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The Bear Creek Site (45KI839), a Late Pleistocene–Holocene Transition Occupation in the Puget Sound Lowland, King County, Washington

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The Bear Creek site in Redmond, Washington, yields important information about settlement, subsistence, and technology in the Puget Lowland during the late Pleistocene–Holocene transition. The lithic assemblage is dominated by expedient flake technology, but also contains bifaces and retouched tools. Ongoing analyses focus on site formation, procurement strategies of lithic raw materials, production of flake tools, and technological comparisons of Bear Creek stemmed and concave-base points with other Paleoarchaic technologies of western North America.

Keywords late Pleistocene–Holocene transition, archaeology, Puget Lowlands, Northwest Coast

Bear Creek (45KI839) in Redmond, Washington (Figure 1), is the only well-stratified, excavated site in the western Washington Puget Lowland to yield in situ lithic artifacts in deposits from the late Pleistocene–Holocene (LPH) transition. Extensive excavations in 2013 produced a large assemblage of lithic artifacts that promise abundant data on lithic technology upon completion of analyses, and provided insights on local and regional landform histories attesting to human presence in the Puget Lowland during the LPH transition (16,000–8,000 cal yr BP). Diagnostic lithic artifacts share affinities with western North American Paleoindian and Paleoarchaic traditions, including concave-based and stemmed points (e.g., Davis et al. 2012). Horizontally discrete concentrations of debitage and other lithic artifacts suggest repeated occupation by small groups of people using a variety of lithic raw materials.

The site was initially identified in 2008 during an archaeological assessment along the lower reaches of the channelized Bear Creek, when lithic artifacts of a

more recent component were found sparsely distributed above Mazama tephra and peat. Follow-up test investigations in 2009 discovered the deeper LPH component below the peat, and artifacts in secondary context within alluvial channel deposits that locally scoured both the LPH and the post-Mazama components (Hodges et al. 2009; Kopperl et al. 2010). In the summer of 2013, 420 1-m² excavation and test units were completed along the habitat restoration corridor. A stratified sampling strategy focused excavation in portions of the site with intact deposits of the LPH component. Smaller samples were retrieved in areas characterized by reworked channel-deposit sediments. Constant volume samples were systematically collected and water-screened through finer mesh, and abundant specialized samples were taken for paleoenvironmental and chronometric analyses.

The stratigraphic relationships at the site, schematically shown in Figure 2, are characterized by well-defined tabular geometry in which the vertical changes represent major environmental shifts (see Online Supplementary Material for additional information). Subdivisions within strata represent minor

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Figure 1 Location of the Bear Creek site (45KI839) near the north shore of Lake Sammamish, Puget Lowland, Washington.

or shorter-term environmental changes, particularly in Stratum V, which includes the in situ artifact-bearing Stratum Vc. The current radiocarbon sequence is based on 12 samples taken during the 2008 and 2009 investigations (Table 1). Most of these samples are within Stratum Vb, providing upper limiting dates on the in situ assemblage. One fragment of detrital charcoal obtained from Stratum Vc sediments, the in situ artifact-bearing deposit, yielded a date of $10,780 \pm 60$ ^{14}C yr BP. Additional dating of this stratum is underway and will hopefully shed light on local site formation processes as well as the

relationship between the Bear Creek LPH component and the Younger Dryas cooling interval (Meltzer and Holliday 2010), which appears to overlap the radiocarbon date from Stratum Vc.

The LPH component in Stratum Vc was the major focus of excavation. Stratum Vc rests on glacial sediments (Stratum VI), and is overlain by peaty wetland deposits (Stratum Vb) and diatomaceous earth (Stratum II). Additionally, several lithic artifacts were found in sandy channel deposits (Stratum III) associated with an erosional event that scoured obliquely through the central portion of the site. Stratum III is

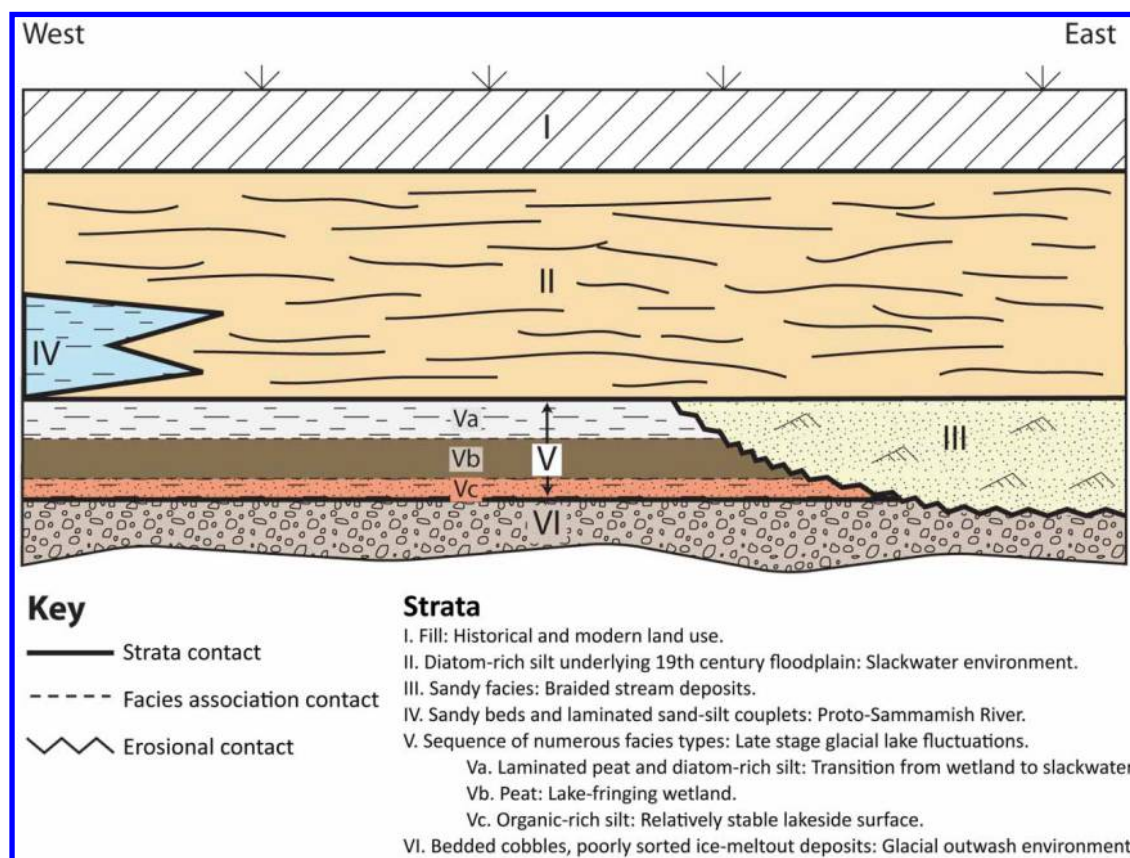


Figure 2 Schematic profile of stratigraphy across the Bear Creek site (45KI839). Primary in situ artifact-bearing LPH deposit is Stratum Vc, shown in red.

Table 1
AMS Radiocarbon dates from 2008 Backhoe trench profiles and 2009 test sondage profiles at the Bear Creek site

Sample (Beta) #	Provenience* (unit and stratum)	Material	¹⁴ C age (uncal BP)	Calibrated age** (2σ cal BP range)
251265	BT7; bottom Vb	Peat	8,850 ± 50	10,168–9,710
252264	BT13; top Vb	Peat	8,050 ± 60	9,126–8,663
265419	SON47; top Vb	Peat	8,580 ± 50	9,663–9,482
265978	SON47; mid Vb	Carbonized shrub wood	10,040 ± 60	11,817–11,274
265418	SON47; bottom Vb	Peat	8,800 ± 50	10,151–9,630
265980	SON47; mid Vc	Carbonized shrub wood	10,780 ± 60	12,770–12,596
265413	SON70; mid Vb	Peat	7,640 ± 50	8,543–8,376
265415	SON107; top Vb	Peat	8,530 ± 50	9,557–9,454
265414	SON107; bottom Vb	Peat	7,900 ± 50	8,978–8,593
265979	SON107; mid Vb	Carbonized shrub wood	9,290 ± 40	10,586–10,298
265416	SON110; clay below V	Uncarbonized willow wood	10,480 ± 60	12,579–12,116
265417	SON110; clay below V	Uncarbonized willow wood	10,590 ± 60	12,690–12,420

*BT = backhoe trench; SON = test sondage.

**OxCal 4.2 (Bronk Ramsey 2009); IntCal13 (Reimer et al. 2013).

currently interpreted as an avulsive event associated with a lateral shift in the location of a proto Bear Creek channel. Both Strata V and III are conformably overlain by Stratum II, and ancestral Sammamish River flood sediments (Stratum IV) were found at the west end of the site intercalated with Stratum II. Units, trenches, and other profile exposures throughout the project area show the archaeological site occupied a subdued, topographically elevated landform adjacent

to a wetland, and possibly the ancestral shoreline of Lake Sammamish near its outlet.

The Bear Creek site contains several small, spatially discrete lithic reduction and tool-use/processing loci (Kopperl et al. 2010). The 2013 block excavation defined and sampled three horizontally discrete concentrations of artifacts, including cores and flakes of the same raw material clustered in particular locations within the site. The preliminary catalog combining all

artifacts collected to date includes over 1,000 flakes and shatter and over 50 cores, most of which are unpatterned. Expedient tools include hammerstones and edge-modified flakes and cobbles. The formed tool assemblage includes bifaces, scrapers, graters,

projectile points, and unifaces. Raw materials are dominated by metasediment and fine- to coarse-grained volcanic rock. Formal tools are made of chert and fine-grained volcanic rock. Three distinctive projectile point bases were found in situ during the

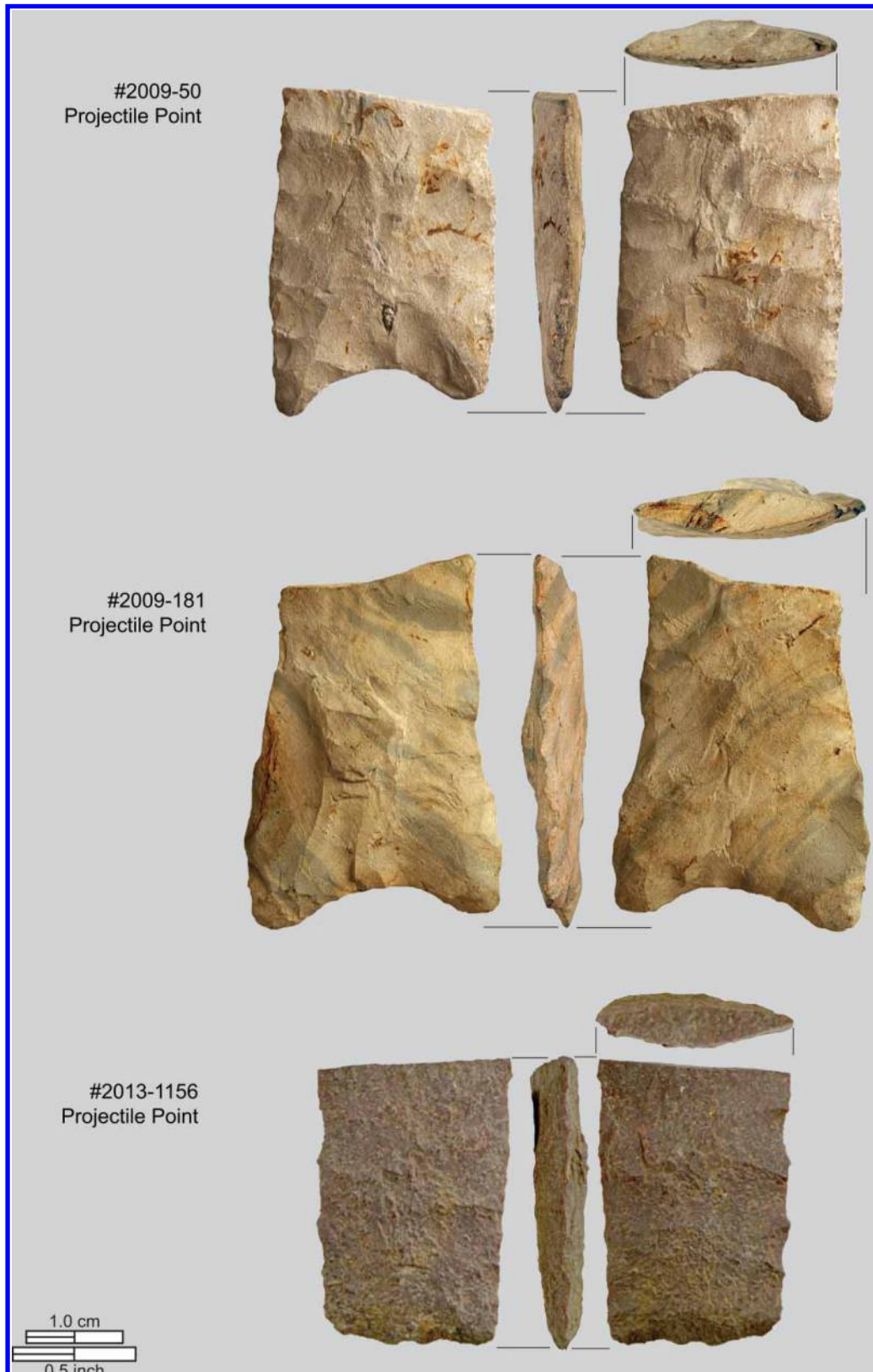


Figure 3 Projectile point bases recovered in situ in Stratum Vc from 2009 test excavation (#2009-50 and -181) and 2013 data recovery (#2013-1156).

2009 and 2013 excavations, two of which are concave-based and one of which may be part of a stemmed projectile (Figure 3). Backhoe-spoils excavation in 2014 also yielded two Cascade-type foliate points and one concave-based lanceolate point that lack stratigraphic context (Boersema et al. 2014). Unlike the points found in situ, these are heavily patinated. Residue analysis by crossover immunoelectrophoresis on several excavated biface fragments yielded positive results with Capparidaceae (beeweed, etc.) antisera on three specimens; and with bear, bovid, deer, sheep, and salmonid antisera on another specimen.

Recent research in the Pacific Northwest is rapidly expanding our knowledge of the regional LPH archaeological record. The timing of human presence here has been extended back significantly both in the interior (e.g., Jenkins et al. 2012) and along the coastal margin (e.g., Fedje et al. 2011). Bear Creek contributes to that research as a well-stratified site in a region notoriously lacking such LPH sites. This recent research also suggests that the LPH was culturally more heterogeneous than previously thought. Emerging issues include the timing and route of migration of the first inhabitants, the relationship between Paleoindian and Paleoarchaic traditions (e.g., Davis et al. 2012) and between Western Fluted and Clovis (e.g., Beck and Jones 2010; Grayson 1993), as new LPH assemblages in western North America are found. Where Bear Creek fits into this complexity is a major focus of our research. Presently, we can say that the Bear Creek assemblage is broadly similar to other regional LPH traditions, but differing in detail. Upon completion of our currently ongoing analyses, the site will contribute significantly to our knowledge of the range of LPH technological traditions and human-environmental interactions in the region.

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