Silver Lake/Sycan Marsh	3.1 ± 0.1	NM ±NM	—
35-KL-810	943	1	C	EXU (471S/521E)	-9.00 -19.00	DEB	Silver Lake/Sycan Marsh	3.1 ±NM	NM ±NM	—
35-KL-810	944	1	A	EXU (471S/521E)	-19.00 -29.00	DEB	Silver Lake/Sycan Marsh	3.1 ±NM	NM ±NM	—
35-KL-810	944	1	B	EXU (471S/521E)	-19.00 -29.00	DEB	Silver Lake/Sycan Marsh	4.5 ± 0.2	NM ±NM	—
35-KL-810	944	1	C	EXU (471S/521E)	-19.00 -29.00	DEB	Silver Lake/Sycan Marsh	4.7 ± 0.1	NM ±NM	—
35-KL-810	949	1	A	EXU (471S/521E)	-29.00 -39.00	DEB	Silver Lake/Sycan Marsh	3.0 ± 0.4	NM ±NM	—
35-KL-810	954	1	A	EXU (475S/524E)	0.00 -12.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Weathered
35-KL-810	955	1	A	EXU (475S/524E)	-12.00 -22.00	DEB	Silver Lake/Sycan Marsh	1.6 ± 0.1	NM ±NM	—
35-KL-810	956	1	A	EXU (475S/524E)	-12.00 -22.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	957	1	—	EXU (475S/524E)	-22.00 -22.00	BIF	Silver Lake/Sycan Marsh	3.2 ± 0.1	NM ±NM	—
35-KL-810	963	2	—	EXU (476S/513E)	-10.00 -20.00	BIF	Spodue Mountain	2.0 ± 0.1	NM ±NM	—
35-KL-810	966	1	A	EXU (480S/520E)	3.00 -12.00	DEB	Silver Lake/Sycan Marsh	3.9 ± 0.1	NM ±NM	—
35-KL-810	966	1	B	EXU (480S/520E)	3.00 -12.00	DEB	Silver Lake/Sycan Marsh	3.5 ± 0.1	NM ±NM	—
35-KL-810	966	1	C	EXU (480S/520E)	3.00 -12.00	DEB	Silver Lake/Sycan Marsh	3.6 ± 0.1	NM ±NM	—
35-KL-810	966	1	D	EXU (480S/520E)	3.00 -12.00	DEB	Silver Lake/Sycan Marsh	3.9 ± 0.1	NM ±NM	—
35-KL-810	967	1	A	EXU (480S/520E)	3.00 -12.00	DEB	Silver Lake/Sycan Marsh	2.2 ± 0.1	NM ±NM	—
35-KL-810	968	1	A	EXU (480S/520E)	-12.00 -22.00	DEB	Silver Lake/Sycan Marsh	2.9 ±NM	NM ±NM	—
35-KL-810	970	2	—	EXU (480S/520E)	-22.00 -32.00	BIF	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-KL-810	971	1	A	EXU (480S/520E)	-22.00 -32.00	DEB	Silver Lake/Sycan Marsh	3.4 ± 0.1	NM ±NM	—
35-KL-810	972	1	A	EXU (480S/520E)	-32.00 -42.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ±NM	—
35-KL-810	973	2	—	EXU (480S/520E)	-32.00 -42.00	BIF	Spodue Mountain	DH ±NM	NM ±NM	Weathered
35-KL-810	976	1	A	EXU (481S/519E)	5.00 -7.00	DEB	Silver Lake/Sycan Marsh	2.5 ±NM	NM ±NM	—
35-KL-810	976	1	B	EXU (481S/519E)	5.00 -7.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	977	1	A	EXU (481S/519E)	-7.00 -17.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ±NM	—
35-KL-810	978	1	A	EXU (481S/519E)	-17.00 -27.00	DEB	Silver Lake/Sycan Marsh	3.9 ± 0.1	NM ±NM	—
35-KL-810	983	1	A	EXU (484S/520E)	0.00 -13.00	DEB	Silver Lake/Sycan Marsh	4.2 ± 0.1	NM ±NM	—
35-KL-810	985	1	A	EXU (484S/520E)	-13.00 -23.00	DEB	Silver Lake/Sycan Marsh	3.7 ± 0.1	NM ±NM	—
35-KL-810	987	1	—	EXU (484S/520E)	-20.00 -20.00	BIF	Spodue Mountain	1.2 ± 0.1	NM ±NM	—
35-KL-810	990	1	A	EXU (484S/520E)	-23.00 -33.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	993	1	A	EXU (484S/520E)	-33.00 -43.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ±NM	—
35-KL-810	995	1	A	EXU (487S/524E)	4.00 -4.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered



### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-810	995	1	B	EXU (487S/524E)	4.00	-4.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	—
35-KL-810	996	1	—	EXU (487S/524E)	-3.00	-3.00	BIF	Silver Lake/Sycan Marsh	4.9 ± 0.1	NM ±NM	—
35-KL-810	997	1	A	EXU (487S/524E)	-4.00	-14.00	DEB	Silver Lake/Sycan Marsh	1.2 ± 0.1	NM ±NM	Weathered
35-KL-810	997	1	B	EXU (487S/524E)	-4.00	-14.00	DEB	Spodue Mountain	3.9 ± 0.1	NM ±NM	—
35-KL-810	998	1	A	EXU (487S/524E)	-14.00	-24.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ±NM	—
35-KL-810	998	1	B	EXU (487S/524E)	-14.00	-24.00	DEB	Silver Lake/Sycan Marsh	1.3 ± 0.1	NM ±NM	—
35-KL-810	998	1	C	EXU (487S/524E)	-14.00	-24.00	DEB	Silver Lake/Sycan Marsh	4.0 ± 0.1	NM ±NM	—
35-KL-810	998	1	D	EXU (487S/524E)	-14.00	-24.00	DEB	Silver Lake/Sycan Marsh	2.3 ±NM	NM ±NM	—
35-KL-810	998	1	E	EXU (487S/524E)	-14.00	-24.00	DEB	Spodue Mountain	3.6 ±NM	NM ±NM	—
35-KL-810	998	1	F	EXU (487S/524E)	-14.00	-24.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	998	3	—	EXU (487S/524E)	-14.00	-24.00	PFT	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	998	4	—	EXU (487S/524E)	-14.00	-24.00	BIF	Spodue Mountain	3.6 ±NM	NM ±NM	—
35-KL-810	998	5	—	EXU (487S/524E)	-14.00	-24.00	BIF	Beatys Butte	2.6 ± 0.1	NM ±NM	—
35-KL-810	999	1	A	EXU (487S/524E)	-24.00	-34.00	DEB	Silver Lake/Sycan Marsh	4.0 ± 0.1	NM ±NM	—
35-KL-810	999	1	B	EXU (487S/524E)	-24.00	-34.00	DEB	Spodue Mountain	3.3 ± 0.1	NM ±NM	—
35-KL-810	999	2	—	EXU (487S/524E)	-24.00	-34.00	BIF	Silver Lake/Sycan Marsh	4.5 ±NM	NM ±NM	—
35-KL-810	999	3	—	EXU (487S/524E)	-24.00	-34.00	BIF	Silver Lake/Sycan Marsh	3.4 ± 0.1	3.6 ± 0.1	Joins with 1071-2; Rim 2 = break
35-KL-810	999	4	—	EXU (487S/524E)	-24.00	-34.00	BIF	Silver Lake/Sycan Marsh	5.0 ± 0.1	NM ±NM	—
35-KL-810	1000	1	A	EXU (487S/524E)	-34.00	-44.00	DEB	Silver Lake/Sycan Marsh	4.0 ± 0.1	NM ±NM	—
35-KL-810	1002	1	A	EXU (487S/525E)	-7.00	-17.00	DEB	Silver Lake/Sycan Marsh	1.9 ±NM	NM ±NM	—
35-KL-810	1002	1	B	EXU (487S/525E)	-7.00	-17.00	DEB	Spodue Mountain	4.8 ± 0.1	NM ±NM	—
35-KL-810	1003	1	A	EXU (487S/525E)	-17.00	-27.00	DEB	Spodue Mountain	1.6 ±NM	NM ±NM	—
35-KL-810	1003	1	B	EXU (487S/525E)	-17.00	-27.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1003	1	C	EXU (487S/525E)	-17.00	-27.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1003	1	D	EXU (487S/525E)	-17.00	-27.00	DEB	Cougar Mountain	4.2 ±NM	NM ±NM	—
35-KL-810	1003	2	—	EXU (487S/525E)	-17.00	-27.00	BIF	Silver Lake/Sycan Marsh	4.4 ± 0.1	NM ±NM	—
35-KL-810	1004	1	A	EXU (487S/525E)	-27.00	-37.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ±NM	—
35-KL-810	1015	1	A	EXU (488S/523E)	0.00	-7.00	DEB	Silver Lake/Sycan Marsh	1.2 ±NM	NM ±NM	—
35-KL-810	1016	1	A	EXU (488S/523E)	-7.00	-17.00	DEB	Silver Lake/Sycan Marsh	3.6 ± 0.1	NM ±NM	—
35-KL-810	1016	1	B	EXU (488S/523E)	-7.00	-17.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ±NM	—
35-KL-810	1016	1	C	EXU (488S/523E)	-7.00	-17.00	DEB	Spodue Mountain	3.5 ± 0.2	NM ±NM	—
35-KL-810	1016	1	D	EXU (488S/523E)	-7.00	-17.00	DEB	Silver Lake/Sycan Marsh	1.6 ± 0.1	NM ±NM	—
35-KL-810	1016	1	E	EXU (488S/523E)	-7.00	-17.00	DEB	Silver Lake/Sycan Marsh	1.7 ± 0.1	NM ±NM	—
35-KL-810	1017	1	A	EXU (488S/523E)	-17.00	-27.00	DEB	Silver Lake/Sycan Marsh	4.2 ± 0.1	NM ±NM	—
35-KL-810	1017	1	B	EXU (488S/523E)	-17.00	-27.00	DEB	Silver Lake/Sycan Marsh	4.9 ± 0.1	NM ±NM	—
35-KL-810	1017	2	—	EXU (488S/523E)	-17.00	-27.00	BIF	Spodue Mountain	2.5 ± 0.1	NM ±NM	—
35-KL-810	1018	2	—	EXU (488S/523E)	-27.00	-37.00	BIF	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-KL-810	1019	1	A	EXU (488S/524E)	4.00	-8.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1020	1	A	EXU (488S/524E)	-8.00	-18.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-KL-810	1020	1	B	EXU (488S/524E)	-8.00	-18.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1021	1	A	EXU (488S/524E)	-18.00	-28.00	DEB	Silver Lake/Sycan Marsh	3.8 ± 0.1	NM ±NM	—
35-KL-810	1021	1	B	EXU (488S/524E)	-18.00	-28.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1021	1	C	EXU (488S/524E)	-18.00	-28.00	DEB	Spodue Mountain	4.4 ±NM	NM ±NM	Weathered
35-KL-810	1021	1	D	EXU (488S/524E)	-18.00	-28.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1022	1	—	EXU (488S/524E)	-22.00	-22.00	BIF	Spodue Mountain	3.2 ± 0.1	NM ±NM	—
35-KL-810	1023	1	A	EXU (488S/524E)	-28.00	-38.00	DEB	Silver Lake/Sycan Marsh	3.3 ± 0.1	NM ±NM	Weathered
35-KL-810	1025	1	A	EXU (488S/525E)	4.00	-7.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1025	1	B	EXU (488S/525E)	4.00	-7.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Weathered
35-KL-810	1027	1	A	EXU (488S/525E)	-7.00	-17.00	DEB	Silver Lake/Sycan Marsh	4.2 ±NM	NM ±NM	Weathered
35-KL-810	1029	2	—	EXU (488S/525E)	-17.00	-27.00	BIF	Spodue Mountain	3.6 ±NM	NM ±NM	—
35-KL-810	1030	1	A	EXU (488S/525E)	-27.00	-37.00	DEB	Silver Lake/Sycan Marsh	5.0 ± 0.1	NM ±NM	—
35-KL-810	1030	1	B	EXU (488S/525E)	-27.00	-37.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration
35-KL-810	1032	1	—	EXU (488S/525E)	-35.00	-35.00	PPT	Spodue Mountain	3.5 ± 0.1	NM ±NM	—
35-KL-810	1035	1	A	EXU (488S/525E)	-47.00	-57.00	DEB	Spodue Mountain	3.4 ± 0.1	NM ±NM	—
35-KL-810	1035	1	B	EXU (488S/525E)	-47.00	-57.00	DEB	Silver Lake/Sycan Marsh	4.9 ± 0.1	NM ±NM	Weathered
35-KL-810	1061	1	A	EXU (489S/522E)	3.00	-6.00	DEB	Silver Lake/Sycan Marsh	4.8 ±NM	NM ±NM	—
35-KL-810	1061	1	B	EXU (489S/522E)	3.00	-6.00	DEB	Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ±NM	—
35-KL-810	1062	1	A	EXU (489S/522E)	-6.00	-16.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ±NM	—
35-KL-810	1062	2	—	EXU (489S/522E)	-6.00	-16.00	BIF	Spodue Mountain	1.4 ± 0.1	NM ±NM	—
35-KL-810	1062	3	—	EXU (489S/522E)	-6.00	-16.00	PPT	Silver Lake/Sycan Marsh	3.2 ±NM	NM ±NM	—
35-KL-810	1063	1	A	EXU (489S/522E)	-16.00	-26.00	DEB	Spodue Mountain	2.5 ±NM	NM ±NM	—
35-KL-810	1063	1	B	EXU (489S/522E)	-16.00	-26.00	DEB	Spodue Mountain	3.5 ± 0.1	NM ±NM	Weathered
35-KL-810	1063	1	C	EXU (489S/522E)	-16.00	-26.00	DEB	Silver Lake/Sycan Marsh	3.4 ± 0.2	NM ±NM	—
35-KL-810	1070	1	A	EXU (489S/523E)	-18.00	-28.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1071	1	A	EXU (489S/523E)	-28.00	-38.00	DEB	Silver Lake/Sycan Marsh	3.8 ± 0.1	NM ±NM	Weathered
35-KL-810	1071	2	—	EXU (489S/523E)	-28.00	-38.00	BIF	Silver Lake/Sycan Marsh	4.1 ± 0.2	3.7 ± 0.1	Joins with 999-3; Rim 2 = break
35-KL-810	1073	1	A	EXU (489S/523E)	-38.00	-48.00	DEB	Silver Lake/Sycan Marsh	5.0 ± 0.1	NM ±NM	—
35-KL-810	1076	1	A	EXU (489S/524E)	5.00	-8.00	DEB	Silver Lake/Sycan Marsh	2.8 ± 0.1	NM ±NM	—
35-KL-810	1076	1	B	EXU (489S/524E)	5.00	-8.00	DEB	Silver Lake/Sycan Marsh	2.0 ± 0.1	NM ±NM	Weathered
35-KL-810	1076	1	C	EXU (489S/524E)	5.00	-8.00	DEB	Silver Lake/Sycan Marsh	4.2 ±NM	NM ±NM	Weathered
35-KL-810	1076	1	D	EXU (489S/524E)	5.00	-8.00	DEB	Silver Lake/Sycan Marsh	1.8 ± 0.1	NM ±NM	Weathered
35-KL-810	1076	1	E	EXU (489S/524E)	5.00	-8.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-KL-810	1076	2	—	EXU (489S/524E)	5.00	-8.00	BIF	Spodue Mountain	1.3 ±NM	NM ±NM	—
35-KL-810	1077	1	A	EXU (489S/524E)	-8.00	-18.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Weathered
35-KL-810	1077	4	—	EXU (489S/524E)	-8.00	-18.00	BIF	Silver Lake/Sycan Marsh	4.4 ±NM	NM ±NM	—
35-KL-810	1078	1	A	EXU (489S/524E)	-18.00	-28.00	DEB	Silver Lake/Sycan Marsh	2.2 ± 0.2	NM ±NM	—
35-KL-810	1078	2	—	EXU (489S/524E)	-18.00	-28.00	BIF	Spodue Mountain	1.6 ±NM	NM ±NM	—
35-KL-810	1079	1	A	EXU (489S/524E)	-28.00	-38.00	DEB	Silver Lake/Sycan Marsh	4.4 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-810	1079	1	B	EXU (489S/524E)	-28.00	-38.00	DEB Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ± NM	Weathered
35-KL-810	1080	1	A	EXU (489S/525E)	2.00	-12.00	DEB Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	1080	1	B	EXU (489S/525E)	2.00	-12.00	DEB Silver Lake/Sycan Marsh	4.4 ± 0.1	NM ± NM	—
35-KL-810	1080	3	—	EXU (489S/525E)	2.00	-12.00	BIF Cougar Mountain	2.3 ± 0.1	NM ± NM	—
35-KL-810	1080	4	—	EXU (489S/525E)	2.00	-12.00	BIF Spodue Mountain	1.1 ± NM	NM ± NM	—
35-KL-810	1081	1	A	EXU (489S/525E)	-12.00	-22.00	DEB Silver Lake/Sycan Marsh	3.6 ± NM	NM ± NM	Weathered
35-KL-810	1081	1	B	EXU (489S/525E)	-12.00	-22.00	DEB Silver Lake/Sycan Marsh	4.9 ± 0.1	NM ± NM	Weathered
35-KL-810	1081	4	—	EXU (489S/525E)	-12.00	-22.00	BIF Silver Lake/Sycan Marsh	4.4 ± 0.1	NM ± NM	—
35-KL-810	1082	1	A	EXU (489S/525E)	-22.00	-32.00	DEB Spodue Mountain	3.8 ± 0.1	NM ± NM	Weathered
35-KL-810	1082	1	B	EXU (489S/525E)	-22.00	-32.00	DEB Silver Lake/Sycan Marsh	4.1 ± 0.2	NM ± NM	Weathered
35-KL-810	1082	2	—	EXU (489S/525E)	-22.00	-32.00	BIF Silver Lake/Sycan Marsh	4.2 ± NM	NM ± NM	—
35-KL-810	1084	1	A	EXU (490S/523E)	8.00	-6.00	DEB Silver Lake/Sycan Marsh	3.8 ± 0.1	NM ± NM	—
35-KL-810	1084	1	B	EXU (490S/523E)	8.00	-6.00	DEB Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ± NM	Weathered
35-KL-810	1085	1	A	EXU (490S/523E)	-6.00	-16.00	DEB Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ± NM	—
35-KL-810	1085	1	B	EXU (490S/523E)	-6.00	-16.00	DEB Silver Lake/Sycan Marsh	4.8 ± 0.1	NM ± NM	—
35-KL-810	1086	1	—	EXU (490S/523E)	-15.00	-15.00	BIF Silver Lake/Sycan Marsh	3.4 ± 0.1	NM ± NM	—
35-KL-810	1087	1	A	EXU (490S/523E)	-16.00	-26.00	DEB Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ± NM	—
35-KL-810	1088	1	—	EXU (490S/523E)	-26.00	-26.00	BIF Spodue Mountain	3.6 ± 0.1	NM ± NM	—
35-KL-810	1089	1	A	EXU (490S/523E)	-26.00	-36.00	DEB Silver Lake/Sycan Marsh	4.2 ± 0.1	NM ± NM	—
35-KL-810	1089	1	B	EXU (490S/523E)	-26.00	-36.00	DEB Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ± NM	—
35-KL-810	1089	2	—	EXU (490S/523E)	-26.00	-36.00	BIF Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ± NM	—
35-KL-810	1090	1	A	EXU (490S/524E)	9.00	0.00	DEB Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	1090	1	B	EXU (490S/524E)	9.00	0.00	DEB Newberry Volcano	DH ± NM	NM ± NM	Weathered
35-KL-810	1091	1	A	EXU (490S/524E)	0.00	-10.00	DEB Silver Lake/Sycan Marsh	1.8 ± 0.1	NM ± NM	—
35-KL-810	1091	1	B	EXU (490S/524E)	0.00	-10.00	DEB Silver Lake/Sycan Marsh	1.5 ± 0.1	NM ± NM	—
35-KL-810	1091	1	C	EXU (490S/524E)	0.00	-10.00	DEB Silver Lake/Sycan Marsh	1.5 ± 0.1	NM ± NM	—
35-KL-810	1091	1	D	EXU (490S/524E)	0.00	-10.00	DEB Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	1091	1	E	EXU (490S/524E)	0.00	-10.00	DEB Spodue Mountain	DH ± NM	NM ± NM	Weathered
35-KL-810	1092	1	A	EXU (490S/524E)	-10.00	-20.00	DEB Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ± NM	—
35-KL-810	1093	1	A	EXU (490S/524E)	-20.00	-30.00	DEB Spodue Mountain	2.5 ± 0.1	NM ± NM	—
35-KL-810	1094	1	A	EXU (490S/524E)	-30.00	-40.00	DEB Silver Lake/Sycan Marsh	4.3 ± 0.2	NM ± NM	—
35-KL-810	1095	1	A	EXU (490S/525E)	6.00	-4.00	DEB Silver Lake/Sycan Marsh	2.3 ± 0.1	NM ± NM	—
35-KL-810	1095	1	B	EXU (490S/525E)	6.00	-4.00	DEB Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	1095	1	C	EXU (490S/525E)	6.00	-4.00	DEB Silver Lake/Sycan Marsh	2.3 ± NM	NM ± NM	—
35-KL-810	1095	1	D	EXU (490S/525E)	6.00	-4.00	DEB Silver Lake/Sycan Marsh	5.0 ± 0.1	NM ± NM	—
35-KL-810	1096	1	A	EXU (490S/525E)	-4.00	-14.00	DEB Silver Lake/Sycan Marsh	4.4 ± 0.2	NM ± NM	—
35-KL-810	1096	1	B	EXU (490S/525E)	-4.00	-14.00	DEB Silver Lake/Sycan Marsh	1.1 ± 0.1	NM ± NM	—
35-KL-810	1096	1	C	EXU (490S/525E)	-4.00	-14.00	DEB Cougar Mountain	1.2 ± NM	NM ± NM	Weathered
35-KL-810	1097	1	A	EXU (490S/525E)	-14.00	-24.00	DEB Spodue Mountain	1.9 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-810	1098	1	A	EXU (490S/525E)	-24.00	-34.00	DEB	Silver Lake/Sycan Marsh	2.9 ± 0.1	NM ± NM	Weathered
35-KL-810	1098	1	B	EXU (490S/525E)	-24.00	-34.00	DEB	Silver Lake/Sycan Marsh	6.4 ± 0.1	NM ± NM	Weathered
35-KL-810	1098	1	C	EXU (490S/525E)	-24.00	-34.00	DEB	Silver Lake/Sycan Marsh	4.5 ± 0.1	NM ± NM	—
35-KL-810	1098	1	D	EXU (490S/525E)	-24.00	-34.00	DEB	Spodue Mountain	5.0 ± 0.1	NM ± NM	—
35-KL-810	1099	1	A	EXU (490S/525E)	-34.00	-44.00	DEB	Silver Lake/Sycan Marsh	4.2 ± 0.2	NM ± NM	—
35-KL-810	1100	1	A	EXU (490S/525E)	-44.00	-54.00	DEB	Silver Lake/Sycan Marsh	3.9 ± 0.1	NM ± NM	—
35-KL-810	1100	3	—	EXU (490S/525E)	-44.00	-54.00	BIF	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Joins with 1107-3
35-KL-810	1103	1	A	EXU (491S/524E)	-4.00	-14.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	1104	1	A	EXU (491S/524E)	-4.00	-14.00	DEB	Spodue Mountain	3.1 ± 0.2	NM ± NM	—
35-KL-810	1105	1	A	EXU (491S/524E)	-14.00	-24.00	DEB	Silver Lake/Sycan Marsh	3.6 ± 0.1	NM ± NM	—
35-KL-810	1107	1	A	EXU (491S/524E)	-24.00	-34.00	DEB	Silver Lake/Sycan Marsh	3.8 ± 0.1	NM ± NM	—
35-KL-810	1107	3	—	EXU (491S/524E)	-24.00	-34.00	BIF	Spodue Mountain	2.9 ± 0.1	2.5 ± 0.1	Joins with 1100-3; Rim 2 = break
35-KL-810	1114	1	A	EXU (495S/510E)	-24.00	-34.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-810	1118	1	A	EXU (495S/510E)	-44.00	-54.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered
35-KL-810	1123	1	A	EXU (496S/520E)	-14.00	-24.00	DEB	Silver Lake/Sycan Marsh	5.2 ± 0.2	NM ± NM	—
35-KL-810	1123	1	B	EXU (496S/520E)	-14.00	-24.00	DEB	Cougar Mountain	2.6 ± 0.1	NM ± NM	Weathered
35-KL-810	1123	1	C	EXU (496S/520E)	-14.00	-24.00	DEB	Spodue Mountain	2.5 ± 0.1	NM ± NM	—
35-KL-810	1124	1	A	EXU (496S/520E)	-14.00	-24.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ± NM	—
35-KL-810	1124	1	B	EXU (496S/520E)	-14.00	-24.00	DEB	Cougar Mountain	3.7 ± 0.1	NM ± NM	—
35-KL-810	1125	1	A	EXU (496S/520E)	-24.00	-34.00	DEB	Silver Lake/Sycan Marsh	3.7 ± 0.1	NM ± NM	—
35-KL-810	1129	1	A	EXU (496S/520E)	-44.00	-54.00	DEB	Silver Lake/Sycan Marsh	3.6 ± 0.1	NM ± NM	—
35-KL-811	3	3	—	SCU 6	0.00	0.00	DEB	Deer Creek/Burn Butte?	NM ± NM	NM ± NM	No OH measurement
35-KL-811	4	1	—	SCU 6	0.00	0.00	BIF	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-811	5	6	A	SCU 7	0.00	0.00	DEB	Deer Creek/Burn Butte	NVB ± NM	NM ± NM	No visible band
35-KL-811	5	6	B	SCU 7	0.00	0.00	DEB	Deer Creek/Burn Butte	NVB ± NM	NM ± NM	No visible band
35-KL-811	84	1	—	SHP 10	-40.00	-60.00	DEB	Deer Creek/Burn Butte	3.6 ± 0.1	NM ± NM	—
35-KL-811	94	1	A	SHP 12	0.00	-20.00	DEB	Deer Creek/Burn Butte	NVB ± NM	NM ± NM	No visible band
35-KL-811	94	1	B	SHP 12	0.00	-20.00	DEB	Deer Creek/Burn Butte	1.1 ± NM	NM ± NM	Weathered
35-KL-811	94	1	C	SHP 12	0.00	-20.00	DEB	Deer Creek/Burn Butte?	NVB ± NM	NM ± NM	No visible band
35-KL-811	205	1	A	TEU 1	0.00	-10.00	DEB	Deer Creek/Burn Butte	1.6 ± 0.1	NM ± NM	—
35-KL-811	205	1	B	TEU 1	0.00	-10.00	DEB	Deer Creek/Burn Butte	3.2 ± 0.1	NM ± NM	—
35-KL-811	207	1	—	TEU 1	-20.00	-30.00	DEB	Deer Creek/Burn Butte	3.1 ± NM	NM ± NM	—
35-KL-811	208	1	A	TEU 1	-30.00	-40.00	DEB	Deer Creek/Burn Butte	1.8 ± NM	NM ± NM	—
35-KL-811	208	1	B	TEU 1	-30.00	-40.00	DEB	Deer Creek/Burn Butte	2.4 ± 0.1	NM ± NM	—
35-KL-811	214	1	—	TEU 1	-17.00	-17.00	DEB	Deer Creek/Burn Butte	3.1 ± 0.1	NM ± NM	—
35-KL-812	33	1	—	SHP 4	0.00	-20.00	UFT	Spodue Mountain	2.7 ± NM	NM ± NM	—
35-KL-812	42	1	—	SHP 3	0.00	-20.00	BIF	Silver Lake/Sycan Marsh	1.4 ± NM	NM ± NM	—
35-KL-812	154	1	—	STU 1	0.00	-10.00	BIF	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-812	155	1	A	STU 2	0.00	-10.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-812	155	1	B	STU 2	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	2.2 ± 0.1	NM ± NM	—
35-KL-812	155	1	C	STU 2	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-812	156	1	—	STU 2	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-812	156	2	—	STU 2	-10.00 -20.00	BIF	Spodue Mountain	2.5 ± 0.1	NM ± NM	—
35-KL-812	157	1	A	STU 2	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	3.0 ± NM	NM ± NM	—
35-KL-812	157	1	B	STU 2	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	1.3 ± 0.1	NM ± NM	—
35-KL-812	157	1	C	STU 2	-20.00 -30.00	DEB	Spodue Mountain	3.5 ± 0.1	NM ± NM	—
35-KL-812	157	2	—	STU 2	-20.00 -30.00	PPT	Spodue Mountain	1.1 ± 0.1	NM ± NM	—
35-KL-812	158	1	—	STU 3	0.00 -10.00	BIF	Silver Lake/Sycan Marsh	1.2 ± 0.1	NM ± NM	—
35-KL-812	161	1	A	STU 4	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	1.3 ± 0.1	NM ± NM	—
35-KL-812	161	1	B	STU 4	0.00 -10.00	DEB	Spodue Mountain	2.2 ± 0.2	NM ± NM	—
35-KL-812	161	1	C	STU 4	0.00 -10.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-812	162	1	A	STU 4	-10.00 -20.00	DEB	Spodue Mountain	1.0 ± 0.1	NM ± NM	Weathered
35-KL-812	162	1	B	STU 4	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	1.5 ± 0.1	NM ± NM	—
35-KL-812	162	1	C	STU 4	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	3.4 ± 0.1	NM ± NM	—
35-KL-812	174	1	—	STU 16	0.00 -10.00	BIF	Spodue Mountain	1.0 ± 0.1	NM ± NM	—
35-KL-812	176	1	—	STU 18	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	1.3 ± NM	NM ± NM	Weathered
35-KL-812	176	2	—	STU 18	0.00 -10.00	BIF	Silver Lake/Sycan Marsh	1.2 ± NM	NM ± NM	—
35-KL-812	177	1	A	STU 18	-10.00 -20.00	DEB	Spodue Mountain	1.2 ± 0.1	NM ± NM	—
35-KL-812	177	1	B	STU 18	-10.00 -20.00	DEB	Spodue Mountain	1.7 ± 0.1	NM ± NM	—
35-KL-812	177	1	C	STU 18	-10.00 -20.00	DEB	Spodue Mountain	1.1 ± NM	NM ± NM	—
35-KL-812	178	1	A	STU 18	-20.00 -30.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-812	178	1	B	STU 18	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	1.3 ± NM	NM ± NM	—
35-KL-812	178	1	C	STU 18	-20.00 -30.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	185	1	A	TEU 1	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	185	1	B	TEU 1	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	1.3 ± NM	NM ± NM	—
35-KL-812	185	1	C	TEU 1	-30.00 -40.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-812	185	1	D	TEU 1	-30.00 -40.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ± NM	—
35-KL-812	185	1	E	TEU 1	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-812	186	1	A	TEU 1	-40.00 -50.00	DEB	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ± NM	—
35-KL-812	186	1	B	TEU 1	-40.00 -50.00	DEB	Silver Lake/Sycan Marsh	1.9 ± 0.1	NM ± NM	—
35-KL-812	186	1	C	TEU 1	-40.00 -50.00	DEB	Silver Lake/Sycan Marsh	1.1 ± NM	NM ± NM	—
35-KL-812	197	1	—	TEU 2	0.00 -10.00	BIF	Spodue Mountain	2.3 ± 0.2	NM ± NM	—
35-KL-812	198	1	—	TEU 2	-10.00 -20.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ± NM	—
35-KL-812	199	1	A	TEU 2	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	199	1	B	TEU 2	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	1.7 ± NM	NM ± NM	—
35-KL-812	199	1	C	TEU 2	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	2.3 ± 0.1	NM ± NM	—
35-KL-812	199	1	D	TEU 2	-20.00 -30.00	DEB	Spodue Mountain	2.4 ± 0.1	NM ± NM	—
35-KL-812	199	1	E	TEU 2	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	1.6 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-812	200	1	A	TEU 2	-30.00	-40.00	DEB	Silver Lake/Sycan Marsh	1.7 ± 0.1	NM ± NM	—
35-KL-812	200	1	B	TEU 2	-30.00	-40.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	200	1	C	TEU 2	-30.00	-40.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-812	209	1	—	TEU 4	6.00	0.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-812	210	1	A	TEU 4	0.00	-10.00	DEB	Spodue Mountain	1.0 ± 0.1	NM ± NM	—
35-KL-812	210	1	B	TEU 4	0.00	-10.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-812	210	1	C	TEU 4	0.00	-10.00	DEB	Spodue Mountain	1.4 ± 0.1	NM ± NM	—
35-KL-812	210	1	D	TEU 4	0.00	-10.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	Weathered
35-KL-812	211	1	A	TEU 4	-10.00	-20.00	DEB	Spodue Mountain	1.0 ± 0.1	NM ± NM	—
35-KL-812	211	1	B	TEU 4	-10.00	-20.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-812	211	1	C	TEU 4	-10.00	-20.00	DEB	Spodue Mountain	1.2 ± 0.1	NM ± NM	—
35-KL-812	211	1	D	TEU 4	-10.00	-20.00	DEB	Spodue Mountain	5.0 ± 0.1	NM ± NM	—
35-KL-812	211	1	E	TEU 4	-10.00	-20.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-812	212	1	—	TEU 4	-20.00	-30.00	BIF	Unknown A	1.2 ± 0.1	NM ± NM	—
35-KL-812	214	1	A	TEU 4	-30.00	-40.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	214	1	B	TEU 4	-30.00	-40.00	DEB	Spodue Mountain	1.4 ± 0.1	NM ± NM	—
35-KL-812	214	1	C	TEU 4	-30.00	-40.00	DEB	Silver Lake/Sycan Marsh	1.9 ± NM	NM ± NM	—
35-KL-812	216	1	—	TEU 4	-50.00	-60.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ± NM	—
35-KL-812	248	2	—	STU 30	0.00	-10.00	BIF	Silver Lake/Sycan Marsh	1.8 ± 0.1	NM ± NM	—
35-KL-812	253	1	—	TEU 4	-60.00	-70.00	DEB	Silver Lake/Sycan Marsh	3.1 ± 0.1	NM ± NM	—
35-KL-812	257	1	—	TEU 4	-100.00	-110.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ± NM	—
35-KL-812	285	1	—	SHP 105	0.00	-20.00	DEB	Silver Lake/Sycan Marsh	2.3 ± 0.2	NM ± NM	—
35-KL-812	290	2	—	SHP 106	0.00	-20.00	DEB	Spodue Mountain	3.1 ± 0.1	NM ± NM	—
35-KL-812	319	1	A	EXU (18S/124E)	0.00	-10.00	DEB	Spodue Mountain	1.4 ± 0.1	NM ± NM	—
35-KL-812	322	1	A	EXU (18S/124E)	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ± NM	—
35-KL-812	325	1	A	EXU (18S/124E)	-30.00	-40.00	DEB	Spodue Mountain	1.3 ± NM	NM ± NM	—
35-KL-812	325	1	B	EXU (18S/124E)	-30.00	-40.00	DEB	Spodue Mountain	1.7 ± 0.2	NM ± NM	—
35-KL-812	336	1	A	EXU (18S/126E)	-20.00	-30.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-812	336	1	B	EXU (18S/126E)	-20.00	-30.00	DEB	Not Obsidian	NVB ± NM	NM ± NM	No visible band
35-KL-812	338	1	—	EXU (18S/126E)	-30.00	-40.00	DEB	Spodue Mountain	1.2 ± 0.1	NM ± NM	—
35-KL-812	348	1	—	EXU (18S/128E)	-10.00	-20.00	DEB	Spodue Mountain	3.6 ± NM	NM ± NM	—
35-KL-812	358	1	—	EXU (18S/128E)	-70.00	-80.00	DEB	Spodue Mountain	0.9 ± 0.1	NM ± NM	—
35-KL-812	359	2	—	EXU (18S/128E)	-80.00	-90.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	359	3	—	EXU (18S/128E)	-80.00	-90.00	BIF	Silver Lake/Sycan Marsh	1.7 ± 0.1	NM ± NM	—
35-KL-812	391	2	—	EXU (19S/124E)	-30.00	-40.00	BIF	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ± NM	—
35-KL-812	399	1	—	EXU (20S/124E)	0.00	-10.00	DEB	Spodue Mountain	1.0 ± 0.1	NM ± NM	—
35-KL-812	401	1	—	EXU (20S/124E)	-10.00	-20.00	UFT	Silver Lake/Sycan Marsh	1.4 ± NM	NM ± NM	—
35-KL-812	403	1	A	EXU (20S/124E)	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	1.2 ± NM	NM ± NM	—
35-KL-812	403	2	—	EXU (20S/124E)	-20.00	-30.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-812	404	2	—	EXU (20S/124E)	-30.00 -40.00	UFT	Spodue Mountain	1.9 ± 0.1	NM ± NM	—
35-KL-812	408	1	—	EXU (21S/124E)	0.00 -10.00	UFT	Spodue Mountain	1.3 ± NM	NM ± NM	—
35-KL-812	410	1	—	EXU (21S/124E)	-10.00 -20.00	UFT	Silver Lake/Sycan Marsh	3.0 ± 0.1	NM ± NM	—
35-KL-812	410	2	—	EXU (21S/124E)	-10.00 -20.00	UFT	Spodue Mountain	1.3 ± NM	NM ± NM	—
35-KL-812	410	3	—	EXU (21S/124E)	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	1.1 ± 0.1	NM ± NM	—
35-KL-812	411	1	—	EXU (21S/124E)	-10.00 -20.00	UFT	Silver Lake/Sycan Marsh	1.9 ± 0.1	NM ± NM	—
35-KL-812	412	1	A	EXU (21S/124E)	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	4.1 ± 0.1	NM ± NM	—
35-KL-812	412	1	B	EXU (21S/124E)	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	3.6 ± 0.1	NM ± NM	—
35-KL-812	412	1	C	EXU (21S/124E)	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	2.2 ± 0.1	NM ± NM	—
35-KL-812	414	1	A	EXU (21S/124E)	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	1.3 ± 0.1	NM ± NM	—
35-KL-812	416	1	A	EXU (21S/124E)	-40.00 -45.00	DEB	Silver Lake/Sycan Marsh	2.6 ± NM	NM ± NM	—
35-KL-812	418	1	A	EXU (21S/124E)	-45.00 -64.00	DEB	Silver Lake/Sycan Marsh	2.3 ± 0.2	NM ± NM	—
35-KL-812	419	1	—	EXU (21S/124E)	-45.00 -64.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ± NM	—
35-KL-812	420	1	A	EXU (22S/124E)	0.00 -10.00	DEB	Unknown A	NVB ± NM	NM ± NM	No visible band
35-KL-812	422	1	A	EXU (22S/124E)	-10.00 -20.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-812	422	1	B	EXU (22S/124E)	-10.00 -20.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-812	423	1	—	EXU (22S/124E)	-10.00 -20.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-812	424	1	—	EXU (22S/124E)	-20.00 -30.00	UFT	Silver Lake/Sycan Marsh	1.8 ± NM	NM ± NM	—
35-KL-812	424	2	A	EXU (22S/124E)	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	1.7 ± NM	NM ± NM	—
35-KL-812	424	2	B	EXU (22S/124E)	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	3.5 ± 0.1	NM ± NM	—
35-KL-812	424	2	C	EXU (22S/124E)	-20.00 -30.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-812	431	1	—	EXU (22S/125E)	-10.00 -20.00	COR	Silver Lake/Sycan Marsh	3.5 ± 0.1	NM ± NM	—
35-KL-812	431	2	A	EXU (22S/125E)	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	432	1	A	EXU (22S/125E)	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	2.1 ± NM	NM ± NM	—
35-KL-812	432	1	B	EXU (22S/125E)	-20.00 -30.00	DEB	Spodue Mountain	2.0 ± 0.1	NM ± NM	—
35-KL-812	434	1	—	EXU (22S/125E)	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	2.4 ± 0.1	NM ± NM	—
35-KL-812	440	1	A	EXU (22S/126E)	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	2.1 ± NM	NM ± NM	—
35-KL-812	440	1	B	EXU (22S/126E)	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	1.8 ± NM	NM ± NM	—
35-KL-812	442	1	—	EXU (22S/126E)	-20.00 -30.00	BIF	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-812	444	1	—	EXU (22S/126E)	-30.00 -40.00	DEB	Spodue Mountain	1.8 ± NM	NM ± NM	—
35-KL-812	451	1	—	EXU (24S/125E)	-20.00 -30.00	PPT	Spodue Mountain	2.7 ± 0.1	NM ± NM	—
35-KL-812	452	1	—	EXU (24S/125E)	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	2.3 ± 0.2	NM ± NM	—
35-KL-812	455	1	A	EXU (25S/124E)	-10.00 -20.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-812	455	1	B	EXU (25S/124E)	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	1.9 ± NM	NM ± NM	—
35-KL-812	458	1	A	EXU (25S/125E)	0.00 -10.00	DEB	Spodue Mountain	4.3 ± 0.1	NM ± NM	—
35-KL-812	458	1	B	EXU (25S/125E)	0.00 -10.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-812	460	1	—	EXU (25S/125E)	-10.00 -20.00	UFT	Silver Lake/Sycan Marsh	2.5 ± NM	NM ± NM	—
35-KL-812	461	1	A	EXU (25S/125E)	-10.00 -20.00	DEB	Spodue Mountain	3.3 ± 0.1	NM ± NM	—
35-KL-812	462	1	—	EXU (25S/125E)	-20.00 -30.00	DEB	Spodue Mountain	2.4 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-812	462	2	A	EXU (25S/125E)	-20.00	-30.00	DEB Spodue Mountain	2.6 ± 0.1	NM ± NM	—
35-KL-812	464	1	—	EXU (25S/125E)	-30.00	-40.00	DEB Spodue Mountain	2.5 ± 0.1	NM ± NM	—
35-KL-812	468	1	A	EXU (25S/126E)	-10.00	-20.00	DEB Spodue Mountain	2.5 ± 0.1	NM ± NM	—
35-KL-812	470	2	A	EXU (25S/126E)	-20.00	-30.00	DEB Spodue Mountain	4.5 ± 0.1	NM ± NM	—
35-KL-812	470	2	B	EXU (25S/126E)	-20.00	-30.00	DEB Silver Lake/Sycan Marsh	5.8 ± 0.1	NM ± NM	—
35-KL-812	470	2	C	EXU (25S/126E)	-20.00	-30.00	DEB Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-812	474	1	—	EXU (25S/128E)	0.00	-10.00	DEB Spodue Mountain	1.9 ± NM	NM ± NM	—
35-KL-812	478	1	A	EXU (25S/128E)	-20.00	-30.00	DEB Spodue Mountain	1.8 ± 0.1	NM ± NM	—
35-KL-812	478	1	B	EXU (25S/128E)	-20.00	-30.00	DEB Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-812	480	1	—	EXU (25S/128E)	-30.00	-40.00	DEB Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-812	481	1	—	EXU (25S/128E)	-30.00	-40.00	UFT Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	486	1	A	EXU (27S/124E)	3.00	0.00	DEB Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-812	488	1	A	EXU (27S/124E)	0.00	-10.00	DEB Silver Lake/Sycan Marsh	1.2 ± NM	NM ± NM	—
35-KL-812	488	1	B	EXU (27S/124E)	0.00	-10.00	DEB Silver Lake/Sycan Marsh	1.2 ± NM	NM ± NM	—
35-KL-812	489	1	—	EXU (27S/124E)	0.00	-10.00	UFT Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-812	489	2	—	EXU (27S/124E)	0.00	-10.00	UFT Silver Lake/Sycan Marsh	3.2 ± 0.1	NM ± NM	—
35-KL-812	489	3	A	EXU (27S/124E)	0.00	-10.00	DEB Silver Lake/Sycan Marsh	1.4 ± 0.1	NM ± NM	—
35-KL-812	494	1	A	EXU (27S/125E)	7.00	0.00	DEB Silver Lake/Sycan Marsh	1.6 ± 0.1	NM ± NM	—
35-KL-812	496	1	—	EXU (27S/125E)	0.00	-10.00	DEB Silver Lake/Sycan Marsh	1.6 ± 0.1	NM ± NM	—
35-KL-812	496	2	—	EXU (27S/125E)	0.00	-10.00	PPT Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-812	499	2	—	EXU (27S/125E)	-20.00	-30.00	DEB Spodue Mountain	2.4 ± NM	NM ± NM	—
35-KL-812	507	1	A	EXU (27S/126E)	-10.00	-20.00	DEB Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-812	507	1	B	EXU (27S/126E)	-10.00	-20.00	DEB Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-812	507	1	C	EXU (27S/126E)	-10.00	-20.00	DEB Spodue Mountain	2.5 ± 0.1	NM ± NM	—
35-KL-812	508	1	A	EXU (27S/126E)	-10.00	-20.00	DEB Silver Lake/Sycan Marsh	1.8 ± 0.1	NM ± NM	—
35-KL-812	509	1	A	EXU (27S/126E)	-20.00	-30.00	DEB Silver Lake/Sycan Marsh	1.2 ± 0.1	NM ± NM	—
35-KL-812	515	1	A	EXU (27S/127E)	3.00	-27.00	DEB Spodue Mountain	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-812	515	1	B	EXU (27S/127E)	3.00	-27.00	DEB Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-812	515	2	—	EXU (27S/127E)	3.00	-27.00	PPT Spodue Mountain	4.5 ± 0.1	NM ± NM	—
35-KL-812	517	1	A	EXU (27S/127E)	-27.00	-35.00	DEB Spodue Mountain	1.9 ± 0.1	NM ± NM	—
35-KL-812	517	2	—	EXU (27S/127E)	-27.00	-35.00	UFT Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ± NM	—
35-KL-812	517	3	—	EXU (27S/127E)	-27.00	-35.00	UFT Spodue Mountain	1.5 ± NM	NM ± NM	—
35-KL-812	521	1	A	EXU (37S/124E)	0.00	-10.00	DEB Spodue Mountain	1.3 ± NM	NM ± NM	Weathered
35-KL-813	1	1	—	SCP 1	0.00	0.00	PPT Spodue Mountain	4.2 ± 0.1	NM ± NM	—
35-KL-813	2	1	—	SCP 2	0.00	0.00	PPT McComb Butte/Tucker Hill?	1.2 ± 0.1	1.3 ± 0.1	2 cuts; Rim 1 on barb; Rim 2 near tip
35-KL-813	3	1	—	SCP 3	0.00	0.00	PPT Silver Lake/Sycan Marsh	1.7 ± 0.2	NM ± NM	—
35-KL-813	7	1	—	SCP 7	0.00	0.00	UFT Spodue Mountain	1.1 ± 0.1	NM ± NM	—
35-KL-813	8	1	—	SCP 8	0.00	0.00	BIF Spodue Mountain	2.8 ± 0.1	NM ± NM	—
35-KL-813	9	1	—	STU 1	0.00	-10.00	PPT Deer Creek/Burn Butte?	NM ± NM	NM ± NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-813	44	1	A	SON 3	0.00 -20.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	No visible band	
35-KL-813	44	1	B	SON 3	0.00 -20.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	No visible band	
35-KL-813	44	1	C	SON 3	0.00 -20.00	DEB	Spodue Mountain	2.9 ± 0.1	NM ±NM	—	
35-KL-813	48	1	A	SON 4	0.00 -20.00	DEB	Spodue Mountain	0.9 ± 0.1	NM ±NM	—	
35-KL-813	48	1	B	SON 4	0.00 -20.00	DEB	Spodue Mountain	1.0 ± 0.1	NM ±NM	—	
35-KL-813	48	1	C	SON 4	0.00 -20.00	DEB	Spodue Mountain	0.8 ± 0.1	NM ±NM	—	
35-KL-813	48	1	D	SON 4	0.00 -20.00	DEB	Spodue Mountain	0.9 ± 0.1	NM ±NM	—	
35-KL-813	49	1	A	SON 4	-20.00 -40.00	DEB	Spodue Mountain	0.9 ± 0.1	NM ±NM	—	
35-KL-813	49	1	B	SON 4	-20.00 -40.00	DEB	Spodue Mountain	1.1 ± 0.1	NM ±NM	—	
35-KL-813	49	1	C	SON 4	-20.00 -40.00	DEB	Spodue Mountain	1.2 ± 0.1	NM ±NM	—	
35-KL-813	50	1	A	SON 4	-40.00 -60.00	DEB	Spodue Mountain	1.8 ± 0.1	NM ±NM	—	
35-KL-813	50	1	B	SON 4	-40.00 -60.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	No visible band	
35-KL-813	50	1	C	SON 4	-40.00 -60.00	DEB	Spodue Mountain	1.6 ± 0.1	NM ±NM	—	
35-KL-813	52	1	A	SON 5	0.00 -20.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	No visible band	
35-KL-813	111	2	—	SON 21	0.00 -20.00	UFT	Silver Lake/Sycan Marsh	3.8 ±NM	NM ±NM	—	
35-KL-813	143	2	—	SON 28	-40.00 -60.00	PPT	Spodue Mountain	NVB ±NM	NM ±NM	No visible band	
35-KL-813	163	2	—	SON 33	0.00 -20.00	UFT	Spodue Mountain	1.2 ±NM	NM ±NM	—	
35-KL-813	163	3	—	SON 33	0.00 -20.00	DEB	Silver Lake/Sycan Marsh	2.2 ± 0.1	NM ±NM	—	
35-KL-813	179	3	—	SON 36	0.00 -40.00	UFT	Silver Lake/Sycan Marsh	1.4 ± 0.1	NM ±NM	—	
35-KL-813	239	1	—	TEU 1	-20.00 -30.00	UFT	Spodue Mountain	1.2 ± 0.1	NM ±NM	—	
35-KL-813	252	1	A	TEU 2	13.00 -5.00	DEB	Spodue Mountain	0.9 ± 0.1	NM ±NM	—	
35-KL-813	252	1	B	TEU 2	13.00 -5.00	DEB	Silver Lake/Sycan Marsh	3.0 ± 0.1	NM ±NM	—	
35-KL-813	252	1	C	TEU 2	13.00 -5.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration	
35-KL-813	255	1	—	TEU 2	-20.00 -35.00	UFT	Silver Lake/Sycan Marsh	1.8 ±NM	NM ±NM	—	
35-KL-813	255	2	—	TEU 2	-20.00 -35.00	DEB	Spodue Mountain	0.7 ± 0.1	NM ±NM	—	
35-KL-813	256	1	A	TEU 2	-35.00 -40.00	DEB	Silver Lake/Sycan Marsh	0.9 ± 0.1	NM ±NM	—	
35-KL-813	256	1	B	TEU 2	-35.00 -40.00	DEB	Silver Lake/Sycan Marsh	0.8 ± 0.1	NM ±NM	—	
35-KL-813	258	1	A	TEU 4	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration	
35-KL-813	258	1	B	TEU 4	0.00 -10.00	DEB	Spodue Mountain	0.6 ± 0.1	NM ±NM	—	
35-KL-813	258	1	C	TEU 4	0.00 -10.00	DEB	Spodue Mountain	2.6 ± 0.1	NM ±NM	—	
35-KL-813	258	1	D	TEU 4	0.00 -10.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Diffuse hydration	
35-KL-813	258	1	E	TEU 4	0.00 -10.00	DEB	Spodue Mountain	2.5 ± 0.1	NM ±NM	—	
35-KL-813	258	1	F	TEU 4	0.00 -10.00	DEB	Spodue Mountain	1.1 ± 0.1	NM ±NM	—	
35-KL-813	258	1	G	TEU 4	0.00 -10.00	DEB	Spodue Mountain	2.2 ± 0.1	NM ±NM	—	
35-KL-813	258	1	H	TEU 4	0.00 -10.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Diffuse hydration	
35-KL-813	258	1	I	TEU 4	0.00 -10.00	DEB	Spodue Mountain	0.8 ± 0.1	NM ±NM	—	
35-KL-813	258	1	J	TEU 4	0.00 -10.00	DEB	Spodue Mountain	0.8 ± 0.1	NM ±NM	—	
35-KL-813	258	1	K	TEU 4	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	0.8 ± 0.1	NM ±NM	—	
35-KL-813	258	1	L	TEU 4	0.00 -10.00	DEB	Spodue Mountain	1.7 ± 0.1	NM ±NM	—	

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-813	258	1	M	TEU 4	0.00 -10.00	DEB	Spodue Mountain	2.2 ± 0.1	NM ± NM	—
35-KL-813	259	1	A	TEU 4	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	0.9 ± 0.1	NM ± NM	—
35-KL-813	259	1	B	TEU 4	-10.00 -20.00	DEB	Spodue Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-813	259	1	C	TEU 4	-10.00 -20.00	DEB	Spodue Mountain	0.9 ± 0.1	NM ± NM	—
35-KL-813	259	1	D	TEU 4	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-813	259	1	E	TEU 4	-10.00 -20.00	DEB	Silver Lake/Sycan Marsh	0.9 ± 0.1	NM ± NM	—
35-KL-813	259	1	F	TEU 4	-10.00 -20.00	DEB	Spodue Mountain	1.0 ± 0.1	NM ± NM	—
35-KL-813	259	2	—	TEU 4	-10.00 -20.00	UFT	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-813	259	3	—	TEU 4	-10.00 -20.00	BIF	Silver Lake/Sycan Marsh	1.5 ± 0.1	NM ± NM	—
35-KL-813	260	1	A	TEU 4	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-813	260	1	B	TEU 4	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	0.9 ± 0.1	NM ± NM	—
35-KL-813	262	1	—	TEU 4	-40.00 -50.00	DEB	Silver Lake/Sycan Marsh	1.7 ± 0.1	NM ± NM	—
35-KL-813	276	1	A	TEU 6	0.00 -10.00	DEB	Spodue Mountain	0.9 ± 0.1	NM ± NM	—
35-KL-813	276	1	B	TEU 6	0.00 -10.00	DEB	Spodue Mountain	0.9 ± 0.1	NM ± NM	—
35-KL-813	277	1	A	TEU 6	-10.00 -20.00	DEB	Spodue Mountain	1.2 ± 0.1	NM ± NM	—
35-KL-813	282	2	—	TEU 7	-20.00 -30.00	PPT	Silver Lake/Sycan Marsh	4.0 ± 0.1	NM ± NM	—
35-KL-813	285	1	—	TEU 7	-50.00 -60.00	UFT	Spodue Mountain	1.9 ± 0.1	NM ± NM	—
35-KL-813	285	2	—	TEU 7	-50.00 -60.00	BIF	Spodue Mountain	2.0 ± 0.1	NM ± NM	—
35-KL-813	300	2	A	TEU 9	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	0.9 ± 0.1	NM ± NM	—
35-KL-813	300	2	B	TEU 9	0.00 -10.00	DEB	Silver Lake/Sycan Marsh	0.8 ± 0.1	NM ± NM	—
35-KL-813	301	1	—	TEU 9	-10.00 -20.00	DEB	Spodue Mountain	2.4 ± 0.1	NM ± NM	—
35-KL-813	302	2	—	TEU 9	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	1.6 ± 0.1	NM ± NM	—
35-KL-813	302	3	—	TEU 9	-20.00 -30.00	UFT	Spodue Mountain	1.8 ± NM	NM ± NM	—
35-KL-813	303	1	—	TEU 9	-30.00 -40.00	DEB	Spodue Mountain	2.3 ± 0.1	NM ± NM	—
35-KL-813	305	1	—	TEU 9	-50.00 -60.00	DEB	Spodue Mountain	2.0 ± 0.1	NM ± NM	—
35-KL-813	306	1	A	TEU 9	-60.00 -70.00	DEB	Spodue Mountain	1.4 ± 0.1	NM ± NM	—
35-KL-813	311	2	A	TEU 10	-10.00 -20.00	DEB	Spodue Mountain	0.8 ± 0.1	NM ± NM	—
35-KL-813	311	2	B	TEU 10	-10.00 -20.00	DEB	Spodue Mountain	0.8 ± 0.1	NM ± NM	—
35-KL-813	312	1	A	TEU 10	-20.00 -30.00	DEB	Spodue Mountain	1.4 ± 0.1	NM ± NM	—
35-KL-813	312	1	B	TEU 10	-20.00 -30.00	DEB	Spodue Mountain	1.4 ± 0.1	NM ± NM	—
35-KL-813	312	3	—	TEU 10	-20.00 -30.00	UFT	Silver Lake/Sycan Marsh	3.9 ± 0.1	NM ± NM	—
35-KL-813	313	2	A	TEU 10	-30.00 -40.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-813	313	2	B	TEU 10	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-813	313	2	C	TEU 10	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	0.8 ± 0.1	NM ± NM	—
35-KL-813	313	2	D	TEU 10	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	2.6 ± NM	NM ± NM	—
35-KL-813	314	2	A	TEU 10	-40.00 -50.00	DEB	Silver Lake/Sycan Marsh	1.8 ± 0.1	NM ± NM	—
35-KL-813	314	2	B	TEU 10	-40.00 -50.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-813	314	2	C	TEU 10	-40.00 -50.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-813	314	2	D	TEU 10	-40.00 -50.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-813	315	1	—	TEU 10	-50.00	-60.00	UFT	Spodue Mountain	1.1 ± 0.1	NM ± NM	—
35-KL-813	317	2	—	TEU 10	-70.00	-80.00	UFT	Spodue Mountain	2.5 ± 0.1	NM ± NM	—
35-KL-813	317	3	—	TEU 10	-70.00	-80.00	PPT	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ± NM	—
35-KL-813	326	1	A	TEU 11	-20.00	-30.00	DEB	Spodue Mountain	0.8 ± 0.1	NM ± NM	—
35-KL-813	326	1	B	TEU 11	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-813	329	1	A	TEU 11	-50.00	-60.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-813	330	1	A	TEU 11	-60.00	-70.00	DEB	Silver Lake/Sycan Marsh	3.5 ± NM	NM ± NM	—
35-KL-813	340	1	A	TEU 3	-30.00	-40.00	DEB	Spodue Mountain	3.1 ± 0.1	NM ± NM	—
35-KL-813	343	1	—	TEU 3	-70.00	-80.00	BIF	Silver Lake/Sycan Marsh	1.3 ± 0.1	NM ± NM	—
35-KL-813	343	3	A	TEU 3	-70.00	-80.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-813	343	3	B	TEU 3	-70.00	-80.00	DEB	Spodue Mountain	1.0 ± 0.1	NM ± NM	—
35-KL-813	343	3	C	TEU 3	-70.00	-80.00	DEB	Spodue Mountain	2.1 ± 0.1	NM ± NM	—
35-KL-813	351	1	A	TEU 12	0.00	-10.00	DEB	Silver Lake/Sycan Marsh	4.2 ± 0.1	NM ± NM	—
35-KL-813	351	1	B	TEU 12	0.00	-10.00	DEB	Silver Lake/Sycan Marsh	0.9 ± NM	NM ± NM	—
35-KL-813	351	1	C	TEU 12	0.00	-10.00	DEB	Spodue Mountain	2.9 ± 0.1	NM ± NM	—
35-KL-813	352	3	A	TEU 12	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-813	352	3	C	TEU 12	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	0.9 ± 0.1	NM ± NM	—
35-KL-813	353	1	—	TEU 12	-20.00	-30.00	BIF	Spodue Mountain	2.4 ± 0.1	NM ± NM	—
35-KL-813	353	2	A	TEU 12	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	NVB ± NM	NM ± NM	No visible band
35-KL-813	354	2	A	TEU 12	-30.00	-40.00	DEB	Silver Lake/Sycan Marsh	1.1 ± 0.1	NM ± NM	—
35-KL-813	355	1	A	TEU 12	-40.00	-50.00	DEB	Silver Lake/Sycan Marsh	2.9 ± 0.1	NM ± NM	—
35-KL-813	355	1	B	TEU 12	-40.00	-50.00	DEB	Silver Lake/Sycan Marsh	1.2 ± 0.1	NM ± NM	—
35-KL-813	355	1	C	TEU 12	-40.00	-50.00	DEB	Silver Lake/Sycan Marsh	2.9 ± 0.1	NM ± NM	—
35-KL-813	356	1	A	TEU 12	-50.00	-60.00	DEB	Silver Lake/Sycan Marsh	0.9 ± 0.1	NM ± NM	—
35-KL-813	358	1	—	TEU 12	-70.00	-80.00	UFT	Spodue Mountain	2.8 ± 0.2	NM ± NM	—
35-KL-813	359	1	—	TEU 12	-80.00	-90.00	DEB	Silver Lake/Sycan Marsh	2.8 ± 0.1	NM ± NM	—
35-KL-814	1	1	—	SCP 1	0.00	0.00	BIF	Spodue Mountain	5.5 ± 0.1	NM ± NM	—
35-KL-814	4	1	—	SCP 4	0.00	0.00	PPT	GF/LIW/RS	4.8 ± 0.1	4.9 ± 0.1	—
35-KL-814	5	1	—	SCP 5	0.00	0.00	PPT	Glass Mountain?	3.3 ± 0.1	NM ± NM	—
35-KL-814	115	1	—	SHP 25	-80.00	-100.00	UFT	Spodue Mountain	3.8 ± 0.1	NM ± NM	—
35-KL-814	135	2	—	STU 5	0.00	-10.00	UFT	Spodue Mountain	3.9 ± 0.1	NM ± NM	—
35-KL-814	138	1	—	STU 8	0.00	-11.00	UFT	Spodue Mountain	4.1 ± 0.1	NM ± NM	—
35-KL-814	143	1	—	STU 13	0.00	-10.00	UFT	Spodue Mountain	3.4 ± 0.1	NM ± NM	—
35-KL-814	165	2	—	TEU 1	0.00	-15.00	UFT	Spodue Mountain	3.3 ± 0.1	NM ± NM	—
35-KL-814	167	2	—	TEU 1	-20.00	-30.00	DEB	Spodue Mountain	2.5 ± 0.1	NM ± NM	—
35-KL-814	226	1	B	TEU 3	-10.00	-20.00	DEB	Spodue Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-814	226	1	C	TEU 3	-10.00	-20.00	DEB	Silver Lake/Sycan Marsh	NM ± NM	NM ± NM	No OH measurement
35-KL-814	226	1	D	TEU 3	-10.00	-20.00	DEB	Spodue Mountain	NM ± NM	NM ± NM	No OH measurement
35-KL-814	226	1	E	TEU 3	-10.00	-20.00	DEB	Spodue Mountain	NM ± NM	NM ± NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-814	226	1	F	TEU 3	-10.00 -20.00	DEB	Spodue Mountain	NM ±NM	NM ±NM	No OH measurement	
35-KL-814	226	1	G	TEU 3	-10.00 -20.00	DEB	Spodue Mountain	3.4 ± 0.1	NM ±NM	—	
35-KL-814	226	1	H	TEU 3	-10.00 -20.00	DEB	Spodue Mountain	4.3 ± 0.1	NM ±NM	—	
35-KL-814	228	2	A	TEU 3	-30.00 -40.00	DEB	Spodue Mountain	4.4 ± 0.1	NM ±NM	—	
35-KL-814	228	2	B	TEU 3	-30.00 -40.00	DEB	Spodue Mountain	3.3 ± 0.1	NM ±NM	—	
35-KL-814	228	2	C	TEU 3	-30.00 -40.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	No visible band	
35-KL-814	228	2	D	TEU 3	-30.00 -40.00	DEB	Spodue Mountain	4.6 ± 0.1	NM ±NM	—	
35-KL-814	228	2	E	TEU 3	-30.00 -40.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ±NM	—	
35-KL-814	229	1	—	TEU 3	-40.00 -50.00	DEB	Spodue Mountain	0.9 ±NM	NM ±NM	—	
35-KL-814	229	3	—	TEU 3	-40.00 -50.00	UFT	Spodue Mountain	4.8 ± 0.1	NM ±NM	—	
35-KL-814	230	1	A	TEU 3	-50.00 -60.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ±NM	—	
35-KL-814	230	1	B	TEU 3	-50.00 -60.00	DEB	Silver Lake/Sycan Marsh	6.0 ± 0.1	NM ±NM	—	
35-KL-814	230	1	C	TEU 3	-50.00 -60.00	DEB	Spodue Mountain	2.3 ± 0.1	NM ±NM	—	
35-KL-814	231	1	B	TEU 3	-60.00 -70.00	DEB	Spodue Mountain	2.3 ± 0.1	NM ±NM	—	
35-KL-814	231	1	C	TEU 3	-60.00 -70.00	DEB	Spodue Mountain	5.5 ±NM	NM ±NM	—	
35-KL-814	231	1	D	TEU 3	-60.00 -70.00	DEB	Spodue Mountain	4.2 ± 0.1	NM ±NM	—	
35-KL-814	232	1	C	TEU 3	-70.00 -80.00	DEB	Spodue Mountain	3.0 ± 0.1	NM ±NM	—	
35-KL-814	232	1	D	TEU 3	-70.00 -80.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ±NM	—	
35-KL-814	232	1	E	TEU 3	-70.00 -80.00	DEB	Spodue Mountain	9.1 ± 0.1	NM ±NM	Natural pebble	
35-KL-814	232	1	F	TEU 3	-70.00 -80.00	DEB	Spodue Mountain	3.9 ± 0.1	NM ±NM	—	
35-KL-814	232	1	G	TEU 3	-70.00 -80.00	DEB	Spodue Mountain	3.7 ±NM	NM ±NM	—	
35-KL-814	232	1	H	TEU 3	-70.00 -80.00	DEB	Spodue Mountain	3.9 ± 0.1	NM ±NM	—	
35-KL-814	232	1	I	TEU 3	-70.00 -80.00	DEB	Silver Lake/Sycan Marsh	4.7 ± 0.1	NM ±NM	—	
35-KL-814	232	2	—	TEU 3	-70.00 -80.00	UFT	Silver Lake/Sycan Marsh	5.4 ± 0.1	NM ±NM	—	
35-KL-814	233	2	B	TEU 3	-80.00 -90.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ±NM	—	
35-KL-814	233	2	C	TEU 3	-80.00 -90.00	DEB	Silver Lake/Sycan Marsh	4.8 ± 0.1	NM ±NM	—	
35-KL-814	233	2	D	TEU 3	-80.00 -90.00	DEB	Spodue Mountain	3.9 ± 0.1	NM ±NM	—	
35-KL-814	233	2	E	TEU 3	-80.00 -90.00	DEB	Silver Lake/Sycan Marsh	DH ±NM	NM ±NM	Diffuse hydration	
35-KL-814	234	1	B	TEU 3	-90.00 -100.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ±NM	—	
35-KL-814	234	1	C	TEU 3	-90.00 -100.00	DEB	Spodue Mountain	3.0 ± 0.1	NM ±NM	—	
35-KL-814	234	1	D	TEU 3	-90.00 -100.00	DEB	Spodue Mountain	2.6 ± 0.1	NM ±NM	—	
35-KL-814	234	1	E	TEU 3	-90.00 -100.00	DEB	Spodue Mountain	2.2 ± 0.1	NM ±NM	—	
35-KL-814	234	1	F	TEU 3	-90.00 -100.00	DEB	Spodue Mountain	3.5 ± 0.1	NM ±NM	—	
35-KL-814	234	1	G	TEU 3	-90.00 -100.00	DEB	Spodue Mountain	3.2 ± 0.1	NM ±NM	—	
35-KL-814	235	1	B	TEU 3	-100.00 -110.00	DEB	Spodue Mountain	3.2 ± 0.1	NM ±NM	—	
35-KL-814	235	1	C	TEU 3	-100.00 -110.00	DEB	Spodue Mountain	3.4 ± 0.1	NM ±NM	—	
35-KL-814	235	1	D	TEU 3	-100.00 -110.00	DEB	Spodue Mountain	3.9 ± 0.1	NM ±NM	—	
35-KL-814	235	1	E	TEU 3	-100.00 -110.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ±NM	—	
35-KL-814	236	1	A	TEU 3	-110.00 -120.00	DEB	Spodue Mountain	4.5 ± 0.1	NM ±NM	—	

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-814	236	1	B	TEU 3	-110.00 -120.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ± NM	—
35-KL-814	237	1	—	TEU 3	-120.00 -130.00	DEB	Spodue Mountain	3.5 ± 0.1	NM ± NM	—
35-KL-814	239	1	—	TEU 3	-140.00 -150.00	DEB	Silver Lake/Sycan Marsh	4.9 ± 0.1	NM ± NM	—
35-KL-814	256	1	—	TEU 4	-60.00 -70.00	DEB	Spodue Mountain	4.5 ± 0.2	NM ± NM	—
35-KL-814	266	1	—	TEU 5	-10.00 -20.00	DEB	Spodue Mountain	4.9 ± 0.1	NM ± NM	—
35-KL-814	266	2	—	TEU 5	-10.00 -20.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ± NM	—
35-KL-814	272	1	—	TEU 5	-80.00 -90.00	UFT	Spodue Mountain	3.9 ± 0.2	NM ± NM	—
35-KL-814	293	1	—	TEU 7	-90.00 -100.00	UFT	Silver Lake/Sycan Marsh	5.3 ± 0.2	NM ± NM	—
35-KL-814	315	1	—	SCP 2	0.00 0.00	UFT	Silver Lake/Sycan Marsh	1.7 ± NM	NM ± NM	—
35-KL-814	316	1	—	SCP 3	0.00 0.00	PPT	Spodue Mountain	3.3 ± 0.1	NM ± NM	—
35-KL-814	317	1	—	SCP 4	0.00 0.00	UFT	Silver Lake/Sycan Marsh	2.0 ± 0.1	NM ± NM	—
35-KL-814	318	1	—	SCP 5	0.00 0.00	PPT	Spodue Mountain	0.9 ± 0.1	NM ± NM	—
35-KL-814	319	1	—	SCP 6	0.00 0.00	UFT	Silver Lake/Sycan Marsh	1.0 ± 0.1	NM ± NM	—
35-KL-814	321	1	—	SCP 8	0.00 0.00	COR	Spodue Mountain	5.6 ± 0.1	NM ± NM	—
35-KL-814	322	1	—	SCP 9	0.00 0.00	UFT	Spodue Mountain	4.3 ± 0.1	NM ± NM	—
35-KL-814	323	1	—	SCP 10	0.00 0.00	UFT	Spodue Mountain	3.4 ± 0.1	NM ± NM	—
35-KL-814	324	1	—	SCP 11	0.00 0.00	UFT	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	325	1	A	SCU 1	0.00 0.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-814	325	1	B	SCU 1	0.00 0.00	DEB	Silver Lake/Sycan Marsh	1.3 ± NM	NM ± NM	—
35-KL-814	325	1	C	SCU 1	0.00 0.00	DEB	Spodue Mountain	5.3 ± 0.1	NM ± NM	—
35-KL-814	325	1	D	SCU 1	0.00 0.00	DEB	Spodue Mountain	1.3 ± NM	NM ± NM	—
35-KL-814	325	1	E	SCU 1	0.00 0.00	DEB	Silver Lake/Sycan Marsh	1.7 ± 0.1	NM ± NM	—
35-KL-814	325	1	F	SCU 1	0.00 0.00	DEB	Spodue Mountain	1.1 ± 0.1	NM ± NM	—
35-KL-814	325	1	G	SCU 1	0.00 0.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-814	325	1	H	SCU 1	0.00 0.00	DEB	Spodue Mountain	5.1 ± 0.2	NM ± NM	—
35-KL-814	325	1	I	SCU 1	0.00 0.00	DEB	Spodue Mountain	1.3 ± NM	NM ± NM	—
35-KL-814	325	1	J	SCU 1	0.00 0.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-814	325	1	K	SCU 1	0.00 0.00	DEB	Spodue Mountain	4.2 ± 0.2	NM ± NM	—
35-KL-814	325	1	L	SCU 1	0.00 0.00	DEB	Spodue Mountain	1.3 ± NM	NM ± NM	—
35-KL-814	325	1	M	SCU 1	0.00 0.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-814	325	1	N	SCU 1	0.00 0.00	DEB	Spodue Mountain	4.6 ± 0.2	NM ± NM	—
35-KL-814	325	1	O	SCU 1	0.00 0.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-814	325	1	P	SCU 1	0.00 0.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-814	325	1	Q	SCU 1	0.00 0.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ± NM	—
35-KL-814	325	1	R	SCU 1	0.00 0.00	DEB	Silver Lake/Sycan Marsh	1.3 ± 0.1	NM ± NM	—
35-KL-814	325	3	—	SCU 1	0.00 0.00	BIF	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-814	326	1	A	EXU (59S/70E)	3.00 -10.00	DEB	Spodue Mountain	1.1 ± 0.1	NM ± NM	—
35-KL-814	326	3	—	EXU (59S/70E)	3.00 -10.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-814	328	1	A	EXU (59S/70E)	-10.00 -20.00	DEB	Spodue Mountain	4.2 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-814	328	1	B	EXU (59S/70E)	-10.00 -20.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-814	328	1	C	EXU (59S/70E)	-10.00 -20.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	329	1	A	EXU (59S/70E)	-10.00 -20.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-814	330	1	A	EXU (59S/70E)	-20.00 -30.00	DEB	Spodue Mountain	4.9 ± 0.1	NM ± NM	—
35-KL-814	330	1	B	EXU (59S/70E)	-20.00 -30.00	DEB	Spodue Mountain	4.3 ± 0.1	NM ± NM	—
35-KL-814	330	1	C	EXU (59S/70E)	-20.00 -30.00	DEB	Silver Lake/Sycan Marsh	4.3 ± NM	NM ± NM	—
35-KL-814	330	1	D	EXU (59S/70E)	-20.00 -30.00	DEB	Spodue Mountain	1.9 ± 0.1	NM ± NM	—
35-KL-814	330	1	E	EXU (59S/70E)	-20.00 -30.00	DEB	Spodue Mountain	2.1 ± 0.1	NM ± NM	—
35-KL-814	331	1	A	EXU (59S/70E)	-20.00 -30.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ± NM	—
35-KL-814	332	1	A	EXU (59S/70E)	-30.00 -40.00	DEB	Silver Lake/Sycan Marsh	6.2 ± 0.1	NM ± NM	—
35-KL-814	336	1	A	EXU (59S/70E)	-50.00 -60.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	336	1	B	EXU (59S/70E)	-50.00 -60.00	DEB	Spodue Mountain	4.8 ± 0.2	NM ± NM	—
35-KL-814	338	1	A	EXU (59S/70E)	-60.00 -70.00	DEB	Spodue Mountain	9.9 ± 0.1	NM ± NM	—
35-KL-814	339	1	A	EXU (59S/70E)	-60.00 -70.00	DEB	Spodue Mountain	4.9 ± 0.1	NM ± NM	—
35-KL-814	339	1	B	EXU (59S/70E)	-60.00 -70.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	340	2	—	EXU (59S/70E)	-70.00 -80.00	DEB	Spodue Mountain	4.6 ± 0.1	NM ± NM	—
35-KL-814	341	1	A	EXU (59S/70E)	-70.00 -80.00	DEB	Spodue Mountain	5.6 ± 0.1	NM ± NM	—
35-KL-814	341	1	B	EXU (59S/70E)	-70.00 -80.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ± NM	—
35-KL-814	342	1	A	EXU (59S/70E)	-70.00 -80.00	DEB	Spodue Mountain	4.3 ± NM	NM ± NM	—
35-KL-814	342	1	B	EXU (59S/70E)	-70.00 -80.00	DEB	Spodue Mountain	4.7 ± 0.1	NM ± NM	—
35-KL-814	342	1	C	EXU (59S/70E)	-70.00 -80.00	DEB	Spodue Mountain	3.5 ± NM	NM ± NM	Weathered; Approx. 3.5 microns
35-KL-814	342	1	D	EXU (59S/70E)	-70.00 -80.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ± NM	—
35-KL-814	342	2	—	EXU (59S/70E)	-80.00 -90.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	344	1	A	EXU (59S/70E)	-90.00 -100.00	DEB	Spodue Mountain	6.1 ± 0.1	NM ± NM	—
35-KL-814	345	1	A	EXU (59S/70E)	-90.00 -100.00	DEB	Spodue Mountain	5.8 ± 0.2	NM ± NM	—
35-KL-814	345	1	B	EXU (59S/70E)	-90.00 -100.00	DEB	Spodue Mountain	5.3 ± 0.1	NM ± NM	—
35-KL-814	352	1	A	EXU (59S/70E)	-130.00 -140.00	DEB	Spodue Mountain	4.2 ± 0.1	NM ± NM	—
35-KL-814	362	2	—	EXU (71S/70E)	-10.00 -20.00	BIF	Spodue Mountain	3.5 ± 0.1	NM ± NM	—
35-KL-814	376	2	—	EXU (71S/70E)	-80.00 -90.00	UFT	Spodue Mountain	4.1 ± 0.1	NM ± NM	—
35-KL-814	406	3	—	EXU (95S/87E)	-10.00 -20.00	UFT	Spodue Mountain	2.6 ± 0.1	NM ± NM	—
35-KL-814	446	2	—	EXU (114S/66E)	-30.00 -40.00	UFT	Spodue Mountain	3.7 ± NM	NM ± NM	—
35-KL-814	458	1	—	EXU (118S/55E)	0.00 -10.00	UFT	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	458	2	A	EXU (118S/55E)	0.00 -10.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-814	460	1	A	EXU (118S/55E)	-10.00 -20.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ± NM	—
35-KL-814	460	1	B	EXU (118S/55E)	-10.00 -20.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ± NM	—
35-KL-814	463	1	A	EXU (118S/55E)	-20.00 -30.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ± NM	—
35-KL-814	464	1	A	EXU (118S/55E)	-30.00 -40.00	DEB	Spodue Mountain	3.4 ± 0.1	NM ± NM	—
35-KL-814	464	1	B	EXU (118S/55E)	-30.00 -40.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ± NM	—
35-KL-814	464	1	C	EXU (118S/55E)	-30.00 -40.00	DEB	Spodue Mountain	4.9 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-KL-814	536	2	—	EXU (39S/62E)	-70.00	-80.00	COR	Spodue Mountain	4.0 ± 0.1	NM ± NM	—
35-KL-814	588	1	A	EXU (82S/56E)	0.00	-10.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-814	588	1	B	EXU (82S/56E)	0.00	-10.00	DEB	Silver Lake/Sycan Marsh	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-814	590	1	A	EXU (82S/56E)	-10.00	-20.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ± NM	—
35-KL-814	590	1	B	EXU (82S/56E)	-10.00	-20.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ± NM	—
35-KL-814	592	1	A	EXU (82S/56E)	-20.00	-30.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	593	1	A	EXU (82S/56E)	-20.00	-30.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	Weathered
35-KL-814	594	1	A	EXU (82S/56E)	-30.00	-40.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ± NM	—
35-KL-814	594	1	B	EXU (82S/56E)	-30.00	-40.00	DEB	Silver Lake/Sycan Marsh	4.5 ± 0.2	NM ± NM	—
35-KL-814	594	1	C	EXU (82S/56E)	-30.00	-40.00	DEB	Spodue Mountain	4.8 ± NM	NM ± NM	—
35-KL-814	595	1	A	EXU (82S/56E)	-30.00	-40.00	DEB	Spodue Mountain	4.8 ± 0.1	NM ± NM	—
35-KL-814	596	1	A	EXU (82S/56E)	-40.00	-50.00	DEB	Spodue Mountain	4.4 ± 0.1	NM ± NM	—
35-KL-814	597	1	A	EXU (82S/56E)	-40.00	-50.00	DEB	Spodue Mountain	4.5 ± 0.1	NM ± NM	—
35-KL-814	598	1	A	EXU (82S/56E)	-50.00	-60.00	DEB	Spodue Mountain	4.6 ± 0.1	NM ± NM	—
35-KL-814	599	1	A	EXU (82S/56E)	-50.00	-60.00	DEB	Spodue Mountain	3.4 ± 0.1	NM ± NM	—
35-KL-814	600	1	A	EXU (82S/56E)	-60.00	-70.00	DEB	Spodue Mountain	4.4 ± 0.1	NM ± NM	—
35-KL-814	600	1	B	EXU (82S/56E)	-60.00	-70.00	DEB	Spodue Mountain	4.4 ± NM	NM ± NM	—
35-KL-814	600	2	—	EXU (82S/56E)	-60.00	-70.00	UFT	Silver Lake/Sycan Marsh	5.3 ± 0.1	NM ± NM	—
35-KL-814	620	1	A	EXU (87S/96E)	0.00	-10.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	Weathered; No visible band
35-KL-814	620	1	B	EXU (87S/96E)	0.00	-10.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-814	622	1	A	EXU (87S/96E)	-10.00	-20.00	DEB	Spodue Mountain	5.8 ± 0.1	NM ± NM	Weathered
35-KL-814	624	1	A	EXU (87S/96E)	-20.00	-30.00	DEB	Spodue Mountain	4.3 ± 0.1	NM ± NM	—
35-KL-814	625	1	A	EXU (87S/96E)	-20.00	-30.00	DEB	Spodue Mountain	4.8 ± 0.1	NM ± NM	—
35-KL-814	625	2	—	EXU (87S/96E)	-20.00	-30.00	DEB	Spodue Mountain	3.7 ± NM	NM ± NM	—
35-KL-814	626	1	A	EXU (87S/96E)	-30.00	-40.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	632	1	A	EXU (87S/96E)	-60.00	-70.00	DEB	Silver Lake/Sycan Marsh	5.2 ± 0.1	NM ± NM	—
35-KL-814	636	1	A	EXU (87S/96E)	-80.00	-82.00	DEB	Silver Lake/Sycan Marsh	5.6 ± 0.1	NM ± NM	—
35-KL-814	636	2	—	EXU (87S/96E)	-80.00	-82.00	BIF	Spodue Mountain	4.1 ± NM	NM ± NM	—
35-KL-814	637	1	A	EXU (87S/96E)	-82.00	-90.00	DEB	Silver Lake/Sycan Marsh	5.7 ± 0.1	NM ± NM	—
35-KL-814	638	1	A	EXU (87S/96E)	-90.00	-100.00	DEB	Silver Lake/Sycan Marsh	5.6 ± 0.1	NM ± NM	—
35-KL-814	642	1	A	EXU (87S/96E)	-110.00	-120.00	DEB	Spodue Mountain	4.7 ± 0.1	NM ± NM	Weathered
35-KL-814	657	2	—	EXU (64S/56E)	0.00	-10.00	COR	Spodue Mountain	4.8 ± 0.1	NM ± NM	—
35-KL-814	692	1	A	EXU (64S/80E)	-10.00	-20.00	DEB	Spodue Mountain	4.7 ± 0.1	NM ± NM	Weathered
35-KL-814	693	1	A	EXU (64S/80E)	-10.00	-20.00	DEB	Spodue Mountain	5.1 ± 0.1	NM ± NM	—
35-KL-814	694	1	A	EXU (64S/80E)	-20.00	-30.00	DEB	Silver Lake/Sycan Marsh	6.0 ± 0.1	NM ± NM	—
35-KL-814	694	1	B	EXU (64S/80E)	-20.00	-30.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-814	694	1	C	EXU (64S/80E)	-20.00	-30.00	DEB	Spodue Mountain	6.6 ± 0.1	NM ± NM	—
35-KL-814	696	1	A	EXU (64S/80E)	-30.00	-40.00	DEB	Spodue Mountain	2.7 ± 0.1	NM ± NM	—
35-KL-814	698	1	A	EXU (64S/80E)	-40.00	-50.00	DEB	Spodue Mountain	3.0 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-814	698	1	B	EXU (64S/80E)	-40.00 -50.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	No visible band
35-KL-814	700	1	A	EXU (64S/80E)	-50.00 -60.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-KL-814	704	1	A	EXU (64S/80E)	-70.00 -80.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ±NM	—
35-KL-814	706	1	A	EXU (64S/80E)	-80.00 -90.00	DEB	Silver Lake/Sycan Marsh	5.5 ± 0.1	NM ±NM	—
35-KL-814	707	1	A	EXU (64S/80E)	-80.00 -90.00	DEB	Spodue Mountain	4.2 ± 0.1	NM ±NM	—
35-KL-814	707	1	B	EXU (64S/80E)	-80.00 -90.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ±NM	—
35-KL-814	708	1	A	EXU (64S/80E)	-90.00 -100.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ±NM	—
35-KL-814	708	1	B	EXU (64S/80E)	-90.00 -100.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ±NM	—
35-KL-814	708	1	C	EXU (64S/80E)	-90.00 -100.00	DEB	Spodue Mountain	4.3 ± 0.1	NM ±NM	—
35-KL-814	709	1	A	EXU (64S/80E)	-90.00 -100.00	DEB	Spodue Mountain	3.9 ± 0.1	NM ±NM	—
35-KL-814	709	1	B	EXU (64S/80E)	-90.00 -100.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ±NM	—
35-KL-814	710	1	A	EXU (64S/80E)	-100.00 -110.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ±NM	—
35-KL-814	712	1	A	EXU (64S/80E)	-110.00 -120.00	DEB	Spodue Mountain	5.9 ± 0.1	NM ±NM	—
35-KL-814	721	1	A	EXU (65S/80E)	0.00 -10.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-KL-814	722	1	A	EXU (65S/80E)	-10.00 -20.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ±NM	—
35-KL-814	722	1	B	EXU (65S/80E)	-10.00 -20.00	DEB	Spodue Mountain	4.7 ± 0.1	NM ±NM	—
35-KL-814	724	1	A	EXU (65S/80E)	-20.00 -30.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-KL-814	724	1	B	EXU (65S/80E)	-20.00 -30.00	DEB	Spodue Mountain	1.8 ± 0.1	NM ±NM	—
35-KL-814	726	1	A	EXU (65S/80E)	-30.00 -40.00	DEB	Spodue Mountain	3.7 ± 0.1	NM ±NM	—
35-KL-814	728	1	A	EXU (65S/80E)	-40.00 -50.00	DEB	Spodue Mountain	7.4 ± 0.1	NM ±NM	—
35-KL-814	730	1	A	EXU (65S/80E)	-50.00 -60.00	DEB	Spodue Mountain	4.3 ± 0.1	NM ±NM	—
35-KL-814	731	1	A	EXU (65S/80E)	-50.00 -60.00	DEB	Spodue Mountain	5.4 ± 0.1	NM ±NM	—
35-KL-814	735	1	A	EXU (65S/80E)	-70.00 -80.00	DEB	Spodue Mountain	3.2 ±NM	NM ±NM	—
35-KL-814	735	1	B	EXU (65S/80E)	-70.00 -80.00	DEB	Silver Lake/Sycan Marsh	4.3 ± 0.1	NM ±NM	—
35-KL-814	736	1	A	EXU (65S/80E)	-80.00 -90.00	DEB	Spodue Mountain	3.6 ± 0.1	NM ±NM	—
35-KL-814	737	1	A	EXU (65S/80E)	-80.00 -90.00	DEB	Spodue Mountain	5.0 ± 0.1	NM ±NM	—
35-KL-814	737	1	B	EXU (65S/80E)	-80.00 -90.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ±NM	—
35-KL-814	737	1	C	EXU (65S/80E)	-80.00 -90.00	DEB	Spodue Mountain	4.7 ± 0.2	NM ±NM	—
35-KL-814	738	1	A	EXU (65S/80E)	-90.00 -100.00	DEB	Spodue Mountain	4.3 ± 0.1	NM ±NM	—
35-KL-814	738	1	B	EXU (65S/80E)	-90.00 -100.00	DEB	Spodue Mountain	4.3 ± 0.1	NM ±NM	—
35-KL-814	738	1	C	EXU (65S/80E)	-90.00 -100.00	DEB	Silver Lake/Sycan Marsh	3.8 ± 0.1	NM ±NM	—
35-KL-814	738	1	D	EXU (65S/80E)	-90.00 -100.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	No visible band
35-KL-814	738	1	E	EXU (65S/80E)	-90.00 -100.00	DEB	Silver Lake/Sycan Marsh	6.0 ± 0.2	NM ±NM	—
35-KL-814	738	1	F	EXU (65S/80E)	-90.00 -100.00	DEB	Silver Lake/Sycan Marsh	3.1 ± 0.1	NM ±NM	—
35-KL-814	738	1	G	EXU (65S/80E)	-90.00 -100.00	DEB	Spodue Mountain	3.6 ±NM	NM ±NM	—
35-KL-814	738	3	—	EXU (65S/80E)	-90.00 -100.00	COR	Spodue Mountain	5.7 ±NM	NM ±NM	—
35-KL-814	739	1	A	EXU (65S/80E)	-90.00 -100.00	DEB	Spodue Mountain	4.1 ± 0.1	NM ±NM	—
35-KL-814	740	1	A	EXU (65S/80E)	-100.00 -110.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ±NM	—
35-KL-814	740	1	B	EXU (65S/80E)	-100.00 -110.00	DEB	Spodue Mountain	4.4 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-814	740	1	C	EXU (65S/80E)	-100.00 -110.00	DEB	Spodue Mountain	5.3 ± 0.1	NM ± NM	—
35-KL-814	740	1	D	EXU (65S/80E)	-100.00 -110.00	DEB	Spodue Mountain	3.4 ± 0.1	NM ± NM	—
35-KL-814	740	1	E	EXU (65S/80E)	-100.00 -110.00	DEB	Spodue Mountain	4.6 ± 0.1	NM ± NM	—
35-KL-814	742	1	A	EXU (65S/80E)	-110.00 -120.00	DEB	Spodue Mountain	5.5 ± NM	NM ± NM	—
35-KL-814	742	1	B	EXU (65S/80E)	-110.00 -120.00	DEB	Silver Lake/Sycan Marsh	6.3 ± NM	NM ± NM	—
35-KL-814	743	1	A	EXU (65S/80E)	-110.00 -120.00	DEB	Spodue Mountain	5.5 ± 0.1	NM ± NM	—
35-KL-814	746	1	A	EXU (65S/80E)	-130.00 -140.00	DEB	Silver Lake/Sycan Marsh	5.2 ± 0.1	NM ± NM	—
35-KL-814	775	2	—	EXU (131S/81E)	-10.00 -20.00	COR	Spodue Mountain	4.4 ± 0.1	NM ± NM	—
35-KL-814	783	2	—	MEC 3	0.00 -50.00	PPT	Spodue Mountain	1.5 ± 0.1	NM ± NM	—
35-KL-814	800	1	A	EXU (64S/80E)	-80.00 -90.00	DEB	Spodue Mountain	6.1 ± 0.1	NM ± NM	—
35-KL-814	808	1	—	EXU (57S/78E)	6.00 0.00	UFT	Silver Lake/Sycan Marsh	4.2 ± 0.1	NM ± NM	—
35-KL-814	818	1	—	EXU (57S/78E)	-80.00 -100.00	UFT	Spodue Mountain	3.3 ± 0.1	NM ± NM	—
35-KL-814	820	6	—	EXU (57S/78E)	-100.00 -110.00	UFT	Spodue Mountain	4.7 ± 0.1	NM ± NM	—
35-KL-814	820	7	—	EXU (57S/78E)	-100.00 -110.00	COR	Spodue Mountain	7.9 ± 0.1	NM ± NM	—
35-KL-814	821	1	—	EXU (57S/78E)	-100.00 -110.00	UFT	Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ± NM	—
35-KL-814	831	1	—	EXU (58S/78E)	-40.00 -60.00	BIF	Silver Lake/Sycan Marsh	8.0 ± 0.1	NM ± NM	—
35-KL-814	852	2	—	EXU (58S/79E)	-60.00 -80.00	DEB	Spodue Mountain	2.4 ± NM	NM ± NM	—
35-KL-814	854	2	—	EXU (58S/79E)	-80.00 -100.00	UFT	Spodue Mountain	3.9 ± 0.1	NM ± NM	—
35-KL-814	869	2	—	EXU (64S/81E)	-40.00 -60.00	PPT	Silver Lake/Sycan Marsh	5.4 ± 0.2	NM ± NM	—
35-KL-814	871	2	—	EXU (64S/81E)	-60.00 -80.00	UFT	Spodue Mountain	3.7 ± NM	NM ± NM	—
35-KL-814	875	3	—	EXU (64S/81E)	-90.00 -100.00	BIF	Spodue Mountain	5.2 ± 0.1	NM ± NM	—
35-KL-814	899	2	—	EXU (65S/81E)	0.00 -20.00	UFT	Silver Lake/Sycan Marsh	8.8 ± 0.1	NM ± NM	—
35-KL-814	927	2	—	EXU (65S/82E)	-90.00 -100.00	COR	Spodue Mountain	4.8 ± 0.1	NM ± NM	—
35-KL-814	947	3	—	EXU (70S/80E)	-20.00 -40.00	UFT	Spodue Mountain	2.8 ± 0.1	NM ± NM	—
35-KL-814	950	2	—	EXU (70S/80E)	-40.00 -60.00	BIF	Spodue Mountain	2.8 ± 0.2	NM ± NM	—
35-KL-814	951	2	—	EXU (70S/80E)	-60.00 -70.00	UFT	Spodue Mountain	4.7 ± 0.1	NM ± NM	—
35-KL-814	966	2	—	EXU (70S/81E)	-60.00 -70.00	UFT	Spodue Mountain	4.6 ± 0.2	NM ± NM	—
35-KL-814	975	2	—	EXU (70S/70E)	0.00 -20.00	UFT	Spodue Mountain	1.4 ± 0.1	NM ± NM	—
35-KL-814	977	3	—	EXU (70S/70E)	-20.00 -40.00	BIF	Spodue Mountain	2.4 ± NM	NM ± NM	—
35-KL-814	987	2	—	EXU (72S/80E)	0.00 -20.00	COR	Spodue Mountain	5.2 ± 0.2	NM ± NM	—
35-KL-814	989	2	—	EXU (72S/80E)	-20.00 -40.00	COR	Spodue Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-KL-814	994	2	—	EXU (72S/80E)	-60.00 -80.00	DEB	Silver Lake/Sycan Marsh	4.9 ± 0.1	NM ± NM	—
35-KL-814	995	2	—	EXU (72S/80E)	-80.00 -90.00	DEB	Spodue Mountain	4.9 ± 0.1	NM ± NM	—
35-KL-814	996	2	—	EXU (72S/80E)	-80.00 -90.00	DEB	Spodue Mountain	4.5 ± 0.1	NM ± NM	—
35-KL-814	996	3	—	EXU (72S/80E)	-80.00 -90.00	COR	Silver Lake/Sycan Marsh	4.9 ± 0.1	NM ± NM	—
35-KL-814	1027	2	—	EXU (73S/81E)	-60.00 -80.00	UFT	Spodue Mountain	4.3 ± 0.1	NM ± NM	—
35-KL-814	1028	2	—	EXU (73S/81E)	-60.00 -80.00	DEB	Silver Lake/Sycan Marsh	6.6 ± 0.1	NM ± NM	—
35-KL-814	1029	2	—	EXU (73S/81E)	-80.00 -90.00	COR	Spodue Mountain	4.8 ± NM	NM ± NM	—
35-KL-814	1040	2	—	EXU (80S/87E)	-20.00 -40.00	UFT	Spodue Mountain	5.4 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-814	1042	2	—	EXU (80S/87E)	-40.00 -60.00	COR	Spodue Mountain	4.4 ± 0.2	NM ±NM	—	
35-KL-814	1047	2	—	EXU (80S/87E)	-70.00 -80.00	DEB	Spodue Mountain	4.8 ±NM	NM ±NM	—	
35-KL-814	1050	2	—	EXU (80S/87E)	-90.00 -100.00	DEB	Spodue Mountain	5.5 ± 0.1	NM ±NM	—	
35-KL-814	1061	2	—	EXU (90S/97E)	-20.00 -40.00	BIF	Spodue Mountain	DH ±NM	NM ±NM	Diffuse hydration	
35-KL-814	1099	2	—	EXU (57S/78E)	-80.00 -100.00	DEB	Spodue Mountain	5.3 ± 0.1	NM ±NM	—	
35-KL-814	1100	1	—	EXU (57S/78E)	-80.00 -100.00	BIF	Spodue Mountain	4.7 ± 0.1	NM ±NM	—	
35-KL-814	1105	2	—	EXU (64S/82E)	-80.00 -90.00	PPT	Silver Lake/Sycan Marsh	4.6 ± 0.1	NM ±NM	—	
35-KL-814	1112	2	—	EXU (65S/82E)	-80.00 -90.00	UFT	Spodue Mountain	4.1 ± 0.1	NM ±NM	—	
35-KL-814	1113	3	—	EXU (65S/83E)	-80.00 -90.00	UFT	Spodue Mountain	4.8 ±NM	NM ±NM	—	
35-KL-814	1118	2	—	EXU (70S/80E)	-70.00 -80.00	UFT	Spodue Mountain	4.2 ±NM	NM ±NM	—	
35-KL-814	1131	2	—	EXU (73S/81E)	-80.00 -90.00	UFT	Spodue Mountain	5.5 ± 0.1	NM ±NM	—	
35-KL-814	1132	2	—	EXU (73S/81E)	-80.00 -90.00	DEB	Spodue Mountain	4.2 ±NM	NM ±NM	—	
35-KL-815	1	1	—	SHP 1	0.00 -20.00	DEB	Spodue Mountain	3.7 ±NM	NM ±NM	—	
35-KL-815	22	1	—	SHP 5	0.00 -20.00	DEB	Spodue Mountain	3.5 ±NM	NM ±NM	—	
35-KL-815	40	1	—	SHP 9	0.00 -20.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Weathered; Diffuse hydration	
35-KL-815	101	1	—	SHP 17	-40.00 -60.00	DEB	Spodue Mountain	1.3 ± 0.1	NM ±NM	Weathered	
35-KL-815	185	1	—	STU 5	0.00 -10.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	Weathered; No visible band	
35-KL-815	195	1	—	STU 15	0.00 -11.00	DEB	Spodue Mountain	1.8 ±NM	NM ±NM	—	
35-KL-815	199	1	—	STU 19	0.00 -10.00	DEB	Spodue Mountain	4.9 ± 0.1	NM ±NM	—	
35-KL-815	200	1	—	SCP 2	0.00 0.00	DEB	Spodue Mountain	2.5 ± 0.1	NM ±NM	—	
35-KL-815	201	1	—	SCP 3	0.00 0.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	Weathered; No visible band	
35-KL-815	202	1	—	SCP 4	0.00 0.00	DEB	Spodue Mountain	3.1 ± 0.1	NM ±NM	—	
35-KL-815	203	1	—	SCP 6	0.00 0.00	DEB	Spodue Mountain	1.8 ±NM	NM ±NM	—	
35-KL-815	204	1	—	SCP 7	0.00 0.00	DEB	Spodue Mountain	2.3 ±NM	NM ±NM	—	
35-KL-815	205	1	—	SCP 8	0.00 0.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Weathered; Diffuse hydration	
35-KL-815	206	1	—	SCP 10	0.00 0.00	DEB	Spodue Mountain	1.3 ±NM	NM ±NM	—	
35-KL-815	207	1	—	SCP 11	0.00 0.00	DEB	Spodue Mountain	1.5 ± 0.1	NM ±NM	—	
35-KL-815	208	1	—	SCP 12	0.00 0.00	UFT	Spodue Mountain	1.2 ± 0.1	NM ±NM	—	
35-KL-815	210	1	—	SCP 14	0.00 0.00	DEB	Spodue Mountain	3.3 ± 0.1	NM ±NM	—	
35-KL-815	211	1	—	SCP 15	0.00 0.00	UFT	Silver Lake/Sycan Marsh	1.4 ±NM	NM ±NM	—	
35-KL-815	213	1	—	SCP 5	0.00 0.00	UFT	Spodue Mountain	2.7 ±NM	NM ±NM	—	
35-KL-815	213	2	—	SCP 5	0.00 0.00	UFT	Spodue Mountain	NVB ±NM	NM ±NM	No visible band	
35-KL-815	214	1	—	SCP 9	0.00 0.00	PPT	Silver Lake/Sycan Marsh	2.8 ± 0.1	2.9 ± 0.1	Second cut	
35-KL-815	219	1	—	TEU 1	0.00 -10.00	PPT	Spodue Mountain	1.9 ± 0.1	1.9 ± 0.1	2 hydration bands	
35-KL-816	3	1	—	SCP 1	0.00 0.00	PPT	Silver Lake/Sycan Marsh	NVB ±NM	NM ±NM	No visible band	
35-KL-817	40	1	—	STU 9	0.00 -10.00	DEB	Spodue Mountain	1.2 ±NM	NM ±NM	—	
35-KL-818	1	1	—	SCP 1	0.00 0.00	PPT	East Medicine Lake?	3.5 ± 0.1	NM ±NM	—	
35-KL-818	2	1	—	SCP 2	0.00 0.00	PPT	Unknown A	NM ±NM	NM ±NM	No OH measurement	
35-KL-818	3	1	—	SCP 3	0.00 0.00	PPT	Blue Mountain	NVB ±NM	NM ±NM	No visible band	

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-KL-818	4	1	—	SCP 4	0.00	0.00	PPT Spodue Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-KL-818	7	1	—	SCP 7	0.00	0.00	PPT Unknown B	NVB ±NM	NM ±NM	No visible band
35-KL-818	8	1	—	SCP 8	0.00	0.00	UFT Blue Mountain	NVB ±NM	NM ±NM	No visible band
35-KL-818	9	1	—	SCP 9	0.00	0.00	UFT East Medicine Lake?	DH ±NM	NM ±NM	Diffuse hydration
35-KL-818	10	1	—	SCP 10	0.00	0.00	BIF GF/LIW/RS	4.3 ± 0.1	NM ±NM	—
35-KL-818	11	1	—	SCP 11	0.00	0.00	UFT Spodue Mountain	NM ±NM	NM ±NM	No OH measurement
35-KL-818	13	1	—	SCP 13	0.00	0.00	PPT Drews Creek/Butcher Flat	1.0 ± 0.1	NM ±NM	—
35-KL-818	14	1	—	SCP 14	0.00	0.00	UFT GF/LIW/RS	2.8 ± 0.1	3.4 ± 0.1	2 hydration bands
35-KL-818	15	1	—	SCP 15	0.00	0.00	UFT East Medicine Lake?	1.2 ± 0.1	NM ±NM	—
35-KL-818	16	1	—	SCP 16	0.00	0.00	PPT Spodue Mountain	NVB ±NM	NM ±NM	No visible band
35-KL-818	17	1	—	SCP 17	0.00	0.00	DEB Spodue Mountain	DH ±NM	NM ±NM	Diffuse hydration
35-KL-818	19	1	—	SCP 19	0.00	0.00	DEB Cougar Butte?	1.3 ± 0.1	NM ±NM	—
35-KL-818	20	1	—	SCP 20	0.00	0.00	PPT East Medicine Lake?	NM ±NM	NM ±NM	No OH measurement
35-KL-818	21	1	—	SCP 21	0.00	0.00	UFT East Medicine Lake?	NM ±NM	NM ±NM	No OH measurement
35-KL-818	24	1	—	SCP 24	0.00	0.00	PPT Drews Creek/Butcher Flat	1.8 ±NM	3.9 ± 0.1	2 hydration bands
35-KL-818	27	1	—	SCP 27	0.00	0.00	BIF Drews Creek/Butcher Flat	2.9 ± 0.1	NM ±NM	—
35-KL-818	31	1	—	SCP 31	0.00	0.00	DEB Drews Creek/Butcher Flat	DH ±NM	NM ±NM	Diffuse hydration
35-KL-818	32	1	—	SCP 32	0.00	0.00	DEB GF/LIW/RS/East Medicine Lake	NM ±NM	NM ±NM	No OH measurement
35-KL-818	33	1	—	SCP 33	0.00	0.00	DEB Spodue Mountain	1.6 ± 0.1	NM ±NM	—
35-KL-818	34	1	—	SCP 34	0.00	0.00	DEB GF/LIW/RS/East Medicine Lake	NM ±NM	NM ±NM	No OH measurement
35-KL-818	36	1	—	SCP 36	0.00	0.00	DEB Spodue Mountain	1.2 ±NM	NM ±NM	—
35-KL-818	37	1	—	SCP 37	0.00	0.00	DEB Spodue Mountain	1.9 ± 0.1	NM ±NM	—
35-KL-818	38	1	—	SCP 38	0.00	0.00	DEB East Medicine Lake?	NM ±NM	NM ±NM	No OH measurement
35-KL-818	39	1	—	SCP 39	0.00	0.00	DEB Drews Creek/Butcher Flat	1.2 ±NM	NM ±NM	—
35-KL-818	40	1	—	SCP 40	0.00	0.00	UFT Glass Mountain?	NM ±NM	NM ±NM	No OH measurement
35-KL-818	41	1	—	SCP 41	0.00	0.00	DEB Drews Creek/Butcher Flat	2.1 ± 0.1	NM ±NM	—
35-KL-818	42	1	—	SCP 42	0.00	0.00	DEB Spodue Mountain	1.7 ±NM	NM ±NM	—
35-KL-818	43	1	—	SCP 43	0.00	0.00	DEB Drews Creek/Butcher Flat	1.5 ± 0.1	NM ±NM	—
35-KL-818	44	1	—	SCP 44	0.00	0.00	DEB Drews Creek/Butcher Flat	4.2 ±NM	NM ±NM	—
35-KL-818	45	1	—	SCP 45	0.00	0.00	DEB Spodue Mountain	NVB ±NM	NM ±NM	Weathered; No visible band; Natural pebble
35-KL-818	46	1	—	SCP 46	0.00	0.00	UFT Spodue Mountain	3.0 ± 0.1	NM ±NM	—
35-KL-818	49	1	—	SCP 49	0.00	0.00	DEB GF/LIW/RS/East Medicine Lake	NM ±NM	NM ±NM	No OH measurement
35-KL-818	50	1	—	SCP 50	0.00	0.00	DEB Blue Mountain	1.7 ± 0.1	NM ±NM	—
35-KL-818	51	1	—	SCP 51	0.00	0.00	BIF East Medicine Lake?	NM ±NM	NM ±NM	No OH measurement
35-KL-818	52	1	—	SCP 52	0.00	0.00	DEB Blue Mountain	1.8 ±NM	NM ±NM	—
35-KL-818	56	1	—	SCP 56	0.00	0.00	DEB Drews Creek/Butcher Flat	NVB ±NM	NM ±NM	No visible band
35-KL-818	57	1	—	SCP 57	0.00	0.00	DEB GF/LIW/RS/East Medicine Lake	NM ±NM	NM ±NM	No OH measurement
35-KL-818	59	1	—	SCP 59	0.00	0.00	DEB Spodue Mountain	1.8 ±NM	NM ±NM	—
35-KL-818	60	1	—	SCP 60	0.00	0.00	DEB Spodue Mountain	DH ±NM	NM ±NM	Weathered; Diffuse hydration

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-KL-818	61	1	—	SCP 61	0.00	0.00	DEB	Blue Mountain	1.6 ± 0.1	NM ±NM	—
35-KL-818	62	1	—	SCP 62	0.00	0.00	DEB	Spodue Mountain	2.1 ± 0.1	NM ±NM	—
35-KL-818	100	1	A	STU 2	0.00	-10.00	DEB	Blue Mountain	1.7 ±NM	NM ±NM	—
35-KL-818	100	1	B	STU 2	0.00	-10.00	DEB	Blue Mountain	2.4 ± 0.1	NM ±NM	—
35-KL-818	102	1	—	STU 4	0.00	-10.00	PPT	GF/LIW/RS	1.2 ± 0.1	1.3 ± 0.1	—
35-KL-818	126	1	—	STU 26	0.00	-10.00	DEB	Blue Mountain	1.6 ±NM	NM ±NM	—
35-KL-818	128	1	A	STU 28	0.00	-10.00	DEB	GF/LIW/RS/East Medicine Lake	NM ±NM	NM ±NM	No OH measurement
35-KL-818	128	1	B	STU 28	0.00	-10.00	DEB	Drews Creek/Butcher Flat	3.0 ± 0.1	NM ±NM	—
35-KL-818	129	1	—	STU 29	0.00	-10.00	BIF	Spodue Mountain	NVB ±NM	NM ±NM	No visible band
35-KL-818	130	1	—	STU 29	0.00	-10.00	BIF	Drews Creek/Butcher Flat	1.3 ± 0.1	NM ±NM	—
35-KL-818	156	1	—	TEU 5	4.00	0.00	PPT	Silver Lake/Sycan Marsh	4.2 ± 0.2	NM ±NM	—
35-KL-832	20	1	—	SCP 1	0.00	0.00	PFT	Spodue Mountain	2.5 ± 0.1	NM ±NM	—
35-KL-832	21	1	—	SCP 2	0.00	0.00	PPT	Spodue Mountain	1.7 ± 0.1	3.7 ± 0.1	2 hydration bands
35-KL-832	23	1	—	SCP 4	0.00	0.00	BIF	Spodue Mountain	3.8 ± 0.1	NM ±NM	—
35-KL-832	24	1	—	SCP 5	0.00	0.00	PPT	Spodue Mountain	4.9 ± 0.1	NM ±NM	—
35-KL-832	27	4	A	SCP 8	0.00	0.00	DEB	Spodue Mountain	4.1 ± 0.1	NM ±NM	Weathered
35-KL-832	27	4	B	SCP 8	0.00	0.00	DEB	Spodue Mountain	3.0 ±NM	NM ±NM	—
35-KL-832	27	4	C	SCP 8	0.00	0.00	DEB	Spodue Mountain	3.5 ± 0.1	NM ±NM	—
35-KL-832	27	4	D	SCP 8	0.00	0.00	DEB	Spodue Mountain	3.1 ± 0.1	NM ±NM	—
35-KL-832	27	5	—	SCP 8	0.00	0.00	BIF	Spodue Mountain	3.0 ± 0.1	NM ±NM	—
35-KL-832	27	6	—	SCP 8	0.00	0.00	UFT	Spodue Mountain	2.4 ± 0.1	NM ±NM	—
35-KL-832	27	7	—	SCP 8	0.00	0.00	UFT	Spodue Mountain	1.7 ± 0.1	1.7 ± 0.1	2 hydration bands
35-KL-832	9999	1	A	SCU A	0.00	0.00	GEO	Spodue Mountain	NM ±NM	NM ±NM	No OH measurement; Nodule
35-KL-832	9999	2	A	SCU A	0.00	0.00	GEO	Spodue Mountain	NM ±NM	NM ±NM	No OH measurement; Nodule
35-KL-832	9999	3	A	SCU A	0.00	0.00	GEO	Unknown A	NM ±NM	NM ±NM	No OH measurement; Nodule
35-KL-834	2	1	—	SCP 2	0.00	0.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	Weathered; No visible band
35-KL-834	3	1	—	SCP 3	0.00	0.00	DEB	Spodue Mountain	3.8 ± 0.1	NM ±NM	—
35-KL-834	4	1	—	SCP 4	0.00	0.00	DEB	Spodue Mountain	NVB ±NM	NM ±NM	Weathered; No visible band
35-KL-834	5	1	—	SCP 5	0.00	0.00	DEB	Spodue Mountain	1.8 ± 0.1	NM ±NM	—
35-KL-834	6	1	—	SCP 6	0.00	0.00	DEB	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ±NM	—
35-KL-834	64	1	A	SHP 10	0.00	-20.00	DEB	Spodue Mountain	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-KL-834	64	2	—	SHP 10	0.00	-20.00	COR	Spodue Mountain	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-KL-834	70	1	—	STU 2	0.00	-10.00	DEB	Spodue Mountain	1.2 ±NM	NM ±NM	—
35-KL-834	71	1	—	STU 3	0.00	-10.00	DEB	Silver Lake/Sycan Marsh	1.0 ±NM	NM ±NM	—
35-KL-835	1	1	—	SCP 1	0.00	0.00	DEB	Spodue Mountain	2.1 ± 0.1	NM ±NM	Weathered
35-KL-835	2	1	—	SCP 2	0.00	0.00	DEB	Spodue Mountain	1.7 ± 0.1	NM ±NM	Weathered
35-KL-835	3	1	—	SCP 3	0.00	0.00	DEB	Spodue Mountain	1.2 ±NM	NM ±NM	Weathered
35-KL-835	4	1	—	SCP 4	0.00	0.00	DEB	Silver Lake/Sycan Marsh	2.8 ± 0.1	NM ±NM	—
35-KL-835	5	1	—	SCP 5	0.00	0.00	DEB	Spodue Mountain	1.4 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-KL-835	7	1	—	SCP 7	0.00	0.00	DEB	Silver Lake/Sycan Marsh	3.2 ± 0.1	NM ± NM	—
35-KL-835	8	1	—	SCP 8	0.00	0.00	DEB	Spodue Mountain	1.2 ± NM	NM ± NM	—
35-KL-835	10	1	—	SCP 10	0.00	0.00	DEB	Spodue Mountain	1.4 ± NM	NM ± NM	—
35-KL-835	11	1	—	SCP 11	0.00	0.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	Weathered; Band approx. 6.7 microns
35-KL-835	12	1	—	SCP 12	0.00	0.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-KL-835	13	1	—	SCP 13	0.00	0.00	DEB	Spodue Mountain	4.0 ± 0.1	NM ± NM	—
35-KL-835	15	1	—	SCP 15	0.00	0.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-835	16	1	—	SCP 16	0.00	0.00	DEB	Spodue Mountain	4.7 ± 0.1	NM ± NM	—
35-KL-835	17	1	—	SCP 17	0.00	0.00	DEB	Spodue Mountain	2.8 ± 0.1	NM ± NM	—
35-KL-835	18	1	—	SCP 18	0.00	0.00	DEB	Spodue Mountain	1.4 ± NM	NM ± NM	—
35-KL-835	19	1	—	SCP 19	0.00	0.00	UFT	Spodue Mountain	2.0 ± 0.1	NM ± NM	—
35-KL-835	20	1	—	SCP 20	0.00	0.00	UFT	Spodue Mountain	4.2 ± 0.1	NM ± NM	—
35-KL-835	21	1	—	AUG 1	0.00	-20.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-KL-835	26	1	—	AUG 2	-20.00	-40.00	DEB	Spodue Mountain	3.0 ± 0.1	NM ± NM	—
35-KL-835	29	1	—	AUG 2	-80.00	-100.00	DEB	Silver Lake/Sycan Marsh	2.6 ± 0.1	NM ± NM	—
35-KL-835	42	1	—	AUG 3	-20.00	-40.00	DEB	Spodue Mountain	1.8 ± NM	NM ± NM	—
35-KL-835	48	1	A	AUG 5	0.00	-20.00	DEB	Spodue Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-KL-835	48	1	B	AUG 5	0.00	-20.00	DEB	Spodue Mountain	NVB ± NM	NM ± NM	No visible band
35-KL-835	48	1	C	AUG 5	0.00	-20.00	DEB	Spodue Mountain	1.8 ± NM	NM ± NM	—
35-KL-835	49	1	—	AUG 5	-20.00	-40.00	UFT	Spodue Mountain	1.3 ± 0.1	NM ± NM	—
35-KL-835	76	1	—	SHP 2	0.00	-20.00	DEB	Spodue Mountain	2.0 ± NM	NM ± NM	—
35-KL-835	183	1	—	STU 2	0.00	-10.00	DEB	Witham Creek	1.1 ± 0.1	NM ± NM	—
35-KL-835	188	1	—	TEU 1	0.00	-20.00	DEB	Spodue Mountain	1.2 ± 0.1	NM ± NM	—
35-KL-835	189	1	—	TEU 1	-20.00	-40.00	DEB	Spodue Mountain	3.0 ± 0.1	NM ± NM	—
35-KL-865	2	2	—	STU 2	0.00	-10.00	DEB	Spodue Mountain	2.4 ± NM	NM ± NM	—
35-KL-865	29	1	—	SON 5	-40.00	-60.00	DEB	Spodue Mountain	1.5 ± 0.1	NM ± NM	—
35-SH-135	1	1	—	SCP 1	0.00	0.00	BIF	Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-SH-135	9	1	—	SCP 9	0.00	0.00	PPT	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-SH-135	15	1	—	SCP 12	0.00	0.00	BIF	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-SH-135	110	3	—	SCU 4	0.00	0.00	DEB	McKay Butte	4.1 ± 0.1	NM ± NM	—
35-SH-135	113	3	A	SCU 7	0.00	0.00	DEB	Quartz Mountain/McKay Butte	4.3 ± 0.1	NM ± NM	—
35-SH-135	113	3	B	SCU 7	0.00	0.00	DEB	Quartz Mountain	4.7 ± NM	NM ± NM	—
35-SH-135	113	3	C	SCU 7	0.00	0.00	DEB	Quartz Mountain	DH ± NM	NM ± NM	Weathered; Diffuse hydration
35-SH-135	113	3	D	SCU 7	0.00	0.00	DEB	Quartz Mountain/McKay Butte	4.7 ± 0.1	NM ± NM	Weathered
35-SH-135	113	3	E	SCU 7	0.00	0.00	DEB	Quartz Mountain/McKay Butte	4.7 ± 0.1	NM ± NM	—
35-SH-135	113	3	F	SCU 7	0.00	0.00	DEB	Quartz Mountain/McKay Butte	5.7 ± NM	NM ± NM	—
35-SH-136	5	1	—	SCP 2	0.00	0.00	DEB	Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-SH-136	6	1	—	SCP 3	0.00	0.00	PPT	Horse Mountain?	NM ± NM	NM ± NM	No OH measurement
35-SH-136	8	1	—	SCP 5	0.00	0.00	PPT	Horse Mountain?	NM ± NM	NM ± NM	No OH measurement

C.3-144

Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-SH-136	17	1	—	SCP 14	0.00	0.00	DEB Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-SH-136	21	3	—	SCU 1	0.00	0.00	PPT Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-SH-137	4	1	—	SCP 4	0.00	0.00	PPT Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-SH-137	11	1	—	SCP 11	0.00	0.00	PPT Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-SH-137	19	1	—	SCP 19	0.00	0.00	DEB Unknown A	NM ±NM	NM ±NM	No OH measurement
35-SH-137	25	2	—	SCP 25	0.00	0.00	BIF Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-SH-137	33	1	—	SCP 33	0.00	0.00	DEB Unknown A	NM ±NM	NM ±NM	No OH measurement
35-SH-137	41	1	—	SCP 41	0.00	0.00	PPT Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-SH-140	9	1	—	SCP 9	0.00	0.00	DEB Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-SH-140	46	1	—	SON 1	-80.00	-90.00	DEB Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-SH-140	77	5	—	EXU (51S/50E)	-110.00	-120.00	DEB Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-SH-140	241	1	—	EXU (50S/50E)	-87.00	-97.00	PPT Whitewater Ridge	2.8 ± 0.2	NM ±NM	—
35-SH-140	346	3	—	EXU (51S/55E)	-56.00	-66.00	DEB Unknown A	2.2 ± 0.1	NM ±NM	—
35-SH-145	14	7	—	SHP 4	0.00	-20.00	DEB Little Bear Cr./Whitewater Ridge	1.4 ±NM	NM ±NM	—
35-SH-145	16	2	—	SHP 4	-40.00	-60.00	DEB Unknown D	4.9 ±NM	NM ±NM	—
35-SH-145	19	1	A	SHP 5	-20.00	-40.00	DEB Newberry Volcano	4.6 ± 0.1	NM ±NM	—
35-SH-145	20	1	A	SHP 5	-40.00	-60.00	DEB Newberry Volcano	4.2 ±NM	NM ±NM	—
35-SH-145	21	1	A	SHP 5	-60.00	-80.00	DEB Whitewater Ridge	3.4 ± 0.1	4.2 ±NM	2 hydration bands
35-SH-145	23	3	A	SHP 6	0.00	-20.00	DEB Unknown C	1.2 ± 0.1	NM ±NM	—
35-SH-145	25	1	A	SHP 6	-40.00	-60.00	DEB Whitewater Ridge?	4.7 ± 0.1	NM ±NM	—
35-SH-145	26	1	—	SHP 6	-60.00	-65.00	DEB Glass Buttes	4.2 ±NM	NM ±NM	—
35-SH-145	36	1	—	SHP 10	0.00	-20.00	DEB Whitewater Ridge	3.9 ±NM	NM ±NM	—
35-SH-145	63	1	A	SHP 15	-60.00	-80.00	DEB Whitewater Ridge	3.8 ± 0.1	NM ±NM	—
35-SH-145	67	1	—	SHP 16	-40.00	-60.00	DEB Whitewater Ridge	4.6 ± 0.1	NM ±NM	—
35-SH-145	79	2	—	SHP 18	-40.00	-60.00	DEB Whitewater Ridge?	4.5 ±NM	NM ±NM	—
35-SH-145	95	1	—	SON 1	0.00	-10.00	DEB Whitewater Ridge	1.2 ±NM	NM ±NM	—
35-SH-145	96	1	—	SON 1	-10.00	-20.00	DEB Whitewater Ridge	1.1 ±NM	NM ±NM	—
35-SH-145	98	1	—	SON 1	-30.00	-40.00	DEB Quartz Mountain/McKay Butte	3.8 ± 0.1	NM ±NM	—
35-SH-145	100	1	A	SON 2	-10.00	-20.00	DEB Whitewater Ridge	5.1 ± 0.2	NM ±NM	—
35-SH-145	129	1	A	TEU 1	11.00	0.00	DEB Whitewater Ridge	3.2 ± 0.1	NM ±NM	—
35-SH-145	130	1	A	TEU 1	0.00	-10.00	DEB Whitewater Ridge	4.4 ± 0.1	NM ±NM	—
35-SH-145	131	1	A	TEU 1	-10.00	-20.00	DEB Obsidian Cliffs	4.3 ± 0.1	NM ±NM	—
35-SH-145	131	1	B	TEU 1	-10.00	-20.00	DEB Unknown A	5.0 ± 0.1	NM ±NM	—
35-SH-145	131	1	C	TEU 1	-10.00	-20.00	DEB Unknown C	2.6 ±NM	NM ±NM	—
35-SH-145	132	3	A	TEU 1	-20.00	-30.00	DEB Whitewater Ridge	4.3 ± 0.1	NM ±NM	—
35-SH-145	132	3	B	TEU 1	-20.00	-30.00	DEB Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-SH-145	133	11	A	TEU 1	-30.00	-40.00	DEB Unknown D	2.2 ± 0.1	NM ±NM	—
35-SH-145	133	11	B	TEU 1	-30.00	-40.00	DEB Unknown D	5.0 ± 0.1	NM ±NM	—
35-SH-145	133	11	C	TEU 1	-30.00	-40.00	DEB Whitewater Ridge	2.9 ± 0.2	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-SH-145	133	11	D	TEU 1	-30.00	-40.00	DEB	Unknown B	5.0 ± 0.1	NM ± NM	—
35-SH-145	134	15	A	TEU 1	-40.00	-50.00	DEB	Whitewater Ridge	2.8 ± 0.1	NM ± NM	—
35-SH-145	143	4	A	TEU 2	10.00	0.00	DEB	Unknown D	2.8 ± 0.2	NM ± NM	—
35-SH-145	143	4	B	TEU 2	10.00	0.00	DEB	Whitewater Ridge	3.0 ± 0.1	NM ± NM	—
35-SH-145	146	4	A	TEU 2	-10.00	-20.00	DEB	Unknown C	2.4 ± NM	NM ± NM	—
35-SH-145	146	8	—	TEU 2	-10.00	-20.00	PPT	Whitewater Ridge	3.0 ± 0.1	NM ± NM	—
35-SH-145	147	10	A	TEU 2	-20.00	-30.00	DEB	Whitewater Ridge	4.8 ± NM	NM ± NM	—
35-SH-145	147	10	B	TEU 2	-20.00	-30.00	DEB	Whitewater Ridge	3.7 ± 0.1	NM ± NM	—
35-SH-145	148	4	—	TEU 2	-30.00	-40.00	PPT	Newberry Volcano	3.9 ± 0.1	NM ± NM	—
35-SH-145	148	6	A	TEU 2	-30.00	-40.00	DEB	Whitewater Ridge?	3.5 ± 0.1	NM ± NM	—
35-SH-145	148	6	B	TEU 2	-30.00	-40.00	DEB	Whitewater Ridge	3.5 ± 0.1	NM ± NM	—
35-SH-145	149	1	A	TEU 2	-40.00	-50.00	DEB	Whitewater Ridge	3.9 ± NM	NM ± NM	—
35-SH-145	158	1	—	TEU 3	-10.00	-20.00	PFT	Whitewater Ridge	4.9 ± 0.1	NM ± NM	—
35-SH-145	158	2	—	TEU 3	-10.00	-20.00	DEB	Whitewater Ridge	1.7 ± 0.1	NM ± NM	—
35-SH-145	181	1	—	TEU 3	-110.00	-120.00	DEB	Unknown C	2.3 ± 0.1	4.6 ± NM	2 hydration bands
35-SH-149	6	1	—	SCP 6	0.00	0.00	PPT	Obsidian Cliffs	3.7 ± 0.1	NM ± NM	—
35-SH-150	9	1	A	SCU 2	0.00	0.00	DEB	Whitewater Ridge	5.8 ± 0.1	NM ± NM	—
35-SH-150	9	1	B	SCU 2	0.00	0.00	DEB	Whitewater Ridge	5.9 ± 0.1	NM ± NM	—
35-SH-150	9	1	C	SCU 2	0.00	0.00	DEB	Whitewater Ridge	5.0 ± 0.1	NM ± NM	—
35-SH-151	2	1	—	SCP 2	0.00	0.00	DEB	Not obsidian	NM ± NM	NM ± NM	No OH measurement
35-SH-151	24	1	—	SCP 24	0.00	0.00	DEB	Not obsidian	NM ± NM	NM ± NM	No OH measurement
35-UM-154	213	4	A	EXU (89S/100E)	-60.00	-70.00	DEB	Unknown B	1.2 ± 0.1	NM ± NM	—
35-UM-154	213	4	B	EXU (89S/100E)	-60.00	-70.00	DEB	Unknown A	1.7 ± 0.1	NM ± NM	—
35-UM-154	343	1	—	TRENCH (91S/101E)	-71.00	-71.00	BIF	Unknown C	1.6 ± 0.1	NM ± NM	—
35-UM-154	368	3	A	EXU (92S/100E)	-50.00	-60.00	DEB	Unknown A	1.2 ± NM	NM ± NM	—
35-WS-120	1	1	—	SCP 1	0.00	0.00	UFT	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-WS-120	2	1	—	SCP 2	0.00	0.00	BIF	Obsidian Cliffs	4.4 ± 0.1	NM ± NM	—
35-WS-120	8	1	—	SCP 8	0.00	0.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-WS-120	10	1	—	SCP 10	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	11	1	—	SCP 11	0.00	0.00	PPT	Obsidian Cliffs	4.3 ± 0.1	NM ± NM	—
35-WS-120	19	1	—	SCP 19	0.00	0.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-WS-120	51	1	—	SCP 51	0.00	0.00	BIF	Silver Lake/Sycan Marsh?	NM ± NM	NM ± NM	No OH measurement
35-WS-120	53	1	—	SCP 53	0.00	0.00	PPT	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-WS-120	56	8	A	SCU 1	0.00	0.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-WS-120	56	8	B	SCU 1	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	56	8	C	SCU 1	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	56	8	D	SCU 1	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	56	8	E	SCU 1	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	56	8	F	SCU 1	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-WS-120	57	2	—	SCU 2	0.00	0.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-120	236	2	—	AUG 1	-20.00	-40.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	237	3	—	AUG 1	-40.00	-60.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	276	2	—	SON 3	0.00	-10.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	360	1	—	SON 8	-30.00	-40.00	DEB	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-WS-120	371	2	—	SON 9	-20.00	-30.00	DEB	Obsidian Cliffs	2.8 ± 0.1	NM ± NM	—
35-WS-120	380	2	—	SON 9	-70.00	-80.00	DEB	Newberry Volcano	NM ± NM	NM ± NM	No OH measurement
35-WS-120	385	1	—	TEU 1	12.00	0.00	DEB	Newberry Volcano	2.9 ± NM	NM ± NM	—
35-WS-120	387	5	—	TEU 1	0.00	-10.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-120	391	2	—	TEU 1	-20.00	-30.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-WS-120	393	2	—	TEU 1	-30.00	-40.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	414	7	A	TEU 2	10.00	0.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ± NM	—
35-WS-120	414	7	B	TEU 2	10.00	0.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-WS-120	416	6	A	TEU 2	0.00	-10.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-WS-120	416	6	B	TEU 2	0.00	-10.00	DEB	Glass Buttes	DH ± NM	NM ± NM	Diffuse hydration
35-WS-120	416	6	C	TEU 2	0.00	-10.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-120	416	6	D	TEU 2	0.00	-10.00	DEB	Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-WS-120	418	3	A	TEU 2	-10.00	-20.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-WS-120	418	3	B	TEU 2	-10.00	-20.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-120	418	3	C	TEU 2	-10.00	-20.00	DEB	Horse Mountain?	NM ± NM	NM ± NM	No OH measurement
35-WS-120	418	3	D	TEU 2	-10.00	-20.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-WS-120	418	3	E	TEU 2	-10.00	-20.00	DEB	Little Bear Creek/Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-WS-120	420	2	A	TEU 2	-20.00	-30.00	DEB	Little Bear Creek/Whitewater Ridge	NM ± NM	NM ± NM	No OH measurement
35-WS-120	420	2	B	TEU 2	-20.00	-30.00	DEB	Chickahominy?	NM ± NM	NM ± NM	No OH measurement
35-WS-120	422	4	A	TEU 2	-30.00	-40.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-120	422	4	B	TEU 2	-30.00	-40.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-223	8	1	—	SHP B1	0.00	-15.00	DEB	Glass Buttes	4.5 ± 0.1	NM ± NM	—
35-WS-224	4	1	—	SCP 4	0.00	0.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-WS-224	5	1	—	SCP 5	0.00	0.00	DEB	Obsidian Cliffs	5.1 ± 0.2	NM ± NM	—
35-WS-224	20	1	—	SCP 20	0.00	0.00	PPT	Newberry Volcano	4.7 ± 0.1	NM ± NM	—
35-WS-224	31	1	—	SCP 31	0.00	0.00	DEB	Unknown A	NM ± NM	NM ± NM	No OH measurement
35-WS-224	38	1	—	SCP 38	0.00	0.00	DEB	Newberry Volcano	4.2 ± NM	NM ± NM	—
35-WS-224	39	1	—	SCP 39	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-224	42	1	—	SCP 42	0.00	0.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-WS-224	46	1	—	SCP 46	0.00	0.00	DEB	Newberry Volcano	5.3 ± 0.2	NM ± NM	—
35-WS-224	47	1	—	SCP 47	0.00	0.00	UFT	Horse Mountain?	NM ± NM	NM ± NM	No OH measurement
35-WS-224	48	1	—	SCP 48	0.00	0.00	DEB	Newberry Volcano	4.1 ± 0.1	NM ± NM	—
35-WS-224	161	2	—	TEU 3	-10.00	-20.00	DEB	Unknown B	NM ± NM	NM ± NM	No OH measurement
35-WS-225	135	2	A	TEU 4	0.00	-10.00	DEB	Horse Mountain?	NM ± NM	NM ± NM	No OH measurement

C.3-147



### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-225	135	2	B	TEU 4	0.00 -10.00	DEB	Newberry Volcano	4.1 ± 0.1	NM ±NM	—
35-WS-225	138	3	A	TEU 4	-30.00 -40.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-225	138	3	B	TEU 4	-30.00 -40.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-WS-225	153	2	—	TEU 6	-20.00 -30.00	DEB	Big Obsidian Flow?	NM ±NM	NM ±NM	No OH measurement
35-WS-225	154	3	—	TEU 6	-30.00 -40.00	BIF	Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-WS-225	154	4	—	TEU 6	-30.00 -40.00	DEB	Big Obsidian Flow	NM ±NM	NM ±NM	No OH measurement
35-WS-225	155	2	A	TEU 6	-40.00 -50.00	DEB	Big Obsidian Flow	NM ±NM	NM ±NM	No OH measurement
35-WS-225	155	2	B	TEU 6	-40.00 -50.00	DEB	Big Obsidian Flow?	NM ±NM	NM ±NM	No OH measurement
35-WS-225	157	2	—	TEU 6	-60.00 -70.00	BIF	Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—
35-WS-225	161	2	—	TEU 6	-100.00 -110.00	DEB	Glass Buttes	3.2 ± 0.1	NM ±NM	—
35-WS-225	162	4	B	TEU 6	-110.00 -120.00	DEB	Glass Buttes	3.2 ± 0.1	NM ±NM	—
35-WS-225	163	2	—	TEU 6	-120.00 -130.00	DEB	Newberry Volcano	NM ±NM	NM ±NM	No OH measurement
35-WS-225	193	2	—	TEU 8	-30.00 -40.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-225	195	1	—	TEU 8	-50.00 -57.00	DEB	Big Obsidian Flow	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	201	4	—	TEU 8	-100.00 -110.00	DEB	Newberry Volcano	NM ±NM	NM ±NM	No OH measurement
35-WS-225	219	5	—	SCN 1	0.00 0.00	DEB	Big Obsidian Flow?	NM ±NM	NM ±NM	No OH measurement
35-WS-225	259	1	A	EXU (96S/153E)	7.00 0.00	DEB	McKay Butte	4.4 ± 0.1	NM ±NM	—
35-WS-225	268	2	A	EXU (96S/153E)	-50.00 -60.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-WS-225	270	3	A	EXU (96S/153E)	-60.00 -70.00	DEB	McKay Butte	4.2 ± 0.1	NM ±NM	—
35-WS-225	279	1	A	EXU (96S/153E)	-100.00 -110.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	300	3	—	EXU (106S/158E)	-10.00 -20.00	BIF	Potato Hills?	2.2 ± 0.2	NM ±NM	—
35-WS-225	309	1	A	EXU (106S/158E)	-60.00 -70.00	DEB	Cougar Mountain	4.7 ± 0.1	NM ±NM	—
35-WS-225	374	1	A	EXU (114S/173E)	-80.00 -90.00	DEB	Glass Buttes	3.4 ± 0.2	NM ±NM	—
35-WS-225	502	1	A	EXU (89S/146E)	-10.00 -20.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-WS-225	534	1	—	EXU (96S/145E)	-10.00 -20.00	BIF	McKay Butte	2.9 ± 0.1	NM ±NM	—
35-WS-225	542	1	A	EXU (96S/145E)	-50.00 -60.00	DEB	Quartz Mountain	4.5 ± 0.1	NM ±NM	—
35-WS-225	586	5	—	EXU (100S/158E)	-40.00 -50.00	UFT	Newberry Volcano	2.2 ± 0.1	2.4 ± 0.1	2 OH cuts to test for reuse
35-WS-225	587	1	A	EXU (100S/158E)	-50.00 -60.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ±NM	—
35-WS-225	614	1	A	EXU (100S/164E)	-30.00 -40.00	DEB	Newberry Volcano	4.1 ± 0.1	NM ±NM	—
35-WS-225	628	1	A	EXU (100S/164E)	-100.00 -110.00	DEB	Obsidian Cliffs	2.4 ±NM	NM ±NM	—
35-WS-225	662	1	A	EXU (106S/149E)	-20.00 -30.00	DEB	Little Bear Creek/Whitewater Ridge	4.1 ±NM	NM ±NM	—
35-WS-225	664	1	—	EXU (106S/149E)	-30.00 -40.00	BIF	Little Bear Cr./Whitewater R./Juniper Sp. 1	3.0 ± 0.1	NM ±NM	—
35-WS-225	668	1	A	EXU (106S/149E)	-50.00 -60.00	DEB	Little Bear Creek/Whitewater Ridge	4.0 ± 0.1	NM ±NM	—
35-WS-225	696	1	A	EXU (106S/169E)	-40.00 -50.00	DEB	Big Obsidian Flow	1.9 ± 0.1	NM ±NM	—
35-WS-225	696	1	B	EXU (106S/169E)	-40.00 -50.00	DEB	Big Obsidian Flow	1.9 ± 0.1	NM ±NM	—
35-WS-225	697	1	A	EXU (106S/169E)	-40.00 -50.00	DEB	Big Obsidian Flow	1.5 ± 0.1	NM ±NM	—
35-WS-225	698	2	A	EXU (106S/169E)	-50.00 -60.00	DEB	Glass Buttes	1.2 ± 0.1	NM ±NM	—
35-WS-225	721	1	—	EXU (100S/164E)	-110.00 -120.00	PPT	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-WS-225	747	3	A	EXU (98S/164E)	-76.00 -86.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-225	752	3	A	EXU (98S/164E)	-96.00 -106.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	753	3	—	EXU (98S/164E)	-96.00 -106.00	PPT	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-WS-225	754	4	A	EXU (98S/164E)	-106.00 -116.00	DEB	Unknown A	1.8 ±NM	NM ±NM	—
35-WS-225	769	2	A	EXU (108S/137E)	0.00 -10.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-WS-225	770	2	A	EXU (108S/137E)	-10.00 -20.00	DEB	Quartz Mountain	2.0 ±NM	NM ±NM	—
35-WS-225	772	4	—	EXU (108S/137E)	-10.00 -20.00	BIF	McKay Butte	3.6 ± 0.2	NM ±NM	—
35-WS-225	776	3	A	EXU (108S/137E)	-20.00 -30.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-WS-225	776	3	B	EXU (108S/137E)	-20.00 -30.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-WS-225	782	4	A	EXU (108S/138E)	-10.00 -20.00	DEB	McKay Butte	2.8 ± 0.1	NM ±NM	—
35-WS-225	782	4	B	EXU (108S/138E)	-10.00 -20.00	DEB	Newberry Volcano	2.0 ±NM	NM ±NM	—
35-WS-225	782	4	C	EXU (108S/138E)	-10.00 -20.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	783	4	—	EXU (108S/138E)	-10.00 -20.00	UFT	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	785	3	—	EXU (108S/138E)	-20.00 -30.00	BIF	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-WS-225	791	5	A	EXU (109S/137E)	0.00 -10.00	DEB	Little Bear Creek/Whitewater Ridge	4.5 ± 0.2	NM ±NM	—
35-WS-225	797	4	A	EXU (109S/138E)	0.00 -10.00	DEB	Obsidian Cliffs	2.7 ± 0.1	NM ±NM	—
35-WS-225	797	4	B	EXU (109S/138E)	0.00 -10.00	DEB	McKay Butte	3.5 ± 0.1	NM ±NM	—
35-WS-225	797	4	C	EXU (109S/138E)	0.00 -10.00	DEB	McKay Butte	2.5 ± 0.1	NM ±NM	—
35-WS-225	797	5	—	EXU (109S/138E)	0.00 -10.00	PPT	Newberry Volcano	2.1 ± 0.1	NM ±NM	—
35-WS-225	800	6	—	EXU (109S/138E)	-10.00 -20.00	BIF	Newberry Volcano	NVB ±NM	NM ±NM	Weathered; No visible band (2 OH cuts)
35-WS-225	801	5	—	EXU (109S/138E)	-10.00 -20.00	BIF	Quartz Mountain	1.9 ±NM	NM ±NM	—
35-WS-225	801	6	—	EXU (109S/138E)	-10.00 -20.00	BIF	Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-WS-225	805	2	A	EXU (109S/140E)	0.00 -10.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	806	3	A	EXU (109S/140E)	0.00 -10.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	807	4	A	EXU (109S/140E)	-10.00 -20.00	DEB	McKay Butte	3.8 ± 0.1	NM ±NM	—
35-WS-225	809	2	A	EXU (109S/140E)	-20.00 -30.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-WS-225	842	4	A	EXU (110S/138E)	-18.00 -28.00	DEB	Whitewater Ridge	3.6 ±NM	NM ±NM	—
35-WS-225	842	4	B	EXU (110S/138E)	-18.00 -28.00	DEB	McKay Butte	3.5 ± 0.1	NM ±NM	—
35-WS-225	846	3	A	EXU (111S/139E)	0.00 -10.00	DEB	McKay Butte	3.4 ± 0.1	NM ±NM	—
35-WS-225	846	3	B	EXU (111S/139E)	0.00 -10.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	848	4	A	EXU (111S/139E)	-10.00 -20.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—
35-WS-225	850	3	A	EXU (111S/139E)	-20.00 -30.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-WS-225	861	2	A	EXU (111S/139E)	-60.00 -70.00	DEB	Juniper Spring 2/Whitewater Ridge	1.8 ±NM	NM ±NM	—
35-WS-225	925	3	A	EXU (26S/2W)	-70.00 -80.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-WS-225	945	3	A	EXU (111S/137E)	-18.00 -28.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-WS-225	947	2	A	EXU (111S/137E)	-28.00 -38.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-WS-225	953	2	A	EXU (111S/137E)	-88.00 -98.00	DEB	Cougar Mountain	6.1 ± 0.1	NM ±NM	—
35-WS-225	953	2	B	EXU (111S/137E)	-88.00 -98.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	953	2	C	EXU (111S/137E)	-88.00 -98.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	953	2	D	EXU (111S/137E)	-88.00 -98.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-WS-225	953	2	E	EXU (111S/137E)	-88.00	-98.00	DEB	Cougar Mountain	6.1 ± 0.1	NM ± NM	—
35-WS-225	953	2	F	EXU (111S/137E)	-88.00	-98.00	DEB	Cougar Mountain	6.2 ± 0.1	NM ± NM	—
35-WS-225	953	2	G	EXU (111S/137E)	-88.00	-98.00	DEB	Cougar Mountain	6.0 ± 0.1	NM ± NM	—
35-WS-225	953	2	H	EXU (111S/137E)	-88.00	-98.00	DEB	Cougar Mountain	6.1 ± 0.1	NM ± NM	—
35-WS-225	957	3	A	EXU (94S/168E)	-10.00	-20.00	DEB	Whitewater Ridge	1.2 ± NM	NM ± NM	—
35-WS-225	958	1	A	EXU (94S/168E)	-10.00	-20.00	DEB	Whitewater Ridge	1.2 ± NM	NM ± NM	—
35-WS-225	987	2	A	EXU (95S/168E)	0.00	-10.00	DEB	Little Bear Creek/Whitewater Ridge	1.4 ± 0.1	NM ± NM	—
35-WS-225	999	1	—	EXU (95S/168E)	-60.00	-70.00	BIF	Newberry Volcano/Unknown X	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1015	1	A	EXU (100S/163E)	-35.00	-45.00	DEB	Little Bear Creek	4.7 ± 0.1	NM ± NM	—
35-WS-225	1032	1	A	EXU (100S/163E)	-95.00	-105.00	DEB	Unknown B	NVB ± NM	NM ± NM	No visible band
35-WS-225	1034	1	A	EXU (100S/163E)	-105.00	-115.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-WS-225	1079	1	A	EXU (100S/166E)	-90.00	-98.00	DEB	Silver Lake/Sycan Marsh	3.6 ± 0.1	NM ± NM	—
35-WS-225	1103	1	—	EXU (100S/167E)	-37.00	-47.00	UFT	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-WS-225	1111	1	A	EXU (100S/167E)	-67.00	-77.00	DEB	Juniper Spring 2/Whitewater Ridge	2.3 ± 0.1	NM ± NM	—
35-WS-225	1116	1	—	EXU (100S/167E)	-77.00	-87.00	PPT	McKay Butte	2.4 ± 0.1	NM ± NM	—
35-WS-225	1123	2	A	EXU (100S/167E)	-107.00	-117.00	DEB	Glass Buttes	2.7 ± NM	NM ± NM	—
35-WS-225	1126	3	—	EXU (100S/167E)	-107.00	-117.00	PPT	Juniper Spring 2/Whitewater Ridge	3.4 ± 0.1	NM ± NM	—
35-WS-225	1149	3	A	EXU (101S/149E)	-60.00	-70.00	DEB	Quartz Mountain	4.4 ± 0.1	NM ± NM	—
35-WS-225	1192	3	A	EXU (102S/169E)	0.00	-10.00	DEB	Big Obsidian Flow	1.6 ± 0.1	NM ± NM	—
35-WS-225	1192	3	B	EXU (102S/169E)	0.00	-10.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1192	3	C	EXU (102S/169E)	0.00	-10.00	DEB	Newberry Volcano	2.8 ± 0.2	NM ± NM	—
35-WS-225	1192	4	—	EXU (102S/169E)	0.00	-10.00	PPT	Silver Lake/Sycan Marsh?	5.0 ± 0.1	NM ± NM	—
35-WS-225	1194	3	A	EXU (102S/169E)	-10.00	-20.00	DEB	Big Obsidian Flow	2.2 ± 0.1	NM ± NM	—
35-WS-225	1205	5	—	EXU (102S/169E)	-60.00	-70.00	PPT	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-WS-225	1208	4	—	EXU (102S/169E)	-80.00	-90.00	PPT	Obsidian Cliffs	4.2 ± 0.1	NM ± NM	—
35-WS-225	1210	4	A	EXU (102S/169E)	-90.00	-100.00	DEB	Glass Buttes	3.6 ± NM	NM ± NM	—
35-WS-225	1211	1	A	EXU (102S/169E)	-90.00	-100.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-WS-225	1223	4	A	EXU (102S/170E)	3.00	-10.00	DEB	McKay Butte	3.8 ± 0.1	NM ± NM	—
35-WS-225	1225	1	A	EXU (102S/170E)	-10.00	-20.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1228	1	A	EXU (102S/170E)	-30.00	-40.00	DEB	Big Obsidian Flow?	1.9 ± 0.1	NM ± NM	—
35-WS-225	1230	1	A	EXU (102S/170E)	-40.00	-50.00	DEB	Glass Buttes	3.7 ± 0.1	NM ± NM	—
35-WS-225	1235	1	A	EXU (102S/170E)	-60.00	-70.00	DEB	Silver Lake/Sycan Marsh	3.3 ± NM	NM ± NM	—
35-WS-225	1245	2	A	EXU (102S/170E)	-110.00	-120.00	DEB	Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-WS-225	1261	2	A	EXU (104S/166E)	-30.00	-40.00	DEB	Whitewater Ridge?	3.8 ± 0.1	NM ± NM	—
35-WS-225	1284	5	A	EXU (109S/139E)	2.00	-10.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1287	2	A	EXU (109S/139E)	-10.00	-20.00	DEB	McKay Butte	2.8 ± 0.1	NM ± NM	—
35-WS-225	1287	10	—	EXU (109S/139E)	-10.00	-20.00	BIF	Newberry Volcano	2.6 ± 0.1	NM ± NM	—
35-WS-225	1287	11	—	EXU (109S/139E)	-10.00	-20.00	PPT	Newberry Volcano	1.8 ± 0.1	2.8 ± 0.1	2 hydration bands
35-WS-225	1291	1	—	EXU (109S/139E)	-22.00	-22.00	PPT	McKay Butte	3.1 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-225	1294	4	A	EXU (109S/139E)	-20.00	-30.00	DEB Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-WS-225	1300	1	—	EXU (109S/139E)	-40.00	-50.00	BIF Little Bear Creek/Whitewater Ridge	5.0 ± 0.1	NM ±NM	—
35-WS-225	1308	3	A	EXU (113S/139E)	4.00	-10.00	DEB McKay Butte	3.5 ± 0.2	NM ±NM	—
35-WS-225	1310	2	A	EXU (113S/139E)	-10.00	-20.00	DEB McKay Butte	3.5 ± 0.1	NM ±NM	—
35-WS-225	1310	2	B	EXU (113S/139E)	-10.00	-20.00	DEB McKay Butte	3.0 ± 0.1	NM ±NM	—
35-WS-225	1310	2	C	EXU (113S/139E)	-10.00	-20.00	DEB Newberry Volcano	1.7 ± 0.1	NM ±NM	—
35-WS-225	1310	2	D	EXU (113S/139E)	-10.00	-20.00	DEB McKay Butte	3.7 ± 0.1	NM ±NM	—
35-WS-225	1310	2	E	EXU (113S/139E)	-10.00	-20.00	DEB McKay Butte	3.2 ± 0.1	NM ±NM	—
35-WS-225	1310	2	F	EXU (113S/139E)	-10.00	-20.00	DEB McKay Butte	3.3 ±NM	NM ±NM	—
35-WS-225	1312	4	A	EXU (113S/139E)	-20.00	-30.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	1312	4	B	EXU (113S/139E)	-20.00	-30.00	DEB Newberry Volcano	1.9 ±NM	NM ±NM	—
35-WS-225	1312	4	C	EXU (113S/139E)	-20.00	-30.00	DEB McKay Butte	3.2 ± 0.1	NM ±NM	—
35-WS-225	1314	1	A	EXU (113S/139E)	-30.00	-40.00	DEB Big Obsidian Flow	1.8 ± 0.1	NM ±NM	—
35-WS-225	1314	1	B	EXU (113S/139E)	-30.00	-40.00	DEB McKay Butte	3.3 ± 0.1	NM ±NM	—
35-WS-225	1314	1	C	EXU (113S/139E)	-30.00	-40.00	DEB Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-WS-225	1321	3	A	EXU (113S/139E)	-50.00	-60.00	DEB Obsidian Cliffs	6.2 ± 0.1	NM ±NM	—
35-WS-225	1328	2	A	EXU (121S/151E)	-10.00	-20.00	DEB McKay Butte	4.0 ± 0.1	NM ±NM	—
35-WS-225	1367	3	A	EXU (105S/137E)	0.00	-10.00	DEB Little Bear Creek/Whitewater Ridge	4.6 ± 0.1	NM ±NM	—
35-WS-225	1369	3	A	EXU (105S/137E)	-10.00	-20.00	DEB McKay Butte	2.6 ±NM	NM ±NM	—
35-WS-225	1369	3	B	EXU (105S/137E)	-10.00	-20.00	DEB Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-WS-225	1369	3	C	EXU (105S/137E)	-10.00	-20.00	DEB Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-WS-225	1400	2	A	EXU (106S/136E)	-15.00	-25.00	DEB Newberry Volcano	1.8 ±NM	NM ±NM	—
35-WS-225	1401	3	A	EXU (106S/136E)	-15.00	-25.00	DEB McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	1405	3	A	EXU (106S/137E)	-10.00	-20.00	DEB Newberry Volcano	3.2 ± 0.2	NM ±NM	—
35-WS-225	1405	3	B	EXU (106S/137E)	-10.00	-20.00	DEB Newberry Volcano	1.8 ± 0.1	NM ±NM	—
35-WS-225	1405	3	C	EXU (106S/137E)	-10.00	-20.00	DEB Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-WS-225	1405	5	—	EXU (106S/137E)	-10.00	-20.00	BIF McKay Butte	2.5 ± 0.1	NM ±NM	—
35-WS-225	1406	4	A	EXU (106S/137E)	-10.00	-20.00	DEB McKay Butte	3.2 ± 0.1	NM ±NM	—
35-WS-225	1406	4	B	EXU (106S/137E)	-10.00	-20.00	DEB Newberry Volcano	2.1 ±NM	NM ±NM	—
35-WS-225	1406	6	—	EXU (106S/137E)	-10.00	-20.00	UFT McKay Butte	2.7 ± 0.1	NM ±NM	—
35-WS-225	1408	3	A	EXU (106S/137E)	-20.00	-30.00	DEB McKay Butte	NVB ±NM	NM ±NM	No visible band
35-WS-225	1408	3	B	EXU (106S/137E)	-20.00	-30.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-WS-225	1408	3	C	EXU (106S/137E)	-20.00	-30.00	DEB Newberry Volcano	NVB ±NM	NM ±NM	No visible band
35-WS-225	1417	3	—	EXU (106S/138E)	-20.00	-30.00	PPT Quartz Mountain	1.7 ± 0.1	NM ±NM	—
35-WS-225	1419	3	A	EXU (106S/138E)	-40.00	-50.00	DEB McKay Butte	2.9 ± 0.2	NM ±NM	—
35-WS-225	1421	2	A	EXU (106S/139E)	-10.00	-20.00	DEB McKay Butte	DH ±NM	NM ±NM	—
35-WS-225	1422	3	A	EXU (106S/139E)	-10.00	-20.00	DEB McKay Butte	3.2 ± 0.1	NM ±NM	—
35-WS-225	1426	3	A	EXU (106S/139E)	-20.00	-30.00	DEB Wolf Creek	4.9 ± 0.1	NM ±NM	—
35-WS-225	1440	3	A	EXU (107S/136E)	-20.00	-30.00	DEB Newberry Volcano	2.3 ±NM	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-WS-225	1444	3	A	EXU (107S/137E)	-10.00	-20.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ± NM	—
35-WS-225	1444	3	B	EXU (107S/137E)	-10.00	-20.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-WS-225	1444	3	C	EXU (107S/137E)	-10.00	-20.00	DEB	McKay Butte	3.7 ± 0.1	NM ± NM	—
35-WS-225	1445	4	A	EXU (107S/137E)	-10.00	-20.00	DEB	Little Bear Creek/Whitewater Ridge	4.9 ± 0.1	NM ± NM	—
35-WS-225	1447	2	A	EXU (107S/137E)	-20.00	-30.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-WS-225	1447	2	B	EXU (107S/137E)	-20.00	-30.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-WS-225	1447	2	C	EXU (107S/137E)	-20.00	-30.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-WS-225	1448	3	A	EXU (107S/137E)	-20.00	-30.00	DEB	Newberry Volcano	1.5 ± 0.1	NM ± NM	—
35-WS-225	1448	3	B	EXU (107S/137E)	-20.00	-30.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-WS-225	1448	3	C	EXU (107S/137E)	-20.00	-30.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-WS-225	1448	3	D	EXU (107S/137E)	-20.00	-30.00	DEB	McKay Butte	4.6 ± 0.2	NM ± NM	—
35-WS-225	1448	3	E	EXU (107S/137E)	-20.00	-30.00	DEB	McKay Butte	2.8 ± 0.1	NM ± NM	—
35-WS-225	1449	2	A	EXU (107S/137E)	-20.00	-30.00	DEB	McKay Butte	3.8 ± 0.1	NM ± NM	—
35-WS-225	1450	3	A	EXU (107S/137E)	-20.00	-30.00	DEB	McKay Butte	3.6 ± 0.1	NM ± NM	—
35-WS-225	1450	3	B	EXU (107S/137E)	-20.00	-30.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-225	1450	3	C	EXU (107S/137E)	-20.00	-30.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-WS-225	1450	3	D	EXU (107S/137E)	-20.00	-30.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-WS-225	1457	3	—	EXU (107S/138E)	0.00	-10.00	BIF	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-WS-225	1460	2	A	EXU (107S/138E)	-10.00	-20.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-WS-225	1461	3	A	EXU (107S/138E)	-10.00	-20.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1463	3	A	EXU (107S/138E)	-20.00	-30.00	DEB	Quartz Mountain?	2.1 ± 0.1	NM ± NM	—
35-WS-225	1475	3	A	EXU (107S/139E)	-5.00	-15.00	DEB	McKay Butte	3.7 ± 0.1	NM ± NM	—
35-WS-225	1475	4	—	EXU (107S/139E)	-5.00	-15.00	BIF	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-WS-225	1478	3	A	EXU (107S/139E)	-15.00	-25.00	DEB	Unknown C	3.2 ± 0.1	NM ± NM	—
35-WS-225	1488	3	A	EXU (108S/136E)	2.00	-10.00	DEB	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-WS-225	1503	2	A	EXU (109S/140E)	-60.00	-70.00	DEB	Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-WS-225	1509	2	A	EXU (111S/139E)	-80.00	-90.00	DEB	Cougar Mountain	6.2 ± 0.1	NM ± NM	—
35-WS-225	1517	3	A	EXU (111S/140E)	-20.00	-30.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-WS-225	1550	3	A	EXU (113S/140E)	0.00	-10.00	DEB	McKay Butte	3.5 ± 0.2	NM ± NM	—
35-WS-225	1550	3	B	EXU (113S/140E)	0.00	-10.00	DEB	McKay Butte	3.3 ± NM	NM ± NM	—
35-WS-225	1550	3	C	EXU (113S/140E)	0.00	-10.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1553	4	A	EXU (113S/140E)	-10.00	-20.00	DEB	McKay Butte	3.5 ± 0.1	NM ± NM	—
35-WS-225	1553	4	B	EXU (113S/140E)	-10.00	-20.00	DEB	McKay Butte	3.2 ± NM	NM ± NM	—
35-WS-225	1554	3	A	EXU (113S/140E)	-20.00	-30.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1554	3	B	EXU (113S/140E)	-20.00	-30.00	DEB	McKay Butte	3.9 ± NM	NM ± NM	—
35-WS-225	1563	3	A	EXU (118S/141E)	-10.00	-20.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-WS-225	1597	2	A	EXU (107S/137E)	0.00	-10.00	DEB	Obsidian Cliffs	5.1 ± 0.1	NM ± NM	—
35-WS-225	1602	2	A	EXU (99S/167E)	-47.00	-57.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1605	2	A	EXU (99S/167E)	-67.00	-77.00	DEB	Unknown D	4.9 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-225	1605	2	B	EXU (99S/167E)	-67.00 -77.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-WS-225	1614	4	A	EXU (99S/167E)	-87.00 -97.00	DEB	Obsidian Cliffs	2.4 ± NM	NM ± NM	—
35-WS-225	1616	4	A	EXU (99S/167E)	-97.00 -107.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-WS-225	1616	4	B	EXU (99S/167E)	-97.00 -107.00	DEB	Horse Mountain	3.8 ± 0.1	NM ± NM	—
35-WS-225	1631	6	A	EXU (112S/139E)	-10.00 -20.00	DEB	Newberry Volcano	1.9 ± NM	NM ± NM	—
35-WS-225	1631	6	B	EXU (112S/139E)	-10.00 -20.00	DEB	McKay Butte	3.2 ± 0.1	NM ± NM	—
35-WS-225	1631	6	C	EXU (112S/139E)	-10.00 -20.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-WS-225	1633	2	A	EXU (112S/139E)	-20.00 -30.00	DEB	Newberry Volcano	1.9 ± NM	NM ± NM	—
35-WS-225	1635	2	A	EXU (112S/139E)	-30.00 -40.00	DEB	Little Bear Creek/Whitewater Ridge	4.3 ± 0.2	NM ± NM	—
35-WS-225	1667	1	—	EXU (112S/140E)	-52.00 -52.00	PPT	Glass Buttes	1.5 ± 0.1	NM ± NM	—
35-WS-225	1671	5	A	EXU (112S/141E)	5.00 -10.00	DEB	Newberry Volcano	4.9 ± 0.1	NM ± NM	—
35-WS-225	1673	5	A	EXU (112S/141E)	-10.00 -20.00	DEB	McKay Butte	4.0 ± 0.1	NM ± NM	—
35-WS-225	1685	3	A	EXU (112S/141E)	-50.00 -60.00	DEB	Whitewater Ridge	2.7 ± 0.1	NM ± NM	—
35-WS-225	1695	1	—	EXU (112S/138E)	-14.00 -24.00	PPT	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-WS-225	1695	2	A	EXU (112S/138E)	-14.00 -24.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-WS-225	1696	4	A	EXU (112S/138E)	-24.00 -34.00	DEB	McKay Butte	2.7 ± NM	NM ± NM	—
35-WS-225	1696	4	B	EXU (112S/138E)	-24.00 -34.00	DEB	McKay Butte	3.2 ± NM	NM ± NM	—
35-WS-225	1696	4	C	EXU (112S/138E)	-24.00 -34.00	DEB	McKay Butte	3.8 ± 0.1	NM ± NM	—
35-WS-225	1696	4	D	EXU (112S/138E)	-24.00 -34.00	DEB	McKay Butte	3.6 ± 0.1	NM ± NM	—
35-WS-225	1697	5	A	EXU (112S/138E)	-24.00 -34.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	1698	1	A	EXU (112S/138E)	-34.00 -44.00	DEB	McKay Butte	3.6 ± NM	NM ± NM	—
35-WS-225	1698	1	B	EXU (112S/138E)	-34.00 -44.00	DEB	Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-WS-225	1699	1	A	EXU (112S/138E)	-34.00 -44.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-WS-225	1702	2	A	EXU (112S/138E)	-44.00 -54.00	DEB	McKay Butte	NVB ± NM	NM ± NM	No visible band
35-WS-225	1707	5	A	EXU (113S/139E)	-10.00 -20.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-WS-225	1708	3	A	EXU (113S/139E)	-20.00 -30.00	DEB	McKay Butte	2.8 ± 0.1	NM ± NM	—
35-WS-225	1708	3	B	EXU (113S/139E)	-20.00 -30.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-WS-225	1708	6	—	EXU (113S/139E)	-20.00 -30.00	UFT	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-WS-225	1710	1	A	EXU (113S/139E)	-20.00 -30.00	DEB	Newberry Volcano	2.5 ± NM	NM ± NM	—
35-WS-225	1710	1	B	EXU (113S/139E)	-20.00 -30.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-WS-225	1710	1	C	EXU (113S/139E)	-20.00 -30.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-WS-225	1714	3	A	EXU (113S/139E)	-30.00 -40.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-WS-225	1714	3	B	EXU (113S/139E)	-30.00 -40.00	DEB	Newberry Volcano	1.9 ± NM	3.1 ± 0.1	2 hydration bands
35-WS-225	1714	3	C	EXU (113S/139E)	-30.00 -40.00	DEB	Newberry Volcano	1.9 ± 0.1	3.0 ± 0.1	2 bands; second band weathered
35-WS-225	1714	3	D	EXU (113S/139E)	-30.00 -40.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-WS-225	1716	1	A	EXU (113S/139E)	-40.00 -50.00	DEB	McKay Butte	3.5 ± 0.1	NM ± NM	—
35-WS-225	1716	1	B	EXU (113S/139E)	-40.00 -50.00	DEB	Silver Lake/Sycan Marsh	2.5 ± 0.1	NM ± NM	—
35-WS-225	1723	2	A	EXU (113S/140E)	-20.00 -30.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-WS-225	1728	3	A	EXU (113S/140E)	-40.00 -50.00	DEB	Newberry Volcano	3.9 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-225	1735	1	—	EXU (113S/140E)	-53.00	-53.00	PPT Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-WS-225	1746	4	A	EXU (113S/138E)	-12.00	-22.00	DEB Obsidian Cliffs	5.2 ± 0.2	NM ± NM	—
35-WS-225	1748	3	A	EXU (113S/138E)	-22.00	-32.00	DEB Quartz Mountain/McKay Butte	3.4 ± 0.1	NM ± NM	—
35-WS-225	1750	1	A	EXU (113S/138E)	-22.00	-32.00	DEB Newberry Volcano	1.9 ± NM	NM ± NM	—
35-WS-225	1756	3	A	EXU (113S/138E)	-32.00	-42.00	DEB Newberry Volcano	2.3 ± NM	NM ± NM	—
35-WS-225	1766	3	A	EXU (114S/141E)	-25.00	-35.00	DEB McKay Butte	3.4 ± 0.2	NM ± NM	—
35-WS-225	1779	3	A	EXU (115S/141E)	-15.00	-25.00	DEB Glass Buttes	1.9 ± 0.1	NM ± NM	—
35-WS-225	1791	5	A	EXU (116S/138E)	-10.00	-20.00	DEB Newberry Volcano	2.3 ± 0.1	5.0 ± 0.1	2 hydration bands
35-WS-225	1794	2	A	EXU (116S/138E)	-20.00	-30.00	DEB McKay Butte	3.6 ± 0.1	NM ± NM	—
35-WS-225	1805	3	A	EXU (116S/138E)	-30.00	-40.00	DEB McKay Butte	3.4 ± 0.1	NM ± NM	—
35-WS-225	1810	3	A	EXU (116S/139E)	-10.00	-20.00	DEB McKay Butte	3.0 ± NM	NM ± NM	—
35-WS-225	1810	3	B	EXU (116S/139E)	-10.00	-20.00	DEB McKay Butte	3.1 ± 0.1	NM ± NM	—
35-WS-225	1810	3	C	EXU (116S/139E)	-10.00	-20.00	DEB McKay Butte	3.3 ± 0.1	NM ± NM	—
35-WS-225	1813	4	A	EXU (116S/139E)	-20.00	-30.00	DEB McKay Butte	3.8 ± 0.3	NM ± NM	—
35-WS-225	1814	3	A	EXU (116S/139E)	-20.00	-30.00	DEB Newberry Volcano	NVB ± NM	NM ± NM	No visible band
35-WS-225	1814	3	B	EXU (116S/139E)	-20.00	-30.00	DEB McKay Butte	2.8 ± 0.1	NM ± NM	—
35-WS-225	1814	3	C	EXU (116S/139E)	-20.00	-30.00	DEB Newberry Volcano	2.0 ± NM	NM ± NM	—
35-WS-225	1820	4	A	EXU (116S/140E)	-10.00	-20.00	DEB Newberry Volcano	4.1 ± 0.1	NM ± NM	—
35-WS-225	1822	2	A	EXU (116S/140E)	-20.00	-30.00	DEB McKay Butte	3.6 ± 0.1	NM ± NM	—
35-WS-225	1823	3	A	EXU (116S/140E)	-20.00	-30.00	DEB Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-WS-225	1838	3	A	EXU (117S/139E)	-30.00	-40.00	DEB McKay Butte	3.9 ± 0.1	NM ± NM	—
35-WS-225	1858	2	A	SHP 1010	-20.00	-40.00	DEB Little Bear Cr./Whitewater R./Juniper Sp. 1	7.7 ± 0.1	NM ± NM	—
35-WS-225	1903	2	A	SHP 1022	0.00	-20.00	DEB Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-WS-225	1913	2	A	SHP 1025	-40.00	-60.00	DEB Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-WS-225	1947	1	—	EXU (108S/139E)	4.00	-10.00	BIF McKay Butte	4.1 ± 0.1	NM ± NM	—
35-WS-225	1950	1	—	EXU (108S/139E)	-10.00	-20.00	BIF Newberry Volcano	2.2 ± 0.1	2.0 ± 0.1	2 cuts to test for possible reuse
35-WS-225	1956	2	—	EXU (108S/139E)	-20.00	-30.00	UFT Glass Buttes	5.1 ± NM	NM ± NM	—
35-WS-225	2045	1	—	EXU (110S/140E)	-20.00	-30.00	PPT Yreka Butte	4.2 ± 0.1	NM ± NM	—
35-WS-225	2046	5	A	EXU (110S/140E)	-20.00	-30.00	DEB McKay Butte	4.4 ± NM	NM ± NM	—
35-WS-225	2048	3	A	EXU (110S/140E)	-30.00	-40.00	DEB Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-WS-225	2087	3	A	EXU (111S/141E)	-30.00	-40.00	DEB McKay Butte	3.7 ± 0.1	NM ± NM	—
35-WS-225	2098	3	A	EXU (111S/138E)	-90.00	-100.00	DEB McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	2098	3	B	EXU (111S/138E)	-90.00	-100.00	DEB Cougar Mountain	6.1 ± 0.1	NM ± NM	—
35-WS-225	2100	2	A	EXU (111S/138E)	-100.00	-110.00	DEB Cougar Mountain	6.0 ± 0.1	NM ± NM	—
35-WS-225	2112	1	—	EXU (112S/136E)	-20.00	-30.00	BIF McKay Butte	3.1 ± 0.1	NM ± NM	—
35-WS-225	2115	2	A	EXU (112S/137E)	-90.00	-100.00	DEB Cougar Mountain	5.1 ± 0.1	NM ± NM	—
35-WS-225	2116	1	A	EXU (112S/137E)	-100.00	-110.00	DEB Cougar Mountain	6.1 ± NM	NM ± NM	—
35-WS-225	2121	1	A	EXU (112S/138E)	-104.00	-114.00	DEB Quartz Mountain	6.1 ± 0.1	NM ± NM	—
35-WS-225	2142	4	A	EXU (113S/137E)	-30.00	-40.00	DEB McKay Butte	3.7 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-225	2145	3	A	EXU (113S/137E)	-30.00 -40.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	2162	3	A	EXU (113S/141E)	-25.00 -35.00	DEB	McKay Butte	3.6 ±NM	NM ±NM	—
35-WS-225	2193	3	A	EXU (114S/137E)	-43.00 -53.00	DEB	Big Obsidian Flow	1.6 ± 0.1	NM ±NM	—
35-WS-225	2197	4	A	EXU (114S/138E)	-23.00 -33.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	2198	3	A	EXU (114S/138E)	-33.00 -43.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	2198	4	—	EXU (114S/138E)	-33.00 -43.00	UFT	McKay Butte	3.2 ±NM	NM ±NM	—
35-WS-225	2200	7	A	EXU (114S/138E)	-33.00 -43.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ±NM	—
35-WS-225	2211	3	A	EXU (114S/139E)	-10.00 -20.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-WS-225	2213	4	A	EXU (114S/139E)	-20.00 -30.00	DEB	McKay Butte	3.5 ± 0.1	NM ±NM	—
35-WS-225	2213	4	B	EXU (114S/139E)	-20.00 -30.00	DEB	McKay Butte	3.4 ± 0.1	NM ±NM	—
35-WS-225	2213	4	C	EXU (114S/139E)	-20.00 -30.00	DEB	McKay Butte	3.1 ± 0.1	NM ±NM	—
35-WS-225	2213	4	D	EXU (114S/139E)	-20.00 -30.00	DEB	McKay Butte	3.0 ± 0.1	NM ±NM	—
35-WS-225	2213	6	—	EXU (114S/139E)	-20.00 -30.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	2213	7	—	EXU (114S/139E)	-20.00 -30.00	BIF	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	2214	3	A	EXU (114S/139E)	-20.00 -30.00	DEB	Newberry Volcano	2.6 ±NM	NM ±NM	—
35-WS-225	2214	3	B	EXU (114S/139E)	-20.00 -30.00	DEB	McKay Butte	3.6 ± 0.1	NM ±NM	—
35-WS-225	2215	3	A	EXU (114S/139E)	-20.00 -30.00	DEB	Big Obsidian Flow	1.9 ± 0.1	NM ±NM	—
35-WS-225	2215	3	B	EXU (114S/139E)	-20.00 -30.00	DEB	Big Obsidian Flow	2.4 ±NM	NM ±NM	—
35-WS-225	2215	3	C	EXU (114S/139E)	-20.00 -30.00	DEB	Newberry Volcano	2.1 ±NM	NM ±NM	—
35-WS-225	2215	3	D	EXU (114S/139E)	-20.00 -30.00	DEB	Big Obsidian Flow	1.9 ±NM	NM ±NM	—
35-WS-225	2215	3	E	EXU (114S/139E)	-20.00 -30.00	DEB	Big Obsidian Flow	1.4 ± 0.1	NM ±NM	—
35-WS-225	2215	3	F	EXU (114S/139E)	-20.00 -30.00	DEB	Newberry Volcano	2.1 ± 0.2	NM ±NM	—
35-WS-225	2215	3	G	EXU (114S/139E)	-20.00 -30.00	DEB	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-WS-225	2215	3	H	EXU (114S/139E)	-20.00 -30.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-WS-225	2239	4	A	EXU (115S/137E)	-25.00 -35.00	DEB	McKay Butte	3.6 ± 0.1	NM ±NM	—
35-WS-225	2239	4	B	EXU (115S/137E)	-25.00 -35.00	DEB	McKay Butte	DH ±NM	NM ±NM	Diffuse hydration
35-WS-225	2241	4	A	EXU (115S/137E)	-35.00 -45.00	DEB	McKay Butte	2.6 ± 0.1	NM ±NM	—
35-WS-225	2241	4	B	EXU (115S/137E)	-35.00 -45.00	DEB	McKay Butte	3.3 ± 0.1	NM ±NM	—
35-WS-225	2241	4	C	EXU (115S/137E)	-35.00 -45.00	DEB	McKay Butte	2.4 ±NM	NM ±NM	—
35-WS-225	2241	4	D	EXU (115S/137E)	-35.00 -45.00	DEB	McKay Butte	3.1 ±NM	NM ±NM	—
35-WS-225	2244	4	A	EXU (114S/137E)	-45.00 -55.00	DEB	Quartz Mountain	6.4 ± 0.1	NM ±NM	—
35-WS-225	2248	1	—	EXU (115S/138E)	-12.00 -22.00	PPT	Newberry Volcano	2.4 ±NM	NM ±NM	—
35-WS-225	2248	4	A	EXU (115S/138E)	-12.00 -22.00	DEB	McKay Butte	3.4 ± 0.1	NM ±NM	—
35-WS-225	2250	2	A	EXU (115S/138E)	-22.00 -32.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ±NM	—
35-WS-225	2252	4	A	EXU (115S/138E)	-22.00 -32.00	DEB	Newberry Volcano	1.6 ± 0.1	NM ±NM	—
35-WS-225	2252	4	B	EXU (115S/138E)	-22.00 -32.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ±NM	—
35-WS-225	2252	4	C	EXU (115S/138E)	-22.00 -32.00	DEB	McKay Butte	3.0 ±NM	NM ±NM	—
35-WS-225	2255	1	—	EXU (115S/138E)	-22.00 -32.00	UFT	Newberry Volcano	1.9 ± 0.1	NM ±NM	—
35-WS-225	2255	2	—	EXU (115S/138E)	-22.00 -32.00	UFT	Newberry Volcano	2.0 ±NM	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments	
								Rim 1	Rim 2		
35-WS-225	2265	2	—	EXU (115S/139E)	-34.00	-44.00	UFT	Newberry Volcano	1.7 ± NM	NM ± NM	—
35-WS-225	2266	3	A	EXU (115S/139E)	-34.00	-44.00	DEB	McKay Butte	2.8 ± 0.1	NM ± NM	—
35-WS-225	2267	3	A	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-WS-225	2267	3	B	EXU (115S/139E)	-34.00	-44.00	DEB	McKay Butte	2.8 ± 0.1	NM ± NM	—
35-WS-225	2267	3	C	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-WS-225	2267	3	D	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-WS-225	2267	3	E	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-WS-225	2267	3	F	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-WS-225	2267	3	G	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	2.0 ± 0.1	NM ± NM	—
35-WS-225	2267	3	H	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-WS-225	2267	3	I	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-WS-225	2267	3	J	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-WS-225	2267	3	K	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-WS-225	2267	3	L	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.9 ± 0.1	NM ± NM	—
35-WS-225	2267	3	M	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-WS-225	2267	3	N	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.9 ± NM	NM ± NM	—
35-WS-225	2267	3	O	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	1.9 ± NM	NM ± NM	—
35-WS-225	2267	3	P	EXU (115S/139E)	-34.00	-44.00	DEB	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-WS-225	2269	1	—	EXU (115S/139E)	-39.00	-39.00	PPT	Newberry Volcano	1.8 ± NM	NM ± NM	—
35-WS-225	2274	1	A	EXU (115S/139E)	-44.00	-54.00	DEB	Newberry Volcano	2.0 ± NM	NM ± NM	—
35-WS-225	2274	1	B	EXU (115S/139E)	-44.00	-54.00	DEB	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	2275	3	A	EXU (115S/139E)	-44.00	-54.00	DEB	Newberry Volcano	1.7 ± 0.1	NM ± NM	—
35-WS-225	2275	3	B	EXU (115S/139E)	-44.00	-54.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-WS-225	2275	3	C	EXU (115S/139E)	-44.00	-54.00	DEB	McKay Butte	3.1 ± 0.1	NM ± NM	—
35-WS-225	2287	2	A	EXU (115S/140E)	-44.00	-54.00	DEB	Newberry Volcano	2.1 ± 0.2	NM ± NM	—
35-WS-225	2293	2	A	EXU (116S/137E)	-25.00	-35.00	DEB	Obsidian Cliffs	3.8 ± 0.1	NM ± NM	—
35-WS-225	2295	2	A	EXU (116S/137E)	-25.00	-45.00	DEB	McKay Butte	3.2 ± 0.1	NM ± NM	—
35-WS-225	2303	2	A	EXU (97S/168E)	-27.00	-37.00	DEB	Whitewater Ridge	4.2 ± 0.2	NM ± NM	—
35-WS-225	2309	2	A	EXU (97S/168E)	-77.00	-87.00	DEB	Newberry Volcano	2.8 ± 0.2	NM ± NM	—
35-WS-225	2315	5	—	EXU (97S/169E)	2.00	-17.00	BIF	Obsidian Cliffs	2.7 ± 0.1	5.9 ± 0.1	2 hydration bands
35-WS-225	2328	2	A	EXU (97S/169E)	-77.00	-87.00	DEB	Glass Buttes	4.1 ± 0.1	NM ± NM	—
35-WS-225	2365	5	A	EXU (98S/168E)	-27.00	-37.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-WS-225	2381	3	A	EXU (98S/168E)	-87.00	-97.00	DEB	Glass Buttes	3.5 ± NM	NM ± NM	—
35-WS-225	2396	2	A	EXU (98S/169E)	-37.00	-47.00	DEB	Glass Buttes	3.3 ± 0.2	NM ± NM	—
35-WS-225	2396	2	B	EXU (98S/169E)	-37.00	-47.00	DEB	Newberry Volcano	2.1 ± 0.1	NM ± NM	—
35-WS-225	2406	2	A	EXU (98S/169E)	-87.00	-97.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-WS-225	2406	2	B	EXU (98S/169E)	-87.00	-97.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ± NM	—
35-WS-225	2465	4	A	EXU (99S/169E)	-37.00	-47.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-WS-225	2488	3	A	EXU (100S/168E)	-27.00	-37.00	DEB	Newberry Volcano	5.2 ± 0.1	NM ± NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-WS-225	2489	2	A	EXU (100S/168E)	-37.00	-47.00	DEB	Glass Buttes	3.8 ± NM	NM ± NM	—
35-WS-225	2490	2	A	EXU (100S/168E)	-37.00	-47.00	DEB	Newberry Volcano	3.5 ± NM	NM ± NM	—
35-WS-225	2530	2	A	EXU (114S/138E)	-43.00	-53.00	DEB	Newberry Volcano	2.3 ± 0.1	NM ± NM	—
35-WS-225	2531	1	—	EXU (114S/138E)	-43.00	-53.00	BIF	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-WS-225	2531	4	A	EXU (114S/138E)	-43.00	-53.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-WS-225	2531	5	—	EXU (114S/138E)	-43.00	-53.00	UFT	McKay Butte	2.8 ± 0.1	NM ± NM	—
35-WS-225	2532	2	A	EXU (114S/138E)	-43.00	-53.00	DEB	McKay Butte	2.7 ± NM	NM ± NM	—
35-WS-225	2565	3	—	EXU (110S/139E)	-50.00	-60.00	DEB	Juniper Spring 2/Whitewater Ridge?	1.2 ± NM	NM ± NM	—
35-WS-225	2735	3	—	EXU (100S/169E)	-57.00	-67.00	BIF	Whitewater Ridge	2.7 ± 0.1	NM ± NM	—
35-WS-226	6	8	A	SCU 1	0.00	0.00	DEB	Obsidian Cliffs	4.9 ± 0.1	NM ± NM	—
35-WS-226	6	8	B	SCU 1	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-226	6	8	C	SCU 1	0.00	0.00	DEB	Obsidian Cliffs	2.4 ± NM	NM ± NM	—
35-WS-226	8	4	A	SCU 3	0.00	0.00	DEB	Newberry Volcano	1.2 ± NM	NM ± NM	—
35-WS-226	8	4	B	SCU 3	0.00	0.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ± NM	—
35-WS-226	9	2	A	SCU 4	0.00	0.00	DEB	Obsidian Cliffs	4.5 ± 0.2	NM ± NM	—
35-WS-226	9	2	B	SCU 4	0.00	0.00	DEB	Obsidian Cliffs	3.0 ± NM	NM ± NM	—
35-WS-226	11	3	A	SCU 6	0.00	0.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-226	11	3	B	SCU 6	0.00	0.00	DEB	Obsidian Cliffs	4.1 ± 0.1	NM ± NM	—
35-WS-226	11	3	C	SCU 6	0.00	0.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	Weathered
35-WS-226	11	3	D	SCU 6	0.00	0.00	DEB	Obsidian Cliffs	4.4 ± NM	9.1 ± 0.1	2 hydration bands
35-WS-226	12	2	A	SCU 7	0.00	0.00	DEB	Newberry Volcano	4.4 ± 0.1	NM ± NM	—
35-WS-226	12	2	B	SCU 7	0.00	0.00	DEB	Cougar Mountain	NM ± NM	NM ± NM	No OH measurement
35-WS-226	36	2	—	SON 17	-10.00	-20.00	DEB	Obsidian Cliffs	DH ± NM	NM ± NM	Diffuse hydration
35-WS-226	40	2	—	SON 18	-10.00	-20.00	DEB	Obsidian Cliffs	4.2 ± 0.1	NM ± NM	—
35-WS-226	91	2	—	STU 1	0.00	-10.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-WS-226	93	2	—	STU 2	0.00	-10.00	PPT	Obsidian Cliffs	3.8 ± 0.1	NM ± NM	—
35-WS-227	4	1	A	SCP 4	0.00	0.00	DEB	Glass Buttes	4.4 ± 0.1	NM ± NM	—
35-WS-227	12	1	—	SCP 12	0.00	0.00	PPT	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-227	29	10	A	SCU 4	0.00	0.00	DEB	Little Bear Creek	NM ± NM	NM ± NM	No OH measurement
35-WS-227	29	10	B	SCU 4	0.00	0.00	DEB	Obsidian Cliffs	3.8 ± NM	NM ± NM	—
35-WS-227	29	10	C	SCU 4	0.00	0.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-WS-227	29	10	D	SCU 4	0.00	0.00	DEB	Quartz Mountain/McKay Butte	2.6 ± 0.1	NM ± NM	—
35-WS-227	30	7	A	SCU 5	0.00	0.00	DEB	Chickahominy?	3.1 ± 0.1	3.5 ± NM	2 hydration bands
35-WS-227	30	7	B	SCU 5	0.00	0.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-WS-227	31	9	—	SCU 6	0.00	0.00	UFT	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-WS-227	31	14	B	SCU 6	0.00	0.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ± NM	—
35-WS-227	31	14	E	SCU 6	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-227	31	14	H	SCU 6	0.00	0.00	DEB	Quartz Mountain/McKay Butte	NM ± NM	NM ± NM	No OH measurement
35-WS-227	31	14	I	SCU 6	0.00	0.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-WS-227	31	14	J	SCU 6	0.00	0.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-WS-227	62	4	A	SHP A25	0.00	-80.00	DEB	Obsidian Cliffs	3.7 ± 0.1	NM ±NM	—
35-WS-227	62	4	B	SHP A25	0.00	-80.00	DEB	Unknown B	NM ±NM	NM ±NM	No OH measurement
35-WS-227	63	11	A	SHP A26	0.00	-60.00	DEB	Unknown B	NM ±NM	NM ±NM	No OH measurement
35-WS-227	63	11	B	SHP A26	0.00	-60.00	DEB	Unknown A	NM ±NM	NM ±NM	No OH measurement
35-WS-227	106	2	A	TEU 1	-50.00	-60.00	DEB	Whitewater Ridge	3.1 ± 0.1	NM ±NM	—
35-WS-227	134	3	—	TEU 5	-20.00	-30.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	—
35-WS-227	140	3	A	TEU 6	0.00	-10.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	—
35-WS-227	141	8	—	TEU 6	-10.00	-20.00	BIF	Obsidian Cliffs	4.0 ± 0.1	NM ±NM	—
35-WS-227	141	10	—	TEU 6	-10.00	-20.00	BIF	Obsidian Cliffs	4.2 ± 0.1	NM ±NM	—
35-WS-227	141	11	—	TEU 6	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	1.3 ± 0.1	NM ±NM	—
35-WS-227	141	13	A	TEU 6	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-227	141	13	C	TEU 6	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-227	141	13	D	TEU 6	-10.00	-20.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-WS-227	141	13	E	TEU 6	-10.00	-20.00	DEB	Obsidian Cliffs	1.2 ±NM	NM ±NM	—
35-WS-227	141	13	F	TEU 6	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-227	142	12	B	TEU 6	-20.00	-30.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-WS-227	142	12	E	TEU 6	-20.00	-30.00	DEB	Obsidian Cliffs	3.7 ±NM	NM ±NM	—
35-WS-227	142	12	F	TEU 6	-20.00	-30.00	DEB	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-WS-227	143	8	A	TEU 6	-20.00	-30.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-WS-227	144	8	A	TEU 6	-30.00	-40.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-227	144	8	B	TEU 6	-30.00	-40.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	—
35-WS-227	144	8	C	TEU 6	-30.00	-40.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-227	144	8	D	TEU 6	-30.00	-40.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-227	144	8	E	TEU 6	-30.00	-40.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-227	146	2	A	TEU 6	-50.00	-60.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-WS-227	146	2	B	TEU 6	-50.00	-60.00	DEB	Glass Buttes	4.5 ±NM	NM ±NM	—
35-WS-227	146	2	C	TEU 6	-50.00	-60.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-227	146	2	D	TEU 6	-50.00	-60.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement; Basaltic glass?
35-WS-227	146	2	E	TEU 6	-50.00	-60.00	DEB	Unknown B	NM ±NM	NM ±NM	No OH measurement
35-WS-227	146	2	F	TEU 6	-50.00	-60.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-230	5	1	—	SCP 2	0.00	0.00	BIF	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-230	8	1	—	SCP 5	0.00	0.00	DEB	Little Bear Creek/Whitewater Ridge?	NM ±NM	NM ±NM	No OH measurement
35-WS-230	9	1	—	SCP 6	0.00	0.00	BIF	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-WS-230	108	2	—	SON 21	0.00	-10.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-WS-230	179	2	—	AUG 12	-20.00	-40.00	DEB	Glass Buttes	3.6 ± 0.2	NM ±NM	—
35-WS-230	192	1	—	TEU 1	-10.00	-20.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-230	248	2	—	TEU 1	-60.00	-70.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-230	251	1	—	TEU 3	-20.00	-30.00	DEB	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-230	262	1	—	TEU 3	-130.00 -140.00	DEB	Cougar Mountain	NM ±NM	NM ±NM	No OH measurement
35-WS-231	30	1	—	SCP 24	0.00 0.00	BIF	Obsidian Cliffs	4.5 ± 0.1	NM ±NM	—
35-WS-231	39	9	—	SCU 2	0.00 0.00	BIF	Chickahominy?	NM ±NM	NM ±NM	No OH measurement
35-WS-231	399	4	—	TEU 2	-30.00 -40.00	DEB	Obsidian Cliffs	3.8 ± 0.1	NM ±NM	—
35-WS-231	405	1	—	TEU 2	-60.00 -70.00	PPT	Obsidian Cliffs	4.1 ±NM	NM ±NM	—
35-WS-231	412	3	—	TEU 2	-90.00 -100.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	416	3	—	TEU 2	-110.00 -120.00	UFT	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-WS-231	440	4	A	TEU 3	0.00 -10.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ±NM	—
35-WS-231	440	4	B	TEU 3	0.00 -10.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-WS-231	440	5	—	TEU 3	0.00 -10.00	PPT	Unknown A	NM ±NM	NM ±NM	No OH measurement
35-WS-231	440	6	—	TEU 3	0.00 -10.00	PPT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	441	2	A	TEU 3	-10.00 -20.00	DEB	Glass Buttes	4.0 ± 0.2	NM ±NM	—
35-WS-231	441	2	B	TEU 3	-10.00 -20.00	DEB	Obsidian Cliffs	4.0 ± 0.1	NM ±NM	—
35-WS-231	441	2	C	TEU 3	-10.00 -20.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ±NM	—
35-WS-231	442	3	—	TEU 3	-20.00 -30.00	DEB	Glass Buttes	4.4 ± 0.1	NM ±NM	—
35-WS-231	443	7	A	TEU 3	-30.00 -40.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	443	7	B	TEU 3	-30.00 -40.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ±NM	—
35-WS-231	443	7	C	TEU 3	-30.00 -40.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	443	7	D	TEU 3	-30.00 -40.00	DEB	Newberry Volcano	3.3 ±NM	NM ±NM	—
35-WS-231	444	4	A	TEU 3	-40.00 -50.00	DEB	Glass Buttes	3.5 ± 0.1	NM ±NM	—
35-WS-231	444	4	B	TEU 3	-40.00 -50.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-WS-231	444	4	C	TEU 3	-40.00 -50.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-WS-231	444	4	D	TEU 3	-40.00 -50.00	DEB	Riley?	NM ±NM	NM ±NM	No OH measurement
35-WS-231	444	4	E	TEU 3	-40.00 -50.00	DEB	Glass Buttes	4.3 ±NM	NM ±NM	—
35-WS-231	445	2	A	TEU 3	-50.00 -60.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ±NM	—
35-WS-231	445	2	B	TEU 3	-50.00 -60.00	DEB	Obsidian Cliffs	3.9 ± 0.1	NM ±NM	—
35-WS-231	445	2	C	TEU 3	-50.00 -60.00	DEB	Glass Buttes	3.7 ± 0.1	NM ±NM	—
35-WS-231	445	2	D	TEU 3	-50.00 -60.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-WS-231	447	1	—	TEU 3	-70.00 -80.00	PPT	Unknown B	NM ±NM	NM ±NM	No OH measurement
35-WS-231	447	4	A	TEU 3	-70.00 -80.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	447	4	B	TEU 3	-70.00 -80.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-WS-231	447	4	C	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-WS-231	447	4	D	TEU 3	-70.00 -80.00	DEB	Newberry Volcano	3.9 ± 0.2	NM ±NM	—
35-WS-231	447	4	E	TEU 3	-70.00 -80.00	DEB	Glass Buttes	4.0 ± 0.1	NM ±NM	—
35-WS-231	448	2	A	TEU 3	-80.00 -90.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-WS-231	448	2	B	TEU 3	-80.00 -90.00	DEB	Glass Buttes	4.1 ± 0.1	NM ±NM	—
35-WS-231	448	2	C	TEU 3	-80.00 -90.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-WS-231	448	2	D	TEU 3	-80.00 -90.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-WS-231	448	2	E	TEU 3	-80.00 -90.00	DEB	Obsidian Cliffs	3.6 ±NM	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	448	2	F	TEU 3	-80.00 -90.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	449	7	A	TEU 3	-90.00 -100.00	DEB	Unknown C	NM ±NM	NM ±NM	No OH measurement
35-WS-231	449	7	B	TEU 3	-90.00 -100.00	DEB	Newberry Volcano	3.9 ± 0.1	NM ±NM	—
35-WS-231	449	7	C	TEU 3	-90.00 -100.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-WS-231	449	7	D	TEU 3	-90.00 -100.00	DEB	Unknown D	NM ±NM	NM ±NM	No OH measurement
35-WS-231	450	2	A	TEU 3	-100.00 -110.00	DEB	Newberry Volcano	3.3 ± 0.2	NM ±NM	—
35-WS-231	450	2	B	TEU 3	-100.00 -110.00	DEB	Little Bear Creek/Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
35-WS-231	450	2	C	TEU 3	-100.00 -110.00	DEB	Newberry Volcano	3.5 ± 0.2	NM ±NM	—
35-WS-231	450	2	D	TEU 3	-100.00 -110.00	DEB	Unknown E	NM ±NM	NM ±NM	No OH measurement
35-WS-231	450	2	E	TEU 3	-100.00 -110.00	DEB	Unknown F	NM ±NM	NM ±NM	No OH measurement
35-WS-231	450	2	F	TEU 3	-100.00 -110.00	DEB	Unknown G	NM ±NM	NM ±NM	No OH measurement
35-WS-231	450	2	G	TEU 3	-100.00 -110.00	DEB	Obsidian Cliffs	3.5 ± 0.1	NM ±NM	—
35-WS-231	452	1	A	TEU 3	-110.00 -120.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	452	1	B	TEU 3	-110.00 -120.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-WS-231	452	1	C	TEU 3	-110.00 -120.00	DEB	Unknown G	NM ±NM	NM ±NM	No OH measurement
35-WS-231	452	1	D	TEU 3	-110.00 -120.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-WS-231	452	2	—	TEU 3	-110.00 -120.00	UFT	Newberry Volcano	2.9 ±NM	NM ±NM	—
35-WS-231	453	2	A	TEU 3	-120.00 -130.00	DEB	Quartz Mountain	NM ±NM	NM ±NM	No OH measurement
35-WS-231	453	2	B	TEU 3	-120.00 -130.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-WS-231	453	2	C	TEU 3	-120.00 -130.00	DEB	Glass Buttes	3.2 ±NM	NM ±NM	—
35-WS-231	453	2	D	TEU 3	-120.00 -130.00	DEB	Obsidian Cliffs	3.5 ± 0.1	NM ±NM	—
35-WS-231	454	5	A	TEU 3	-130.00 -140.00	DEB	Whitewater Ridge?	NM ±NM	NM ±NM	No OH measurement
35-WS-231	454	5	B	TEU 3	-130.00 -140.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	455	7	A	TEU 3	-140.00 -150.00	DEB	Newberry Volcano	3.3 ± 0.1	NM ±NM	—
35-WS-231	455	7	B	TEU 3	-140.00 -150.00	DEB	Newberry Volcano	3.2 ± 0.1	NM ±NM	—
35-WS-231	455	7	C	TEU 3	-140.00 -150.00	DEB	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-231	455	7	D	TEU 3	-140.00 -150.00	DEB	Horse Mountain?	NM ±NM	NM ±NM	No OH measurement
35-WS-231	456	4	A	TEU 3	-150.00 -160.00	DEB	Horse Mountain?	NM ±NM	NM ±NM	No OH measurement
35-WS-231	468	2	A	EXU (98S/178E)	-40.00 -50.00	DEB	Glass Buttes	4.7 ±NM	NM ±NM	—
35-WS-231	470	2	A	EXU (98S/178E)	-50.00 -60.00	DEB	Quartz Mountain	2.4 ±NM	NM ±NM	—
35-WS-231	478	2	A	EXU (98S/178E)	-90.00 -100.00	DEB	Glass Buttes	3.0 ± 0.1	NM ±NM	—
35-WS-231	504	3	A	EXU (105S/172E)	-20.00 -30.00	DEB	Glass Buttes	3.7 ± 0.1	NM ±NM	—
35-WS-231	504	3	B	EXU (105S/172E)	-20.00 -30.00	DEB	Glass Buttes	4.1 ± 0.1	NM ±NM	—
35-WS-231	506	3	A	EXU (105S/172E)	-30.00 -40.00	DEB	Little Bear Creek	3.3 ± 0.1	NM ±NM	—
35-WS-231	512	2	A	EXU (105S/172E)	-60.00 -70.00	DEB	Whitewater Ridge?	3.0 ±NM	NM ±NM	—
35-WS-231	522	1	A	EXU (105S/172E)	-110.00 -120.00	DEB	Quartz Mountain	3.4 ± 0.2	NM ±NM	—
35-WS-231	580	2	A	EXU (117S/169E)	-15.00 -25.00	DEB	Quartz Mountain	3.4 ± 0.1	NM ±NM	—
35-WS-231	587	3	A	EXU (117S/169E)	-45.00 -55.00	DEB	Whitewater Ridge	2.2 ± 0.1	NM ±NM	—
35-WS-231	588	2	A	EXU (117S/169E)	-55.00 -65.00	DEB	Quartz Mountain	2.7 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	588	2	B	EXU (117S/169E)	-55.00 -65.00	DEB	Whitewater Ridge	2.0 ± 0.1	NM ± NM	—
35-WS-231	593	3	A	EXU (117S/169E)	-75.00 -85.00	DEB	Obsidian Cliffs	2.5 ± 0.1	NM ± NM	—
35-WS-231	594	4	A	EXU (117S/169E)	-85.00 -95.00	DEB	Newberry Volcano	2.4 ± NM	NM ± NM	—
35-WS-231	596	4	A	EXU (117S/169E)	-95.00 -105.00	DEB	Whitewater Ridge	2.6 ± 0.2	NM ± NM	—
35-WS-231	598	2	A	EXU (117S/169E)	-105.00 -115.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-WS-231	598	2	B	EXU (117S/169E)	-105.00 -115.00	DEB	Glass Buttes	3.6 ± NM	NM ± NM	—
35-WS-231	598	2	C	EXU (117S/169E)	-105.00 -115.00	DEB	Glass Buttes	2.9 ± 0.1	NM ± NM	—
35-WS-231	598	2	D	EXU (117S/169E)	-105.00 -115.00	DEB	Glass Buttes	3.5 ± NM	NM ± NM	—
35-WS-231	600	5	—	EXU (117S/169E)	-115.00 -125.00	BIF	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-WS-231	604	2	A	EXU (117S/169E)	-135.00 -145.00	DEB	Whitewater Ridge	3.6 ± NM	NM ± NM	—
35-WS-231	604	2	B	EXU (117S/169E)	-135.00 -145.00	DEB	Quartz Mountain	3.5 ± 0.1	NM ± NM	—
35-WS-231	609	2	A	EXU (125S/158E)	-10.00 -20.00	DEB	Newberry Volcano	1.8 ± 0.1	NM ± NM	—
35-WS-231	614	3	A	EXU (125S/158E)	-40.00 -50.00	DEB	Glass Buttes	3.7 ± 0.1	NM ± NM	—
35-WS-231	618	1	A	EXU (125S/158E)	-60.00 -70.00	DEB	Newberry Volcano	2.7 ± NM	NM ± NM	—
35-WS-231	618	1	B	EXU (125S/158E)	-60.00 -70.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ± NM	—
35-WS-231	628	3	A	EXU (125S/158E)	-110.00 -120.00	DEB	Inman Creek/Salt Creek A?	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	634	3	A	EXU (125S/158E)	-140.00 -150.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-WS-231	660	2	A	EXU (129S/177E)	-40.00 -50.00	DEB	Quartz Mountain	3.0 ± 0.1	NM ± NM	—
35-WS-231	662	1	A	EXU (129S/177E)	-50.00 -60.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-WS-231	676	1	—	EXU (129S/177E)	-120.00 -130.00	PFT	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	676	4	A	EXU (129S/177E)	-120.00 -130.00	DEB	Juniper Spring 2	1.9 ± 0.1	NM ± NM	—
35-WS-231	678	2	A	EXU (129S/177E)	-130.00 -140.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ± NM	—
35-WS-231	696	3	A	EXU (137S/120E)	-5.00 -15.00	DEB	McKay Butte	3.8 ± 0.1	NM ± NM	—
35-WS-231	697	7	—	EXU (137S/120E)	-15.00 -25.00	UFT	Glass Buttes	4.4 ± 0.1	NM ± NM	—
35-WS-231	697	8	A	EXU (137S/120E)	-15.00 -25.00	DEB	Juniper Spring 2	3.0 ± 0.1	NM ± NM	—
35-WS-231	697	8	B	EXU (137S/120E)	-15.00 -25.00	DEB	Glass Buttes	4.2 ± 0.1	NM ± NM	—
35-WS-231	697	8	C	EXU (137S/120E)	-15.00 -25.00	DEB	Glass Buttes	1.9 ± 0.1	NM ± NM	—
35-WS-231	697	8	D	EXU (137S/120E)	-15.00 -25.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-WS-231	698	3	—	EXU (137S/120E)	-25.00 -35.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-231	700	4	A	EXU (137S/120E)	-45.00 -55.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-WS-231	701	1	—	EXU (137S/120E)	-55.00 -65.00	PPT	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-WS-231	701	4	A	EXU (137S/120E)	-55.00 -65.00	DEB	Quartz Mountain	3.5 ± 0.1	NM ± NM	—
35-WS-231	701	4	B	EXU (137S/120E)	-55.00 -65.00	DEB	Obsidian Cliffs	2.9 ± 0.1	NM ± NM	—
35-WS-231	701	4	C	EXU (137S/120E)	-55.00 -65.00	DEB	Little Bear Creek/Whitewater Ridge	3.0 ± 0.1	NM ± NM	—
35-WS-231	702	4	A	EXU (137S/120E)	-65.00 -75.00	DEB	Quartz Mountain	2.9 ± 0.2	NM ± NM	—
35-WS-231	703	4	A	EXU (137S/120E)	-75.00 -85.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ± NM	—
35-WS-231	703	4	B	EXU (137S/120E)	-75.00 -85.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-WS-231	703	4	C	EXU (137S/120E)	-75.00 -85.00	DEB	Glass Buttes	3.4 ± 0.1	NM ± NM	—
35-WS-231	705	3	—	EXU (137S/120E)	-95.00 -105.00	UFT	Quartz Mountain	4.7 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	705	6	A	EXU (137S/120E)	-95.00 -105.00	DEB	Obsidian Cliffs	2.9 ± 0.2	NM ± NM	—
35-WS-231	705	6	B	EXU (137S/120E)	-95.00 -105.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-WS-231	706	3	A	EXU (137S/120E)	-105.00 -115.00	DEB	Glass Buttes	3.6 ± NM	NM ± NM	—
35-WS-231	707	4	A	EXU (137S/120E)	-115.00 -125.00	DEB	Potato Hills	3.1 ± 0.1	NM ± NM	—
35-WS-231	708	5	A	EXU (137S/120E)	-125.00 -135.00	DEB	Delintment Creek	3.7 ± 0.1	NM ± NM	—
35-WS-231	713	3	A	EXU (137S/151E)	-10.00 -20.00	DEB	Whitewater Ridge?	2.5 ± NM	NM ± NM	—
35-WS-231	715	4	A	EXU (137S/151E)	-20.00 -30.00	DEB	Quartz Mountain	3.8 ± 0.1	NM ± NM	—
35-WS-231	715	4	B	EXU (137S/151E)	-20.00 -30.00	DEB	Quartz Mountain	3.7 ± 0.1	NM ± NM	—
35-WS-231	719	3	—	EXU (137S/151E)	-40.00 -50.00	UFT	Newberry Volcano	2.7 ± 0.1	NM ± NM	—
35-WS-231	721	4	A	EXU (137S/151E)	-50.00 -60.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ± NM	—
35-WS-231	722	2	A	EXU (137S/151E)	-50.00 -60.00	DEB	Chickahominy	3.0 ± 0.1	NM ± NM	—
35-WS-231	724	4	A	EXU (137S/151E)	-60.00 -70.00	DEB	Obsidian Cliffs	2.4 ± 0.1	NM ± NM	—
35-WS-231	727	4	A	EXU (137S/151E)	-80.00 -90.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Rim approx. 5.7 microns
35-WS-231	728	3	A	EXU (137S/151E)	-80.00 -90.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ± NM	—
35-WS-231	731	3	A	EXU (137S/151E)	-100.00 -110.00	DEB	Obsidian Cliffs	2.9 ± 0.1	NM ± NM	—
35-WS-231	823	2	A	EXN (138S/183E)	-194.00 -204.00	DEB	Quartz Mountain	2.8 ± 0.1	NM ± NM	—
35-WS-231	828	5	A	EXU (140S/181E)	-115.00 -125.00	DEB	Glass Buttes	3.7 ± NM	NM ± NM	—
35-WS-231	829	3	A	EXU (140S/181E)	-125.00 -135.00	DEB	Quartz Mountain	2.2 ± 0.1	NM ± NM	—
35-WS-231	830	3	A	EXU (140S/181E)	-135.00 -145.00	DEB	Quartz Mountain	2.7 ± 0.1	NM ± NM	—
35-WS-231	839	3	A	EXU (140S/184E)	-146.00 -156.00	DEB	Glass Buttes	3.0 ± NM	NM ± NM	—
35-WS-231	841	4	A	EXU (141S/124E)	-7.00 -17.00	DEB	Juniper Spring 2	2.0 ± NM	NM ± NM	—
35-WS-231	841	4	B	EXU (141S/124E)	-7.00 -17.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ± NM	—
35-WS-231	844	4	A	EXU (141S/124E)	-37.00 -47.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-WS-231	845	3	A	EXU (141S/124E)	-47.00 -57.00	DEB	Newberry Volcano	3.0 ± 0.1	NM ± NM	—
35-WS-231	847	2	A	EXU (141S/124E)	-67.00 -77.00	DEB	Little Bear Creek/Whitewater Ridge	2.4 ± 0.1	NM ± NM	—
35-WS-231	848	4	A	EXU (141S/124E)	-77.00 -87.00	DEB	Cougar Mountain	3.7 ± 0.1	NM ± NM	—
35-WS-231	848	4	B	EXU (141S/124E)	-77.00 -87.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-WS-231	848	4	C	EXU (141S/124E)	-77.00 -87.00	DEB	Unknown H	3.0 ± NM	NM ± NM	—
35-WS-231	849	5	A	EXU (141S/124E)	-87.00 -97.00	DEB	Quartz Mountain	3.0 ± 0.1	NM ± NM	—
35-WS-231	849	5	B	EXU (141S/124E)	-87.00 -97.00	DEB	Quartz Mountain	3.4 ± 0.1	NM ± NM	—
35-WS-231	849	5	C	EXU (141S/124E)	-87.00 -97.00	DEB	Little Bear Creek	3.7 ± 0.1	NM ± NM	—
35-WS-231	850	1	—	EXU (141S/124E)	-97.00 -107.00	BIF	Unknown I	2.7 ± 0.1	NM ± NM	—
35-WS-231	851	4	A	EXU (141S/124E)	-107.00 -117.00	DEB	Glass Buttes	2.5 ± 0.1	NM ± NM	—
35-WS-231	852	3	A	EXU (141S/124E)	-117.00 -127.00	DEB	Little Bear Creek/Whitewater Ridge	3.5 ± 0.1	NM ± NM	—
35-WS-231	853	4	A	EXU (141S/124E)	-127.00 -137.00	DEB	Quartz Mountain	3.2 ± 0.1	NM ± NM	—
35-WS-231	853	4	B	EXU (141S/124E)	-127.00 -137.00	DEB	Glass Buttes	3.0 ± 0.1	NM ± NM	—
35-WS-231	854	4	A	EXU (141S/124E)	-137.00 -147.00	DEB	Quartz Mountain	3.2 ± 0.1	NM ± NM	—
35-WS-231	854	4	B	EXU (141S/124E)	-137.00 -147.00	DEB	Little Bear Creek	3.5 ± 0.1	NM ± NM	—
35-WS-231	854	4	C	EXU (141S/124E)	-137.00 -147.00	DEB	Quartz Mountain	3.3 ± NM	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	854	4	D	EXU (141S/124E)	-137.00 -147.00	DEB	Whitewater Ridge?	3.0 ± 0.1	NM ±NM	—
35-WS-231	857	5	A	EXU (143S/146E)	-10.00 -20.00	DEB	Whitewater Ridge	4.0 ± 0.1	NM ±NM	—
35-WS-231	861	4	—	EXU (143S/146E)	-30.00 -40.00	PPT	Quartz Mountain	1.2 ±NM	NM ±NM	—
35-WS-231	861	6	A	EXU (143S/146E)	-30.00 -40.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement
35-WS-231	870	2	A	EXU (143S/146E)	-70.00 -80.00	DEB	Glass Buttes	3.1 ± 0.1	NM ±NM	—
35-WS-231	873	4	A	EXU (143S/146E)	-90.00 -100.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	3.0 ± 0.1	NM ±NM	—
35-WS-231	875	2	A	EXU (143S/146E)	-100.00 -110.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ±NM	—
35-WS-231	875	2	B	EXU (143S/146E)	-100.00 -110.00	DEB	Newberry Volcano	2.4 ± 0.1	NM ±NM	—
35-WS-231	877	5	A	EXU (143S/146E)	-110.00 -120.00	DEB	Quartz Mountain	3.2 ±NM	NM ±NM	—
35-WS-231	877	5	B	EXU (143S/146E)	-110.00 -120.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ±NM	—
35-WS-231	909	3	A	EXU (143S/163E)	-60.00 -70.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-WS-231	909	3	B	EXU (143S/163E)	-60.00 -70.00	DEB	Whitewater Ridge?	2.0 ± 0.1	NM ±NM	—
35-WS-231	913	2	A	EXU (143S/163E)	-80.00 -90.00	DEB	Quartz Mountain	3.0 ± 0.1	NM ±NM	—
35-WS-231	913	2	B	EXU (143S/163E)	-80.00 -90.00	DEB	Quartz Mountain	2.5 ± 0.1	NM ±NM	—
35-WS-231	914	3	A	EXU (143S/163E)	-80.00 -90.00	DEB	Quartz Mountain	3.5 ± 0.1	NM ±NM	—
35-WS-231	915	3	A	EXU (143S/163E)	-90.00 -100.00	DEB	Quartz Mountain	3.0 ±NM	NM ±NM	—
35-WS-231	915	3	B	EXU (143S/163E)	-90.00 -100.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ±NM	—
35-WS-231	915	3	C	EXU (143S/163E)	-90.00 -100.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—
35-WS-231	921	2	A	EXU (143S/163E)	-120.00 -130.00	DEB	Quartz Mountain	2.9 ± 0.1	NM ±NM	—
35-WS-231	921	2	B	EXU (143S/163E)	-120.00 -130.00	DEB	Newberry Volcano	2.7 ± 0.1	NM ±NM	—
35-WS-231	921	2	C	EXU (143S/163E)	-120.00 -130.00	DEB	Quartz Mountain	3.7 ± 0.1	NM ±NM	—
35-WS-231	922	3	A	EXU (143S/163E)	-120.00 -130.00	DEB	Quartz Mountain	2.5 ± 0.1	NM ±NM	—
35-WS-231	924	3	—	EXU (143S/163E)	-130.00 -140.00	DEB	Quartz Mountain	3.5 ± 0.1	NM ±NM	—
35-WS-231	924	4	A	EXU (143S/163E)	-130.00 -140.00	DEB	Quartz Mountain	3.0 ±NM	NM ±NM	—
35-WS-231	925	3	A	EXU (143S/163E)	-130.00 -140.00	DEB	Quartz Mountain	3.2 ± 0.1	NM ±NM	—
35-WS-231	926	1	A	EXU (143S/163E)	-140.00 -150.00	DEB	Whitewater Ridge	4.2 ±NM	NM ±NM	—
35-WS-231	943	2	A	EXU (143S/173E)	-30.00 -40.00	DEB	Whitewater Ridge?	3.0 ± 0.1	NM ±NM	—
35-WS-231	948	2	A	EXU (143S/173E)	-50.00 -60.00	DEB	Quartz Mountain	2.8 ± 0.1	NM ±NM	—
35-WS-231	955	2	A	EXU (143S/173E)	-90.00 -100.00	DEB	Quartz Mountain	2.8 ± 0.1	NM ±NM	—
35-WS-231	955	2	B	EXU (143S/173E)	-90.00 -100.00	DEB	Obsidian Cliffs	2.9 ± 0.1	NM ±NM	—
35-WS-231	955	2	C	EXU (143S/173E)	-90.00 -100.00	DEB	Obsidian Cliffs	2.8 ± 0.1	NM ±NM	—
35-WS-231	957	4	A	EXU (143S/173E)	-100.00 -110.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ±NM	—
35-WS-231	958	2	A	EXU (143S/173E)	-100.00 -110.00	DEB	Glass Buttes	3.1 ± 0.1	NM ±NM	—
35-WS-231	962	2	A	EXU (143S/173E)	-120.00 -130.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-WS-231	985	3	A	EXU (144S/186E)	-50.00 -60.00	DEB	Newberry Volcano	1.3 ± 0.1	NM ±NM	—
35-WS-231	999	3	A	EXU (144S/186E)	-120.00 -130.00	DEB	Chickahominy	3.6 ±NM	NM ±NM	—
35-WS-231	1000	5	A	EXU (144S/186E)	-130.00 -140.00	DEB	Unknown H	2.0 ±NM	NM ±NM	—
35-WS-231	1000	5	B	EXU (144S/186E)	-130.00 -140.00	DEB	Newberry Volcano	3.2 ±NM	NM ±NM	—
35-WS-231	1027	3	A	EXU (146S/127E)	-9.00 -19.00	DEB	Juniper Spring 2	3.7 ± 0.1	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	1027	3	B	EXU (146S/127E)	-9.00 -19.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ±NM	—
35-WS-231	1027	3	C	EXU (146S/127E)	-9.00 -19.00	DEB	Obsidian Cliffs	3.0 ±NM	NM ±NM	—
35-WS-231	1029	2	A	EXU (146S/127E)	-29.00 -39.00	DEB	Quartz Mountain/McKay Butte	4.3 ± 0.1	NM ±NM	—
35-WS-231	1030	4	A	EXU (146S/127E)	-39.00 -49.00	DEB	Unknown H	2.6 ± 0.1	NM ±NM	—
35-WS-231	1031	4	A	EXU (146S/127E)	-49.00 -59.00	DEB	Glass Buttes	3.7 ± 0.1	NM ±NM	—
35-WS-231	1031	4	B	EXU (146S/127E)	-49.00 -59.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ±NM	—
35-WS-231	1032	3	A	EXU (146S/127E)	-59.00 -69.00	DEB	Little Bear Creek	3.2 ±NM	NM ±NM	—
35-WS-231	1032	3	B	EXU (146S/127E)	-59.00 -69.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Rim approx. 4.5 microns
35-WS-231	1033	3	A	EXU (146S/127E)	-69.00 -79.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—
35-WS-231	1033	3	B	EXU (146S/127E)	-69.00 -79.00	DEB	Juniper Spring 2	2.6 ± 0.1	NM ±NM	—
35-WS-231	1033	3	C	EXU (146S/127E)	-69.00 -79.00	DEB	Obsidian Cliffs	4.3 ± 0.1	NM ±NM	—
35-WS-231	1034	4	A	EXU (146S/127E)	-79.00 -89.00	DEB	Quartz Mountain	3.7 ± 0.1	NM ±NM	—
35-WS-231	1034	4	B	EXU (146S/127E)	-79.00 -89.00	DEB	Quartz Mountain	3.3 ±NM	NM ±NM	—
35-WS-231	1037	1	—	EXU (146S/127E)	-99.00 -109.00	PPT	Quartz Mountain	3.5 ± 0.1	NM ±NM	—
35-WS-231	1037	2	A	EXU (146S/127E)	-99.00 -109.00	DEB	Quartz Mountain	3.0 ± 0.1	NM ±NM	—
35-WS-231	1037	2	B	EXU (146S/127E)	-99.00 -109.00	DEB	Unknown H	2.5 ± 0.1	NM ±NM	—
35-WS-231	1038	3	A	EXU (146S/127E)	-109.00 -119.00	DEB	Quartz Mountain	3.4 ± 0.1	NM ±NM	—
35-WS-231	1038	3	B	EXU (146S/127E)	-109.00 -119.00	DEB	Quartz Mountain	3.4 ± 0.1	NM ±NM	—
35-WS-231	1039	3	A	EXU (146S/127E)	-119.00 -129.00	DEB	Quartz Mountain	2.8 ± 0.1	NM ±NM	—
35-WS-231	1039	3	B	EXU (146S/127E)	-119.00 -129.00	DEB	Glass Buttes	3.5 ± 0.1	NM ±NM	—
35-WS-231	1039	3	C	EXU (146S/127E)	-119.00 -129.00	DEB	Glass Buttes	3.1 ± 0.1	NM ±NM	—
35-WS-231	1040	4	A	EXU (146S/127E)	-129.00 -139.00	DEB	Unknown E	3.7 ± 0.1	NM ±NM	—
35-WS-231	1040	4	B	EXU (146S/127E)	-129.00 -139.00	DEB	Whitewater Ridge?	2.5 ± 0.1	NM ±NM	—
35-WS-231	1060	3	A	EXU (145S/186E)	-88.00 -98.00	DEB	Delintment Creek	3.4 ± 0.1	NM ±NM	—
35-WS-231	1074	2	A	EXU (145S/188E)	-80.00 -90.00	DEB	Unknown H	2.5 ± 0.1	NM ±NM	—
35-WS-231	1075	3	A	EXU (145S/188E)	-80.00 -90.00	DEB	Newberry Volcano	2.5 ±NM	NM ±NM	—
35-WS-231	1078	1	—	EXU (145S/188E)	-100.00 -110.00	UFT	Obsidian Cliffs	3.9 ± 0.1	NM ±NM	—
35-WS-231	1078	4	A	EXU (145S/188E)	-100.00 -110.00	DEB	Little Bear Creek/Whitewater Ridge	2.2 ± 0.1	NM ±NM	—
35-WS-231	1089	2	A	EXU (147S/143E)	2.00 -10.00	DEB	Whitewater Ridge?	4.1 ± 0.1	NM ±NM	—
35-WS-231	1093	3	A	EXU (147S/143E)	-20.00 -30.00	DEB	Glass Buttes	4.0 ± 0.1	NM ±NM	—
35-WS-231	1094	3	A	EXU (147S/143E)	-30.00 -40.00	DEB	Riley	3.7 ± 0.1	NM ±NM	—
35-WS-231	1094	3	B	EXU (147S/143E)	-30.00 -40.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ±NM	—
35-WS-231	1095	1	—	EXU (147S/143E)	-30.00 -40.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered; Diffuse hydration
35-WS-231	1097	4	A	EXU (147S/143E)	-40.00 -50.00	DEB	Obsidian Cliffs	3.2 ±NM	NM ±NM	—
35-WS-231	1098	4	A	EXU (147S/143E)	-50.00 -60.00	DEB	Glass Buttes	3.2 ±NM	NM ±NM	—
35-WS-231	1100	2	A	EXU (147S/143E)	-60.00 -70.00	DEB	Glass Buttes	3.6 ±NM	NM ±NM	—
35-WS-231	1104	3	A	EXU (147S/143E)	-80.00 -90.00	DEB	Newberry Volcano	3.6 ± 0.1	NM ±NM	—
35-WS-231	1106	3	A	EXU (147S/143E)	-90.00 -100.00	DEB	Cougar Mountain	3.5 ± 0.1	NM ±NM	—
35-WS-231	1108	3	A	EXU (147S/143E)	-100.00 -110.00	DEB	Newberry Volcano	2.9 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	1110	3	A	EXU (147S/143E)	-110.00 -120.00	DEB	Little Bear Creek	3.8 ± 0.1	NM ± NM	—
35-WS-231	1162	2	A	EXU (147S/180E)	-97.00 -107.00	DEB	Unknown H	2.4 ± NM	NM ± NM	—
35-WS-231	1170	2	A	EXU (150S/132E)	0.00 -9.00	DEB	Unknown H	2.9 ± 0.1	NM ± NM	—
35-WS-231	1172	2	A	EXU (150S/132E)	-19.00 -29.00	DEB	Quartz Mountain	2.8 ± 0.1	NM ± NM	—
35-WS-231	1172	2	B	EXU (150S/132E)	-19.00 -29.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-WS-231	1172	2	C	EXU (150S/132E)	-19.00 -29.00	DEB	Newberry Volcano	4.5 ± 0.1	NM ± NM	—
35-WS-231	1173	3	A	EXU (150S/132E)	-29.00 -39.00	DEB	Glass Buttes	4.2 ± 0.1	NM ± NM	—
35-WS-231	1173	3	B	EXU (150S/132E)	-29.00 -39.00	DEB	Quartz Mountain	3.0 ± 0.1	NM ± NM	—
35-WS-231	1173	3	C	EXU (150S/132E)	-29.00 -39.00	DEB	Newberry Volcano	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	1173	3	D	EXU (150S/132E)	-29.00 -39.00	DEB	Glass Buttes	2.8 ± 0.1	NM ± NM	—
35-WS-231	1174	1	A	EXU (150S/132E)	-39.00 -49.00	DEB	Whitewater Ridge	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	1174	1	B	EXU (150S/132E)	-39.00 -49.00	DEB	Whitewater Ridge	3.4 ± 0.1	NM ± NM	—
35-WS-231	1176	1	A	EXU (150S/132E)	-49.00 -59.00	DEB	Unknown J	3.4 ± 0.1	NM ± NM	—
35-WS-231	1176	1	B	EXU (150S/132E)	-49.00 -59.00	DEB	Newberry Volcano?	3.1 ± 0.1	NM ± NM	—
35-WS-231	1179	2	A	EXU (150S/132E)	-59.00 -69.00	DEB	Quartz Mountain	2.5 ± 0.1	NM ± NM	—
35-WS-231	1179	2	B	EXU (150S/132E)	-59.00 -69.00	DEB	Quartz Mountain	4.3 ± 0.1	NM ± NM	—
35-WS-231	1179	2	C	EXU (150S/132E)	-59.00 -69.00	DEB	Glass Buttes	2.8 ± 0.1	NM ± NM	—
35-WS-231	1179	2	D	EXU (150S/132E)	-59.00 -69.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-WS-231	1179	2	E	EXU (150S/132E)	-59.00 -69.00	DEB	Quartz Mountain	2.7 ± NM	NM ± NM	—
35-WS-231	1180	3	A	EXU (150S/132E)	-69.00 -79.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-WS-231	1180	3	B	EXU (150S/132E)	-69.00 -79.00	DEB	Quartz Mountain	3.4 ± 0.1	NM ± NM	—
35-WS-231	1181	4	A	EXU (150S/132E)	-79.00 -89.00	DEB	Glass Buttes	3.6 ± 0.1	NM ± NM	—
35-WS-231	1181	4	B	EXU (150S/132E)	-79.00 -89.00	DEB	Not Obsidian	NM ± NM	NM ± NM	No OH measurement
35-WS-231	1181	4	C	EXU (150S/132E)	-79.00 -89.00	DEB	Quartz Mountain	4.2 ± 0.1	NM ± NM	—
35-WS-231	1183	1	A	EXU (150S/132E)	-89.00 -99.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-231	1184	2	A	EXU (150S/132E)	-99.00 -109.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-WS-231	1184	2	B	EXU (150S/132E)	-99.00 -109.00	DEB	Quartz Mountain	2.7 ± 0.1	NM ± NM	—
35-WS-231	1184	2	C	EXU (150S/132E)	-99.00 -109.00	DEB	Whitewater Ridge?	2.6 ± 0.1	NM ± NM	—
35-WS-231	1186	3	A	EXU (150S/132E)	-109.00 -119.00	DEB	Quartz Mountain	2.5 ± NM	NM ± NM	—
35-WS-231	1186	3	B	EXU (150S/132E)	-109.00 -119.00	DEB	Glass Buttes	3.6 ± 0.1	NM ± NM	—
35-WS-231	1186	3	C	EXU (150S/132E)	-109.00 -119.00	DEB	Unknown H	2.5 ± 0.1	NM ± NM	—
35-WS-231	1186	3	D	EXU (150S/132E)	-109.00 -119.00	DEB	Unknown H	2.3 ± 0.1	NM ± NM	—
35-WS-231	1187	1	A	EXU (150S/132E)	-119.00 -129.00	DEB	Unknown O	4.4 ± 0.1	5.6 ± 0.1	2 hydration bands
35-WS-231	1187	1	B	EXU (150S/132E)	-119.00 -129.00	DEB	Unknown E	4.4 ± 0.1	NM ± NM	—
35-WS-231	1189	3	A	EXU (150S/132E)	-129.00 -139.00	DEB	Unknown H	3.2 ± 0.1	NM ± NM	—
35-WS-231	1189	3	B	EXU (150S/132E)	-129.00 -139.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ± NM	—
35-WS-231	1191	3	A	EXU (150S/132E)	-139.00 -149.00	DEB	Obsidian Cliffs	3.1 ± 0.1	NM ± NM	—
35-WS-231	1191	3	B	EXU (150S/132E)	-139.00 -149.00	DEB	Newberry Volcano	3.6 ± NM	NM ± NM	—
35-WS-231	1196	1	A	EXU (150S/148E)	-10.00 -20.00	DEB	Quartz Mountain	3.5 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	1197	2	A	EXU (150S/148E)	-20.00 -30.00	DEB	Whitewater Ridge	3.0 ± 0.1	NM ± NM	—
35-WS-231	1203	2	A	EXU (150S/148E)	-50.00 -60.00	DEB	Quartz Mountain/McKay Butte	2.7 ± 0.1	NM ± NM	—
35-WS-231	1207	1	A	EXU (150S/148E)	-70.00 -80.00	DEB	Potato Hills	4.4 ± 0.1	NM ± NM	—
35-WS-231	1207	1	B	EXU (150S/148E)	-70.00 -80.00	DEB	Quartz Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	1209	1	A	EXU (150S/148E)	-80.00 -90.00	DEB	Quartz Mountain	3.3 ± 0.1	NM ± NM	—
35-WS-231	1210	3	A	EXU (150S/148E)	-80.00 -90.00	DEB	Quartz Mountain	2.4 ± NM	NM ± NM	—
35-WS-231	1210	3	B	EXU (150S/148E)	-80.00 -90.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ± NM	—
35-WS-231	1211	3	A	EXU (150S/148E)	-90.00 -100.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ± NM	—
35-WS-231	1212	3	A	EXU (150S/148E)	-90.00 -100.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ± NM	—
35-WS-231	1215	2	A	EXU (150S/148E)	-110.00 -120.00	DEB	Obsidian Cliffs	4.7 ± 0.1	NM ± NM	—
35-WS-231	1230	4	A	EXU (152S/140E)	-30.00 -40.00	DEB	Quartz Mountain	2.2 ± 0.1	NM ± NM	—
35-WS-231	1230	4	B	EXU (152S/140E)	-30.00 -40.00	DEB	Newberry Volcano	3.4 ± 0.1	NM ± NM	—
35-WS-231	1230	4	C	EXU (152S/140E)	-30.00 -40.00	DEB	Whitewater Ridge?	2.2 ± 0.1	NM ± NM	—
35-WS-231	1232	2	A	EXU (152S/140E)	-40.00 -50.00	DEB	Glass Buttes	2.9 ± NM	NM ± NM	—
35-WS-231	1232	2	B	EXU (152S/140E)	-40.00 -50.00	DEB	Obsidian Cliffs	3.6 ± NM	NM ± NM	—
35-WS-231	1232	2	C	EXU (152S/140E)	-40.00 -50.00	DEB	Riley	3.8 ± NM	NM ± NM	—
35-WS-231	1234	1	A	EXU (152S/140E)	-50.00 -60.00	DEB	Quartz Mountain	4.0 ± 0.1	NM ± NM	—
35-WS-231	1234	1	B	EXU (152S/140E)	-50.00 -60.00	DEB	Glass Buttes	2.5 ± 0.1	NM ± NM	—
35-WS-231	1234	4	—	EXU (152S/140E)	-50.00 -60.00	BIF	Obsidian Cliffs	3.8 ± 0.2	NM ± NM	—
35-WS-231	1235	3	A	EXU (152S/140E)	-50.00 -60.00	DEB	Glass Buttes	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	1236	1	A	EXU (152S/140E)	-60.00 -70.00	DEB	Quartz Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	1237	2	A	EXU (152S/140E)	-60.00 -70.00	DEB	Glass Buttes	3.0 ± NM	NM ± NM	—
35-WS-231	1240	4	A	EXU (152S/140E)	-80.00 -90.00	DEB	Newberry Volcano	2.8 ± 0.1	NM ± NM	—
35-WS-231	1246	1	A	EXU (152S/140E)	-110.00 -120.00	DEB	Quartz Mountain	3.3 ± 0.1	NM ± NM	—
35-WS-231	1251	3	A	EXU (152S/140E)	-130.00 -140.00	DEB	Whitewater Ridge?	3.2 ± 0.1	NM ± NM	—
35-WS-231	1260	2	A	EXX NW (152S/140E)	-260.00 -300.00	DEB	Unknown K	3.4 ± 0.1	NM ± NM	—
35-WS-231	1289	7	A	EXU (152S/158E)	-10.00 -20.00	DEB	Quartz Mountain	2.6 ± NM	NM ± NM	—
35-WS-231	1290	3	A	EXU (152S/158E)	-10.00 -20.00	DEB	Quartz Mountain	2.9 ± 0.1	NM ± NM	—
35-WS-231	1293	4	A	EXU (152S/158E)	-30.00 -40.00	DEB	Obsidian Cliffs	3.7 ± 0.1	NM ± NM	—
35-WS-231	1301	4	A	EXU (152S/158E)	-70.00 -80.00	DEB	Quartz Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	1305	3	A	EXU (152S/158E)	-90.00 -100.00	DEB	Quartz Mountain	3.0 ± 0.1	NM ± NM	—
35-WS-231	1309	3	A	EXU (152S/158E)	-110.00 -120.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	4.0 ± 0.1	NM ± NM	—
35-WS-231	1342	3	A	EXU (154S/176E)	-50.00 -60.00	DEB	Whitewater Ridge	3.0 ± 0.1	NM ± NM	—
35-WS-231	1344	2	—	EXU (154S/176E)	-60.00 -70.00	PFT	Quartz Mountain	3.1 ± 0.1	NM ± NM	—
35-WS-231	1354	3	A	EXU (154S/176E)	-100.00 -110.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-WS-231	1356	3	A	EXU (154S/176E)	-110.00 -120.00	DEB	Quartz Mountain	3.0 ± NM	NM ± NM	—
35-WS-231	1357	4	A	EXU (154S/176E)	-120.00 -130.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ± NM	—
35-WS-231	1358	3	A	EXU (154S/176E)	-120.00 -130.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ± NM	—
35-WS-231	1360	3	A	EXU (154S/176E)	-130.00 -140.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
									Rim 1	Rim 2	
35-WS-231	1373	3	A	EXU (157S/136E)	-12.00	-22.00	DEB	Quartz Mountain	3.6 ± 0.1	NM ±NM	—
35-WS-231	1374	4	A	EXU (157S/136E)	-22.00	-32.00	DEB	Quartz Mountain	4.3 ±NM	NM ±NM	—
35-WS-231	1374	4	B	EXU (157S/136E)	-22.00	-32.00	DEB	Glass Buttes	4.4 ±NM	NM ±NM	—
35-WS-231	1378	1	—	EXU (157S/136E)	-62.00	-72.00	UFT	Quartz Mountain	3.2 ± 0.1	NM ±NM	—
35-WS-231	1378	4	A	EXU (157S/136E)	-62.00	-72.00	DEB	Quartz Mountain	2.9 ±NM	NM ±NM	—
35-WS-231	1378	4	B	EXU (157S/136E)	-62.00	-72.00	DEB	Quartz Mountain	3.5 ±NM	NM ±NM	—
35-WS-231	1383	2	A	EXU (160S/133E)	-10.00	-20.00	DEB	Round Top Butte	4.2 ± 0.1	NM ±NM	—
35-WS-231	1393	3	A	EXU (160S/133E)	-60.00	-70.00	DEB	Quartz Mountain	3.5 ± 0.1	NM ±NM	—
35-WS-231	1394	2	A	EXU (160S/133E)	-60.00	-70.00	DEB	Unknown L	3.7 ± 0.1	NM ±NM	—
35-WS-231	1395	3	A	EXU (160S/133E)	-70.00	-80.00	DEB	Quartz Mountain	3.7 ± 0.1	NM ±NM	—
35-WS-231	1395	3	B	EXU (160S/133E)	-70.00	-80.00	DEB	Quartz Mountain	3.4 ± 0.2	NM ±NM	—
35-WS-231	1397	3	A	EXU (160S/133E)	-80.00	-90.00	DEB	Whitewater Ridge?	2.7 ± 0.1	NM ±NM	—
35-WS-231	1397	3	B	EXU (160S/133E)	-80.00	-90.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-WS-231	1401	6	A	EXU (160S/133E)	-100.00	-110.00	DEB	Quartz Mountain	3.6 ± 0.1	NM ±NM	—
35-WS-231	1403	3	A	EXU (160S/133E)	-110.00	-120.00	DEB	Quartz Mountain	3.2 ± 0.1	NM ±NM	—
35-WS-231	1403	3	B	EXU (160S/133E)	-110.00	-120.00	DEB	Quartz Mountain	3.3 ± 0.1	NM ±NM	—
35-WS-231	1408	4	A	EXU (160S/133E)	-130.00	-140.00	DEB	Quartz Mountain	3.2 ±NM	NM ±NM	—
35-WS-231	1408	4	B	EXU (160S/133E)	-130.00	-140.00	DEB	Quartz Mountain	3.3 ±NM	NM ±NM	—
35-WS-231	1422	4	A	EXU (160S/152E)	-10.00	-24.00	DEB	Obsidian Cliffs	3.9 ± 0.2	NM ±NM	—
35-WS-231	1423	1	—	EXU (160S/152E)	-10.00	-24.00	BIF	Quartz Mountain	3.7 ± 0.1	NM ±NM	—
35-WS-231	1423	4	A	EXU (160S/152E)	-10.00	-24.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ±NM	—
35-WS-231	1424	2	—	EXU (160S/152E)	-24.00	-34.00	UFT	Obsidian Cliffs	3.7 ±NM	NM ±NM	—
35-WS-231	1424	4	A	EXU (160S/152E)	-24.00	-34.00	DEB	Quartz Mountain	3.6 ±NM	NM ±NM	—
35-WS-231	1428	1	—	EXU (160S/152E)	-44.00	-44.00	BIF	Juniper Spring 1	3.8 ± 0.1	NM ±NM	—
35-WS-231	1431	2	A	EXU (160S/152E)	-54.00	-64.00	DEB	Glass Buttes	3.6 ±NM	NM ±NM	—
35-WS-231	1434	2	A	EXU (160S/152E)	-64.00	-74.00	DEB	Quartz Mountain	3.1 ± 0.1	NM ±NM	—
35-WS-231	1435	3	A	EXU (160S/152E)	-74.00	-84.00	DEB	Obsidian Cliffs	3.8 ± 0.1	NM ±NM	—
35-WS-231	1435	3	B	EXU (160S/152E)	-74.00	-84.00	DEB	Little Bear Creek/Whitewater Ridge	3.5 ± 0.1	NM ±NM	—
35-WS-231	1436	3	A	EXU (160S/152E)	-74.00	-84.00	DEB	Little Bear Creek/Whitewater Ridge	4.9 ± 0.1	NM ±NM	—
35-WS-231	1437	1	—	EXU (160S/152E)	-84.00	-94.00	BIF	Newberry Volcano	3.5 ± 0.1	NM ±NM	—
35-WS-231	1437	4	A	EXU (160S/152E)	-84.00	-94.00	DEB	Quartz Mountain	3.2 ±NM	NM ±NM	—
35-WS-231	1440	4	A	EXU (160S/152E)	-94.00	-104.00	DEB	Newberry Volcano	3.4 ± 0.2	NM ±NM	—
35-WS-231	1460	1	A	EXU (166S/168E)	-50.00	-60.00	DEB	Newberry Volcano	1.8 ±NM	NM ±NM	—
35-WS-231	1466	1	A	EXU (166S/168E)	-80.00	-90.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ±NM	—
35-WS-231	1469	1	A	EXU (166S/168E)	-90.00	-100.00	DEB	Horse Mountain	3.7 ± 0.1	NM ±NM	—
35-WS-231	1489	1	A	EXU (167S/146E)	-10.00	-20.00	DEB	McKay Butte	3.6 ± 0.1	NM ±NM	—
35-WS-231	1490	1	A	EXU (167S/146E)	-20.00	-30.00	DEB	Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—
35-WS-231	1491	1	A	EXU (167S/146E)	-20.00	-30.00	DEB	Quartz Mountain	3.4 ± 0.1	NM ±NM	—
35-WS-231	1492	1	A	EXU (167S/146E)	-30.00	-40.00	DEB	Whitewater Ridge?	3.0 ± 0.1	NM ±NM	—

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### Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	1492	1	B	EXU (167S/146E)	-30.00 -40.00	DEB	Newberry Volcano	2.5 ± 0.1	NM ±NM	—
35-WS-231	1493	1	A	EXU (167S/146E)	-30.00 -40.00	DEB	Quartz Mountain	1.3 ±NM	NM ±NM	—
35-WS-231	1494	1	A	EXU (167S/146E)	-40.00 -50.00	DEB	Little Bear Creek	1.2 ±NM	NM ±NM	—
35-WS-231	1495	1	A	EXU (167S/146E)	-40.00 -50.00	DEB	Quartz Mountain	3.6 ±NM	NM ±NM	—
35-WS-231	1495	1	B	EXU (167S/146E)	-40.00 -50.00	DEB	Glass Buttes	1.3 ±NM	NM ±NM	—
35-WS-231	1500	1	A	EXU (167S/146E)	-70.00 -80.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ±NM	—
35-WS-231	1502	1	A	EXU (167S/146E)	-80.00 -90.00	DEB	Quartz Mountain	3.5 ± 0.1	NM ±NM	—
35-WS-231	1503	1	A	EXU (167S/146E)	-80.00 -90.00	DEB	Quartz Mountain	3.6 ±NM	NM ±NM	—
35-WS-231	1505	1	A	EXU (167S/146E)	-90.00 -100.00	DEB	Newberry Volcano	3.0 ±NM	NM ±NM	—
35-WS-231	1510	1	A	EXU (167S/146E)	-120.00 0.00	DEB	Whitewater Ridge	3.4 ± 0.2	NM ±NM	—
35-WS-231	1538	1	—	EXU (144S/184E)	-84.00 -94.00	DEB	McKay Butte	3.2 ±NM	NM ±NM	—
35-WS-231	1539	3	A	EXU (144S/184E)	-94.00 -104.00	DEB	Whitewater Ridge?	3.0 ±NM	NM ±NM	—
35-WS-231	1541	1	—	EXU (144S/184E)	-104.00 -114.00	DEB	Newberry Volcano	DH ±NM	NM ±NM	Weathered
35-WS-231	1541	3	A	EXU (144S/184E)	-104.00 -114.00	DEB	Unknown G	2.5 ± 0.1	NM ±NM	—
35-WS-231	1543	1	—	EXU (144S/184E)	-114.00 -124.00	PPT	Newberry Volcano?	3.2 ±NM	NM ±NM	—
35-WS-231	1543	5	A	EXU (144S/184E)	-114.00 -124.00	DEB	Obsidian Cliffs	3.4 ± 0.1	NM ±NM	—
35-WS-231	1555	3	A	EXU (144S/185E)	-94.00 -104.00	DEB	Obsidian Cliffs	3.2 ±NM	3.7 ± 0.1	2 hydration bands
35-WS-231	1555	3	B	EXU (144S/185E)	-94.00 -104.00	DEB	Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—
35-WS-231	1556	2	—	EXU (144S/185E)	-104.00 -114.00	BIF	Glass Buttes	3.7 ±NM	NM ±NM	—
35-WS-231	1557	4	A	EXU (144S/185E)	-114.00 -124.00	DEB	Obsidian Cliffs	3.2 ± 0.1	NM ±NM	—
35-WS-231	1564	3	A	EXU (145S/184E)	-89.00 -99.00	DEB	Little Bear Creek/Whitewater Ridge	3.1 ± 0.1	NM ±NM	—
35-WS-231	1565	3	A	EXU (145S/184E)	-89.00 -99.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ±NM	—
35-WS-231	1565	3	B	EXU (145S/184E)	-89.00 -99.00	DEB	Whitewater Ridge?	2.7 ± 0.1	NM ±NM	—
35-WS-231	1566	5	A	EXU (145S/184E)	-99.00 -109.00	DEB	Horse Mountain	5.0 ± 0.2	NM ±NM	—
35-WS-231	1568	3	A	EXU (145S/184E)	-109.00 -119.00	DEB	Glass Buttes	3.6 ± 0.1	NM ±NM	—
35-WS-231	1569	2	—	EXU (145S/184E)	-109.00 -119.00	UFT	Glass Buttes	3.6 ± 0.1	NM ±NM	—
35-WS-231	1569	5	A	EXU (145S/184E)	-109.00 -119.00	DEB	Newberry Volcano	2.6 ± 0.1	NM ±NM	—
35-WS-231	1569	5	B	EXU (145S/184E)	-109.00 -119.00	DEB	Whitewater Ridge	2.6 ± 0.1	NM ±NM	—
35-WS-231	1570	3	A	EXU (145S/184E)	-119.00 -129.00	DEB	Unknown G	3.1 ± 0.1	NM ±NM	—
35-WS-231	1570	3	B	EXU (145S/184E)	-119.00 -129.00	DEB	Whitewater Ridge	2.6 ± 0.1	NM ±NM	—
35-WS-231	1570	3	C	EXU (145S/184E)	-119.00 -129.00	DEB	Obsidian Cliffs	3.8 ± 0.1	NM ±NM	—
35-WS-231	1570	3	D	EXU (145S/184E)	-119.00 -129.00	DEB	Obsidian Cliffs	4.0 ± 0.1	NM ±NM	—
35-WS-231	1572	5	A	EXU (145S/184E)	-129.00 -139.00	DEB	Glass Buttes	3.6 ±NM	NM ±NM	—
35-WS-231	1572	6	—	EXU (145S/184E)	-129.00 -139.00	UFT	Juniper Spring 1	2.9 ± 0.1	NM ±NM	—
35-WS-231	1575	2	A	EXU (145S/184E)	-139.00 -149.00	DEB	Whitewater Ridge?	2.4 ± 0.1	NM ±NM	—
35-WS-231	1613	2	A	EXU (114S/165E)	-10.00 -20.00	DEB	Newberry Volcano	3.6 ±NM	NM ±NM	—
35-WS-231	1614	2	A	EXU (114S/165E)	-20.00 -30.00	DEB	Juniper Spring 2	2.9 ±NM	NM ±NM	—
35-WS-231	1616	3	A	EXU (114S/165E)	-30.00 -40.00	DEB	Quartz Mountain	2.9 ± 0.1	NM ±NM	—
35-WS-231	1617	2	A	EXU (114S/165E)	-30.00 -40.00	DEB	Quartz Mountain	2.9 ± 0.2	NM ±NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	1618	2	A	EXU (114S/165E)	-40.00 -50.00	DEB	Newberry Volcano	2.2 ± 0.1	NM ± NM	—
35-WS-231	1619	3	A	EXU (114S/165E)	-40.00 -50.00	DEB	Quartz Mountain	3.0 ± NM	NM ± NM	—
35-WS-231	1620	3	A	EXU (114S/165E)	-50.00 -60.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	3.5 ± 0.1	NM ± NM	—
35-WS-231	1620	3	B	EXU (114S/165E)	-50.00 -60.00	DEB	Quartz Mountain	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	1620	3	C	EXU (114S/165E)	-50.00 -60.00	DEB	Whitewater Ridge	2.5 ± NM	NM ± NM	—
35-WS-231	1622	3	A	EXU (114S/165E)	-60.00 -70.00	DEB	Quartz Mountain	3.3 ± 0.1	NM ± NM	—
35-WS-231	1625	2	A	EXU (114S/165E)	-70.00 -80.00	DEB	Newberry Volcano	3.1 ± 0.1	NM ± NM	—
35-WS-231	1625	2	B	EXU (114S/165E)	-70.00 -80.00	DEB	Whitewater Ridge	2.5 ± 0.1	NM ± NM	—
35-WS-231	1626	3	A	EXU (114S/165E)	-80.00 -90.00	DEB	Quartz Mountain	2.6 ± 0.1	NM ± NM	—
35-WS-231	1626	3	B	EXU (114S/165E)	-80.00 -90.00	DEB	Whitewater Ridge	2.0 ± 0.1	NM ± NM	—
35-WS-231	1626	3	C	EXU (114S/165E)	-80.00 -90.00	DEB	Unknown H	2.0 ± NM	NM ± NM	—
35-WS-231	1626	4	—	EXU (114S/165E)	-80.00 -90.00	BIF	Obsidian Cliffs	3.4 ± 0.2	NM ± NM	—
35-WS-231	1630	3	A	EXU (114S/165E)	-90.00 -100.00	DEB	Juniper Spring 2	2.3 ± 0.1	NM ± NM	—
35-WS-231	1630	3	B	EXU (114S/165E)	-90.00 -100.00	DEB	Unknown H	2.2 ± 0.1	NM ± NM	—
35-WS-231	1631	2	A	EXU (114S/165E)	-90.00 -100.00	DEB	Whitewater Ridge	2.4 ± 0.1	NM ± NM	—
35-WS-231	1631	2	B	EXU (114S/165E)	-90.00 -100.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	3.6 ± 0.1	NM ± NM	—
35-WS-231	1632	3	A	EXU (114S/165E)	-100.00 -110.00	DEB	Glass Buttes	3.6 ± NM	NM ± NM	—
35-WS-231	1632	3	B	EXU (114S/165E)	-100.00 -110.00	DEB	Whitewater Ridge	2.5 ± 0.1	NM ± NM	Band width approx. 54.0 microns
35-WS-231	1632	3	C	EXU (114S/165E)	-100.00 -110.00	DEB	Cougar Mountain	2.6 ± 0.1	NM ± NM	—
35-WS-231	1633	1	A	EXU (114S/165E)	-100.00 -110.00	DEB	Juniper Spring 2	2.2 ± 0.1	NM ± NM	—
35-WS-231	1634	1	A	EXU (114S/165E)	-110.00 -120.00	DEB	Juniper Spring 2	2.2 ± 0.1	NM ± NM	—
35-WS-231	1634	1	B	EXU (114S/165E)	-110.00 -120.00	DEB	Quartz Mountain	2.4 ± NM	NM ± NM	—
35-WS-231	1638	3	—	EXU (114S/165E)	-130.00 -140.00	BIF	Quartz Mountain	2.5 ± 0.1	NM ± NM	—
35-WS-231	1670	1	—	EXX SW (114S/165E)	-210.00 -230.00	PPT	McKay Butte	DH ± NM	NM ± NM	Diffuse hydration
35-WS-231	1869	1	A	EXU X (101S/106E)	-102.00 -109.00	DEB	Quartz Mountain	3.6 ± 0.1	NM ± NM	—
35-WS-231	1869	1	B	EXU X (101S/106E)	-102.00 -109.00	DEB	Potato Hills	4.7 ± 0.1	NM ± NM	—
35-WS-231	1869	1	C	EXU X (101S/106E)	-102.00 -109.00	DEB	Quartz Mountain	2.5 ± 0.1	NM ± NM	—
35-WS-231	1872	2	A	EXU X (101S/106E)	-109.00 -119.00	DEB	Quartz Mountain	3.3 ± NM	NM ± NM	—
35-WS-231	1964	2	A	EXU X (101S/108E)	-179.00 -189.00	DEB	Newberry Volcano	3.5 ± 0.1	NM ± NM	—
35-WS-231	2037	3	A	EXU (144S/188E)	-155.00 -169.00	DEB	Juniper Spring 2	2.3 ± NM	NM ± NM	—
35-WS-231	2137	3	A	EXU (145S/188E)	-239.00 -249.00	DEB	Silver Lake/Sycan Marsh	4.8 ± 0.1	NM ± NM	—
35-WS-231	2173	1	A	EXU X (100S/100E)	-130.00 -140.00	DEB	Quartz Mountain	3.5 ± 0.1	NM ± NM	—
35-WS-231	2224	3	A	EXU X (100S/101E)	-115.00 -125.00	DEB	Quartz Mountain	3.3 ± NM	NM ± NM	—
35-WS-231	2231	2	A	EXU X (100S/101E)	-135.00 -145.00	DEB	Riley	3.0 ± 0.1	NM ± NM	—
35-WS-231	2282	3	A	EXU X (100S/103E)	-101.00 -109.00	DEB	Quartz Mountain	3.6 ± NM	NM ± NM	—
35-WS-231	2289	3	A	EXU X (100S/103E)	-129.00 -139.00	DEB	Whitewater Ridge?	2.4 ± 0.1	NM ± NM	—
35-WS-231	2324	3	A	EXU X (100S/105E)	-118.00 -128.00	DEB	Glass Buttes	4.1 ± 0.1	NM ± NM	—
35-WS-231	2324	3	B	EXU X (100S/105E)	-118.00 -128.00	DEB	Newberry Volcano	3.3 ± NM	NM ± NM	—
35-WS-231	2330	1	A	EXU X (100S/105E)	-138.00 -148.00	DEB	Unknown M	3.5 ± 0.1	NM ± NM	—

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments
								Rim 1	Rim 2	
35-WS-231	2330	1	B	EXU X (100S/105E)	-138.00 -148.00	DEB	Unknown M	3.2 ± 0.1	NM ± NM	—
35-WS-231	2332	1	A	EXU X (100S/105E)	-148.00 -158.00	DEB	Silver Lake/Sycan Marsh	3.8 ± NM	NM ± NM	—
35-WS-231	2332	1	B	EXU X (100S/105E)	-148.00 -158.00	DEB	Silver Lake/Sycan Marsh	4.0 ± 0.1	NM ± NM	—
35-WS-231	2357	3	A	EXU X (100S/107E)	-98.00 -107.00	DEB	Cougar Mountain	3.3 ± 0.2	NM ± NM	—
35-WS-231	2357	3	B	EXU X (100S/107E)	-98.00 -107.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 2	2.3 ± NM	NM ± NM	—
35-WS-231	2412	3	A	EXU X (100S/109E)	-147.00 -157.00	DEB	Little Bear Creek/Whitewater Ridge	3.2 ± NM	NM ± NM	—
35-WS-231	2412	3	B	EXU X (100S/109E)	-147.00 -157.00	DEB	Little Bear Creek/Juniper Spring 1	3.1 ± 0.1	NM ± NM	—
35-WS-231	2436	3	A	EXU X (100S/110E)	-85.00 -95.00	DEB	Juniper Spring 2/Whitewater Ridge?	2.6 ± 0.1	NM ± NM	—
35-WS-231	2457	4	A	EXU X (100S/110E)	-125.00 -135.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 1	2.7 ± 0.1	NM ± NM	—
35-WS-231	2457	4	B	EXU X (100S/110E)	-125.00 -135.00	DEB	Quartz Mountain	2.7 ± 0.1	NM ± NM	—
35-WS-231	2457	4	C	EXU X (100S/110E)	-125.00 -135.00	DEB	Chickahominy	3.4 ± 0.1	NM ± NM	—
35-WS-231	2461	3	A	EXU X (100S/110E)	-115.00 -135.00	DEB	Newberry Volcano	3.2 ± NM	NM ± NM	—
35-WS-231	2465	2	A	EXU X (100S/110E)	-135.00 -145.00	DEB	Glass Buttes	3.2 ± NM	NM ± NM	—
35-WS-231	2477	2	A	EXU X (100S/110E)	-155.00 -165.00	DEB	Quartz Mountain	3.2 ± 0.1	NM ± NM	—
35-WS-231	2480	3	A	EXU X (100S/110E)	-165.00 -175.00	DEB	Obsidian Cliffs	3.3 ± 0.1	NM ± NM	—
35-WS-231	2489	2	A	EXU X (101S/100E)	-89.00 -96.00	DEB	Quartz Mountain	4.0 ± 0.1	NM ± NM	—
35-WS-231	2490	3	A	EXU X (101S/100E)	-96.00 -106.00	DEB	Unknown N	2.2 ± 0.1	NM ± NM	—
35-WS-231	2516	2	A	EXU X (101S/100E)	-166.00 -176.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ± NM	—
35-WS-231	2520	1	A	EXU X (101S/100E)	-176.00 -186.00	DEB	Quartz Mountain	3.9 ± 0.1	NM ± NM	—
35-WS-231	2589	3	A	EXU X (101S/101E)	-109.00 -119.00	DEB	Cougar Mountain	3.3 ± 0.1	NM ± NM	—
35-WS-231	2591	2	A	EXU X (101S/101E)	-129.00 -139.00	DEB	Quartz Mountain	2.9 ± 0.1	NM ± NM	—
35-WS-231	2622	4	A	EXU X (101S/102E)	-97.00 -107.00	DEB	Whitewater Ridge?	3.2 ± NM	NM ± NM	—
35-WS-231	2624	3	A	EXU X (101S/102E)	-107.00 -117.00	DEB	Quartz Mountain	3.5 ± 0.2	NM ± NM	—
35-WS-231	2624	3	B	EXU X (101S/102E)	-107.00 -117.00	DEB	Juniper Spring 2	3.2 ± 0.1	NM ± NM	—
35-WS-231	2624	3	C	EXU X (101S/102E)	-107.00 -117.00	DEB	Newberry Volcano	3.7 ± 0.1	NM ± NM	—
35-WS-231	2636	4	A	EXU X (101S/104E)	-130.00 -140.00	DEB	Little Bear Creek/Whitewater Ridge	4.0 ± 0.2	NM ± NM	—
35-WS-231	2637	2	A	EXU X (101S/104E)	-140.00 -150.00	DEB	Whitewater Ridge?	2.3 ± 0.1	NM ± NM	—
35-WS-231	2684	1	A	EXU X (101S/109E)	-138.00 -148.00	DEB	Obsidian Cliffs	4.1 ± NM	NM ± NM	—
35-WS-231	2684	1	B	EXU X (101S/109E)	-138.00 -148.00	DEB	Obsidian Cliffs	3.6 ± NM	NM ± NM	—
35-WS-231	2690	3	A	EXU X (101S/109E)	-148.00 -158.00	DEB	Obsidian Cliffs	3.1 ± 0.1	NM ± NM	—
35-WS-231	2711	4	A	EXU X (101S/110E)	-87.00 -97.00	DEB	Juniper Spring 2	2.5 ± 0.1	NM ± NM	—
35-WS-231	2712	4	A	EXU X (101S/110E)	-97.00 -107.00	DEB	Little Bear Cr./Whitewater R./Juniper Sp. 2	2.4 ± NM	NM ± NM	—
35-WS-231	2712	4	B	EXU X (101S/110E)	-97.00 -107.00	DEB	Little Bear Creek/Whitewater Ridge	3.0 ± 0.1	NM ± NM	—
35-WS-231	2712	4	C	EXU X (101S/110E)	-97.00 -107.00	DEB	Little Bear Creek/Whitewater Ridge	2.6 ± NM	NM ± NM	—
35-WS-231	2712	4	D	EXU X (101S/110E)	-97.00 -107.00	DEB	Little Bear Creek/Whitewater Ridge	2.9 ± 0.1	NM ± NM	—
35-WS-231	2717	1	—	SCP 101 (145S/182E)	0.00 0.00	PPT	Juniper Spring 2/Whitewater Ridge	2.6 ± 0.1	NM ± NM	—
35-WS-231	2718	1	—	SCP 102 (156S/155E)	0.00 0.00	PPT	Little Bear Creek/Whitewater Ridge	2.6 ± 0.1	NM ± NM	—
35-WS-231	2720	3	A	EXU X (101S/110E)	-107.00 -117.00	DEB	Obsidian Cliffs	3.6 ± 0.1	NM ± NM	—
35-WS-232	24	7	—	SCU 1	0.00 0.00	DEB	Chickahominy?	NM ± NM	NM ± NM	No OH measurement

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Appendix C.3 Results of Northwest PEP Obsidian Studies (continued)

Site	Lot Spec Item Unit			Depth (cm)	CLA	Artifact Source/Chemical Type	Hydration Rims <sup>a</sup>		Comments		
							Rim 1	Rim 2			
35-WS-232	24	8	—	SCU 1	0.00	0.00	UFT	Little Bear Creek/Juniper Spring 2	NM ±NM	NM ±NM	No OH measurement
35-WS-232	25	2	—	SCU 2	0.00	0.00	DEB	Newberry Volcano	3.8 ± 0.1	NM ±NM	—
35-WS-233	18	1	—	SCP 18	0.00	0.00	PPT	Quartz Mountain/McKay Butte	NM ±NM	NM ±NM	No OH measurement
35-WS-233	20	1	A	SCU 2	0.00	0.00	DEB	Newberry Volcano	4.3 ±NM	NM ±NM	—
35-WS-233	20	1	B	SCU 2	0.00	0.00	DEB	Newberry Volcano	4.0 ± 0.1	NM ±NM	—
35-WS-233	21	1	—	SCU 3	0.00	0.00	DEB	Newberry Volcano	5.0 ± 0.1	NM ±NM	—
35-WS-233	21	2	—	SCU 3	0.00	0.00	BIF	Obsidian Cliffs	3.5 ± 0.1	NM ±NM	—
35-WS-233	25	1	—	SCU 7	0.00	0.00	DEB	Riley?	4.5 ±NM	NM ±NM	—
35-WS-233	26	1	—	SCU 8	0.00	0.00	BIF	Unknown A	NM ±NM	NM ±NM	No OH measurement
35-WS-239	22	1	—	SCP 19	0.00	0.00	PPT	Whitewater Ridge	2.3 ± 0.2	NM ±NM	—
PEP 5-76	2	2	A	SCN 1	0.00	0.00	DEB	Whitewater Ridge	NM ±NM	NM ±NM	No OH measurement
PEP 5-76	2	2	B	SCN 1	0.00	0.00	DEB	Not Obsidian	NM ±NM	NM ±NM	No OH measurement; Basaltic glass?
PEP 6-23	3	1	—	SCP 1	0.00	0.00	DEB	Glass Buttes	6.3 ± 0.1	NM ±NM	—
PEP 6-23	4	1	—	SCP 2	0.00	0.00	DEB	Unknown A	NM ±NM	NM ±NM	No OH measurement
PEP 7-3	1	1	—	SCP 1	0.00	0.00	COR	Deer Creek/Burn Butte?	2.6 ±NM	NM ±NM	—
PEP 7-3	2	1	—	SCP 2	0.00	0.00	DEB	Deer Creek/Burn Butte?	NM ±NM	NM ±NM	No OH measurement

<sup>a</sup> KEY: DH = Diffuse hydration; NM = No OH measurement; NO = Not obsidian; NVB = No visible band; VW = Variable width.



Appendix C.4 Results of California PEP Obsidian Studies.

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-CCO-129	4	1	- SCP 4	0.0	0.0	DEB Napa Valley	3.9	NM	—
CA-CCO-129	5	1	- SCP 5	0.0	0.0	DEB Napa Valley	1.8	4.1	2 hydration bands
CA-CCO-129	6	1	- SCP 6	0.0	0.0	DEB Napa Valley	DH	NM	Diffuse hydration
CA-CCO-129	7	1	- SCP 7	0.0	0.0	DEB Napa Valley	3.4	NM	—
CA-CCO-129	8	1	- SCP 8	0.0	0.0	DEB Napa Valley	2.6	NM	—
CA-CCO-129	9	1	- SCP 9	0.0	0.0	DEB Napa Valley	1.9	NM	—
CA-CCO-368	1	1	- SCP 1	0.0	0.0	BIF Annadel	1.3	NM	—
CA-CCO-368	2	1	- SCP 2	0.0	0.0	BIF Napa Valley	3.4	NM	—
CA-CCO-368	3	1	- SCP 3	0.0	0.0	BIF Bodie Hills	3.8	NM	—
CA-CCO-368	11	1	A SCP 11	0.0	0.0	DEB Napa Valley	1.2	NM	—
CA-CCO-368	11	1	B SCP 11	0.0	0.0	DEB Napa Valley	3.0	NM	—
CA-CCO-368	12	1	- SCP 12	0.0	0.0	DEB Napa Valley	NVB	NM	—
CA-CCO-368	14	1	- SCP 14	0.0	0.0	DEB Unknown A	NVB	NM	No visible band
CA-CCO-368	22	452	- EXU (0N/2E)	0.0	-10.0	DEB Napa Valley	1.5	NM	—
CA-CCO-368	22	466	A EXU (0N/3E)	-10.0	-20.0	DEB Napa Valley	NVB	NM	Weathered
CA-CCO-368	22	466	B EXU (0N/3E)	-10.0	-20.0	DEB Napa Valley	2.5	NM	—
CA-CCO-368	22	470	- EXU (0N/3E)	-20.0	-30.0	DEB Napa Valley	2.1	NM	—
CA-CCO-368	22	476	- EXU (1S/2E)	0.0	-10.0	DEB Napa Valley	2.6	NM	—
CA-CCO-368	22	488	- EXU (1S/3E)	0.0	-10.0	DEB Napa Valley	3.5	NM	—
CA-CCO-368	22	632	- EXU (5S/5E)	-10.0	-20.0	DEB Napa Valley	2.6	NM	—
CA-CCO-368	22	659	- EXU (6S/5E)	-10.0	-20.0	DEB Napa Valley	2.4	NM	—
CA-CCO-368	22	782	A EXU (3S/2E)	0.0	-10.0	DEB Napa Valley	2.2	NM	—
CA-CCO-368	22	782	B EXU (3S/2E)	0.0	-10.0	DEB Napa Valley	3.8	NM	—
CA-CCO-368	22	782	C EXU (3S/2E)	0.0	-10.0	DEB Napa Valley	4.0	NM	—
CA-CCO-368	22	787	- EXU (3S/2E)	-10.0	-20.0	DEB Napa Valley	2.3	NM	—
CA-CCO-368	22	809	- EXU (0N/17E)	-10.0	-20.0	DEB Napa Valley	2.4	NM	—
CA-CCO-368	22	829	- EXU (0N/18E)	-20.0	-30.0	DEB Napa Valley	2.4	NM	—
CA-CCO-368	22	840	- EXU (1S/18E)	-10.0	-20.0	DEB Napa Valley	2.3	NM	—
CA-CCO-368	32	1	- SON 8	-53.0	-63.0	DEB Napa Valley	2.4	NM	—
CA-CCO-368	33	1	- SON 8	-63.0	-73.0	DEB Napa Valley	2.1	NM	—
CA-CCO-368	35	1	- SON 13	-80.0	-90.0	DEB Napa Valley	3.7	NM	—
CA-CCO-368	120	1	- TEU 1	-70.0	-80.0	DEB Napa Valley	1.8	NM	—
CA-CCO-368	193	1	A TEU 8	-10.0	-20.0	DEB Napa Valley	1.5	NM	—
CA-CCO-368	194	1	- TEU 8	-10.0	-20.0	DEB Napa Valley	5.2	NM	—
CA-CCO-368	200	1	- TEU 8	-40.0	-50.0	BIF Napa Valley	DH	NM	Diffuse hydration
CA-CCO-368	201	1	- TEU 8	-50.0	-60.0	DEB Napa Valley	2.2	NM	—
CA-CCO-368	216	1	- TEU 9	-20.0	-30.0	DEB Napa Valley	3.5	NM	—
CA-CCO-368	218	1	- TEU 9	-30.0	-40.0	DEB Napa Valley	3.0	NM	—
CA-CCO-368	239	3	- TEU 10	-20.0	-30.0	DEB Mono Glass Mountain	3.6	NM	—
CA-CCO-368	246	1	- TEU 10	-50.0	-60.0	DEB Casa Diablo	DH	NM	Diffuse hydration
CA-CCO-368	247	1	- TEU 10	-60.0	-70.0	DEB Annadel	2.7	NM	—
CA-CCO-368	251	1	- TEU 10	-80.0	-90.0	DEB Unknown B	DH	NM	Diffuse hydration

C.4-1

Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
								1	2			
CA-CCO-368	276	1	A	TEU	12	4.0	-10.0	DEB	Napa Valley	5.0	5.6	2 hydration bands
CA-CCO-368	276	1	B	TEU	12	4.0	-10.0	DEB	Napa Valley	3.9	NM	—
CA-CCO-368	283	4	A	TEU	12	-30.0	-40.0	DEB	Napa Valley	2.6	NM	—
CA-CCO-368	283	4	B	TEU	12	-30.0	-40.0	DEB	Napa Valley	DH	NM	Diffuse hydration
CA-CCO-368	284	2	-	TEU	12	-40.0	-50.0	DEB	Napa Valley	DH	NM	Diffuse hydration
CA-CCO-368	286	3	-	TEU	12	-50.0	-60.0	DEB	Napa Valley	1.3	NM	—
CA-CCO-368	290	3	-	TEU	12	-70.0	-80.0	DEB	Napa Valley	2.0	NM	—
CA-CCO-368	344	2	-	TEU	14	0.0	-10.0	DEB	Napa Valley	DH	NM	Diffuse hydration
CA-CCO-368	357	5	A	TEU	14	-52.0	-57.0	DEB	Napa Valley	1.3	NM	—
CA-CCO-368	357	5	B	TEU	14	-52.0	-57.0	DEB	Napa Valley	3.9	NM	—
CA-CCO-368	366	1	-	TEU	14	-55.0	-55.0	DEB	Napa Valley	3.5	NM	—
CA-CCO-368	368	4	-	TEU	14	0.0	-32.0	DEB	Napa Valley	1.3	NM	—
CA-CCO-368	368	5	-	TEU	14	0.0	-32.0	DEB	Annadel	1.8	NM	—
CA-CCO-368	379	1	-	TEU	15	-32.0	-32.0	BIF	Bodie Hills	1.8	NM	—
CA-CCO-368	399	3	-	TEU	16	-76.0	-86.0	DEB	Borax Lake	5.8	6.5	2 hydration bands
CA-CCO-368	401	2	-	TEU	17	-75.0	-85.0	DEB	Annadel	1.8	NM	—
CA-COL-165	49	5	-	SC	(44N/54W)	0.0	0.0	PPT	Borax Lake	4.3	NM	—
CA-COL-165	49	6	-	SC	(48N/55W)	0.0	0.0	PPT	Borax Lake	6.4	NM	—
CA-COL-165	49	265	-	MRR	7 (65N/66W)	0.0	-10.0	BIF	Borax Lake	5.1	4.4	2 hydration rims
CA-COL-165	49	269	-	MRR	7 (65N/66W)	-10.0	-20.0	BIF	Mt. Konocti	3.6	NM	—
CA-COL-165	49	270	A	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Napa Valley	5.7	NM	—
CA-COL-165	49	270	B	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Napa Valley	5.6	NM	—
CA-COL-165	49	270	C	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Napa Valley	6.3	NM	—
CA-COL-165	49	270	D	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Napa Valley	5.7	NM	—
CA-COL-165	49	270	E	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Napa Valley	4.7	NM	—
CA-COL-165	49	270	F	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Borax Lake	5.9	NM	—
CA-COL-165	49	270	G	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Napa Valley	5.6	NM	—
CA-COL-165	49	270	H	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Napa Valley	3.9	NM	—
CA-COL-165	49	270	I	MRR	7 (65N/66W)	-10.0	-20.0	DEB	Napa Valley	5.2	NM	—
CA-COL-165	49	275	A	MRR	7 (65N/66W)	-20.0	-30.0	DEB	Napa Valley	5.1	NM	—
CA-COL-165	49	275	B	MRR	7 (65N/66W)	-20.0	-30.0	DEB	Napa Valley	5.0	NM	—
CA-COL-165	49	275	C	MRR	7 (65N/66W)	-20.0	-30.0	DEB	Borax Lake	4.0	NM	Weathered
CA-COL-165	49	275	D	MRR	7 (65N/66W)	-20.0	-30.0	DEB	Napa Valley	10.6	NM	—
CA-COL-165	49	275	E	MRR	7 (65N/66W)	-20.0	-30.0	DEB	Napa Valley	3.8	NM	—
CA-COL-165	49	275	F	MRR	7 (65N/66W)	-20.0	-30.0	DEB	Napa Valley	2.5	NM	—
CA-COL-165	49	275	G	MRR	7 (65N/66W)	-20.0	-30.0	DEB	Napa Valley	3.5	NM	—
CA-COL-165	49	275	H	MRR	7 (65N/66W)	-20.0	-30.0	DEB	Borax Lake	6.2	NM	—
CA-COL-165	49	278	A	MRR	7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	5.0	NM	—
CA-COL-165	49	278	B	MRR	7 (65N/66W)	-30.0	-40.0	DEB	Borax Lake	7.5	NM	Weathered
CA-COL-165	49	278	C	MRR	7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	5.5	NM	—
CA-COL-165	49	278	D	MRR	7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	4.4	NM	—

C.4-2

Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
							1	2			
CA-COL-165	49	278	E	MRR 7 (65N/66W)	-30.0	-40.0	DEB	Borax Lake	6.1	NM	—
CA-COL-165	49	278	F	MRR 7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	5.1	NM	—
CA-COL-165	49	278	G	MRR 7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	NM	NM	Poor image
CA-COL-165	49	278	H	MRR 7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	NM	NM	Poor image
CA-COL-165	49	278	I	MRR 7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	4.7	NM	—
CA-COL-165	49	278	J	MRR 7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	3.6	NM	—
CA-COL-165	49	278	K	MRR 7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	3.7	NM	—
CA-COL-165	49	278	L	MRR 7 (65N/66W)	-30.0	-40.0	DEB	Napa Valley	4.7	NM	—
CA-COL-165	49	284	-	MRR 7 (65N/66W)	-40.0	-50.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-COL-165	49	284	A	MRR 7 (65N/66W)	-40.0	-50.0	DEB	Napa Valley	11.3	10.7	2 hydration rims
CA-COL-165	49	284	B	MRR 7 (65N/66W)	-40.0	-50.0	DEB	Napa Valley	4.3	NM	—
CA-COL-165	49	284	C	MRR 7 (65N/66W)	-40.0	-50.0	DEB	Napa Valley	NM	NM	Poor image
CA-COL-165	49	305	A	MRR 9 (50N/56W)	0.0	-10.0	DEB	Napa Valley	4.8	NM	—
CA-COL-165	49	305	B	MRR 9 (50N/56W)	0.0	-10.0	DEB	Napa Valley	5.0	NM	—
CA-COL-165	49	305	C	MRR 9 (50N/56W)	0.0	-10.0	DEB	Napa Valley	3.9	NM	—
CA-COL-165	49	305	D	MRR 9 (50N/56W)	0.0	-10.0	DEB	Napa Valley	2.7	NM	—
CA-COL-165	49	305	E	MRR 9 (50N/56W)	0.0	-10.0	DEB	Napa Valley	3.0	NM	Visually assigned source
CA-COL-165	49	305	F	MRR 9 (50N/56W)	0.0	-10.0	DEB	Napa Valley	3.2	NM	—
CA-COL-165	49	305	G	MRR 9 (50N/56W)	0.0	-10.0	DEB	Napa Valley	5.5	NM	—
CA-COL-165	49	305	H	MRR 9 (50N/56W)	0.0	-10.0	DEB	Napa Valley	4.5	NM	—
CA-COL-165	49	309	A	MRR 9 (50N/56W)	-10.0	-20.0	DEB	Napa Valley	4.1	NM	—
CA-COL-165	49	309	B	MRR 9 (50N/56W)	-10.0	-20.0	DEB	Napa Valley	6.1	NM	—
CA-COL-165	49	309	C	MRR 9 (50N/56W)	-10.0	-20.0	DEB	Napa Valley	3.5	2.3	2 hydration rims
CA-COL-165	49	314	-	MRR 9 (50N/56W)	-20.0	-30.0	BIF	Napa Valley	4.2	NM	—
CA-COL-165	49	315	A	MRR 9 (50N/56W)	-20.0	-30.0	DEB	Napa Valley	3.6	NM	—
CA-COL-165	49	315	B	MRR 9 (50N/56W)	-20.0	-30.0	DEB	Napa Valley	NM	NM	Poor image
CA-COL-165	49	315	C	MRR 9 (50N/56W)	-20.0	-30.0	DEB	Napa Valley	3.5	NM	—
CA-COL-165	49	319	A	MRR 9 (50N/56W)	-30.0	-40.0	DEB	Napa Valley	5.1	NM	—
CA-COL-165	49	319	B	MRR 9 (50N/56W)	-30.0	-40.0	DEB	Napa Valley	3.5	NM	—
CA-COL-165	49	319	C	MRR 9 (50N/56W)	-30.0	-40.0	DEB	Napa Valley	3.0	NM	—
CA-COL-165	49	319	D	MRR 9 (50N/56W)	-30.0	-40.0	DEB	Napa Valley	9.4	NM	—
CA-COL-165	49	322	A	MRR 9 (50N/56W)	-40.0	-50.0	DEB	Napa Valley	5.5	NM	—
CA-COL-165	49	322	B	MRR 9 (50N/56W)	-40.0	-50.0	DEB	Borax Lake	4.7	NM	—
CA-COL-165	49	322	C	MRR 9 (50N/56W)	-40.0	-50.0	DEB	Napa Valley	4.5	NM	Weathered; pitted surface
CA-COL-165	49	323	A	MRR 9 (50N/56W)	-40.0	-50.0	DEB	Napa Valley	5.0	NM	—
CA-COL-165	49	323	B	MRR 9 (50N/56W)	-40.0	-50.0	DEB	Napa Valley	5.5	NM	Weathered; pitted surface
CA-COL-165	49	323	C	MRR 9 (50N/56W)	-40.0	-50.0	DEB	Napa Valley	3.9	NM	—
CA-COL-165	49	323	D	MRR 9 (50N/56W)	-40.0	-50.0	DEB	Borax Lake	6.4	NM	—
CA-COL-178	31	5	A	STU 9 (60N/0W)	0.0	-10.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-COL-178	31	5	B	STU 9 (60N/0W)	0.0	-10.0	DEB	Borax Lake	NM	NM	No OH measurement
CA-COL-178	31	7	-	STU 9 (60N/0W)	0.0	-10.0	DEB	Mt. Konocti	NM	NM	No OH measurement

C.4-3

Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
							1	2			
CA-COL-178	31	11	-	MRR 1 (57N/0W)	-10.0	-20.0	DEB	Napa Valley	1.7	NM	—
CA-COL-178	31	34	-	STU 11 (10N/0W)	0.0	-10.0	DEB	Borax Lake	NM	NM	No OH measurement
CA-COL-178	31	41	-	STU 14 (40N/0W)	0.0	-10.0	DEB	Napa Valley	7.0	NM	—
CA-COL-178	31	43	-	STU 14 (40N/0W)	0.0	-10.0	DEB	Borax Lake	5.9	NM	—
CA-COL-178	31	48	A	STU 16 (57N/0W)	0.0	-10.0	DEB	Borax Lake	NM	NM	No OH measurement
CA-COL-178	31	48	B	STU 16 (57N/0W)	0.0	-10.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-COL-178	31	52	-	MRR 2 (53N/0W)	0.0	-10.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-COL-178	31	53	-	MRR 2 (53N/0W)	-10.0	-30.0	DEB	Borax Lake	5.3	NM	—
CA-COL-178	31	54	A	MRR 2 (53N/0W)	-10.0	-30.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-COL-178	31	54	B	MRR 2 (53N/0W)	-10.0	-30.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-COL-178	31	55	A	MRR 2 (53N/0W)	-20.0	-30.0	DEB	Napa Valley	5.0	NM	—
CA-COL-178	31	55	B	MRR 2 (53N/0W)	-20.0	-30.0	DEB	Napa Valley	4.4	NM	—
CA-COL-178	31	55	C	MRR 2 (53N/0W)	-20.0	-30.0	DEB	Borax Lake	NM	NM	No OH measurement
CA-COL-178	31	57	-	MRR 2 (53N/0W)	-30.0	-40.0	DEB	Napa Valley	3.4	NM	—
CA-COL-178	31	62	A	STU 18 (5N/0W)	0.0	-10.0	DEB	Napa Valley	NM	NM	Weathered
CA-COL-178	31	62	B	STU 18 (5N/0W)	0.0	-10.0	DEB	Borax Lake	1.2	NM	—
CA-COL-178	31	62	C	STU 18 (5N/0W)	0.0	-10.0	DEB	Borax Lake	NM	NM	No OH measurement
CA-COL-178	31	68	A	STU 19 (17N/0W)	0.0	-10.0	DEB	Napa Valley	3.3	NM	—
CA-COL-178	31	68	B	STU 19 (17N/0W)	0.0	-10.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-COL-178	31	82	-	STU 23 (45N/0W)	0.0	-10.0	DEB	Napa Valley	1.2	NM	—
CA-COL-178	31	89	-	STU 24 (65N/0W)	0.0	-10.0	DEB	Borax Lake	NM	NM	No OH measurement
CA-COL-178	31	93	-	MRR 3 (19N/0W)	0.0	-10.0	DEB	Napa Valley	NM	NM	Weathered
CA-COL-178	31	110	-	ISO	0.0	0.0	DEB	Napa Valley	4.6	NM	—
CA-COL-178	31	113	-	ISO	0.0	0.0	DEB	Borax Lake	4.0	NM	—
CA-COL-178	31	119	-	MRR (0N/13E)	0.0	-10.0	DEB	Napa Valley	4.5	NM	—
CA-COL-178	31	121	-	EXU (0N/13E)	0.0	-10.0	PPT	Tuscan	DH	NM	Diffuse hydration
CA-COL-178	31	122	-	MRR (0N/13E)	-10.0	-20.0	DEB	Napa Valley	2.9	NM	—
CA-COL-178	31	124	-	MRR (0N/13E)	-20.0	-30.0	DEB	Napa Valley	4.2	NM	—
CA-COL-178	31	132	-	MRR (1N/12E)	-20.0	-30.0	DEB	Napa Valley	VW	NM	Weathered
CA-COL-178	31	183	-	MRR (15N/0W)	-10.0	-20.0	DEB	Napa Valley	3.0	NM	—
CA-COL-178	31	187	-	MRR (15N/0W)	-20.0	-30.0	DEB	Napa Valley	6.5	NM	—
CA-COL-178	31	207	-	MRR (13N/1W)	-10.0	-20.0	DEB	Napa Valley	DH	NM	Weathered
CA-COL-178	31	210	A	MRR (13N/1W)	-20.0	-30.0	DEB	Napa Valley	3.9	NM	—
CA-COL-178	31	210	B	MRR (13N/1W)	-20.0	-30.0	DEB	Napa Valley	3.9	NM	—
CA-COL-178	31	212	-	MRR (13N/1W)	-30.0	-40.0	DEB	Not sourced	3.9	NM	—
CA-COL-178	31	214	-	MRR (14N/1W)	0.0	-10.0	DEB	Borax Lake	3.7	NM	—
CA-COL-178	31	216	-	MRR (14N/1W)	-10.0	-20.0	DEB	Borax Lake	6.5	NM	—
CA-COL-178	31	218	A	MRR (14N/1W)	-20.0	-30.0	DEB	Napa Valley	3.8	NM	—
CA-COL-178	31	218	B	MRR (14N/1W)	-20.0	-30.0	DEB	Napa Valley	3.1	3.7	—
CA-COL-178	31	218	C	MRR (14N/1W)	-20.0	-30.0	DEB	Borax Lake	5.1	NM	—
CA-COL-178	31	220	-	MRR (14N/1W)	-30.0	-40.0	DEB	Napa Valley	5.0	NM	—

C.4-4

Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
							1	2		
CA-MOD-77	38	2	-	0.0	0.0	PPT	East Medicine Lake	4.3	NM	—
CA-MOD-77	38	29	A	0.0	-10.0	DEB	Glass Mountain	2.0	NM	—
CA-MOD-77	38	29	B	0.0	-10.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-77	38	31	A	0.0	-10.0	DEB	Grasshopper Group	2.6	NM	Visually assigned source
CA-MOD-77	38	31	B	0.0	-10.0	DEB	Grasshopper Group	2.7	NM	Visually assigned source
CA-MOD-77	38	31	C	0.0	-10.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-77	38	40	-	0.0	-10.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-77	38	54	A	0.0	-10.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-77	38	59	A	0.0	-10.0	DEB	Grasshopper Group	2.3	NM	Visually assigned source
CA-MOD-77	38	59	B	0.0	-10.0	DEB	Grasshopper Group	1.7	NM	Visually assigned source
CA-MOD-77	38	95	-	0.0	-10.0	UFT	Cowhead Lake	NM	NM	No OH measurement
CA-MOD-77	38	101	A	0.0	-10.0	DEB	Grasshopper Group	3.4	NM	Visually assigned source
CA-MOD-77	38	101	B	0.0	-10.0	DEB	Grasshopper Group	2.3	NM	Visually assigned source
CA-MOD-77	38	101	C	0.0	-10.0	DEB	Grasshopper Group	2.6	NM	Visually assigned source
CA-MOD-77	38	101	D	0.0	-10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-77	38	101	E	0.0	-10.0	DEB	Grasshopper Group	4.7	NM	Visually assigned source
CA-MOD-77	38	110	A	0.0	-10.0	DEB	Grasshopper Group	3.0	NM	Visually assigned source
CA-MOD-77	38	110	B	0.0	-10.0	DEB	Grasshopper Group	2.9	NM	Visually assigned source; Weathered
CA-MOD-77	38	110	C	0.0	-10.0	DEB	Grasshopper Group	1.8	NM	Visually assigned source
CA-MOD-77	38	110	D	0.0	-10.0	DEB	Grasshopper Group	3.0	NM	Visually assigned source
CA-MOD-77	38	110	E	0.0	-10.0	DEB	Grasshopper Group	2.1	NM	Visually assigned source
CA-MOD-77	38	112	-	-10.0	-20.0	PPT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-77	38	125	-	-20.0	-30.0	PPT	Cowhead Lake/Drews Creek/Butcher Flat	4.2	NM	—
CA-MOD-77	38	143	-	-40.0	-50.0	BIF	Cowhead Lake	NM	NM	No OH measurement
CA-MOD-77	38	150	-	-50.0	-60.0	BIF	Blue Mountain	NM	NM	No OH measurement
CA-MOD-77	38	156	-	-60.0	-70.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-77	38	163	-	-70.0	-80.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-77	38	164	A	-80.0	-90.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-77	38	164	B	-80.0	-90.0	DEB	Grasshopper Group	4.6	NM	—
CA-MOD-77	38	164	C	-80.0	-90.0	DEB	Grasshopper Group	4.1	NM	—
CA-MOD-77	38	164	D	-80.0	-90.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-77	38	164	E	-80.0	-90.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-77	38	272	A	0.0	-10.0	DEB	East Medicine Lake	3.9	NM	—
CA-MOD-77	38	272	B	0.0	-10.0	DEB	Blue Mountain	3.0	NM	—
CA-MOD-77	38	272	C	0.0	-10.0	DEB	Glass Mountain	3.1	NM	—
CA-MOD-77	38	272	D	0.0	-10.0	DEB	Spodue Mountain	5.0	NM	—
CA-MOD-77	38	290	A	-40.0	-50.0	DEB	Spodue Mountain	5.1	NM	—
CA-MOD-77	38	290	B	-40.0	-50.0	DEB	Blue Mountain	1.6	NM	—
CA-MOD-77	38	290	C	-40.0	-50.0	DEB	Unknown A	NVB	NM	No visible band
CA-MOD-77	38	290	D	-40.0	-50.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-77	38	294	-	-60.0	-60.0	DEB	Grasshopper Group	3.6	NM	—

C.4-5

Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-77	38	295	- EXU (1N/17E)	-70.0	-70.0	DEB Blue Mountain	1.7	NM	-
CA-MOD-77	38	323	A EXU (8N/11E)	0.0	0.0	DEB Glass Mountain	2.2	NM	-
CA-MOD-77	38	323	B EXU (8N/11E)	0.0	0.0	DEB East Medicine Lake	3.8	NM	-
CA-MOD-77	38	323	C EXU (8N/11E)	0.0	0.0	DEB Blue Mountain	1.9	NM	-
CA-MOD-77	38	323	D EXU (8N/11E)	0.0	0.0	DEB Glass Mountain	2.2	NM	-
CA-MOD-77	38	333	A EXU (8N/11E)	-30.0	-36.0	DEB Blue Mountain	1.5	NM	-
CA-MOD-77	38	333	B EXU (8N/11E)	-30.0	-36.0	DEB East Medicine Lake	3.7	NM	-
CA-MOD-77	38	333	C EXU (8N/11E)	-30.0	-36.0	DEB GF/LIW/RS	4.9	NM	-
CA-MOD-77	38	333	D EXU (8N/11E)	-30.0	-36.0	DEB East Medicine Lake	6.2	NM	-
CA-MOD-77	38	333	E EXU (8N/11E)	-30.0	-36.0	DEB East Medicine Lake	2.5	NM	-
CA-MOD-77	38	333	F EXU (8N/11E)	-30.0	-36.0	DEB East Medicine Lake	3.6	NM	-
CA-MOD-77	38	333	G EXU (8N/11E)	-30.0	-36.0	DEB East Medicine Lake	3.6	NM	-
CA-MOD-77	38	333	H EXU (8N/11E)	-30.0	-36.0	DEB Blue Mountain	1.8	NM	-
CA-MOD-77	38	333	I EXU (8N/11E)	-30.0	-36.0	DEB Blue Mountain	DH	NM	Weathered; Diffuse hydration
CA-MOD-77	38	337	- EXU (8N/11E)	-30.0	-36.0	PPT Blue Mountain	1.8	NM	-
CA-MOD-77	38	340	A EXU (8N/11E)	-36.0	-40.0	DEB Cougar Butte	4.8	NM	-
CA-MOD-77	38	340	B EXU (8N/11E)	-36.0	-40.0	DEB Cougar Butte	5.1	NM	-
CA-MOD-77	38	340	C EXU (8N/11E)	-36.0	-40.0	DEB Blue Mountain	2.0	NM	-
CA-MOD-77	38	340	D EXU (8N/11E)	-36.0	-40.0	DEB East Medicine Lake	4.2	NM	-
CA-MOD-77	38	340	E EXU (8N/11E)	-36.0	-40.0	DEB East Medicine Lake	3.7	NM	-
CA-MOD-77	38	340	F EXU (8N/11E)	-36.0	-40.0	DEB Blue Mountain	2.1	NM	-
CA-MOD-77	38	340	G EXU (8N/11E)	-36.0	-40.0	DEB Blue Mountain	2.0	NM	-
CA-MOD-77	38	361	A EXU (8N/11E)	-100.0	-110.0	DEB East Medicine Lake	4.7	NM	-
CA-MOD-77	38	361	B EXU (8N/11E)	-100.0	-110.0	DEB East Medicine Lake	4.8	NM	-
CA-MOD-77	38	361	C EXU (8N/11E)	-100.0	-110.0	DEB Buck Mountain	4.3	NM	-
CA-MOD-77	38	361	D EXU (8N/11E)	-100.0	-110.0	DEB Drews Creek/Butcher Flat	3.6	NM	-
CA-MOD-77	38	381	- EXU (8N/12E)	-40.0	-50.0	PPT Spodue Mountain	4.3	NM	-
CA-MOD-77	38	392	- EXU (8N/12E)	-60.0	-70.0	PPT Spodue Mountain	4.4	NM	-
CA-MOD-77	38	413	- EXU (8N/17E)	-30.0	-40.0	PPT East Medicine Lake	4.6	NM	-
CA-MOD-77	38	414	- EXU (8N/17E)	-30.0	-40.0	PPT East Medicine Lake	5.1	NM	-
CA-MOD-77	38	498	- EXU (9N/11E)	-50.0	-60.0	PPT Grasshopper Group	5.1	NM	-
CA-MOD-77	38	615	- EXU (45N/20E)	-10.0	-20.0	PPT East Medicine Lake	4.0	NM	-
CA-MOD-128	40	8	- STU (21N/0W)	0.0	-10.0	DEB Grasshopper Group	4.0	NM	Visually assigned source
CA-MOD-128	40	13	- STU (80S/0W)	0.0	-20.0	BIF Grasshopper Group	4.5	NM	Visually assigned source
CA-MOD-128	40	14	- STU (13N/0W)	0.0	-10.0	DEB Grasshopper Group	3.0	NM	Visually assigned source; Weathered
CA-MOD-128	40	27	- STU (21N/0W)	0.0	-10.0	DEB Grasshopper Group	4.1	NM	Visually assigned source
CA-MOD-128	40	30	- STU (0N/0W)	0.0	-10.0	DEB Grasshopper Group	2.5	NM	Visually assigned source
CA-MOD-129	41	62	- STU (50N/0W)	0.0	-20.0	BIF East Medicine Lake	5.0	NM	-
CA-MOD-129	41	103	- STU (90S/0W)	0.0	-20.0	BIF Spodue Mountain	4.9	NM	-
CA-MOD-129	41	234	- STU (330N/0W)	0.0	-20.0	BIF Unknown D	4.8	NM	-
CA-MOD-129	41	290	- STU (0N/0W)	0.0	-20.0	BIF East Medicine Lake	4.7	NM	-

C.4-6

Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
						1	2	
CA-MOD-129	41 315	- STU (0N/0W)	0.0 -20.0	BIF	Blue Mountain	1.8	NM	—
CA-MOD-129	41 316	- STU (0N/0W)	0.0 -20.0	PPT	East Medicine Lake	2.6	NM	Visually assigned source
CA-MOD-129	41 357	A MRR 1	0.0 -10.0	DEB	Grasshopper Group	6.2	NM	Visually assigned source
CA-MOD-129	41 357	B MRR 1	0.0 -10.0	DEB	Grasshopper Group	4.2	NM	Visually assigned source
CA-MOD-129	41 357	C MRR 1	0.0 -10.0	DEB	East Medicine Lake	6.2	NM	Visually assigned source
CA-MOD-129	41 357	D MRR 1	0.0 -10.0	DEB	Grasshopper Group	4.8	NM	Visually assigned source
CA-MOD-129	41 357	E MRR 1	0.0 -10.0	DEB	Grasshopper Group	6.9	NM	Visually assigned source
CA-MOD-129	41 357	F MRR 1	0.0 -10.0	DEB	Grasshopper Group	7.3	NM	Visually assigned source
CA-MOD-129	41 357	G MRR 1	0.0 -10.0	DEB	East Medicine Lake	6.9	NM	Visually assigned source
CA-MOD-129	41 357	H MRR 1	0.0 -10.0	DEB	Grasshopper Group	6.1	NM	Visually assigned source
CA-MOD-129	41 357	I MRR 1	0.0 -10.0	DEB	Grasshopper Group	5.8	NM	Visually assigned source
CA-MOD-129	41 357	J MRR 1	0.0 -10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-129	41 385	A MRR 1	-50.0 -60.0	DEB	Grasshopper Group	5.8	NM	Visually assigned source
CA-MOD-129	41 385	B MRR 1	-50.0 -60.0	DEB	East Medicine Lake	4.2	NM	Grasshopper Group visual source
CA-MOD-129	41 385	C MRR 1	-50.0 -60.0	DEB	Grasshopper Group	4.2	NM	Visually assigned source
CA-MOD-129	41 385	D MRR 1	-50.0 -60.0	DEB	Grasshopper Group	5.7	NM	Visually assigned source
CA-MOD-129	41 385	E MRR 1	-50.0 -60.0	DEB	Grasshopper Group	7.0	NM	Visually assigned source
CA-MOD-129	41 385	F MRR 1	-50.0 -60.0	DEB	Grasshopper Group	6.2	NM	Visually assigned source
CA-MOD-129	41 385	G MRR 1	-50.0 -60.0	DEB	East Medicine Lake	7.3	NM	Grasshopper Group visual source
CA-MOD-129	41 385	H MRR 1	-50.0 -60.0	DEB	Grasshopper Group	7.4	NM	Visually assigned source
CA-MOD-129	41 385	I MRR 1	-50.0 -60.0	DEB	Grasshopper Group	7.2	NM	Visually assigned source
CA-MOD-129	41 385	J MRR 1	-50.0 -60.0	DEB	Grasshopper Group	5.6	NM	Visually assigned source
CA-MOD-129	41 410	A SON 2	0.0 -10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-129	41 410	B SON 2	0.0 -10.0	DEB	Grasshopper Group	1.5	NM	Visually assigned source
CA-MOD-129	41 410	C SON 2	0.0 -10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-129	41 410	D SON 2	0.0 -10.0	DEB	Grasshopper Group	1.8	NM	Visually assigned source
CA-MOD-129	41 410	E SON 2	0.0 -10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-129	41 410	F SON 2	0.0 -10.0	DEB	Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-129	41 410	G SON 2	0.0 -10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-129	41 410	H SON 2	0.0 -10.0	DEB	Grasshopper Group	2.6	NM	Visually assigned source
CA-MOD-129	41 410	I SON 2	0.0 -10.0	DEB	Blue Mountain	1.7	NM	Visually assigned source
CA-MOD-129	41 410	J SON 2	0.0 -10.0	DEB	Blue Mountain	1.3	NM	Visually assigned source
CA-MOD-129	41 410	K SON 2	0.0 -10.0	DEB	Blue Mountain	1.0	NM	Visually assigned source
CA-MOD-129	41 410	L SON 2	0.0 -10.0	DEB	Blue Mountain	1.7	NM	Visually assigned source
CA-MOD-129	41 416	- SON 2	-10.0 -20.0	BIF	East Medicine Lake	1.5	NM	—
CA-MOD-129	41 417	- SON 2	-10.0 -20.0	BIF	Blue Mountain	1.9	NM	—
CA-MOD-129	41 418	A SON 2	-10.0 -20.0	DEB	Grasshopper Group	1.0	NM	Visually assigned source
CA-MOD-129	41 418	B SON 2	-10.0 -20.0	DEB	East Medicine Lake	2.6	NM	Grasshopper Group visual source
CA-MOD-129	41 418	C SON 2	-10.0 -20.0	DEB	Grasshopper Group	2.1	NM	Visually assigned source
CA-MOD-129	41 418	D SON 2	-10.0 -20.0	DEB	East Medicine Lake	1.3	NM	Grasshopper Group visual source
CA-MOD-129	41 418	E SON 2	-10.0 -20.0	DEB	Grasshopper Group	1.2	NM	Visually assigned source

C.4-7

Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
					1	2			1	2	
CA-MOD-129	41	418	F	SON 2	-10.0	-20.0	DEB	East Medicine Lake	1.7	NM	Grasshopper Group visual source
CA-MOD-129	41	418	G	SON 2	-10.0	-20.0	DEB	Grasshopper Group	1.2	NM	Visually assigned source
CA-MOD-129	41	418	H	SON 2	-10.0	-20.0	DEB	Grasshopper Group	1.5	NM	—
CA-MOD-129	41	418	I	SON 2	-10.0	-20.0	DEB	Grasshopper Group	1.3	NM	—
CA-MOD-129	41	418	J	SON 2	-10.0	-20.0	DEB	Blue Mountain	1.3	NM	—
CA-MOD-129	41	418	K	SON 2	-10.0	-20.0	DEB	Blue Mountain	1.4	NM	Visually assigned source
CA-MOD-129	41	418	L	SON 2	-10.0	-20.0	DEB	Blue Mountain	1.2	NM	Grasshopper Group visual source
CA-MOD-129	41	418	M	SON 2	-10.0	-20.0	DEB	Blue Mountain	1.2	NM	Grasshopper Group visual source
CA-MOD-129	41	452	-	ISO	0.0	0.0	PPT	East Medicine Lake	1.2	NM	—
CA-MOD-129	41	453	-	ISO	0.0	0.0	PPT	McComb Butte	3.6	NM	—
CA-MOD-129	41	455	-	ISO	0.0	0.0	PPT	CL/DC/BF	4.9	NM	—
CA-MOD-129	41	457	-	ISO	0.0	0.0	PPT	East Medicine Lake	5.0	NM	Grasshopper Group visual source
CA-MOD-129	41	461	-	ISO	0.0	0.0	BIF	Blue Mountain	4.1	NM	—
CA-MOD-129	41	468	-	ISO	0.0	0.0	BIF	Buck Mountain/Cougar Butte	4.5	NM	—
CA-MOD-129	41	469	-	ISO	0.0	0.0	BIF	Glass Mountain	1.9	NM	—
CA-MOD-129	83	1	A	TEU 1	0.0	-10.0	DEB	Sugar Hill	3.3	NM	—
CA-MOD-129	83	1	B	TEU 1	0.0	-10.0	DEB	Glass Mountain	2.2	NM	—
CA-MOD-129	84	4	A	TEU 1	-10.0	-20.0	DEB	Cougar Butte	6.8	NM	—
CA-MOD-129	84	4	B	TEU 1	-10.0	-20.0	DEB	Glass Mountain	3.2	NM	—
CA-MOD-129	85	1	B	TEU 1	-20.0	-30.0	DEB	Buck Mountain	13.1	NM	—
CA-MOD-129	86	2	-	TEU 1	-30.0	-40.0	BIF	East Medicine Lake	5.2	NM	—
CA-MOD-129	86	4	B	TEU 1	-30.0	-40.0	DEB	Cougar Butte	7.5	NM	—
CA-MOD-129	87	1	A	TEU 1	-40.0	-50.0	DEB	Blue Mountain	DH	NM	Diffuse hydration
CA-MOD-129	87	1	B	TEU 1	-40.0	-50.0	DEB	East Medicine Lake	4.2	NM	—
CA-MOD-129	87	1	C	TEU 1	-40.0	-50.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-129	88	3	-	TEU 1	-50.0	-60.0	EMP	East Medicine Lake	4.8	NM	—
CA-MOD-129	88	4	A	TEU 1	-50.0	-60.0	DEB	East Medicine Lake	6.1	NM	—
CA-MOD-129	89	2	-	TEU 1	-60.0	-70.0	DEB	East Medicine Lake	4.9	NM	—
CA-MOD-129	89	3	-	TEU 1	-60.0	-70.0	DEB	Cougar Butte	DH	NM	Rim approx. 24 microns; Weathered
CA-MOD-129	90	1	A	TEU 1	-70.0	-80.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-129	90	1	B	TEU 1	-70.0	-80.0	DEB	Grasshopper Group	DH	NM	Diffuse hydration
CA-MOD-129	91	2	B	TEU 1	-80.0	-90.0	DEB	Warner Mountain	6.2	NM	—
CA-MOD-129	91	2	C	TEU 1	-80.0	-90.0	DEB	Grasshopper Group	4.9	NM	—
CA-MOD-129	92	1	A	TEU 1	-90.0	-100.0	DEB	East Medicine Lake	6.6	NM	—
CA-MOD-129	92	1	B	TEU 1	-90.0	-100.0	DEB	East Medicine Lake	4.9	NM	—
CA-MOD-129	93	1	A	TEU 1	-100.0	-110.0	DEB	Sugar Hill	6.2	NM	—
CA-MOD-129	93	1	B	TEU 1	-100.0	-110.0	DEB	Drews Creek/Butcher Flat	7.8	NM	—
CA-MOD-129	94	1	B	TEU 1	-110.0	-120.0	DEB	East Medicine Lake	5.8	NM	—
CA-MOD-129	94	1	C	TEU 1	-110.0	-120.0	DEB	Unknown A	8.2	NM	—
CA-MOD-129	95	1	B	TEU 1	-120.0	-130.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-129	95	1	C	TEU 1	-120.0	-130.0	DEB	GF/LIW/RS	6.6	NM	—

C.4-8



Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-129	96	1	A	TEU 1	-130.0	-140.0	DEB	Buck Mountain	6.2	NM	—
CA-MOD-129	96	1	B	TEU 1	-130.0	-140.0	DEB	East Medicine Lake	6.4	NM	—
CA-MOD-129	97	1	-	TEU 1	-140.0	-150.0	DEB	Cougar Butte	7.2	NM	—
CA-MOD-129	98	1	A	TEU 1	-150.0	-160.0	DEB	East Medicine Lake	DH	NM	Not measurable
CA-MOD-129	98	1	B	TEU 1	-150.0	-160.0	DEB	East Medicine Lake	6.3	NM	—
CA-MOD-129	99	1	A	TEU 1	-160.0	-170.0	DEB	East Medicine Lake	5.7	NM	—
CA-MOD-129	99	1	B	TEU 1	-160.0	-170.0	DEB	East Medicine Lake	6.0	NM	—
CA-MOD-129	100	1	A	TEU 1	-170.0	-180.0	DEB	East Medicine Lake	7.2	NM	—
CA-MOD-129	100	1	B	TEU 1	-170.0	-180.0	DEB	Buck Mountain	6.8	NM	—
CA-MOD-129	101	1	A	TEU 1	-180.0	-190.0	DEB	Unknown B	8.8	NM	—
CA-MOD-129	101	1	B	TEU 1	-180.0	-190.0	DEB	Unknown C	7.1	NM	—
CA-MOD-1205	42	59	A	MRR 1	0.0	-10.0	DEB	Grasshopper Group	5.6	NM	Visually assigned source
CA-MOD-1205	42	59	B	MRR 1	0.0	-10.0	DEB	East Medicine Lake	5.3	NM	—
CA-MOD-1205	42	59	C	MRR 1	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	—
CA-MOD-1205	42	59	D	MRR 1	0.0	-10.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-1205	42	59	E	MRR 1	0.0	-10.0	DEB	East Medicine Lake	2.0	NM	—
CA-MOD-1205	42	59	F	MRR 1	0.0	-10.0	DEB	Grasshopper Group	5.1	NM	Visually assigned source
CA-MOD-1205	42	59	G	MRR 1	0.0	-10.0	DEB	East Medicine Lake	4.9	NM	—
CA-MOD-1205	42	59	H	MRR 1	0.0	-10.0	DEB	East Medicine Lake	4.2	NM	—
CA-MOD-1205	42	59	I	MRR 1	0.0	-10.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-1205	42	59	J	MRR 1	0.0	-10.0	DEB	Unknown A	4.9	NM	—
CA-MOD-1205	42	68	A	MRR 1	-30.0	-40.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-1205	42	68	B	MRR 1	-30.0	-40.0	DEB	Cougar Butte	5.7	NM	—
CA-MOD-1205	42	68	C	MRR 1	-30.0	-40.0	DEB	East Medicine Lake	3.9	NM	—
CA-MOD-1205	42	68	D	MRR 1	-30.0	-40.0	DEB	East Medicine Lake	5.7	NM	—
CA-MOD-1205	42	68	E	MRR 1	-30.0	-40.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-1205	42	68	F	MRR 1	-30.0	-40.0	DEB	Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-1205	42	68	G	MRR 1	-30.0	-40.0	DEB	Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-1205	42	68	H	MRR 1	-30.0	-40.0	DEB	Grasshopper Group	4.3	NM	Visually assigned source
CA-MOD-1205	42	68	I	MRR 1	-30.0	-40.0	DEB	Grasshopper Group	4.2	NM	Visually assigned source
CA-MOD-1205	42	68	J	MRR 1	-30.0	-40.0	DEB	Grasshopper Group	4.4	NM	Visually assigned source
CA-MOD-1205	42	112	-	STU 28	0.0	-10.0	BIF	East Medicine Lake	1.1	NM	—
CA-MOD-1205	42	188	-	STU 46 (60N/0-)	0.0	-10.0	PPT	East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-1205	42	192	A	STU 46 (60N/0-)	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	—
CA-MOD-1205	42	192	B	STU 46 (60N/0-)	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	—
CA-MOD-1205	42	192	C	STU 46 (60N/0-)	0.0	-10.0	DEB	East Medicine Lake	5.5	NM	—
CA-MOD-1205	42	192	D	STU 46 (60N/0-)	0.0	-10.0	DEB	East Medicine Lake	6.6	NM	—
CA-MOD-1205	42	192	E	STU 46 (60N/0-)	0.0	-10.0	DEB	East Medicine Lake	5.5	NM	—
CA-MOD-1205	42	192	F	STU 46 (60N/0-)	0.0	-10.0	DEB	East Medicine Lake	6.5	23.7	2 hydration rims
CA-MOD-1205	42	192	G	STU 46 (60N/0-)	0.0	-10.0	DEB	East Medicine Lake	7.8	NM	—
CA-MOD-1205	42	192	H	STU 46 (60N/0-)	0.0	-10.0	DEB	East Medicine Lake	6.7	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-1205	42	192	I	STU 46 (60N/0-)	0.0	-10.0	DEB	Grasshopper Group	5.2	NM	Visually assigned source
CA-MOD-1205	42	192	J	STU 46 (60N/0-)	0.0	-10.0	DEB	Grasshopper Group	4.5	NM	Visually assigned source
CA-MOD-1205	42	227	-	AUG B4 (60N/0-)	-10.0	-20.0	BIF	Blue Mountain	NM	NM	No OH measurement
CA-MOD-1205	42	263	-	ISO	0.0	0.0	BIF	East Medicine Lake	3.4	NM	—
CA-MOD-1205	42	268	-	ISO	0.0	0.0	BIF	Blue Mountain	NM	NM	No OH measurement
CA-MOD-1205	42	274	-	ISO	0.0	0.0	PPT	East Medicine Lake	3.0	NM	—
CA-MOD-1205	42	275	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.7	NM	—
CA-MOD-1205	42	276	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.4	NM	—
CA-MOD-1205	42	277	-	ISO	0.0	0.0	PPT	Blue Mountain	1.1	NM	Faint hydration band
CA-MOD-1205	42	279	-	ISO	0.0	0.0	PPT	Cowhead Lake	1.9	NM	—
CA-MOD-1205	42	283	-	ISO	0.0	0.0	BIF	East Medicine Lake	3.4	NM	—
CA-MOD-1205	42	286	-	ISO	0.0	0.0	PPT	East Medicine Lake	3.7	NM	—
CA-MOD-1205	42	294	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.5	NM	—
CA-MOD-1205	42	297	-	ISO	0.0	0.0	PPT	East Medicine Lake	3.9	NM	—
CA-MOD-1205	42	299	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.9	NM	—
CA-MOD-1205	42	305	-	ISO	0.0	0.0	PPT	Buck Mountain	4.5	NM	—
CA-MOD-1206/07	43	122	-	SC (0S/0E)	0.0	0.0	BIF	Cowhead Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	156	-	ISO (203N/0E)	0.0	-10.0	PPT	East Medicine Lake	6.0	NM	—
CA-MOD-1206/07	43	171	A	EXU (1N/6E)	0.0	-10.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-1206/07	43	171	B	EXU (1N/6E)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-1206/07	43	171	C	EXU (1N/6E)	0.0	-10.0	DEB	Cougar Butte	6.3	NM	—
CA-MOD-1206/07	43	172	A	EXU (1N/6E)	0.0	-10.0	DEB	Cougar Butte	4.9	NM	—
CA-MOD-1206/07	43	172	B	EXU (1N/6E)	0.0	-10.0	DEB	Grasshopper Group	6.2	NM	—
CA-MOD-1206/07	43	174	A	EXU (1N/6E)	-10.0	-20.0	DEB	East Medicine Lake	6.3	NM	—
CA-MOD-1206/07	43	174	B	EXU (1N/6E)	-10.0	-20.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-1206/07	43	174	C	EXU (1N/6E)	-10.0	-20.0	DEB	Unknown A	6.2	NM	—
CA-MOD-1206/07	43	174	D	EXU (1N/6E)	-10.0	-20.0	DEB	Cougar Butte	DH	NM	Diffuse hydration
CA-MOD-1206/07	43	176	-	EXU (1N/6E)	-10.0	-20.0	DEB	Blue Mountain	1.4	NM	—
CA-MOD-1206/07	43	179	-	EXU (1N/6E)	-20.0	-30.0	DEB	East Medicine Lake	4.2	NM	—
CA-MOD-1206/07	43	181	-	EXU (1N/6E)	-20.0	-30.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-1206/07	43	182	A	STU (2N/13E)	0.0	-10.0	DEB	East Medicine Lake	2.9	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	182	B	STU (2N/13E)	0.0	-10.0	DEB	East Medicine Lake	3.9	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	182	C	STU (2N/13E)	0.0	-10.0	DEB	Grasshopper Group	6.1	NM	Visually assigned source
CA-MOD-1206/07	43	182	D	STU (2N/13E)	0.0	-10.0	DEB	Grasshopper Group	8.0	NM	Visually assigned source
CA-MOD-1206/07	43	182	E	STU (2N/13E)	0.0	-10.0	DEB	Grasshopper Group	4.8	NM	Visually assigned source
CA-MOD-1206/07	43	182	F	STU (2N/13E)	0.0	-10.0	DEB	Grasshopper Group	4.5	NM	Visually assigned source
CA-MOD-1206/07	43	182	G	STU (2N/13E)	0.0	-10.0	DEB	Grasshopper Group	4.6	NM	Visually assigned source
CA-MOD-1206/07	43	182	H	STU (2N/13E)	0.0	-10.0	DEB	Grasshopper Group	1.1	NM	Visually assigned source
CA-MOD-1206/07	43	182	I	STU (2N/13E)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-1206/07	43	182	J	STU (2N/13E)	0.0	-10.0	DEB	Grasshopper Group	3.0	NM	Visually assigned source
CA-MOD-1206/07	43	393	A	MRR (50N/5E)	0.0	-10.0	DEB	East Medicine Lake	2.6	5.5	Grasshopper group visual source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-1206/07	43	393	B	MRR (50N/5E)	0.0	-10.0	DEB	Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-1206/07	43	393	C	MRR (50N/5E)	0.0	-10.0	DEB	Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-1206/07	43	393	D	MRR (50N/5E)	0.0	-10.0	DEB	Grasshopper Group	4.2	4.6	Visually assigned source
CA-MOD-1206/07	43	393	E	MRR (50N/5E)	0.0	-10.0	DEB	East Medicine Lake	4.4	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	393	F	MRR (50N/5E)	0.0	-10.0	DEB	East Medicine Lake	5.0	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	393	G	MRR (50N/5E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	393	H	MRR (50N/5E)	0.0	-10.0	DEB	Grasshopper Group	5.1	NM	Visually assigned source
CA-MOD-1206/07	43	393	I	MRR (50N/5E)	0.0	-10.0	DEB	Grasshopper Group	5.1	NM	Visually assigned source
CA-MOD-1206/07	43	393	J	MRR (50N/5E)	0.0	-10.0	DEB	Grasshopper Group	5.0	NM	Visually assigned source
CA-MOD-1206/07	43	402	A	MRR (50N/5E)	-30.0	-40.0	DEB	East Medicine Lake	5.0	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	402	B	MRR (50N/5E)	-30.0	-40.0	DEB	Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-1206/07	43	402	C	MRR (50N/5E)	-30.0	-40.0	DEB	East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	402	D	MRR (50N/5E)	-30.0	-40.0	DEB	Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-1206/07	43	402	E	MRR (50N/5E)	-30.0	-40.0	DEB	Grasshopper Group	4.1	NM	Visually assigned source
CA-MOD-1206/07	43	402	F	MRR (50N/5E)	-30.0	-40.0	DEB	Grasshopper Group	5.1	NM	Visually assigned source
CA-MOD-1206/07	43	402	G	MRR (50N/5E)	-30.0	-40.0	DEB	Grasshopper Group	5.0	NM	Visually assigned source
CA-MOD-1206/07	43	402	H	MRR (50N/5E)	-30.0	-40.0	DEB	Grasshopper Group	4.4	NM	Visually assigned source
CA-MOD-1206/07	43	402	I	MRR (50N/5E)	-30.0	-40.0	DEB	East Medicine Lake	5.1	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	402	J	MRR (50N/5E)	-30.0	-40.0	DEB	Grasshopper Group	4.7	NM	Visually assigned source
CA-MOD-1206/07	43	463	-	ISO	0.0	0.0	BIF	East Medicine Lake	3.6	NM	—
CA-MOD-1206/07	43	466	-	ISO	0.0	0.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1206/07	43	470	-	ISO	0.0	0.0	PPT	East Medicine Lake	3.7	NM	—
CA-MOD-1206/07	43	477	-	ISO	0.0	0.0	PPT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	481	-	ISO	0.0	0.0	PPT	East Medicine Lake	4.0	NM	—
CA-MOD-1206/07	43	484	-	ISO	0.0	0.0	BIF	Blue Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	486	-	ISO (8.7N/1.7W)	0.0	0.0	BIF	East Medicine Lake	3.7	NM	—
CA-MOD-1206/07	43	488	-	ISO (28N/5W)	0.0	0.0	PPT	East Medicine Lake	4.4	NM	—
CA-MOD-1206/07	43	494	-	ISO (6N/14W)	0.0	0.0	PPT	East Medicine Lake	6.0	NM	—
CA-MOD-1206/07	43	495	-	ISO (20S/33E)	0.0	0.0	PPT	East Medicine Lake	5.1	NM	—
CA-MOD-1206/07	43	496	-	ISO (7.7S/1E)	0.0	0.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1206/07	43	519	-	MRR (18N/6E)	0.0	-10.0	PPT	East Medicine Lake	5.1	NM	—
CA-MOD-1206/07	43	529	-	MRR (18N/6E)	-20.0	-30.0	BIF	East Medicine Lake	3.6	NM	—
CA-MOD-1206/07	43	547	-	MRR (18N/6E)	-60.0	-70.0	BIF	Blue Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	617	-	STU (5N/4E)	0.0	-10.0	PPT	Buck Mountain	1.2	NM	—
CA-MOD-1206/07	43	634	-	MRR (5N/4E)	-20.0	-30.0	PPT	Blue Mountain	1.3	NM	—
CA-MOD-1206/07	43	638	-	MRR (5N/5E)	-10.0	-20.0	PPT	Cougar Butte	1.7	NM	—
CA-MOD-1206/07	43	648	-	MRR (5N/5E)	-20.0	-30.0	PPT	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	649	-	MRR (5N/5E)	-20.0	-30.0	PPT	East Medicine Lake	1.2	NM	—
CA-MOD-1206/07	43	664	A	EXU (5N/6E)	0.0	-10.0	DEB	East Medicine Lake	6.1	NM	—
CA-MOD-1206/07	43	664	B	EXU (5N/6E)	0.0	-10.0	DEB	Cougar Butte	6.0	NM	—
CA-MOD-1206/07	43	664	C	EXU (5N/6E)	0.0	-10.0	DEB	Cougar Butte	6.2	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-1206/07	43	664	D EXU (5N/6E)	0.0	-10.0	DEB East Medicine Lake	1.2	NM	—
CA-MOD-1206/07	43	664	E EXU (5N/6E)	0.0	-10.0	DEB East Medicine Lake	1.3	NM	—
CA-MOD-1206/07	43	670	A EXU (5N/6E)	-10.0	-20.0	DEB Cougar Butte	3.9	NM	—
CA-MOD-1206/07	43	670	B EXU (5N/6E)	-10.0	-20.0	DEB East Medicine Lake	5.6	NM	—
CA-MOD-1206/07	43	670	C EXU (5N/6E)	-10.0	-20.0	DEB East Medicine Lake	8.5	NM	Weathered
CA-MOD-1206/07	43	670	D EXU (5N/6E)	-10.0	-20.0	DEB East Medicine Lake	4.4	NM	—
CA-MOD-1206/07	43	670	E EXU (5N/6E)	-10.0	-20.0	DEB East Medicine Lake	1.8	NM	—
CA-MOD-1206/07	43	676	A EXU (5N/6E)	-20.0	-30.0	DEB East Medicine Lake	3.7	NM	—
CA-MOD-1206/07	43	676	B EXU (5N/6E)	-20.0	-30.0	DEB East Medicine Lake	1.7	NM	—
CA-MOD-1206/07	43	676	C EXU (5N/6E)	-20.0	-30.0	DEB East Medicine Lake	5.4	NM	—
CA-MOD-1206/07	43	676	D EXU (5N/6E)	-20.0	-30.0	DEB East Medicine Lake	1.9	NM	—
CA-MOD-1206/07	43	676	E EXU (5N/6E)	-20.0	-30.0	DEB Glass Mountain	3.6	NM	—
CA-MOD-1206/07	43	682	A EXU (5N/6E)	-30.0	-40.0	DEB East Medicine Lake	2.7	NM	—
CA-MOD-1206/07	43	682	B EXU (5N/6E)	-30.0	-40.0	DEB Cougar Butte	5.8	NM	—
CA-MOD-1206/07	43	682	C EXU (5N/6E)	-30.0	-40.0	DEB Glass Mountain	3.2	NM	—
CA-MOD-1206/07	43	682	D EXU (5N/6E)	-30.0	-40.0	DEB East Medicine Lake	1.8	NM	—
CA-MOD-1206/07	43	682	E EXU (5N/6E)	-30.0	-40.0	DEB East Medicine Lake	5.2	NM	—
CA-MOD-1206/07	43	687	- MRR (3N/3E)	0.0	-10.0	PPT Blue Mountain	2.9	NM	—
CA-MOD-1206/07	43	693	- MRR (3N/3E)	-20.0	-30.0	PPT East Medicine Lake	1.0	NM	—
CA-MOD-1206/07	43	703	- MRR (3N/3E)	-20.0	-30.0	BIF East Medicine Lake	NM	NM	—
No OH measurement									
CA-MOD-1206/07	43	708	- MRR (3N/3E)	-30.0	-40.0	BIF East Medicine Lake	1.3	NM	—
CA-MOD-1206/07	43	709	- MRR (3N/3E)	-30.0	-40.0	PPT East Medicine Lake	1.0	NM	—
CA-MOD-1206/07	43	710	- MRR (3N/3E)	-30.0	-40.0	BIF East Medicine Lake	NM	NM	—
CA-MOD-1206/07	43	711	- MRR (3N/3E)	-30.0	-40.0	BIF Glass Mountain	0.9	NM	—
CA-MOD-1206/07	43	714	- MRR (3N/3E)	-30.0	-40.0	BIF Grasshopper Group	1.5	NM	—
CA-MOD-1206/07	43	721	- MRR (3N/4E)	0.0	-10.0	PPT CL/DC/BF	1.5	NM	—
CA-MOD-1206/07	43	722	- MRR (3N/4E)	0.0	-10.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	725	A MRR (3N/4E)	0.0	-10.0	DEB Glass Mountain	1.1	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	725	B MRR (3N/4E)	0.0	-10.0	DEB East Medicine Lake	4.3	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	725	C MRR (3N/4E)	0.0	-10.0	DEB East Medicine Lake	4.5	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	725	D MRR (3N/4E)	0.0	-10.0	DEB East Medicine Lake	3.1	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	725	E MRR (3N/4E)	0.0	-10.0	DEB Grasshopper Group	4.1	NM	Visually assigned source
CA-MOD-1206/07	43	725	F MRR (3N/4E)	0.0	-10.0	DEB East Medicine Lake	4.7	NM	Grasshopper Group visual source
CA-MOD-1206/07	43	725	G MRR (3N/4E)	0.0	-10.0	DEB Grasshopper Group	1.0	NM	Visually assigned source
CA-MOD-1206/07	43	725	H MRR (3N/4E)	0.0	-10.0	DEB Grasshopper Group	5.4	NM	Visually assigned source
CA-MOD-1206/07	43	725	I MRR (3N/4E)	0.0	-10.0	DEB Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-1206/07	43	725	J MRR (3N/4E)	0.0	-10.0	DEB Grasshopper Group	0.8	NM	Visually assigned source
CA-MOD-1206/07	43	732	- MRR (3N/4E)	-10.0	-20.0	PPT Buck Mountain	3.8	NM	—
CA-MOD-1206/07	43	733	- MRR (3N/4E)	-10.0	-20.0	PPT East Medicine Lake	NM	NM	—
CA-MOD-1206/07	43	739	- MRR (3N/4E)	-20.0	-30.0	BIF Grasshopper Group	0.9	NM	Visually assigned source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-1206/07	43	741	-	MRR (3N/4E)	-20.0	-30.0	BIF	Grasshopper Group	1.8	NM	Visually assigned source
CA-MOD-1206/07	43	743	A	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	1.6	NM	Visually assigned source
CA-MOD-1206/07	43	743	B	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	4.7	NM	Visually assigned source
CA-MOD-1206/07	43	743	C	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	1.0	NM	Visually assigned source
CA-MOD-1206/07	43	743	D	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	1.1	NM	Visually assigned source
CA-MOD-1206/07	43	743	E	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	4.4	NM	Visually assigned source
CA-MOD-1206/07	43	743	F	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	1.4	NM	Visually assigned source
CA-MOD-1206/07	43	743	G	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	4.5	NM	Visually assigned source
CA-MOD-1206/07	43	743	H	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	5.1	4.4	Visually assigned source
CA-MOD-1206/07	43	743	I	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	5.3	NM	Visually assigned source
CA-MOD-1206/07	43	743	J	MRR (3N/4E)	-20.0	-30.0	DEB	Grasshopper Group	5.0	NM	Visually assigned source
CA-MOD-1206/07	43	751	1	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	10	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	11	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	12	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	13	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	14	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	15	MRR (3N/4E)	-30.0	-40.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	16	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	17	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	18	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	19	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	2	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	20	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	3	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	4	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	5	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	6	MRR (3N/4E)	-30.0	-40.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	7	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	8	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	9	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	751	A	MRR (3N/4E)	-30.0	-40.0	DEB	East Medicine Lake	1.1	NM	-
CA-MOD-1206/07	43	751	B	MRR (3N/4E)	-30.0	-40.0	DEB	East Medicine Lake	1.1	NM	-
CA-MOD-1206/07	43	751	C	MRR (3N/4E)	-30.0	-40.0	DEB	Cougar Butte	1.1	NM	-
CA-MOD-1206/07	43	751	D	MRR (3N/4E)	-30.0	-40.0	DEB	East Medicine Lake	3.5	5.5	2 hydration rims
CA-MOD-1206/07	43	751	E	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	5.5	NM	-
CA-MOD-1206/07	43	751	F	MRR (3N/4E)	-30.0	-40.0	DEB	Cougar Butte	1.0	NM	-
CA-MOD-1206/07	43	751	G	MRR (3N/4E)	-30.0	-40.0	DEB	East Medicine Lake	0.9	NM	-
CA-MOD-1206/07	43	751	H	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	0.9	NM	-
CA-MOD-1206/07	43	751	I	MRR (3N/4E)	-30.0	-40.0	DEB	Glass Mountain	0.9	NM	-
CA-MOD-1206/07	43	751	J	MRR (3N/4E)	-30.0	-40.0	DEB	Sugar Hill	1.7	NM	-

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
							1	2			
CA-MOD-1206/07	43	760	-	MRR (3N/6E)	-10.0	-20.0	PPT	East Medicine Lake	NM	NM	--
CA-MOD-1206/07	43	780	-	MRR (2N/4E)	0.0	-10.0	BIF	Glass Mountain	1.1	NM	--
CA-MOD-1206/07	43	781	-	MRR (2N/4E)	0.0	-10.0	BIF	East Medicine Lake	1.1	NM	--
CA-MOD-1206/07	43	786	-	MRR (2N/4E)	-10.0	-20.0	BIF	Glass Mountain	1.1	NM	--
CA-MOD-1206/07	43	796	-	MRR (2N/4E)	-30.0	-40.0	PPT	East Medicine Lake	1.0	NM	--
CA-MOD-1206/07	43	828	-	SC (12N/2W)	0.0	0.0	PPT	Blue Mountain	1.8	NM	--
CA-MOD-1206/07	43	1036	-	SCP 113 (20N/0E)	0.0	0.0	PPT	Buck Mountain	5.1	NM	--
CA-MOD-1206/07	43	1039	-	ISO (3.7N/3.6W)	0.0	0.0	PPT	East Medicine Lake	1.7	NM	--
CA-MOD-1206/07	43	1040	-	ISO (1.25S/2.3W)	0.0	0.0	PPT	East Medicine Lake	1.0	NM	--
CA-MOD-1206/07	43	1043	-	ISO (14.4N/8.4W)	0.0	0.0	BIF	East Medicine Lake	2.9	NM	--
CA-MOD-1206/07	43	1044	-	ISO (12.45S/26.6W)	0.0	0.0	BIF	East Medicine Lake	1.2	NM	--
CA-MOD-1206/07	43	1045	-	ISO (5.7S/7.4E)	0.0	0.0	BIF	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1206/07	43	1048	-	ISO (8.9N/2E)	0.0	0.0	BIF	Unknown B	NM	NM	No OH measurement
CA-MOD-1206/07	43	1049	-	ISO (29.7N/2.6W)	0.0	0.0	PPT	East Medicine Lake	4.2	NM	--
CA-MOD-1206/07	43	1050	-	ISO (32.9N/22.8E)	0.0	0.0	PPT	East Medicine Lake	2.5	NM	--
CA-MOD-1206/07	43	1051	-	ISO (61N/23.7E)	0.0	0.0	PPT	East Medicine Lake	DH	NM	Diffuse hydration; Weathered
CA-MOD-1206/07	43	1052	-	ISO (17N/8.6E)	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	1053	-	ISO (18N/6E)	0.0	0.0	PPT	Unknown C	NM	NM	No OH measurement
CA-MOD-1206/07	43	1103	-	SC (18S/2W)	0.0	0.0	PPT	Cougar Butte	7.4	NM	--
CA-MOD-1206/07	43	1109	-	SC (18S/2W)	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	1119	-	SC (2N/2W)	0.0	0.0	PPT	Blue Mountain	7.2	NM	--
CA-MOD-1206/07	43	1199	-	SC (15S/8.3E)	0.0	0.0	PPT	Cougar Butte	6.4	NM	--
CA-MOD-1206/07	43	1202	-	SC (5.3S/2.1E)	0.0	0.0	BIF	East Medicine Lake	6.6	NM	--
CA-MOD-1206/07	43	1203	-	SC (4.1S/7.5E)	0.0	0.0	BIF	Blue Mountain	2.2	NM	--
CA-MOD-1206/07	43	1204	-	SC (4S/6E)	0.0	0.0	PPT	Blue Mountain	2.6	NM	--
CA-MOD-1206/07	43	1205	-	MRR (7N/6E)	0.0	-10.0	PPT	East Medicine Lake	7.0	NM	--
CA-MOD-1206/07	43	1206	-	MRR (7N/6E)	0.0	-10.0	BIF	East Medicine Lake	4.9	NM	--
CA-MOD-1206/07	43	1211	-	MRR (7N/6E)	0.0	-10.0	PPT	Cougar Butte	DH	NM	--
CA-MOD-1206/07	43	1213	-	MRR (7N/6E)	0.0	-10.0	PPT	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1206/07	43	1214	A	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	4.2	NM	--
CA-MOD-1206/07	43	1214	B	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Poor image
CA-MOD-1206/07	43	1214	C	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Poor image
CA-MOD-1206/07	43	1214	D	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Poor image
CA-MOD-1206/07	43	1214	E	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Poor image
CA-MOD-1206/07	43	1214	F	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	4.6	NM	--
CA-MOD-1206/07	43	1214	G	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	5.0	NM	--
CA-MOD-1206/07	43	1214	H	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Poor image
CA-MOD-1206/07	43	1214	I	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Poor image
CA-MOD-1206/07	43	1214	J	MRR (7N/6E)	0.0	-10.0	DEB	East Medicine Lake	5.3	NM	--
CA-MOD-1206/07	43	1236	A	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	4.4	NM	--
CA-MOD-1206/07	43	1236	B	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	4.3	NM	--

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-MOD-1206/07	43 1236	C	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	4.6	NM	—
CA-MOD-1206/07	43 1236	D	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	4.6	NM	—
CA-MOD-1206/07	43 1236	E	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-1206/07	43 1236	F	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-1206/07	43 1236	G	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-1206/07	43 1236	H	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	3.3	NM	—
CA-MOD-1206/07	43 1236	I	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	3.8	NM	—
CA-MOD-1206/07	43 1236	J	MRR (7N/6E)	-50.0	-60.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-1206/07	43 1250	-	STU (10S/6W)	0.0	-10.0	PPT	Blue Mountain	2.5	NM	—
CA-MOD-1206/07	43 1341	-	SC (12N/43W)	0.0	0.0	PPT	East Medicine Lake	4.3	NM	—
CA-MOD-1206/07	43 1410	A	EXU (16N/38E)	0.0	-10.0	DEB	Cougar Butte	DH	NM	Weathered; Diffuse hydration
CA-MOD-1206/07	43 1410	B	EXU (16N/38E)	0.0	-10.0	DEB	East Medicine Lake	5.8	NM	—
CA-MOD-1206/07	43 1410	C	EXU (16N/38E)	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	—
CA-MOD-1206/07	43 1410	D	EXU (16N/38E)	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-1206/07	43 1410	E	EXU (16N/38E)	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	—
CA-MOD-1206/07	43 1413	A	EXU (16N/38E)	-10.0	-20.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-1206/07	43 1413	B	EXU (16N/38E)	-10.0	-20.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-1206/07	43 1413	C	EXU (16N/38E)	-10.0	-20.0	DEB	East Medicine Lake	5.2	NM	—
CA-MOD-1206/07	43 1413	D	EXU (16N/38E)	-10.0	-20.0	DEB	East Medicine Lake	1.5	NM	—
CA-MOD-1206/07	43 1413	E	EXU (16N/38E)	-10.0	-20.0	DEB	Glass Mountain	1.7	NM	—
CA-MOD-1206/07	43 1416	A	EXU (16N/38E)	-20.0	-30.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-1206/07	43 1416	B	EXU (16N/38E)	-20.0	-30.0	DEB	Cougar Butte	6.1	NM	—
CA-MOD-1206/07	43 1416	C	EXU (16N/38E)	-20.0	-30.0	DEB	Unknown D	1.4	NM	—
CA-MOD-1206/07	43 1416	D	EXU (16N/38E)	-20.0	-30.0	DEB	East Medicine Lake	3.8	NM	—
CA-MOD-1206/07	43 1416	E	EXU (16N/38E)	-20.0	-30.0	DEB	East Medicine Lake	1.4	NM	—
CA-MOD-1206/07	43 1459	-	ISO (27.7S/4.7E)	0.0	0.0	PPT	East Medicine Lake	1.8	NM	—
CA-MOD-1206/07	43 1467	-	ISO (7S/7W)	0.0	0.0	BIF	Cougar Butte		NM	NMNo OH measurement
CA-MOD-1206/07	43 1468	-	SC (2.6S/15.2W)	0.0	0.0	BIF	East Medicine Lake	4.7	NM	—
CA-MOD-1206/07	43 1527	-	SC (0S/26E)	0.0	0.0	BIF	East Medicine Lake	3.6	NM	—
CA-MOD-1206/07	43 1541	-	STU (3S/5W)	0.0	-10.0	BIF	East Medicine Lake	5.5	NM	—
CA-MOD-1206/07	43 1553	A	EXU (1N/5E)	0.0	-10.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-1206/07	43 1553	B	EXU (1N/5E)	0.0	-10.0	DEB	Cougar Butte	DH	NM	Weathered; Diffuse hydration
CA-MOD-1206/07	43 1553	C	EXU (1N/5E)	0.0	-10.0	DEB	East Medicine Lake	5.3	NM	—
CA-MOD-1206/07	43 1553	D	EXU (1N/5E)	0.0	-10.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-1206/07	43 1553	E	EXU (1N/5E)	0.0	-10.0	DEB	Cougar Butte	5.6	NM	—
CA-MOD-1206/07	43 1559	A	EXU (1N/5E)	-20.0	-30.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-1206/07	43 1559	B	EXU (1N/5E)	-20.0	-30.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-1206/07	43 1559	C	EXU (1N/5E)	-20.0	-30.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-1206/07	43 1559	D	EXU (1N/5E)	-20.0	-30.0	DEB	East Medicine Lake	6.2	NM	—
CA-MOD-1206/07	43 1559	E	EXU (1N/5W)	-20.0	-30.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-1206/07	43 1567	A	EXU (1N/5W)	-40.0	-50.0	DEB	East Medicine Lake	4.3	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-1206/07	43	1567	B	EXU (1N/5W)	-40.0	-50.0	DEB	Cougar Butte	4.8	NM	—
CA-MOD-1206/07	43	1567	C	EXU (1N/5W)	-40.0	-50.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-1206/07	43	1567	D	EXU (1N/5W)	-40.0	-50.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-1206/07	43	1567	E	EXU (1N/5W)	-40.0	-50.0	DEB	Cougar Butte	5.1	NM	—
CA-MOD-1206/07	43	1626	-	ISO (40.4N/0.9E)	0.0	0.0	PPT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	1724	A	STU (34N/10W)	0.0	-10.0	DEB	Cougar Butte	7.7	NM	—
CA-MOD-1206/07	43	1724	B	STU (34N/10W)	0.0	-10.0	DEB	East Medicine Lake	7.0	NM	—
CA-MOD-1206/07	43	1724	C	STU (34N/10W)	0.0	-10.0	DEB	East Medicine Lake	6.3	NM	—
CA-MOD-1206/07	43	1724	D	STU (34N/10W)	0.0	-10.0	DEB	Cougar Butte	7.6	NM	—
CA-MOD-1206/07	43	1724	E	STU (34N/10W)	0.0	-10.0	DEB	Cougar Butte	DH	NM	—
CA-MOD-1206/07	43	1728	A	STU (58N/8W)	0.0	-10.0	DEB	Cougar Butte	8.6	NM	—
CA-MOD-1206/07	43	1728	B	STU (58N/8W)	0.0	-10.0	DEB	East Medicine Lake	7.4	NM	—
CA-MOD-1206/07	43	1728	C	STU (58N/8W)	0.0	-10.0	DEB	Cougar Butte	DH	NM	—
CA-MOD-1206/07	43	1728	D	STU (58N/8W)	0.0	-10.0	DEB	East Medicine Lake	5.8	NM	—
CA-MOD-1206/07	43	1728	E	STU (58N/8W)	0.0	-10.0	DEB	Cougar Butte	7.5	NM	—
CA-MOD-1206/07	43	1731	A	EXU (55N/2W)	0.0	-10.0	DEB	Cougar Butte	3.6	6.7	Weathered; 2 hydration bands
CA-MOD-1206/07	43	1731	B	EXU (55N/2W)	0.0	-10.0	DEB	Cougar Butte	DH	NM	Weathered; Diffuse hydration
CA-MOD-1206/07	43	1731	C	EXU (55N/2W)	0.0	-10.0	DEB	Cougar Butte	6.0	NM	Weathered
CA-MOD-1206/07	43	1731	D	EXU (55N/2W)	0.0	-10.0	DEB	Cougar Butte	8.5	NM	—
CA-MOD-1206/07	43	1731	E	EXU (55N/2W)	0.0	-10.0	DEB	East Medicine Lake	6.6	NM	—
CA-MOD-1206/07	43	1733	-	EXU (55N/2W)	-10.0	-20.0	DEB	Cougar Butte	7.2	NM	—
CA-MOD-1206/07	43	1734	-	EXU (55N/2W)	-20.0	-30.0	DEB	Cougar Butte	6.7	NM	—
CA-MOD-1206/07	43	1814	-	STU (33S/6E)	0.0	-10.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	1816	-	STU (8S/10W)	0.0	-10.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1206/07	43	1817	-	SCP 114	0.0	0.0	PPT	Sugar Hill	2.7	NM	—
CA-MOD-1206/07	43	1857	-	SCP 15	0.0	0.0	PPT	South Warners	6.6	NM	—
CA-MOD-1461	44	39	-	STU 18 (5S/26W)	0.0	-10.0	PPT	East Medicine Lake	NVB	NM	Weathered; No visible band
CA-MOD-1461	44	45	-	STU 19 (5S/24W)	0.0	-10.0	PPT	Buck Mountain	2.5	NM	—
CA-MOD-1461	44	46	-	STU 19 (5S/24W)	0.0	-10.0	PPT	East Medicine Lake	2.9	NM	—
CA-MOD-1461	44	47	-	STU 19 (5S/24W)	0.0	-10.0	PPT	East Medicine Lake	3.4	2.9	2 hydration rims
CA-MOD-1461	44	48	-	STU 19 (5S/24W)	0.0	-10.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	50	-	STU 19 (5S/24W)	0.0	-10.0	COR	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	51	-	STU 19 (5S/24W)	0.0	-10.0	PPT	East Medicine Lake	NVB	NM	—
CA-MOD-1461	44	59	-	MRR 3 (5S/24W)	-10.0	-20.0	PPT	East Medicine Lake	2.6	NM	—
CA-MOD-1461	44	67	-	MRR 3 (5S/24W)	-20.0	-30.0	PPT	East Medicine Lake	1.7	NM	—
CA-MOD-1461	44	78	-	MRR 1 (5S/25W)	0.0	-10.0	PPT	Glass Mountain	NVB	NM	No visible band
CA-MOD-1461	44	79	-	MRR 1 (5S/25W)	0.0	-10.0	PPT	East Medicine Lake	2.9	NM	—
CA-MOD-1461	44	80	-	MRR 1 (5S/25W)	0.0	-10.0	PPT	East Medicine Lake	1.9	NM	—
CA-MOD-1461	44	81	-	MRR 1 (5S/25W)	0.0	-10.0	PPT	East Medicine Lake	2.8	NM	—
CA-MOD-1461	44	82	-	MRR 1 (5S/25W)	0.0	-10.0	PPT	Buck Mountain	1.3	NM	—
CA-MOD-1461	44	83	-	MRR 1 (5S/25W)	0.0	-10.0	PPT	East Medicine Lake	3.5	NM	Faint band

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot Spec Item Unit			Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
	1	2									
CA-MOD-1461	44	84	-	MRR 1 (SS/25W)	0.0	-10.0	BIF	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	1	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	2	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	3	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	4	MRR 1 (SS/25W)	0.0	-10.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	85	5	MRR 1 (SS/25W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1461	44	85	6	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	7	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	8	MRR 1 (SS/25W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1461	44	85	9	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	10	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	11	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	12	MRR 1 (SS/25W)	0.0	-10.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	85	13	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	14	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	15	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	16	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	17	MRR 1 (SS/25W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1461	44	85	18	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	19	MRR 1 (SS/25W)	0.0	-10.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	85	20	MRR 1 (SS/25W)	0.0	-10.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	85	21	MRR 1 (SS/25W)	0.0	-10.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	85	22	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	23	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	24	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	25	MRR 1 (SS/25W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1461	44	85	26	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	27	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	28	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	29	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	30	MRR 1 (SS/25W)	0.0	-10.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	85	31	MRR 1 (SS/25W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1461	44	85	32	MRR 1 (SS/25W)	0.0	-10.0	DEB	Unknown A	NM	NM	No OH measurement
CA-MOD-1461	44	85	33	MRR 1 (SS/25W)	0.0	-10.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	85	34	MRR 1 (SS/25W)	0.0	-10.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	85	35	MRR 1 (SS/25W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	85	A	MRR 1 (SS/25W)	0.0	-10.0	DEB	Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-1461	44	85	B	MRR 1 (SS/25W)	0.0	-10.0	DEB	Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-1461	44	85	C	MRR 1 (SS/25W)	0.0	-10.0	DEB	Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-1461	44	85	D	MRR 1 (SS/25W)	0.0	-10.0	DEB	Grasshopper Group	1.0	NM	Visually assigned source
CA-MOD-1461	44	85	E	MRR 1 (SS/25W)	0.0	-10.0	DEB	Grasshopper Group	2.0	NM	Visually assigned source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-1461	44	89	A	MRR 1 (5S/25W)	0.0	-10.0	DEB	Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-1461	44	89	B	MRR 1 (5S/25W)	0.0	-10.0	DEB	Grasshopper Group	1.9	1.1	Visually assigned source
CA-MOD-1461	44	89	C	MRR 1 (5S/25W)	0.0	-10.0	DEB	Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-1461	44	89	D	MRR 1 (5S/25W)	0.0	-10.0	DEB	Grasshopper Group	1.0	NM	Visually assigned source
CA-MOD-1461	44	89	E	MRR 1 (5S/25W)	0.0	-10.0	DEB	Grasshopper Group	1.0	NM	Visually assigned source
CA-MOD-1461	44	91	-	MRR 1 (5S/25W)	-10.0	-20.0	PPT	Glass Mountain	2.8	NM	—
CA-MOD-1461	44	96	-	MRR 1 (5S/25W)	-20.0	-30.0	PPT	East Medicine Lake	2.6	NM	—
CA-MOD-1461	44	97	-	MRR 1 (5S/25W)	-20.0	-30.0	PPT	Cougar Butte	2.1	NM	—
CA-MOD-1461	44	98	-	MRR 1 (5S/25W)	-20.0	-30.0	PPT	Cougar Butte	NVB	NM	No visible band
CA-MOD-1461	44	99	-	MRR 1 (5S/25W)	-20.0	-30.0	PPT	East Medicine Lake	1.6	NM	—
CA-MOD-1461	44	100	-	MRR 1 (5S/25W)	-20.0	-30.0	BIF	Sugar Hill	NM	NM	No OH measurement
CA-MOD-1461	44	103	A	MRR 1 (5S/25W)	-20.0	-30.0	DEB	Glass Mountain	1.5	NM	Grasshopper Group visual source
CA-MOD-1461	44	103	B	MRR 1 (5S/25W)	-20.0	-30.0	DEB	Grasshopper Group	1.3	NM	Visually assigned source
CA-MOD-1461	44	103	C	MRR 1 (5S/25W)	-20.0	-30.0	DEB	Grasshopper Group	1.3	NM	Visually assigned source
CA-MOD-1461	44	103	D	MRR 1 (5S/25W)	-20.0	-30.0	DEB	Glass Mountain	1.4	NM	Grasshopper Group visual source
CA-MOD-1461	44	103	E	MRR 1 (5S/25W)	-20.0	-30.0	DEB	Glass Mountain	1.8	NM	Grasshopper Group visual source
CA-MOD-1461	44	103	F	MRR 1 (5S/25W)	-20.0	-30.0	DEB	Grasshopper Group	1.0	NM	Visually assigned source
CA-MOD-1461	44	103	G	MRR 1 (5S/25W)	-20.0	-30.0	DEB	Grasshopper Group	1.1	NM	Visually assigned source
CA-MOD-1461	44	103	H	MRR 1 (5S/25W)	-20.0	-30.0	DEB	Grasshopper Group	2.0	NM	Visually assigned source
CA-MOD-1461	44	139	-	STU 37 (10S/87W)	0.0	-10.0	PPT	Glass Mountain	NM	NM	Unreadable slide
CA-MOD-1461	44	141	A	STU 37 (10S/87W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	Unreadable slide
CA-MOD-1461	44	141	B	STU 37 (10S/87W)	0.0	-10.0	DEB	Glass Mountain	1.7	NM	—
CA-MOD-1461	44	141	C	STU 37 (10S/87W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	Unreadable slide
CA-MOD-1461	44	141	D	STU 37 (10S/87W)	0.0	-10.0	DEB	Glass Mountain	NM	NM	Unreadable slide
CA-MOD-1461	44	141	E	STU 37 (10S/87W)	0.0	-10.0	DEB	Glass Mountain	1.2	NM	—
CA-MOD-1461	44	151	-	STU 46 (4S/25W)	0.0	-10.0	PPT	East Medicine Lake	1.6	NM	Weathered
CA-MOD-1461	44	170	-	SC (0N/31W)	0.0	-10.0	PPT	Glass Mountain	1.4	NM	Weathered
CA-MOD-1461	44	177	-	SC (7N/31W)	0.0	0.0	BIF	East Medicine Lake	2.0	NM	—
CA-MOD-1461	44	193	-	SC (1N/34W)	0.0	0.0	PPT	Unknown B	3.0	NM	—
CA-MOD-1461	44	195	-	SC (2N/34W)	0.0	0.0	PPT	East Medicine Lake	3.0	NM	—
CA-MOD-1461	44	196	-	SC (2N/34W)	0.0	0.0	PPT	East Medicine Lake	4.0	NM	—
CA-MOD-1461	44	200	-	SC (5N/34W)	0.0	0.0	PPT	East Medicine Lake	1.4	NM	—
CA-MOD-1461	44	218	-	SC (5N/36W)	0.0	0.0	BIF	East Medicine Lake	2.0	NM	Grasshopper Group visual source
CA-MOD-1461	44	228	-	SC (5N/37W)	0.0	0.0	BIF	Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	233	-	SC (0N/38W)	0.0	0.0	BIF	Cougar Butte	0.9	NM	—
CA-MOD-1461	44	235	-	SC (1N/38W)	0.0	0.0	BIF	Sugar Hill	NM	NM	No OH measurement
CA-MOD-1461	44	236	-	SC (1N/38W)	0.0	0.0	PPT	Cougar Butte	2.7	NM	—
CA-MOD-1461	44	237	-	SC (1N/38W)	0.0	0.0	PPT	Buck Mountain	DH	NM	Weathered; Diffuse hydration
CA-MOD-1461	44	238	-	SC (1N/38W)	0.0	0.0	PPT	Buck Mountain	1.7	NM	—
CA-MOD-1461	44	293	-	SC (2N/21W)	0.0	0.0	EMP	Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	296	-	SC (5S/21W)	0.0	0.0	PPT	East Medicine Lake	1.5	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-1461	44	307	- SC (18S/23W)	0.0	0.0	PPT Grasshopper Group	NM	NM	No OH measurement
CA-MOD-1461	44	312	- SC (12S/24W)	0.0	0.0	BIF Buck Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	327	- SC (15S/26W)	0.0	0.0	PPT East Medicine Lake	1.0	NM	-
CA-MOD-1461	44	335	- SC (14S/27W)	0.0	0.0	BIF Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	356	- SC (11S/29W)	0.0	0.0	PPT East Medicine Lake	2.8	NM	-
CA-MOD-1461	44	360	- SC (13S/29W)	0.0	0.0	PPT East Medicine Lake	2.1	NM	-
CA-MOD-1461	44	369	- SC (3S/30W)	0.0	0.0	EMP Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	397	- SC (3S/32W)	0.0	0.0	EMP Cougar Butte	NM	NM	No OH measurement
CA-MOD-1461	44	409	- SC (0S/33W)	0.0	0.0	EMP Basalt	NM	NM	No OH measurement
CA-MOD-1461	44	413	- SC (3S/33W)	0.0	0.0	PPT Basalt	NM	NM	No OH measurement
CA-MOD-1461	44	415	- SC (4S/33W)	0.0	0.0	PPT Cougar Butte	1.7	NM	Weathered
CA-MOD-1461	44	446	- SC (1S/35W)	0.0	0.0	PPT Glass Mountain	1.7	NM	-
CA-MOD-1461	44	447	- SC (1S/35W)	0.0	0.0	BIF Unknown B	NM	NM	No OH measurement
CA-MOD-1461	44	451	- SC (4S/35W)	0.0	0.0	EMP Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	452	- SC (5S/35W)	0.0	0.0	PPT Cougar Butte	NM	NM	Weathered
CA-MOD-1461	44	453	- SC (5S/35W)	0.0	0.0	PPT Cougar Butte/East Glass Mountain	3.4	NM	-
CA-MOD-1461	44	457	- SC (6S/35W)	0.0	0.0	BIF Glass Mountain	NVB	NM	No visible band
CA-MOD-1461	44	458	- SC (6S/35W)	0.0	0.0	EMP Glass Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	471	- SC (3S/35W)	0.0	0.0	PPT Cougar Butte	4.8	NM	Weathered
CA-MOD-1461	44	488	- SC (2S/37W)	0.0	0.0	PPT Unknown B	3.0	NM	-
CA-MOD-1461	44	490	- SC (2S/37W)	0.0	0.0	PPT Glass Mountain	2.1	NM	-
CA-MOD-1461	44	492	- SC (4S/37W)	0.0	0.0	PPT East Medicine Lake	1.2	NM	-
CA-MOD-1461	44	500	- SC (10S/37W)	0.0	0.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1461	44	506	- SC (3S/38W)	0.0	0.0	PPT Glass Mountain	NM	NM	Weathered
CA-MOD-1461	44	518	- SC (2S/39W)	0.0	0.0	PPT East Medicine Lake	2.0	NM	-
CA-MOD-1461	44	519	- SC (2S/39W)	0.0	0.0	PPT East Medicine Lake	NM	NM	No OH measurement
CA-MOD-1461	44	529	- SC (11S/39W)	0.0	0.0	PPT South Warners	1.9	NM	-
CA-MOD-1461	44	544	- SC (12S/86W)	0.0	0.0	DEB Glass Mountain	2.3	NM	-
CA-MOD-1461	44	546	A SC (9S/87W)	0.0	0.0	DEB Glass Mountain	1.7	NM	-
CA-MOD-1461	44	546	B SC (9S/87W)	0.0	0.0	DEB Glass Mountain	1.7	NM	-
CA-MOD-1461	44	546	C SC (9S/87W)	0.0	0.0	DEB Glass Mountain	NM	NM	Unreadable slide
CA-MOD-1461	44	548	- SC (10S/87W)	0.0	0.0	BIF Buck Mountain	NM	NM	No OH measurement
CA-MOD-1461	44	556	- SC (6N/33W)	0.0	0.0	PPT East Medicine Lake	3.4	NM	Weathered
CA-MOD-1461	44	576	- ISO	0.0	0.0	PPT East Medicine Lake	3.7	NM	Weathered
CA-MOD-1461	44	580	- ISO	0.0	0.0	PPT East Medicine Lake	3.7	NM	Weathered
CA-MOD-1461	44	581	- ISO	0.0	0.0	PPT East Medicine Lake	2.0	NM	-
CA-MOD-1461	44	590	- MRR 3 (5S/24W)	-10.0	-20.0	PPT Unknown C	NM	NM	No OH measurement
CA-MOD-1461	44	592	- STU 44 (22N/65W)	0.0	-10.0	BIF Unknown D	NM	NM	No OH measurement
CA-MOD-1461	44	633	- STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	634	- STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	635	- STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-MOD-1461	44	636	-	STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	637	-	STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	638	-	STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	639	-	STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	640	-	STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	641	-	STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	642	-	STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	643	-	STU 21 (14N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	644	-	MRR 2 (15N/66W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	645	-	MRR 2 (15N/66W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	646	-	MRR 2 (15N/66W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	647	-	MRR 2 (15N/66W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	648	-	MRR 2 (15N/66W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	649	-	MRR 2 (15N/66W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	650	-	STU 22 (15N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	651	-	STU 22 (15N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	652	-	STU 22 (15N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	653	-	STU 22 (15N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	654	-	STU 22 (15N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	655	-	STU 22 (15N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-1461	44	656	-	STU 22 (15N/59W)	0.0	-10.0	DEB Basalt	NM	NM	Basalt
CA-MOD-2555	12	11	-	STU 16 (140S/20W)	0.0	-10.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2555	12	19	-	STU 24 (275S/47E)	0.0	-10.0	PPT East Medicine Lake	2.9	NM	—
CA-MOD-2555	12	20	A	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	B	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	C	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	2.6	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	D	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	E	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	F	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	2.6	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	G	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	2.1	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	H	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	NVB	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	I	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2555	12	20	J	STU 24 (275S/47E)	0.0	-10.0	DEB East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2555	12	21	-	STU 24 (275S/47E)	-10.0	-20.0	PPT East Medicine Lake	1.8	NM	—
CA-MOD-2555	12	24	-	STU 24 (275S/47E)	-10.0	-20.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2555	12	31	-	STU 26 (275S/49W)	-10.0	-20.0	PPT Unknown A	1.5	NM	—
CA-MOD-2555	12	36	A	STU 30	0.0	-10.0	DEB East Medicine Lake	DH	NM	Grasshopper Group visual source
CA-MOD-2555	12	36	B	STU 30	0.0	-10.0	DEB East Medicine Lake	2.3	NM	Grasshopper Group visual source
CA-MOD-2555	12	36	C	STU 30	0.0	-10.0	DEB Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2555	12	36	D	STU 30	0.0	-10.0	DEB Grasshopper Group	4.1	NM	Visually assigned source
CA-MOD-2555	12	36	E	STU 30	0.0	-10.0	DEB East Medicine Lake	2.3	NM	Grasshopper Group visual source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-2555	12	36	F	STU 30	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2555	12	36	G	STU 30	0.0	-10.0	DEB	Grasshopper Group	4.5	NM	Visually assigned source
CA-MOD-2555	12	36	H	STU 30	0.0	-10.0	DEB	Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-2555	12	56	A	MRR 1 (131S/23W)	-50.0	-60.0	DEB	Grasshopper Group	4.3	NM	Visually assigned source
CA-MOD-2555	12	56	B	MRR 1 (131S/23W)	-50.0	-60.0	DEB	Grasshopper Group	3.8	NM	Visually assigned source
CA-MOD-2555	12	56	C	MRR 1 (131S/23W)	-50.0	-60.0	DEB	Grasshopper Group	3.5	NM	Visually assigned source
CA-MOD-2555	12	94	-	MRR 3 (275S/48E)	-10.0	-20.0	PPT	Buck Mountain	2.4	NM	—
CA-MOD-2555	12	131	-	ISO	0.0	0.0	PPT	GF/LIW/RS	1.3	NM	—
CA-MOD-2555	12	132	-	ISO	0.0	0.0	PPT	Blue Mountain	2.4	NM	—
CA-MOD-2555	12	133	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.5	NM	—
CA-MOD-2555	12	135	-	SCP 9	0.0	0.0	PPT	Cougar Butte	6.3	NM	—
CA-MOD-2555	12	310	-	EXU (7S/4E)	-50.0	-60.0	PPT	Cougar Butte	3.5	NM	—
CA-MOD-2555	12	359	A	EXU (8S/0W)	0.0	-10.0	DEB	Cougar Butte	4.0	NM	—
CA-MOD-2555	12	359	B	EXU (8S/0W)	0.0	-10.0	DEB	Cougar Butte	DH	NM	Weathered; Diffuse hydration
CA-MOD-2555	12	359	C	EXU (8S/0W)	0.0	-10.0	DEB	Cougar Butte	7.1	NM	—
CA-MOD-2555	12	359	D	EXU (8S/0W)	0.0	-10.0	DEB	Cougar Butte	4.8	NM	—
CA-MOD-2555	12	359	E	EXU (8S/0W)	0.0	-10.0	DEB	Cougar Butte	5.0	NM	—
CA-MOD-2555	12	362	A	EXU (8S/0W)	-20.0	-30.0	DEB	Cougar Butte	2.7	NM	—
CA-MOD-2555	12	362	B	EXU (8S/0W)	-20.0	-30.0	DEB	Cougar Butte	3.6	NM	—
CA-MOD-2555	12	362	C	EXU (8S/0W)	-20.0	-30.0	DEB	Cougar Butte	DH	NM	Weathered; Diffuse hydration
CA-MOD-2555	12	362	D	EXU (8S/0W)	-20.0	-30.0	DEB	Cougar Butte	3.8	NM	—
CA-MOD-2555	12	362	E	EXU (8S/0W)	-20.0	-30.0	DEB	Cougar Butte	4.1	NM	—
CA-MOD-2555	12	366	A	EXU (8S/0W)	-40.0	-50.0	DEB	Cougar Butte	3.7	NM	—
CA-MOD-2555	12	366	B	EXU (8S/0W)	-40.0	-50.0	DEB	Cougar Butte	3.7	NM	—
CA-MOD-2555	12	366	C	EXU (8S/0W)	-40.0	-50.0	DEB	Cougar Butte	3.7	NM	—
CA-MOD-2555	12	366	D	EXU (8S/0W)	-40.0	-50.0	DEB	Cougar Butte	3.7	NM	—
CA-MOD-2555	12	366	E	EXU (8S/0W)	-40.0	-50.0	DEB	Cougar Butte	3.8	NM	—
CA-MOD-2555	12	369	A	EXU (8S/0W)	-50.0	-60.0	DEB	Cougar Butte	3.5	NM	—
CA-MOD-2555	12	369	B	EXU (8S/0W)	-50.0	-60.0	DEB	Cougar Butte	DH	NM	Diffuse hydration
CA-MOD-2555	12	369	C	EXU (8S/0W)	-50.0	-60.0	DEB	Cougar Butte	2.6	NM	—
CA-MOD-2555	12	372	A	EXU (8S/0W)	-60.0	-70.0	DEB	Cougar Butte	5.0	NM	—
CA-MOD-2555	12	372	B	EXU (8S/0W)	-60.0	-70.0	DEB	Cougar Butte	3.0	NM	—
CA-MOD-2555	12	404	A	EXU (8S/3E)	-72.0	-84.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2555	12	404	B	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.3	NM	—
CA-MOD-2555	12	404	C	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.4	NM	—
CA-MOD-2555	12	404	D	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.2	NM	—
CA-MOD-2555	12	404	E	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.1	NM	—
CA-MOD-2555	12	404	F	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.8	NM	—
CA-MOD-2555	12	404	G	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.2	NM	—
CA-MOD-2555	12	404	H	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.2	NM	—
CA-MOD-2555	12	404	I	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.3	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-2555	12	404	J	EXU (8S/3E)	-72.0	-84.0	DEB	Cougar Butte	3.6	NM	—
CA-MOD-2555	12	410	-	EXU (8S/2E)	-80.0	-90.0	PPT	Cougar Butte	3.9	NM	—
CA-MOD-2555	12	412	A	EXU (8S/3E)	-90.0	-100.0	DEB	Cougar Butte	3.6	NM	—
CA-MOD-2555	12	412	B	EXU (8S/3E)	-90.0	-100.0	DEB	Cougar Butte	3.6	NM	—
CA-MOD-2555	12	412	C	EXU (8S/3E)	-90.0	-100.0	DEB	Cougar Butte	3.6	NM	—
CA-MOD-2555	12	412	D	EXU (8S/3E)	-90.0	-100.0	DEB	Cougar Butte	3.6	NM	—
CA-MOD-2555	12	412	E	EXU (8S/3E)	-90.0	-100.0	DEB	Cougar Butte	3.9	NM	—
CA-MOD-2555	12	416	A	MRR (8S/3E)	-110.0	-120.0	DEB	Cougar Butte	3.6	NM	—
CA-MOD-2555	12	416	B	MRR (8S/3E)	-110.0	-120.0	DEB	Cougar Butte	1.6	NM	—
CA-MOD-2555	12	416	C	MRR (8S/3E)	-110.0	-120.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2555	12	416	D	MRR (8S/3E)	-110.0	-120.0	DEB	Cougar Butte	2.8	NM	—
CA-MOD-2555	12	416	E	MRR (8S/3E)	-110.0	-120.0	DEB	Cougar Butte	3.1	NM	—
CA-MOD-2555	12	419	A	CME (8S/3E)	-130.0	-140.0	DEB	Cougar Butte	3.5	NM	—
CA-MOD-2555	12	419	B	CME (8S/3E)	-130.0	-140.0	DEB	Cougar Butte	3.1	NM	—
CA-MOD-2555	12	419	C	CME (8S/3E)	-130.0	-140.0	DEB	Cougar Butte	3.7	NM	—
CA-MOD-2555	12	419	D	CME (8S/3E)	-130.0	-140.0	DEB	East Medicine Lake	3.4	NM	—
CA-MOD-2555	12	419	E	CME (8S/3E)	-130.0	-140.0	DEB	Cougar Butte	3.6	NM	—
CA-MOD-2555	12	479	-	EXU (9S/2E)	-10.0	-20.0	PPT	Cougar Butte	5.9	NM	—
CA-MOD-2555	12	530	A	EXU (334S/9W)	0.0	-10.0	DEB	East Medicine Lake	3.8	NM	—
CA-MOD-2555	12	530	B	EXU (334S/9W)	0.0	-10.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-2555	12	530	C	EXU (334S/9W)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2555	12	530	D	EXU (334S/9W)	0.0	-10.0	DEB	East Medicine Lake	4.2	NM	—
CA-MOD-2555	12	530	E	EXU (334S/9W)	0.0	-10.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-2555	12	537	A	EXU (334S/9W)	-20.0	-30.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2555	12	537	B	EXU (334S/9W)	-20.0	-30.0	DEB	Cougar Butte	2.8	NM	—
CA-MOD-2555	12	537	C	EXU (334S/9W)	-20.0	-30.0	DEB	Cougar Butte	5.7	NM	—
CA-MOD-2555	12	537	D	EXU (334S/9W)	-20.0	-30.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2555	12	537	E	EXU (334S/9W)	-20.0	-30.0	DEB	Cougar Butte	4.4	NM	—
CA-MOD-2555	12	542	A	EXU (334S/9W)	-40.0	-50.0	DEB	Cougar Butte	5.4	NM	—
CA-MOD-2555	12	542	B	EXU (334S/9W)	-40.0	-50.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2555	12	542	C	EXU (334S/9W)	-40.0	-50.0	DEB	East Medicine Lake	3.8	NM	—
CA-MOD-2555	12	542	D	EXU (334S/9W)	-40.0	-50.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2555	12	542	E	EXU (334S/9W)	-40.0	-50.0	DEB	East Medicine Lake	4.6	NM	—
CA-MOD-2555	12	544	A	EXU (334S/9W)	-60.0	-70.0	DEB	Cougar Butte	4.3	NM	—
CA-MOD-2555	12	544	B	EXU (334S/9W)	-60.0	-70.0	DEB	Cougar Butte	4.0	NM	—
CA-MOD-2555	12	544	C	EXU (334S/9W)	-60.0	-70.0	DEB	Cougar Butte	4.2	NM	—
CA-MOD-2555	12	544	D	EXU (334S/9W)	-60.0	-70.0	DEB	Cougar Butte	3.2	NM	—
CA-MOD-2555	12	544	E	EXU (334S/9W)	-60.0	-70.0	DEB	East Medicine Lake	2.6	NM	—
CA-MOD-2556	13	3	A	STU 6 (150N/0E)	0.0	-10.0	DEB	East Medicine Lake	3.9	NM	Grasshopper Group visual source
CA-MOD-2556	13	3	B	STU 6 (150N/0E)	0.0	-10.0	DEB	Grasshopper Group	3.2	NM	Visually assigned source
CA-MOD-2556	13	23	A	STU 55 (15N/12E)	0.0	-10.0	DEB	East Medicine Lake	2.5	NM	Grasshopper Group visual source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot Spec Item Unit			Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
	1	2			1			2			
CA-MOD-2556	13	23	B	STU 55 (15N/12E)	0.0	-10.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2556	13	23	C	STU 55 (15N/12E)	0.0	-10.0	DEB	East Medicine Lake	2.3	NM	Grasshopper Group visual source
CA-MOD-2556	13	23	D	STU 55 (15N/12E)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2556	13	23	E	STU 55 (15N/12E)	0.0	-10.0	DEB	East Medicine Lake	2.7	NM	Grasshopper Group visual source
CA-MOD-2556	13	23	F	STU 55 (15N/12E)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2556	13	23	G	STU 55 (15N/12E)	0.0	-10.0	DEB	East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2556	13	23	H	STU 55 (15N/12E)	0.0	-10.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2556	13	32	-	STU 45 (30N/12E)	0.0	-10.0	PPT	Grasshopper Group	3.3	NM	Visually assigned source
CA-MOD-2556	13	33	-	STU 45 (30N/12E)	0.0	-10.0	PPT	East Medicine Lake	4.2	NM	—
CA-MOD-2556	13	41	A	STU 54 (23N/12E)	0.0	-10.0	DEB	East Medicine Lake	2.9	NM	Grasshopper Group visual source
CA-MOD-2556	13	41	B	STU 54 (23N/12E)	0.0	-10.0	DEB	Grasshopper Group	1.4	NM	Visually assigned source
CA-MOD-2556	13	41	C	STU 54 (23N/12E)	0.0	-10.0	DEB	East Medicine Lake	3.0	NM	Grasshopper Group visual source
CA-MOD-2556	13	41	D	STU 54 (23N/12E)	0.0	-10.0	DEB	Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-2556	13	41	E	STU 54 (23N/12E)	0.0	-10.0	DEB	Grasshopper Group	DH	NM	Visually assigned source; Weathered
CA-MOD-2556	13	63	-	MRR 4 (321N/25.5W)	-20.0	-30.0	PPT	East Medicine Lake	4.1	NM	Weathered
CA-MOD-2556	13	76	-	ISO	0.0	0.0	BIF	East Medicine Lake	NM	NM	Weathered
CA-MOD-2556	13	77	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.6	NM	—
CA-MOD-2556	13	84	-	ISO	0.0	0.0	PPT	East Medicine Lake	DH	NM	—
CA-MOD-2556	13	85	-	ISO	0.0	0.0	PPT	East Medicine Lake	4.5	NM	—
CA-MOD-2556	13	87	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.8	NM	—
CA-MOD-2556	13	88	-	ISO	0.0	0.0	BIF	Unknown A	NM	NM	No OH measurement
CA-MOD-2556	13	91	-	ISO	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2556	13	93	-	ISO	0.0	0.0	BIF	East Medicine Lake	2.9	NM	—
CA-MOD-2557	19	4	A	STU 5 (100S/0W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	4	B	STU 5 (100S/0W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	4	C	STU 5 (100S/0W)	0.0	-10.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2557	19	4	D	STU 5 (100S/0W)	0.0	-10.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2557	19	4	E	STU 5 (100S/0W)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2557	19	11	A	MRR 1 (100S/0E)	-10.0	-20.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	11	B	MRR 1 (100S/0E)	-10.0	-20.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	11	C	MRR 1 (100S/0E)	-10.0	-20.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	11	D	MRR 1 (100S/0E)	-10.0	-20.0	DEB	East Medicine Lake	2.0	NM	—
CA-MOD-2557	19	11	E	MRR 1 (100S/0E)	-10.0	-20.0	DEB	East Medicine Lake	2.0	NM	—
CA-MOD-2557	19	20	A	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	20	B	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	20	C	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	20	D	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	20	E	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Unreadable slide
CA-MOD-2557	19	20	F	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Unreadable slide
CA-MOD-2557	19	20	G	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	3.4	NM	—
CA-MOD-2557	19	20	H	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	3.4	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact	Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2557	19	20	I	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2557	19	20	J	MRR 2 (2S/45W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2557	19	21	A	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	21	B	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	NM	NM	—
CA-MOD-2557	19	21	C	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2557	19	21	D	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	21	E	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2557	19	21	F	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2557	19	21	G	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	1.7	NM	—
CA-MOD-2557	19	21	H	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	NM	NM	Unreadable slide
CA-MOD-2557	19	21	I	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	1.9	NM	—
CA-MOD-2557	19	21	J	MRR 2 (2S/45W)	-10.0	-20.0	DEB	East Medicine Lake	1.7	NM	—
CA-MOD-2557	19	27	-	ISO (1.7S/2.43E)	0.0	0.0	BIF	Blue Mountain	1.8	NM	—
CA-MOD-2558	20	3	A	STU 8 (40S/34W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2558	20	3	B	STU 8 (40S/34W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2558	20	3	C	STU 8 (40S/34W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2558	20	3	D	STU 8 (40S/34W)	0.0	-10.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2558	20	3	E	STU 8 (40S/34W)	0.0	-10.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2558	20	10	-	ISO	0.0	0.0	PPT	Blue Mountain	2.0	NM	—
CA-MOD-2558	20	11	-	ISO	0.0	0.0	BIF	East Medicine Lake	NM	NM	Unreadable slide
CA-MOD-2559	21	3	-	STU 2 (10N/10W)	0.0	-10.0	PPT	East Medicine Lake	4.0	NM	—
CA-MOD-2559	21	33	A	STU 29 (70S/10W)	0.0	-10.0	DEB	Grasshopper Group	6.3	NM	Visually assigned source
CA-MOD-2559	21	33	B	STU 29 (70S/10W)	0.0	-10.0	DEB	Grasshopper Group	5.3	NM	Visually assigned source
CA-MOD-2559	21	33	C	STU 29 (70S/10W)	0.0	-10.0	DEB	Grasshopper Group	5.2	NM	Visually assigned source
CA-MOD-2559	21	33	D	STU 29 (70S/10W)	0.0	-10.0	DEB	East Medicine Lake	6.2	NM	Grasshopper Group visual source
CA-MOD-2559	21	33	E	STU 29 (70S/10W)	0.0	-10.0	DEB	Grasshopper Group	5.0	NM	Visually assigned source
CA-MOD-2559	21	33	F	STU 29 (70S/10W)	0.0	-10.0	DEB	East Medicine Lake	5.6	NM	Grasshopper Group visual source
CA-MOD-2559	21	33	G	STU 29 (70S/10W)	0.0	-10.0	DEB	Grasshopper Group	4.7	NM	Visually assigned source
CA-MOD-2559	21	33	H	STU 29 (70S/10W)	0.0	-10.0	DEB	East Medicine Lake	6.7	NM	Grasshopper Group visual source
CA-MOD-2559	21	33	I	STU 29 (70S/10W)	0.0	-10.0	DEB	East Medicine Lake	24.0	5.9	Grasshopper Group visual source
CA-MOD-2559	21	33	J	STU 29 (70S/10W)	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	Grasshopper Group visual source
CA-MOD-2559	21	35	-	STU 30 (80S/10W)	0.0	-10.0	PPT	East Medicine Lake	3.8	NM	—
CA-MOD-2559	21	110	A	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2559	21	110	B	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	2.7	NM	Grasshopper Group visual source
CA-MOD-2559	21	110	C	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	2.8	NM	Grasshopper Group visual source
CA-MOD-2559	21	110	D	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	2.0	NM	Grasshopper Group visual source
CA-MOD-2559	21	110	E	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	1.5	NM	Grasshopper Group visual source
CA-MOD-2559	21	110	F	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	2.3	NM	Grasshopper Group visual source
CA-MOD-2559	21	110	G	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2559	21	110	H	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	1.9	NM	Grasshopper Group visual source
CA-MOD-2559	21	110	I	STU 42 (46N/48W)	0.0	-10.0	DEB	East Medicine Lake	1.7	NM	Grasshopper Group visual source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-MOD-2559	21	110	J	STU 42 (46N/48W)	0.0	-10.0	DEB East Medicine Lake	1.6	NM	Grasshopper Group visual source
CA-MOD-2559	21	215	-	STU 93 (180S/70E)	0.0	-10.0	PPT Unknown A	1.6	NM	—
CA-MOD-2559	21	223	-	STU 94 (190S/70E)	0.0	-10.0	PPT East Medicine Lake	3.7	NM	Grasshopper Group visual source
CA-MOD-2559	21	323	A	MRR 6 (195S/63E)	0.0	-10.0	DEB East Medicine Lake	2.7	NM	—
CA-MOD-2559	21	323	B	MRR 6 (195S/63E)	0.0	-10.0	DEB East Medicine Lake	DH	NM	—
CA-MOD-2559	21	323	C	MRR 6 (195S/63E)	0.0	-10.0	DEB Cougar Butte	DH	NM	—
CA-MOD-2559	21	323	D	MRR 6 (195S/63E)	0.0	-10.0	DEB East Medicine Lake	DH	NM	—
CA-MOD-2559	21	323	E	MRR 6 (195S/63E)	0.0	-10.0	DEB East Medicine Lake	2.7	NM	—
CA-MOD-2559	21	326	A	MRR 6 (195S/63E)	-10.0	-20.0	DEB East Medicine Lake	5.2	NM	—
CA-MOD-2559	21	326	B	MRR 6 (195S/63E)	-10.0	-20.0	DEB East Medicine Lake	DH	NM	Weathered
CA-MOD-2559	21	326	C	MRR 6 (195S/63E)	-10.0	-20.0	DEB East Medicine Lake	5.2	NM	—
CA-MOD-2559	21	326	D	MRR 6 (195S/63E)	-10.0	-20.0	DEB East Medicine Lake	5.3	NM	—
CA-MOD-2559	21	326	E	MRR 6 (195S/63E)	-10.0	-20.0	DEB East Medicine Lake	5.2	NM	—
CA-MOD-2559	21	329	-	MRR 7 (124° 0', 172.0 m from Datum A)	0.0	-10.0	PPT Blue Mountain	3.4	NM	—
CA-MOD-2559	21	332	A	MRR 7 (124° 0', 172.0 m from Datum A)	0.0	-10.0	DEB East Medicine Lake	2.9	NM	—
CA-MOD-2559	21	332	B	MRR 7 (124° 0', 172.0 m from Datum A)	0.0	-10.0	DEB East Medicine Lake	DH	NM	—
CA-MOD-2559	21	332	C	MRR 7 (124° 0', 172.0 m from Datum A)	0.0	-10.0	DEB East Medicine Lake	5.3	NM	—
CA-MOD-2559	21	332	D	MRR 7 (124° 0', 172.0 m from Datum A)	0.0	-10.0	DEB East Medicine Lake	5.3	NM	—
CA-MOD-2559	21	332	E	MRR 7 (124° 0', 172.0 m from Datum A)	0.0	-10.0	DEB East Medicine Lake	2.9	NM	—
CA-MOD-2559	21	347	A	MRR 7 (124° 0', 172.0 m from Datum A)	-30.0	-40.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2559	21	347	B	MRR 7 (124° 0', 172.0 m from Datum A)	-30.0	-40.0	DEB East Medicine Lake	4.2	NM	—
CA-MOD-2559	21	347	C	MRR 7 (124° 0', 172.0 m from Datum A)	-30.0	-40.0	DEB East Medicine Lake	4.2	NM	—
CA-MOD-2559	21	347	D	MRR 7 (124° 0', 172.0 m from Datum A)	-30.0	-40.0	DEB East Medicine Lake	4.2	NM	—
CA-MOD-2559	21	347	E	MRR 7 (124° 0', 172.0 m from Datum A)	-30.0	-40.0	DEB East Medicine Lake	4.7	NM	—
CA-MOD-2559	21	358	-	MRR 8 (256.8S/74E)	-20.0	-30.0	PPT East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2559	21	364	A	MRR (19N/15W)	-10.0	-20.0	DEB East Medicine Lake	6.2	7.7	—
CA-MOD-2559	21	364	B	MRR (19N/15W)	-10.0	-20.0	DEB East Medicine Lake	4.7	NM	—
CA-MOD-2559	21	364	C	MRR (19N/15W)	-10.0	-20.0	DEB East Medicine Lake	5.7	6.2	—
CA-MOD-2559	21	364	D	MRR (19N/15W)	-10.0	-20.0	DEB East Medicine Lake	5.8	NM	—
CA-MOD-2559	21	364	E	MRR (19N/15W)	-10.0	-20.0	DEB East Medicine Lake	5.6	NM	—
CA-MOD-2559	21	400	-	ISO	0.0	0.0	PPT East Medicine Lake	4.3	NM	Grasshopper Group visual source
CA-MOD-2559	21	404	-	ISO	0.0	0.0	PPT East Medicine Lake	NM	NM	—
CA-MOD-2559	21	415	-	ISO	0.0	0.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2559	21	416	-	ISO	0.0	0.0	PPT East Medicine Lake	2.8	NM	—
CA-MOD-2559	21	422	-	ISO	0.0	0.0	PPT Buck Mountain	4.8	NM	—
CA-MOD-2559	21	423	-	ISO	0.0	0.0	PPT Blue Mountain	1.8	NM	—
CA-MOD-2559	21	424	-	ISO	0.0	0.0	PPT GF/LIW/RS	7.1	NM	Grasshopper Group visual source
CA-MOD-2559	21	425	-	ISO	0.0	0.0	PPT East Medicine Lake	4.4	NM	Grasshopper Group visual source
CA-MOD-2559	21	426	-	ISO	0.0	0.0	PPT Blue Mountain	3.2	NM	—
CA-MOD-2559	21	427	-	ISO	0.0	0.0	BIF East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2559	21	429	-	ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2559	21	431	-	ISO	0.0	0.0	PPT	East Medicine Lake	3.4	NM	—
CA-MOD-2559	21	433	-	ISO	0.0	0.0	BIF	East Medicine Lake	4.4	NM	Grasshopper Group visual source
CA-MOD-2559	21	435	-	ISO	0.0	0.0	PPT	Blue Mountain	2.7	NM	—
CA-MOD-2559	21	442	-	ISO	0.0	0.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2559	21	448	-	ISO	0.0	0.0	BIF	East Medicine Lake	4.2	5.4	Grasshopper Group visual source
CA-MOD-2559	21	450	-	ISO	0.0	0.0	PPT	East Medicine Lake	6.5	NM	Grasshopper Group visual source
CA-MOD-2559	21	463	-	ISO	0.0	0.0	BIF	Cougar Butte	4.2	NM	—
CA-MOD-2559	21	464	-	ISO	0.0	0.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2559	21	465	-	ISO	0.0	0.0	COR	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2559	21	470	-	ISO	0.0	0.0	PPT	Cougar Butte	3.2	NM	—
CA-MOD-2559	21	471	-	ISO	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2559	21	480	-	ISO	0.0	0.0	DEB	East Medicine Lake	2.9	NM	Grasshopper Group visual source
CA-MOD-2559	21	509	A	MRR (19N/15W)	-20.0	-30.0	DEB	East Medicine Lake	6.3	NM	—
CA-MOD-2559	21	509	B	MRR (19N/15W)	-20.0	-30.0	DEB	East Medicine Lake	7.9	NM	—
CA-MOD-2559	21	509	C	MRR (19N/15W)	-20.0	-30.0	DEB	East Medicine Lake	DH	NM	—
CA-MOD-2559	21	509	D	MRR (19N/15W)	-20.0	-30.0	DEB	East Medicine Lake	5.3	NM	—
CA-MOD-2559	21	509	E	MRR (19N/15W)	-20.0	-30.0	DEB	East Medicine Lake	3.4	NM	—
CA-MOD-2559	21	530	A	EXU (41S/22E)	0.0	-10.0	DEB	East Medicine Lake	5.5	NM	—
CA-MOD-2559	21	530	B	EXU (41S/22E)	0.0	-10.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-2559	21	530	C	EXU (41S/22E)	0.0	-10.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-2559	21	530	D	EXU (41S/22E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Diffuse hydration
CA-MOD-2559	21	530	E	EXU (41S/22E)	0.0	-10.0	DEB	East Medicine Lake	1.9	NM	—
CA-MOD-2559	21	535	A	EXU (41S/22E)	-20.0	-30.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2559	21	535	B	EXU (41S/22E)	-20.0	-30.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-2559	21	535	C	EXU (41S/22E)	-20.0	-30.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-2559	21	535	D	EXU (41S/22E)	-20.0	-30.0	DEB	East Medicine Lake	2.0	NM	—
CA-MOD-2559	21	535	E	EXU (41S/22E)	-20.0	-30.0	DEB	East Medicine Lake	7.4	NM	—
CA-MOD-2559	21	537	A	EXU (41S/22E)	-40.0	-50.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-2559	21	537	B	EXU (41S/22E)	-40.0	-50.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-2559	21	537	C	EXU (41S/22E)	-40.0	-50.0	DEB	East Medicine Lake	5.5	NM	—
CA-MOD-2559	21	537	D	EXU (41S/22E)	-40.0	-50.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-2559	21	537	E	EXU (41S/22E)	-40.0	-50.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-2559	21	597	-	EXU (61S/15E)	-10.0	-20.0	PPT	East Medicine Lake	5.8	NM	—
CA-MOD-2559	21	690	-	EXU (59S/15E)	0.0	-10.0	PPT	Spodue Mountain	6.0	NM	—
CA-MOD-2559	21	719	A	EXU (71S/22E)	0.0	-10.0	DEB	East Medicine Lake	6.4	NM	—
CA-MOD-2559	21	719	B	EXU (71S/13E)	0.0	-10.0	DEB	East Medicine Lake	6.9	NM	Weathered
CA-MOD-2559	21	719	C	EXU (71S/13E)	0.0	-10.0	DEB	East Medicine Lake	6.1	NM	Weathered
CA-MOD-2559	21	719	D	EXU (71S/13E)	0.0	-10.0	DEB	East Medicine Lake	6.3	NM	—
CA-MOD-2559	21	719	E	EXU (71S/13E)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2559	21	728	A	EXU (71S/13E)	-20.0	-30.0	DEB	Cougar Butte	6.2	NM	—
CA-MOD-2559	21	728	B	EXU (71S/13E)	-20.0	-30.0	DEB	East Medicine Lake	3.0	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2559	21	728	C	EXU (71S/13E)	-20.0	-30.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-2559	21	728	D	EXU (71S/13E)	-20.0	-30.0	DEB	East Medicine Lake	6.1	NM	—
CA-MOD-2559	21	728	E	EXU (71S/13E)	-20.0	-30.0	DEB	East Medicine Lake	1.9	4.3	2 hydration bands
CA-MOD-2559	21	734	A	EXU (71S/13E)	-40.0	-50.0	DEB	Cougar Butte	8.2	NM	—
CA-MOD-2559	21	734	B	EXU (71S/13E)	-40.0	-50.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2559	21	734	C	EXU (71S/13E)	-40.0	-50.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-2559	21	734	D	EXU (71S/13E)	-40.0	-50.0	DEB	Cougar Butte	4.6	NM	—
CA-MOD-2559	21	734	E	EXU (71S/13E)	-40.0	-50.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-2559	21	735	A	EXU (64S/7W)	0.0	-10.0	DEB	East Medicine Lake	4.2	NM	—
CA-MOD-2559	21	735	B	EXU (64S/7W)	0.0	-10.0	DEB	East Medicine Lake	7.2	NM	—
CA-MOD-2559	21	735	C	EXU (64S/7W)	0.0	-10.0	DEB	East Medicine Lake	5.3	5.3	2 hydration bands
CA-MOD-2559	21	735	D	EXU (64S/7W)	0.0	-10.0	DEB	East Medicine Lake	4.6	NM	—
CA-MOD-2559	21	735	E	EXU (64S/7W)	0.0	-10.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2559	21	741	A	EXU (64S/7W)	-10.0	-20.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2559	21	741	B	EXU (64S/7W)	-10.0	-20.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-2559	21	741	C	EXU (64S/7W)	-10.0	-20.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2559	21	741	D	EXU (64S/7W)	-10.0	-20.0	DEB	East Medicine Lake	4.5	NM	—
CA-MOD-2559	21	741	E	EXU (64S/7W)	-10.0	-20.0	DEB	East Medicine Lake	5.2	NM	—
CA-MOD-2559	21	780	A	EXU (74S/8W)	0.0	-10.0	DEB	Cougar Butte	8.7	NM	—
CA-MOD-2559	21	780	B	EXU (74S/8W)	0.0	-10.0	DEB	East Medicine Lake	9.4	NM	—
CA-MOD-2559	21	780	C	EXU (74S/8W)	0.0	-10.0	DEB	East Medicine Lake	5.3	NM	—
CA-MOD-2559	21	780	D	EXU (74S/8W)	0.0	-10.0	DEB	Cougar Butte	3.7	NM	—
CA-MOD-2559	21	780	E	EXU (74S/8W)	0.0	-10.0	DEB	East Medicine Lake	6.1	NM	—
CA-MOD-2559	21	783	A	EXU (74S/8W)	-10.0	-20.0	DEB	East Medicine Lake	7.1	NM	—
CA-MOD-2559	21	783	B	EXU (74S/8W)	-10.0	-20.0	DEB	East Medicine Lake	5.9	NM	—
CA-MOD-2559	21	783	C	EXU (74S/8W)	-10.0	-20.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2559	21	783	D	EXU (74S/8W)	-10.0	-20.0	DEB	East Medicine Lake	NVB	NM	No visible band
CA-MOD-2559	21	783	E	EXU (74S/8W)	-10.0	-20.0	DEB	East Medicine Lake	3.9	NM	—
CA-MOD-2559	21	789	-	EXU (76S/8W)	0.0	-10.0	PPT	East Medicine Lake	5.6	NM	—
CA-MOD-2559	21	807	A	EXU (124S/35W)	0.0	-10.0	DEB	East Medicine Lake	6.2	NM	—
CA-MOD-2559	21	807	B	EXU (124S/35W)	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	—
CA-MOD-2559	21	807	C	EXU (124S/35W)	0.0	-10.0	DEB	East Medicine Lake	1.1	NM	—
CA-MOD-2559	21	807	D	EXU (124S/35W)	0.0	-10.0	DEB	East Medicine Lake	6.8	NM	—
CA-MOD-2559	21	807	E	EXU (124S/35W)	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	—
CA-MOD-2559	21	809	A	EXU (124S/35W)	-10.0	-20.0	DEB	Cougar Butte	6.8	NM	—
CA-MOD-2559	21	809	B	EXU (124S/35W)	-10.0	-20.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-2559	21	809	C	EXU (124S/35W)	-10.0	-20.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2559	21	809	D	EXU (124S/35W)	-10.0	-20.0	DEB	East Medicine Lake	DH	NM	Weathered
CA-MOD-2559	21	809	E	EXU (124S/35W)	-10.0	-20.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2559	21	826	-	SCP 110	0.0	0.0	PPT	East Medicine Lake	2.8	NM	Weathered
CA-MOD-2559	21	835	-	SCP 119	0.0	0.0	PPT	Cougar Butte	6.0	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-MOD-2559	21	838	-	SCP 122	0.0	0.0	PPT East Medicine Lake	4.1	NM	—
CA-MOD-2559	21	866	-	SCP 142	0.0	0.0	PPT East Medicine Lake	6.7	NM	—
CA-MOD-2560	27	13	A	STU 8 (240N/1W)	0.0	-10.0	DEB East Medicine Lake	DH	NM	Grasshopper Group visual source
CA-MOD-2560	27	13	B	STU 8 (240N/1W)	0.0	-10.0	DEB East Medicine Lake	5.1	NM	Grasshopper Group visual source
CA-MOD-2560	27	13	C	STU 8 (240N/1W)	0.0	-10.0	DEB East Medicine Lake	5.5	NM	Grasshopper Group visual source
CA-MOD-2560	27	13	D	STU 8 (240N/1W)	0.0	-10.0	DEB East Medicine Lake	6.5	NM	Grasshopper Group visual source
CA-MOD-2560	27	13	E	STU 8 (240N/1W)	0.0	-10.0	DEB Grasshopper Group	6.6	NM	Visually assigned source
CA-MOD-2560	27	13	F	STU 8 (240N/1W)	0.0	-10.0	DEB Grasshopper Group	NM	NM	Visually assigned source; Weathered
CA-MOD-2560	27	27	-	STU 14 (420N/1W)	0.0	-10.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2560	27	31	-	STU 14 (420N/1W)	0.0	0.0	BIF Glass Mountain	NM	NM	No OH measurement
CA-MOD-2560	27	52	-	STU 23 (300N/21W)	0.0	-10.0	PPT East Medicine Lake	4.6	1.5	2 hydration rims
CA-MOD-2560	27	56	-	STU 24 (330N/20W)	0.0	-10.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2560	27	191	-	STU 74 (20S/50W)	0.0	0.0	PPT Cougar Butte	1.7	NM	—
CA-MOD-2560	27	217	A	MRR 1 (34S/25E)	-10.0	-20.0	DEB East Medicine Lake	2.9	NM	Grasshopper Group visual source
CA-MOD-2560	27	217	B	MRR 1 (34S/25E)	-10.0	-20.0	DEB East Medicine Lake	4.2	NM	Grasshopper Group visual source
CA-MOD-2560	27	217	C	MRR 1 (34S/25E)	-10.0	-20.0	DEB Grasshopper Group	3.4	NM	Visually assigned source
CA-MOD-2560	27	217	D	MRR 1 (34S/25E)	-10.0	-20.0	DEB East Medicine Lake	3.6	NM	Grasshopper Group visual source
CA-MOD-2560	27	217	E	MRR 1 (34S/25E)	-10.0	-20.0	DEB Grasshopper Group	3.1	NM	Visually assigned source
CA-MOD-2560	27	217	F	MRR 1 (34S/25E)	-10.0	-20.0	DEB Grasshopper Group	2.9	NM	Visually assigned source
CA-MOD-2560	27	217	G	MRR 1 (34S/25E)	-10.0	-20.0	DEB Grasshopper Group	3.0	NM	Visually assigned source
CA-MOD-2560	27	217	H	MRR 1 (34S/25E)	-10.0	-20.0	DEB Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2560	27	217	I	MRR 1 (34S/25E)	-10.0	-20.0	DEB Grasshopper Group	3.3	NM	Visually assigned source
CA-MOD-2560	27	217	J	MRR 1 (34S/25E)	-10.0	-20.0	DEB Grasshopper Group	3.8	NM	Visually assigned source
CA-MOD-2560	27	222	A	MRR 1 (34S/25E)	-20.0	-30.0	DEB Grasshopper Group	3.0	NM	Visually assigned source
CA-MOD-2560	27	222	B	MRR 1 (34S/25E)	-20.0	-30.0	DEB Grasshopper Group	2.9	NM	Visually assigned source
CA-MOD-2560	27	222	C	MRR 1 (34S/25E)	-20.0	-30.0	DEB Grasshopper Group	3.3	NM	Visually assigned source
CA-MOD-2560	27	222	D	MRR 1 (34S/25E)	-20.0	-30.0	DEB Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-2560	27	222	E	MRR 1 (34S/25E)	-20.0	-30.0	DEB Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2560	27	222	F	MRR 1 (34S/25E)	-20.0	-30.0	DEB Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2560	27	222	G	MRR 1 (34S/25E)	-20.0	-30.0	DEB Grasshopper Group	2.6	NM	Visually assigned source
CA-MOD-2560	27	250	-	STU 112 (0N/110E)	0.0	-10.0	PPT East Medicine Lake	4.1	NM	—
CA-MOD-2560	27	256	A	STU 115 (20N/100E)	0.0	-10.0	DEB Grasshopper Group	3.2	NM	Visually assigned source
CA-MOD-2560	27	256	B	STU 115 (20N/100E)	0.0	-10.0	DEB East Medicine Lake	3.7	NM	Grasshopper Group visual source
CA-MOD-2560	27	256	C	STU 115 (20N/100E)	0.0	-10.0	DEB Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2560	27	256	D	STU 115 (20N/100E)	0.0	-10.0	DEB Grasshopper Group	DH	NM	Visually assigned source
CA-MOD-2560	27	256	E	STU 115 (20N/100E)	0.0	-10.0	DEB Grasshopper Group	1.2	NM	Visually assigned source
CA-MOD-2560	27	256	F	STU 115 (20N/100E)	0.0	-10.0	DEB Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2560	27	256	G	STU 115 (20N/100E)	0.0	-10.0	DEB Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2560	27	256	H	STU 115 (20N/100E)	0.0	-10.0	DEB East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2560	27	256	I	STU 115 (20N/100E)	0.0	-10.0	DEB Grasshopper Group	3.6	NM	Visually assigned source
CA-MOD-2560	27	256	J	STU 115 (20N/100E)	0.0	-10.0	DEB Grasshopper Group	3.7	NM	Visually assigned source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2560	27	256	K	STU 115 (20N/100E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	256	L	STU 115 (20N/100E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	256	M	STU 115 (20N/100E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	289	-	STU 124 (50N/80E)	0.0	-10.0	PFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	343	-	CME 1 (6N/6W)	-5.0	-15.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2560	27	351	-	CME 2 (5N/6W)	0.0	-10.0	PPT	East Medicine Lake	1.5	NM	Faint band
CA-MOD-2560	27	352	-	CME 2 (5N/6W)	0.0	-10.0	BIF	Buck Mountain	NM	NM	No OH measurement
CA-MOD-2560	27	353	-	CME 2 (5N/6W)	0.0	-10.0	PFT	Unknown A	NM	NM	No OH measurement
CA-MOD-2560	27	354	-	CME 2 (5N/6W)	0.0	-10.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	389	A	MRR 3 (10N/0E)	-10.0	-20.0	DEB	Grasshopper Group	1.2	NM	Visually assigned source
CA-MOD-2560	27	389	B	MRR 3 (10N/0E)	-10.0	-20.0	DEB	Grasshopper Group	2.1	NM	Visually assigned source
CA-MOD-2560	27	389	C	MRR 3 (10N/0E)	-10.0	-20.0	DEB	Grasshopper Group	1.2	NM	Visually assigned source
CA-MOD-2560	27	389	D	MRR 3 (10N/0E)	-10.0	-20.0	DEB	Grasshopper Group	1.1	NM	Visually assigned source
CA-MOD-2560	27	389	E	MRR 3 (10N/0E)	-10.0	-20.0	DEB	Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-2560	27	389	F	MRR 3 (10N/0E)	-10.0	-20.0	DEB	Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-2560	27	392	A	MRR 3 (10N/0E)	-10.0	-20.0	DEB	Grasshopper Group	1.8	NM	Visually assigned source
CA-MOD-2560	27	392	B	MRR 3 (10N/0E)	-10.0	-20.0	DEB	Grasshopper Group	1.9	NM	—
CA-MOD-2560	27	431	-	STU 152 (420N/25W)	0.0	-10.0	BIF	Glass Mountain	3.4	NM	—
CA-MOD-2560	27	438	-	STU 88 (296N/28W)	0.0	-10.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	439	-	STU 88 (296N/28W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	452	-	STU 93 (10N/0E)	0.0	-10.0	PPT	East Medicine Lake	2.7	NM	Faint band
CA-MOD-2560	27	462	-	STU 98 (0N/50W)	0.0	-10.0	BIF	Glass Mountain	NM	NM	No OH measurement
CA-MOD-2560	27	477	-	STU 147 (0N/140W)	0.0	-10.0	PPT	East Medicine Lake	NM	NM	Weathered
CA-MOD-2560	27	485	-	STU 150 (25S/131W)	0.0	-10.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2560	27	492	-	STU 151 (14S/135E)	0.0	-10.0	DEB	Glass Mountain	NM	NM	No OH measurement
CA-MOD-2560	27	515	-	SC (4.9N/4.9W)	0.0	0.0	PPT	Glass Mountain	NM	NM	No visible band
CA-MOD-2560	27	519	-	SC (4.8N/5.1W)	0.0	0.0	BIF	Cowhead Lake	NM	NM	No OH measurement
CA-MOD-2560	27	532	-	SC (6N/6W)	0.0	0.0	PPT	East Medicine Lake	1.3	NM	—
CA-MOD-2560	27	535	-	SC (5.1N/6W)	0.0	0.0	PPT	Unknown A	NM	NM	No OH measurement
CA-MOD-2560	27	536	-	SCU (5.6N/6.2W)	0.0	0.0	PPT	Buck Mountain	2.5	NM	—
CA-MOD-2560	27	552	-	SC (7.6N/5.1W)	0.0	0.0	PPT	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2560	27	587	-	ISO	0.0	0.0	PPT	Unknown A	3.8	NM	—
CA-MOD-2560	27	591	-	ISO	0.0	0.0	PPT	East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2560	27	592	-	ISO	0.0	0.0	BIF	Sugar Hill	NM	NM	No OH measurement
CA-MOD-2560	27	595	-	ISO	0.0	0.0	BIF	Spodue Mountain	NM	NM	No OH measurement
CA-MOD-2560	27	601	-	ISO	0.0	0.0	PPT	East Medicine Lake	DH	NM	Diffuse hydration; Weathered
CA-MOD-2560	27	606	-	ISO	0.0	0.0	PPT	Buck Mountain	2.8	NM	—
CA-MOD-2560	27	607	-	ISO	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	609	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.6	NM	Weathered
CA-MOD-2560	27	612	-	ISO	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	613	-	ISO	0.0	0.0	PPT	East Medicine Lake	4.9	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2560	27	614	-	ISO	0.0	0.0	PPT	Cougar Butte	2.8	NM	—
CA-MOD-2560	27	615	-	ISO	0.0	0.0	BIF	East Medicine Lake	2.8	NM	—
CA-MOD-2560	27	616	-	ISO	0.0	0.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2560	27	618	-	ISO	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	621	-	ISO	0.0	0.0	BIF	Glass Mountain	NM	NM	No OH measurement
CA-MOD-2560	27	623	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.7	NM	—
CA-MOD-2560	27	624	-	ISO	0.0	0.0	PPT	Unknown A	2.1	NM	—
CA-MOD-2560	27	627	-	ISO	0.0	0.0	PFT	Glass Mountain	NM	NM	No OH measurement
CA-MOD-2560	27	628	-	ISO	0.0	0.0	PPT	East Medicine Lake	2.1	NM	—
CA-MOD-2560	27	629	-	ISO	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2560	27	630	-	ISO	0.0	0.0	BIF	Glass Mountain	NM	NM	No OH measurement
CA-MOD-2560	27	650	-	SCP 51	0.0	0.0	PPT	East Medicine Lake	1.8	NM	Weathered
CA-MOD-2560	27	651	-	SCP 52	0.0	0.0	PPT	Buck Mountain	NVB	NM	Weathered
CA-MOD-2560	27	656	-	SCP 57	0.0	0.0	PPT	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	27	657	-	SCP 58	0.0	0.0	PPT	Glass Mountain	NVB	NM	Weathered
CA-MOD-2560	27	659	-	SCP 60	0.0	0.0	PPT	Spodue Mountain	2.3	NM	—
CA-MOD-2560	27	681	-	SCP 82	0.0	0.0	PPT	East Medicine Lake	3.8	NM	—
CA-MOD-2560	27	691	-	SCP 92	0.0	0.0	PPT	East Medicine Lake	4.2	NM	—
CA-MOD-2560	27	713	-	EXU (43N/32W)	0.0	-10.0	PPT	Buck Mountain	DH	NM	Diffuse hydration
CA-MOD-2560	27	737	-	EXU (43N/34W)	0.0	-10.0	PPT	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	27	748	-	EXU (43N/35W)	0.0	-10.0	PPT	East Medicine Lake	4.2	NM	—
CA-MOD-2560	27	751	-	EXU (43N/35W)	-10.0	-20.0	PPT	East Medicine Lake	2.6	NM	—
CA-MOD-2560	27	753	-	EXU (43N/35W)	0.0	-10.0	PPT	East Medicine Lake	2.0	NM	—
CA-MOD-2560	27	760	-	EXU (43N/35W)	-10.0	-20.0	PPT	East Medicine Lake	1.8	NM	—
CA-MOD-2560	27	763	A	EXU (44N/33W)	0.0	-10.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2560	27	763	B	EXU (44N/33W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2560	27	763	C	EXU (44N/33W)	0.0	-10.0	DEB	East Medicine Lake	2.6	NM	—
CA-MOD-2560	27	763	D	EXU (44N/33W)	0.0	-10.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2560	27	763	E	EXU (44N/33W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2560	27	772	A	EXU (44N/33W)	-10.0	-20.0	DEB	East Medicine Lake	1.3	NM	—
CA-MOD-2560	27	772	B	EXU (44N/33W)	-10.0	-20.0	DEB	East Medicine Lake	1.3	NM	—
CA-MOD-2560	27	772	C	EXU (44N/33W)	-10.0	-20.0	DEB	Glass Mountain	1.7	NM	—
CA-MOD-2560	27	772	D	EXU (44N/33W)	-10.0	-20.0	DEB	East Medicine Lake	2.1	NM	—
CA-MOD-2560	27	772	E	EXU (44N/33W)	-10.0	-20.0	DEB	East Medicine Lake	2.6	NM	—
CA-MOD-2560	27	775	A	EXU (41N/40W)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	27	775	B	EXU (41N/40W)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	27	775	C	EXU (41N/40W)	0.0	-10.0	DEB	Glass Mountain	1.2	NM	Weathered
CA-MOD-2560	27	775	D	EXU (41N/40W)	0.0	-10.0	DEB	East Medicine Lake	2.3	NM	—
CA-MOD-2560	27	775	E	EXU (41N/40W)	0.0	-10.0	DEB	Glass Mountain	1.3	NM	—
CA-MOD-2560	27	775	F	EXU (41N/40W)	0.0	-10.0	DEB	East Medicine Lake	3.2	NM	Weathered
CA-MOD-2560	27	775	G	EXU (41N/40W)	0.0	-10.0	DEB	Glass Mountain	2.5	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2560	27	775	H	EXU (41N/40W)	0.0	-10.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2560	27	777	A	EXU (41N/40W)	-10.0	-20.0	DEB	Glass Mountain	1.3	NM	—
CA-MOD-2560	27	777	B	EXU (41N/40W)	-10.0	-20.0	DEB	East Medicine Lake	1.8	NM	—
CA-MOD-2560	27	788	-	EXU (43N/40W)	0.0	-10.0	PPT	East Medicine Lake	2.3	NM	—
CA-MOD-2560	27	825	-	EXU (45N/41W)	0.0	-10.0	PPT	East Medicine Lake	2.7	NM	—
CA-MOD-2560	27	842	-	EXU (41N/42W)	0.0	-10.0	PPT	East Medicine Lake	1.7	NM	—
CA-MOD-2560	27	848	-	EXU (42N/42W)	0.0	-10.0	PPT	Glass Mountain	1.8	NM	—
CA-MOD-2560	27	849	-	EXU (42N/42W)	0.0	-10.0	PPT	East Medicine Lake	2.5	NM	—
CA-MOD-2560	27	883	-	EXU (41N/43W)	0.0	-10.0	PPT	East Medicine Lake	1.8	NM	—
CA-MOD-2560	27	905	-	EXU (41N/44W)	0.0	-10.0	PPT	Unknown B	NVB	NM	No visible band
CA-MOD-2560	27	912	-	EXU (41N/44W)	-10.0	-20.0	PPT	East Medicine Lake	1.2	NM	—
CA-MOD-2560	27	919	-	EXU (42N/44W)	-10.0	-18.0	PPT	East Medicine Lake	1.6	NM	—
CA-MOD-2560	27	925	-	EXU (43N/44W)	-10.0	-18.0	PPT	East Medicine Lake	1.7	NM	—
CA-MOD-2560	27	930	-	EXU (44N/44W)	0.0	-10.0	PPT	Unknown C	2.4	NM	—
CA-MOD-2560	27	948	-	EXU (41N/45W)	0.0	-10.0	PPT	Buck Mountain	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	27	949	-	EXU (41N/45W)	0.0	-10.0	PPT	East Medicine Lake	2.6	NM	—
CA-MOD-2560	27	953	-	EXU (42N/45W)	0.0	-10.0	PPT	East Medicine Lake	2.8	NM	—
CA-MOD-2560	27	954	-	EXU (42N/45W)	0.0	-10.0	PPT	East Medicine Lake	2.4	NM	—
CA-MOD-2560	27	964	-	EXU (44N/45W)	0.0	-10.0	PPT	East Medicine Lake	2.4	NM	—
CA-MOD-2560	27	973	A	EXU (77N/33W)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	27	973	B	EXU (77N/33W)	0.0	-10.0	DEB	East Medicine Lake	2.9	NM	—
CA-MOD-2560	27	973	C	EXU (77N/33W)	0.0	-10.0	DEB	East Medicine Lake	3.8	NM	—
CA-MOD-2560	27	973	D	EXU (77N/33W)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	27	973	E	EXU (77N/33W)	0.0	-10.0	DEB	Grasshopper Group	2.5	NM	—
CA-MOD-2560	27	974	A	EXU (77N/33W)	-10.0	-20.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2560	27	974	B	EXU (77N/33W)	-10.0	-20.0	DEB	East Medicine Lake	2.3	NM	—
CA-MOD-2560	27	974	C	EXU (77N/33W)	-10.0	-20.0	DEB	Cougar Butte	5.3	NM	—
CA-MOD-2560	27	974	D	EXU (77N/33W)	-10.0	-20.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2560	27	974	E	EXU (77N/33W)	-10.0	-20.0	DEB	Cougar Butte	5.0	NM	—
CA-MOD-2560	27	982	-	MRR (101N/51W)	0.0	-10.0	BIF	East Medicine Lake	2.0	NM	—
CA-MOD-2560	27	993	-	MRR (102N/51W)	-10.0	-20.0	BIF	East Medicine Lake	3.6	NM	—
CA-MOD-2560	27	1008	-	MRR (102N/50W)	-10.0	-20.0	BIF	East Medicine Lake	2.9	NM	—
CA-MOD-2560	27	1009	-	MRR (102N/50W)	-10.0	-20.0	BIF	East Medicine Lake	3.0	NM	—
CA-MOD-2560	27	1011	A	CME (103N/50W)	0.0	-10.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2560	27	1011	B	CME (103N/50W)	0.0	-10.0	DEB	East Medicine Lake	3.4	NM	—
CA-MOD-2560	27	1011	C	CME (103N/50W)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2560	27	1011	D	CME (103N/50W)	0.0	-10.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2560	27	1011	E	CME (103N/50W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2560	27	1016	A	CME (103N/50W)	-10.0	-20.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2560	27	1016	B	CME (103N/50W)	-10.0	-20.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2560	27	1016	C	CME (103N/50W)	-10.0	-20.0	DEB	East Medicine Lake	2.7	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-2560	271016	D	CME	(103N/50W)	-10.0	-20.0	DEB	East Medicine Lake	2.9	NM	—
CA-MOD-2560	271016	E	CME	(103N/50W)	-10.0	-20.0	DEB	East Medicine Lake	2.9	NM	—
CA-MOD-2560	271017	A	CME	(103N/50W)	-20.0	-30.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2560	271017	B	CME	(103N/50W)	-20.0	-30.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2560	271017	C	CME	(103N/50W)	-20.0	-30.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2560	271017	D	CME	(103N/50W)	-20.0	-30.0	DEB	East Medicine Lake	2.6	NM	—
CA-MOD-2560	271017	E	CME	(103N/50W)	-20.0	-30.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-2560	271018	A	CME	(103N/50W)	-30.0	-40.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2560	271018	B	CME	(103N/50W)	-30.0	-40.0	DEB	East Medicine Lake	2.0	NM	—
CA-MOD-2560	271018	C	CME	(103N/50W)	-30.0	-40.0	DEB	East Medicine Lake	2.0	NM	—
CA-MOD-2560	271018	D	CME	(103N/50W)	-30.0	-40.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2560	271018	E	CME	(103N/50W)	-30.0	-40.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2560	271025	-	EXU	(123N/54W)	0.0	-10.0	PPT	Buck Mountain	2.2	NM	—
CA-MOD-2560	271028	A	EXU	(124N/54W)	0.0	-10.0	DEB	East Medicine Lake	2.0	NM	Weathered
CA-MOD-2560	271028	B	EXU	(124N/54W)	0.0	-10.0	DEB	Cougar Butte	2.7	NM	Weathered
CA-MOD-2560	271028	C	EXU	(124N/54W)	0.0	-10.0	DEB	Glass Mountain	2.1	NM	—
CA-MOD-2560	271028	D	EXU	(124N/54W)	0.0	-10.0	DEB	Glass Mountain	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	271028	E	EXU	(124N/54W)	0.0	-10.0	DEB	Glass Mountain	2.3	NM	—
CA-MOD-2560	271031	A	EXU	(124N/54W)	-10.0	-20.0	DEB	East Medicine Lake	1.8	NM	—
CA-MOD-2560	271031	B	EXU	(124N/54W)	-10.0	-20.0	DEB	Cougar Butte	1.6	NM	—
CA-MOD-2560	271031	C	EXU	(124N/54W)	-10.0	-20.0	DEB	Cougar Butte	1.9	NM	—
CA-MOD-2560	271031	D	EXU	(124N/54W)	-10.0	-20.0	DEB	East Medicine Lake	1.9	NM	Weathered
CA-MOD-2560	271031	E	EXU	(124N/54W)	-10.0	-20.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-2560	271043	-	EXU	(60S/9E)	-10.0	-20.0	PPT	East Medicine Lake	1.3	NM	—
CA-MOD-2560	271065	A	EXU	(61S/10E)	0.0	-10.0	DEB	East Medicine Lake	1.3	NM	—
CA-MOD-2560	271065	B	EXU	(61S/10E)	0.0	-10.0	DEB	East Medicine Lake	1.8	NM	—
CA-MOD-2560	271065	C	EXU	(61S/10E)	0.0	-10.0	DEB	East Medicine Lake	2.2	NM	—
CA-MOD-2560	271065	D	EXU	(61S/10E)	0.0	-10.0	DEB	East Medicine Lake	2.1	NM	—
CA-MOD-2560	271065	E	EXU	(61S/10E)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2560	271066	-	EXU	(61S/10E)	0.0	-10.0	PPT	East Medicine Lake	2.8	NM	—
CA-MOD-2560	271068	A	EXU	(61S/10E)	-10.0	-20.0	DEB	Glass Mountain	1.8	NM	—
CA-MOD-2560	271068	B	EXU	(61S/10E)	-10.0	-20.0	DEB	East Medicine Lake	1.9	NM	—
CA-MOD-2560	271068	C	EXU	(61S/10E)	-10.0	-20.0	DEB	East Medicine Lake	1.8	NM	Weathered
CA-MOD-2560	271068	D	EXU	(61S/10E)	-10.0	-20.0	DEB	Glass Mountain	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	271068	E	EXU	(61S/10E)	-10.0	-20.0	DEB	Glass Mountain	1.8	NM	—
CA-MOD-2560	271068	F	EXU	(61S/10E)	-10.0	-20.0	DEB	Glass Mountain	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	271070	A	EXU	(61S/10E)	-20.0	-30.0	DEB	Glass Mountain	1.5	NM	—
CA-MOD-2560	271070	B	EXU	(61S/10E)	-20.0	-30.0	DEB	East Medicine Lake	1.7	NM	—
CA-MOD-2560	271070	C	EXU	(61S/10E)	-20.0	-30.0	DEB	East Medicine Lake	2.0	NM	—
CA-MOD-2560	271070	D	EXU	(61S/10E)	-20.0	-30.0	DEB	East Medicine Lake	1.8	NM	—
CA-MOD-2560	271070	E	EXU	(61S/10E)	-20.0	-30.0	DEB	GF/LIW/RS	1.8	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-MOD-2560	271070	F	EXU (61S/10E)	-20.0	-30.0	DEB	Glass Mountain	1.9	NM	—
CA-MOD-2560	271070	G	EXU (61S/10E)	-20.0	-30.0	DEB	East Medicine Lake	1.7	NM	—
CA-MOD-2560	271071	A	EXU (61S/10E)	-30.0	-40.0	DEB	Glass Mountain	3.1	NM	—
CA-MOD-2560	271071	B	EXU (61S/10E)	-30.0	-40.0	DEB	Glass Mountain	1.7	NM	—
CA-MOD-2560	271117	A	EXU (104S/55E)	0.0	-10.0	DEB	Cougar Butte	2.5	NM	—
CA-MOD-2560	271117	B	EXU (104S/55E)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	271117	C	EXU (104S/55E)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2560	271117	D	EXU (104S/55E)	0.0	-10.0	DEB	East Medicine Lake	6.6	NM	—
CA-MOD-2560	271117	E	EXU (104S/55E)	0.0	-10.0	DEB	Cougar Butte	2.6	NM	—
CA-MOD-2560	271117	F	EXU (104S/55E)	0.0	-10.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-2560	271117	G	EXU (104S/55E)	0.0	-10.0	DEB	Cougar Butte	2.7	NM	—
CA-MOD-2560	271117	H	EXU (104S/55E)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2560	271117	I	EXU (104S/55E)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2560	271117	J	EXU (104S/55E)	0.0	-10.0	DEB	East Medicine Lake	4.1	NM	—
CA-MOD-2560	271120	A	EXU (188S/68E)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	271120	B	EXU (188S/68E)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2560	271120	C	EXU (188S/68E)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	Weathered
CA-MOD-2560	271120	D	EXU (188S/68E)	0.0	-10.0	DEB	East Medicine Lake	2.6	NM	Weathered
CA-MOD-2560	271120	E	EXU (188S/68E)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2560	271121	-	EXU (188S/68E)	0.0	-10.0	PPT	East Medicine Lake	1.5	NM	Weathered
CA-MOD-2560	271122	A	EXU (188S/68E)	-10.0	-20.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2560	271122	B	EXU (188S/68E)	-10.0	-20.0	DEB	East Medicine Lake	3.4	NM	—
CA-MOD-2560	271122	C	EXU (188S/68E)	-10.0	-20.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-2560	271122	D	EXU (188S/68E)	-10.0	-20.0	DEB	East Medicine Lake	4.1	NM	—
CA-MOD-2560	271122	E	EXU (188S/68E)	-10.0	-20.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-2561	24 33	A	MRR (60S/0W)	-10.0	-20.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2561	24 33	B	MRR (60S/0W)	-10.0	-20.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2561	24 33	C	MRR (60S/0W)	-10.0	-20.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2561	24 33	D	MRR (60S/0W)	-10.0	-20.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-2561	24 33	E	MRR (60S/0W)	-10.0	-20.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-2561	24 38	A	MRR (60S/0W)	-30.0	-40.0	DEB	East Medicine Lake	3.0	NM	—
CA-MOD-2561	24 38	B	MRR (60S/0W)	-30.0	-40.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2561	24 38	C	MRR (60S/0W)	-30.0	-40.0	DEB	East Medicine Lake	3.6	4.7	—
CA-MOD-2561	24 38	D	MRR (60S/0W)	-30.0	-40.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2561	24 38	E	MRR (60S/0W)	-30.0	-40.0	DEB	East Medicine Lake	DH	NM	—
CA-MOD-2561	24 44	A	MRR (60S/0W)	-50.0	-60.0	DEB	East Medicine Lake	2.9	NM	—
CA-MOD-2561	24 44	B	MRR (60S/0W)	-50.0	-60.0	DEB	East Medicine Lake	3.9	NM	—
CA-MOD-2561	24 44	C	MRR (60S/0W)	-50.0	-60.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2561	24 46	A	MRR (60S/0W)	-60.0	-70.0	DEB	East Medicine Lake	2.9	NM	—
CA-MOD-2561	24 46	B	MRR (60S/0W)	-60.0	-70.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-2561	24 66	A	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	5.0	NM	Grasshopper Group visual source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-2561	24	66	B	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2561	24	66	C	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2561	24	66	D	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2561	24	66	E	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	3.2	NM	Grasshopper Group visual source
CA-MOD-2561	24	66	F	MRR (0N/4W)	-40.0	-50.0	DEB	Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2561	24	66	G	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2561	24	66	H	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2561	24	66	I	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2561	24	66	J	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	1.9	NM	Grasshopper Group visual source
CA-MOD-2561	24	66	K	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2561	24	66	L	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2561	24	66	M	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2561	24	66	N	MRR (0N/4W)	-40.0	-50.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2561	24	86	A	STU (1S/5W)	0.0	-10.0	DEB	East Medicine Lake	1.5	NM	Grasshopper Group visual source
CA-MOD-2561	24	86	B	STU (1S/5W)	0.0	-10.0	DEB	East Medicine Lake	3.5	NM	Grasshopper Group visual source
CA-MOD-2561	24	86	C	STU (1S/5W)	0.0	-10.0	DEB	Grasshopper Group	3.3	11.0	Visually assigned source
CA-MOD-2561	24	86	D	STU (1S/5W)	0.0	-10.0	DEB	East Medicine Lake	3.2	NM	Grasshopper Group visual source
CA-MOD-2561	24	86	E	STU (1S/5W)	0.0	-10.0	DEB	Grasshopper Group	1.9	NM	Visually assigned source; Weathered
CA-MOD-2561	24	86	F	STU (1S/5W)	0.0	-10.0	DEB	Grasshopper Group	2.9	NM	Visually assigned source
CA-MOD-2561	24	86	G	STU (1S/5W)	0.0	-10.0	DEB	Grasshopper Group	2.3	NM	Visually assigned source
CA-MOD-2561	24	86	H	STU (1S/5W)	0.0	-10.0	DEB	Grasshopper Group	3.1	NM	Visually assigned source
CA-MOD-2561	24	86	I	STU (1S/5W)	0.0	-10.0	DEB	East Medicine Lake	1.4	NM	Grasshopper Group visual source
CA-MOD-2561	24	86	J	STU (1S/5W)	0.0	-10.0	DEB	East Medicine Lake	3.4	NM	Grasshopper Group visual source
CA-MOD-2561	24	115	A	MRR (24S/8E)	-10.0	-20.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2561	24	115	B	MRR (24S/8E)	-10.0	-20.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2561	24	115	C	MRR (24S/8E)	-10.0	-20.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2561	24	115	D	MRR (24S/8E)	-10.0	-20.0	DEB	East Medicine Lake	2.6	NM	—
CA-MOD-2561	24	115	E	MRR (24S/8E)	-10.0	-20.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2562	25	1	-	STU 1(100S/0W)	0.0	-10.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	18	A	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2562	25	18	B	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-2562	25	18	C	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	18	D	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-2562	25	18	E	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	3.8	NM	—
CA-MOD-2562	25	18	F	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-2562	25	18	G	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2562	25	18	H	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	18	I	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-2562	25	18	J	EXU (12N/63W)	0.0	-10.0	DEB	East Medicine Lake	3.9	NM	—
CA-MOD-2562	25	29	-	STU 27	0.0	-10.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	31	-	STU 28 (84S/0W)	0.0	-10.0	PPT	East Medicine Lake	1.1	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-2562	25	34	- STU 28 (84S/0W)	0.0	-10.0	UFT East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	50	- MRR 3	0.0	-10.0	PPT East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	51	- MRR 3	0.0	-10.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	52	A MRR 3	0.0	-10.0	DEB East Medicine Lake	5.7	NM	Grasshopper Group visual source
CA-MOD-2562	25	52	B MRR 3	0.0	-10.0	DEB Grasshopper Group	1.3	NM	Visually assigned source
CA-MOD-2562	25	52	C MRR 3	0.0	-10.0	DEB East Medicine Lake	DH	NM	Grasshopper Group visual source
CA-MOD-2562	25	52	D MRR 3	0.0	-10.0	DEB East Medicine Lake	4.7	NM	Grasshopper Group visual source
CA-MOD-2562	25	52	E MRR 3	0.0	-10.0	DEB Grasshopper Group	DH	NM	Grasshopper Group visual source
CA-MOD-2562	25	52	F MRR 3	0.0	-10.0	DEB East Medicine Lake	2.0	NM	Grasshopper Group visual source
CA-MOD-2562	25	52	G MRR 3	0.0	-10.0	DEB East Medicine Lake	5.7	NM	Grasshopper Group visual source
CA-MOD-2562	25	52	H MRR 3	0.0	-10.0	DEB Grasshopper Group	5.7	NM	Visually assigned source
CA-MOD-2562	25	52	I MRR 3	0.0	-10.0	DEB East Medicine Lake	4.6	NM	Grasshopper Group visual source
CA-MOD-2562	25	52	J MRR 3	0.0	-10.0	DEB Grasshopper Group	4.6	NM	Visually assigned source
CA-MOD-2562	25	56	- MRR 3	-20.0	-30.0	PPT East Medicine Lake	7.0	NM	—
CA-MOD-2562	25	57	- MRR 3	-20.0	-30.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	58	- MRR 3	-20.0	-30.0	BIF Buck Mountain	NM	NM	No OH measurement
CA-MOD-2562	25	66	A MRR 3	-50.0	-60.0	DEB East Medicine Lake	4.5	NM	Grasshopper Group visual source
CA-MOD-2562	25	66	B MRR 3	-50.0	-60.0	DEB East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2562	25	66	C MRR 3	-50.0	-60.0	DEB East Medicine Lake	4.1	NM	Grasshopper Group visual source
CA-MOD-2562	25	66	D MRR 3	-50.0	-60.0	DEB East Medicine Lake	4.6	NM	Grasshopper Group visual source
CA-MOD-2562	25	66	E MRR 3	-50.0	-60.0	DEB Grasshopper Group	2.4	NM	Visually assigned source
CA-MOD-2562	25	66	F MRR 3	-50.0	-60.0	DEB Grasshopper Group	4.6	NM	Visually assigned source
CA-MOD-2562	25	66	G MRR 3	-50.0	-60.0	DEB Grasshopper Group	3.5	3.0	Visually assigned source
CA-MOD-2562	25	66	H MRR 3	-50.0	-60.0	DEB Grasshopper Group	3.6	NM	Visually assigned source
CA-MOD-2562	25	66	I MRR 3	-50.0	-60.0	DEB Grasshopper Group	5.5	NM	Visually assigned source
CA-MOD-2562	25	66	J MRR 3	-50.0	-60.0	DEB Grasshopper Group	4.4	NM	Visually assigned source
CA-MOD-2562	25	74	A MRR 4 (168N/2W)	0.0	0.0	DEB Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2562	25	74	B MRR 4 (168N/2W)	0.0	0.0	DEB East Medicine Lake	2.1	NM	Grasshopper Group visual source
CA-MOD-2562	25	74	C MRR 4 (168N/2W)	0.0	0.0	DEB Grasshopper Group	2.4	NM	Visually assigned source
CA-MOD-2562	25	74	D MRR 4 (168N/2W)	0.0	0.0	DEB Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-2562	25	74	E MRR 4 (168N/2W)	0.0	0.0	DEB Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-2562	25	74	F MRR 4 (168N/2W)	0.0	0.0	DEB Grasshopper Group	2.3	NM	Visually assigned source
CA-MOD-2562	25	74	G MRR 4 (168N/2W)	0.0	0.0	DEB Cougar Butte	2.6	NM	—
CA-MOD-2562	25	74	H MRR 4 (168N/2W)	0.0	0.0	DEB Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2562	25	74	I MRR 4 (168N/2W)	0.0	0.0	DEB Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2562	25	74	J MRR 4 (168N/2W)	0.0	0.0	DEB Grasshopper Group	2.5	NM	Visually assigned source
CA-MOD-2562	25	83	A MRR (570N/170E)	0.0	-10.0	DEB East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2562	25	83	B MRR (570N/170E)	0.0	-10.0	DEB East Medicine Lake	3.8	NM	—
CA-MOD-2562	25	83	C MRR (570N/170E)	0.0	-10.0	DEB East Medicine Lake	7.1	NM	—
CA-MOD-2562	25	86	- MRR 5	-10.0	-20.0	UFT East Medicine Lake	NM	NM	—
CA-MOD-2562	25	88	- MRR 5	-20.0	-30.0	PPT Cougar Butte	6.1	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-2562	25	89	- MRR 5	-20.0	-30.0	PPT East Medicine Lake	NM	NM	—
CA-MOD-2562	25	90	- MRR 5	-20.0	-30.0	UFT East Medicine Lake	6.2	4.3	3 rims; Rim 3=3.9; 0.04 microns
CA-MOD-2562	25	100	A MRR (570N/170E)	-30.0	-40.0	DEB East Medicine Lake	3.2	NM	—
CA-MOD-2562	25	100	B MRR (570N/170E)	-30.0	-40.0	DEB East Medicine Lake	3.8	NM	—
CA-MOD-2562	25	100	C MRR (570N/170E)	-30.0	-40.0	DEB East Medicine Lake	3.0	NM	—
CA-MOD-2562	25	117	- MRR 5	-50.0	-60.0	BIF East Medicine Lake	NM	NM	—
CA-MOD-2562	25	127	A MRR (570N/170E)	-80.0	-90.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2562	25	127	B MRR (570N/170E)	-80.0	-90.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2562	25	127	C MRR (570N/170E)	-80.0	-90.0	DEB East Medicine Lake	4.8	NM	—
CA-MOD-2562	25	127	D MRR (570N/170E)	-80.0	-90.0	DEB East Medicine Lake	4.8	NM	—
CA-MOD-2562	25	129	A EXU (4N/6E)	0.0	-10.0	DEB East Medicine Lake	4.1	NM	—
CA-MOD-2562	25	129	B EXU (4N/6E)	0.0	-10.0	DEB East Medicine Lake	3.9	NM	—
CA-MOD-2562	25	129	C EXU (4N/6E)	0.0	-10.0	DEB East Medicine Lake	3.4	NM	—
CA-MOD-2562	25	131	A EXU (4N/6E)	-20.0	-30.0	DEB East Medicine Lake	3.5	NM	—
CA-MOD-2562	25	131	B EXU (4N/6E)	-20.0	-30.0	DEB East Medicine Lake	3.7	NM	—
CA-MOD-2562	25	131	C EXU (4N/6E)	-20.0	-30.0	DEB East Medicine Lake	3.7	NM	—
CA-MOD-2562	25	132	A EXU (4N/6E)	-30.0	-40.0	DEB East Medicine Lake	3.0	NM	—
CA-MOD-2562	25	132	B EXU (4N/6E)	-30.0	-40.0	DEB East Medicine Lake	3.4	NM	—
CA-MOD-2562	25	132	C EXU (4N/6E)	-30.0	-40.0	DEB East Medicine Lake	3.8	NM	—
CA-MOD-2562	25	132	D EXU (4N/6E)	-30.0	-40.0	DEB East Medicine Lake	4.2	NM	—
CA-MOD-2562	25	141	- MRR 7	-20.0	-30.0	BIF East Medicine Lake	NM	NM	—
CA-MOD-2562	25	147	A MRR 8	0.0	-10.0	DEB East Medicine Lake	2.6	NM	Grasshopper Group visual source
CA-MOD-2562	25	147	B MRR 8	0.0	-10.0	DEB East Medicine Lake	3.4	NM	Grasshopper Group visual source
CA-MOD-2562	25	147	C MRR 8	0.0	-10.0	DEB East Medicine Lake	2.6	NM	Grasshopper Group visual source
CA-MOD-2562	25	147	D MRR 8	0.0	-10.0	DEB East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2562	25	147	E MRR 8	0.0	-10.0	DEB East Medicine Lake	3.6	NM	Grasshopper Group visual source
CA-MOD-2562	25	147	F MRR 8	0.0	-10.0	DEB East Medicine Lake	3.6	NM	Grasshopper Group visual source
CA-MOD-2562	25	147	G MRR 8	0.0	-10.0	DEB East Medicine Lake	2.7	NM	Grasshopper Group visual source
CA-MOD-2562	25	147	H MRR 8	0.0	-10.0	DEB East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2562	25	147	I MRR 8	0.0	-10.0	DEB Grasshopper Group	2.5	NM	Visually assigned source
CA-MOD-2562	25	147	J MRR 8	0.0	-10.0	DEB East Medicine Lake	3.4	NM	Grasshopper Group visual source
CA-MOD-2562	25	189	- ISO	0.0	0.0	PPT Cougar Butte	2.4	NM	—
CA-MOD-2562	25	190	- ISO	0.0	0.0	BIF Grasshopper Group	2.5	NM	—
CA-MOD-2562	25	191	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	192	- ISO	0.0	0.0	BIF Grasshopper Group	NM	NM	Unreadable slide
CA-MOD-2562	25	193	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	194	- ISO	0.0	0.0	PPT East Medicine Lake	2.7	NM	—
CA-MOD-2562	25	195	- ISO	0.0	0.0	PPT East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	196	- ISO	0.0	0.0	PPT Unknown A	2.4	NM	—
CA-MOD-2562	25	198	- ISO	0.0	0.0	PPT East Medicine Lake	3.5	NM	—
CA-MOD-2562	25	199	- ISO	0.0	0.0	PPT East Medicine Lake	NM	NM	No OH measurement

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-MOD-2562	25	200	-	ISO	0.0	0.0	BIF East Medicine Lake	2.2	NM	—
CA-MOD-2562	25	202	-	ISO	0.0	0.0	PPT Buck Mountain	2.5	NM	—
CA-MOD-2562	25	203	-	ISO	0.0	0.0	PPT Buck Mountain	DH	NM	No OH measurement
CA-MOD-2562	25	204	-	ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	205	-	ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	206	-	ISO	0.0	0.0	PPT Cougar Butte	2.5	NM	—
CA-MOD-2562	25	207	-	ISO	0.0	0.0	PPT East Medicine Lake	NM	NM	Weathered
CA-MOD-2562	25	209	-	ISO	0.0	0.0	PPT Tucker Hill	DH	NM	No OH measurement
CA-MOD-2562	25	210	-	ISO	0.0	0.0	PPT East Medicine Lake	2.2	NM	—
CA-MOD-2562	25	211	-	ISO	0.0	0.0	BIF East Medicine Lake	4.8	NM	—
CA-MOD-2562	25	212	-	ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	215	-	ISO	0.0	0.0	PPT East Medicine Lake	2.1	NM	—
CA-MOD-2562	25	216	-	ISO	0.0	0.0	PPT East Medicine Lake	4.0	NM	Weathered
CA-MOD-2562	25	217	-	ISO	0.0	0.0	PPT East Medicine Lake	2.7	NM	—
CA-MOD-2562	25	218	-	ISO	0.0	0.0	PPT East Medicine Lake	2.1	NM	—
CA-MOD-2562	25	221	-	ISO	0.0	0.0	BIF East Medicine Lake	2.2	NM	Grasshopper Group visual source
CA-MOD-2562	25	223	-	ISO	0.0	0.0	BIF East Medicine Lake	2.1	NM	Grasshopper Group visual source
CA-MOD-2562	25	225	-	MRR 7	0.0	0.0	BIF East Medicine Lake	2.4	NM	—
CA-MOD-2562	25	226	-	ISO	0.0	0.0	PPT East Medicine Lake	4.1	NM	—
CA-MOD-2562	25	229	-	ISO	0.0	0.0	PPT East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2562	25	230	-	ISO	0.0	0.0	PPT East Medicine Lake	3.9	NM	—
CA-MOD-2562	25	231	-	ISO	0.0	0.0	BIF East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2562	25	232	-	ISO	0.0	0.0	BIF East Medicine Lake	3.1	NM	Grasshopper Group visual source
CA-MOD-2562	25	236	-	ISO	0.0	0.0	BIF East Medicine Lake	2.9	NM	Grasshopper Group visual source
CA-MOD-2562	25	238	-	ISO	0.0	0.0	PPT East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2562	25	239	-	ISO	0.0	0.0	PPT Glass Mountain	1.9	NM	—
CA-MOD-2562	25	240	-	ISO	0.0	0.0	PPT East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2562	25	242	-	ISO	0.0	0.0	PPT East Medicine Lake	1.7	NM	Weathered
CA-MOD-2562	25	243	-	ISO	0.0	0.0	PPT East Medicine Lake	1.6	NM	Weathered
CA-MOD-2562	25	244	-	ISO	0.0	0.0	PPT East Medicine Lake	2.3	NM	—
CA-MOD-2562	25	245	-	ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2562	25	246	-	ISO	0.0	0.0	PPT Rainbow Mines	DH	NM	No OH measurement
CA-MOD-2562	25	247	-	ISO	0.0	0.0	PPT East Medicine Lake	2.3	NM	Weathered
CA-MOD-2562	25	251	-	ISO	0.0	0.0	BIF East Medicine Lake	2.1	NM	Grasshopper Group visual source
CA-MOD-2562	25	253	-	ISO	0.0	0.0	PPT East Medicine Lake	2.6	NM	—
CA-MOD-2562	25	254	-	ISO	0.0	0.0	PPT Buck Mountain	3.0	NM	—
CA-MOD-2562	25	255	-	ISO	0.0	0.0	BIF East Medicine Lake	4.1	NM	Grasshopper Group visual source
CA-MOD-2562	25	256	-	ISO	0.0	0.0	PPT East Medicine Lake	2.6	NM	Grasshopper Group visual source
CA-MOD-2562	25	257	-	ISO	0.0	0.0	PPT Buck Mountain	3.7	NM	—
CA-MOD-2562	25	259	-	ISO	0.0	0.0	PPT East Medicine Lake	2.5	NM	—
CA-MOD-2562	25	265	-	MRR 5	-50.0	-60.0	PPT Buck Mountain	NM	NM	No OH measurement

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
								1	2			
CA-MOD-2562	25	266	-	MRR	3	-10.0	-20.0	PPT	East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2562	25	269	-	SCP	74	0.0	0.0	PPT	East Medicine Lake	3.3	NM	—
CA-MOD-2562	25	271	-	SCP	76	0.0	0.0	PPT	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	283	A	EXU	(75N/1W)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	283	B	EXU	(75N/1W)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	283	C	EXU	(75N/1W)	0.0	-10.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2562	25	283	D	EXU	(75N/1W)	0.0	-10.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2562	25	283	E	EXU	(75N/1W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2562	25	287	A	EXU	(75N/1W)	-20.0	-30.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2562	25	287	B	EXU	(75N/1W)	-20.0	-30.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	287	C	EXU	(75N/1W)	-20.0	-30.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-2562	25	287	D	EXU	(75N/1W)	-20.0	-30.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	287	E	EXU	(75N/1W)	-20.0	-30.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	310	A	EXU	(99N/22W)	-10.0	-20.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2562	25	310	B	EXU	(99N/22W)	-10.0	-20.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2562	25	310	C	EXU	(99N/22W)	-10.0	-20.0	DEB	East Medicine Lake	4.2	NM	—
CA-MOD-2562	25	310	D	EXU	(99N/22W)	-10.0	-20.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2562	25	310	E	EXU	(99N/22W)	-10.0	-20.0	DEB	East Medicine Lake	2.2	NM	—
CA-MOD-2562	25	313	A	EXU	(99N/22W)	-40.0	-50.0	DEB	East Medicine Lake	2.6	NM	—
CA-MOD-2562	25	313	B	EXU	(99N/22W)	-40.0	-50.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2562	25	313	C	EXU	(99N/22W)	-40.0	-50.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2562	25	313	D	EXU	(99N/22W)	-40.0	-50.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2562	25	313	E	EXU	(99N/22W)	-40.0	-50.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2562	25	362	A	EXU	(276N/41W)	0.0	-10.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2562	25	362	B	EXU	(276N/41W)	0.0	-10.0	DEB	East Medicine Lake	3.3	NM	—
CA-MOD-2562	25	362	C	EXU	(276N/41W)	0.0	-10.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-2562	25	364	A	EXU	(276N/41W)	-20.0	-30.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2562	25	364	B	EXU	(276N/41W)	-20.0	-30.0	DEB	East Medicine Lake	3.3	NM	—
CA-MOD-2562	25	364	C	EXU	(276N/41W)	-20.0	-30.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2562	25	365	A	EXU	(276N/41W)	-30.0	-40.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2562	25	365	B	EXU	(276N/41W)	-30.0	-40.0	DEB	East Medicine Lake	3.0	NM	—
CA-MOD-2562	25	365	C	EXU	(276N/41W)	-30.0	-40.0	DEB	East Medicine Lake	1.2	NM	—
CA-MOD-2562	25	366	-	EXU	(276N/41W)	-40.0	-50.0	DEB	East Medicine Lake	3.3	NM	—
CA-MOD-2562	25	371	A	EXU	(460N/37W)	0.0	-10.0	DEB	East Medicine Lake	5.4	NM	Weathered
CA-MOD-2562	25	371	B	EXU	(460N/37W)	0.0	-10.0	DEB	East Medicine Lake	7.1	NM	—
CA-MOD-2562	25	371	C	EXU	(460N/37W)	0.0	-10.0	DEB	East Medicine Lake	3.9	NM	—
CA-MOD-2562	25	372	A	EXU	(460N/37W)	-10.0	-20.0	DEB	East Medicine Lake	5.2	NM	—
CA-MOD-2562	25	372	B	EXU	(460N/37W)	-10.0	-20.0	DEB	East Medicine Lake	4.9	NM	—
CA-MOD-2562	25	372	C	EXU	(460N/37W)	-10.0	-20.0	DEB	East Medicine Lake	4.1	NM	Weathered
CA-MOD-2562	25	374	A	EXU	(460N/37W)	-20.0	-30.0	DEB	East Medicine Lake	4.9	NM	Weathered
CA-MOD-2562	25	374	B	EXU	(460N/37W)	-20.0	-30.0	DEB	East Medicine Lake	NVB	NM	No visible band

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
					1	2					
CA-MOD-2562	25	374	C	EXU (460N/37W)	-20.0	-30.0	DEB	Unknown B	4.1	NM	—
CA-MOD-2562	25	374	D	EXU (460N/37W)	-20.0	-30.0	DEB	East Medicine Lake	NVB	NM	Weathered; No visible band
CA-MOD-2563	26	68	A	STU (5S/8W)	0.0	-10.0	DEB	East Medicine Lake	3.5	NM	Grasshopper Group visual source
CA-MOD-2563	26	68	AA	STU (5S/8W)	0.0	-10.0	DEB	East Medicine Lake	2.8	NM	Grasshopper Group visual source
CA-MOD-2563	26	68	B	STU (5S/8W)	0.0	-10.0	DEB	Grasshopper Group	3.6	NM	Visually assigned source
CA-MOD-2563	26	68	BB	STU (5S/8W)	0.0	-10.0	DEB	East Medicine Lake	3.3	NM	Grasshopper Group visual source
CA-MOD-2563	26	68	C	STU (5S/8W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2563	26	68	D	STU (5S/8W)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	Grasshopper Group visual source
CA-MOD-2563	26	68	E	STU (5S/8W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2563	26	68	F	STU (5S/8W)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	Grasshopper Group visual source
CA-MOD-2563	26	68	G	STU (5S/8W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Visually assigned source
CA-MOD-2563	26	68	H	STU (5S/8W)	0.0	-10.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2563	26	68	I	STU (5S/8W)	0.0	-10.0	DEB	Grasshopper Group	1.7	NM	Visually assigned source
CA-MOD-2563	26	68	J	STU (5S/8W)	0.0	-10.0	DEB	Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-2563	26	71	A	STU (5S/8W)	0.0	-10.0	DEB	Grasshopper Group	3.2	NM	Visually assigned source
CA-MOD-2563	26	82	A	MRR (5S/8W)	-30.0	-40.0	DEB	East Medicine Lake	3.0	NM	Grasshopper Group visual source
CA-MOD-2563	26	82	B	MRR (5S/8W)	-30.0	-40.0	DEB	East Medicine Lake	2.8	NM	Grasshopper Group visual source
CA-MOD-2563	26	82	C	MRR (5S/8W)	-30.0	-40.0	DEB	East Medicine Lake	2.5	NM	Grasshopper Group visual source
CA-MOD-2563	26	82	D	MRR (5S/8W)	-30.0	-40.0	DEB	East Medicine Lake	2.9	NM	Grasshopper Group visual source
CA-MOD-2563	26	82	E	MRR (5S/8W)	-30.0	-40.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2563	26	82	F	MRR (5S/8W)	-30.0	-40.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2563	26	82	G	MRR (5S/8W)	-30.0	-40.0	DEB	Grasshopper Group	2.9	NM	Visually assigned source
CA-MOD-2563	26	82	H	MRR (5S/8W)	-30.0	-40.0	DEB	Grasshopper Group	3.5	NM	Visually assigned source
CA-MOD-2563	26	82	I	MRR (5S/8W)	-30.0	-40.0	DEB	Grasshopper Group	2.6	NM	Visually assigned source
CA-MOD-2563	26	82	J	MRR (5S/8W)	-30.0	-40.0	DEB	Grasshopper Group	2.5	NM	Visually assigned source
CA-MOD-2563	26	89	-	STU (16N/2W)	0.0	-10.0	BIF	East Medicine Lake	4.7	NM	—
CA-MOD-2563	26	91	-	STU (16N/2W)	0.0	-10.0	BIF	East Medicine Lake	4.4	NM	—
CA-MOD-2563	26	94	-	STU (16N/2W)	0.0	-10.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	95	A	STU (16N/2W)	0.0	-10.0	DEB	East Medicine Lake	6.3	NM	Grasshopper Group visual source
CA-MOD-2563	26	95	B	STU (16N/2W)	0.0	-10.0	DEB	Grasshopper Group	5.2	NM	Visually assigned source
CA-MOD-2563	26	95	C	STU (16N/2W)	0.0	-10.0	DEB	East Medicine Lake	6.0	NM	Grasshopper Group visual source
CA-MOD-2563	26	95	D	STU (16N/2W)	0.0	-10.0	DEB	East Medicine Lake	5.3	NM	Grasshopper Group visual source
CA-MOD-2563	26	95	E	STU (16N/2W)	0.0	-10.0	DEB	Grasshopper Group	5.1	NM	Visually assigned source
CA-MOD-2563	26	95	F	STU (16N/2W)	0.0	-10.0	DEB	East Medicine Lake	5.0	NM	Grasshopper Group visual source
CA-MOD-2563	26	95	G	STU (16N/2W)	0.0	-10.0	DEB	East Medicine Lake	4.2	NM	Grasshopper Group visual source
CA-MOD-2563	26	95	H	STU (16N/2W)	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2563	26	95	I	STU (16N/2W)	0.0	-10.0	DEB	East Medicine Lake	4.9	NM	Grasshopper Group visual source
CA-MOD-2563	26	95	J	STU (16N/2W)	0.0	-10.0	DEB	East Medicine Lake	3.7	NM	Grasshopper Group visual source
CA-MOD-2563	26	106	-	STU (10S/6E)	0.0	-10.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	125	-	MRR (16N/1W)	-20.0	-30.0	BIF	East Medicine Lake	4.3	NM	—
CA-MOD-2563	26	139	A	MRR (16N/1W)	-40.0	-50.0	DEB	East Medicine Lake	NM	NM	No OH measurement

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2563	26	139	B	MRR (16N/1W)	-40.0	-50.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	139	C	MRR (16N/1W)	-40.0	-50.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	139	D	MRR (16N/1W)	-40.0	-50.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	143	A	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	4.0	NM	Visually assigned source
CA-MOD-2563	26	143	B	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	3.5	NM	Visually assigned source
CA-MOD-2563	26	143	C	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-2563	26	143	D	MRR (16N/1W)	-50.0	-60.0	DEB	East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2563	26	143	E	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-2563	26	143	F	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	3.5	NM	Visually assigned source
CA-MOD-2563	26	143	G	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	4.1	NM	Visually assigned source
CA-MOD-2563	26	143	H	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2563	26	143	I	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-2563	26	143	J	MRR (16N/1W)	-50.0	-60.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2563	26	149	-	STU (45N/31W)	0.0	-10.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	150	-	STU (45N/31W)	0.0	-10.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	151	A	EXU (45S/31W)	0.0	-10.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2563	26	151	B	EXU (45S/31W)	0.0	-10.0	DEB	East Medicine Lake	4.6	NM	—
CA-MOD-2563	26	151	C	EXU (45S/31W)	0.0	-10.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-2563	26	151	D	EXU (45S/31W)	0.0	-10.0	DEB	East Medicine Lake	1.5	NM	—
CA-MOD-2563	26	151	E	EXU (45S/31W)	0.0	-10.0	DEB	East Medicine Lake	4.1	NM	—
CA-MOD-2563	26	159	A	STP 1	0.0	-23.0	DEB	Grasshopper Group	2.3	NM	Visually assigned source
CA-MOD-2563	26	159	B	STP 1	0.0	-23.0	DEB	East Medicine Lake	2.7	NM	Grasshopper Group visual source
CA-MOD-2563	26	159	C	STP 1	0.0	-23.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2563	26	159	D	STP 1	0.0	-23.0	DEB	Grasshopper Group	2.3	NM	Visually assigned source
CA-MOD-2563	26	159	E	STP 1	0.0	-23.0	DEB	Grasshopper Group	2.4	NM	Visually assigned source
CA-MOD-2563	26	164	A	STU (80S/7W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	Grasshopper Group visual source
CA-MOD-2563	26	169	A	STU (82S/88W)	0.0	-10.0	DEB	Grasshopper Group	3.4	3.7	Visually assigned source
CA-MOD-2563	26	169	B	STU (82S/88W)	0.0	-10.0	DEB	East Medicine Lake	2.8	NM	Grasshopper Group visual source
CA-MOD-2563	26	169	C	STU (82S/88W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2563	26	169	D	STU (82S/88W)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	Grasshopper Group visual source
CA-MOD-2563	26	172	-	STU (4N/42E)	0.0	-10.0	BIF	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2563	26	175	A	STU (4N/42E)	0.0	-10.0	DEB	East Medicine Lake	1.2	NM	Grasshopper Group visual source
CA-MOD-2563	26	181	-	SC (5S/0W)	0.0	0.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	195	-	SC (50S/0W)	0.0	0.0	PFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	205	-	SC (75S/0W)	0.0	0.0	PPT	Unknown A	3.8	NM	—
CA-MOD-2563	26	323	-	SC (14S/0W)	0.0	0.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	357	-	SC (58S/0W)	0.0	0.0	PPT	Buck Mountain	2.3	NM	—
CA-MOD-2563	26	381	-	SC (25S/35E)	0.0	0.0	PFT	East Medicine Lake	4.5	NM	—
CA-MOD-2563	26	439	-	SC (20S/12E)	0.0	0.0	PFT	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2563	26	466	-	SC (20S/48E)	0.0	0.0	PPT	East Medicine Lake	4.0	NM	—
CA-MOD-2563	26	479	-	SC (20S/10W)	0.0	0.0	PFT	East Medicine Lake	NM	NM	No OH measurement

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-2563	26	497	- SC (20N/28W)	0.0	0.0	PFT East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	511	- SC (20N/50W)	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	522	- SC (10N/0W)	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	532	- SC (20N/0W)	0.0	0.0	BIF East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2563	26	534	- SC (20N/0W)	0.0	0.0	BIF Unknown A	NM	NM	No OH measurement
CA-MOD-2563	26	552	- SC (36N/0W)	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	591	- ISO (66S/2.4W)	0.0	0.0	PPT East Medicine Lake	2.5	NM	—
CA-MOD-2563	26	593	- ISO (3.5N/2.93E)	0.0	0.0	PPT East Medicine Lake	1.1	NM	—
CA-MOD-2563	26	594	- ISO (6.3S/14.4E)	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	596	- ISO (21.6N/0.4W)	0.0	0.0	PPT East Medicine Lake	3.8	NM	—
CA-MOD-2563	26	597	- ISO (1.15N/0.7W)	0.0	0.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2563	26	598	- ISO (2.94N/0.29W)	0.0	0.0	BIF East Medicine Lake	3.8	NM	—
CA-MOD-2563	26	599	- ISO (14.01N/35.05W)	0.0	0.0	PPT East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	600	- ISO (2N/0W)	0.0	0.0	PPT Buck Mountain	5.7	NM	—
CA-MOD-2563	26	602	- ISO (49.1S/9E)	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	604	- ISO (26N/25.35W)	0.0	0.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	605	- ISO (23.8N/28.71E)	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	607	- ISO (25.4N/5W)	0.0	0.0	UFT East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	610	- ISO (2.8N/18.1E)	0.0	0.0	PFT East Medicine Lake	4.4	NM	—
CA-MOD-2563	26	611	- ISO (8.6S/15.6E)	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	612	- ISO (25.9N/29.4W)	0.0	0.0	BIF East Medicine Lake	4.4	NM	—
CA-MOD-2563	26	613	- ISO (38S/28.5E)	0.0	0.0	BIF Buck Mountain	NM	NM	No OH measurement
CA-MOD-2563	26	615	- ISO (15.6S/4.4E)	0.0	0.0	PPT Unknown A	2.1	NM	—
CA-MOD-2563	26	616	- ISO	0.0	0.0	BIF Unknown A	NM	NM	No OH measurement
CA-MOD-2563	26	617	- ISO	0.0	0.0	PPT East Medicine Lake	3.2	NM	—
CA-MOD-2563	26	618	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	619	- ISO	0.0	0.0	PPT East Medicine Lake	1.1	NM	—
CA-MOD-2563	26	623	- ISO	0.0	0.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2563	26	626	- ISO	0.0	0.0	BIF Buck Mountain	NM	NM	No OH measurement
CA-MOD-2563	26	627	- ISO	0.0	0.0	PPT East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	628	- ISO	0.0	0.0	BIF East Medicine Lake	4.9	NM	—
CA-MOD-2563	26	629	- ISO	0.0	0.0	BIF Blue Mountain	NM	NM	No OH measurement
CA-MOD-2563	26	631	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	635	- ISO	0.0	0.0	PPT East Medicine Lake	4.0	NM	—
CA-MOD-2563	26	639	- ISO	0.0	0.0	PPT East Medicine Lake	3.1	NM	—
CA-MOD-2563	26	644	- ISO	0.0	0.0	PPT East Medicine Lake	3.0	NM	—
CA-MOD-2563	26	649	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2563	26	653	- ISO	0.0	0.0	PPT Sugar Hill	4.6	NM	—
CA-MOD-2563	26	656	- ISO	0.0	0.0	PPT East Medicine Lake	3.1	NM	Grasshopper Group visual source
CA-MOD-2563	26	665	- ISO	0.0	0.0	PPT East Medicine Lake	4.1	NM	—
CA-MOD-2563	26	677	- ISO	0.0	0.0	PPT East Medicine Lake	DH	NM	Diffuse hydration

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2563	26	678	-	ISO	0.0	0.0	PPT	Unknown A	2.7	NM	--
CA-MOD-2563	26	683	-	ISO	0.0	0.0	PPT	East Medicine Lake	4.5	NM	--
CA-MOD-2563	26	687	-	ISO	0.0	0.0	PPT	East Medicine Lake	3.2	NM	--
CA-MOD-2563	26	693	-	SCP 105	0.0	0.0	PPT	GF/LIW/RS	5.1	NM	--
CA-MOD-2563	26	713	A	EXU (59N/65W)	-10.0	-20.0	DEB	East Medicine Lake	3.0	NM	--
CA-MOD-2563	26	713	B	EXU (59N/65W)	-10.0	-20.0	DEB	East Medicine Lake	2.1	NM	--
CA-MOD-2563	26	713	C	EXU (59N/65W)	-10.0	-20.0	DEB	East Medicine Lake	2.8	NM	--
CA-MOD-2563	26	713	D	EXU (59N/65W)	-10.0	-20.0	DEB	East Medicine Lake	3.8	NM	--
CA-MOD-2563	26	713	E	EXU (59N/65W)	-10.0	-20.0	DEB	East Medicine Lake	4.3	NM	--
CA-MOD-2563	26	715	-	EXU (59N/65W)	-20.0	-30.0	PPT	Buck Mountain	3.8	NM	--
CA-MOD-2563	26	716	A	EXU (59N/65W)	-30.0	-40.0	DEB	East Medicine Lake	3.7	NM	--
CA-MOD-2563	26	716	B	EXU (59N/65W)	-30.0	-40.0	DEB	East Medicine Lake	3.4	NM	--
CA-MOD-2563	26	716	C	EXU (59N/65W)	-30.0	-40.0	DEB	East Medicine Lake	2.8	NM	--
CA-MOD-2563	26	716	D	EXU (59N/65W)	-30.0	-40.0	DEB	East Medicine Lake	4.4	NM	--
CA-MOD-2563	26	716	E	EXU (59N/65W)	-30.0	-40.0	DEB	GF/LIW/RS	3.2	NM	--
CA-MOD-2563	26	748	A	EXU (18N/67W)	0.0	-10.0	DEB	East Medicine Lake	3.2	NM	--
CA-MOD-2563	26	748	B	EXU (18N/67W)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	--
CA-MOD-2563	26	748	C	EXU (18N/67W)	0.0	-10.0	DEB	East Medicine Lake	3.9	NM	--
CA-MOD-2563	26	748	D	EXU (18N/67W)	0.0	-10.0	DEB	East Medicine Lake	4.2	NM	--
CA-MOD-2563	26	748	E	EXU (18N/67W)	0.0	-10.0	DEB	East Medicine Lake	4.2	NM	--
CA-MOD-2563	26	751	A	EXU (18N/67W)	-20.0	-28.0	DEB	East Medicine Lake	3.1	NM	--
CA-MOD-2563	26	751	B	EXU (18N/67W)	-20.0	-28.0	DEB	East Medicine Lake	3.4	NM	--
CA-MOD-2563	26	751	C	EXU (18N/67W)	-20.0	-28.0	DEB	East Medicine Lake	3.1	NM	--
CA-MOD-2563	26	751	D	EXU (18N/67W)	-20.0	-28.0	DEB	East Medicine Lake	3.1	NM	--
CA-MOD-2563	26	751	E	EXU (18N/67W)	-20.0	-28.0	DEB	East Medicine Lake	3.2	NM	--
CA-MOD-2564	33	11	-	STU 8 (175S/15W)	0.0	-10.0	BIF	East Medicine Lake	3.9	NM	Grasshopper Group visual source
CA-MOD-2564	33	13	-	STU 9 (175S/33W)	0.0	-10.0	PPT	Unknown A	2.7	NM	--
CA-MOD-2564	33	14	-	STU 9 (175S/33W)	0.0	-10.0	PPT	East Medicine Lake	2.3	NM	--
CA-MOD-2564	33	22	A	STU 14 (292S/33W)	0.0	-10.0	DEB	East Medicine Lake	4.9	NM	Grasshopper Group visual source
CA-MOD-2564	33	22	B	STU 14 (292S/33W)	0.0	-10.0	DEB	East Medicine Lake	2.0	NM	Grasshopper Group visual source
CA-MOD-2564	33	22	C	STU 14 (292S/33W)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Grasshopper Group visual source
CA-MOD-2564	33	22	D	STU 14 (292S/33W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2564	33	22	E	STU 14 (292S/33W)	0.0	-10.0	DEB	East Medicine Lake	4.5	NM	Grasshopper Group visual source
CA-MOD-2564	33	33	-	MRR 1 (181S/19W)	0.0	-10.0	PPT	East Medicine Lake	1.8	NM	--
CA-MOD-2564	33	34	A	MRR 1 (181S/19W)	0.0	-10.0	DEB	East Medicine Lake	1.8	NM	Grasshopper Group visual source
CA-MOD-2564	33	34	B	MRR 1 (181S/19W)	0.0	-10.0	DEB	East Medicine Lake	7.4	NM	Grasshopper Group visual source
CA-MOD-2564	33	34	C	MRR 1 (181S/19W)	0.0	-10.0	DEB	East Medicine Lake	5.7	NM	Grasshopper Group visual source
CA-MOD-2564	33	34	D	MRR 1 (181S/19W)	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2564	33	34	E	MRR 1 (181S/19W)	0.0	-10.0	DEB	East Medicine Lake	5.0	NM	Grasshopper Group visual source
CA-MOD-2564	33	34	F	MRR 1 (181S/19W)	0.0	-10.0	DEB	East Medicine Lake	5.5	NM	Grasshopper Group visual source
CA-MOD-2564	33	34	G	MRR 1 (181S/19W)	0.0	-10.0	DEB	East Medicine Lake	5.9	NM	Grasshopper Group visual source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-2564	33	34	H MRR 1 (181S/19W)	0.0	-10.0	DEB East Medicine Lake	5.2	NM	Grasshopper Group visual source
CA-MOD-2564	33	34	I MRR 1 (181S/19W)	0.0	-10.0	DEB East Medicine Lake	5.0	NM	Grasshopper Group visual source
CA-MOD-2564	33	34	J MRR 1 (181S/19W)	0.0	-10.0	DEB East Medicine Lake	7.0	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	A MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	5.2	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	B MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	3.1	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	C MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	D MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	4.4	5.2	Grasshopper Group visual source
CA-MOD-2564	33	38	E MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	4.9	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	F MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	3.7	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	G MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	4.4	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	H MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	5.2	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	I MRR 1 (181S/19W)	-30.0	-40.0	DEB East Medicine Lake	6.3	NM	Grasshopper Group visual source
CA-MOD-2564	33	38	J MRR 1 (181S/19W)	-30.0	-40.0	DEB Blue Mountain	2.6	NM	Grasshopper Group visual source
CA-MOD-2564	33	50	- SCP 1	0.0	0.0	PPT Callahan Flow?	NVB	NM	—
CA-MOD-2564	33	51	- ISO	0.0	0.0	PPT East Medicine Lake	4.8	NM	—
CA-MOD-2564	33	54	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2564	33	55	- SCP 6	0.0	0.0	BIF East Medicine Lake	4.6	NM	—
CA-MOD-2564	33	59	- SCP 9	0.0	0.0	PPT Buck Mountain	7.4	NM	—
CA-MOD-2564	33	65	- EXU (0N/0W)	0.0	-10.0	PPT East Medicine Lake	5.5	NM	—
CA-MOD-2564	33	75	- EXU (0N/1E)	-30.0	-40.0	PPT East Medicine Lake	4.8	NM	—
CA-MOD-2564	33	219	- EXU (136S/40W)	0.0	-10.0	PPT Tucker Hill	4.5	NM	—
CA-MOD-2565	14	93	A MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	4.9	NM	Visually assigned source
CA-MOD-2565	14	93	B MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	5.6	NM	Visually assigned source
CA-MOD-2565	14	93	C MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	6.5	NM	Visually assigned source
CA-MOD-2565	14	93	D MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	5.9	NM	Visually assigned source
CA-MOD-2565	14	93	E MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	5.4	NM	Visually assigned source
CA-MOD-2565	14	93	F MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	6.0	NM	Visually assigned source
CA-MOD-2565	14	93	G MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	1.6	NM	Visually assigned source
CA-MOD-2565	14	93	H MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	6.0	NM	Visually assigned source
CA-MOD-2565	14	93	I MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	5.1	NM	Visually assigned source
CA-MOD-2565	14	93	J MRR 1 (215N/35W)	0.0	-10.0	DEB Grasshopper Group	6.6	NM	Visually assigned source
CA-MOD-2565	14	95	A EXU (215N/35W)	-10.0	-20.0	DEB East Medicine Lake	5.5	NM	—
CA-MOD-2565	14	95	B EXU (215N/35W)	-10.0	-20.0	DEB East Medicine Lake	4.3	NM	—
CA-MOD-2565	14	95	C EXU (215N/35W)	-10.0	-20.0	DEB East Medicine Lake	5.1	NM	—
CA-MOD-2565	14	95	D EXU (215N/35W)	-10.0	-20.0	DEB East Medicine Lake	2.0	NM	—
CA-MOD-2565	14	95	E EXU (215N/35W)	-10.0	-20.0	DEB East Medicine Lake	5.4	NM	—
CA-MOD-2565	14	102	- MRR 1 (215N/35W)	-40.0	-50.0	BIF East Medicine Lake	2.4	NM	—
CA-MOD-2565	14	105	A MRR 1 (215N/35W)	-60.0	-70.0	DEB East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2565	14	105	B MRR 1 (215N/35W)	-60.0	-70.0	DEB East Medicine Lake	4.9	NM	Grasshopper Group visual source
CA-MOD-2565	14	105	C MRR 1 (215N/35W)	-60.0	-70.0	DEB East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2565	14	105	D MRR 1 (215N/35W)	-60.0	-70.0	DEB East Medicine Lake	4.9	NM	Grasshopper Group visual source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2565	14	105	E	MRR 1 (215N/35W)	-60.0	-70.0	DEB	East Medicine Lake	5.9	NM	Grasshopper Group visual source
CA-MOD-2565	14	105	F	MRR 1 (215N/35W)	-60.0	-70.0	DEB	East Medicine Lake	6.0	NM	Grasshopper Group visual source
CA-MOD-2565	14	105	G	MRR 1 (215N/35W)	-60.0	-70.0	DEB	East Medicine Lake	5.0	NM	Grasshopper Group visual source
CA-MOD-2565	14	105	H	MRR 1 (215N/35W)	-60.0	-70.0	DEB	Cougar Butte	6.2	NM	Grasshopper Group visual source
CA-MOD-2565	14	105	I	MRR 1 (215N/35W)	-60.0	-70.0	DEB	East Medicine Lake	5.5	NM	Grasshopper Group visual source
CA-MOD-2565	14	105	J	MRR 1 (215N/35W)	-60.0	-70.0	DEB	East Medicine Lake	5.5	NM	Grasshopper Group visual source
CA-MOD-2565	14	114	A	MRR (142N/145W)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2565	14	114	B	MRR (142N/145W)	0.0	-10.0	DEB	East Medicine Lake	1.1	NM	—
CA-MOD-2565	14	114	C	MRR (142N/145W)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2565	14	114	D	MRR (142N/145W)	0.0	-10.0	DEB	Cougar Butte	DH	NM	Diffuse hydration
CA-MOD-2565	14	114	E	MRR (142N/145W)	0.0	-10.0	DEB	East Medicine Lake	1.1	NM	Weathered
CA-MOD-2565	14	118	A	MRR (142N/145W)	-30.0	-40.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-2565	14	118	B	MRR (142N/145W)	-30.0	-40.0	DEB	Cougar Butte	6.2	NM	—
CA-MOD-2565	14	118	C	MRR (142N/145W)	-30.0	-40.0	DEB	East Medicine Lake	5.7	NM	—
CA-MOD-2565	14	118	D	MRR (142N/145W)	-30.0	-40.0	DEB	Cougar Butte	6.3	NM	—
CA-MOD-2565	14	118	E	MRR (142N/145W)	-30.0	-40.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2565	14	130	A	MRR (10N/24W)	0.0	-10.0	DEB	Blue Mountain	1.4	NM	—
CA-MOD-2565	14	130	B	MRR (10N/24W)	0.0	-10.0	DEB	East Medicine Lake	NVB	NM	Weathered; No visible band
CA-MOD-2565	14	130	C	MRR (10N/24W)	0.0	-10.0	DEB	Cowhead Lake	1.3	NM	—
CA-MOD-2565	14	130	D	MRR (10N/24W)	0.0	-10.0	DEB	Blue Mountain	1.2	NM	—
CA-MOD-2565	14	130	E	MRR (10N/24W)	0.0	-10.0	DEB	East Medicine Lake	1.3	NM	—
CA-MOD-2565	14	133	A	MRR (10N/24W)	-10.0	-20.0	DEB	East Medicine Lake	1.2	NM	—
CA-MOD-2565	14	133	B	MRR (10N/24W)	-10.0	-20.0	DEB	East Medicine Lake	1.1	NM	—
CA-MOD-2565	14	136	A	MRR (10N/24W)	-10.0	-20.0	DEB	East Medicine Lake	1.2	NM	—
CA-MOD-2565	14	136	B	MRR (10N/24W)	-20.0	-30.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2565	14	136	C	MRR (10N/24W)	-20.0	-30.0	DEB	East Medicine Lake	2.9	3.6	2 hydration bands
CA-MOD-2565	14	139	A	MRR (90S/25W)	-20.0	-30.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2565	14	139	B	MRR (90S/25W)	0.0	-10.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2565	14	139	C	MRR (90S/25W)	0.0	-10.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2565	14	139	D	MRR (90S/25W)	0.0	-10.0	DEB	East Medicine Lake	4.1	NM	—
CA-MOD-2565	14	139	E	MRR (90S/25W)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2565	14	141	A	MRR (90S/25W)	-10.0	-20.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2565	14	141	B	MRR (90S/25W)	-10.0	-20.0	DEB	East Medicine Lake	4.5	NM	—
CA-MOD-2565	14	141	C	MRR (90S/25W)	-10.0	-20.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-2565	14	141	D	MRR (90S/25W)	-10.0	-20.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2565	14	141	E	MRR (90S/25W)	-10.0	-20.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2565	14	153	-	STU 23	0.0	-10.0	PPT	East Medicine Lake	4.0	NM	Visually assigned source
CA-MOD-2565	14	154	-	MMR 3	0.0	0.0	PPT	Blue Mountain	4.7	NM	—
CA-MOD-2565	14	156	-	ISO	0.0	0.0	BIF	Drews Creek/Butcher Flat	NM	NM	No OH measurement
CA-MOD-2565	14	157	-	ISO	0.0	0.0	PPT	Blue Mountain	3.6	NM	—
CA-MOD-2565	14	158	-	ISO	0.0	0.0	PPT	Unknown A	4.6	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-2565	14	159	- ISO	0.0	0.0	PPT East Medicine Lake	5.1	NM	—
CA-MOD-2565	14	160	- ISO	0.0	0.0	PPT East Medicine Lake	3.8	NM	Visually assigned source
CA-MOD-2565	14	162	- ISO	0.0	0.0	BIF Grasshopper Group	5.6	NM	Visually assigned source
CA-MOD-2565	14	166	- ISO	0.0	0.0	PPT East Medicine Lake	6.3	NM	—
CA-MOD-2565	14	171	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2565	14	175	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2565	14	176	- ISO	0.0	0.0	PPT East Medicine Lake	2.0	NM	—
CA-MOD-2565	14	177	- ISO	0.0	0.0	BIF East Medicine Lake	4.2	NM	—
CA-MOD-2565	14	178	- ISO	0.0	0.0	PPT East Medicine Lake	1.5	NM	—
CA-MOD-2565	14	181	- ISO	0.0	0.0	PPT East Medicine Lake	3.8	NM	—
CA-MOD-2565	14	182	- ISO	0.0	0.0	PPT East Medicine Lake	1.6	NM	—
CA-MOD-2565	14	229	- EXU (125N/31W)	0.0	-10.0	PPT Blue Mountain	2.8	NM	—
CA-MOD-2566/67	32	37	A STU (40S/0W)	0.0	-10.0	DEB East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	37	B STU (40S/0W)	0.0	-10.0	DEB East Medicine Lake	6.7	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	37	C STU (40S/0W)	0.0	-10.0	DEB East Medicine Lake	4.6	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	37	D STU (40S/0W)	0.0	-10.0	DEB East Medicine Lake	5.3	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	37	E STU (40S/0W)	0.0	-10.0	DEB Unknown A	1.9	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	37	F STU (40S/0W)	0.0	-10.0	DEB East Medicine Lake	6.2	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	37	G STU (40S/0W)	0.0	-10.0	DEB Unknown A	2.7	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	37	H STU (40S/0W)	0.0	-10.0	DEB East Medicine Lake	4.1	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	37	I STU (40S/0W)	0.0	-10.0	DEB Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-2566/67	32	37	J STU (40S/0W)	0.0	-10.0	DEB Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-2566/67	32	50	A STU (100S/2E)	0.0	-10.0	DEB Grasshopper Group	5.0	NM	Visually assigned source
CA-MOD-2566/67	32	50	B STU (100S/2E)	0.0	-10.0	DEB East Medicine Lake	6.7	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	50	C STU (100S/2E)	0.0	-10.0	DEB East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	50	D STU (100S/2E)	0.0	-10.0	DEB East Medicine Lake	6.2	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	50	E STU (100S/2E)	0.0	-10.0	DEB Grasshopper Group	NM	NM	Visually assigned source
CA-MOD-2566/67	32	50	F STU (100S/2E)	0.0	-10.0	DEB Grasshopper Group	4.6	NM	Visually assigned source
CA-MOD-2566/67	32	50	G STU (100S/2E)	0.0	-10.0	DEB Grasshopper Group	6.4	NM	Visually assigned source
CA-MOD-2566/67	32	50	H STU (100S/2E)	0.0	-10.0	DEB East Medicine Lake	1.3	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	50	I STU (100S/2E)	0.0	-10.0	DEB East Medicine Lake	6.4	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	50	J STU (100S/2E)	0.0	-10.0	DEB East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	74	A STU (180S/0W)	0.0	-10.0	DEB Sugar Hill	7.3	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	74	B STU (180S/0W)	0.0	-10.0	DEB Grasshopper Group	4.3	NM	Visually assigned source
CA-MOD-2566/67	32	74	C STU (180S/0W)	0.0	-10.0	DEB East Medicine Lake	3.3	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	74	D STU (180S/0W)	0.0	-10.0	DEB Grasshopper Group	4.2	NM	Visually assigned source
CA-MOD-2566/67	32	74	E STU (180S/0W)	0.0	-10.0	DEB Grasshopper Group	4.5	NM	Visually assigned source
CA-MOD-2566/67	32	74	F STU (180S/0W)	0.0	-10.0	DEB East Medicine Lake	5.8	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	74	G STU (180S/0W)	0.0	-10.0	DEB East Medicine Lake	6.4	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	91	A STU (240S/0W)	0.0	-10.0	DEB Grasshopper Group	5.9	NM	Visually assigned source
CA-MOD-2566/67	32	91	B STU (240S/0W)	0.0	-10.0	DEB East Medicine Lake	6.0	NM	Grasshopper Group visual source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-2566/67	32	91	C	STU (240S/0W)	0.0	-10.0	DEB	East Medicine Lake	4.6	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	91	D	STU (240S/0W)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	91	E	STU (240S/0W)	0.0	-10.0	DEB	Grasshopper Group	5.0	NM	Visually assigned source
CA-MOD-2566/67	32	91	F	STU (240S/0W)	0.0	-10.0	DEB	Grasshopper Group	4.2	NM	Visually assigned source
CA-MOD-2566/67	32	91	G	STU (240S/0W)	0.0	-10.0	DEB	East Medicine Lake	6.5	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	91	H	STU (240S/0W)	0.0	-10.0	DEB	East Medicine Lake	4.9	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	91	I	STU (240S/0W)	0.0	-10.0	DEB	East Medicine Lake	6.4	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	91	J	STU (240S/0W)	0.0	-10.0	DEB	East Medicine Lake	3.5	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	96	-	STU (260S/0W)	0.0	-10.0	PPT	East Medicine Lake	5.3	NM	-
CA-MOD-2566/67	32	112	A	STU (300S/0W)	0.0	-10.0	DEB	Grasshopper Group	4.0	NM	Visually assigned source
CA-MOD-2566/67	32	112	B	STU (300S/0W)	0.0	-10.0	DEB	Grasshopper Group	3.3	NM	Visually assigned source
CA-MOD-2566/67	32	112	C	STU (300S/0W)	0.0	-10.0	DEB	Grasshopper Group	4.1	NM	Visually assigned source
CA-MOD-2566/67	32	112	D	STU (300S/0W)	0.0	-10.0	DEB	East Medicine Lake	5.3	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	112	E	STU (300S/0W)	0.0	-10.0	DEB	Grasshopper Group	5.2	NM	Visually assigned source
CA-MOD-2566/67	32	112	F	STU (300S/0W)	0.0	-10.0	DEB	East Medicine Lake	5.1	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	112	G	STU (300S/0W)	0.0	-10.0	DEB	Grasshopper Group	5.7	NM	Visually assigned source
CA-MOD-2566/67	32	112	H	STU (300S/0W)	0.0	-10.0	DEB	Grasshopper Group	5.3	NM	Visually assigned source
CA-MOD-2566/67	32	112	I	STU (300S/0W)	0.0	-10.0	DEB	Grasshopper Group	4.4	NM	Visually assigned source
CA-MOD-2566/67	32	112	J	STU (300S/0W)	0.0	-10.0	DEB	Grasshopper Group	5.3	NM	Visually assigned source
CA-MOD-2566/67	32	130	-	STU (300S/0W)	0.0	-10.0	BIF	East Medicine Lake	6.7	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	279	-	MRR (116S/2E)	-20.0	-30.0	BIF	East Medicine Lake	4.0	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	377	-	ISO	0.0	0.0	COR	East Medicine Lake	3.6	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	379	-	ISO	0.0	0.0	BIF	East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	381	-	ISO	0.0	0.0	BIF	Witham Creek	NM	NM	-
CA-MOD-2566/67	32	395	-	ISO	0.0	0.0	PPT	McComb Butte	3.4	NM	-
CA-MOD-2566/67	32	415	-	ISO	0.0	0.0	PPT	Unknown B	NM	NM	-
CA-MOD-2566/67	32	419	-	ISO	0.0	0.0	UFT	East Medicine Lake	5.9	NM	Grasshopper Group visual source
CA-MOD-2566/67	32	426	-	ISO	0.0	0.0	BIF	East Medicine Lake	4.1	NM	-
CA-MOD-2566/67	32	427	-	ISO	0.0	0.0	PPT	East Medicine Lake	3.1	NM	-
CA-MOD-2566/67	32	430	-	ISO	0.0	0.0	BIF	Grasshopper Group	3.6	NM	-
CA-MOD-2566/67	32	432	-	ISO	0.0	0.0	PPT	East Medicine Lake	4.4	NM	-
CA-MOD-2566/67	32	439	-	ISO	0.0	0.0	BIF	Cougar Butte	3.6	NM	-
CA-MOD-2566/67	32	448	-	ISO	0.0	0.0	PPT	Cowhead Lake	6.2	NM	-
CA-MOD-2566/67	32	449	-	ISO (220.3S/2.6E)	0.0	0.0	PPT	East Medicine Lake	6.5	5.1	2 hydration rims
CA-MOD-2566/67	32	458	-	ISO (119S/11W)	0.0	0.0	BIF	East Medicine Lake	NM	NM	-
CA-MOD-2566/67	32	472	-	SCP 97	0.0	0.0	PPT	Buck Mountain	6.3	NM	-
CA-MOD-2566/67	32	478	-	ISO	0.0	-10.0	PPT	Blue Mountain	3.8	NM	Visually assigned source
CA-MOD-2566/67	32	482	-	SCP 107	0.0	0.0	PPT	GF/LIW/RS	8.1	NM	-
CA-MOD-2566/67	32	485	-	ISO	0.0	-10.0	PPT	East Medicine Lake	3.1	NM	-
CA-MOD-2566/67	32	489	-	SCP 114	0.0	0.0	PPT	East Glass Mountain	6.2	NM	-
CA-MOD-2566/67	32	659	-	SCP 134	0.0	0.0	PPT	Rainbow Mines	DH	NM	-

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2566/67	32	660	-	SCP 135	0.0	0.0	PPT	Cowhead Lake	6.5	NM	—
CA-MOD-2566/67	32	691	A	EXU (60N/38W)	0.0	-10.0	DEB	Glass Mountain	2.6	NM	—
CA-MOD-2566/67	32	691	B	EXU (60N/38W)	0.0	-10.0	DEB	East Medicine Lake	6.7	NM	—
CA-MOD-2566/67	32	691	C	EXU (60N/38W)	0.0	-10.0	DEB	Cougar Butte	5.6	NM	—
CA-MOD-2566/67	32	691	D	EXU (60N/38W)	0.0	-10.0	DEB	Glass Mountain	3.7	NM	—
CA-MOD-2566/67	32	691	E	EXU (60N/38W)	0.0	-10.0	DEB	GF/LIW/RS	6.2	NM	—
CA-MOD-2566/67	32	695	A	EXU (60N/38W)	-20.0	-30.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-2566/67	32	695	B	EXU (60N/38W)	-20.0	-30.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-2566/67	32	695	C	EXU (60N/38W)	-20.0	-30.0	DEB	East Medicine Lake	4.1	NM	—
CA-MOD-2566/67	32	695	D	EXU (60N/38W)	-20.0	-30.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2566/67	32	696	A	EXU (99N/72W)	0.0	-10.0	DEB	Blue Mountain	3.1	NM	Weathered
CA-MOD-2566/67	32	696	B	EXU (99N/72W)	0.0	-10.0	DEB	East Medicine Lake	6.0	NM	—
CA-MOD-2566/67	32	696	C	EXU (99N/72W)	0.0	-10.0	DEB	Cougar Butte	6.0	NM	—
CA-MOD-2566/67	32	696	D	EXU (99N/72W)	0.0	-10.0	DEB	East Medicine Lake	7.3	NM	—
CA-MOD-2566/67	32	696	E	EXU (99N/72W)	0.0	-10.0	DEB	Blue Spring/Mosquito Lake	7.2	NM	—
CA-MOD-2566/67	32	703	A	EXU (99N/72W)	-20.0	-30.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-2566/67	32	703	B	EXU (99N/72W)	-20.0	-30.0	DEB	Cougar Butte	7.4	NM	—
CA-MOD-2566/67	32	703	C	EXU (99N/72W)	-20.0	-30.0	DEB	East Medicine Lake	7.0	NM	—
CA-MOD-2566/67	32	703	D	EXU (99N/72W)	-20.0	-30.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-2566/67	32	703	E	EXU (99N/72W)	-20.0	-30.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2566/67	32	709	A	EXU (99N/72W)	-40.0	-50.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-2566/67	32	709	B	EXU (99N/72W)	-40.0	-50.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-2566/67	32	709	C	EXU (99N/72W)	-40.0	-50.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2566/67	32	709	D	EXU (99N/72W)	-40.0	-50.0	DEB	Sugar Hill	7.5	NM	—
CA-MOD-2566/67	32	709	E	EXU (99N/72W)	-40.0	-70.0	DEB	East Medicine Lake	4.2	NM	—
CA-MOD-2566/67	32	713	A	EXU (99N/72W)	-60.0	-70.0	DEB	East Medicine Lake	VW	NM	Variable width hydration rim
CA-MOD-2566/67	32	713	B	EXU (99N/72W)	-60.0	-70.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2566/67	32	713	C	EXU (99N/72W)	-60.0	-70.0	DEB	Buck Mountain	5.9	NM	—
CA-MOD-2566/67	32	713	D	EXU (99N/72W)	-60.0	-70.0	DEB	East Medicine Lake	7.4	NM	—
CA-MOD-2566/67	32	713	E	EXU (99N/72W)	-60.0	-70.0	DEB	East Medicine Lake	6.3	NM	—
CA-MOD-2566/67	32	714	A	EXU (99N/72W)	-70.0	-80.0	DEB	Unknown C	4.6	NM	—
CA-MOD-2566/67	32	714	B	EXU (99N/72W)	-70.0	-80.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2566/67	32	714	C	EXU (99N/72W)	-70.0	-80.0	DEB	East Medicine Lake	5.2	NM	—
CA-MOD-2566/67	32	714	D	EXU (99N/72W)	-70.0	-80.0	DEB	East Medicine Lake	6.4	NM	—
CA-MOD-2566/67	32	714	E	EXU (99N/72W)	-70.0	-80.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2566/67	32	716	A	EXU (99N/72W)	-80.0	-90.0	DEB	East Medicine Lake	7.0	NM	—
CA-MOD-2566/67	32	716	B	EXU (99N/72W)	-80.0	-90.0	DEB	Cougar Butte	9.5	NM	—
CA-MOD-2566/67	32	718	-	EXU (99N/72W)	-90.0	-100.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2566/67	32	755	A	MRR (121N/72W)	0.0	-10.0	DEB	East Medicine Lake	6.0	NM	—
CA-MOD-2566/67	32	755	B	MRR (121N/72W)	0.0	-10.0	DEB	East Medicine Lake	7.1	NM	—
CA-MOD-2566/67	32	755	C	MRR (121N/72W)	0.0	-10.0	DEB	East Medicine Lake	8.0	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-MOD-2566/67	32	755	D	MRR (121N/72W)	0.0	-10.0	DEB East Medicine Lake	3.8	8.1	—
CA-MOD-2566/67	32	755	E	MRR (121N/72W)	0.0	-10.0	DEB East Medicine Lake	8.1	NM	—
CA-MOD-2566/67	32	760	A	MRR (121N/72W)	-10.0	-20.0	DEB Not sourced	DH	NM	—
CA-MOD-2566/67	32	760	B	MRR (121N/72W)	-10.0	-20.0	DEB Drews Creek/Butcher Flat	5.4	NM	—
CA-MOD-2566/67	32	760	C	MRR (121N/72W)	-10.0	-20.0	DEB East Medicine Lake	7.6	NM	—
CA-MOD-2566/67	32	760	D	MRR (121N/72W)	-10.0	-20.0	DEB East Medicine Lake	4.8	NM	—
CA-MOD-2566/67	32	760	E	MRR (121N/72W)	-10.0	-20.0	DEB East Medicine Lake	4.2	NM	—
CA-MOD-2566/67	32	763	A	MRR (121N/72W)	-20.0	-30.0	DEB Buck Mountain	7.2	NM	—
CA-MOD-2566/67	32	763	B	MRR (121N/72W)	-20.0	-30.0	DEB Buck Mountain	4.4	NM	—
CA-MOD-2566/67	32	763	C	MRR (121N/72W)	-20.0	-30.0	DEB East Medicine Lake	8.2	NM	—
CA-MOD-2566/67	32	763	D	MRR (121N/72W)	-20.0	-30.0	DEB Not sourced	6.8	NM	—
CA-MOD-2566/67	32	763	E	MRR (121N/72W)	-20.0	-30.0	DEB East Medicine Lake	6.9	NM	—
CA-MOD-2566/67	32	768	A	MRR (121N/72W)	-30.0	-40.0	DEB East Medicine Lake	6.3	NM	—
CA-MOD-2566/67	32	768	B	MRR (121N/72W)	-30.0	-40.0	DEB East Medicine Lake	6.3	NM	—
CA-MOD-2566/67	32	768	C	MRR (121N/72W)	-30.0	-40.0	DEB Not sourced	7.4	NM	—
CA-MOD-2566/67	32	768	D	MRR (121N/72W)	-30.0	-40.0	DEB Not sourced	6.5	NM	—
CA, M D-2566/67	32	768	E	MRR (121N/72W)	-30.0	-40.0	DEB Not sourced	5.7	NM	—
CA-MOD-2566/67	32	770	A	MRR (121N/72W)	-40.0	-50.0	DEB Not sourced	8.4	NM	—
CA-MOD-2566/67	32	770	B	MRR (121N/72W)	-40.0	-50.0	DEB Not sourced	7.4	NM	—
CA-MOD-2566/67	32	770	C	MRR (121N/72W)	-40.0	-50.0	DEB East Medicine Lake	6.4	NM	—
CA-MOD-2566/67	32	770	D	MRR (121N/72W)	-40.0	-50.0	DEB Not sourced	3.5	NM	—
CA-MOD-2566/67	32	770	E	MRR (121N/72W)	-40.0	-50.0	DEB East Medicine Lake	5.9	NM	—
CA-MOD-2566/67	32	857	A	EXU (144N/80W)	0.0	-10.0	DEB East Medicine Lake	4.1	NM	—
CA-MOD-2566/67	32	857	B	EXU (144N/80W)	0.0	-10.0	DEB Cougar Butte	9.4	NM	—
CA-MOD-2566/67	32	857	C	EXU (144N/80W)	0.0	-10.0	DEB East Medicine Lake	7.0	NM	—
CA-MOD-2566/67	32	857	D	EXU (144N/80W)	0.0	-10.0	DEB East Medicine Lake	6.9	NM	—
CA-MOD-2566/67	32	857	E	EXU (144N/80W)	0.0	-10.0	DEB East Medicine Lake	7.2	NM	—
CA-MOD-2566/67	32	861	A	EXU (144N/80W)	-20.0	-30.0	DEB East Medicine Lake	6.2	NM	—
CA-MOD-2566/67	32	861	B	EXU (144N/80W)	-20.0	-30.0	DEB East Medicine Lake	3.6	NM	—
CA-MOD-2566/67	32	861	C	EXU (144N/80W)	-20.0	-30.0	DEB East Medicine Lake	7.4	NM	—
CA-MOD-2566/67	32	861	D	EXU (144N/80W)	-20.0	-30.0	DEB East Medicine Lake	8.1	NM	—
CA-MOD-2566/67	32	861	E	EXU (144N/80W)	-20.0	-30.0	DEB East Medicine Lake	7.0	NM	—
CA-MOD-2566/67	32	867	A	EXU (144N/80W)	-40.0	-50.0	DEB East Medicine Lake	7.2	NM	—
CA-MOD-2566/67	32	867	B	EXU (144N/80W)	-40.0	-50.0	DEB East Medicine Lake	6.9	NM	—
CA-MOD-2566/67	32	867	C	EXU (144N/80W)	-40.0	-50.0	DEB East Medicine Lake	6.3	NM	—
CA-MOD-2566/67	32	867	D	EXU (144N/80W)	-40.0	-50.0	DEB East Medicine Lake	7.3	NM	—
CA-MOD-2566/67	32	867	E	EXU (144N/80W)	-40.0	-50.0	DEB Buck Mountain	7.3	NM	—
CA-MOD-2566/67	32	916	-	EXU (156N/84W)	-40.0	-50.0	PPT East Medicine Lake	6.9	NM	—
CA-MOD-2566/67	32	939	A	EXU (144N/80W)	0.0	-10.0	DEB Cougar Butte	10.2	NM	—
CA-MOD-2566/67	32	939	B	EXU (40S/1W)	0.0	-10.0	DEB Cougar Butte	8.5	NM	—
CA-MOD-2566/67	32	939	C	EXU (40S/1W)	0.0	-10.0	DEB East Medicine Lake	4.3	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-2566/67	32	939	D EXU (40S/1W)	0.0	-10.0	DEB East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2566/67	32	939	E EXU (40S/1W)	0.0	-10.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2566/67	32	942	A EXU (40S/1W)	-20.0	-30.0	DEB Blue Mountain	2.5	NM	—
CA-MOD-2566/67	32	942	B EXU (40S/1W)	-20.0	-30.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2566/67	32	942	C EXU (40S/1W)	-20.0	-30.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2566/67	32	942	D EXU (40S/1W)	-20.0	-30.0	DEB Glass Mountain	3.7	NM	—
CA-MOD-2566/67	32	967	- SCP 115	0.0	0.0	PPT Spodue Mountain	7.1	NM	—
CA-MOD-2568	34	3	A STU 2 (70S/0W)	-10.0	-20.0	DEB Grasshopper Group	2.6	NM	Visually assigned source
CA-MOD-2568	34	3	B STU 2 (70S/0W)	-10.0	-20.0	DEB Grasshopper Group	2.6	NM	Visually assigned source
CA-MOD-2568	34	3	C STU 2 (70S/0W)	-10.0	-20.0	DEB Grasshopper Group	2.4	NM	Visually assigned source
CA-MOD-2568	34	3	D STU 2 (70S/0W)	-10.0	-20.0	DEB Grasshopper Group	1.9	NM	Visually assigned source
CA-MOD-2568	34	3	E STU 2 (70S/0W)	-10.0	-20.0	DEB Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2568	34	14	A MRR 1 (65S/14W)	0.0	-10.0	DEB East Medicine Lake	3.7	NM	Grasshopper Group visual source
CA-MOD-2568	34	14	B MRR 1 (65S/14W)	0.0	-10.0	DEB East Medicine Lake	2.6	NM	Grasshopper Group visual source
CA-MOD-2568	34	14	C MRR 1 (65S/14W)	0.0	-10.0	DEB East Medicine Lake	2.7	NM	Grasshopper Group visual source
CA-MOD-2568	34	14	D MRR 1 (65S/14W)	0.0	-10.0	DEB East Medicine Lake	2.7	3.1	Grasshopper Group visual source
CA-MOD-2568	34	14	E MRR 1 (65S/14W)	0.0	-10.0	DEB Grasshopper Group	3.2	NM	Visually assigned source
CA-MOD-2568	34	16	A MRR 1 (65S/14W)	-10.0	-20.0	DEB Grasshopper Group	2.0	NM	Visually assigned source
CA-MOD-2568	34	16	B MRR 1 (65S/14W)	-10.0	-20.0	DEB Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-2568	34	16	C MRR 1 (65S/14W)	-10.0	-20.0	DEB Grasshopper Group	2.9	NM	Visually assigned source
CA-MOD-2568	34	16	D MRR 1 (65S/14W)	-10.0	-20.0	DEB Grasshopper Group	2.2	NM	Visually assigned source
CA-MOD-2568	34	16	E MRR 1 (65S/14W)	-10.0	-20.0	DEB Grasshopper Group	2.4	NM	Visually assigned source
CA-MOD-2568	34	18	A MRR 1 (65S/14W)	-20.0	-30.0	DEB Grasshopper Group	2.7	NM	Visually assigned source
CA-MOD-2568	34	18	B MRR 1 (65S/14W)	-20.0	-30.0	DEB Grasshopper Group	2.5	NM	Visually assigned source
CA-MOD-2568	34	18	C MRR 1 (65S/14W)	-20.0	-30.0	DEB Grasshopper Group	3.0	NM	Visually assigned source
CA-MOD-2568	34	18	D MRR 1 (65S/14W)	-20.0	-30.0	DEB Grasshopper Group	3.0	NM	Visually assigned source
CA-MOD-2568	34	18	E MRR 1 (65S/14W)	-20.0	-30.0	DEB Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2568	40	1	- SCP 1 (284° 0', 145.0 m from Datum B)	0.0	0.0	PPT East Medicine Lake	2.7	NM	—
CA-MOD-2568	41	1	- SCP 2 (216° 0', 250.0 m from Datum B)	0.0	0.0	PPT East Medicine Lake	3.4	NM	—
CA-MOD-2568	95	1	A TEU 101 (226° 30', 67.5 m from Datum B)	0.0	-10.0	DEB East Medicine Lake	2.6	NM	—
CA-MOD-2568	95	1	B TEU 101 (226° 30', 67.5 m from Datum B)	0.0	-10.0	DEB East Medicine Lake	2.5	NM	—
CA-MOD-2568	95	1	C TEU 101 (226° 30', 67.5 m from Datum B)	0.0	-10.0	DEB East Medicine Lake	1.8	NM	—
CA-MOD-2568	95	1	D TEU 101 (226° 30', 67.5 m from Datum B)	0.0	-10.0	DEB East Medicine Lake	4.1	NM	—
CA-MOD-2568	95	1	E TEU 101 (226° 30', 67.5 m from Datum B)	0.0	-10.0	DEB East Medicine Lake	4.3	NM	—
CA-MOD-2568	97	1	A TEU 101 (226° 30', 67.5 m from Datum B)	-10.0	-20.0	DEB East Medicine Lake	3.6	NM	—
CA-MOD-2568	97	1	B TEU 101 (226° 30', 67.5 m from Datum B)	-10.0	-20.0	DEB East Medicine Lake	3.2	NM	—
CA-MOD-2568	97	1	C TEU 101 (226° 30', 67.5 m from Datum B)	-10.0	-20.0	DEB East Medicine Lake	3.7	NM	—
CA-MOD-2568	97	1	D TEU 101 (226° 30', 67.5 m from Datum B)	-10.0	-20.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2568	100	1	- TEU 101 (226° 30', 67.5 m from Datum B)	-20.0	-30.0	DEB Blue Mountain	1.8	NM	—
CA-MOD-2569	28	10	A STU 6 (130N/1W)	0.0	-10.0	DEB East Medicine Lake	4.6	NM	Grasshopper Group visual source
CA-MOD-2569	28	10	B STU 6 (130N/1W)	0.0	-10.0	DEB Grasshopper Group	2.6	NM	Visually assigned source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-MOD-2569	28	10	C	STU 6 (130N/1W)	0.0	-10.0	DEB Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2569	28	10	D	STU 6 (130N/1W)	0.0	-10.0	DEB Grasshopper Group	0.8	NM	Visually assigned source
CA-MOD-2569	28	10	E	STU 6 (130N/1W)	0.0	-10.0	DEB Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2569	28	16	A	STU 7 (160N/1W)	0.0	-10.0	DEB Grasshopper Group	3.4	NM	Visually assigned source
CA-MOD-2569	28	16	B	STU 7 (160N/1W)	0.0	-10.0	DEB Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2569	28	16	C	STU 7 (160N/1W)	0.0	-10.0	DEB Grasshopper Group	3.1	NM	Visually assigned source
CA-MOD-2569	28	16	D	STU 7 (160N/1W)	0.0	-10.0	DEB Grasshopper Group	3.2	NM	Visually assigned source
CA-MOD-2569	28	56	-	ISO	0.0	0.0	PPT Grasshopper Group	1.5	NM	Visually assigned source
CA-MOD-2569	28	57	-	ISO	0.0	0.0	BIF Spodue Mountain	3.0	NM	—
CA-MOD-2569	28	58	-	ISO	0.0	0.0	DEB East Medicine Lake	3.8	NM	Grasshopper Group visual source
CA-MOD-2569	28	59	-	ISO	0.0	0.0	EMP East Medicine Lake	4.2	NM	Grasshopper Group visual source
CA-MOD-2569	28	60	-	ISO	0.0	0.0	BIF East Medicine Lake	3.1	NM	Grasshopper Group visual source
CA-MOD-2570	15	17	-	SC (0N/4E)	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2570	15	98	-	ISO	0.0	0.0	BIF East Medicine Lake	4.9	NM	Grasshopper Group visual source
CA-MOD-2570	15	100	-	ISO	0.0	0.0	PPT CL/DC/BF	5.7	NM	—
CA-MOD-2570	15	106	-	ISO	0.0	0.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2570	15	108	-	ISO	0.0	0.0	BIF East Medicine Lake	4.8	NM	—
CA-MOD-2570	15	112	-	ISO	0.0	0.0	BIF Grasshopper Group	4.1	NM	—
CA-MOD-2570	15	120	-	SC (2N/12E)	0.0	0.0	PPT Buck Mountain	2.0	NM	—
CA-MOD-2570	15	252	A	MRR 5 (20N/30E)	0.0	-10.0	DEB East Medicine Lake	5.2	NM	Grasshopper Group visual source
CA-MOD-2570	15	252	B	MRR 5 (20N/30E)	0.0	-10.0	DEB East Medicine Lake	5.0	NM	Grasshopper Group visual source
CA-MOD-2570	15	252	C	MRR 5 (20N/30E)	0.0	-10.0	DEB East Medicine Lake	5.1	NM	Grasshopper Group visual source
CA-MOD-2570	15	252	D	MRR 5 (20N/30E)	0.0	-10.0	DEB East Medicine Lake	5.1	NM	Grasshopper Group visual source
CA-MOD-2570	15	252	E	MRR 5 (20N/30E)	0.0	-10.0	DEB East Medicine Lake	6.8	NM	Grasshopper Group visual source
CA-MOD-2570	15	268	A	MRR 5 (20N/30E)	-50.0	-60.0	DEB Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-2570	15	268	B	MRR 5 (20N/30E)	-50.0	-60.0	DEB Grasshopper Group	4.6	NM	Visually assigned source
CA-MOD-2570	15	268	C	MRR 5 (20N/30E)	-50.0	-60.0	DEB Grasshopper Group	5.5	4.8	Visually assigned source
CA-MOD-2570	15	268	D	MRR 5 (20N/30E)	-50.0	-60.0	DEB Grasshopper Group	4.6	NM	Visually assigned source
CA-MOD-2570	15	268	E	MRR 5 (20N/30E)	-50.0	-60.0	DEB Grasshopper Group	1.1	NM	Visually assigned source
CA-MOD-2570	15	273	-	ISO (19.95N/28.9E)	0.0	0.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2570	15	307	-	SC (14N/10E)	0.0	0.0	PPT Unknown B	5.7	NM	—
CA-MOD-2570	15	371	A	MRR 2 (8N/30E)	0.0	-10.0	DEB Grasshopper Group	3.2	NM	Visually assigned source
CA-MOD-2570	15	371	B	MRR 2 (8N/30E)	0.0	-10.0	DEB Grasshopper Group	6.7	NM	Visually assigned source
CA-MOD-2570	15	371	C	MRR 2 (8N/30E)	0.0	-10.0	DEB Grasshopper Group	3.5	NM	Visually assigned source
CA-MOD-2570	15	371	D	MRR 2 (8N/30E)	0.0	-10.0	DEB Grasshopper Group	6.5	NM	Visually assigned source
CA-MOD-2570	15	371	E	MRR 2 (8N/30E)	0.0	-10.0	DEB Grasshopper Group	DH	NM	Visually assigned source
CA-MOD-2570	15	383	A	MRR 2 (8N/30E)	-50.0	-60.0	DEB Grasshopper Group	3.9	NM	Visually assigned source
CA-MOD-2570	15	383	B	MRR 2 (8N/30E)	-50.0	-60.0	DEB Grasshopper Group	1.3	NM	Visually assigned source
CA-MOD-2570	15	383	C	MRR 2 (8N/30E)	-50.0	-60.0	DEB Grasshopper Group	5.6	NM	Visually assigned source
CA-MOD-2570	15	383	D	MRR 2 (8N/30E)	-50.0	-60.0	DEB Grasshopper Group	2.5	NM	Visually assigned source
CA-MOD-2570	15	383	E	MRR 2 (8N/30E)	-50.0	-60.0	DEB Grasshopper Group	2.4	NM	Visually assigned source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-2570	15	427	A EXU (9S/30W)	0.0	-10.0	DEB Unknown C	3.7	NM	—
CA-MOD-2570	15	427	B EXU (9S/30W)	0.0	-10.0	DEB East Medicine Lake	6.9	NM	—
CA-MOD-2570	15	427	C EXU (9S/30W)	0.0	-10.0	DEB East Medicine Lake	3.1	NM	—
CA-MOD-2570	15	427	D EXU (9S/30W)	0.0	-10.0	DEB East Medicine Lake	5.2	NM	—
CA-MOD-2570	15	429	A EXU (9S/30W)	-10.0	-20.0	DEB East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2570	15	429	B EXU (9S/30W)	-10.0	-20.0	DEB East Medicine Lake	6.1	NM	—
CA-MOD-2570	15	429	C EXU (9S/30W)	-10.0	-20.0	DEB East Medicine Lake	4.9	NM	—
CA-MOD-2570	15	429	D EXU (9S/30W)	-10.0	-20.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2570	15	429	E EXU (9S/30W)	-10.0	-20.0	DEB East Medicine Lake	5.6	NM	—
CA-MOD-2570	15	431	A EXU (9S/30W)	-20.0	-30.0	DEB East Medicine Lake	5.6	NM	—
CA-MOD-2570	15	431	B EXU (9S/30W)	-20.0	-30.0	DEB East Medicine Lake	7.7	NM	—
CA-MOD-2570	15	431	C EXU (9S/30W)	-20.0	-30.0	DEB East Medicine Lake	5.7	NM	—
CA-MOD-2570	15	431	D EXU (9S/30W)	-20.0	-30.0	DEB East Medicine Lake	7.3	NM	—
CA-MOD-2570	15	432	A EXU (9S/30W)	-30.0	-40.0	DEB East Medicine Lake	5.6	NM	—
CA-MOD-2570	15	432	B EXU (9S/30W)	-30.0	-40.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2570	15	432	C EXU (9S/30W)	-30.0	-40.0	DEB East Medicine Lake	4.9	NM	—
CA-MOD-2570	15	432	D EXU (9S/30W)	-30.0	-40.0	DEB East Medicine Lake	5.0	NM	—
CA-MOD-2570	15	432	E EXU (9S/30W)	-30.0	-40.0	DEB East Medicine Lake	5.1	NM	—
CA-MOD-2570	15	432	F EXU (9S/30W)	-30.0	-40.0	DEB GF/LIW/RS	5.0	NM	—
CA-MOD-2570	15	436	- EXU (9S/30W)	-50.0	-60.0	DEB East Medicine Lake	5.1	NM	—
CA-MOD-2571	29	29	A STU 20 (46N/0W)	0.0	-10.0	DEB East Medicine Lake	4.8	NM	Grasshopper Group visual source
CA-MOD-2571	29	29	B STU 20 (46N/0W)	0.0	-10.0	DEB East Medicine Lake	5.2	NM	Grasshopper Group visual source
CA-MOD-2571	29	29	C STU 20 (46N/0W)	0.0	-10.0	DEB East Medicine Lake	4.7	NM	Grasshopper Group visual source
CA-MOD-2571	29	29	D STU 20 (46N/0W)	0.0	-10.0	DEB East Medicine Lake	4.4	NM	Grasshopper Group visual source
CA-MOD-2571	29	29	E STU 20 (46N/0W)	0.0	-10.0	DEB East Medicine Lake	1.1	NM	Grasshopper Group visual source
CA-MOD-2571	29	68	A SC (30N/0E)	0.0	0.0	DEB East Medicine Lake	3.0	NM	—
CA-MOD-2571	29	68	B SC (30N/0E)	0.0	0.0	DEB East Medicine Lake	4.4	NM	—
CA-MOD-2571	29	68	C SC (30N/0E)	0.0	0.0	DEB Cougar Butte	1.4	NM	—
CA-MOD-2571	29	68	D SC (30N/0E)	0.0	0.0	DEB East Medicine Lake	5.3	NM	—
CA-MOD-2571	29	68	E SC (30N/0E)	0.0	0.0	DEB Cougar Butte	5.7	NM	—
CA-MOD-2571	29	109	A MRR 3 (30N/10E)	0.0	-10.0	DEB East Medicine Lake	4.6	NM	—
CA-MOD-2571	29	109	B MRR 3 (30N/10E)	0.0	-10.0	DEB Cougar Butte	5.5	NM	—
CA-MOD-2571	29	109	C MRR 3 (30N/10E)	0.0	-10.0	DEB East Medicine Lake	5.2	NM	—
CA-MOD-2571	29	109	D MRR 3 (30N/10E)	0.0	-10.0	DEB East Medicine Lake	NM	NM	Unreadable slide
CA-MOD-2571	29	109	E MRR 3 (30N/10E)	0.0	-10.0	DEB East Medicine Lake	4.6	NM	—
CA-MOD-2571	29	119	A MRR 3 (30N/10E)	-30.0	-40.0	DEB East Medicine Lake	3.6	NM	—
CA-MOD-2571	29	119	B MRR 3 (30N/10E)	-30.0	-40.0	DEB East Medicine Lake	2.4	NM	—
CA-MOD-2571	29	119	C MRR 3 (30N/10E)	-30.0	-40.0	DEB East Medicine Lake	4.4	NM	—
CA-MOD-2571	29	119	D MRR 3 (30N/10E)	-30.0	-40.0	DEB East Medicine Lake	5.7	2.6	2 hydration rims
CA-MOD-2571	29	119	E MRR 3 (30N/10E)	-30.0	-40.0	DEB Blue Mountain	2.1	NM	—
CA-MOD-2571	29	135	- ISO	0.0	0.0	PPT East Medicine Lake	NM	NM	No OH measurement

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
							1	2	
CA-MOD-2571	29	136	- ISO	0.0	0.0	BIF Cougar Butte	NM	NM	No OH measurement
CA-MOD-2571	29	138	- ISO	0.0	0.0	BIF East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2571	29	139	- ISO	0.0	0.0	BIF Buck Mountain	NM	NM	No OH measurement
CA-MOD-2571	29	146	- ISO	0.0	0.0	PPT East Medicine Lake	4.8	7.2	2 hydration rims
CA-MOD-2571	29	150	- ISO	0.0	0.0	PPT East Medicine Lake	NM	NM	—
CA-MOD-2571	29	151	- ISO	0.0	0.0	PPT East Medicine Lake	4.7	4.0	2 hydration rims
CA-MOD-2571	29	152	- ISO	0.0	0.0	BIF Blue Mountain	NM	NM	No OH measurement
CA-MOD-2571	29	155	- ISO	0.0	0.0	PPT East Medicine Lake	3.7	NM	—
CA-MOD-2571	29	156	- ISO	0.0	0.0	PPT Sugar Hill	3.6	NM	—
CA-MOD-2572	30	35	A STU 15 (40N/20W)	0.0	-10.0	DEB Grasshopper Group	2.9	NM	Visually assigned source
CA-MOD-2572	30	35	B STU 15 (40N/20W)	0.0	-10.0	DEB East Medicine Lake	4.6	NM	Grasshopper Group visual source
CA-MOD-2572	30	35	C STU 15 (40N/20W)	0.0	-10.0	DEB East Medicine Lake	3.0	NM	Grasshopper Group visual source
CA-MOD-2572	30	35	D STU 15 (40N/20W)	0.0	-10.0	DEB East Medicine Lake	1.1	NM	Grasshopper Group visual source
CA-MOD-2572	30	37	A STU 15 (40N/20W)	0.0	-10.0	DEB Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-2572	30	57	A MRR 1 (40N/19W)	0.0	-10.0	DEB East Medicine Lake	4.2	NM	Grasshopper Group visual source
CA-MOD-2572	30	57	B MRR 1 (40N/19W)	0.0	-10.0	DEB East Medicine Lake	1.6	NM	Grasshopper Group visual source
CA-MOD-2572	30	57	C MRR 1 (40N/19W)	0.0	-10.0	DEB East Medicine Lake	1.0	NM	Grasshopper Group visual source
CA-MOD-2572	30	57	D MRR 1 (40N/19W)	0.0	-10.0	DEB East Medicine Lake	4.1	NM	Grasshopper Group visual source
CA-MOD-2572	30	84	A MRR 1 (40N/19W)	-50.0	-60.0	DEB Grasshopper Group	4.2	NM	Visually assigned source
CA-MOD-2572	30	84	B MRR 1 (40N/19W)	-50.0	-60.0	DEB Grasshopper Group	2.9	NM	Visually assigned source
CA-MOD-2572	30	84	C MRR 1 (40N/19W)	-50.0	-60.0	DEB Grasshopper Group	4.1	NM	Visually assigned source
CA-MOD-2572	30	84	D MRR 1 (40N/19W)	-50.0	-60.0	DEB East Medicine Lake	4.1	NM	Grasshopper Group visual source
CA-MOD-2572	30	104	- STU 27 (43N/50W)	0.0	-10.0	PPT East Medicine Lake	1.0	NM	—
CA-MOD-2572	30	122	A MRR 2 (39N/78W)	0.0	-10.0	DEB East Medicine Lake	4.1	NM	Grasshopper Group visual source
CA-MOD-2572	30	130	A MRR 2 (39N/78W)	-20.0	-30.0	DEB Grasshopper Group	2.3	NM	Visually assigned source
CA-MOD-2572	30	141	A STU 38 (50N/95W)	0.0	-10.0	DEB Grasshopper Group	3.7	NM	Visually assigned source
CA-MOD-2572	30	141	B STU 38 (50N/95W)	0.0	-10.0	DEB Grasshopper Group	5.1	NM	Visually assigned source
CA-MOD-2572	30	141	C STU 38 (50N/95W)	0.0	-10.0	DEB East Medicine Lake	3.7	NM	Grasshopper Group visual source
CA-MOD-2572	30	143	- STU 38 (50N/95W)	0.0	-10.0	DEB Grasshopper Group	NVB	NM	Visually assigned source
CA-MOD-2572	30	189	- ISO	0.0	0.0	PPT East Medicine Lake	2.8	NM	—
CA-MOD-2572	30	190	- ISO	0.0	0.0	PPT Buck Mountain	4.7	NM	—
CA-MOD-2572	30	195	- ISO	0.0	0.0	BIF Rainbow Mines	NM	NM	No OH measurement
CA-MOD-2572	30	196	- ISO	0.0	0.0	PPT Blue Mountain	2.8	NM	—
CA-MOD-2572	30	232	- EXU (20S/39W)	-10.0	-20.0	PPT East Medicine Lake	4.9	NM	—
CA-MOD-2572	30	273	- EXU (30S/38.5W)	-20.0	-30.0	PPT East Medicine Lake	4.8	NM	—
CA-MOD-2572	30	298	A EXU (38S/32W)	0.0	-10.0	DEB East Medicine Lake	3.8	NM	—
CA-MOD-2572	30	298	B EXU (38S/32W)	0.0	-10.0	DEB East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2572	30	298	C EXU (38S/32W)	0.0	-10.0	DEB East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2572	30	298	D EXU (38S/32W)	0.0	-10.0	DEB East Medicine Lake	4.0	NM	Weathered
CA-MOD-2572	30	298	E EXU (38S/32W)	0.0	-10.0	DEB East Medicine Lake	5.4	NM	—
CA-MOD-2572	30	300	A EXU (38S/32W)	-20.0	-30.0	DEB East Medicine Lake	5.2	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
							1	2			
CA-MOD-2572	30	300	B	EXU (38S/32W)	-20.0	-30.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2572	30	300	C	EXU (38S/32W)	-20.0	-30.0	DEB	East Medicine Lake	6.5	NM	—
CA-MOD-2572	30	300	D	EXU (38S/32W)	-20.0	-30.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2572	30	300	E	EXU (38S/32W)	-20.0	-30.0	DEB	East Medicine Lake	4.1	NM	—
CA-MOD-2572	30	301	A	EXU (38S/32W)	-30.0	-40.0	DEB	East Medicine Lake	5.1	NM	—
CA-MOD-2572	30	301	B	EXU (38S/32W)	-30.0	-40.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2572	30	301	C	EXU (38S/32W)	-30.0	-40.0	DEB	East Medicine Lake	5.3	NM	—
CA-MOD-2572	30	302	A	EXU (38S/32W)	-40.0	-50.0	DEB	East Medicine Lake	5.5	NM	—
CA-MOD-2572	30	302	B	EXU (38S/32W)	-40.0	-50.0	DEB	East Medicine Lake	4.9	NM	—
CA-MOD-2572	30	309	A	EXU (38S/32W)	0.0	-10.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2572	30	309	B	EXU (38S/32W)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2572	30	309	C	EXU (38S/32W)	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2572	30	309	D	EXU (38S/32W)	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2572	30	309	E	EXU (38S/32W)	0.0	-10.0	DEB	East Medicine Lake	6.1	NM	—
CA-MOD-2572	30	311	A	EXU (38S/32W)	-20.0	-30.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2572	30	311	B	EXU (38S/32W)	-20.0	-30.0	DEB	East Medicine Lake	4.9	NM	—
CA-MOD-2572	30	311	C	EXU (38S/32W)	-20.0	-30.0	DEB	East Medicine Lake	4.9	NM	—
CA-MOD-2572	30	311	D	EXU (38S/32W)	-20.0	-30.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-2572	30	311	E	EXU (38S/33W)	-20.0	-30.0	DEB	East Medicine Lake	4.4	NM	—
CA-MOD-2572	30	314	A	EXU (38S/33W)	-40.0	-50.0	DEB	East Medicine Lake	5.0	NM	—
CA-MOD-2572	30	314	B	EXU (38S/33W)	-40.0	-50.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2572	30	314	C	EXU (38S/33W)	-40.0	-50.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2572	30	314	D	EXU (38S/33W)	-40.0	-50.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2572	30	314	E	EXU (38S/33W)	-40.0	-50.0	DEB	Grasshopper Group	4.8	NM	—
CA-MOD-2573	1	1	-	SCP 1	0.0	0.0	BIF	East Medicine Lake	6.5	NM	—
CA-MOD-2573	2	1	-	SCP 2	0.0	0.0	EMP	Spodue Mountain	7.2	NM	—
CA-MOD-2573	11	5	-	STU 8	0.0	-10.0	EMP	East Medicine Lake	9.2	NM	—
CA-MOD-2573	171	1	B	TEU 1	0.0	-10.0	DEB	East Medicine Lake	8.0	NM	—
CA-MOD-2573	171	1	C	TEU 1	0.0	-10.0	DEB	East Medicine Lake	10.5	NM	—
CA-MOD-2573	171	1	D	TEU 1	0.0	-10.0	DEB	East Medicine Lake	7.9	NM	—
CA-MOD-2573	172	1	A	TEU 1	0.0	-10.0	DEB	East Medicine Lake	8.0	NM	—
CA-MOD-2573	173	1	B	TEU 1	-10.0	-20.0	DEB	East Medicine Lake	1.6	NM	—
CA-MOD-2573	173	1	C	TEU 1	-10.0	-20.0	DEB	East Medicine Lake	6.5	NM	—
CA-MOD-2573	175	2	B	TEU 1	-20.0	-30.0	DEB	Glass Mountain	3.5	NM	—
CA-MOD-2573	175	2	C	TEU 1	-20.0	-30.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2573	175	2	D	TEU 1	-20.0	-30.0	DEB	East Medicine Lake	8.3	NM	—
CA-MOD-2573	177	1	-	TEU 1	-30.0	-40.0	DEB	East Medicine Lake	6.6	NM	—
CA-MOD-2573	177	2	C	TEU 1	-30.0	-40.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2573	178	1	A	TEU 1	-30.0	-40.0	DEB	East Medicine Lake	7.6	NM	—
CA-MOD-2573	179	1	A	TEU 1	-40.0	-50.0	DEB	East Medicine Lake	6.9	NM	—
CA-MOD-2573	179	1	B	TEU 1	-40.0	-50.0	DEB	East Medicine Lake	7.5	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-2573	181	1	A	TEU 1	-50.0	-60.0	DEB	Drews Creek/Butcher Flat	6.3	NM	—
CA-MOD-2573	181	1	C	TEU 1	-50.0	-60.0	DEB	GF/LIW/RS	5.7	NM	—
CA-MOD-2573	182	1	-	TEU 1	-50.0	-60.0	DEB	GF/LIW/RS	7.5	NM	—
CA-MOD-2573	182	1	-	TEU 1	-40.0	-50.0	DEB	Cougar Butte	9.2	NM	—
CA-MOD-2573	183	1	A	TEU 1	-60.0	-70.0	DEB	East Medicine Lake	6.6	NM	—
CA-MOD-2573	184	1	A	TEU 1	-60.0	-70.0	DEB	East Medicine Lake	6.9	NM	—
CA-MOD-2573	184	1	B	TEU 1	-60.0	-70.0	DEB	East Medicine Lake	7.2	NM	—
CA-MOD-2573	185	1	A	TEU 1	-70.0	-80.0	DEB	East Medicine Lake	7.4	NM	—
CA-MOD-2573	185	1	C	TEU 1	-70.0	-80.0	DEB	East Medicine Lake	7.0	NM	—
CA-MOD-2573	185	1	D	TEU 1	-70.0	-80.0	DEB	East Medicine Lake	7.0	NM	—
CA-MOD-2573	188	1	A	TEU 1	-80.0	-90.0	DEB	East Medicine Lake	7.7	NM	—
CA-MOD-2573	188	1	B	TEU 1	-80.0	-90.0	DEB	East Medicine Lake	8.0	NM	—
CA-MOD-2573	189	1	A	TEU 1	-90.0	-100.0	DEB	East Medicine Lake	6.6	NM	—
CA-MOD-2573	189	1	B	TEU 1	-90.0	-100.0	DEB	Blue Mountain	3.7	NM	—
CA-MOD-2573	192	1	-	TEU 1	-100.0	-110.0	DEB	East Medicine Lake	7.7	NM	—
CA-MOD-2574	36	57	-	STU (98S/0W)	0.0	-10.0	PPT	Cowhead Lake	NM	NM	No OH measurement
CA-MOD-2574	36	69	-	STU (25S/0W)	0.0	-10.0	PPT	Silver Lake/Sycan Marsh	2.7	NM	—
CA-MOD-2574	36	77	-	STU (65S/0W)	0.0	-10.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2574	36	85	-	STU (0N/0W)	0.0	-10.0	PPT	Unknown B	2.8	NM	—
CA-MOD-2574	36	108	-	ISO	0.0	0.0	PPT	East Medicine Lake	4.6	NM	—
CA-MOD-2574	36	109	-	ISO	0.0	0.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2574	36	111	-	ISO	0.0	0.0	UFT	Cougar Butte	NM	NM	No OH measurement
CA-MOD-2574	36	112	-	ISO	0.0	0.0	BIF	Cowhead Lake	NM	NM	No OH measurement
CA-MOD-2574	36	113	-	ISO	0.0	0.0	DEB	Spodue Mountain	NM	NM	No OH measurement
CA-MOD-2574	36	115	-	ISO	0.0	0.0	PPT	East Medicine Lake	4.5	NM	—
CA-MOD-2574	36	117	-	ISO	0.0	0.0	UFT	Sugar Hill	4.0	5.8	2 hydration rims
CA-MOD-2574	36	118	-	ISO	0.0	0.0	PPT	Buck Mountain	3.5	NM	—
CA-MOD-2574	36	143	A	EXU (57S/21W)	0.0	-10.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-2574	36	143	B	EXU (57S/21W)	0.0	-10.0	DEB	Glass Mountain	3.0	NM	—
CA-MOD-2574	36	143	C	EXU (57S/21W)	0.0	-10.0	DEB	Glass Mountain	3.8	NM	—
CA-MOD-2574	36	143	D	EXU (57S/21W)	0.0	-10.0	DEB	Glass Mountain	2.0	NM	—
CA-MOD-2574	36	143	E	EXU (57S/21W)	0.0	-10.0	DEB	Glass Mountain	1.3	NM	—
CA-MOD-2574	36	145	A	EXU (57S/21W)	-10.0	-20.0	DEB	Glass Mountain	3.1	NM	—
CA-MOD-2574	36	145	B	EXU (57S/21W)	-10.0	-20.0	DEB	East Medicine Lake	1.3	NM	—
CA-MOD-2574	36	145	C	EXU (57S/21W)	-10.0	-20.0	DEB	Glass Mountain	3.7	NM	—
CA-MOD-2574	36	145	D	EXU (57S/21W)	-10.0	-20.0	DEB	Unknown C	1.9	NM	—
CA-MOD-2574	36	145	E	EXU (57S/21W)	-10.0	-20.0	DEB	Glass Mountain	2.9	NM	—
CA-MOD-2574	36	150	A	EXU (57S/21W)	-20.0	-30.0	DEB	East Medicine Lake	2.4	NM	—
CA-MOD-2574	36	150	B	EXU (57S/21W)	-20.0	-30.0	DEB	East Medicine Lake	5.8	NM	—
CA-MOD-2574	36	150	C	EXU (57S/21W)	-20.0	-30.0	DEB	Glass Mountain	1.6	NM	—
CA-MOD-2574	36	150	D	EXU (57S/21W)	-20.0	-30.0	DEB	Glass Mountain	DH	NM	Diffuse hydration

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-MOD-2574	36	150	E	EXU (57S/21W)	-20.0	-30.0	DEB	Glass Mountain	2.5	NM	—
CA-MOD-2574	36	152	-	EXU (57S/21W)	-20.0	-30.0	PPT	Drews Creek/Butcher Flat	3.8	NM	—
CA-MOD-2574	36	154	A	EXU (57S/21W)	-30.0	-40.0	DEB	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2574	36	154	B	EXU (57S/21W)	-30.0	-40.0	DEB	East Medicine Lake	4.6	NM	—
CA-MOD-2574	36	154	C	EXU (57S/21W)	-30.0	-40.0	DEB	Glass Mountain	2.9	NM	—
CA-MOD-2574	36	154	D	EXU (57S/21W)	-30.0	-40.0	DEB	Glass Mountain	2.5	NM	—
CA-MOD-2574	36	154	E	EXU (57S/21W)	-30.0	-40.0	DEB	East Medicine Lake	4.7	NM	—
CA-MOD-2574	36	157	A	EXU (57S/21W)	-40.0	-50.0	DEB	Glass Mountain	4.4	NM	—
CA-MOD-2574	36	157	B	EXU (57S/21W)	-40.0	-50.0	DEB	Glass Mountain	DH	NM	Weathered; Diffuse hydration
CA-MOD-2574	36	157	C	EXU (57S/21W)	-40.0	-50.0	DEB	Glass Mountain	3.1	NM	—
CA-MOD-2574	36	157	D	EXU (57S/21W)	-40.0	-50.0	DEB	Glass Mountain	2.6	NM	—
CA-MOD-2574	36	157	E	EXU (57S/21W)	-40.0	-50.0	DEB	East Medicine Lake	2.5	NM	—
CA-MOD-2574	36	159	A	EXU (57S/21W)	-50.0	-60.0	DEB	Blue Mountain	1.9	NM	—
CA-MOD-2574	36	159	B	EXU (57S/21W)	-50.0	-60.0	DEB	Glass Mountain	2.0	NM	—
CA-MOD-2574	36	159	C	EXU (57S/21W)	-50.0	-60.0	DEB	Not obsidian	NVB	NM	No visible band
CA-MOD-2574	36	159	D	EXU (57S/21W)	-50.0	-60.0	DEB	Not obsidian	NVB	NM	No visible band
CA-MOD-2574	36	159	E	EXU (57S/21W)	-50.0	-60.0	DEB	Glass Mountain	2.2	NM	—
CA-MOD-2574	36	163	-	EXU (58S/20W)	-10.0	-20.0	PPT	Cougar Butte	3.3	NM	—
CA-MOD-2574	36	175	-	EXU (59S/20W)	0.0	-10.0	PPT	East Medicine Lake	1.6	NM	—
CA-MOD-2575	1	1	-	STU 1	0.0	-10.0	DEB	Glass Mountain	2.7	NM	—
CA-MOD-2575	4	1	-	STU 4	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2575	17	1	-	SHP 3	0.0	-20.0	DEB	East Medicine Lake	3.0	NM	—
CA-MOD-2575	34	1	-	SHP 7	-40.0	-60.0	EMP	Buck Mountain	3.6	NM	—
CA-MOD-2575	37	3	A	STU (8N/0W)	0.0	-10.0	DEB	Cougar Butte	5.8	NM	—
CA-MOD-2575	37	5	A	STU (28N/1W)	0.0	-10.0	DEB	Glass Mountain	3.6	NM	—
CA-MOD-2575	37	5	B	STU (28N/1W)	0.0	-10.0	DEB	Spodue Mountain	DH	NM	Weathered; Diffuse hydration
CA-MOD-2575	37	19	-	STU 1	0.0	-10.0	BIF	Blue Mountain	NM	NM	No OH measurement
CA-MOD-2575	37	20	-	STU 1	0.0	-10.0	EMP	East Medicine Lake	NM	NM	No OH measurement
CA-MOD-2575	37	21	A	STU 1	0.0	-10.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-2575	37	21	B	STU 1	0.0	-10.0	DEB	Grasshopper Group	1.8	NM	Visually assigned source
CA-MOD-2575	37	21	C	STU 1	0.0	-10.0	DEB	Grasshopper Group	2.7	NM	Visually assigned source
CA-MOD-2575	37	21	D	STU 1	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	Visually assigned source
CA-MOD-2575	37	21	E	STU 1	0.0	-10.0	DEB	Grasshopper Group	DH	NM	Visually assigned source
CA-MOD-2575	37	21	F	STU 1	0.0	-10.0	DEB	Grasshopper Group	2.7	NM	Visually assigned source
CA-MOD-2575	37	21	G	STU 1	0.0	-10.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2575	37	21	H	STU 1	0.0	-10.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-MOD-2575	37	21	I	STU 1	0.0	-10.0	DEB	East Medicine Lake	2.1	NM	Visually assigned source
CA-MOD-2575	37	21	J	STU 1	0.0	-10.0	DEB	Grasshopper Group	2.6	NM	Visually assigned source
CA-MOD-2575	37	29	A	MRR (0N/1W)	-10.0	-20.0	EMP	East Medicine Lake	4.7	NM	—
CA-MOD-2575	37	29	B	MRR (0N/1W)	-10.0	-20.0	DEB	Glass Mountain	3.7	NM	—
CA-MOD-2575	37	34	-	MRR (0N/1W)	-20.0	-30.0	DEB	Grasshopper Group	3.3	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
					1	2					
CA-MOD-2575	37	35	A	MRR (0N/1W)	-20.0	-30.0	DEB	Cougar Butte	7.2	NM	—
CA-MOD-2575	37	35	B	MRR (0N/1W)	-20.0	-30.0	DEB	East Medicine Lake	4.6	NM	—
CA-MOD-2575	37	42	-	ISO	0.0	0.0	BIF	East Medicine Lake	3.9	NM	—
CA-MOD-2575	37	42	-	ISO	0.0	0.0	BIF	East Medicine Lake	3.5	NM	—
CA-MOD-2575	37	43	-	ISO	0.0	0.0	EMP	Blue Mountain	1.4	NM	No OH measurement
CA-MOD-2575	37	43	-	ISO	0.0	0.0	EMP	Blue Mountain	NM	NM	—
CA-MOD-2575	43	1	-	SHP 10	0.0	-20.0	EMP	Cougar Butte	1.8	NM	—
CA-MOD-2575	49	1	-	SHP 13	0.0	-20.0	EMP	East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-MOD-2627	39	9	-	STU 6 (100N/0W)	0.0	-20.0	DEB	East Medicine Lake	4.0	NM	Grasshopper Group visual source
CA-MOD-2627	39	17	A	STU 10 (180N/0W)	0.0	-20.0	DEB	East Medicine Lake	1.8	NM	Grasshopper Group visual source
CA-MOD-2627	39	19	A	STU 11 (200N/0W)	0.0	-20.0	DEB	East Medicine Lake	3.4	NM	Grasshopper Group visual source
CA-MOD-2627	39	29	-	STU 14 (260N/0W)	0.0	-20.0	DEB	East Medicine Lake	4.3	NM	Grasshopper Group visual source
CA-MOD-2627	39	32	A	STU 5 (280N/0W)	0.0	-20.0	DEB	East Medicine Lake	4.3	NM	Grasshopper Group visual source
CA-MOD-2627	39	49	A	STU 67 (420N/0W)	0.0	-20.0	DEB	East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2627	39	49	B	STU 67 (420N/0W)	0.0	-20.0	DEB	Grasshopper Group	3.0	NM	Visually assigned source
CA-MOD-2627	39	49	C	STU 67 (420N/0W)	0.0	-20.0	DEB	East Medicine Lake	3.5	NM	Grasshopper Group visual source
CA-MOD-2627	39	73	-	STU 23 (180N/0W)	0.0	-20.0	PPT	East Medicine Lake	4.0	NM	—
CA-MOD-2627	39	75	A	STU 24 (210N/0W)	0.0	-20.0	DEB	East Medicine Lake	NM	NM	Grasshopper Group visual source
CA-MOD-2627	39	87	-	STU 64 (330N/0W)	0.0	-20.0	PPT	East Medicine Lake	3.2	NM	—
CA-MOD-2627	39	88	A	STU 64 (330N/0W)	0.0	-20.0	DEB	East Medicine Lake	4.7	NM	Grasshopper Group visual source
CA-MOD-2627	39	97	-	STU 70 (390N/0W)	0.0	-20.0	DEB	East Medicine Lake	3.0	NM	—
CA-MOD-2627	39	164	-	STU 59 (0N/130E)	0.0	-20.0	UFT	Blue Mountain	NM	NM	—
CA-MOD-2627	39	236	-	MRR 2 (0N/120E)	-50.0	-60.0	DEB	East Medicine Lake	4.1	NM	—
CA-MOD-2627	39	278	A	MRR 5 (0N/120E)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	No OH measurement
CA-MOD-2627	39	278	B	MRR 5 (0N/120E)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	No OH measurement
CA-MOD-2627	39	278	C	MRR 5 (0N/120E)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	No OH measurement
CA-MOD-2627	39	278	D	MRR 5 (0N/120E)	0.0	-10.0	DEB	Grasshopper Group	3.9	NM	—
CA-MOD-2627	39	289	-	MRR 5 (0N/120E)	-20.0	-30.0	PPT	East Medicine Lake	4.6	NM	—
CA-MOD-2627	39	292	A	MRR 5 (0N/120E)	-20.0	-30.0	DEB	Grasshopper Group	5.9	NM	—
CA-MOD-2627	39	292	B	MRR 5 (0N/120E)	-20.0	-30.0	DEB	Grasshopper Group	3.7	NM	—
CA-MOD-2627	39	314	A	MRR 6 (350N/0W)	-20.0	-30.0	DEB	Grasshopper Group	4.4	NM	—
CA-MOD-2627	39	341	-	SHP 8 (290N/0W)	0.0	-10.0	PPT	Blue Mountain	2.0	NM	—
CA-MOD-2627	39	375	-	ISO	0.0	0.0	PPT	CL/DC/BF	5.0	NM	—
CA-MOD-2627	39	377	-	ISO	0.0	0.0	PPT	CL/DC/BF	7.1	NM	—
CA-MOD-2627	39	378	-	ISO	0.0	0.0	PPT	East Medicine Lake	3.2	NM	—
CA-MOD-2627	39	379	-	ISO	0.0	0.0	UFT	East Medicine Lake	3.3	3.0	2 hydration rims
CA-MOD-2627	39	380	-	ISO	0.0	0.0	BIF	Spodue Mountain	NM	NM	—
CA-MOD-2627	39	383	-	ISO	0.0	0.0	UFT	Buck Mountain	NM	NM	—
CA-MOD-2627	39	384	-	ISO	0.0	0.0	BIF	Cowhead Lake	NM	NM	—
CA-MOD-2627	39	385	-	ISO	0.0	0.0	PPT	Spodue Mountain	4.5	NM	—
CA-MOD-2627	39	386	-	ISO	0.0	0.0	BIF	Spodue Mountain	NM	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-MOD-2627	39	391	-	ISO	0.0	0.0	PPT	Cougar Butte	4.8	NM	—
CA-MOD-2627	39	394	-	ISO	0.0	0.0	PPT	CL/DC/BF	1.1	NM	—
CA-MOD-2627	39	465	-	EXU (87S/70E)	-20.0	-30.0	PPT	Spodue Mountain	5.5	NM	—
CA-MOD-2627	39	473	-	EXU (88S/70E)	-10.0	-20.0	DEB	Cougar Butte	4.3	NM	—
CA-MOD-2627	39	474	A	EXU (88S/70E)	-20.0	-30.0	DEB	Glass Mountain	2.5	NM	—
CA-MOD-2627	39	474	B	EXU (88S/70E)	-20.0	-30.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-2627	39	476	A	EXU (88S/70E)	-30.0	-40.0	DEB	Glass Mountain	2.5	NM	—
CA-MOD-2627	39	476	B	EXU (88S/70E)	-30.0	-40.0	DEB	Glass Mountain	2.3	NM	—
CA-MOD-2627	39	478	-	EXU (88S/70E)	-40.0	-50.0	DEB	Glass Mountain	2.4	NM	—
CA-MOD-2627	39	509	-	EXU (130S/E)	0.0	-10.0	DEB	Blue Mountain	2.0	NM	—
CA-MOD-2627	39	510	A	EXU (130S/E)	-10.0	-20.0	DEB	East Medicine Lake	5.6	NM	—
CA-MOD-2627	39	510	B	EXU (130S/E)	-10.0	-20.0	DEB	Cougar Butte	VW	NM	Weathered; Variable width band
CA-MOD-2627	39	512	A	EXU (130S/E)	-20.0	-30.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2627	39	512	B	EXU (130S/E)	-20.0	-30.0	DEB	East Medicine Lake	NVB	NM	No visible band
CA-MOD-2627	39	512	C	EXU (130S/E)	-20.0	-30.0	DEB	East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2627	39	514	-	EXU (130S/E)	-30.0	-40.0	DEB	Blue Mountain	2.8	NM	—
CA-MOD-2646	17	12	-	EXU (26S/75W)	0.0	-10.0	PPT	East Medicine Lake	4.1	NM	—
CA-MOD-2646	17	14	A	EXU (46S/6E)	0.0	-10.0	DEB	East Medicine Lake	3.8	NM	—
CA-MOD-2646	17	14	B	EXU (46S/6E)	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2646	17	14	C	EXU (46S/6E)	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	—
CA-MOD-2646	17	14	D	EXU (46S/6E)	0.0	-10.0	DEB	East Medicine Lake	1.8	NM	—
CA-MOD-2646	17	14	E	EXU (46S/6E)	0.0	-10.0	DEB	East Medicine Lake	4.1	NM	—
CA-MOD-2646	17	18	A	EXU (46S/6E)	-20.0	-30.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2646	17	18	B	EXU (46S/6E)	-20.0	-30.0	DEB	East Medicine Lake	2.9	NM	—
CA-MOD-2646	17	18	C	EXU (46S/6E)	-20.0	-30.0	DEB	East Medicine Lake	3.8	NM	—
CA-MOD-2646	17	18	D	EXU (46S/6E)	-20.0	-30.0	DEB	East Medicine Lake	3.9	NM	—
CA-MOD-2646	17	18	E	EXU (46S/6E)	-20.0	-30.0	DEB	East Medicine Lake	4.3	NM	—
CA-MOD-2646	17	22	A	EXU (46S/6E)	-40.0	-50.0	DEB	East Medicine Lake	3.4	NM	—
CA-MOD-2646	17	22	B	EXU (46S/6E)	-40.0	-50.0	DEB	East Medicine Lake	3.4	NM	—
CA-MOD-2646	17	22	C	EXU (46S/6E)	-40.0	-50.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-2646	17	22	D	EXU (46S/6E)	-40.0	-50.0	DEB	East Medicine Lake	4.0	NM	—
CA-MOD-2646	17	22	E	EXU (46S/6E)	-40.0	-50.0	DEB	East Medicine Lake	3.4	NM	—
CA-MOD-2646	17	24	A	EXU (47S/6E)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Diffuse hydration
CA-MOD-2646	17	24	B	EXU (47S/6E)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2646	17	24	C	EXU (47S/6E)	0.0	-10.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2646	17	24	D	EXU (47S/6E)	0.0	-10.0	DEB	East Medicine Lake	3.7	NM	—
CA-MOD-2646	17	24	E	EXU (47S/6E)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	—
CA-MOD-2646	17	29	A	EXU (47S/6E)	-20.0	-30.0	DEB	East Medicine Lake	3.2	NM	—
CA-MOD-2646	17	29	B	EXU (47S/6E)	-20.0	-30.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2646	17	29	C	EXU (47S/6E)	-20.0	-30.0	DEB	East Medicine Lake	3.5	NM	—
CA-MOD-2646	17	29	D	EXU (47S/6E)	-20.0	-30.0	DEB	East Medicine Lake	3.4	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
					1	2					
CA-MOD-2646	17	29	E	EXU (47S/6E)	-20.0	-30.0	DEB	East Medicine Lake	3.3	NM	—
CA-MOD-2646	17	34	A	EXU (47S/6E)	-30.0	-40.0	DEB	East Medicine Lake	3.7	5.1	2 hydration bands
CA-MOD-2646	17	34	B	EXU (47S/6E)	-30.0	-40.0	DEB	East Medicine Lake	2.6	NM	—
CA-MOD-2646	17	34	C	EXU (47S/6E)	0.0	-10.0	DEB	East Medicine Lake	2.7	NM	—
CA-MOD-2646	17	35	A	EXU (47S/6E)	-30.0	-40.0	DEB	East Medicine Lake	2.8	NM	—
CA-MOD-2646	17	35	B	EXU (47S/6E)	-30.0	-40.0	DEB	East Medicine Lake	3.1	NM	—
CA-MOD-2904	6	1	-	SCP 5	0.0	0.0	PPT	East Medicine Lake	5.0	NM	—
CA-SHA-68/H	47	1	-	STU 1 (160N/10W)	0.0	-10.0	BIF	Buck Mountain	0.9	NM	—
CA-SHA-68/H	47	13	-	STU 2 (160N/10W)	0.0	-10.0	BIF	East Medicine Lake	2.9	NM	—
CA-SHA-68/H	47	39	A	STU 9 (100N/15E)	0.0	-10.0	DEB	Grasshopper Group	2.5	NM	Visually assigned source
CA-SHA-68/H	47	39	B	STU 9 (100N/15E)	0.0	-10.0	DEB	Grasshopper Group	4.4	NM	Visually assigned source
CA-SHA-68/H	47	39	C	STU 9 (100N/15E)	0.0	-10.0	DEB	Grasshopper Group	1.1	NM	Visually assigned source
CA-SHA-68/H	47	39	D	STU 9 (100N/15E)	0.0	-10.0	DEB	East Medicine Lake	1.0	NM	Grasshopper Group visual source
CA-SHA-68/H	47	39	E	STU 9 (100N/15E)	0.0	-10.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-SHA-68/H	47	39	F	STU 9 (100N/15E)	0.0	-10.0	DEB	Grasshopper Group	1.1	NM	Visually assigned source
CA-SHA-68/H	47	39	G	STU 9 (100N/15E)	0.0	-10.0	DEB	Grasshopper Group	2.3	NM	Visually assigned source
CA-SHA-68/H	47	39	H	STU 9 (100N/15E)	0.0	-10.0	DEB	Grasshopper Group	3.1	NM	Visually assigned source
CA-SHA-68/H	47	39	I	STU 9 (100N/15E)	0.0	-10.0	DEB	East Medicine Lake	1.1	NM	Grasshopper Group visual source
CA-SHA-68/H	47	39	J	STU 9 (100N/15E)	0.0	-10.0	DEB	Grasshopper Group	1.6	NM	Visually assigned source
CA-SHA-68/H	47	43	-	STU 9 (100N/15E)	0.0	-10.0	BIF	GF/LIW/RS	DH	NM	Diffuse hydration
CA-SHA-68/H	47	78	-	STU 13 (100N/30E)	0.0	-10.0	PPT	East Medicine Lake	2.9	NM	—
CA-SHA-68/H	47	107	-	STU 21 (100N/25E)	0.0	-10.0	PPT	East Medicine Lake	1.7	NM	—
CA-SHA-68/H	47	108	-	STU 21 (100N/25E)	0.0	-10.0	PPT	Buck Mountain	1.4	NM	—
CA-SHA-68/H	47	109	-	STU 21 (100N/25E)	0.0	-10.0	BIF	East Medicine Lake	1.0	NM	—
CA-SHA-68/H	47	111	-	STU 21 (100N/25E)	0.0	-10.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-68/H	47	124	-	STU 22 (80N/25E)	0.0	-10.0	BIF	Grasshopper Group	2.0	NM	—
CA-SHA-68/H	47	125	-	STU 22 (80N/25E)	0.0	-10.0	PFT	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-68/H	47	154	-	STU 26 (40S/20E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-68/H	47	170	A	TEU 1 (70N/25E)	0.0	-10.0	DEB	East Medicine Lake	1.7	NM	Grasshopper Group visual source
CA-SHA-68/H	47	170	B	TEU 1 (70N/25E)	0.0	-10.0	DEB	Grasshopper Group	1.8	NM	Visually assigned source
CA-SHA-68/H	47	170	C	TEU 1 (70N/25E)	0.0	-10.0	DEB	Buck Mountain	1.7	NM	Grasshopper Group visual source
CA-SHA-68/H	47	170	D	TEU 1 (70N/25E)	0.0	-10.0	DEB	Grasshopper Group	DH	NM	Diffuse hydration
CA-SHA-68/H	47	170	E	TEU 1 (70N/25E)	0.0	-10.0	DEB	Grasshopper Group	2.5	NM	Visually assigned source
CA-SHA-68/H	47	170	F	TEU 1 (70N/25E)	0.0	-10.0	DEB	Grasshopper Group	1.7	NM	Visually assigned source
CA-SHA-68/H	47	170	G	TEU 1 (70N/25E)	0.0	-10.0	DEB	Grasshopper Group	2.6	NM	Visually assigned source
CA-SHA-68/H	47	170	H	TEU 1 (70N/25E)	0.0	-10.0	DEB	Grasshopper Group	1.0	NM	Visually assigned source
CA-SHA-68/H	47	170	I	TEU 1 (70N/25E)	0.0	-10.0	DEB	Grasshopper Group	1.7	NM	Visually assigned source
CA-SHA-68/H	47	170	J	TEU 1 (70N/25E)	0.0	-10.0	DEB	Grasshopper Group	2.1	NM	Visually assigned source
CA-SHA-68/H	47	176	-	MRR (70N/25E)	-20.0	-30.0	PPT	East Medicine Lake	3.2	NM	—
CA-SHA-68/H	47	178	-	MRR (70N/25E)	-30.0	-40.0	PPT	Not sourced	4.3	6.7	—
CA-SHA-68/H	47	183	-	TEU 1 (70N/25E)	-40.0	-50.0	PPT	Tuscan	NM	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-SHA-68/H	47	186	A	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-SHA-68/H	47	186	B	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-SHA-68/H	47	186	C	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	2.9	NM	Visually assigned source
CA-SHA-68/H	47	186	D	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	2.6	NM	Visually assigned source
CA-SHA-68/H	47	186	E	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	1.8	NM	Visually assigned source
CA-SHA-68/H	47	186	F	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	2.1	NM	Visually assigned source
CA-SHA-68/H	47	186	G	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	3.4	NM	Visually assigned source
CA-SHA-68/H	47	186	H	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	2.8	NM	Visually assigned source
CA-SHA-68/H	47	186	I	TEU 1 (70N/25E)	-50.0	-60.0	DEB	Grasshopper Group	2.2	NM	Visually assigned source
CA-SHA-68/H	47	186	J	TEU 1 (70N/25E)	-50.0	-60.0	DEB	East Medicine Lake	3.9	NM	Grasshopper Group visual source
CA-SHA-68/H	47	247	A	TEU 2	-50.0	-60.0	DEB	Unknown A	NM	NM	No OH measurement
CA-SHA-68/H	47	261	-	TEU 2	-70.0	-80.0	PFT	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-68/H	47	267	-	TEU 2	-90.0	-100.0	PPT	Tuscan	1.0	NM	—
CA-SHA-68/H	47	346	-	ISO	0.0	0.0	BIF	East Medicine Lake	2.6	NM	—
CA-SHA-68/H	47	350	-	SCP 6	0.0	0.0	BIF	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-68/H	47	352	-	ISO	0.0	0.0	UFT	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-68/H	47	364	-	SCP 10	0.0	0.0	PPT	GF/LIW/RS	DH	NM	Weathered; Diffuse hydration
CA-SHA-68/H	47	367	-	SCP 13	0.0	0.0	PPT	East Medicine Lake	1.5	NM	—
CA-SHA-68/H	47	368	-	SCP 14	0.0	0.0	PPT	Unknown B	1.3	NM	—
CA-SHA-68/H	47	374	-	SCP 2	0.0	0.0	BIF	GF/LIW/RS	3.9	NM	—
CA-SHA-68/H	47	381	-	SCP 27	0.0	0.0	BIF	East Medicine Lake	4.1	NM	—
CA-SHA-68/H	47	382	-	SCP 28	0.0	0.0	PPT	East Medicine Lake	2.5	NM	—
CA-SHA-68/H	47	480	-	EXU (0N/45E)	-70.0	-80.0	PPT	Grasshopper Group	3.5	NM	—
CA-SHA-68/H	47	492	-	EXU (0N/45E)	-100.0	-110.0	PPT	East Medicine Lake	3.5	NM	—
CA-SHA-68/H	47	493	-	MRR (0N/45E)	-100.0	-110.0	PFT	East Medicine Lake	4.0	NM	—
CA-SHA-68/H	47	595	-	EXU (0N/57E)	-30.0	-40.0	PPT	Buck Mountain	5.8	NM	—
CA-SHA-68/H	47	628	-	MRR (0N/58E)	0.0	-10.0	BIF	GF/LIW/RS	4.3	NM	—
CA-SHA-68/H	47	665	-	EXU (1S/57E)	-10.0	-20.0	PPT	Tuscan	2.5	NM	—
CA-SHA-68/H	47	719	-	EXU (1S/58E)	-20.0	-30.0	PPT	Buck Mountain	2.7	NM	—
CA-SHA-68/H	47	748	-	EXU (9N/59E)	0.0	-10.0	PPT	Grasshopper Group	3.9	NM	—
CA-SHA-68/H	47	776	-	EXU (9N/59E)	-50.0	-60.0	PPT	East Medicine Lake	4.6	NM	—
CA-SHA-68/H	47	788	-	EXU (10N/59E)	0.0	-10.0	PPT	Buck Mountain	5.0	NM	—
CA-SHA-68/H	47	806	-	EXU (10N/59E)	-30.0	-40.0	PPT	GF/LIW/RS	4.4	NM	—
CA-SHA-68/H	47	824	-	EXU (9N/60E)	0.0	-10.0	PPT	Grasshopper Group	3.1	NM	—
CA-SHA-68/H	47	837	-	EXU (9N/60E)	-20.0	-30.0	PPT	Grasshopper Group	3.6	NM	—
CA-SHA-68/H	47	850	-	EXU (9N/60E)	-40.0	-50.0	PPT	East Medicine Lake	3.6	NM	—
CA-SHA-68/H	47	852	-	EXU (9N/60E)	-50.0	-60.0	PPT	Grasshopper Group	4.0	NM	—
CA-SHA-68/H	47	869	A	EXU (10N/60E)	-100.0	-110.0	DEB	GF/LIW/RS	3.6	NM	—
CA-SHA-68/H	47	869	B	EXU (10N/60E)	-10.0	-20.0	DEB	East Medicine Lake	4.1	NM	—
CA-SHA-68/H	47	869	C	EXU (10N/60E)	-10.0	-20.0	DEB	East Medicine Lake	3.8	NM	—
CA-SHA-68/H	47	869	D	EXU (10N/60E)	-10.0	-20.0	DEB	East Medicine Lake	3.6	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-SHA-68/H	47	869	E	EXU (10N/60E)	-10.0	-20.0	DEB	GF/LIW/RS	2.4	NM	—
CA-SHA-68/H	47	882	A	EXU (10N/60E)	-40.0	-50.0	DEB	GF/LIW/RS	4.1	NM	—
CA-SHA-68/H	47	882	B	EXU (10N/60E)	-40.0	-50.0	DEB	GF/LIW/RS	4.6	NM	—
CA-SHA-68/H	47	882	C	EXU (10N/60E)	-40.0	-50.0	DEB	East Medicine Lake	4.6	NM	—
CA-SHA-68/H	47	882	D	EXU (10N/60E)	-40.0	-50.0	DEB	East Medicine Lake	4.6	NM	—
CA-SHA-68/H	47	882	E	EXU (10N/60E)	-40.0	-50.0	DEB	East Medicine Lake	4.6	NM	—
CA-SHA-68/H	47	895	A	EXU (10N/60E)	-100.0	-110.0	DEB	GF/LIW/RS	4.8	NM	—
CA-SHA-68/H	47	895	B	EXU (10N/60E)	-100.0	-110.0	DEB	GF/LIW/RS	4.1	NM	—
CA-SHA-68/H	47	895	C	EXU (10N/60E)	-100.0	-110.0	DEB	East Medicine Lake	3.0	NM	—
CA-SHA-68/H	47	895	D	EXU (10N/60E)	-100.0	-110.0	DEB	GF/LIW/RS	4.7	NM	—
CA-SHA-68/H	47	895	E	EXU (10N/60E)	-100.0	-110.0	DEB	East Medicine Lake	4.8	NM	—
CA-SHA-68/H	47	953	-	EXU (19N/30E)	-20.0	-30.0	PPT	East Medicine Lake	3.9	NM	—
CA-SHA-68/H	47	954	-	EXU (19N/30E)	-20.0	-30.0	PPT	East Medicine Lake	2.9	NM	—
CA-SHA-68/H	47	984	A	EXU (20N/30E)	-20.0	-30.0	DEB	East Medicine Lake	4.2	NM	—
CA-SHA-68/H	47	984	B	EXU (20N/30E)	-20.0	-30.0	DEB	East Medicine Lake	1.9	NM	—
CA-SHA-68/H	47	984	C	EXU (20N/30E)	-20.0	-30.0	DEB	GF/LIW/RS	4.3	7.1	2 hydration bands
CA-SHA-68/H	47	984	D	EXU (20N/30E)	-20.0	-30.0	DEB	East Medicine Lake	4.2	NM	—
CA-SHA-68/H	47	984	E	EXU (20N/30E)	-20.0	-30.0	DEB	East Medicine Lake	1.7	NM	—
CA-SHA-68/H	47	1001	A	EXU (20N/30E)	-40.0	-50.0	DEB	GF/LIW/RS	3.0	NM	—
CA-SHA-68/H	47	1001	B	EXU (20N/30E)	-40.0	-50.0	DEB	GF/LIW/RS	4.7	NM	—
CA-SHA-68/H	47	1001	C	EXU (20N/30E)	-40.0	-50.0	DEB	GF/LIW/RS	4.5	NM	—
CA-SHA-68/H	47	1001	D	EXU (20N/30E)	-40.0	-50.0	DEB	East Medicine Lake	4.2	NM	—
CA-SHA-68/H	47	1001	E	EXU (20N/30E)	-40.0	-50.0	DEB	East Medicine Lake	4.9	NM	—
CA-SHA-68/H	47	1010	A	EXU (20N/30E)	-80.0	-90.0	DEB	GF/LIW/RS	4.3	NM	—
CA-SHA-68/H	47	1010	B	EXU (20N/30E)	-80.0	-90.0	DEB	East Medicine Lake	4.1	NM	—
CA-SHA-68/H	47	1010	C	EXU (20N/30E)	-80.0	-90.0	DEB	East Medicine Lake	3.0	NM	—
CA-SHA-68/H	47	1010	D	EXU (20N/30E)	-80.0	-90.0	DEB	East Medicine Lake	3.5	NM	—
CA-SHA-68/H	47	1010	E	EXU (20N/30E)	-80.0	-90.0	DEB	East Medicine Lake	4.4	NM	—
CA-SHA-68/H	47	1039	A	EXU (40N/24E)	-10.0	-20.0	DEB	East Medicine Lake	4.1	NM	—
CA-SHA-68/H	47	1039	B	EXU (40N/24E)	-10.0	-20.0	DEB	East Medicine Lake	4.4	NM	—
CA-SHA-68/H	47	1039	C	EXU (40N/24E)	-10.0	-20.0	DEB	East Medicine Lake	4.5	NM	—
CA-SHA-68/H	47	1039	D	EXU (40N/24E)	-10.0	-20.0	DEB	GF/LIW/RS	3.7	NM	—
CA-SHA-68/H	47	1039	E	EXU (40N/24E)	-10.0	-20.0	DEB	East Medicine Lake	4.1	NM	—
CA-SHA-68/H	47	1047	A	EXU (40N/24E)	-40.0	-50.0	DEB	East Medicine Lake	3.4	NM	—
CA-SHA-68/H	47	1047	B	EXU (40N/24E)	-40.0	-50.0	DEB	East Medicine Lake	3.8	NM	—
CA-SHA-68/H	47	1047	C	EXU (40N/24E)	-40.0	-50.0	DEB	GF/LIW/RS	2.3	NM	—
CA-SHA-68/H	47	1047	D	EXU (40N/24E)	-40.0	-50.0	DEB	GF/LIW/RS	2.9	NM	—
CA-SHA-68/H	47	1047	E	EXU (40N/24E)	-40.0	-50.0	DEB	East Medicine Lake	3.2	NM	—
CA-SHA-68/H	47	1057	A	EXU (40N/24E)	-90.0	-100.0	DEB	East Medicine Lake	3.9	NM	—
CA-SHA-68/H	47	1057	B	EXU (40N/24E)	-90.0	-100.0	DEB	East Medicine Lake	2.6	NM	—
CA-SHA-68/H	47	1057	C	EXU (40N/24E)	-90.0	-100.0	DEB	GF/LIW/RS	3.9	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-SHA-68/H	471057	D	EXU (40N/24E)	-90.0	-100.0	DEB	East Medicine Lake	4.3	NM	—
CA-SHA-68/H	471057	E	EXU (40N/24E)	-90.0	-100.0	DEB	GF/LIW/RS	4.3	NM	—
CA-SHA-68/H	471153	A	EXU (60N/0W)	-10.0	-20.0	DEB	East Medicine Lake	2.5	NM	—
CA-SHA-68/H	471153	B	EXU (60N/0W)	-10.0	-20.0	DEB	East Medicine Lake	2.9	NM	—
CA-SHA-68/H	471153	C	EXU (60N/0W)	-10.0	-20.0	DEB	East Medicine Lake	4.9	NM	—
CA-SHA-68/H	471153	D	EXU (60N/0W)	-10.0	-20.0	DEB	GF/LIW/RS	DH	NM	Diffuse hydration
CA-SHA-68/H	471153	E	EXU (60N/0W)	-10.0	-20.0	DEB	GF/LIW/RS	3.2	NM	—
CA-SHA-68/H	471198	A	EXU (60N/0W)	-40.0	-50.0	DEB	GF/LIW/RS	4.4	NM	—
CA-SHA-68/H	471198	B	EXU (60N/0W)	-40.0	-50.0	DEB	GF/LIW/RS	3.3	NM	—
CA-SHA-68/H	471198	C	EXU (60N/0W)	-40.0	-50.0	DEB	GF/LIW/RS	2.6	NM	—
CA-SHA-68/H	471198	D	EXU (60N/0W)	-40.0	-50.0	DEB	GF/LIW/RS	3.7	NM	—
CA-SHA-68/H	471198	E	EXU (60N/0W)	-40.0	-50.0	DEB	East Medicine Lake	2.2	NM	—
CA-SHA-68/H	471222	A	EXU (60N/0W)	-80.0	-90.0	DEB	East Medicine Lake	3.8	NM	—
CA-SHA-68/H	471222	B	EXU (60N/0W)	-80.0	-90.0	DEB	East Medicine Lake	3.7	NM	—
CA-SHA-68/H	471222	C	EXU (60N/0W)	-80.0	-90.0	DEB	East Medicine Lake	4.2	NM	—
CA-SHA-68/H	471225	A	EXU (60N/0W)	-90.0	-100.0	DEB	GF/LIW/RS	2.4	NM	—
CA-SHA-68/H	471225	B	EXU (60N/0W)	-90.0	-100.0	DEB	GF/LIW/RS	3.7	NM	—
CA-SHA-68/H	471332	-	EXU (7S/50E)	-40.0	-50.0	PPT	Buck Mountain	4.1	NM	—
CA-SHA-68/H	471333	-	EXU (7S/50E)	-40.0	-50.0	PPT	Tuscan	2.3	NM	Weathered
CA-SHA-68/H	471343	-	EXU (7S/50E)	-50.0	-60.0	PPT	Buck Mountain	4.0	NM	—
CA-SHA-68/H	471413	-	EXU (8S/50E)	-10.0	-20.0	PPT	East Medicine Lake	2.6	NM	—
CA-SHA-68/H	471457	-	MRR (8S/50E)	-70.0	-80.0	BIF	Grasshopper Group	4.1	NM	—
CA-SHA-68/H	471464	-	MRR (8S/50E)	-80.0	-90.0	BIF	GF/LIW/RS	4.1	NM	—
CA-SHA-68/H	471482	-	MRR (8S/50E)	-100.0	-110.0	PPT	Not sourced	3.0	NM	—
CA-SHA-68/H	472020	A	EXU (8S/60E)	-10.0	-20.0	DEB	East Medicine Lake	2.4	NM	—
CA-SHA-68/H	472020	B	EXU (8S/60E)	-10.0	-20.0	DEB	GF/LIW/RS	2.4	NM	—
CA-SHA-68/H	472020	C	EXU (8S/60E)	-10.0	-20.0	DEB	Glass Mountain	1.7	NM	—
CA-SHA-68/H	472020	D	EXU (8S/60E)	-10.0	-20.0	DEB	East Medicine Lake	2.2	NM	—
CA-SHA-68/H	472020	E	EXU (8S/60E)	-10.0	-20.0	DEB	East Medicine Lake	4.2	NM	—
CA-SHA-68/H	472034	A	EXU (8S/60E)	-40.0	-50.0	DEB	East Medicine Lake	3.2	NM	—
CA-SHA-68/H	472034	B	EXU (8S/60E)	-40.0	-50.0	DEB	East Medicine Lake	4.7	NM	—
CA-SHA-68/H	472034	C	EXU (8S/60E)	-40.0	-50.0	DEB	East Medicine Lake	3.7	NM	—
CA-SHA-68/H	472034	D	EXU (8S/60E)	-40.0	-50.0	DEB	East Medicine Lake	3.0	NM	—
CA-SHA-68/H	472034	E	EXU (8S/60E)	-40.0	-50.0	DEB	East Medicine Lake	3.5	NM	—
CA-SHA-68/H	472056	A	EXU (8S/60E)	-110.0	-120.0	DEB	GF/LIW/RS	4.2	NM	—
CA-SHA-68/H	472056	B	EXU (8S/60E)	-110.0	-120.0	DEB	GF/LIW/RS	3.7	NM	—
CA-SHA-68/H	472056	C	EXU (8S/60E)	-110.0	-120.0	DEB	GF/LIW/RS	2.8	NM	—
CA-SHA-68/H	472056	D	EXU (8S/60E)	-110.0	-120.0	DEB	East Medicine Lake	3.8	NM	—
CA-SHA-68/H	472056	E	EXU (8S/60E)	-110.0	-120.0	DEB	GF/LIW/RS	3.7	NM	—
CA-SHA-68/H	472064	-	MRR (9S/60E)	0.0	-10.0	PPT	Not sourced	3.8	NM	—
CA-SHA-68/H	472079	-	EXU (9S/60E)	-30.0	-40.0	PPT	Tuscan	1.3	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-SHA-68/H	472112	-	EXU (18S/60E)	0.0	-10.0	PPT	East Medicine Lake	1.4	NM	—
CA-SHA-68/H	472127	-	EXU (19S/60E)	0.0	-10.0	PPT	East Medicine Lake	4.5	NM	—
CA-SHA-68/H	472137	A	EXU (20S/35E)	-10.0	-20.0	DEB	East Medicine Lake	5.9	NM	—
CA-SHA-68/H	472137	B	EXU (20S/35E)	-10.0	-20.0	DEB	GF/LIW/RS	3.6	NM	—
CA-SHA-68/H	472137	C	EXU (20S/35E)	-10.0	-20.0	DEB	East Medicine Lake	3.7	NM	—
CA-SHA-68/H	472137	D	EXU (20S/35E)	-10.0	-20.0	DEB	East Medicine Lake	1.4	NM	—
CA-SHA-68/H	472137	E	EXU (20S/35E)	-10.0	-20.0	DEB	East Medicine Lake	1.7	NM	—
CA-SHA-68/H	472143	A	EXU (20S/35E)	-40.0	-50.0	DEB	GF/LIW/RS	3.6	NM	—
CA-SHA-68/H	472143	B	EXU (20S/35E)	-40.0	-50.0	DEB	GF/LIW/RS	2.4	NM	—
CA-SHA-68/H	472143	C	EXU (20S/35E)	-40.0	-50.0	DEB	GF/LIW/RS	2.6	NM	—
CA-SHA-68/H	472143	D	EXU (20S/35E)	-40.0	-50.0	DEB	East Medicine Lake	2.6	NM	—
CA-SHA-68/H	472143	E	EXU (20S/35E)	-40.0	-50.0	DEB	GF/LIW/RS	4.6	NM	—
CA-SHA-68/H	472150	A	EXU (20S/35E)	-70.0	-8.0	DEB	East Medicine Lake	4.5	NM	—
CA-SHA-68/H	472150	B	EXU (20S/35E)	-70.0	-80.0	DEB	GF/LIW/RS	4.0	NM	—
CA-SHA-68/H	472150	C	EXU (20S/35E)	-70.0	-80.0	DEB	GF/LIW/RS	3.7	NM	—
CA-SHA-68/H	472150	D	EXU (20S/35E)	-70.0	-80.0	DEB	GF/LIW/RS	3.1	NM	—
CA-SHA-68/H	472150	E	EXU (20S/35E)	-70.0	-80.0	DEB	East Medicine Lake	NVB	NM	No visible band
CA-SHA-68/H	472167	-	SCP 2001	0.0	0.0	BIF	GF/LIW/RS	2.8	NM	—
CA-SHA-68/H	472168	-	SCP 2002	0.0	0.0	PPT	GF/LIW/RS	1.3	NM	—
CA-SHA-68/H	472175	-	STU (61N/2E)	0.0	-10.0	PPT	East Medicine Lake	2.5	4.2	2 hydration bands
CA-SHA-68/H	472177	-	STU (60N/2E)	0.0	-10.0	PPT	East Medicine Lake	3.2	NM	—
CA-SHA-68/H	472179	-	STU (59N/2E)	0.0	-10.0	PPT	Grasshopper Group	4.0	NM	—
CA-SHA-68/H	472253	-	EXU (63N/10E)	-10.0	-20.0	PPT	GF/LIW/RS	3.9	NM	—
CA-SHA-68/H	472294	-	EXU (70N/10W)	0.0	-10.0	BIF	GF/LIW/RS	4.0	NM	—
CA-SHA-1474	2721712	-	EXU (51N/40E)	0.0	-10.0	DEB	East Medicine Lake	1.8	NM	—
CA-SHA-1474	2721712	A	EXU (51N/40E)	0.0	-10.0	DEB	East Medicine Lake	4.7	NM	—
CA-SHA-1474	2721712	B	EXU (51N/40E)	0.0	-10.0	DEB	East Medicine Lake	0.9	NM	Weathered
CA-SHA-1474	2721712	C	EXU (51N/40E)	0.0	-10.0	DEB	East Medicine Lake	1.0	NM	Weathered
CA-SHA-1474	2721712	D	EXU (51N/40E)	0.0	-10.0	DEB	Tuscan	3.2	NM	—
CA-SHA-1474	2721725	-	EXU (51N/40E)	-20.0	-30.0	DEB	East Medicine Lake	4.9	NM	—
CA-SHA-1474	2721725	A	EXU (51N/40E)	-20.0	-30.0	DEB	GF/LIW/RS	4.8	NM	—
CA-SHA-1474	2721725	B	EXU (51N/40E)	-20.0	-30.0	DEB	Grasshopper Group	3.4	NM	—
CA-SHA-1474	2721725	C	EXU (51N/40E)	-20.0	-30.0	DEB	East Medicine Lake	3.7	NM	—
CA-SHA-1474	2721725	D	EXU (51N/40E)	-20.0	-30.0	DEB	East Medicine Lake	3.3	NM	—
CA-SHA-1474	2721732	-	EXU (51N/40E)	-40.0	-50.0	DEB	East Medicine Lake	5.7	NM	—
CA-SHA-1474	2721732	A	EXU (51N/40E)	-40.0	-50.0	DEB	East Medicine Lake	4.8	NM	—
CA-SHA-1474	2721732	B	EXU (51N/40E)	-40.0	-50.0	DEB	Buck Mountain	DH	NM	Diffuse hydration
CA-SHA-1474	2721732	C	EXU (51N/40E)	-40.0	-50.0	DEB	East Medicine Lake	5.0	NM	—
CA-SHA-1474	2721732	D	EXU (51N/40E)	-40.0	-50.0	DEB	East Medicine Lake	6.1	NM	—
CA-SHA-1474	2721736	-	EXU (51N/40E)	-50.0	-60.0	DEB	East Medicine Lake	5.0	NM	—
CA-SHA-1474	2721736	A	EXU (51N/40E)	-50.0	-60.0	DEB	East Medicine Lake	4.7	5.8	2 hydration bands

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-SHA-1474	272	1736	B EXU (51N/40E)	-50.0	-60.0	DEB	East Medicine Lake	6.1	NM	—
CA-SHA-1474	272	1736	C EXU (51N/40E)	-50.0	-60.0	DEB	East Medicine Lake	5.3	NM	—
CA-SHA-1474	272	1736	D EXU (51N/40E)	-50.0	-60.0	DEB	East Medicine Lake	5.6	NM	—
CA-SHA-1474	272	1752	- EXU (51N/40E)	-80.0	-90.0	PPT	Not sourced	4.6	NM	—
CA-SHA-1474	272	1754	- EXU (51N/40E)	-90.0	-100.0	DEB	East Medicine Lake	6.1	NM	—
CA-SHA-1474	272	1754	A EXU (51N/40E)	-90.0	-100.0	DEB	East Medicine Lake	4.4	NM	—
CA-SHA-1474	272	1754	B EXU (51N/40E)	-90.0	-100.0	DEB	East Medicine Lake	5.8	NM	—
CA-SHA-1474	272	1754	C EXU (51N/40E)	-90.0	-100.0	DEB	East Medicine Lake	5.6	NM	—
CA-SHA-1474	272	1754	D EXU (51N/40E)	-90.0	-100.0	DEB	East Medicine Lake	4.6	NM	—
CA-SHA-1474	272	1760	A EXU (51N/40E)	-110.0	-110.0	DEB	East Medicine Lake	6.7	NM	—
CA-SHA-1474	272	1760	B EXU (51N/40E)	-110.0	-110.0	DEB	East Medicine Lake	6.9	NM	—
CA-SHA-1836	22	1	- ISO	0.0	0.0	PPT	East Medicine Lake	NM	NM	—
CA-SHA-1836	22	2	- ISO	0.0	0.0	PPT	East Medicine Lake	2.9	NM	—
CA-SHA-1836	22	3	- ISO	0.0	0.0	BIF	East Medicine Lake	3.0	2.3	2 hydration rims
CA-SHA-1837	23	1	- ISO	0.0	0.0	DEB	East Medicine Lake	3.2	NM	—
CA-SHA-1837	23	2	- ISO	0.0	0.0	DEB	Cougar Butte	NM	NM	No OH measurement
CA-SHA-1837	23	3	- ISO	0.0	0.0	DEB	East Medicine Lake	3.1	NM	—
CA-SHA-1837	23	4	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	5	- ISO	0.0	0.0	DEB	East Medicine Lake	3.0	NM	—
CA-SHA-1837	23	6	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	7	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	8	- ISO	0.0	0.0	DEB	East Medicine Lake	3.7	NM	—
CA-SHA-1837	23	9	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	10	- ISO	0.0	0.0	DEB	East Medicine Lake	2.0	NM	—
CA-SHA-1837	23	11	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	12	- ISO	0.0	0.0	BIF	East Medicine Lake	2.1	NM	—
CA-SHA-1837	23	13	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	14	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	15	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	16	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	17	- ISO	0.0	0.0	DEB	East Medicine Lake	3.1	NM	—
CA-SHA-1837	23	18	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	19	- ISO	0.0	0.0	DEB	East Medicine Lake	2.0	NM	—
CA-SHA-1837	23	20	- ISO	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SHA-1837	23	21	- ISO	0.0	0.0	DEB	East Medicine Lake	1.9	NM	—
CA-SHA-1837	23	22	- ISO	0.0	0.0	DEB	East Medicine Lake	3.5	2.4	2 hydration rims
CA-SHA-1837	23	23	- ISO	0.0	0.0	BIF	East Medicine Lake	3.8	NM	—
CA-SHA-1837	23	24	- SCP 27	0.0	0.0	PPT	East Medicine Lake	4.1	NM	—
CA-SHA-1838/H	45	1	- STU 2 (10N/10W)	0.0	-10.0	BIF	Grasshopper Group	2.8	NM	—
CA-SHA-1838/H	45	2	- STU 2 (10N/10W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	No OH measurement
CA-SHA-1838/H	45	4	- STU 3 (20N/10W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	No OH measurement

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-SHA-1838/H	45	5	-	STU 5 (0N/20W)	0.0	-10.0	DEB	Grasshopper Group	2.9	NM	—
CA-SHA-1838/H	45	7	-	STU 7 (20N/20W)	0.0	-10.0	DEB	Grasshopper Group	2.2	NM	—
CA-SHA-1838/H	45	10	-	STU 8 (20N/20W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	No OH measurement
CA-SHA-1838/H	45	11	-	STU 9 (20N/20W)	0.0	-10.0	DEB	Grasshopper Group	1.7	NM	—
CA-SHA-1838/H	45	13	-	STU 10 (30N/20W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	No OH measurement
CA-SHA-1838/H	45	21	-	MRR 2 (0N/30W)	-10.0	-20.0	DEB	Grasshopper Group	NM	NM	No OH measurement
CA-SHA-1838/H	45	26	-	SCP 1	0.0	0.0	PPT	GF/LIW/RS	3.9	NM	—
CA-SHA-1838/H	45	29	-	SCP 4	0.0	0.0	PPT	GF/LIW/RS	DH	NM	Diffuse hydration
CA-SHA-1838/H	45	30	-	SCP 5	0.0	0.0	PPT	East Medicine Lake	7.4	NM	—
CA-SHA-1838/H	45	33	-	SCP 8	0.0	0.0	PPT	Buck Mountain	2.2	NM	—
CA-SHA-1838/H	45	64	-	EXU (0N/10E)	-20.0	-30.0	PPT	East Medicine Lake	2.9	NM	—
CA-SHA-1838/H	45	85	A	EXU (10S/54W)	0.0	-10.0	DEB	Grasshopper Group	1.4	NM	—
CA-SHA-1838/H	45	85	B	EXU (10S/54W)	0.0	-10.0	DEB	East Medicine Lake	1.4	NM	—
CA-SHA-1838/H	45	85	C	EXU (10S/54W)	0.0	-10.0	DEB	East Medicine Lake	3.9	NM	—
CA-SHA-1838/H	45	85	D	EXU (10S/54W)	0.0	-10.0	DEB	Not sourced	5.5	NM	—
CA-SHA-1838/H	45	85	E	EXU (10S/54W)	0.0	-10.0	DEB	East Medicine Lake	4.9	NM	—
CA-SHA-1838/H	45	88	A	EXU (10S/54W)	0.0	-10.0	DEB	East Medicine Lake	2.9	NM	—
CA-SHA-1838/H	45	88	B	EXU (10S/54W)	0.0	-10.0	DEB	East Medicine Lake	3.8	NM	—
CA-SHA-1838/H	45	88	C	EXU (10S/54W)	0.0	-10.0	DEB	East Medicine Lake	3.8	NM	—
CA-SHA-1838/H	45	88	D	EXU (10S/54W)	0.0	-10.0	DEB	East Medicine Lake	3.4	NM	—
CA-SHA-1838/H	45	88	E	EXU (10S/54W)	0.0	-10.0	DEB	East Medicine Lake	2.8	NM	—
CA-SHA-1838/H	45	100	A	EXU (10S/54W)	-40.0	-50.0	DEB	East Medicine Lake	4.2	NM	—
CA-SHA-1838/H	45	100	B	EXU (10S/54W)	-40.0	-50.0	DEB	East Medicine Lake	4.6	NM	—
CA-SHA-1838/H	45	100	C	EXU (10S/54W)	-40.0	-50.0	DEB	East Medicine Lake	4.4	NM	—
CA-SHA-1838/H	45	100	D	EXU (10S/54W)	-40.0	-50.0	DEB	East Medicine Lake	4.5	NM	—
CA-SHA-1838/H	45	100	E	EXU (10S/54W)	-40.0	-50.0	DEB	East Medicine Lake	3.7	NM	—
CA-SHA-1838/H	45	112	A	EXU (10S/54W)	-60.0	-70.0	DEB	East Medicine Lake	4.5	NM	—
CA-SHA-1838/H	45	112	B	EXU (10S/54W)	-60.0	-70.0	DEB	East Medicine Lake	4.6	NM	—
CA-SHA-1838/H	45	112	C	EXU (10S/54W)	-60.0	-70.0	DEB	East Medicine Lake	4.7	NM	—
CA-SHA-1838/H	45	112	D	EXU (10S/54W)	-60.0	-70.0	DEB	East Medicine Lake	4.5	NM	—
CA-SHA-1838/H	45	112	E	EXU (10S/54W)	-60.0	-70.0	DEB	East Medicine Lake	4.2	NM	—
CA-SHA-1838/H	45	113	-	MRR (10S/54W)	-60.0	-70.0	PPT	GF/LIW/RS	4.4	5.4	—
CA-SHA-1838/H	45	122	A	EXU (10S/54W)	-80.0	-90.0	DEB	East Medicine Lake	4.7	NM	—
CA-SHA-1838/H	45	122	B	EXU (10S/54W)	-80.0	-90.0	DEB	East Medicine Lake	4.8	NM	—
CA-SHA-1838/H	45	122	C	EXU (10S/54W)	-80.0	-90.0	DEB	East Medicine Lake	5.0	NM	—
CA-SHA-1838/H	45	122	D	EXU (10S/54W)	-80.0	-90.0	DEB	East Medicine Lake	4.4	NM	—
CA-SHA-1838/H	45	122	E	EXU (10S/54W)	-80.0	-90.0	DEB	East Medicine Lake	3.9	NM	—
CA-SHA-1838/H	45	129	A	EXU (10S/54W)	-100.0	-110.0	DEB	East Medicine Lake	4.1	6.1	2 hydration bands
CA-SHA-1838/H	45	129	B	EXU (10S/54W)	-100.0	-110.0	DEB	Grasshopper Group	4.9	NM	—
CA-SHA-1838/H	45	129	C	EXU (10S/54W)	-100.0	-110.0	DEB	East Medicine Lake	4.1	NM	—
CA-SHA-1838/H	45	129	D	EXU (10S/54W)	-100.0	-110.0	DEB	GF/LIW/RS	5.1	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
					1	2					
CA-SHA-1838/H	45	134	A	EXU (10S/54W)	-120.0	-130.0	DEB	East Medicine Lake	6.1	NM	—
CA-SHA-1838/H	45	134	B	EXU (10S/54W)	-120.0	-130.0	DEB	East Medicine Lake	5.2	NM	—
CA-SHA-1838/H	45	134	C	EXU (10S/54W)	-120.0	-130.0	DEB	East Medicine Lake	5.0	NM	—
CA-SHA-1838/H	45	134	D	EXU (10S/54W)	-120.0	-130.0	DEB	Grasshopper Group	4.9	NM	—
CA-SHA-1838/H	45	134	E	EXU (10S/54W)	-120.0	-130.0	DEB	Grasshopper Group	4.9	NM	—
CA-SHA-1838/H	45	136	A	EXU (10S/54W)	-130.0	-140.0	DEB	Grasshopper Group	5.0	NM	—
CA-SHA-1838/H	45	136	B	EXU (10S/54W)	-130.0	-140.0	DEB	GF/LIW/RS	4.6	NM	—
CA-SHA-1838/H	45	138	-	EXU (10S/54W)	-140.0	-150.0	DEB	East Medicine Lake	5.0	NM	—
CA-SHA-1838/H	45	139	-	SCP 10	0.0	0.0	PPT	East Medicine Lake	3.0	NM	—
CA-SHA-1838/H	45	140	-	EXU (3N/14W)	0.0	-10.0	DEB	Grasshopper Group	1.9	NM	—
CA-SHA-1838/H	45	145	-	EXU (3N/15W)	0.0	-10.0	DEB	Grasshopper Group	4.0	NM	—
CA-SHA-1838/H	45	146	-	EXU (4N/14W)	0.0	-10.0	DEB	East Medicine Lake	4.9	NM	—
CA-SHA-1838/H	45	150	A	EXU (4N/15W)	0.0	-10.0	DEB	East Medicine Lake	3.2	NM	—
CA-SHA-1838/H	45	150	B	EXU (4N/15W)	0.0	-10.0	DEB	East Medicine Lake	4.2	NM	—
CA-SHA-1838/H	45	154	A	EXU (27N/14W)	0.0	-10.0	DEB	East Medicine Lake	2.0	NM	—
CA-SHA-1838/H	45	154	B	EXU (27N/14W)	0.0	-10.0	DEB	East Medicine Lake	4.7	NM	—
CA-SHA-1838/H	45	155	A	EXU (27N/15W)	0.0	-10.0	DEB	East Medicine Lake	2.5	NM	—
CA-SHA-1838/H	45	155	B	EXU (27N/15W)	0.0	-10.0	DEB	East Medicine Lake	3.6	NM	—
CA-SHA-1838/H	45	156	-	EXU (28N/14W)	0.0	-10.0	DEB	East Medicine Lake	3.8	NM	—
CA-SHA-1838/H	45	295	A	EXU (19S/30W)	0.0	-10.0	DEB	East Medicine Lake	1.4	NM	—
CA-SHA-1838/H	45	295	B	EXU (19S/30W)	0.0	-10.0	DEB	GF/LIW/RS	1.5	NM	—
CA-SHA-1838/H	45	295	C	EXU (19S/30W)	0.0	-10.0	DEB	East Medicine Lake	NVB	NM	—
CA-SHA-1838/H	45	295	D	EXU (19S/30W)	0.0	-10.0	DEB	East Medicine Lake	1.8	NM	—
CA-SHA-1838/H	45	296	-	EXU (19S/30W)	0.0	-10.0	UFT	Grasshopper Group	4.6	NM	—
CA-SHA-1838/H	45	317	A	EXU (27N/24W)	0.0	-10.0	DEB	East Medicine Lake	2.1	NM	—
CA-SHA-1838/H	45	317	B	EXU (27N/24W)	0.0	-10.0	DEB	East Medicine Lake	5.5	NM	—
CA-SHA-1838/H	45	320	-	EXU (27N/25W)	0.0	-10.0	DEB	East Medicine Lake	2.6	NM	—
CA-SHA-1838/H	45	324	-	EXU (28N/24W)	0.0	-10.0	DEB	East Medicine Lake	3.2	NM	—
CA-SHA-1838/H	45	325	-	EXU (28N/25W)	0.0	-10.0	DEB	East Medicine Lake	3.5	NM	—
CA-SHA-1838/H	45	355	-	EXU (4N/21W)	0.0	-10.0	UFT	GF/LIW/RS	4.5	NM	—
CA-SHA-1838/H	45	361	A	EXU (4N/21W)	-20.0	-30.0	DEB	Not sourced	4.3	NM	—
CA-SHA-1838/H	45	361	B	EXU (4N/21W)	-20.0	-30.0	DEB	East Medicine Lake	3.6	NM	—
CA-SHA-1838/H	45	361	C	EXU (4N/21W)	-20.0	-30.0	DEB	Not sourced	3.4	NM	—
CA-SHA-1838/H	45	361	D	EXU (4N/21W)	-20.0	-30.0	DEB	East Medicine Lake	3.4	NM	—
CA-SHA-1838/H	45	361	E	EXU (4N/21W)	-20.0	-30.0	DEB	East Medicine Lake	3.5	NM	—
CA-SHA-1838/H	45	365	A	EXU (4N/21W)	-40.0	-50.0	DEB	East Medicine Lake	3.6	NM	—
CA-SHA-1838/H	45	365	B	EXU (4N/21W)	-40.0	-50.0	DEB	East Medicine Lake	2.4	NM	—
CA-SHA-1838/H	45	365	C	EXU (4N/21W)	-40.0	-50.0	DEB	GF/LIW/RS	3.5	NM	—
CA-SHA-1838/H	45	377	-	EXU (4S/30W)	-10.0	-20.0	DEB	Grasshopper Group	2.2	NM	—
CA-SHA-1838/H	45	379	A	EXU (4S/30W)	-20.0	-30.0	DEB	GF/LIW/RS	3.6	NM	—
CA-SHA-1838/H	45	379	B	EXU (4S/30W)	-20.0	-30.0	DEB	GF/LIW/RS	4.4	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-SHA-1838/H	45	379	C	EXU (4S/30W)	-20.0	-30.0	DEB Grasshopper Group	4.5	NM	—
CA-SHA-1838/H	45	382	-	EXU (4S/30W)	-20.0	-30.0	DEB Blue Spring	3.2	NM	—
CA-SHA-1838/H	45	390	A	EXU (4S/30W)	-60.0	-70.0	DEB Grasshopper Group	3.6	NM	—
CA-SHA-1838/H	45	390	B	EXU (4S/30W)	-60.0	-70.0	DEB GF/LIW/RS	4.5	NM	—
CA-SHA-1838/H	45	390	C	EXU (4S/30W)	-60.0	-70.0	DEB GF/LIW/RS	3.5	NM	—
CA-SHA-1838/H	45	393	A	EXU (4S/30W)	-70.0	-80.0	DEB Grasshopper Group	3.6	NM	—
CA-SHA-1838/H	45	393	B	EXU (4S/30W)	-70.0	-80.0	DEB GF/LIW/RS	3.7	NM	—
CA-SHA-1838/H	45	395	-	EXU (4S/30W)	-70.0	-80.0	PPT East Medicine Lake	3.4	NM	—
CA-SHA-1838/H	45	439	-	EXU (0N/23W)	-20.0	-30.0	UFT Grasshopper Group	3.7	4.5	3rd band=5.8
CA-SHA-1838/H	45	466	A	EXU (1N/23W)	-10.0	-20.0	DEB East Medicine Lake	1.8	NM	—
CA-SHA-1838/H	45	466	B	EXU (1N/23W)	-10.0	-20.0	DEB Bordwell Spring	3.2	NM	—
CA-SHA-1838/H	45	470	A	EXU (1N/23W)	-20.0	-30.0	DEB GF/LIW/RS	3.0	NM	—
CA-SHA-1838/H	45	470	B	EXU (1N/23W)	-20.0	-30.0	DEB GF/LIW/RS	4.7	NM	—
CA-SHA-1838/H	45	470	C	EXU (1N/23W)	-20.0	-30.0	DEB Grasshopper Group	4.1	NM	—
CA-SHA-1838/H	45	477	A	EXU (1N/23W)	-40.0	-50.0	DEB Not sourced	3.6	NM	—
CA-SHA-1838/H	45	477	B	EXU (1N/23W)	-40.0	-50.0	DEB East Medicine Lake	5.1	NM	—
CA-SHA-1838/H	45	477	C	EXU (1N/23W)	-40.0	-50.0	DEB East Medicine Lake	4.9	NM	—
CA-SHA-1838/H	45	477	D	EXU (1N/23W)	-40.0	-50.0	DEB East Medicine Lake	4.1	NM	—
CA-SHA-1838/H	45	477	E	EXU (1N/23W)	-40.0	-50.0	DEB Grasshopper Group	2.9	NM	—
CA-SHA-1838/H	45	482	A	EXU (1N/23W)	-60.0	-70.0	DEB Not sourced	4.1	NM	—
CA-SHA-1838/H	45	482	B	EXU (1N/23W)	-60.0	-70.0	DEB East Medicine Lake	5.1	NM	—
CA-SHA-1838/H	45	482	C	EXU (1N/23W)	-60.0	-70.0	DEB Not sourced	6.1	NM	—
CA-SHA-1838/H	45	484	A	EXU (1N/23W)	-70.0	-80.0	DEB Not sourced	5.8	7.1	—
CA-SHA-1838/H	45	484	B	EXU (1N/23W)	-70.0	-80.0	DEB East Medicine Lake	7.3	NM	—
CA-SHA-1838/H	45	484	C	EXU (1N/23W)	-70.0	-80.0	DEB Not sourced	5.2	NM	—
CA-SHA-1838/H	45	486	-	EXU (1N/23W)	-80.0	-90.0	DEB Not sourced	5.2	NM	—
CA-SHA-1838/H	45	488	-	EXU (1N/23W)	-90.0	-100.0	DEB Not sourced	7.1	NM	—
CA-SHA-1838/H	45	513	-	EXU (3.5S/20W)	0.0	-10.0	PPT Buck Mountain	8.9	NM	—
CA-SHA-1838/H	45	573	A	EXU (9S/23W)	0.0	-10.0	DEB East Medicine Lake	1.6	NM	—
CA-SHA-1838/H	45	573	B	EXU (9S/23W)	0.0	-10.0	DEB East Medicine Lake	1.2	NM	—
CA-SHA-1838/H	45	573	C	EXU (9S/23W)	0.0	-10.0	DEB East Medicine Lake	1.3	NM	—
CA-SHA-1838/H	45	573	D	EXU (9S/23W)	0.0	-10.0	DEB East Medicine Lake	1.3	NM	—
CA-SHA-1838/H	45	573	E	EXU (9S/23W)	0.0	-10.0	DEB East Medicine Lake	DH	NM	Weathered; Diffuse hydration
CA-SHA-1838/H	45	582	A	EXU (9S/23W)	-20.0	-30.0	DEB East Medicine Lake	2.6	NM	—
CA-SHA-1838/H	45	582	B	EXU (9S/23W)	-20.0	-30.0	DEB East Medicine Lake	2.5	NM	—
CA-SHA-1838/H	45	582	C	EXU (9S/23W)	-20.0	-30.0	DEB East Medicine Lake	2.5	NM	—
CA-SHA-1838/H	45	582	D	EXU (9S/23W)	-20.0	-30.0	DEB Grasshopper Group	5.5	NM	Weathered
CA-SHA-1838/H	45	582	E	EXU (9S/23W)	-20.0	-30.0	DEB East Medicine Lake	4.3	NM	—
CA-SHA-1838/H	45	586	A	EXU (9S/23W)	-40.0	-50.0	DEB East Medicine Lake	3.8	NM	—
CA-SHA-1838/H	45	586	B	EXU (9S/23W)	-40.0	-50.0	DEB GF/LIW/RS	4.2	NM	—
CA-SHA-1838/H	45	586	C	EXU (9S/23W)	-40.0	-50.0	DEB East Medicine Lake	4.2	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-SHA-1838/H	45	586	D	EXU (9S/23W)	-40.0	-50.0	DEB	East Medicine Lake	1.2	NM	—
CA-SHA-1838/H	45	586	E	EXU (9S/23W)	-40.0	-50.0	DEB	East Medicine Lake	4.9	NM	—
CA-SHA-1838/H	45	591	A	EXU (9S/23W)	-60.0	-70.0	DEB	East Medicine Lake	4.5	NM	—
CA-SHA-1838/H	45	591	B	EXU (9S/23W)	-60.0	-70.0	DEB	East Medicine Lake	4.9	NM	—
CA-SHA-1838/H	45	591	C	EXU (9S/23W)	-60.0	-70.0	DEB	East Medicine Lake	4.7	NM	—
CA-SHA-1838/H	45	591	D	EXU (9S/23W)	-60.0	-70.0	DEB	East Medicine Lake	5.2	NM	—
CA-SHA-1838/H	45	591	E	EXU (9S/23W)	-60.0	-70.0	DEB	East Medicine Lake	5.0	NM	—
CA-SHA-1838/H	45	596	A	EXU (9S/23W)	-80.0	-90.0	DEB	Grasshopper Group	5.0	NM	—
CA-SHA-1838/H	45	596	B	EXU (9S/23W)	-80.0	-90.0	DEB	Grasshopper Group	4.2	NM	—
CA-SHA-1838/H	45	596	C	EXU (9S/23W)	-80.0	-90.0	DEB	East Medicine Lake	5.0	NM	—
CA-SHA-1838/H	45	596	D	EXU (9S/23W)	-80.0	-90.0	DEB	Buck Mountain	4.8	NM	—
CA-SHA-1838/H	45	596	E	EXU (9S/23W)	-80.0	-90.0	DEB	East Medicine Lake	3.6	NM	—
CA-SHA-1839/H	46	6	-	STU 28 (61N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.9	NM	—
CA-SHA-1839/H	46	8	-	STU 44 (100N/24W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	Weathered
CA-SHA-1839/H	46	10	-	STU 44 (100N/24W)	0.0	0.0	PFT	Grasshopper Group	1.1	NM	—
CA-SHA-1839/H	46	11	-	STU 44 (100N/24W)	0.0	0.0	UFT	Grasshopper Group	1.3	NM	—
CA-SHA-1839/H	46	12	-	STU 41 (107N/34W)	0.0	-10.0	DEB	Grasshopper Group	1.2	NM	—
CA-SHA-1839/H	46	13	-	STU 23 (110N/30W)	0.0	-10.0	DEB	Grasshopper Group	2.5	NM	—
CA-SHA-1839/H	46	16	-	STU 40 (111N/30W)	-10.0	-20.0	DEB	Grasshopper Group	DH	NM	Diffuse hydration
CA-SHA-1839/H	46	17	-	STU 10 (130N/10W)	0.0	0.0	COR	Grasshopper Group	5.0	NM	—
CA-SHA-1839/H	46	18	A	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.2	NM	—
CA-SHA-1839/H	46	18	B	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	DH	NM	Weathered; Diffuse hydration
CA-SHA-1839/H	46	18	C	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	2.0	NM	—
CA-SHA-1839/H	46	18	D	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.6	NM	—
CA-SHA-1839/H	46	18	E	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.8	NM	—
CA-SHA-1839/H	46	18	F	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.3	NM	—
CA-SHA-1839/H	46	18	G	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.8	NM	—
CA-SHA-1839/H	46	18	H	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.3	NM	—
CA-SHA-1839/H	46	18	I	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.4	NM	—
CA-SHA-1839/H	46	18	J	MRR 1 (106N/31W)	0.0	-10.0	DEB	Grasshopper Group	1.2	NM	—
CA-SHA-1839/H	46	20	A	MRR 1 (106N/31W)	-10.0	-20.0	DEB	Grasshopper Group	1.3	NM	—
CA-SHA-1839/H	46	20	B	MRR 1 (106N/31W)	-10.0	-20.0	DEB	Grasshopper Group	1.3	NM	—
CA-SHA-1839/H	46	20	C	MRR 1 (106N/31W)	-10.0	-20.0	DEB	Grasshopper Group	14.6	1.3	2 hydration rims
CA-SHA-1839/H	46	20	D	MRR 1 (106N/31W)	-10.0	-20.0	DEB	Grasshopper Group	1.3	NM	—
CA-SHA-1839/H	46	20	E	MRR 1 (106N/31W)	-10.0	-20.0	DEB	Grasshopper Group	1.1	NM	—
CA-SHA-1839/H	46	24	-	SC (22N/12W)	0.0	0.0	BIF	Grasshopper Group	4.2	4.3	2 hydration rims
CA-SHA-1839/H	46	25	-	SC (27N/13W)	0.0	0.0	PPT	Buck Mountain	3.6	NM	—
CA-SHA-1839/H	46	26	-	SC (41N/15W)	0.0	0.0	BIF	Grasshopper Group	5.3	2.7	2 hydration rims
CA-SHA-1839/H	46	27	-	SC (44N/14W)	0.0	0.0	UFT	Grasshopper Group	2.1	1.7	2 hydration rims
CA-SHA-1839/H	46	28	-	SC (44N/14W)	0.0	0.0	DEB	Grasshopper Group	2.7	NM	—
CA-SHA-1839/H	46	29	-	SC (52N/17W)	0.0	0.0	DEB	Grasshopper Group	3.9	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-SHA-1839/H	46	30	-	SC (59N/26W)	0.0	0.0	DEB Grasshopper Group	2.9	NM	—
CA-SHA-1839/H	46	31	-	SC (66N/27W)	0.0	0.0	DEB Grasshopper Group	4.4	NM	—
CA-SHA-1839/H	46	32	-	SC (69N/20W)	0.0	0.0	DEB Grasshopper Group	2.5	NM	—
CA-SHA-1839/H	46	33	A	SC (86N/25W)	0.0	0.0	DEB Grasshopper Group	2.3	NM	—
CA-SHA-1839/H	46	35	-	SC (94N/26W)	0.0	0.0	DEB Grasshopper Group	2.6	NM	—
CA-SHA-1839/H	46	47	-	SC (6S/41W)	0.0	0.0	UFT Grasshopper Group	3.6	NM	—
CA-SHA-1840	11	2	-	SC (65N/46W)	0.0	-10.0	PPT Tuscan	1.0	NM	—
CA-SHA-1841	6	5	-	STU 2	0.0	-10.0	PPT Tuscan	1.2	NM	—
CA-SHA-1841	9	5	-	STU 5	0.0	-10.0	PPT Kelly Mountain	7.4	NM	—
CA-SHA-1841	11	5	-	STU 7	0.0	-10.0	BIF Tuscan	3.6	NM	—
CA-SHA-1841	13	5	-	STU 9	0.0	-10.0	PPT Tuscan	1.1	NM	—
CA-SHA-1841	14	5	-	STU 10	0.0	-10.0	BIF Tuscan	1.1	NM	—
CA-SHA-1841	19	508	-	SCP 108	0.0	0.0	PPT Tuscan	2.9	NM	—
CA-SHA-1841	19	513	-	SCP 113	0.0	0.0	PPT East Medicine Lake	2.4	NM	—
CA-SHA-1841	19	515	-	SCP 115	0.0	0.0	PPT Tuscan	3.1	NM	—
CA-SHA-1841	19	516	-	SCP 116	0.0	0.0	PPT Tuscan	DH	NM	—
CA-SHA-1841	19	607	-	SHP 119	0.0	-20.0	PPT East Medicine Lake	3.0	NM	—
CA-SHA-1841	19	617	-	MRR (6S/2E)	-10.0	-20.0	DEB Tuscan	1.8	NM	—
CA-SHA-1841	19	620	-	MRR (6S/2E)	-10.0	-20.0	PPT Not sourced	4.3	NM	—
CA-SHA-1841	19	625	A	MRR (6S/2E)	-30.0	-40.0	DEB East Medicine Lake	3.6	NM	—
CA-SHA-1841	19	625	B	MRR (6S/2E)	-30.0	-40.0	DEB Grasshopper Group	4.1	NM	—
CA-SHA-1841	19	625	C	MRR (6S/2E)	-30.0	-40.0	DEB Grasshopper Group	3.5	NM	—
CA-SHA-1841	19	631	-	MRR (6S/2E)	-50.0	-60.0	DEB East Medicine Lake	3.0	NM	—
CA-SHA-1841	19	634	-	MRR (6S/2E)	-60.0	-70.0	DEB East Medicine Lake	3.1	NM	—
CA-SHA-1841	19	662	-	MRR (7S/2E)	-20.0	-30.0	DEB GF/LIW/RS	3.0	NM	—
CA-SHA-1841	19	664	-	MRR (7S/2E)	-30.0	-40.0	DEB East Medicine Lake	4.3	NM	—
CA-SHA-1841	19	695	A	MRR (8S/2E)	-10.0	-20.0	DEB Tuscan	2.8	NM	—
CA-SHA-1841	19	695	B	MRR (8S/2E)	-10.0	-20.0	DEB East Medicine Lake	3.8	NM	—
CA-SHA-1841	19	709	-	MRR (8S/2E)	-40.0	-50.0	DEB East Medicine Lake	2.9	NM	—
CA-SHA-1841	19	720	A	MRR (8S/2E)	-70.0	-80.0	DEB East Medicine Lake	3.9	NM	—
CA-SHA-1841	19	720	B	MRR (8S/2E)	-70.0	-80.0	DEB Tuscan	1.7	NM	—
CA-SHA-1841	19	723	-	MRR (8S/2E)	-80.0	-90.0	DEB East Medicine Lake	3.3	NM	—
CA-SHA-1841	19	732	-	CME (8S/3E)	-10.0	-20.0	DEB East Medicine Lake	3.7	NM	—
CA-SHA-1841	19	822	-	MRR (14S/1E)	-30.0	-40.0	PPT Tuscan	DH	NM	—
CA-SHA-1841	19	871	-	CME (15S/1E)	-50.0	-60.0	PPT South Warners	3.7	NM	—
CA-SHA-1841	19	1004	-	MRR (19S/2E)	-30.0	-40.0	PPT Tuscan	3.4	NM	—
CA-SHA-1841	19	1038	-	MRR (20S/2E)	-20.0	-30.0	PPT Tuscan	1.4	NM	—
CA-SHA-1841	19	1069	A	MRR (21S/2E)	-10.0	-20.0	DEB GF/LIW/RS	4.6	NM	—
CA-SHA-1841	19	1069	B	MRR (21S/2E)	-10.0	-20.0	DEB Tuscan	2.8	NM	—
CA-SHA-1841	19	1081	A	MRR (21S/2E)	-40.0	-50.0	DEB GF/LIW/RS	2.7	NM	—
CA-SHA-1841	19	1081	B	MRR (21S/2E)	-40.0	-50.0	DEB East Medicine Lake	3.5	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-SHA-1841	191081	C	MRR (21S/2E)	-40.0	-50.0	DEB	Tuscan	2.0	NM	—
CA-SHA-1841	191094	-	MRR (21S/2E)	-80.0	-90.0	DEB	Tuscan	1.8	NM	—
CA-SHA-1841	191112	A	MRR (22S/2E)	-10.0	-20.0	DEB	East Medicine Lake	2.9	NM	—
CA-SHA-1841	191112	B	MRR (22S/2E)	-10.0	-20.0	DEB	East Medicine Lake	2.9	NM	—
CA-SHA-1841	191115	-	MRR (22S/2E)	-20.0	-30.0	DEB	East Medicine Lake	3.8	NM	—
CA-SHA-1841	191127	-	MRR (22S/2E)	-40.0	-50.0	DEB	South Warners	3.0	NM	—
CA-SHA-1841	191130	-	MRR (22S/2E)	-50.0	-60.0	DEB	East Medicine Lake	4.1	NM	—
CA-SHA-1841	191137	-	MRR (22S/2E)	-60.0	-70.0	PPT	Not sourced	2.4	NM	—
CA-SHA-1841	191140	A	MRR (22S/2E)	-70.0	-80.0	DEB	East Medicine Lake	3.4	NM	—
CA-SHA-1841	191140	B	MRR (22S/2E)	-70.0	-80.0	DEB	Tuscan	2.4	NM	—
CA-SHA-1841	191147	A	MRR (22S/2E)	-90.0	-100.0	DEB	East Medicine Lake	3.6	NM	—
CA-SHA-1841	191147	B	MRR (22S/2E)	-90.0	-100.0	DEB	Tuscan	2.7	NM	—
CA-SHA-1841	70	1	A TEU 1	-10.0	-20.0	DEB	Tuscan	1.5	2.0	2 hydration bands
CA-SHA-1841	70	1	B TEU 1	-10.0	-20.0	DEB	Tuscan	1.7	6.1	2 hydration bands
CA-SHA-1841	73	1	- TEU 1	-20.0	-30.0	DEB	Tuscan	1.7	NM	—
CA-SHA-1841	75	2	- TEU 1	-30.0	-40.0	DEB	Tuscan	1.7	NM	—
CA-SHA-1841	78	1	A TEU 1	-40.0	-50.0	DEB	East Medicine Lake	2.0	NM	—
CA-SHA-1841	78	1	B TEU 1	-40.0	-50.0	DEB	Tuscan	2.0	NM	—
CA-SHA-1841	81	1	- TEU 1	-50.0	-60.0	DEB	Tuscan	1.2	NM	—
CA-SHA-1841	85	2	- TEU 2	-20.0	-30.0	BIF	Tuscan	1.8	NM	—
CA-SHA-1841	92	1	A TEU 3	-10.0	-20.0	DEB	Tuscan	1.4	NM	—
CA-SHA-1841	92	1	B TEU 3	-10.0	-20.0	DEB	Tuscan	1.3	NM	—
CA-SHA-1841	95	1	- TEU 3	-20.0	-30.0	DEB	East Medicine Lake	2.0	NM	—
CA-SHA-1841	96	1	- TEU 3	-30.0	-40.0	PPT	East Medicine Lake	2.3	NM	—
CA-SHA-1841	96	2	- TEU 3	-30.0	-40.0	DEB	Tuscan	1.8	NM	—
CA-SHA-1841	96	5	- TEU 3	-30.0	-40.0	UFT	Tuscan	1.4	NM	—
CA-SHA-1841	97	1	- TEU 3	-30.0	-40.0	DEB	Tuscan	2.2	NM	—
CA-SHA-1841	98	1	A TEU 3	-40.0	-50.0	DEB	Tuscan	1.8	NM	—
CA-SHA-1841	98	1	B TEU 3	-40.0	-50.0	DEB	Tuscan	1.9	NM	—
CA-SHA-1841	105	1	- TEU 4	5.0	0.0	PPT	Tuscan	1.9	NM	—
CA-SHA-1841	111	1	- TEU 4	-20.0	-30.0	PPT	Tuscan	1.2	NM	—
CA-SHA-1842	2	1	- SCP 2	0.0	0.0	PPT	Not sourced	1.5	NM	—
CA-SHA-1842	13	1	- SCP 13	0.0	0.0	BIF	Tuscan	NVB	NM	Weathered; No visible band
CA-SHA-1842	17	1	- SCP 17	0.0	0.0	UFT	Tuscan	DH	NM	Weathered; Diffuse hydration
CA-SHA-1842	20	312	- MRR (32N/11E)	0.0	-10.0	PPT	Tuscan	1.8	NM	—
CA-SHA-1842	20	337	- MRR (32N/11E)	-40.0	-50.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1842	20	409	- MRR (33N/11E)	-60.0	-70.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	434	- MRR (36N/15E)	-10.0	-20.0	PPT	Tuscan	1.4	NM	—
CA-SHA-1842	20	435	- MRR (36N/15E)	-10.0	-20.0	PPT	Tuscan	1.1	NM	—
CA-SHA-1842	20	460	- MRR (36N/15E)	-40.0	-50.0	PPT	Buck Mountain	3.2	NM	—
CA-SHA-1842	20	489	- MRR (36N/15E)	-70.0	-80.0	PPT	Tuscan	DH	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
					1	2					
CA-SHA-1842	20	490	-	MRR (36N/15E)	-70.0	-80.0	PPT	Tuscan	2.9	NM	—
CA-SHA-1842	20	492	-	MRR (36N/15E)	-70.0	-80.0	PPT	Not sourced	1.3	NM	—
CA-SHA-1842	20	504	-	MRR (36N/15E)	-80.0	-90.0	PPT	Tuscan	1.0	NM	—
CA-SHA-1842	20	505	-	MRR (36N/15E)	-80.0	-90.0	PPT	GF/LIW/RS	1.6	NM	—
CA-SHA-1842	20	514	-	MRR (36N/15E)	-90.0	-100.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1842	20	535	-	MRR (36N/15E)	-110.0	-120.0	PPT	GF/LIW/RS	2.2	4.8	—
CA-SHA-1842	20	590	-	MRR (37N/15E)	-20.0	-30.0	PPT	Tuscan	1.7	NM	—
CA-SHA-1842	20	613	-	MRR (37N/15E)	-50.0	-60.0	PPT	Tuscan	1.6	NM	—
CA-SHA-1842	20	615	-	MRR (37N/15E)	-50.0	-60.0	PPT	Tuscan	3.4	NM	—
CA-SHA-1842	20	624	-	MRR (37N/15E)	-60.0	-70.0	PPT	Tuscan	3.2	NM	—
CA-SHA-1842	20	636	-	MRR (37N/15E)	-70.0	-80.0	PPT	Tuscan	1.4	NM	—
CA-SHA-1842	20	637	-	MRR (37N/15E)	-70.0	-80.0	PPT	Buck Mountain	1.5	NM	—
CA-SHA-1842	20	638	-	MRR (37N/15E)	-70.0	-80.0	PPT	East Medicine Lake	3.8	NM	—
CA-SHA-1842	20	648	-	MRR (37N/15E)	-80.0	-90.0	PPT	GF/LIW/RS	2.6	NM	—
CA-SHA-1842	20	649	-	MRR (37N/15E)	-80.0	-90.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	650	-	MRR (37N/15E)	-80.0	-90.0	PPT	Tuscan	1.2	NM	—
CA-SHA-1842	20	651	-	MRR (37N/15E)	-80.0	-90.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	661	-	MRR (37N/15E)	-90.0	-100.0	PPT	Grasshopper Group	2.2	NM	—
CA-SHA-1842	20	678	-	MRR (37N/15E)	-110.0	-120.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	724	-	MRR (38N/16E)	-10.0	-20.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	725	-	MRR (38N/16E)	-10.0	-20.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	735	-	MRR (38N/16E)	-20.0	-40.0	PPT	Tuscan	2.7	NM	—
CA-SHA-1842	20	736	-	MRR (38N/16E)	-20.0	-40.0	PPT	Tuscan	1.8	NM	—
CA-SHA-1842	20	750	-	MRR (38N/16E)	-40.0	-50.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	751	-	MRR (38N/16E)	-40.0	-50.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1842	20	752	-	MRR (38N/16E)	-40.0	-50.0	PPT	Tuscan	2.1	NM	—
CA-SHA-1842	20	771	-	MRR (38N/16E)	-60.0	-70.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	792	-	MRR (38N/16E)	-80.0	-90.0	PPT	Tuscan	2.1	NM	—
CA-SHA-1842	20	802	-	MRR (38N/16E)	-90.0	-100.0	PPT	Tuscan	DH	NM	—
CA-SHA-1842	20	899	-	MRR (39N/16E)	-40.0	-50.0	PPT	Tuscan	1.0	NM	—
CA-SHA-1842	20	911	-	MRR (39N/16E)	-50.0	-60.0	PPT	Tuscan	2.7	NM	—
CA-SHA-1842	20	918	-	MRR (39N/16E)	-60.0	-70.0	PPT	Tuscan	1.7	NM	—
CA-SHA-1842	20	927	-	MRR (39N/16E)	-70.0	-80.0	PPT	Not sourced	1.4	NM	—
CA-SHA-1842	20	928	-	MRR (39N/16E)	-70.0	-80.0	PPT	Not sourced	2.2	NM	—
CA-SHA-1842	20	937	-	MRR (39N/16E)	-80.0	-90.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1842	20	951	-	MRR (39N/16E)	-90.0	-100.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1842	20	959	-	MRR (39N/16E)	-100.0	-110.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1842	20	969	-	MRR (39N/16E)	-110.0	-120.0	PPT	GF/LIW/RS	2.2	NM	—
CA-SHA-1842	20	970	-	MRR (39N/16E)	-110.0	-120.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1842	20	971	-	MRR (39N/16E)	-110.0	-120.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1842	20	992	-	MRR (39N/16E)	-130.0	-140.0	PPT	Tuscan	1.6	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-SHA-1842	201009	-	MRR (41N/15E)	0.0	-10.0	PPT	Tuscan	2.6	NM	—
CA-SHA-1842	201010	-	MRR (41N/15E)	0.0	-10.0	PPT	Tuscan	2.6	NM	—
CA-SHA-1842	201036	-	MRR (41N/15E)	-20.0	-30.0	PPT	Tuscan	1.6	NM	—
CA-SHA-1842	201053	-	MRR (41N/15E)	-30.0	-40.0	PPT	Tuscan	1.6	NM	—
CA-SHA-1842	201087	-	MRR (41N/15E)	-50.0	-60.0	PPT	East Medicine Lake	5.4	NM	—
CA-SHA-1842	201088	-	MRR (41N/15E)	-50.0	-60.0	PPT	Tuscan	1.1	NM	—
CA-SHA-1842	201107	-	MRR (41N/15E)	-60.0	-70.0	PPT	Tuscan	2.2	NM	—
CA-SHA-1842	201122	-	MRR (41N/15E)	-70.0	-80.0	PPT	Tuscan	1.2	NM	—
CA-SHA-1842	201208	-	MRR (42N/15E)	-20.0	-30.0	PPT	Tuscan	1.4	NM	—
CA-SHA-1842	201209	-	MRR (42N/15E)	-20.0	-30.0	PPT	Tuscan	1.0	NM	—
CA-SHA-1842	201222	-	MRR (42N/15E)	-30.0	-40.0	PPT	Tuscan	1.1	NM	—
CA-SHA-1842	201226	-	MRR (42N/15E)	-30.0	-40.0	PPT	Not sourced	2.4	NM	—
CA-SHA-1842	201242	-	MRR (42N/15E)	-40.0	-50.0	PPT	Tuscan	DH	NM	—
CA-SHA-1842	201279	-	MRR (42N/15E)	-60.0	-70.0	PPT	Tuscan	1.6	NM	—
CA-SHA-1842	201280	-	MRR (42N/15E)	-60.0	-70.0	PPT	Tuscan	1.6	NM	—
CA-SHA-1842	201312	-	MRR (42N/15E)	-90.0	-100.0	PPT	Tuscan	2.1	NM	—
CA-SHA-1842	201320	-	MRR (42N/15E)	-100.0	-110.0	PPT	Tuscan	1.2	NM	—
CA-SHA-1842	201321	-	MRR (42N/15E)	-100.0	-110.0	PPT	Tuscan	1.7	NM	—
CA-SHA-1842	201343	-	MRR (42N/15E)	-140.0	-150.0	PPT	Tuscan	1.0	NM	—
CA-SHA-1842	201404	-	MRR (46N/12E)	-20.0	-30.0	PPT	Not sourced	1.8	NM	—
CA-SHA-1842	201428	-	MRR (46N/12E)	0.0	-80.0	PPT	Tuscan	DH	NM	—
CA-SHA-1842	201453	-	MRR (50N/23E)	-20.0	-30.0	PPT	Tuscan	1.1	NM	—
CA-SHA-1842	201454	-	MRR (50N/23E)	-20.0	-30.0	PPT	Not sourced	1.4	NM	—
CA-SHA-1842	201538	-	MRR (55N/23E)	-20.0	-30.0	PPT	East Medicine Lake	5.1	NM	—
CA-SHA-1842	201600	-	MRR (76N/1W)	-30.0	-40.0	PPT	Tuscan	2.9	NM	—
CA-SHA-1842	201614	-	MRR (79N/3E)	-20.0	-30.0	PPT	Not sourced	5.0	NM	—
CA-SHA-1842	201650	-	MRR (80N/3E)	-30.0	-40.0	PPT	GF/LIW/RS	3.0	NM	—
CA-SHA-1842	22	1	- SCP 22	0.0	0.0	PPT	Tuscan	DH	NM	Weathered; Diffuse hydration
CA-SHA-1842	31	1	- SCP 31	0.0	0.0	BIF	Tuscan	3.1	NM	—
CA-SHA-1842	62	1	- SCP 62	0.0	0.0	BIF	Tuscan	1.3	NM	—
CA-SHA-1842	77	1	- SHP 3	-20.0	-40.0	PPT	East Medicine Lake	1.9	NM	—
CA-SHA-1842	166	5	A TEU 1	-10.0	-20.0	DEB	Tuscan	1.8	NM	—
CA-SHA-1842	166	5	B TEU 1	-10.0	-20.0	DEB	Tuscan	1.6	NM	—
CA-SHA-1842	167	2	A TEU 1	-10.0	-20.0	DEB	Tuscan	NVB	NM	No visible band
CA-SHA-1842	167	3	- TEU 1	-10.0	-20.0	BIF	Tuscan	1.8	NM	—
CA-SHA-1842	168	2	- TEU 1	-20.0	-30.0	PPT	Tuscan	1.7	NM	—
CA-SHA-1842	168	3	- TEU 1	-20.0	-30.0	BIF	Tuscan	1.3	NM	—
CA-SHA-1842	168	4	- TEU 1	-20.0	-30.0	BIF	East Medicine Lake	3.6	NM	—
CA-SHA-1842	168	8	A TEU 1	-20.0	-30.0	DEB	Tuscan	1.8	NM	—
CA-SHA-1842	168	8	B TEU 1	-20.0	-30.0	DEB	Tuscan	1.0	NM	—
CA-SHA-1842	169	2	- TEU 1	-20.0	-30.0	PPT	Tuscan	DH	NM	Weathered; Diffuse hydration

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact	Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
										1	2	
CA-SHA-1842	169	4	-	TEU 1	-20.0	-30.0	BIF	Tuscan		1.8	NM	-
CA-SHA-1842	169	6	A	TEU 1	-20.0	-30.0	DEB	East Medicine Lake		3.7	NM	-
CA-SHA-1842	170	3	-	TEU 1	-30.0	-40.0	DEB	Tuscan		1.3	NM	-
CA-SHA-1842	170	4	-	TEU 1	-30.0	-40.0	BIF	Tuscan		0.9	NM	-
CA-SHA-1842	170	5	-	TEU 1	-30.0	-40.0	BIF	Tuscan		2.4	NM	-
CA-SHA-1842	170	7	A	TEU 1	-30.0	-40.0	DEB	Tuscan		1.8	NM	-
CA-SHA-1842	171	3	-	TEU 1	-30.0	-40.0	DEB	Tuscan		3.0	NM	-
CA-SHA-1842	171	4	-	TEU 1	-30.0	-40.0	BIF	East Medicine Lake		3.0	NM	-
CA-SHA-1842	171	5	-	TEU 1	-30.0	-40.0	PPT	East Medicine Lake		3.1	NM	-
CA-SHA-1842	171	6	-	TEU 1	-30.0	-40.0	BIF	Tuscan		1.8	NM	-
CA-SHA-1842	171	7	-	TEU 1	-30.0	-40.0	PPT	Tuscan		1.6	NM	-
CA-SHA-1842	173	2	-	TEU 1	-40.0	-50.0	UFT	Tuscan		1.5	NM	-
CA-SHA-1842	173	3	-	TEU 1	-40.0	-50.0	PPT	Tuscan		2.2	NM	-
CA-SHA-1842	173	8	A	TEU 1	-40.0	-50.0	DEB	East Medicine Lake		2.9	NM	-
CA-SHA-1842	173	8	B	TEU 1	-40.0	-50.0	DEB	East Medicine Lake		DH	NM	Weathered; Diffuse hydration
CA-SHA-1842	174	3	A	TEU 1	-40.0	-50.0	DEB	Tuscan		1.5	NM	-
CA-SHA-1842	175	1	-	TEU 1	-50.0	-60.0	PPT	Tuscan		1.2	NM	-
CA-SHA-1842	175	4	A	TEU 1	-50.0	-60.0	DEB	Tuscan		1.5	NM	-
CA-SHA-1842	176	2	A	TEU 1	-50.0	-60.0	DEB	Tuscan		2.1	NM	-
CA-SHA-1842	176	2	B	TEU 1	-50.0	-60.0	DEB	Tuscan		1.4	NM	-
CA-SHA-1842	177	1	-	TEU 1	-60.0	-70.0	UFT	Tuscan		1.8	NM	-
CA-SHA-1842	177	6	A	TEU 1	-60.0	-70.0	DEB	East Medicine Lake		3.7	NM	-
CA-SHA-1842	177	7	-	TEU 1	-60.0	-70.0	PPT	Tuscan		NM	NM	Weathered
CA-SHA-1842	177	8	-	TEU 1	-60.0	-70.0	DEB	Tuscan		4.1	NM	-
CA-SHA-1842	178	4	-	TEU 1	-60.0	-70.0	DEB	Grasshopper Group		1.8	NM	-
CA-SHA-1842	179	4	A	TEU 1	-70.0	-80.0	DEB	GF/LIW/RS		4.2	NM	-
CA-SHA-1842	179	4	B	TEU 1	-70.0	-80.0	DEB	Tuscan		1.7	NM	-
CA-SHA-1842	180	2	A	TEU 1	-70.0	-80.0	DEB	Tuscan		NM	NM	Weathered
CA-SHA-1842	181	1	-	TEU 1	-80.0	-90.0	BIF	Tuscan		1.8	NM	-
CA-SHA-1842	181	3	A	TEU 1	-80.0	-90.0	DEB	Grasshopper Group		3.4	NM	-
CA-SHA-1842	181	3	B	TEU 1	-80.0	-90.0	DEB	East Medicine Lake		3.8	NM	-
CA-SHA-1842	182	2	-	TEU 1	-80.0	-90.0	DEB	East Medicine Lake		4.3	NM	-
CA-SHA-1842	183	2	A	TEU 1	-90.0	-100.0	DEB	Grasshopper Group		3.4	4.2	2 hydration bands
CA-SHA-1842	183	2	B	TEU 1	-90.0	-100.0	DEB	Tuscan		1.8	NM	-
CA-SHA-1842	183	2	C	TEU 1	-90.0	-100.0	DEB	Tuscan		1.8	NM	-
CA-SHA-1842	185	1	-	TEU 1	-100.0	-110.0	PPT	Tuscan		1.1	NM	-
CA-SHA-1842	187	1	A	TEU 1	-110.0	-120.0	DEB	East Medicine Lake		4.7	NM	-
CA-SHA-1842	187	1	B	TEU 1	-110.0	-120.0	DEB	Tuscan		2.3	NM	-
CA-SHA-1842	187	1	C	TEU 1	-110.0	-120.0	DEB	Grasshopper Group		2.9	NM	-
CA-SHA-1842	187	2	-	TEU 1	-110.0	-120.0	DEB	Tuscan		2.1	NM	-
CA-SHA-1842	189	2	A	TEU 1	-120.0	-130.0	DEB	Tuscan		1.9	NM	-

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-SHA-1842	189	2	B	TEU 1	-120.0	-130.0	DEB	East Medicine Lake	2.6	NM	—
CA-SHA-1842	224	1	-	TEU 2	-50.0	-60.0	PPT	Tuscan	2.3	NM	—
CA-SHA-1842	224	4	-	TEU 2	-50.0	-60.0	PFT	Tuscan	2.4	NM	—
CA-SHA-1842	255	1	-	TEU 3	-10.0	-20.0	BIF	Tuscan	0.9	NM	—
CA-SHA-1842	265	2	-	TEU 3	-60.0	-70.0	BIF	Tuscan	2.4	NM	—
CA-SHA-1843H	2	1	-	SCP 1	0.0	0.0	BIF	Tuscan	1.2	NM	—
CA-SHA-1843H	3	1	-	SCP 2	0.0	0.0	UFT	Tuscan	NVB	NM	No visible band
CA-SHA-1843H	5	1	-	SCP 4	0.0	0.0	BIF	East Medicine Lake	2.5	NM	—
CA-SHA-1843H	6	1	-	SCP 5	0.0	0.0	EMP	Tuscan	1.1	NM	—
CA-SHA-1843H	7	1	A	SCP 6	0.0	0.0	DEB	East Medicine Lake	1.4	NM	—
CA-SHA-1843H	7	1	B	SCP 6	0.0	0.0	DEB	Tuscan	1.3	NM	—
CA-SHA-1843H	7	1	C	SCP 6	0.0	0.0	DEB	East Medicine Lake	2.0	NM	—
CA-SHA-1843H	7	1	D	SCP 6	0.0	0.0	DEB	East Medicine Lake	1.1	NM	—
CA-SHA-1843H	7	1	E	SCP 6	0.0	0.0	DEB	Tuscan	1.2	NM	—
CA-SHA-1843H	7	1	F	SCP 6	0.0	0.0	DEB	Tuscan	1.2	NM	—
CA-SHA-1843H	7	1	G	SCP 6	0.0	0.0	DEB	Tuscan	1.2	NM	—
CA-SHA-1843H	7	1	H	SCP 6	0.0	0.0	DEB	Tuscan	1.2	NM	Weathered
CA-SHA-1843H	7	1	I	SCP 6	0.0	0.0	DEB	Tuscan	NVB	NM	No visible band
CA-SHA-1843H	14	1	-	STU 7	0.0	-10.0	DEB	East Medicine Lake	1.1	NM	—
CA-SHA-1843H	23	1	-	SHP 1	-80.0	-94.0	BIF	East Medicine Lake	2.5	NM	—
CA-SHA-1843H	77	1	A	TEU 1	-30.0	-40.0	DEB	Tuscan	1.3	NM	—
CA-SHA-1843H	77	1	B	TEU 1	-30.0	-40.0	DEB	Tuscan	1.1	NM	—
CA-SHA-1843H	77	1	C	TEU 1	-30.0	-40.0	DEB	Tuscan	NVB	NM	No visible band
CA-SHA-1843H	77	1	D	TEU 1	-30.0	-40.0	DEB	Tuscan	1.3	NM	—
CA-SHA-1843H	82	1	-	TEU 1	-50.0	-60.0	DEB	Tuscan	1.2	NM	—
CA-SHA-1843H	89	1	-	TEU 1	-90.0	-100.0	BIF	Tuscan	1.3	NM	—
CA-SHA-1891	1	1	-	SCP 1	0.0	0.0	PPT	Tuscan	NVB	NM	Weathered
CA-SHA-1891	4	1	-	SCP 4	0.0	0.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1891	5	1	-	SCP 5	0.0	0.0	PPT	East Medicine Lake	2.3	NM	—
CA-SHA-1891	6	1	-	SCP 6	0.0	0.0	PPT	Tuscan	1.1	NM	—
CA-SHA-1891	7	1	-	SCP 7	0.0	0.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1891	11	1	-	SCP 11	0.0	0.0	EMP	East Medicine Lake	1.3	NM	—
CA-SHA-1891	12	1	-	SCP 12	0.0	0.0	PPT	Tuscan	1.2	NM	—
CA-SHA-1891	13	1	-	SCP 13	0.0	0.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1891	20	1	-	SHP 3	-20.0	-40.0	DEB	Tuscan	3.7	NM	—
CA-SHA-1891	29	1	-	SHP 6	-20.0	-40.0	DEB	Tuscan	1.5	NM	—
CA-SHA-1891	36	2	-	SHP 9	0.0	-20.0	DEB	Tuscan	2.0	NM	—
CA-SHA-1891	39	1	-	SHP 10	0.0	-20.0	EMP	Tuscan	1.4	NM	—
CA-SHA-1891	39	2	-	SHP 10	0.0	-20.0	EMP	Tuscan	1.3	NM	—
CA-SHA-1891	42	1	-	SHP 11	0.0	-20.0	DEB	Tuscan	NM	NM	Weathered
CA-SHA-1891	44	1	A	SHP 12	0.0	-20.0	DEB	Tuscan	2.2	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-SHA-1891	44	1	B	SHP 12	0.0	-20.0	DEB	Tuscan	3.1	NM	Weathered
CA-SHA-1966	8	60	A	MRR (57S/51E)	12.0	0.0	DEB	Grasshopper Group	1.3	NM	—
CA-SHA-1966	8	60	B	MRR (57S/51E)	12.0	0.0	DEB	East Medicine Lake	1.7	NM	—
CA-SHA-1966	8	60	C	MRR (57S/51E)	12.0	0.0	DEB	Tuscan	1.2	NM	—
CA-SHA-1966	8	60	D	MRR (57S/51E)	12.0	0.0	DEB	East Medicine Lake	3.9	NM	—
CA-SHA-1966	8	60	E	MRR (57S/51E)	12.0	0.0	DEB	East Medicine Lake	2.2	NM	—
CA-SHA-1966	8	67	A	MRR (57S/51E)	-10.0	-20.0	DEB	East Medicine Lake	4.3	NM	—
CA-SHA-1966	8	67	B	MRR (57S/51E)	-10.0	-20.0	DEB	South Warners	3.2	NM	—
CA-SHA-1966	8	67	C	MRR (57S/51E)	-10.0	-20.0	DEB	Tuscan	3.2	NM	—
CA-SHA-1966	8	67	D	MRR (57S/51E)	-10.0	-20.0	DEB	East Medicine Lake	3.9	NM	—
CA-SHA-1966	8	67	E	MRR (57S/51E)	-10.0	-20.0	DEB	Grasshopper Group	3.8	NM	—
CA-SHA-1966	8	76	A	MRR (57S/51E)	-30.0	-40.0	DEB	Tuscan	1.3	NM	—
CA-SHA-1966	8	76	B	MRR (57S/51E)	-30.0	-40.0	DEB	South Warners	3.1	NM	—
CA-SHA-1966	8	76	C	MRR (57S/51E)	-30.0	-40.0	DEB	Tuscan	1.4	NM	—
CA-SHA-1966	8	76	D	MRR (57S/51E)	-30.0	-40.0	DEB	Tuscan	1.9	NM	—
CA-SHA-1966	8	76	E	MRR (57S/51E)	-30.0	-40.0	DEB	Tuscan	1.1	NM	—
CA-SHA-1966	8	82	-	MRR (58S/50E)	0.0	0.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1966	8	90	-	MRR (58S/50E)	0.0	0.0	PPT	Tuscan	1.4	NM	—
CA-SHA-1966	8	115	-	MRR (63S/50E)	0.0	0.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1966	8	126	-	MRR (64S/50E)	0.0	0.0	PPT	Tuscan	2.9	NM	—
CA-SHA-1966	8	127	-	MRR (64S/50E)	0.0	0.0	PPT	GF/LIW/RS	1.1	NM	—
CA-SHA-1966	16	1	-	SHP 2	-20.0	-40.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1966	42	1	-	SHP 12	-20.0	-40.0	PPT	Tuscan	1.4	NM	—
CA-SHA-1966	64	1	-	SHP 21	-20.0	-40.0	PPT	Tuscan	2.4	NM	—
CA-SHA-1966	96	2	-	SHP 35	0.0	-20.0	DEB	Tuscan	1.0	NM	—
CA-SHA-1966	97	2	-	SHP 35	-20.0	-40.0	DEB	Not sourced	1.6	NM	—
CA-SHA-1966	98	1	A	SHP 35	-40.0	-60.0	DEB	Grasshopper Group	3.5	NM	—
CA-SHA-1966	98	1	B	SHP 35	-40.0	-60.0	DEB	Tuscan	1.8	NM	—
CA-SHA-1975	2	2	-	SCU 2	0.0	0.0	COR	Tuscan	1.3	NM	—
CA-SHA-1975	5	6	-	SCU 5	0.0	0.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1975	5	7	-	SCU 5	0.0	0.0	PPT	Tuscan	1.7	NM	—
CA-SHA-1975	6	8	-	SCU 12	0.0	0.0	BIF	Tuscan	1.3	NM	—
CA-SHA-1975	12	7	-	SCU 12	0.0	0.0	BIF	Tuscan	1.2	NM	—
CA-SHA-1975	12	9	-	SCU 12	0.0	0.0	BIF	Tuscan	1.3	NM	—
CA-SHA-1975	13	1	-	SCP 1	0.0	0.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1975	16	1	-	SCP 4	0.0	0.0	PPT	Tuscan	2.3	NM	—
CA-SHA-1975	17	1	-	SCP 5	0.0	0.0	PPT	Tuscan	1.5	NM	—
CA-SHA-1975	18	1	-	SCP 6	0.0	0.0	PPT	Tuscan	1.3	NM	—
CA-SHA-1975	19	1	-	SCP 7	0.0	0.0	PPT	Tuscan	1.4	NM	—
CA-SHA-1975	21	1	-	SCP 9	0.0	0.0	PPT	Tuscan	2.3	NM	—
CA-SHA-1975	22	1	-	SCP 10	0.0	0.0	PPT	Tuscan	1.5	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-SHA-1975	79	1	-	SHP 20	0.0	0.0	PPT Tuscan	1.2	NM	—
CA-SHA-1975	134	2	-	SHP 32	-20.0	-40.0	UFT Not sourced	2.0	NM	—
CA-SHA-1975	134	3	-	SHP 32	-20.0	-40.0	BIF Tuscan	DH	NM	—
CA-SHA-1975	134	4	-	SHP 32	0.0	0.0	PPT Tuscan	3.1	NM	—
CA-SHA-1975	135	3	-	SHP 32	0.0	0.0	PPT Tuscan	1.3	NM	—
CA-SHA-1975	199	1	-	SHP 57	-20.0	-40.0	BIF Tuscan	0.9	NM	—
CA-SHA-1975	221	4	-	SON 1	0.0	0.0	PPT Tuscan	2.2	NM	—
CA-SHA-1975	221	5	-	SON 1	0.0	0.0	PPT Tuscan	0.9	NM	—
CA-SHA-1976	1	1	-	SCP 1	0.0	0.0	PPT East Medicine Lake	2.7	NM	—
CA-SHA-1976	3	1	-	SCP 3	0.0	0.0	BIF Tuscan	2.1	NM	—
CA-SHA-1976	6	1	-	SCP 6	0.0	0.0	BIF Tuscan	2.4	NM	—
CA-SHA-1976	7	1	-	SCP 7	0.0	0.0	PPT East Medicine Lake	3.7	NM	—
CA-SHA-1976	9	1	-	SCP 9	0.0	0.0	BIF Tuscan	2.2	NM	—
CA-SHA-1976	10	1	-	SCP 10	0.0	0.0	PPT Tuscan	3.2	NM	—
CA-SHA-1976	11	1	-	SCP 11	0.0	0.0	PPT Tuscan	2.1	NM	—
CA-SHA-1976	13	3	-	SCU 2	0.0	0.0	BIF Tuscan	2.3	NM	—
CA-SHA-1976	17	4	-	SCU 6	0.0	0.0	UFT Tuscan	2.4	NM	—
CA-SHA-1976	18	2	-	SCU 7	0.0	0.0	BIF Tuscan	1.3	NM	—
CA-SHA-1976	197	1	-	SHP 38	0.0	-20.0	BIF Tuscan	2.2	NM	—
CA-SHA-1976	279	1	-	SHP 54	0.0	0.0	PPT Tuscan	1.1	NM	—
CA-SHA-1976	327	1	-	SHP 67	0.0	-20.0	UFT East Medicine Lake	3.6	NM	—
CA-SIS-1552	18	13	A	STU 21 (175N/30W)	0.0	-10.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1552	18	13	B	STU 21 (175N/30W)	0.0	-10.0	DEB GF/LIW/RS	3.8	NM	—
CA-SIS-1552	18	13	C	STU 21 (175N/30W)	0.0	-10.0	DEB East Medicine Lake	1.2	NM	—
CA-SIS-1552	18	13	D	STU 21 (175N/30W)	0.0	-10.0	DEB East Medicine Lake	3.6	NM	—
CA-SIS-1552	18	13	E	STU 21 (175N/30W)	0.0	-10.0	DEB East Medicine Lake	3.5	NM	—
CA-SIS-1552	18	26	-	MRR 1 (180N/33W)	0.0	-10.0	BIF East Medicine Lake	2.1	NM	Grasshopper Group visual source
CA-SIS-1552	18	27	-	MRR 1	0.0	-10.0	BIF East Medicine Lake	2.6	NM	Grasshopper Group visual source
CA-SIS-1552	18	28	A	MRR 1	0.0	-10.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1552	18	28	B	MRR 1	0.0	-10.0	DEB Grasshopper Group	NM	NM	No OH measurement
CA-SIS-1552	18	28	C	MRR 1	0.0	-10.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1552	18	28	D	MRR 1	0.0	-10.0	DEB East Medicine Lake	2.5	NM	—
CA-SIS-1552	18	28	E	MRR 1	0.0	-10.0	DEB East Medicine Lake	2.5	NM	—
CA-SIS-1552	18	34	A	MRR 1	0.0	-10.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1552	18	34	B	MRR 1	0.0	-10.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1552	18	34	C	MRR 1	0.0	-10.0	DEB East Medicine Lake	DH	NM	Diffuse hydration
CA-SIS-1552	18	34	D	MRR 1	0.0	-10.0	DEB East Medicine Lake	2.5	NM	—
CA-SIS-1552	18	34	E	MRR 1	0.0	-10.0	DEB East Medicine Lake	2.6	NM	—
CA-SIS-1552	18	61	A	STU 30 (214N/10E)	0.0	-10.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1552	18	61	B	STU 30 (214N/10E)	0.0	-10.0	DEB East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1552	18	61	C	STU 30 (214N/10E)	0.0	-10.0	DEB East Medicine Lake	0.9	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
									1	2	
CA-SIS-1552	18	61	D	STU 30 (214N/10E)	0.0	-10.0	DEB	East Medicine Lake	0.9	NM	—
CA-SIS-1552	18	61	E	STU 30 (214N/10E)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Diffuse hydration
CA-SIS-1552	18	75	A	MRR 4 (214N/10E)	0.0	-10.0	DEB	GF/LIW/RS	NM	NM	No OH measurement
CA-SIS-1552	18	75	B	MRR 4 (214N/10E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1552	18	75	C	MRR 4 (214N/10E)	0.0	-10.0	DEB	East Medicine Lake	2.6	NM	—
CA-SIS-1552	18	75	D	MRR 4 (214N/10E)	0.0	-10.0	DEB	East Medicine Lake	1.0	NM	—
CA-SIS-1552	18	75	E	MRR 4 (214N/10E)	0.0	-10.0	DEB	East Medicine Lake	NM	NM	—
CA-SIS-1552	18	104	-	ISO	0.0	0.0	BIF	Grasshopper Group	4.6	NM	—
CA-SIS-1552	18	105	-	ISO	0.0	0.0	PPT	Buck Mountain	1.0	NM	—
CA-SIS-1552	18	106	-	ISO	0.0	0.0	PPT	Buck Mountain	2.7	NM	—
CA-SIS-1552	18	107	-	ISO	0.0	0.0	PPT	Buck Mountain	1.9	NM	—
CA-SIS-1552	18	108	-	ISO	0.0	0.0	BIF	Grasshopper Group	3.7	2.5	2 hydration rims
CA-SIS-1552	18	109	-	ISO	0.0	0.0	BIF	Grasshopper Group	1.7	NM	—
CA-SIS-1552	18	110	-	ISO	0.0	0.0	BIF	Grasshopper Group	2.4	NM	—
CA-SIS-1552	18	111	-	ISO	0.0	0.0	BIF	Grasshopper Group	3.5	NM	—
CA-SIS-1552	18	132	-	EXU (13N/0W)	-10.0	-20.0	PPT	Buck Mountain	2.6	NM	—
CA-SIS-1552	18	183	A	EXU (62N/1W)	0.0	-10.0	DEB	GF/LIW/RS	2.7	NM	—
CA-SIS-1552	18	183	B	EXU (62N/1W)	0.0	-10.0	DEB	GF/LIW/RS	1.3	NM	—
CA-SIS-1552	18	183	C	EXU (62N/1W)	0.0	-10.0	DEB	GF/LIW/RS	2.6	NM	—
CA-SIS-1552	18	183	D	EXU (62N/1W)	0.0	-10.0	DEB	GF/LIW/RS	3.0	NM	—
CA-SIS-1552	18	183	E	EXU (62N/1W)	0.0	-10.0	DEB	East Medicine Lake	3.0	NM	—
CA-SIS-1552	18	184	A	EXU (62N/1W)	-10.0	-20.0	DEB	GF/LIW/RS	2.8	NM	—
CA-SIS-1552	18	184	B	EXU (62N/1W)	-10.0	-20.0	DEB	East Medicine Lake	2.8	NM	—
CA-SIS-1552	18	184	C	EXU (62N/1W)	-10.0	-20.0	DEB	East Medicine Lake	3.0	NM	—
CA-SIS-1552	18	184	D	EXU (62N/1W)	-10.0	-20.0	DEB	East Medicine Lake	3.1	NM	—
CA-SIS-1552	18	184	E	EXU (62N/1W)	-10.0	-20.0	DEB	East Medicine Lake	3.7	NM	—
CA-SIS-1552	18	185	A	EXU (62N/1W)	-20.0	-30.0	DEB	East Medicine Lake	2.9	NM	—
CA-SIS-1552	18	185	B	EXU (62N/1W)	-20.0	-30.0	DEB	GF/LIW/RS	2.2	NM	—
CA-SIS-1552	18	185	C	EXU (62N/1W)	-20.0	-30.0	DEB	GF/LIW/RS	2.5	NM	—
CA-SIS-1552	18	185	D	EXU (62N/1W)	-20.0	-30.0	DEB	East Medicine Lake	2.5	NM	—
CA-SIS-1552	18	185	E	EXU (62N/1W)	-20.0	-30.0	DEB	East Medicine Lake	2.5	NM	—
CA-SIS-1552	18	187	A	EXU (62N/1W)	-30.0	-40.0	DEB	GF/LIW/RS	3.0	NM	—
CA-SIS-1552	18	187	B	EXU (62N/1W)	-30.0	-40.0	DEB	East Medicine Lake	2.9	NM	—
CA-SIS-1552	18	187	C	EXU (62N/1W)	-30.0	-40.0	DEB	East Medicine Lake	2.8	NM	—
CA-SIS-1552	18	187	D	EXU (62N/1W)	-30.0	-40.0	DEB	East Medicine Lake	3.7	NM	—
CA-SIS-1552	18	187	E	EXU (62N/1W)	-30.0	-40.0	DEB	Grasshopper Group	3.1	NM	—
CA-SIS-1552	18	189	A	EXU (62N/1W)	-40.0	-50.0	DEB	East Medicine Lake	2.5	NM	—
CA-SIS-1552	18	189	B	EXU (62N/1W)	-40.0	-50.0	DEB	East Medicine Lake	3.5	NM	—
CA-SIS-1552	18	189	C	EXU (62N/1W)	-40.0	-50.0	DEB	East Medicine Lake	1.3	NM	—
CA-SIS-1552	18	189	D	EXU (62N/1W)	-40.0	-50.0	DEB	East Medicine Lake	2.7	NM	—
CA-SIS-1552	18	189	E	EXU (62N/1W)	-40.0	-50.0	DEB	East Medicine Lake	2.6	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments	
								1	2		
CA-SIS-1552	18	212	-	EXU (147.1S/43.5E)	-60.0	-70.0	BIF	GF/LIW/RS	4.8	NM	—
CA-SIS-1552	18	213	A	EXU (147.1S/44.5E)	0.0	-10.0	DEB	East Medicine Lake	6.7	NM	—
CA-SIS-1552	18	213	B	EXU (147.1S/44.5E)	0.0	-10.0	DEB	GF/LIW/RS	6.2	NM	—
CA-SIS-1552	18	213	C	EXU (147.1S/44.5E)	0.0	-10.0	DEB	East Medicine Lake	4.8	NM	—
CA-SIS-1552	18	213	D	EXU (147.1S/44.5E)	0.0	-10.0	DEB	East Medicine Lake	5.4	NM	—
CA-SIS-1552	18	213	E	EXU (147.1S/44.5E)	0.0	-10.0	DEB	GF/LIW/RS	5.7	NM	—
CA-SIS-1552	18	214	-	EXU (147.1S/44.5E)	0.0	-10.0	BIF	Not sourced	2.8	NM	—
CA-SIS-1552	18	218	A	EXU (147.1S/44.5E)	-20.0	-30.0	DEB	East Medicine Lake	5.3	NM	—
CA-SIS-1552	18	218	B	EXU (147.1S/44.5E)	-20.0	-30.0	DEB	East Medicine Lake	5.8	NM	—
CA-SIS-1552	18	218	C	EXU (147.1S/44.5E)	-20.0	-30.0	DEB	GF/LIW/RS	5.7	NM	—
CA-SIS-1552	18	218	D	EXU (147.1S/44.5E)	-20.0	-30.0	DEB	East Medicine Lake	6.0	NM	—
CA-SIS-1552	18	218	E	EXU (147.1S/44.5E)	-20.0	-30.0	DEB	East Medicine Lake	4.7	NM	—
CA-SIS-1552	18	228	A	EXU (147.1S/44.5E)	-40.0	-50.0	DEB	East Medicine Lake	6.0	NM	—
CA-SIS-1552	18	228	B	EXU (147.1S/44.5E)	-40.0	-50.0	DEB	GF/LIW/RS	4.5	NM	—
CA-SIS-1552	18	228	C	EXU (147.1S/44.5E)	-40.0	-50.0	DEB	East Medicine Lake	5.0	NM	—
CA-SIS-1552	18	228	D	EXU (147.1S/44.5E)	-40.0	-50.0	DEB	GF/LIW/RS	5.1	NM	—
CA-SIS-1552	18	228	E	EXU (147.1S/44.5E)	-40.0	-50.0	DEB	GF/LIW/RS	5.1	NM	—
CA-SIS-1552	18	241	-	EXU (147.1S/44.5E)	-50.0	-60.0	BIF	East Medicine Lake	5.3	NM	—
CA-SIS-1552	18	242	-	EXU (147.1S/44.5E)	-50.0	-60.0	BIF	East Medicine Lake	6.4	7.8	—
CA-SIS-1552	18	247	A	EXU (147.1S/44.5E)	-60.0	-70.0	DEB	East Medicine Lake	5.6	NM	—
CA-SIS-1552	18	247	B	EXU (147.1S/44.5E)	-60.0	-70.0	DEB	East Medicine Lake	5.6	NM	—
CA-SIS-1552	18	247	C	EXU (147.1S/44.5E)	-60.0	-70.0	DEB	East Medicine Lake	4.4	6.2	2hydration bands
CA-SIS-1552	18	247	D	EXU (147.1S/44.5E)	-60.0	-70.0	DEB	GF/LIW/RS	4.9	NM	—
CA-SIS-1552	18	247	E	EXU (147.1S/44.5E)	-60.0	-70.0	DEB	East Medicine Lake	5.2	NM	—
CA-SIS-1553	17	1	-	STU 6 (156N/9W)	0.0	-10.0	DEB	East Medicine Lake	2.0	NM	—
CA-SIS-1553	17	3	-	STU 10 (240N/9W)	0.0	-10.0	DEB	East Medicine Lake	4.4	NM	—
CA-SIS-1553	17	9	-	STU 24 (90N/25W)	0.0	-10.0	PPT	Buck Mountain	1.1	NM	—
CA-SIS-1553	17	18	-	MRR 1 (180N/33W)	0.0	-10.0	PPT	East Medicine Lake	2.5	NM	—
CA-SIS-1553	17	19	A	MRR 1 (180N/33W)	0.0	-10.0	DEB	East Medicine Lake	3.0	NM	—
CA-SIS-1553	17	19	B	MRR 1 (180N/33W)	0.0	-10.0	DEB	East Medicine Lake	1.0	NM	—
CA-SIS-1553	17	19	C	MRR 1 (180N/33W)	0.0	-10.0	DEB	East Medicine Lake	DH	NM	Diffuse hydration
CA-SIS-1553	17	19	D	MRR 1 (180N/33W)	0.0	-10.0	DEB	East Medicine Lake	3.0	NM	—
CA-SIS-1553	17	19	E	MRR 1 (180N/33W)	0.0	-10.0	DEB	East Medicine Lake	3.8	NM	—
CA-SIS-1553	17	29	-	MRR 2 (261N/16W)	0.0	0.0	DEB	East Medicine Lake	2.5	NM	—
CA-SIS-1553	17	30	A	MRR 2 (261N/16W)	0.0	0.0	DEB	East Medicine Lake	1.0	NM	—
CA-SIS-1553	17	30	B	MRR 2 (261N/16W)	0.0	0.0	DEB	East Medicine Lake	2.7	1.0	2hydration rims
CA-SIS-1553	17	30	C	MRR 2 (261N/16W)	0.0	0.0	DEB	East Medicine Lake	0.8	NM	—
CA-SIS-1553	17	30	D	MRR 2 (261N/16W)	0.0	0.0	DEB	East Medicine Lake	NM	NM	No OH measurement
CA-SIS-1553	17	30	E	MRR 2 (261N/16W)	0.0	0.0	DEB	East Medicine Lake	0.8	NM	—
CA-SIS-1553	17	31	A	MRR 2 (261N/16W)	0.0	-10.0	DEB	Grasshopper Group	1.1	NM	Visually assigned source
CA-SIS-1553	17	31	B	MRR 2 (261N/16W)	0.0	-10.0	DEB	Grasshopper Group	0.8	NM	Visually assigned source

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot Spec Item Unit			Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
	1	2	3				1	2			
CA-SIS-1553	17	31	C	MRR 2 (261N/16W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-SIS-1553	17	31	D	MRR 2 (261N/16W)	0.0	-10.0	DEB	Grasshopper Group	1.0	NM	Visually assigned source
CA-SIS-1553	17	31	E	MRR 2 (261N/16W)	0.0	-10.0	DEB	Grasshopper Group	NM	NM	Visually assigned source
CA-SOL-347	55	1	-	ISO (68S/13E)	0.0	0.0	DEB	Napa Valley	NM	NM	—
CA-SOL-347	55	3	-	ISO (48S/70W)	0.0	0.0	DEB	Napa Valley	1.0	NM	—
CA-SOL-347	55	4	-	ISO (52S/78W)	0.0	0.0	DEB	Napa Valley	DH	NM	Weathered
CA-SOL-347	55	6	-	ISO (90S/79W)	0.0	0.0	BIF	Not obsidian	NM	NM	No OH measurement
CA-SOL-347	55	10	A	ISO	0.0	0.0	DEB	Napa Valley	18.8	NM	Weathered; ventral surface
CA-SOL-347	55	10	B	ISO	0.0	0.0	DEB	Napa Valley	DH	NM	Diffuse hydration
CA-SOL-347	55	16	-	MRR 1 (40S/70W)	0.0	-10.0	DEB	Napa Valley	2.7	NM	—
CA-SOL-347	55	23	A	STU 18 (47S/75W)	0.0	-10.0	DEB	Napa Valley	1.4	NM	—
CA-SOL-347	55	23	B	STU 18 (47S/75W)	0.0	-10.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-SOL-347	55	30	-	MRR 3 (92S/0W)	0.0	-10.0	PPT	Napa Valley	4.1	NM	Weathered
CA-SOL-347	55	31	-	MRR 3 (92S/0W)	0.0	-10.0	DEB	Napa Valley	DH	NM	Diffuse hydration
CA-SOL-347	55	32	-	MRR 3 (92S/0W)	-10.0	-20.0	DEB	Napa Valley	7.9	NM	—
CA-SOL-347	55	33	-	STU 4 (92S/0W)	-30.0	-40.0	DEB	Napa Valley	NM	NM	No OH measurement
CA-SOL-348	17	1	-	SCP 17	0.0	0.0	BIF	Napa Valley	5.0	NM	—
CA-SOL-348	58	1	-	SCP 58	0.0	0.0	DEB	Annadel	3.2	NM	—
CA-SOL-348	61	1	-	SCP 61	0.0	0.0	DEB	Napa Valley	5.8	NM	—
CA-SOL-348	148	1	-	SCU 2	0.0	0.0	DEB	Napa Valley	NVB	NM	No visible band
CA-SOL-348	187	1	-	STU 19	0.0	-10.0	BIF	Napa Valley	DH	NM	Diffuse hydration
CA-SOL-348	486	1	-	STU 18	0.0	-10.0	DEB	Napa Valley	7.1	NM	—
CA-SOL-351	52	39	-	STU 5 (10S/20E)	0.0	-20.0	DEB	Napa Valley	2.6	NM	—
CA-SOL-351	52	39	A	STU 5 (10S/20E)	0.0	-20.0	DEB	Napa Valley	1.2	NM	Diffuse hydration
CA-SOL-351	52	48	-	STU 5 (10S/20E)	0.0	-20.0	DEB	Napa Valley	3.8	NM	—
CA-SOL-351	52	48	A	STU 5 (10S/20E)	0.0	-20.0	DEB	Napa Valley	1.7	NM	—
CA-SOL-351	52	76	-	ISO (33N/W)	0.0	0.0	BIF	Napa Valley	NM	NM	No OH measurement
CA-SOL-351	52	77	A	SC (33N/W)	0.0	0.0	DEB	Napa Valley	1.4	NM	Grasshopper Group visual source
CA-SOL-351	52	77	B	SC (33N/W)	0.0	0.0	DEB	Napa Valley	3.1	NM	Grasshopper Group visual source
CA-SOL-351	52	77	C	SC (33N/W)	0.0	0.0	DEB	Napa Valley	1.8	NM	Grasshopper Group visual source
CA-SOL-351	52	77	D	SC (33N/W)	0.0	0.0	DEB	Napa Valley	2.7	NM	Grasshopper Group visual source
CA-SOL-351	52	77	E	SC (33N/W)	0.0	0.0	DEB	Napa Valley	1.8	NM	Grasshopper Group visual source
CA-SOL-351	52	77	F	SC (33N/W)	0.0	0.0	DEB	Napa Valley	1.6	NM	Grasshopper Group visual source
CA-SOL-351	52	77	G	SC (33N/W)	0.0	0.0	DEB	Napa Valley	1.7	NM	Grasshopper Group visual source
CA-SOL-351	52	77	H	SC (33N/W)	0.0	0.0	DEB	Napa Valley	2.5	1.3	Grasshopper Group visual source
CA-SOL-351	52	77	I	SC (33N/W)	0.0	0.0	DEB	Napa Valley	1.4	NM	Grasshopper Group visual source
CA-SOL-351	52	77	J	SC (33N/W)	0.0	0.0	DEB	Napa Valley	1.7	NM	Grasshopper Group visual source
CA-SOL-351	52	111	-	MRR 1 (20S/0W)	-20.0	-30.0	DEB	Napa Valley	1.5	NM	Grasshopper Group visual source
CA-SOL-351	52	212	-	East Side Right-of-Way	—	—	PPT	Napa Valley	3.3	NM	—
CA-TEH-1528	31	99	A	MRR (0N/9.5W)	-10.0	-20.0	DEB	Not sourced	7.8	NM	—
CA-TEH-1528	31	99	B	MRR (0N/9.5W)	-10.0	-20.0	DEB	Not sourced	2.7	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
							1	2			
CA-TEH-1528	31	99	C	MRR (0N/9.5W)	-10.0	-20.0	DEB	Not sourced	3.8	NM	—
CA-TEH-1528	31	99	D	MRR (0N/9.5W)	-10.0	-20.0	DEB	Not sourced	7.8	NM	—
CA-TEH-1528	31	103	-	MRR (0N/9.5W)	-10.0	-20.0	PPT	Not sourced	NVB	NM	—
CA-TEH-1528	31	126	A	MRR (0N/9.5W)	-50.0	-60.0	DEB	Not sourced	9.6	NM	—
CA-TEH-1528	31	126	B	MRR (0N/9.5W)	-50.0	-60.0	DEB	Not sourced	2.4	NM	—
CA-TEH-1528	31	128	-	MRR (0N/9.5W)	-50.0	-60.0	PPT	Tuscan	6.3	NM	—
CA-TEH-1528	31	147	A	MRR (0N/9.5W)	-80.0	-90.0	DEB	Not sourced	2.7	NM	—
CA-TEH-1528	31	147	B	MRR (0N/9.5W)	-80.0	-90.0	DEB	Not sourced	6.1	NM	—
CA-TEH-1528	31	147	C	MRR (0N/9.5W)	-80.0	-90.0	DEB	Not sourced	2.7	NM	—
CA-TEH-1528	31	152	A	MRR (0N/9.5W)	-90.0	-100.0	DEB	Not sourced	3.0	NM	—
CA-TEH-1528	31	152	B	MRR (0N/9.5W)	-90.0	-100.0	DEB	Not sourced	6.2	NM	—
CA-TEH-1528	31	195	-	CME (1N/8.5W)	-10.0	-20.0	PPT	Not sourced	NVB	NM	—
CA-TEH-1528	31	206	A	CME (1N/9.5W)	0.0	-10.0	DEB	Not sourced	3.1	NM	—
CA-TEH-1528	31	206	B	CME (1N/9.5W)	0.0	-10.0	DEB	Not sourced	2.2	NM	—
CA-TEH-1528	31	206	C	CME (1N/9.5W)	0.0	-10.0	DEB	Not sourced	2.5	NM	—
CA-TEH-1528	31	206	D	CME (1N/9.5W)	0.0	-10.0	DEB	Not sourced	2.4	NM	—
CA-TEH-1528	31	222	A	CME (1N/9.5W)	-20.0	-30.0	DEB	Not sourced	2.5	NM	—
CA-TEH-1528	31	222	B	CME (1N/9.5W)	-20.0	-30.0	DEB	Not sourced	6.7	NM	—
CA-TEH-1528	31	222	C	CME (1N/9.5W)	-20.0	-30.0	DEB	Not sourced	2.5	NM	—
CA-TEH-1528	31	222	D	CME (1N/9.5W)	-20.0	-30.0	DEB	Not sourced	2.5	NM	—
CA-TEH-1528	31	341	A	MRR (3N/0W)	0.0	-10.0	DEB	Tuscan	2.8	NM	—
CA-TEH-1528	31	341	B	MRR (3N/0W)	0.0	-10.0	DEB	Tuscan	2.5	NM	—
CA-TEH-1528	31	341	C	MRR (3N/0W)	0.0	-10.0	DEB	Tuscan	4.2	NM	—
CA-TEH-1528	31	341	D	MRR (3N/0W)	0.0	-10.0	DEB	Tuscan	2.4	NM	—
CA-TEH-1528	31	341	E	MRR (3N/0W)	0.0	-10.0	DEB	Tuscan	3.0	NM	—
CA-TEH-1528	31	343	-	MRR (3N/0W)	0.0	-10.0	PPT	Tuscan	3.2	NM	—
CA-TEH-1528	31	351	A	MRR (3N/0W)	-20.0	-30.0	DEB	Tuscan	3.1	NM	—
CA-TEH-1528	31	351	B	MRR (3N/0W)	-20.0	-30.0	DEB	Tuscan	3.2	NM	—
CA-TEH-1528	31	351	C	MRR (3N/0W)	-20.0	-30.0	DEB	Kelly Mountain	6.6	NM	—
CA-TEH-1528	31	351	D	MRR (3N/0W)	-20.0	-30.0	DEB	Tuscan	4.4	NM	—
CA-TEH-1528	31	351	E	MRR (3N/0W)	-20.0	-30.0	DEB	Tuscan	3.0	NM	—
CA-TEH-1528	31	363	A	MRR (3N/0W)	-40.0	-50.0	DEB	Tuscan	2.4	NM	—
CA-TEH-1528	31	363	B	MRR (3N/0W)	-40.0	-50.0	DEB	East Medicine Lake	3.4	NM	—
CA-TEH-1528	31	363	C	MRR (3N/0W)	-40.0	-50.0	DEB	Tuscan	2.8	NM	—
CA-TEH-1528	31	369	A	MRR (3N/0W)	-50.0	-60.0	DEB	East Medicine Lake	2.1	31.0	—
CA-TEH-1528	31	369	B	MRR (3N/0W)	-50.0	-60.0	DEB	Tuscan	4.0	NM	—
CA-TEH-1528	31	374	A	MRR (3N/0W)	-60.0	-70.0	DEB	Tuscan	3.6	NM	—
CA-TEH-1528	31	374	B	MRR (3N/0W)	-60.0	-70.0	DEB	Tuscan	3.4	NM	—
CA-TEH-1528	31	376	-	MRR (3N/0W)	-60.0	-70.0	PPT	Tuscan	DH	NM	—
CA-TEH-1528	31	380	A	MRR (3N/0W)	-70.0	-85.0	DEB	Tuscan	4.5	NM	—
CA-TEH-1528	31	380	B	MRR (3N/0W)	-70.0	-85.0	DEB	Tuscan	2.5	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec Item	Unit	Depth (cm)	CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments		
							1	2			
CA-TEH-1528	31	380	C	MRR (3N/0W)	-70.0	-85.0	DEB	Tuscan	4.7	NM	—
CA-TEH-1528	31	469	-	CME (2N/3E)	0.0	-10.0	PPT	Tuscan	DH	NM	—
CA-TEH-1528	31	514	-	MRR (2N/5E)	0.0	-10.0	PPT	Tuscan	2.7	NM	—
CA-TEH-1528	31	536	A	MRR (2N/9E)	0.0	-10.0	DEB	Grasshopper Group	4.7	NM	—
CA-TEH-1528	31	536	B	MRR (2N/9E)	0.0	-10.0	DEB	Tuscan	4.5	NM	—
CA-TEH-1528	31	536	C	MRR (2N/9E)	0.0	-10.0	DEB	Tuscan	2.0	NM	Weathered
CA-TEH-1528	31	536	D	MRR (2N/9E)	0.0	-10.0	DEB	Tuscan	6.7	NM	—
CA-TEH-1528	31	536	E	MRR (2N/9E)	0.0	-10.0	DEB	Grasshopper Group	6.8	NM	—
CA-TEH-1528	31	541	-	MRR (2N/9E)	0.0	-10.0	PPT	Tuscan	NVB	NM	—
CA-TEH-1528	31	564	-	MRR (3N/10E)	0.0	-10.0	PPT	Fox Mountain	4.4	NM	—
CA-TEH-1528	31	611	-	MRR (5.5N/1E)	-20.0	-30.0	PPT	Tuscan	1.8	NM	—
CA-TEH-1528	31	663	-	MRR (2S/1W)	-20.0	-30.0	PPT	Tuscan	2.7	NM	—
CA-TEH-1528	31	762	-	MRR (4S/1W)	-20.0	-30.0	PPT	Sugar Hill	5.6	NM	—
CA-TEH-1528	31	769	-	MRR (4S/1W)	-40.0	-50.0	PPT	East Medicine Lake	4.9	NM	—
CA-TEH-1528	31	841	A	MRR (4S/6E)	0.0	-10.0	DEB	Grasshopper Group	4.4	NM	—
CA-TEH-1528	31	841	B	MRR (4S/6E)	0.0	-10.0	DEB	GF/LIW/RS	1.3	NM	Weathered
CA-TEH-1528	31	841	C	MRR (4S/6E)	0.0	-10.0	DEB	Grasshopper Group	1.8	NM	Weathered
CA-TEH-1528	31	841	D	MRR (4S/6E)	0.0	-10.0	DEB	Not sourced	3.2	NM	—
CA-TEH-1528	31	852	-	MRR (20S/6E)	0.0	-10.0	PPT	Not sourced	NVB	NM	—
CA-TEH-1528	31	854	A	MRR (4S/7E)	-10.0	-20.0	DEB	Tuscan	3.6	NM	—
CA-TEH-1528	31	854	B	MRR (4S/7E)	-10.0	-20.0	DEB	Tuscan	2.2	NM	—
CA-TEH-1528	31	900	-	MRR (4S/3E)	0.0	-10.0	PPT	Tuscan	2.7	NM	—
CA-TEH-1528	31	901	-	MRR (20S/6E)	0.0	-10.0	PPT	Tuscan	DH	NM	—
CA-TEH-1528	31	931	A	MRR (22S/3E)	0.0	-10.0	DEB	Tuscan	DH	NM	Weathered
CA-TEH-1528	31	931	B	MRR (22S/3E)	0.0	-10.0	DEB	Tuscan	NVB	NM	Weathered
CA-TEH-1528	31	931	C	MRR (22S/3E)	0.0	-10.0	DEB	Not sourced	2.9	NM	—
CA-TEH-1528	31	931	D	MRR (22S/3E)	0.0	-10.0	DEB	Tuscan	10.0	NM	—
CA-TEH-1528	31	931	E	MRR (22S/3E)	0.0	-10.0	DEB	Tuscan	3.1	NM	—
CA-TEH-1529/H	32	29	-	CME (3N/73W)	0.0	-10.0	PPT	Tuscan	DH	NM	—
CA-TEH-1529/H	32	73	-	CME (3N/73W)	-60.0	-70.0	PPT	Tuscan	3.9	NM	—
CA-TEH-1529/H	32	84	-	CME (3N/73W)	-80.0	-90.0	PPT	Tuscan	3.4	NM	—
CA-TEH-1529/H	32	102	A	EXU (3N/74W)	0.0	-10.0	DEB	Tuscan	4.6	NM	—
CA-TEH-1529/H	32	102	B	EXU (3N/74W)	0.0	-10.0	DEB	East Medicine Lake	4.7	NM	—
CA-TEH-1529/H	32	102	C	EXU (3N/74W)	0.0	-10.0	DEB	Tuscan	4.6	NM	—
CA-TEH-1529/H	32	102	D	EXU (3N/74W)	0.0	-10.0	DEB	East Medicine Lake	5.1	NM	—
CA-TEH-1529/H	32	102	E	EXU (3N/74W)	0.0	-10.0	DEB	Tuscan	3.0	NM	—
CA-TEH-1529/H	32	102	F	EXU (3N/74W)	0.0	-10.0	DEB	Tuscan	2.6	NM	—
CA-TEH-1529/H	32	120	A	EXU (3N/74W)	-50.0	-60.0	DEB	Tuscan	NVB	NM	No visible band
CA-TEH-1529/H	32	120	B	EXU (3N/74W)	-50.0	-60.0	DEB	Tuscan	3.0	NM	—
CA-TEH-1529/H	32	120	C	EXU (3N/74W)	-50.0	-60.0	DEB	Tuscan	4.0	NM	—
CA-TEH-1529/H	32	120	D	EXU (3N/74W)	-50.0	-60.0	DEB	Tuscan	4.7	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	SpecItem	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
								1	2	
CA-TEH-1529/H	32	138	A	EXU (3N/74W)	-50.0	-60.0	DEB Tuscan	3.1	NM	—
CA-TEH-1529/H	32	138	B	EXU (3N/74W)	-50.0	-60.0	DEB Tuscan	5.0	NM	—
CA-TEH-1529/H	32	138	C	EXU (3N/74W)	-50.0	-60.0	DEB Tuscan	3.8	NM	—
CA-TEH-1529/H	32	138	D	EXU (3N/74W)	-50.0	-60.0	DEB Tuscan	3.1	NM	—
CA-TEH-1529/H	32	138	E	EXU (3N/74W)	-50.0	-60.0	DEB Tuscan	3.1	NM	—
CA-TEH-1529/H	32	154	A	EXU (3N/74W)	-80.0	-90.0	DEB Tuscan	4.1	NM	—
CA-TEH-1529/H	32	154	B	EXU (3N/74W)	-80.0	-90.0	DEB East Medicine Lake	5.0	NM	—
CA-TEH-1529/H	32	154	C	EXU (3N/74W)	-80.0	-90.0	DEB Tuscan	3.8	NM	—
CA-TEH-1529/H	32	154	D	EXU (3N/74W)	-80.0	-90.0	DEB Tuscan	4.8	NM	—
CA-TEH-1529/H	32	154	E	EXU (3N/74W)	-80.0	-90.0	DEB Tuscan	3.1	NM	—
CA-TEH-1529/H	32	172	-	MRR (7S/69W)	-20.0	-30.0	PPT Tuscan	3.1	NM	—
CA-TEH-1529/H	32	181	-	MRR (7S/69W)	-30.0	-40.0	PPT Not sourced	DH	NM	—
CA-TEH-1529/H	32	189	-	MRR (7S/69W)	-40.0	-50.0	PPT Tuscan	DH	NM	—
CA-TEH-1529/H	32	210	-	MRR (7S/69W)	-70.0	-80.0	PPT Tuscan	3.1	NM	—
CA-TEH-1529/H	32	219	-	MRR (7S/69W)	-80.0	-90.0	PPT Kelly Mountain	3.1	NM	—
CA-TEH-1529/H	32	220	-	MRR (7S/69W)	-80.0	-90.0	PPT Tuscan	DH	NM	—
CA-TEH-1529/H	32	260	-	MRR (13N/67W)	-20.0	-30.0	PPT Borax Lake	7.1	NM	—
CA-TEH-1529/H	32	275	-	MRR (13N/67W)	-50.0	-60.0	PPT Not sourced	3.7	NM	—
CA-TEH-1529/H	32	287	A	EXU (6S/70W)	0.0	-10.0	DEB Tuscan	3.8	NM	—
CA-TEH-1529/H	32	287	B	EXU (6S/70W)	0.0	-10.0	DEB Tuscan	3.4	NM	—
CA-TEH-1529/H	32	287	C	EXU (6S/70W)	0.0	-10.0	DEB East Medicine Lake	4.8	NM	—
CA-TEH-1529/H	32	287	D	EXU (6S/70W)	0.0	-10.0	DEB East Medicine Lake	5.1	NM	—
CA-TEH-1529/H	32	287	E	EXU (6S/70W)	0.0	-10.0	DEB Tuscan	3.7	NM	—
CA-TEH-1529/H	32	291	-	MRR (6S/70W)	0.0	-10.0	PPT Kelly Mountain	3.4	NM	—
CA-TEH-1529/H	32	318	-	MRR (6S/70W)	-20.0	-30.0	PPT Tuscan	3.9	NM	—
CA-TEH-1529/H	32	325	A	EXU (6S/70W)	-30.0	-40.0	DEB East Medicine Lake	2.6	NM	—
CA-TEH-1529/H	32	325	B	EXU (6S/70W)	-30.0	-40.0	DEB Tuscan	3.0	NM	—
CA-TEH-1529/H	32	325	C	EXU (6S/70W)	-30.0	-40.0	DEB East Medicine Lake	4.2	NM	—
CA-TEH-1529/H	32	325	D	EXU (6S/70W)	-30.0	-40.0	DEB Tuscan	4.7	NM	—
CA-TEH-1529/H	32	325	E	EXU (6S/70W)	-30.0	-40.0	DEB Tuscan	4.8	NM	—
CA-TEH-1529/H	32	330	-	MRR (6S/70W)	-30.0	-40.0	PPT Tuscan	2.5	NM	—
CA-TEH-1529/H	32	364	-	MRR (6S/70W)	-60.0	-70.0	PPT Tuscan	4.9	NM	—
CA-TEH-1529/H	32	365	-	MRR (6S/70W)	-60.0	-70.0	PPT Tuscan	DH	NM	—
CA-TEH-1529/H	32	366	-	MRR (6S/70W)	-60.0	-70.0	PPT Tuscan	DH	NM	—
CA-TEH-1529/H	32	371	A	EXU (6S/70W)	-70.0	-80.0	DEB Tuscan	3.7	NM	—
CA-TEH-1529/H	32	371	B	EXU (6S/70W)	-70.0	-80.0	DEB Tuscan	3.8	NM	—
CA-TEH-1529/H	32	371	C	EXU (6S/70W)	-70.0	-80.0	DEB Tuscan	3.7	NM	—
CA-TEH-1529/H	32	371	D	EXU (6S/70W)	-70.0	-80.0	DEB Tuscan	4.9	NM	—
CA-TEH-1529/H	32	371	E	EXU (6S/70W)	-70.0	-80.0	DEB East Medicine Lake	4.2	NM	—
CA-TEH-1529/H	32	374	-	MRR (6S/70W)	-70.0	-80.0	PPT Tuscan	3.5	NM	—
CA-TEH-1529/H	32	400	A	EXU (6S/70W)	-100.0	-110.0	DEB Tuscan	3.8	NM	—

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Appendix C.4 Results of California PEP Obsidian Studies (continued).

Site	Lot	Spec	Item	Unit	Depth (cm)		CLA	Artifact Source/Chemical Type <sup>a</sup>	Hydration Rims <sup>b</sup>		Comments
					1	2			1	2	
CA-TEH-1529/H	32	400	B	EXU (6S/70W)	-100.0	-110.0	DEB	Tuscan	1.9	NM	—
CA-TEH-1529/H	32	400	C	EXU (6S/70W)	-100.0	-110.0	DEB	Tuscan	3.2	NM	—
CA-TEH-1529/H	32	400	D	EXU (6S/70W)	-100.0	-110.0	DEB	Tuscan	4.0	NM	—
CA-TEH-1529/H	32	400	E	EXU (6S/70W)	-100.0	-110.0	DEB	Tuscan	3.0	NM	—
CA-TEH-1529/H	32	407	-	MRR (6S/70W)	-60.0	-110.0	PPT	Tuscan	DH	NM	—
CA-TEH-1611	34	1	-	SCP 1	0.0	0.0	PPT	Tuscan	1.1	NM	—
CA-TEH-1611	34	75	-	TEU 1	-40.0	-50.0	DEB	Tuscan	4.1	NM	—
CA-TEH-1611	34	138	-	UNIT 7	-40.0	-50.0	PPT	Tuscan	2.8	NM	—
CA-TEH-1611	34	160	-	UNIT 7	-100.0	-110.0	PPT	East Medicine Lake	5.4	NM	—
CA-TEH-1611	34	193	A	UNIT 4	-10.0	-20.0	DEB	Tuscan	1.0	NM	—
CA-TEH-1611	34	193	B	UNIT 4	-10.0	-20.0	DEB	Tuscan	2.3	NM	—
CA-TEH-1611	34	193	C	UNIT 4	-10.0	-20.0	DEB	Tuscan	1.1	NM	—
CA-TEH-1611	34	193	D	UNIT 4	-10.0	-20.0	DEB	Tuscan	1.0	NM	—
CA-TEH-1611	34	193	E	UNIT 4	-10.0	-20.0	DEB	Grasshopper Group	5.4	NM	—
CA-TEH-1611	34	205	-	UNIT 4	-20.0	-30.0	PPT	Not sourced	2.1	NM	—
CA-TEH-1611	34	215	A	UNIT 4	-40.0	-50.0	DEB	Tuscan	3.7	NM	—
CA-TEH-1611	34	215	B	UNIT 4	-40.0	-50.0	DEB	Tuscan	3.3	NM	—
CA-TEH-1611	34	215	C	UNIT 4	-40.0	-50.0	DEB	Tuscan	2.8	NM	—
CA-TEH-1611	34	218	-	UNIT 4	-40.0	-50.0	DEB	Buck Mountain	4.9	NM	—
CA-TEH-1611	34	229	A	UNIT 4	-70.0	-80.0	DEB	Tuscan	3.2	NM	—
CA-TEH-1611	34	229	B	UNIT 4	-70.0	-80.0	DEB	Tuscan	5.4	NM	—
CA-TEH-1611	34	229	C	UNIT 4	-70.0	-80.0	DEB	Not sourced	5.5	NM	—
CA-TEH-1611	34	234	A	UNIT 4	-80.0	-90.0	DEB	Tuscan	3.9	NM	—
CA-TEH-1611	34	234	B	UNIT 4	-80.0	-90.0	DEB	Tuscan	3.2	NM	—
CA-TEH-1611	34	234	C	UNIT 4	-80.0	-90.0	DEB	Tuscan	3.2	NM	—
CA-TEH-1611	34	246	A	UNIT 4	-110.0	-120.0	DEB	Grasshopper Group	5.4	NM	—
CA-TEH-1611	34	246	B	UNIT 4	-110.0	-120.0	DEB	Not sourced	5.4	NM	—
CA-TEH-1611	34	246	C	UNIT 4	-110.0	-120.0	DEB	Tuscan	9.5	NM	—
CA-TEH-1611	34	246	D	UNIT 4	-110.0	-120.0	DEB	Tuscan	4.0	NM	—
CA-TEH-1611	34	250	A	UNIT 4	-120.0	-130.0	DEB	Tuscan	5.3	NM	—
CA-TEH-1611	34	250	B	UNIT 4	-120.0	-130.0	DEB	Tuscan	5.0	NM	—
CA-YOL-161	50	4	-	STU 1 (0N/10W)	-10.0	-20.0	DEB	Napa Valley	NM	NM	Weathered
CA-YOL-161	50	6	-	STU 3 (20S/10W)	-10.0	-20.0	DEB	Napa Valley	4.3	NM	—
CA-YOL-161	50	10	-	STU 8 (35N/10W)	-10.0	-20.0	DEB	Napa Valley	4.1	NM	—
CA-YOL-161	50	20	-	SC (76N/18W)	0.0	-10.0	DEB	Napa Valley	4.2	NM	—
CA-YOL-177	21	10	-	North Side	0.0	0.0	PPT	Napa Valley	3.2	NM	—

<sup>a</sup> Artifact Source/Chemical Type adjusted for zirconium (Zr) reading.

<sup>b</sup> DH = Diffuse hydration; NM = No measurement; NVB = No visible band; VW = Variable width.

C.4-82

## **C.5 OBSIDIAN SOURCES IDENTIFIED DURING PEP STUDIES**

Fifty-nine different potential chemical sources or types of obsidian were identified during the x-ray fluorescence (XRF) characterization studies associated with the PGT-PG&E Pipeline Expansion Project (Table C.5-1, Figures C.5-1 and C.5-2). Although many sources in addition to those identified during these investigations are known, particularly in Oregon and California, only those found during trace element studies of PEP samples are described here. These chemical types represent almost all major sources of glass known to exist within direct procurement range of sites within the Project corridor. Sources of glass are also known from Washington (McClure 1989; Weld 1962) and Idaho (Sappington 1981a, 1981b), though none were identified during the course of PEP XRF studies.

### **C.5.1 Oregon Obsidian Sources**

More sources of natural glass are found in Oregon than in any other comparable geographic area of the world. With field research still in its early stages, well over 100 geochemically distinct sources have been identified. These sources are found primarily in the central High Cascades, the Newberry Volcano region, north-central Oregon, the Klamath Basin, and scattered throughout the northwestern Great Basin. Although obsidian characterization studies have appeared with increasing frequency in contract and graduate archaeological research in recent years, the systematic geoarchaeological studies of Oregon obsidian sources are still rare. Geologic investigations of Oregon obsidian are incomplete and widely dispersed throughout the literature; the Newberry Volcano and Glass Buttes areas have received the most attention because of their high geothermal or mineral potential and their spectacular geologic features (Berri 1982; Higgins 1968, 1973; Johnson 1984; MacLeod et al. 1982; Roche 1987; Williams 1935). Obsidian source compilations have appeared in Hughes (1986a) and Skinner (1983); many additional references to archaeological and geological obsidian studies in Oregon are found in Skinner and Tremaine (1993).

### **C.5.2 California Obsidian Sources**

The first attempt to assemble descriptions of California obsidian sources was made as part of an ambitious compilation of prehistoric mines and quarries by Heizer and Treganza (1944). Although this initial effort contained numerous factual errors, including several nonexistent sources (Jackson 1974:33-51), it provided an important platform for later studies. Since then, several contributions to California obsidian source compilations have been made, most notably by Ericson (1977, 1981), Ericson et al. (1976), Hughes (1986a), and Jackson (1974, 1986). Other major contributions to California obsidian studies include edited volumes by Hughes (1984, 1989) and Taylor (1976). Contract and graduate-level archaeological investigations, particularly those reported since about 1975, have produced more obsidian characterization and hydration studies for California than perhaps any other similar geographic area in the world except New Zealand. In addition, areas of recent volcanism, potential volcanic hazards, and geothermal activity such as the Medicine Lake Highlands, the Long Valley Caldera-Mono Lake Basin, and the North Coast Range have received considerable geologic attention (Bailey 1989; Bailey et al. 1976; Donnelly-Nolan et al. 1981; Donnelly-Nolan et al. 1990). Many geologic studies of associated obsidian sources in these and other areas are available. Specific references related to archaeological and geological investigations are listed in Skinner and Tremaine (1993).

### **C.5.3 Wyoming Obsidian Sources**

Obsidian sources in the Teton-Yellowstone area are briefly described by Frison (1974). Obsidian Cliff, a well-known source located within Yellowstone National Park, was the subject of the first major geologic study of any obsidian source (Iddings 1888). Glass from that source was extensively utilized and has been identified at prehistoric sites in Montana, Idaho, Wyoming, Ohio, Illinois, Wisconsin, Michigan, Alberta, Saskatchewan, and Ontario (Davis 1972; Frison 1974; Griffin et al. 1969; Hatch et al. 1990).

Table C.5-1 Obsidian Sources Identified During Obsidian Characterization Studies of PEP Obsidian Artifacts.

Chemical Group	Location	Comments
<b>OREGON OBSIDIAN SOURCES</b>		
Bald Butte	T23S R26E	Source located southeast of Wagontire Mountain about 10 km northwest of the town of Wagontire.
Beatys Butte	T37S R28E	Dense concentrations of surface obsidian nodules are found on the northern slopes of Beatys Butte and are common in the lacustrine deposits of Pluvial Lake Catlow to the north and east of the Butte. Obsidian from this source was widely used in the southeastern part of the state. References: Ericson et al. 1976; Hughes 1986a:317-318; Skinner 1983:9-10.
Big Obsidian Flow	T21S R12E	This chemical group includes the Big Obsidian Flow and Buried Obsidian Flow, both located within the summit caldera of Newberry Caldera. Trace element studies by Linneman (1990:277) indicate that both flows are chemically similar, resolving a problem of anomalously thick obsidian hydration rims found on artifacts thought to be from the geologically recent Big Obsidian Flow. Preliminary XRF analyses of samples from the two flows by Richard Hughes, however, suggests that the two units may be eventually prove to be geochemically separable. The age of the Buried Obsidian Flow is estimated by Linneman (1990:87) to be about 10,000 years. Radiocarbon dates from charcoal associated with the ashfall or ashflow that immediately preceded the eruption of the Big Obsidian Flow has yielded ages of: 1270 ± 60 B.P. (Tx-245; Pearson et al. 1966); 1330 ± 60 B.P. (IVIC-200; Tamers 1969); 1340 ± 60 B.P. (USGS-755; Robinson and Trimble 1983); 1390 ± 200 B.P. (W-277; Kelley et al. 1978); 1550 ± 120 B.P. (USGS-755; Robinson and Trimble 1983); 1720 ± 250 B.P. (W-2168; Spiker et al. 1978); 2054 ± 230 B.P. (C-657; Libby 1952). References: Higgins 1968, 1973; Linneman 1990; Skinner 1983:110-112, 236-237; Williams 1935.
Brooks Canyon	T23S R20E	Located north of Benjamin Lake and just south of the Lake County line. The obsidian is found in a canyon that opens onto Brooks Lake (dry).
Chickahominy	T23S R26E	Nodules of obsidian are found on the surface in the vicinity of Chickahominy Reservoir.
Coglan Buttes	T33S R20E	Nodules of glass up to about 10 cm in diameter are found in a sagebrush flat immediately west of Hope Well in the Coglan Buttes. References: Hughes 1986a:316-317; Skinner 1983:241.
Cougar Mountain	T25S R15E	A rhyolite-obsidian dome located on the northwest edge of the Fort Rock Valley, central Oregon. High-quality glass from this source is widespread in lacustrine deposits associated with the former Pluvial Fort Rock Lake. References: Hughes 1986a:317; Skinner 1983:114-118, 242-244.

Table C.5-1 (continued)

Chemical Group	Location	Comments
Deer Creek	T27S R7E	A locally-utilized source of obsidian found in the drainage of Deer Creek a few kilometers west of Chemult, central Oregon. The source was first mentioned in a description of PEP Site 35-KL-811 in Moratto et al. 1991. Reference: Moratto et al. 1991.
Delintment Creek	T19S R25-26E	Obsidian is found in association with ash-flow deposits at several locations in the Delintment Lake area, Ochoco National Forest. Numerous widespread secondary outcrops of glass in this chemical group have been located. The secondary distribution of obsidian is currently poorly-known although trace element studies by Richard Hughes are underway.
Drews Creek/Butcher Flat	T38S R16E	Obsidian in the Drews Reservoir area co-occurs with commercial quantities of perlite and has been described by Peterson (1961). References: Hughes 1986a:314; Peterson 1961; Skinner 1983:247.
Glass Buttes	T23S R22E	Oregon's most well-known source of obsidian. High-quality obsidian from this complex of flows and domes is spread over a large area in the vicinity of Glass Buttes. A long-standing rumor that glass from this source was found in the Hopewell mounds of the Midwest was discounted by trace element studies of Hopewell artifacts (Griffin et al. 1969). References: Berri 1982; Godfrey-Smith et al. 1993; Hughes 1986a:318; Johnson 1984; Mack 1975; Roche 1987; Skinner 1983:118-123, 251-253.
Horse Mountain	T28S R22E	Obsidian nodules from the Horse Mountain chemical group are widely distributed in the region surrounding this large dome. References: Hughes 1986a:319-320; Skinner 1983:254-255.
Inman Creek/ Salt Creek A	T18S T17S R5W T22S R5E	Widely distributed throughout northwest Oregon, glass from this source is found in secondary geologic contexts in the Willamette Valley, the central Oregon Coast, and the Western Cascades. The primary source appears to lie near Salt Creek in the Upper Middle Fork Willamette drainage at the southern base of Mount David Douglas. The type locality for this source is located at Inman Creek, a tributary to Fern Ridge Reservoir in the southwestern Willamette Valley. A geochemically-distinct Inman/Salt Creek B chemical group co-occurs with Inman A glass at most geologic localities. References: Skinner 1983:304-320; Skinner 1993; Woller and Black 1983.
Juniper Spring 1 and 2	—	Located about 30 miles north northeast of Glass Buttes north of Buck Creek and south of Twelvemile Creek. Obsidian from two geochemically distinguishable chemical groups, Juniper Spring 1 and 2, occurs together at this location.
Little Bear Creek	T16S R33E	Located east of Seneca and northeast of Whitewater Spring. This source is geochemically very similar to the Whitewater Ridge glass and further geochemical studies may show that the two sources represent chemical variability of a single chemical group. This source was first mentioned briefly in the literature by Ericson 1977:316.

Table C.5-1 (continued)

Chemical Group	Location	Comments
McComb Butte	T34S R18E	Source of obsidian nodules along the southwestern flank of McComb Butte; shows evidence of prehistoric use. Reference: Hughes 1986a:315.
McKay Butte	T21S R11E	An obsidian-rhyolite dome situated on the lower western flanks of Newberry Volcano, central Oregon. Glass from this localized source is typically a distinctive gray to bluish-gray and was extensively used prior to the eruption of Newberry Caldera obsidian flows during the mid-Holocene. References: MacLeod et al. 1982; Skinner 1983:261-262.
Newberry Volcano	T21S R12-13E	A chemical group consisting of the geochemically indistinguishable Central Pumice Cone, East Lake, Game Hut, and Interlake obsidian flows. These flows were all extruded not long after tephra from Mount Mazama covered the region. References: Higgins 1968 and 1973; MacLeod et al. 1981; MacLeod et al. 1982; Skinner 1983:105-114; Williams 1935.
Obsidian Cliffs	T16S R7-8E	Extensive obsidian quarry source located near the Three Sisters, central High Cascades. Characterized glass from this source has been found at many archaeological sites in both western and central Oregon. References: Hughes 1993d; Skinner 1983:98-102, 265-266; Skinner 1986; Skinner and Winkler 1991.
Potato Hills	T23S R24E	Located about 14 miles east northeast from Glass Buttes. This source is currently under investigation by Richard Hughes.
Quartz Mountain	T22S R15E	A complex of rhyolite dome and flows located immediately east-southeast of Newberry Volcano. References: Hughes 1986a:320; Skinner 1983:267-268.
Riley	T24S R26E	Surface nodules of high quality glass located a few kilometers south of Riley in central Oregon. References: Atherton 1966; Hughes 1986a:319; Skinner 1983:123-125, 269.
Round Top Butte	T24S R23E	A silicic complex located just south of Glass Buttes, Round Butte consists of rhyolitic flows and domes of glass overlain by basalts. References: Cummings 1984; Skinner 1983:270.
Sawmill Creek	T20S R25E	Ash-flow source located at several locations near Sawmill Creek, Ochoco National Forest. This source is currently under investigation by Richard Hughes.
Silver Lake/Sycan Marsh	T30/31S R13E	Obsidian from this chemical group is found spread over a large area in the Sycan Marsh and Sycan River region. Silver Lake is located some distance to the north of the source; the name was adopted because of an early reference to a Silver Lake source by Atherton (1966). References: Atherton 1966:30-33; Hughes 1986a:313-314; Hughes and Mikkelsen 1985; Skinner 1983:271.

Table C.5-1 (continued)

Chemical Group	Location	Comments
Spodue Mountain	T34/36-37S R10-13E	Obsidian from the Spodue Mountain chemical group is widely distributed in the Spodue Mountain area and in secondary deposits in the Sprague and Williamson River valleys. References: Hughes and Mikkelsen 1985; Hughes 1986a:311-312.
Tucker Hill	T34S R19E	Obsidian associated with commercial deposits of perlite are found at this alignment of rhyolitic domes at the southern margin of Pluvial Lake Chewaukan. References: Hughes 1986a:315, Skinner 1983:274-275; Wilson and Emmons 1985.
Whitewater Ridge	T17S R32-33E	Obsidian is found in numerous locations east of Seneca in the vicinity of Whitewater Spring, Bear Valley, central Oregon. Also called the Whitewater Spring or Foster Spring source. Glass from this source is found in the Bear Creek Valley, Silvies River, and west in Antelope Valley. Currently under investigation by Richard Hughes.
Witham Creek	T34S R16-17E	Emerald-colored glass found at locations south of Summer Lake, central Oregon. Reference: Hughes 1986a:320-321.
Wolf Creek	T17S R33E	Obsidian found at several outcrops near Bear Creek Valley east of Seneca. The obsidian may originate from a primary source in the Glass Mountain area. Currently under investigation by Richard Hughes.
Yreka Butte	T22S R20E	A rhyolite-obsidian dome complex located about 15 miles west northwest from Glass Buttes.
CALIFORNIA OBSIDIAN SOURCES		
Annadel	T7N R6W	Obsidian quarry located near Santa Rosa in present day Annadel State Park. References: Ericson et al. 1976, Jackson 1986:51-52; Jackson 1989.
Blue Mountain	T46N R9E	Source of nodules found in an area of prehistoric quarrying activity located west of Goose Lake. Referred to as the Steel Swamp source by Ericson et al. 1976. References: Ericson et al. 1976; Hughes 1986a:309; Van de Hoek 1990.
Blue Spring	T46N R14-15E	Glass from this chemical group can be found at several localities in the Warner Mountains east of Goose Lake, northern California. Reference: Hughes 1986a:296-297.
Bodie Hills	T5N R26E	Surface nodules are found over a large area in the Bodie Hills, eastern California. References: Ericson et al. 1976; Ericson 1977.
Borax Lake	T13N R7W	Large pieces of obsidian found at Borax Lake near Clear Lake. This is one of the most well-known California obsidian sources. References: Ericson et al. 1976; Jackson 1986:59.



Table C.5-1 (continued)

Chemical Group	Location	Comments
Buck Mountain	T44-45N R14-15E	Glass from this chemical group can be found at a few localities in the Warner Mountains east of Goose Lake, northern California. References: Ericson et al. 1976; Hughes 1986a:291-295.
Casa Diablo	T2-3S R27-28E	Obsidian found at many different locations within the Long Valley Caldera has long been collectively referred to as the Casa Diablo source. Many of the sources are associated with a resurgent dome located in the western portion of the caldera (Bailey et al. 1976). Although the Casa Diablo source has been generally considered as a single geochemical group, recent research by Hughes (1992) has indicated that three geochemically distinguishable chemical groups are identifiable within the Casa Diablo source area. Hughes has provisionally termed these varieties, based primarily on Sr, Ti, and Ba composition, as the Lookout Mountain, Sawmill Ridge, and Hot Creek varieties. References: Bailey et al. 1976; Ericson et al. 1976; Hughes 1992.
Cougar Butte	T44N 5E	A prehistoric quarry area found near Cougar Butte, Medicine Lake Highlands. References: Ericson et al. 1976; Hughes 1986a:303.
Cowhead Lake	T47N R16-17E	Obsidian nodules from the chemical group are found at locations in the vicinity of Cowhead Lake, Surprise Valley. References: Ericson et al. 1976; Hughes 1986a:308-309.
East Glass Mt.	T43N R4E	Source located near Glass Mountain, Medicine Lake Highlands. Reference: Hughes 1986a:304-305.
East Medicine Lake	T44N R5E	Obsidian from this chemical group is found at two locations near Glass Mountain, Medicine Lake Highlands. Iron-manganese ratios are typically used to distinguish this source from the chemically similar GF/LIW/RS glass. Reference: Hughes 1986a:301-302.
GF/LIW/RS	—	Grasshopper Flat (GF), Red Switchback (RS), and Lost Iron Well (LIW) chemical group distinguished by Richard Hughes. These three geochemically indistinguishable sources are located in the Medicine Lake Highlands of northern California. High quality glass from this chemical source was prehistorically extensively utilized. Reference: Hughes 1986a:300-301.

Table C.5-1 (continued)

Chemical Group	Location	Comments
Glass Mountain	T44N R5E	The age of this spectacular and well-studied flow of obsidian, found on the upper eastern slopes of the Medicine Lake Highlands, has been a subject of archaeological and geologic discussion for some time. Based on radiocarbon dates and paleomagnetic evidence, Donnelly-Nolan et al. (1990) places the age of the flow at somewhere between about 850 and 1050 years B.P., providing a well-defined time frame for its procurement and prehistoric use. Ethnographic accounts point to the use of glass from this source by the Achomawi and several northern California groups to the west of the source (Kniffen 1928). The source was extensively utilized during the late prehistoric period—Hardesty and Fox (1974) recorded 594 archaeological sites along the margin of the flow. References: Anderson 1933; Donnelly-Nolan et al. 1990; Ericson et al. 1976; Hardesty and Fox 1974; Hughes 1986a:302-303; Kniffen 1928.
Grasshopper Flat	T43N R2E	One of the geochemically indistinguishable source outcrops in Hughes' GF/LIW/RS chemical source group. References: Ericson et al. 1976; Hughes 1986a:300.
Grasshopper Group	—	Geochemical group identified by BioSystems Analysis as consisting of the Grasshopper Flat, Red Switchback, Lost Iron Well, and East Medicine Lake chemical groups.
Kelly Mountain	T29-30N R5-6E	Chemical group consisting of small nodules of glass available at a few scattered locations. Reference: Hughes 1986a:309-310.
Lost Iron Well	T42N R2E	One of the geochemically indistinguishable source outcrops in Hughes' GF/LIW/RS chemical source group. Reference: Hughes 1986a:301.
Mono Glass Mountain	T1-2S R30E	This extensive Pliocene-Pleistocene complex of rhyolitic domes, flow, and pyroclastic deposits is located along the northeastern boundaries of the Long Valley Caldera. Glass Mountain obsidian is widely available at Glass Mountain and in the lacustrine deposits of Pleistocene Long Valley Lake (Bailey et al. 1976). References: Bailey et al. 1976; Ericson et al. 1976.
Mt. Konocti	T13N R8W	Widely used and widespread source of obsidian located on the south side of Mt Konocti near Clear Lake. Glass from this area is of poorer quality than many other North Coast Range sources. References: Ericson et al. 1976; Jackson 1986:58-59; Jackson 1989.
Napa Valley	T8N R6W	Extensively used prehistoric quarry site located in northern Napa Valley near the town of St. Helena. Also known as Napa Glass Mountain. References: Ericson et al. 1976; Jackson 1986:54-57; Jackson, 1989.
Rainbow Mines	T46N R14E	Large nodules of glass associated with a modern rockhound collecting area. Reference: Hughes 1986a:298-299.

Table C.5-1 (continued)

Chemical Group	Location	Comments
Red Switchback	T45N R3E	One of the geochemically indistinguishable source outcrops in Hughes' GF/LIW/RS chemical source group. Reference: Hughes 1986a:301.
South Warners	T36-38N R16E	Nodules of glass are found at several locales in the Dodge Reservoir Area, Surprise Valley. Reference: Hughes 1986a:297-298.
Sugar Hill	T45-45N R14E	The source lies within the ethnographic boundaries of the Achomawi and Sugar Hill was reported as sacred by Kniffen (1928). References: Ericson et al. 1976; Hughes 1986a:295-296; Kniffen 1928.
Tuscan	T31-34N R1-3W	Obsidian associated with the Tuscan Formation, a widespread laharc deposit, is found in numerous localities in the area east of Redding, California. Recent geochemical studies of Tuscan source material indicate that three chemical subgroups may be distinguished from among glass recovered from the Tuscan Formation (Hamusek 1993). References: Hamusek 1993; Hughes 1986a:305-308.
NEVADA OBSIDIAN SOURCES		
Mosquito Lake	T46N R19E	Nodules up to about 10 cm in diameter are found immediately north of Mosquito Lake, Washoe County, northwestern Nevada. Location is not shown in Figure 4-13. Reference: Hughes 1986a:327.
Bordwell Spring	T36-37N R19/21E T39N T20E	Several discrete source localities of obsidian nodules located in northwestern Nevada are included in the Bordwell Spring chemical group. Evidence of prehistoric utilization has been reported from all known source locations. This source has previously been called Homecamp A by Hughes and appears to be the same chemical group reported as Duck Flat by Ericson et al. (1976:33). Reference: Hughes 1986a:325, 328-329.
WYOMING OBSIDIAN SOURCES		
Obsidian Cliff	—	Located in Yellowstone National Park, this obsidian flow was extensively prehistorically used, most notably as a component of the Hopewell Interaction Sphere. Artifacts from this source have been found in sites in southern Canada and throughout the northern United States. References: Davis 1972; Frison 1974; Griffin et al. 1969; Hatch et al. 1990; Iddings 1888.

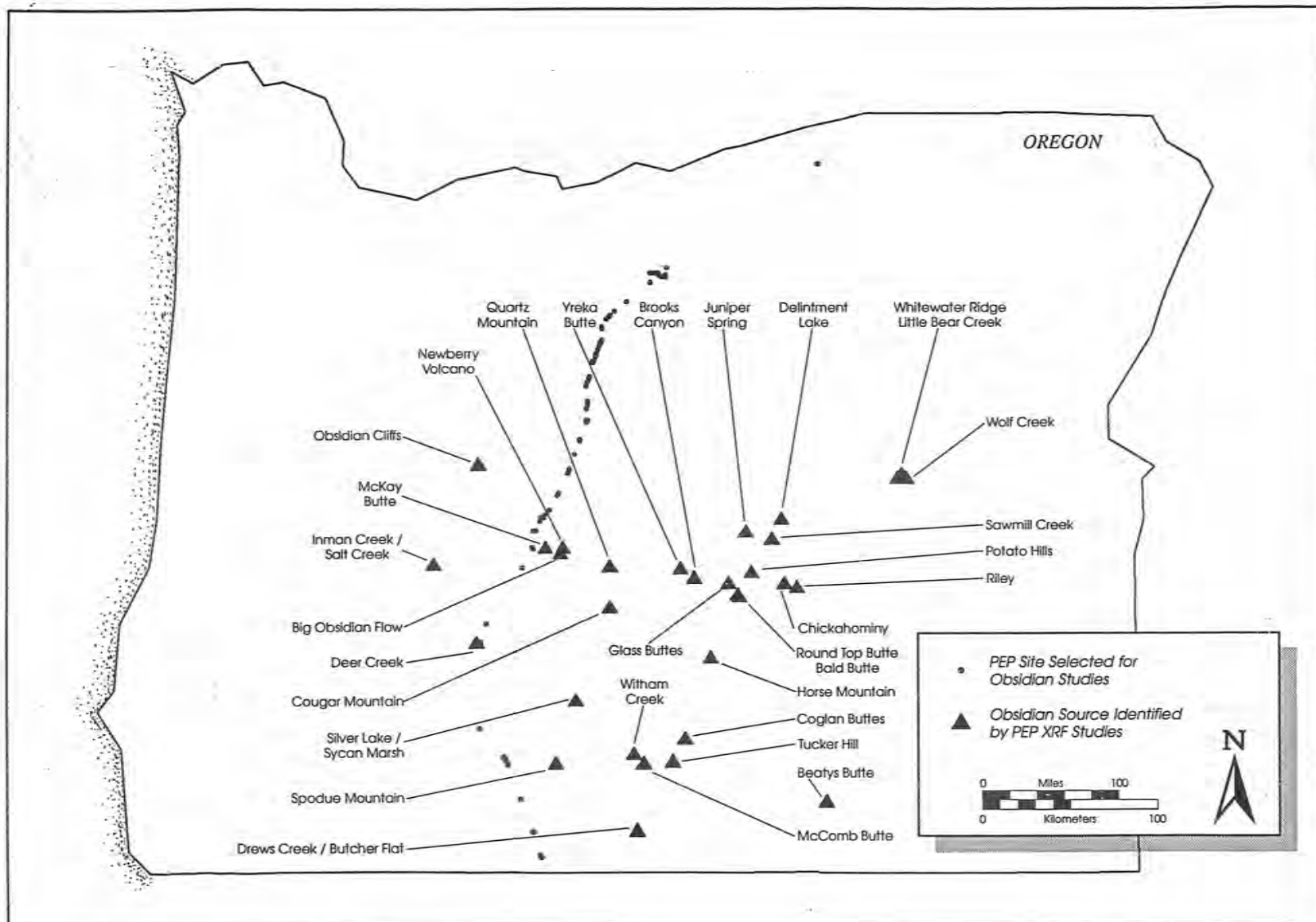


Figure C.5-1 Location of all Oregon obsidian sources identified during trace element studies of PEP artifacts. Source locations are from Hughes (1986a) and Skinner (1983).

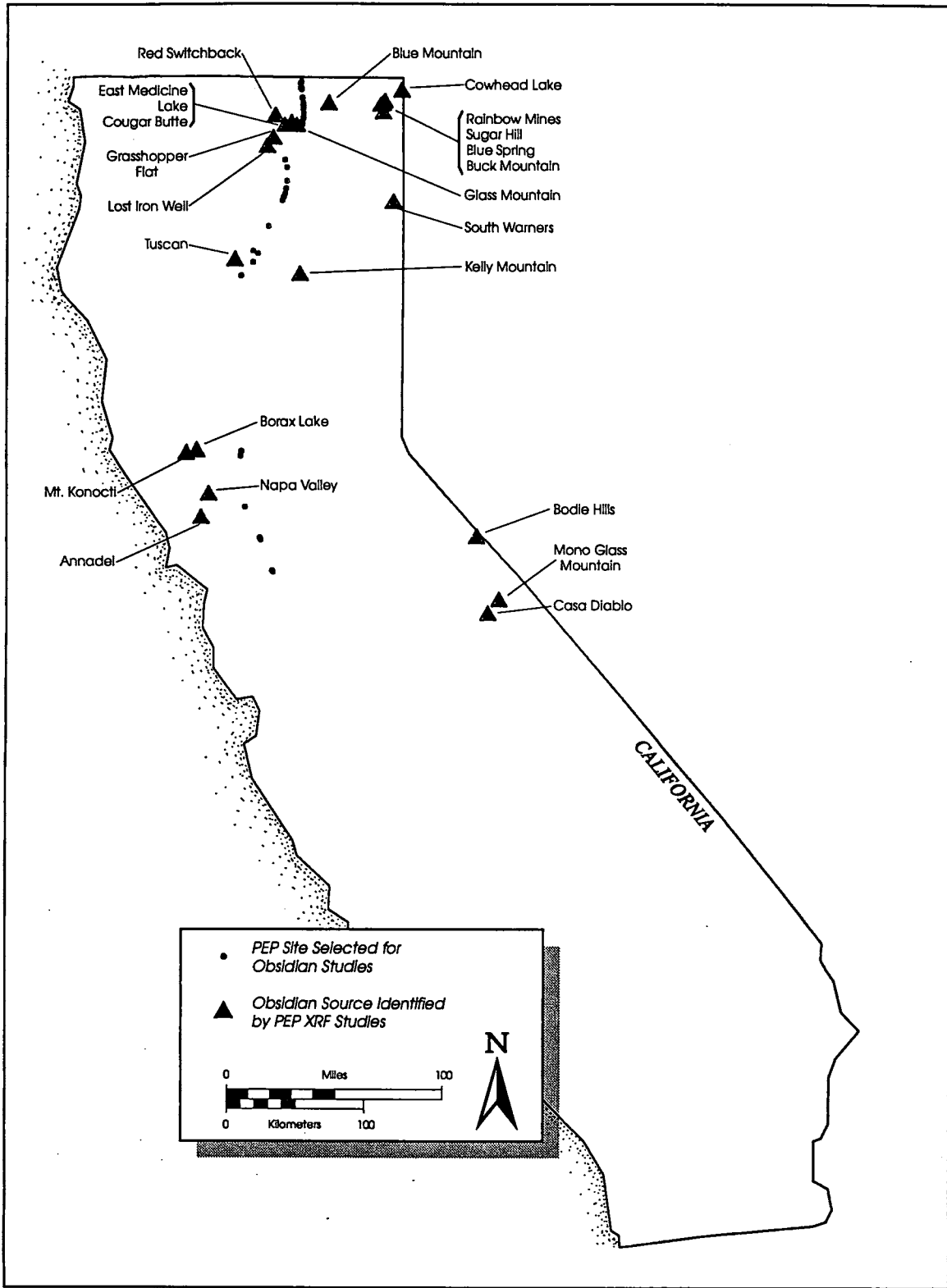


Figure C.5-2 Location of all California obsidian sources identified during trace element studies of PEP artifacts. Source locations are from Ericson et al. (1976), Hughes (1986a), and Jackson (1986).