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THE IDAHO ARCHAEOLOGIST

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MARK G. PLEW, Department of Anthropology, 1910 University Drive, Boise State University, Boise, ID 83725-1950; phone: 208-426-3444; email: mplew@boisestate.edu

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The *Idaho Archaeologist* publishes peer reviewed articles, reports, and book reviews. Though the journal's primary focus is the archeology of Idaho, technical and more theoretical papers having relevance to issues in Idaho and surrounding areas will be considered. The *Idaho Archaeologist* is published semi-annually in cooperation with the College of Arts and Sciences, Boise State University as the journal of the Idaho Archaeological Society.

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Darby C. Stapp

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ARTICLE

Test Excavations at the Faull Site (10-BO-1005) Southwest Idaho

TESSA AMEND, JENNIFER CUTHBERTSON, JULIE JULISON, SHELBY LABRUM,
CONNOR NEAL

Abstract

This paper reports on test excavations at the Faull Site (10-BO-1005), located north of Horseshoe Bend, Idaho. Test excavations recovered evidence that the site appears to be a short term lithic camp reduction station located at an elevation of 4,400 feet. Though no specifically diagnostic artifacts were recovered, lithic debris suggests middle to late stage reduction.

Keywords: Late Archaic, Payette River, Lithic Reduction, XRF

Introduction and Background

In early fall of 2016, Boise State University was contacted by Mr. Eric Faull, who reported having found archaeological materials on his property. This land was located in the foothills above Horseshoe Bend, Idaho, along the Payette River (Figure 1). Upon Faull's invitation, Boise State University conducted an initial survey of the location in October 2016. An inspection of the materials in Mr. Faull's possession identified artifacts dating to the Middle and Late Archaic periods of the southern Idaho chronology. Owing to limited investigation of the area, Mr. Faull agreed to allow Boise State University to conduct excavations of the property. Following creation of a formal Master Operating Agreement, Boise State conducted test excavations in June 2017.



Figure 1. Overview Map of Idaho with Faull Site.

Previous Archaeological Research

Archaeological sites have been documented in the region of the upper basin of the Payette River for more than 60 years (Moore and Ames, 1979; Ames 1982; Plew, Ames, and Furhman 1984; Plew and Fuhrman 1985; Plew 1992; Lewarch and Benson 1989; and Gallison and Reid 1993). The majority of the sites are short term camps with limited artifact assemblages. These sites span east of Lowman and west to Banks, and then south of Horseshoe Bend, Idaho with dates estimated between 5,000 and 2,000 B.P. The sites mentioned in this report are noted on the map on Figure 2.

The earliest work in the Payette River area was conducted by Idaho State College Museum under Donald Tuohy, who surveyed across the state during the late 1950s (Moore and Ames, 1979). This included a number of sites originally recorded for the National Park Service while conducting an archaeological reservoir survey (Moore and Ames, 1979). During 1977 and 1978, the Federal Highway Commission granted the Idaho Highway Archaeological Survey and Reconnaissance Program to undertake the South Fork Payette River Archaeological Survey. A two-man team was sent out during the summer for each year, supervised by Dr. Kenneth Ames, and located 45 archaeological sites during the survey stretching west of Crouch and east of Lowman, Idaho (Moore and Ames, 1979). The crew would only inspect 400 meters from the north side of the highway corridor and if time permitted the south side of the river in potential areas, due to a limited budget (Moore and Ames, 1979). Among the sites discovered was 10-BO-110, situated on the south side of the confluence of

the South and Middle Forks of the Payette River. The site produced a limited assemblage, including cobble tools, pestles, mortars, along with cores, and bifaces (Moore and Ames, 1979). Site 10-BO-110 also contained thermally-altered rock, although there was no mention of faunal remains, hearth features, or any pottery. Though no diagnostic artifacts were recovered at 10-BO-110 that could be utilized to determine the dating of the site; in surrounding sites surveyed there were three Elko points, four Rose Springs, one Eastgate, one Corner-Notched, and three Stemmed points which suggest occupations between 3,000 to 4,000 B.P. (Moore and Ames 1979).

Between 1979 and 1982, the North Fork Project was conducted by pedestrian survey to determine if there were eligible sites for the National Register. During the study, a number of sites in the Payette River drainage were recorded (Ames 1982). Notable among them was the Danskin Station of 10-BO-47, located east of Crouch on the north side of the Payette River, between Crouch and Lowman, Idaho (Ames 1982). Though only three test pits were excavated, 148 artifacts were recovered, along with 1,785 pieces of lithic debitage that was predominantly obsidian. In addition, there were 13 faunal remains recovered (Ames 1982). This site is suggested to be a field camp due to the larger variation of artifact classes; Ames doesn't provide a detailed accounting of all the artifacts but mentions that there are cores, cobbles, spall tools, pestles, and mortars. There were four different distinct styles of projectile points: Elko Corner-Notched, Desert Side-Notched, Pinto Shouldered, and Pinto Shoulderless which indicate different occupations during the last 4,000 to 5,000 years (Ames 1982).

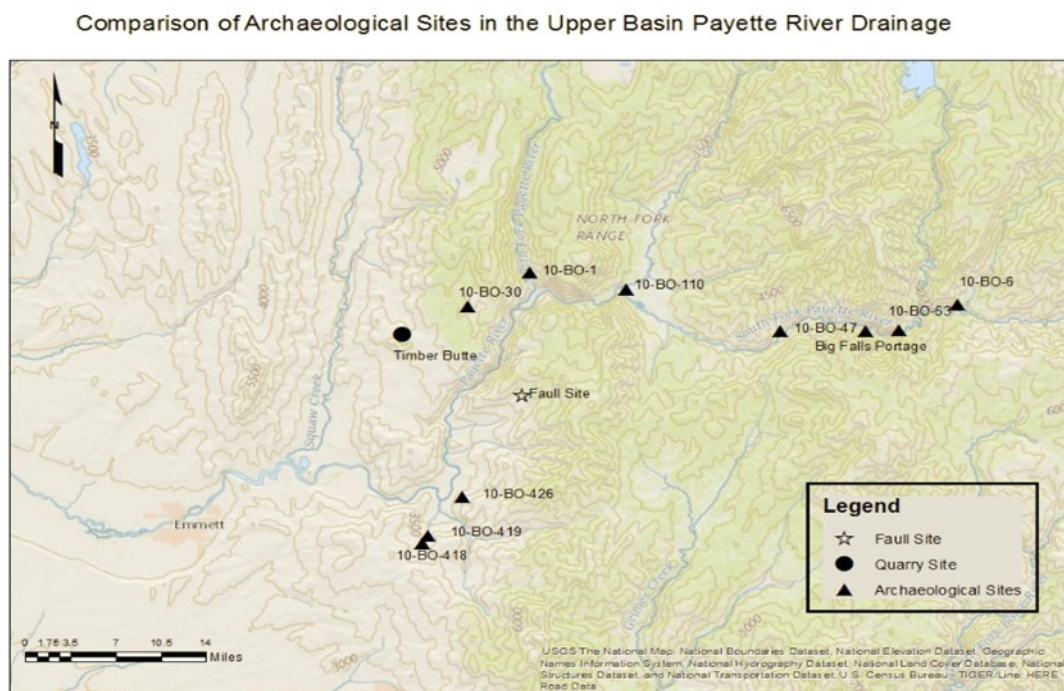


Figure 2. Archaeological sites in the Upper Basin Payette River drainage.

The same survey recorded site 10-BO-30, located in Dry Buck Valley along the north side, where Peterson Creek enters the valley (Ames 1982). Seven test pits were excavated, and resulted in the recovery of 65 artifacts – the most common being projectile points and bifaces. Obsidian was the primary composition of the debitage, the total debitage count was 1,917 (Ames 1982). There were

no thermally-altered rocks, hearths, or shell remnants recovered from the site. Even though the soil was acidic, seven pieces of bone were recovered (Ames 1982). Seven projectile points were identified: one Desert Side-Notched, two Elko Eared-Series, one Rose Spring Corner-Notched, one Rose Spring - Eastgate Series, and two Rose Spring-Series. The time span of these styles of projectile points extends over the last 4,000 B.P. in the Great Basin (Ames 1982).

In 1958, the Silver Bridge site (10-BO-1) located on the North Fork of the Payette River, north of Banks, Idaho, was recorded at the confluence of the Zimmer Creek. The initial excavation of the site was completed in November 1982 (Plew, Ames, and Furhman 1984). A total of 159 artifacts were recovered, though 96 of those were modified flakes. There was a total of 8,539 pieces of debitage recorded from the excavation. Obsidian was the primary material of the artifacts and debitage (Plew, Ames, and Furhman 1984). Site 10-BO-1 produced projectile points or fragments, scrapers, knives, drills, bifaces, cores, and a graver. Even though there are numerous artifacts, there is a low density of artifact variance. The majority of the projectile points are diagnostic: two Rose Spring Corner-Notched, two Elko Side-Notched, one Elko Eared, and one Humboldt-Series (Plew, Ames, and Furhman 1984). The only Large Triangular Stemmed point located was tested 3680 ± 100 B.P. by radiocarbon dating (Beta 6529). Along with an obsidian hydration date of 4311 B.P. which is of similar age (Plew, Ames, and Furhman 1984).

In 1984, test excavations were conducted at site 10-BO-6 and 10-BO-53, both are located on the north bank of the Payette River west of Lowman, Idaho (Plew and Fuhrman 1985). At 10-BO-6 a single test unit was excavated and the artifact assemblage recovered was limited to projectile points, a cobble, and a pestle fragment (Plew and Fuhrman 1985). A total of 42 lithic flakes principally consisting of obsidian. Hydration analysis was completed on three specimens from 10-BO-6 returned dates of 3065 B. P., 3414 B.P., and 3477 B.P. (Plew and Fuhrman 1985). One Eastgate projectile point was located in the test unit. Dating of the site supports the argument that occupations from 5,000 to 2,000 B.P. are common in the upper Payette River drainage (Plew and Fuhrman 1985).

Site 10-BO-53 is located east of Pine Flat Creek, west of Cooley Creek, and northwest 500 meters from the South Fork of the Payette River, was excavated by Plew and Fuhrman (1985). The excavation, comprised of sixteen test pits 1 X 2 meters, yielded a small assemblage of three projectile points, three bifaces, and a knife with only one out of seven made of cryptocrystalline. There were 169 pieces of lithic debitage, obsidian being the primary composition at 95%. The two samples for hydration dating are 3021 B.P. and 3095 B.P. (Plew and Fuhrman 1985). With the limited assemblage and extremely low diversity of artifacts, this site was surmised to be a short term camp. Two complete projectile points were recorded, one Side-Notched point and the other an Elko point. The sites 10-BO-6 and 10-BO-53 support the current sequence of dating in the Payette River Drainage between 5,000 to 2,000 B.P. (Plew and Fuhrman 1985).

The summer of 1987, Evans-Hamilton, Inc. performed recovery excavations due to the realignment of Highway 55 south of Horseshoe Bend, Idaho at 10-BO-418 and 10-BO-419 (Lewarch and Benson 1989). These two sites are situated at the confluence of the Payette River and Cottonwood Creek. Thirteen test pits were excavated at 10-BO-418 with an artifact assemblage that consists of projectile points, bifaces, cores, hammerstones, metates or fragments, atlatl weights, and Gray ware pottery (Lewarch and Benson 1989). Obsidian was the principal material in the lithic debitage with 1,586 items out of the total of 1,946. There were unidentified faunal fragments recorded along with thermally-altered rock, but there was no mention of charring of the bone material or if charcoal was present. Twenty six projectile points were excavated from 10-BO-418 in what was determined to be two separate occupations (Lewarch and Benson 1989). The north side of the excavation site contained thirteen Large Side-Notched points and three Small Side-Notched points. The south side of the site contained one Small Side-Notched, one Elko point, three Rosegate, and five fragmented speci-

mens (Lewarch and Benson 1989). XRF was performed on 40 samples of obsidian and all examples were sourced back to Timber Butte. The age of the north side of the site was determined from 4,000 to 3,300 B.P. while the south side was determined to be 1,500 to 500 B. P. (Lewarch and Benson 1989).

Site 10-BO-419 located northeast of 10-BO-418, saw three block excavations that produced a large artifact assemblage with considerable diversity (Lewarch and Benson 1989). The assemblage contained projectile points, cores, graters, scrapers, spokeshaves, drills, abraders, cobblestones, a hammerstone, hand stones, choppers, mortars, and a knife, in addition to Gray ware pottery (Lewarch and Benson 1989). Debitage consisted largely of obsidian with 13,420 or 90% of the overall 14,936. Thermally-altered rock, charcoal, hearth features, ochre, and faunal remains burned and green were also recorded during the excavation (Lewarch and Benson 1989). There were 137 projectile points that were documented: twenty-three Desert Side-Notched, fifty-three Rosegate, twelve Corner-Notched, three Small Stemmed, eight Small Triangular, four Small Lanceolate, nineteen Elko, four Large Stemmed, five Large Side-Notched, and six Large Lanceolate with the majority being obsidian (Lewarch and Benson 1989). Five occupations were identified but were intermittent and even though there had been some shifting from the eastern side to the western side and then back again, the overall utilization of the site demonstrates a continual use over the course of 5,000 B.P. (Lewarch and Benson 1989).

In 1988, Idaho Department of Transportation archaeologists recorded site 10-BO-426 (Plew 1992). This site is situated east of Horseshoe Bend along the Payette River in an agricultural field. This site had two distinct areas: Area A and Area B (Plew 1992). The combined artifact assemblage was diverse including: cores, scrapers, bifaces, projectile points, a chopper, hammerstones, cobbles, pottery sherds, a pestle fragment, and a partial basin mortar. The overalldebitage composition was 2,253, which consisted primarily of obsidian (94%), though there were 68 basalt and 56 cryptocrystalline present (Plew 1992). A greater number of artifacts anddebitage were located in Area B although Area A produced a greater number of shell and faunal remains. The presence of shallow open fire pits were recorded during the excavation along with a few pieces of thermally-altered rock (Plew 1992). A total of 15 projectile points including four Eastgate Expanding-Stem, three Rose Spring Corner-Notched, one Rose Spring Side-Notched, one Slightly Stemmed point and six tips that resemble Rosegate were recovered. The pottery is mentioned as smooth in texture and grey - brown in color along with Rosegate projectile point fragments suggest a Late Archaic occupation from the last 1,000 B.P. (Plew 1992).

One final site of relevance is the Big Falls Portage Site located on the south bank of the South Fork of the Payette River between Little Hole in the Wall Creek on the west side and Hole in the Wall Creek on the east side (Gallison and Reid 1993). Four shovel 50 X 50 cm tests and one test unit 1 X 1 meter were excavated. The assemblage contained projectile points, bifaces, drills, a core and a cobble pestle (Gallison and Reid 1993). An additional 1,054 pieces of lithicdebitage including 12 argillite specimens were recovered, though obsidian was the primary source material. Two pieces of thermally-altered rock were documented but no faunal remains, no features, or structures. The assemblage contained thirteen projectile points that included: six Rosegate-Series, one Elko, and six Bliss points (Gallison and Reid 1993). XRF analysis was performed on ten obsidian points and all specimens were sourced to Timber Butte. Chronology of cross dating the site gives a range 1350 - 200 B.P. (Gallison and Reid 1993).

The similar artifact tool assemblages from archaeological sites located in the upper basin of the Payette River drainage mentioned in the previous archaeological research can be seen in Figure 3.

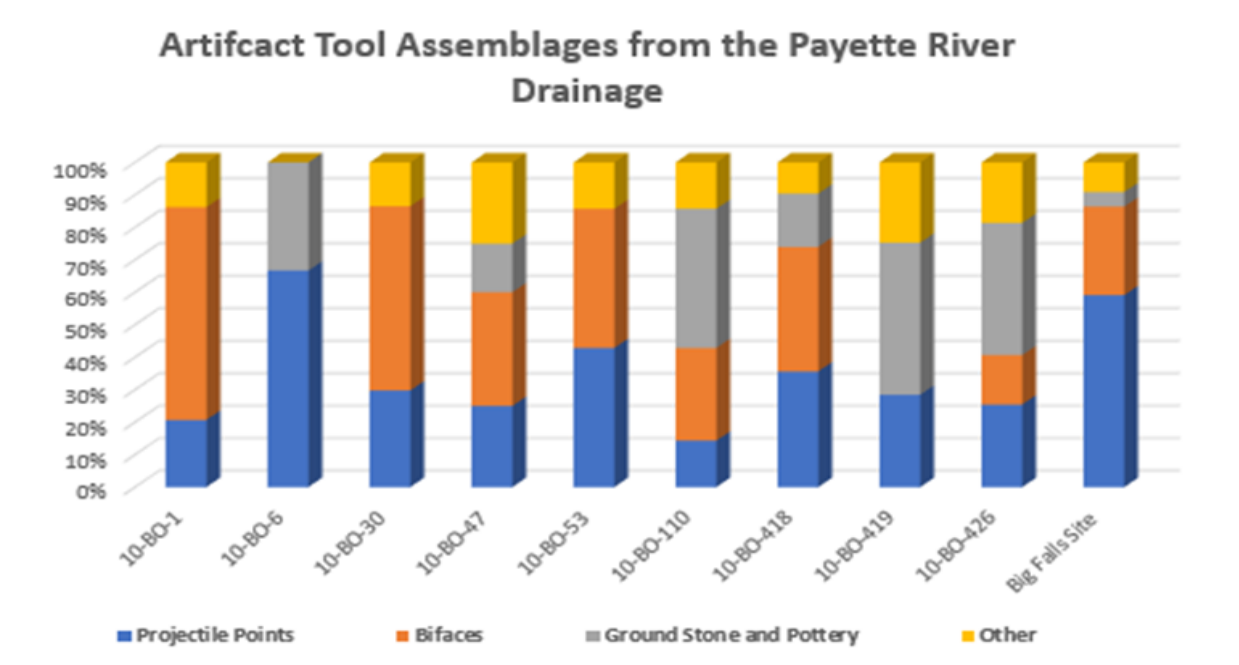


Figure 3. Upper Basin Payette River Assemblage Comparison.

Setting

The Faull site is located four kilometers west of the Payette River, the nearest permanent water source, at an elevation of 4,400 feet. The site is part of the Boise Front that includes a part of the Payette River, the Boise Basin, and parts of the Boise River. The Faull site is situated in a forested upland area along a hillside with a knoll to the east. The area is heavily vegetated with low ground visibility due to an array of grasses such as pine bluegrass, cereal rye, and exotic Idaho fescue which can be observed in Figures 5 and 6. A number of endemic forbs that are known traditional food sources also grow within the site area, mostly consisting of biscuit root, yarrow, and arrowleaf balsamroot. Although the site is located in a forested upland area, the site vicinity itself is devoid of trees. Figure 4 shows the site's location within the immediate area, with the site being located to the west of the access road.

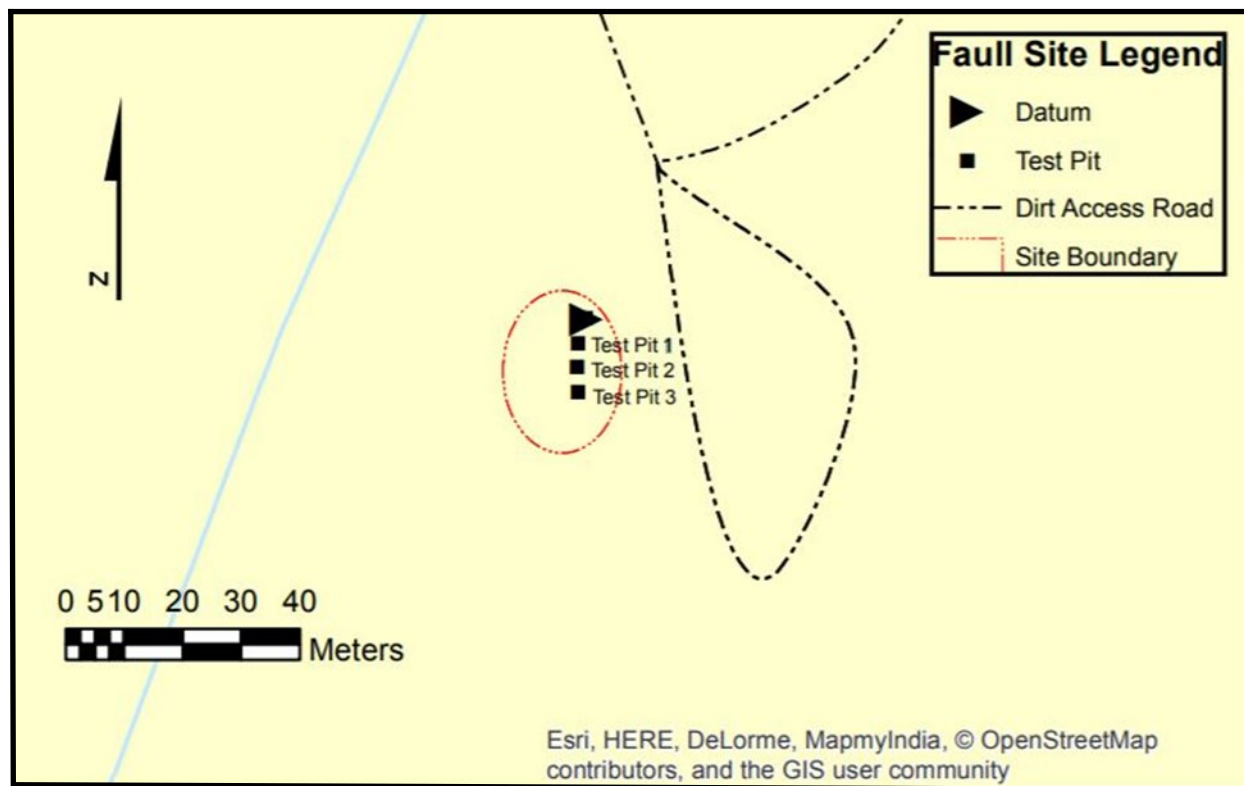


Figure 4. Faull Site overview.



Figure 5. Site overview facing north.



Figure 6. Site overview facing east.

Test Excavations

During the most recent project at the time of writing, three 1 x 1 meter test units were excavated. Since the site is located on a slight hill, units were placed at a downhill slope in order to determine any colluvial movement of cultural materials. Test units were mapped with the use of an arbitrary datum. Units were excavated using trowels and shovel shaving techniques using arbitrary 10 cm levels. All sediments were passed through 1/8 inch hard wire mesh. Field paperwork and level bags were labeled according to their correlating levels with each level bag containing distinct bags for any artifacts, lithics, and faunal remains. Test Units 1 and 2 were each excavated to 70 cm below datum, while Test Unit 3 was excavated to 60 cm below datum.

Photographs of floor levels were taken in each unit upon completion of each level. Site overview photographs were taken as well as general photographs of the excavation and surrounding area. Stratigraphic profiles were drawn of two walls per unit, and soil samples were taken from the north wall of Test Unit 1.

Sediments Analysis

The Faull site deposits indicate an accumulation of aeolian and alluvial sediments. Organic material has variously stained what appear as three strata which are visible in Figure 7. The uppermost level has been disturbed by animal activity. The stratigraphy of the three test units is uniform although thicknesses of individual strata vary to the 10 degree east-west slope of the terrace. The upper stratum that extends some 30 cm below pit datum contains wind deposited material with intermixed organic remains. The additional strata contain increasing clay content. The greatest density of cultural materials is found in the upper 50 cm.

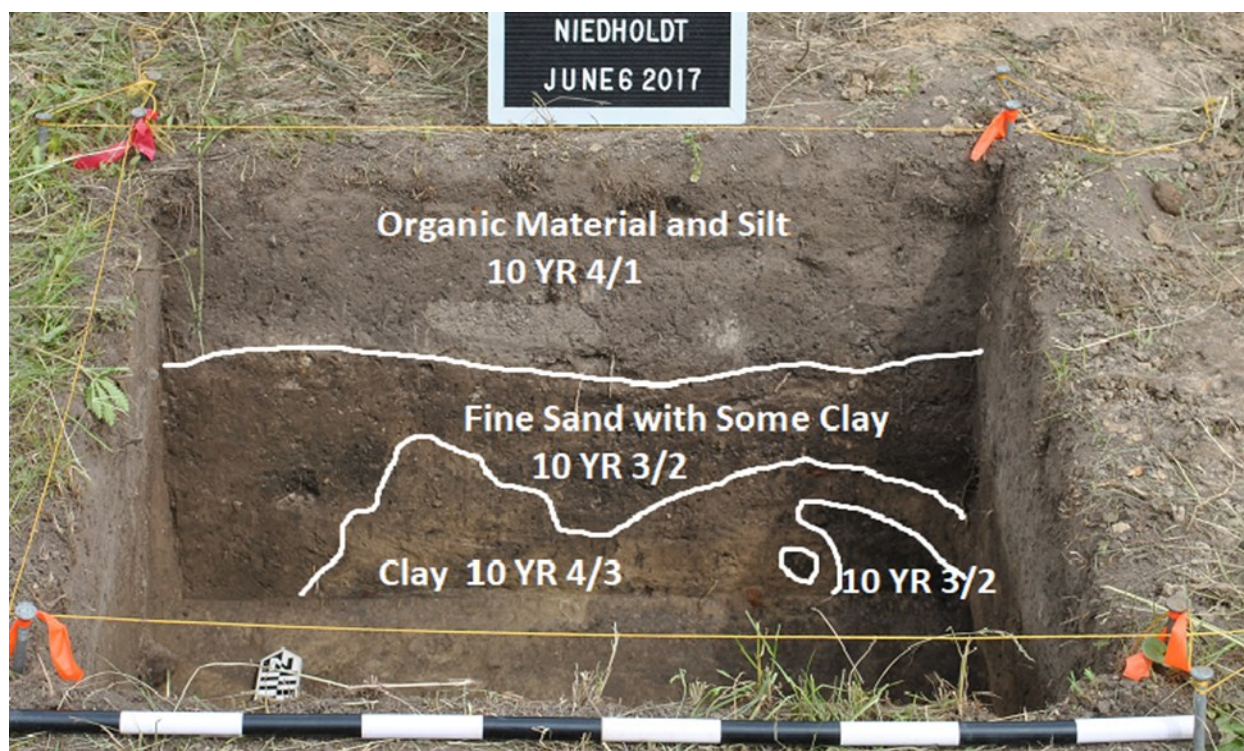


Figure 7. North wall with soil profile.

Sediment samples collected in 10 cm increments to a depth of 70 cm were recovered from the north wall of test Unit 1. Grain size was assessed using a grain size chart, and compared with soil texture techniques including the moist ball test, ribbon test, sticky test, and others, adapted from the Field Manual for Describing Soils 3rd edition (1985). Color was determined using the Munsell Soil-Color Charts on the samples after they were dry. The samples were not seized specifically for exact % by volume measurements due to small sample sizes. The samples from the Faull site consist of approximately 95% clay sized particles, less than 0.002 mm in diameter, and approximately 5% silt sized particles. Organic material is located in the uppermost level and intermixed with the disturbed clay particles. The Munsell readings for each sample are as follows: 0-10cm, 4/3; 10-20cm, 4/2; 20-30cm, 4/2; 30-40cm, 5/2; 40-50cm, 6/3; 50-60cm, 6/3; 60-70cm, 6/3.

Material Culture

Test excavations produced only 11 artifacts. Three artifacts were located in the 20-30 cm level, followed by the majority of artifacts (n=7) recovered in the 30-40 cm level, and only 1 artifact in the 40-50 cm level. The majority of artifacts that make up the assemblage are cores with a total of five, ranging in various materials including obsidian (2), unidentified cryptocrystalline (2), and basalt (1). This is followed by two bifaces, one uniface, one projectile point tip, one scraper, and one hammerstone. The composition of artifacts includes obsidian, cryptocrystalline, basalt, and quartzite, with obsidian (5) and cryptocrystalline (4) being the primary utilized materials, with cryptocrystalline ranging in shades of red and green. The lack of artifacts indicate that this site was likely utilized by highly mobile individuals. This idea of limited occupation is further demonstrated by the lack of faunal or botanical remains. Two unidentifiable green bone fragments were recovered within upper levels and do not appear to be culturally associated.

Artifacts were categorized by item type and include the number of specimens and material type. Additionally, each artifact is given a brief description of form and morphology, and size ranges are included in the format of length, width, and thickness.

Projectile Point Tip (Figure 8, c)

Number of specimens: 1

Form: Triangular blade broken at the proximal end. There is no notching and the flaking patterns are not symmetrical.

Size: 2.6 X 1.5 X .5 cm

Material: Obsidian

Scraper (Figure 8, f)

Number of specimens: 1

Form: Generally rectangular in form. One of the lateral margins has been modified.

Size: 3.5 X 2.0 X .94 cm

Material: Cryptocrystalline

Cores (Figure 8, g-k)

Number of specimens: 5

Form: Three specimens are exhausted and have cortex. One core is heart shaped, two are rectangular, and 2 are triangular. Flake removal is apparent on all.

Sizes: 5.7 – 3.6 X 4.7 – 3.2 X 3.4 – 1.9 cm

Material: 2 Obsidian, 2 Cryptocrystalline, 1 Basalt



Figure 8. a, hammerstone; g-k, cores; b,d, bifaces; c, projectile point tip; e, uniface; f, scraper

Bifaces (Figure 8, b,d)

Number of specimens: 2

Form: All are triangular in shape. One has a tip broken off and has a side notch, on the opposite side the tip is broken off. There is cortex on the ventral side. The other biface is more than twice as long in length as its width. The flaking patterns are not symmetrical.

Sizes: 7.8 – 2.8 X 2.8 – 1.3 X .97 - .2 cm

Material: Obsidian, Cryptocrystalline

Uniface Fragment (Figure 8, e)

Number of specimens: 1

Form: The fragment is triangular in shape and its lateral edges show smaller flaking scars on the lateral margins.

Size: 2.2 X 2.2 X .57 cm

Material: Obsidian

Hammerstone (Figure 8, a)

Number of specimens: 1

Form: Elongated oval shape is rounded at the proximal end. The proximal end is larger by almost twice the size of the distal end. The distal end is flat and has striations on the bottom of it.

Size: 17.3 X 7.8 X 5.6 cm

Material: Quartzite

Debitage Analysis

Although the number of artifacts recovered were limited, a total of 1,684 lithic flakes were recovered. Debitage was sorted into material categories and a flake size analysis was conducted. The majority of flakes (1,089) were <1 cm, followed by a large amount of 2 cm flakes (519), and few being 3 cm or above. This indicates that the site was likely utilized for late stage reduction or retooling processes. The material breakdown of lithicdebitage was overwhelmingly dominated by obsidian (1,668) with limited basalt (13) and even fewer cryptocrystalline flakes (3) (Figure 9).

Of the obsidian, 1,089 of the flakes were <1 cm, making up the majority of the lithicdebitage. This was followed by 519 flakes within the 2 cm flake size range, followed 70 at 3 cm. The last 6 flakes were 5 cm or greater. Only one flake throughout the entire lithic assemblage was over 5 cm, and that belonged to obsidian. The basaltdebitage was scant in comparison to the obsidiandebitage, with basalt flakes only accounting for 1 within the <1cm range, 10 within 2 cm, and 2 flakes at 3 cm. This is followed by a very limited amount of cryptocrystalline, with 2 flakes being <1 cm, and only 1 flake being 5 cm.

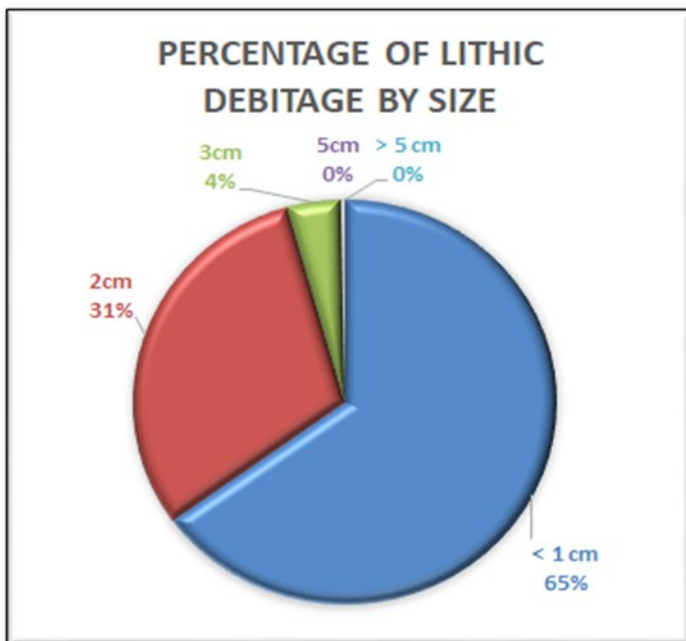


Figure 9. Faull Site lithic debitage by size with a maximum length of 3 cm.

Geochemical Analysis

Five artifacts from site 10-BO-1005 were submitted to the Northwest Research Obsidian Studies Laboratory for energy dispersive X-ray fluorescence trace element provenience analysis. All five samples were determined to be from the Timber Butte source located some 10 miles west of the Faull site (see Figure 2).

Discussion

The test excavation conducted at the Faull Site produced a small lithic assemblage consisting of cores, bifaces, a uniface, a projectile point, a hammerstone, a scraper, as well as 1,684 pieces of lithic debitage. Six of the 11 artifacts were recovered from Test Unit 1. Of the 1,684 flakes recovered, 1,608 are less than 2 cm (Figure 9). The limited number of artifacts and high frequency of flakes from later stages of reduction suggests that formal tools were brought to the site and reworked. The high frequency of obsidian can be attributed to the site's close proximity to the Timber Butte obsidian source. Most of the comparison sites' debitage is predominately obsidian (Figure 10).

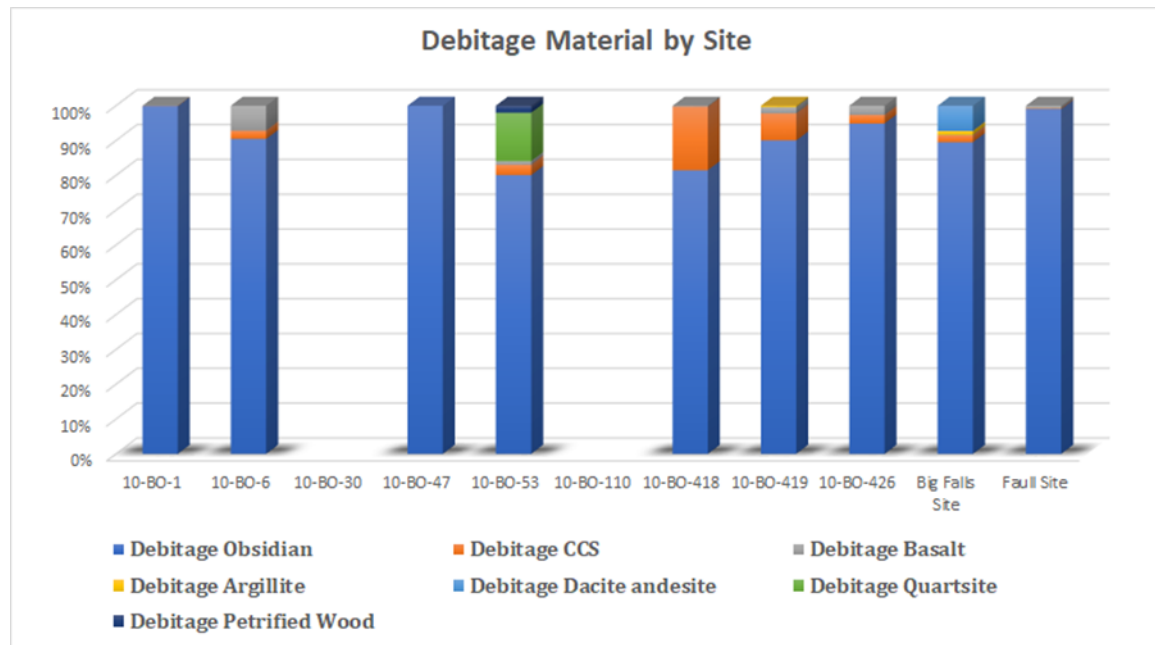


Figure 10. Comparison of debitage composition across sites.

The Faull Site resembles other sites located within or near the Payette River system (Figure 2). In general, the Faull site like others in the local area produced a small tool and debitage assemblage with no evidence of hearths or other features. The Faull site exhibits a lack of diversity in artifact counts; four weapons, two tools and five cores. No pottery was recovered. This lack of artifact diversity is consistent with the assemblages at the Silver Bridge (10-BO-1), 10-BO-6, and 10-BO-53 and other sites within the area. The Faull site lithic assemblage like other sites in the vicinity are composed primarily of obsidian. Though the Faull assemblage does not contain artifacts that are time diagnostic, surrounding sites with similar assemblages have been dated to between 5,000 to 2,000 B.P. (Plew and Fuhrman 1985). The Faull site most likely represents a short term lithic reduction station.

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ARTICLE

Archaeological Excavations at the Swenson Site (10-EL-1417), Southwest Idaho

ANNE VANWASSENHOVE, CONNER NEAL, WESTON WARDLE, KEANA WINNINGER,
MARK PLEW

Introduction

During May and June of 2016, and May 2017 Boise State University conducted its annual field school at Swenson site (10-EL-1417). The site is located on private land north of the Snake River between Glens Ferry and King Hill, Idaho (Figure 1). The investigation of the site was in part driven by earlier test excavations conducted in 2002 (Plew and Willson 2007). These test excavations recovered evidence of a Late Archaic component identified by the presence of Late Archaic point styles and the presence of ceramics. The recent excavations sought to further explore site functions, age of deposits and the extent to which we might infer about levels of mobility of the Swenson occupants. (Plew 2016; Plew and Wilson 2013; Kelly 2001).

Methods

Prior to excavation, a grid system was superposed upon 10-EL-1417 from a site datum established at the northeastern corner of the site where two fences met, creating a wedge of private land which provided a division of land between a railroad easement and the north bank of the Snake River (Figure 2, 3). With the use of a standard transit a baseline measuring approximately twenty-six meters was staked at 2 meter intervals. Standard 1 x 1 meter units were superimposed onto the site location, with a central y-axis running north to south. A topographic map of the site surface was created prior to testing. Eleven units were excavated to depths ranging between 0-120 centimeters below the arbitrary datum. Excavations used standard methods, including shovel shaving, hand troweling, and brushing. Each unit was excavated using arbitrary 10 cm levels. All sediments were screened using a 1/8th inch hardware mesh.



Figure 1. Map showing general site location.

All recovered artifacts were sorted in the field by morphological or descriptive type, including: bone, ceramic sherds, lithic artifacts and debitage. Each artifact was assigned a catalog number and was recorded in a master catalog. Artifacts and additional materials collected in the field were bagged at the site in plastic zip bags which were then individually labeled by site number, unit, provenience, catalog number if appropriate, followed by the date and excavators name. All items bagged for each level/provenience were then collected in a larger zip bag that was labeled in the same fashion and stored in totes for later analysis. Thermally altered rock, though not bagged, was counted and recorded by level. Charcoal samples were collected from unit floors and hearth features. Sediment samples were collected using a trowel on the side walls at 10 cm intervals in a horizontally alternating pattern to avoid mixing level sediment samples. The color of all sediment samples was analyzed using a Munsell Soil-Color Chart (2009). Hand drawn maps recorded the stratigraphy and Munsell color readings of the side walls of each unit.

Archaeological Excavations at the Swenson Site (10-EL-1417), Southwest Idaho

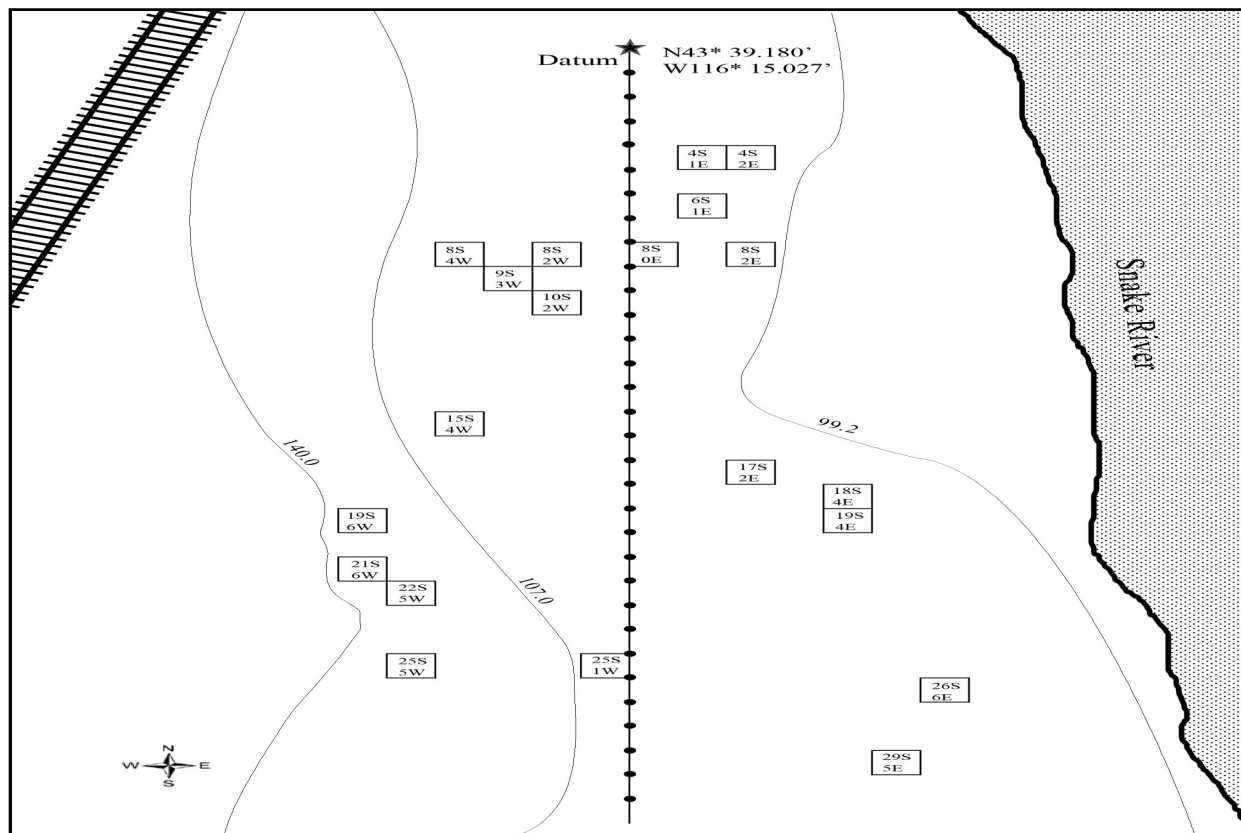


Figure 2. Site map.



Figure 3. Overview of site looking north. Raid road is visible in background.

Post-Depositional History

A major railroad line runs east to west along the north of the site area and some-50 meters above the river. Extensive removal of sediment during the construction may have altered the stratigraphy of the site as the rail line is 10-20 meters from the northern perimeter of the site. Owing to this, a clear understanding of the stratigraphy of the site was essential to understand the extent of the disturbance caused by the construction of the nearby railroad and other alterations/uses by the land owners.

Evidence of disturbance to the ground surface of the site extended to a depth of 10 cm. This included evidence of more than a dozen pieces of charcoal per 10 cm² on the ground surface, suggesting previous incidents of fire. The uppermost levels consisted of poorly sorted sand and gravel mixture. In unit 8S/2W, for example, this sediment layer extended to a depth of 25-30 cm and had a light brown color with a Munsell reading of 10YR 4/2. This layer of disturbed sediment was consistently thicker in the units west of the y-axis and nearer the present railroad line. There was also a level of aeolian sediment under the disturbed level. In 8S/2W, this aeolian deposited material was wedge shaped—beginning at a depth of 25 cm and consisting of yellowish, light brown, fine grain sand, with a Munsell reading of 10YR 5/3.

Sediment and Stratigraphy

Methods

Sediment sieves were used to determine the grain size distribution of the sediment from each level—with each level being measured by an increment of 10cm. The sieving was conducted in the Boise State University Surface Processes Lab, run by Dr. Jen Pierce of the Boise State Geosciences Department. After sieving, each separated grain size was weighed and totaled to determine the percent by weight of the different sized grains. The grain sizes present included pebbles (>2mm), very coarse grained sand (2mm-1mm), coarse grained sand (1mm-0.5mm), medium grained sand (0.5mm-0.25mm), fine grained sand (0.25mm-0.125mm), very fine grained sand (0.125mm-0.063mm), and silt and clay (<0.063mm), though the last two were not differentiated for the sake of simplicity. The results from this analysis can be seen in Figure 4. For the sake of simplifying the visual representation on the graph, the 5 categories on the x-axis are simply pebble, coarse grained sand, medium grained sand, fine grained sand, and silt/clay.

Discussion

As seen in the graph, there were some rather large differences between the first few levels of sediment and those encountered with increasing depth. In general, in the first 50cm (5 samples) the primary grain type was very coarse to coarse grained sand. There are also a higher percentage of pebbles at these depths. Upon reaching 50cm depth, the sediment began to become slightly normalized, with the dominant grain types being fine to very fine grained sand, silt and clay. Though the percent composition is not linear, there were observable increases in silt/clay grains with increased depth.

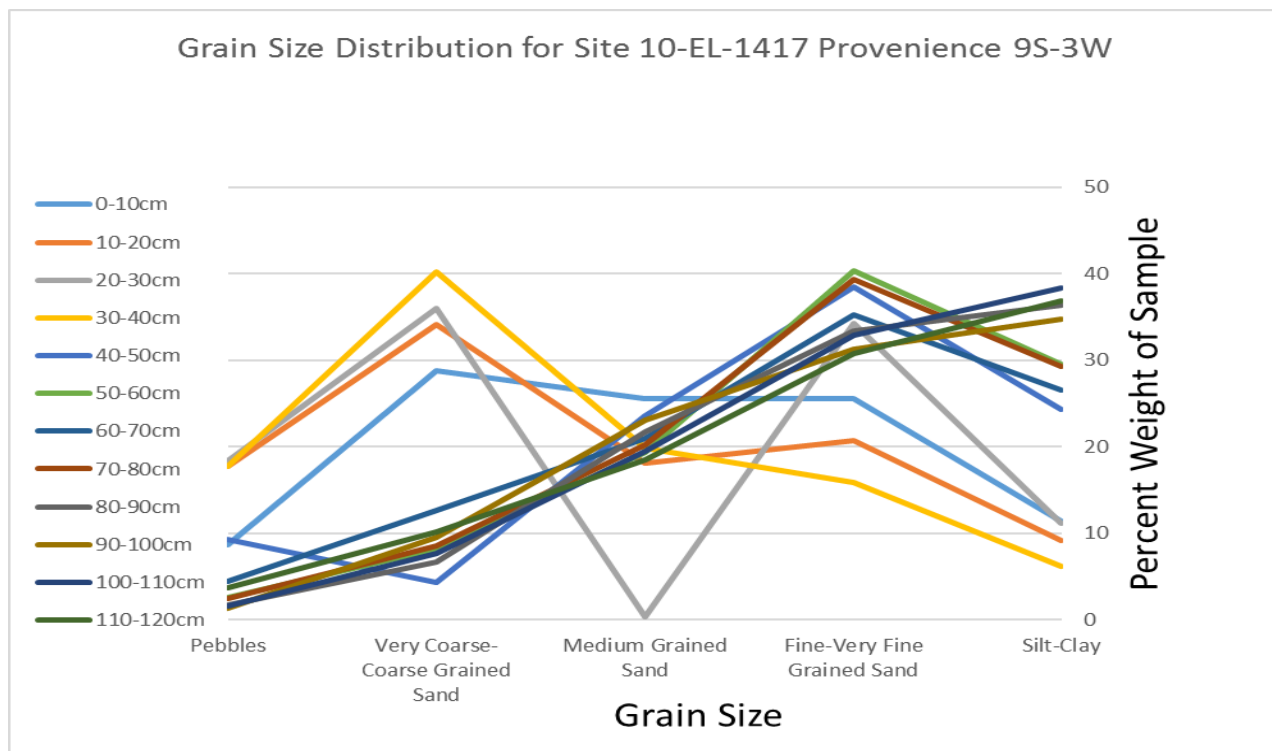


Figure 4. Grain size distribution.

During the excavations on 10-EL-1417, there was mention of the potential impact that railroad construction would have had on the soil profile. This is a valid argument, as this can be seen by the high variability in the first 30cm of sediment, as well as the higher percentages of pebbles and coarser grained sand in these samples.



Figure 5. Photo of showing stratigraphy of unit 5W/25S.

Radiocarbon Assessment

A composite bone sample taken from the lower level of the excavation was submitted to Beta Analytical. The sample returned a conventional radiocarbon age of 590 \pm 30 BP (1298-1370 AD, Beta-476562). The date falls within an expected time range compared to nearby Late Archaic sites in the middle Snake River Plain. Three Island Crossing has a radiocarbon range of 580 \pm 180 BP (TX 57-24) to 970 \pm 330BP (TX 57-23) (Meatte 1990). Bliss has a range of 250 \pm 110BP (RL 1501) to 1140 \pm 120BP (RL 1500) (Plew 1981).

Material Culture

Material remains were placed into categories based on type and function. These categories included weapons (projectile points), general utility tools (knives, bifaces, scrapers, etc.), fabricating tools (cores, hammerstones, and perforators), domestic gear (groundstone and pottery), and decorative items (polished bone). The ordering of points is chronological; we describe more recent types first followed by earlier forms. In instances in which artifacts do not conform to described types, morphological descriptions are used.

Projectile Points

1. Desert Side-Notched (Figure 6, c-e)

Number of Specimens: 24

Artifact Number: A9, A11, A30, A53, A71, A82, A112, A114, A117, A143, A155, A176, A179, A199, A201, A213, A246, A254, A292, A293, A294, A317, A339, A355

Form: Desert Side-Notched artifact points are small triangular forms with flaring bases. These projectile points present variable basal margins; both straight and concave, as well as the General-DSN and Sierra-DSN subtype. Points missing tangs and/or bases: A176, A114, A254, A71, A246, A155, A317, A339. Points missing distal ends: A199, A201, A117, A82, A30, A9, A112, A174, A213, A292, A293, A294, A317, A355, and points that were complete: A143, A53. A292 is a unique dark auburn colored cryptocrystalline.

Size Range: 0.6-3.3 L x 0.7-1.7 W x 0.1-0.98 T cm

Material Type: Basalt, Cryptocrystalline, Obsidian

2. Rose Spring Side-Notched(Figure 6, f-h)

Number of Specimens: 14

Artifact Number: A19, A23, A38, A70, A73, A110, A113, A147, A169, A194, A244, A228, A284

Form: Narrow small triangular corner notch points. Blade varies between artifacts. Artifacts include both straight as well as convex blades. Artifact tangs are barbed and horizontal. Broken tangs and/or bases: A194, A244, A113, A110, A228. Missing distal end of point: A38, A73. Complete projectile points: A19, A23, A70, A11, A147, A169. Some points are asymmetrical in cross-section and have been reworked.

Size Range: 1.5-2.4L x 1-2.2W x 0.1-1.2T cm

Material Type: Basalt, Cryptocrystalline, Obsidian

3. Eastgate Expanding Stem (Figure 6, i-k)

Number of Specimens: 5

Artifact Number: A33, A167, A184, A189, A253

Form: Small triangular notched points. Some artifacts the blade flares at shoulders edge, others have a straight blade. Most have square shoulders with the exception of A253 which has pointed shoulders suggesting reworking. Bases range from straight to convex.

Size Range: 1.5-3.3 L x 1.4-2.4 W x 0.2-0.3T cm

Material Type: Basalt, Cryptocrystalline, Obsidian

4. Bliss (Figure 6, a-b)

Number of Specimens: 5

Artifact Number: A31, A44, A80, A288, A304

Form: A44 and A80 both have curved basal corners; A31 has a curved midsection with triangular lateral margins extending toward both the distal and proximal ends. All points have flat bases and a biconvex cross section and flaking appears random.

Size Range: 1.9-3.57 L x 0.6-1.5 W x 0.1-0.61 T cm

Material Type: Cryptocrystalline, Obsidian

5. Elko Corner-Notched

Number of Specimens: 2

Artifact Number: A45, A210

Form: Artifacts are both asymmetrical in shape; A210 is an obsidian proximal fragment with an impact fracture, A45 is a nearly complete point with the distal tip broken off in an impact fracture.

Size Range: 1.5-3 L x 2-2.1 W x 0.3-0.5 T cm

Material Type: Basalt, Obsidian

6. Lanceolate

Number of Specimens: 5

Artifact Number: A200, A236, A256, A363, A366

Form: All proximal section of projectile points which are missing their distal ends. A256 presents a possible impact fracture and is possibly reworked. A236 is asymmetrical in cross section and is possibly reworked, it also presents a bending/hinge fracture. A200 shows slight asymmetry in cross section, and is also possibly reworked.

Size Range: 1.9-2.9 L x 1.4-2 W x 0.2-0.6 T cm

Material Type: Obsidian

7. Humboldt

Number of Specimens: 1

Artifact Number: A195

Form: Artifact is smaller than the regular form, and presents as a narrow projectile point with no notches. The initial cross section appears to be plano-convex as well as excurvate lateral margins. Due to the asymmetrical nature of cross-section and lateral margins the point appears to be reworked.

Size Range: 3 L x 1.2 W x 0.4 T cm

Material Type: Obsidian

8. Single Description

Number of Specimens: 13

Artifact Number: A2, A34, A59, A109, A182, A212, A227, A257, A270, A275, A291, A357, A361

Form: All artifacts present are projectile point in varying completeness as well as material and form; see individual descriptions below.

A2: Specimen is a long, narrow deltoid projectile point measuring 3.4L x 1.5W x 0.5T cm and is a cryptocrystalline material. This is a complete point which is white in color and presenting excurvate lateral margins and is plano-convex in cross-section. There are no notches present and the proximal end is straight. Point presents random flaking patterns, and appears to be similar in form to a Cottonwood Triangular Lanceolate point.

A34: Presents a wide basalt projectile point that is missing the distal end and measuring 3.4L x 2.5W x 1.1T cm. This is a unique projectile point in that its base is different than the other single description artifacts. It presents a distinct neck and stemmed portion with prominent side notches and rounded shoulders with a proximal end that is slightly convex between the tangs. Its shape provides for possible excurvate lateral margins, as well as presents a random flaking pattern and a plano-convex cross section.

A59: This is a complete projectile point that is made from caramel colored cryptocrystalline. This point is unique in its overall size which is quite small measuring 1.7L x 0.9W x 0.3T cm. It presents excurvate lateral margins that are pronounced, providing an almost oval blade shape. There are side notches present and the tangs are slightly split. There are variable flaking patterns are present as well as a plano-convex cross section.

A109: This is a partial projectile point made of a cryptocrystalline; is a dull brown color at the distal end and showing hints of deeper red colors at the proximal end. The distal end is missing as is one barb, however the remaining proximal portion reveals corner notches similar to an Elko corner notch or a Rose Spring corner notch projectile point. The lateral margins appear to be straight, flaking is random, and the cross section is plano-convex. The tangs of this point are pronounced and are split by a concave distal region between the tangs with an overall measurement of 2.2L x 2.3W x 0.4T cm.

A182: This projectile point measures 2.6L x 2.7W x 0.6T cm and reveals that this projectile is quite wide in relation to the length. It is triangular in form and made of basalt with excurvate lateral margins and a plano-convex cross section. This point presents random flaking and is similar in form to an Elko corner notched point with corner notches and pronounced barbs.

- A212: This is a projectile point fragment includes one tang, but the incompleteness does not provide enough detail to speculate on its type or form. The artifact is a fragment of plano-convex obsidian and the overall measurement of the fragment are 1.9L x 1.0W x 0.3T cm.
- A227: This a nearly complete triangular basalt projectile point measuring 2.3L x 1.3W x 0.3T cm. The lateral margins are excurvate with rounded shoulders leading to side notches and random flaking. The neck and tangs are narrower than the blade, as well as the tangs being slightly split by a slightly concave base.
- A257: This is a small proximal end of an obsidian projectile point which measures 1.1L x 1.1W x 0.2T cm. Although the distal end is missing it appears to have straight lateral margins and is triangular in shape similar to a Cottonwood Triangular point. There are no notches present, however the base is slightly concave. The flaking appears to be random and the cross section is plano-convex; this is a unique artifact in that it is quite thin in relation to the other single description items.
- A270: Small triangular bladed side-notched point measuring 2.9 L x 1.9 W x 0.5 T cm. and exhibits similarities to Rose Spring Corner-Notched points, although outside the size range of Rose Spring Corner-Notched points. The material is obsidian.
- A275: This projectile point is a small straight based point, that is corner-notched, and has slightly excurvate sides. The artifact which is made from obsidian and measures 1.6L x 1W x 0.3T is outside the range of common area point type.
- A291: Small triangular bladed side-notched point measuring 2.8 L x 1.9 W x 0.5 T cm. and exhibits similarities to Rose Spring Corner-Notched points, although outside the size range of Rose Spring Corner-Notched points. The material is obsidian.
- A357: This point is similar to an Elko Corner-Notch or a Rose Spring Corner Notch in its triangular shape measuring 1.9 L x 2 W x 0.4 T. It is corner-notched with downward sloping shoulders and straight blade edges. The material is obsidian.
- A361: Artifact has the appearance of a large basalt projectile point that is missing the distal end and measures 3 L x 3.5 W x 0.6 T cm. Artifact has a distinct neck and stemmed portion with prominent side-notches and rounded shoulders with a proximal end that is slightly convex between the tangs. It has slight excurvate lateral margins as with a plano-convex cross section.

Size Range: 1.1-3.5 L x 0.75-3.5 W x 0.1-0.6 T cm

Material Type: Basalt, Cryptocrystalline, Obsidian

Small Side-Notch

Number of Specimens: 2 Artifact Number: A5, A247

Form: Triangular points with random flaking and bases wider than the width of the point.

Size Range: 1.3-1.3 L x 1.1-1.3 W x 0.1-0.3 T cm

Material Type: Obsidian



Figure 6. Bliss; a-b, Desert Side-Notched; c-e, Rose Spring; f-h, Eastgate; i-k.

9. Mid-Sections

Number of Specimens: 2

Artifact Number: A79, A125

Form: A79 is obsidian, plano-convex, possibly excurvate margins, with a variable and random flaking pattern. A125 is basalt, plano-convex, possibly incurvate margins, with variable flaking patterns.

Size Range: 2.8-3.5 L x 1.4-2 W x 0.3-0.8 T cm

Material Type: Basalt, Obsidian

10. Tips

Number of Specimens: 23

Artifact Number: A1, A3, A6, A29, A42, A46, A87, A124, A128, A134, A166, A181, A191, A192, A 209, A235, A241, A259, A273, A310, A312, A342, A359

Form: Triangular tips with patterns of random flaking. Lateral margins are straight and several specimens exhibit serration on the lateral margins (e.g., A42 and A46). All specimens have

a biconvex cross section.

Size Range: 1-2.5 L x 0.5-1.5 W x 0.1-1 T cm

Material Type: Basalt, Cryptocrystalline, Obsidian

11. Bases

Number of Specimens: 3

Artifact Number: A32, A90, A344

Form: Both are plano-convex, with variable flaking patterns, and appear to be side-notched. Both artifacts are fragments that provide one notch, not enough margin to speculate on ex-curve vs. incurvate margins.

Size Range: 0.8-1.4 L x 0.7-1.6 W x 0.2-1.3 T cm

Material Type: Obsidian

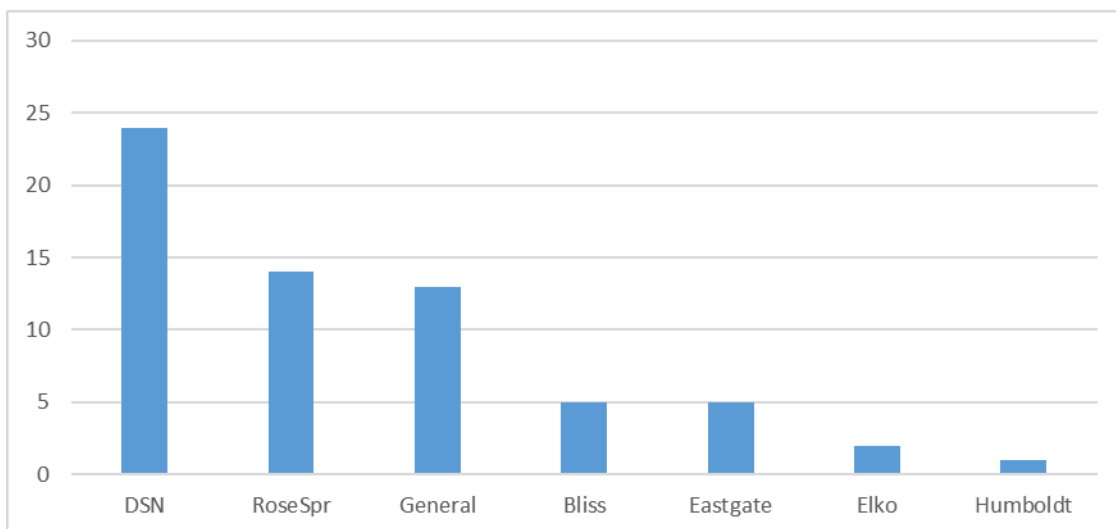


Figure 7. Frequency distribution of projectile point types.

Bifaces

Number of Specimens: 20

Artifact Number: A26, A55, A68, A75, A84, A91, A100, A102, A103, A131, A133, A164, A183, A186, A188, A203, A204, A207, A242, A313

Form: Artifacts have biconvex cross sections with random flaking. Six of the artifacts possess straight lateral margins, and the remaining six have concave. Artifacts are generally triangular in form. Items A91, A84, A164 are broken and appear to be increasingly concave opposite the break. A242 appears to be fragmented mid-section.

Size Range: 2.1-5.7 L x 1-3.9 W x 0.3-4 T cm

Material Type: Basalt, Cryptocrystalline, Obsidian

A. Biface Fragments

Number of Specimens: 9

Artifact Number: A86, A89, A170, A218, A274, A283, A298, A318, A320

Form: Biface fragments are triangular with straight lateral margins and are biconvex in cross section; A283 is a cream colored cryptocrystalline.

Size Range: 1.6-4.2 L x 0.8-2.6 W x 0.2-1.8 T cm

Material Type: Basalt, Cryptocrystalline, Obsidian

B. Knives (Figure 8)

Number of Specimens: 7

Artifact Number: A36, A74, A88, A137, A150, A157, A160

Form: Specimens primarily exhibit plano-convex or biconvex cross-sections. They present mostly random flake scars and excurvate lateral margins are common. Artifact A74 has decreasing width at the proximal end, with distal end wider with more convex lateral margins. Artifact A157 is the only obsidian artifact, with transverse flaking style.

Size Range: 3.5-12 L x 2.3-4.7 W x 0.4-3 T cm

Material Type: Basalt, Cryptocrystalline, Obsidian



Figure 8. Knives; a-e.

C. Scrapers (Figure 9, c-h)

Number of Specimens: 7

Artifact Number: A64, A126, A130, A250, A266, A268, A281

Form: Specimens are randomly flaked on the distal end with flat bases on the proximal end. Cross sections are plano-convex. Two of the specimens, A126 and A130, are small thumbnail scrapers. All specimens display curved margins, though A126 is less curved and more triangular than the other three specimens. A281 is a cream colored cryptocrystalline.

Size Range: 2.1-4.3 L x 1-3.3 W x 0.1-1 T cm

Material Type: Basalt, Cryptocrystalline

D. Perforators (Figure 9, a-b)

Number of Specimens: 5

Artifact Number: A72, A121, A129, A196, A265

Form: Specimens A121 and A196 are biconvex; A196 shows more transverse flaking towards the dorsal ridge, A121 appears have random flaking. A129 cross section is more plano-convex with minimal random flaking on distal edges.

Size Range: 1.1-4.6 L x 0.7-3 W x 0.2-0.7 T cm

Material Type: Basalt, Cryptocrystalline, Obsidian



Figure 9. Perforators; a-b, scrapers; c-h.

E. Hammerstones (Figure 10-a-c)

Number of Specimens: 5

Artifact Number: A83, 271, 329, 330, 354

Form: A83 presents as an oblong cobble stone that is palm sized and wider on one end in relation to the other. There is obvious use wear on the narrow distal end. A271, A329, A330 are oblong cobble stone fragments. A354 is a round cobble stone, it is unique compared to all the others in that it is more uniform in its round shape and would easily fit in the palm of your hand.

Size Range: 4.4-11.5L cm x 4.4-7.2W cm x 2-4.2T cm

Material Type: Cryptocrystalline, Quartzite



Figure 10. Hammerstones; a-c.

F. Cores (Figure 11, a-f)

Number of Specimens: 29

Artifact Number: A4, A12, A24, A25, A35, A52, A56, A85, A94, A98, A104, A108, A148, A152, A180, A222, A223, A224, A248, A262, A263, A272, A276, A279, A282, A290, A311, A326, A343

Form: Cores are irregular in size and shape. Sixteen specimens are basalt. Three specimens are cryptocrystalline. Cortex is present on A248 and A85.

Size Range: 2.9-8.3 L x 1.6-8.5 W x 0.4-9 T cm

Material Type: Basalt, Cryptocrystalline, Obsidian



Figure 11. Cores; a-f.

G. Uniface

Number of Specimens: 3

Artifact Number: A264, A277, A280

Form: Artifacts have an irregular form varying in shape and size, all three are plano-convex and have been worked on at least one edge or on an entire side.

Size Range: 3.1-6.1 L x 2-3.6 W x 0.4-0.8 T cm

Material Type: Basalt, Cryptocrystalline

H. Pestle

Number of Specimens: 2

Artifact Number: A161, A190

Form: Oblong cobbles with scarred distal ends.

Size Range: 4.5-6.8 L cm x 4-5.4 W x 3.2-4 T cm

Material Type: Basalt, Quartzite

I. Groundstone

Number of Specimens: 2

Artifact Number: A185, A251

Form: Large stones with concave depression in center on one side. In larger grindstone (A185) the ground area is 10cm in diameter.

Size Range: 35.0-12.0L x 27.0-12.0W x 13.0-10.0T cm

Material Type: Quartzite

J. Pottery

Number of Specimens: 151 (Figure 12)

Artifact Number: A7, A8, A10, A13, A18, A20, A27, A28, A39, A43, A47, A48, A49, A50, A51, A54, A57, A58, A60, A61, A62, A63, A65, A66, A67, A76, A77, A78, A81, A92, A93, A95, A96, A97, A99, A101, A105, A106, A107, A111, A115, A116, A118, A119, A120, A122, A123, A138, A140, A141, A142, A145, A146, A151, A153, A154, A156, A158, A159, A162, A163, A165, A168, A171, A172, A173, A174, A175, A177, A178, A187, A197, A198, A205, A206, A208, A214, A217, A219, A220, A221, A225, A226, A229, A230, A231, A232, A233, A234, A237, A238, A239, A240, A243, A245, A249, A252, A258, A260, A261, A278, A285, A286, A289, A295, A296, A297, A299, A300, A301, A305, A306, A307, A308, A309, A314, A316, A319, A321, A322, A323, A324, A325, A327, A328, A332, A333, A334, A335, A336, A337, A338, A341, A345, A346, A350, A351, A352, A353, A356, A358, A360, A362, A364, A365, A367, A368, A369, A370, A371, A372

Form: Non-decorative plain-ware, mostly exhibiting neutral grey/brown color overall with some mottling. Some sherds appear to be blackened.

A96: This is a fragment made of a darker grey or slate colored fine-grained sand. It shows blackening on the convex outer side, and slightly lighter coloration on the interior concave side. The rim of the fragments is not decorative or rounded, rather is of the same general thickness just curved inward towards the center. The overall measurements are 2.4L x 2.6W x 0.5T cm.

A159: This is the largest specimen of all pottery artifacts and measures 7.0L x 7.1W x 0.8T cm. It is a mottled brown color on the outer or convex side, and on the interior or concave site the top edge shows darkening. The rim is a prominent rolled edge from interior to the exterior and measures one centimeter at the thickest point on the rim.

Size Range: 0.6-5.5 L x 0.4-4 W x 0.1-2.5 T cm

Material Type: Fine grained sand tempered.

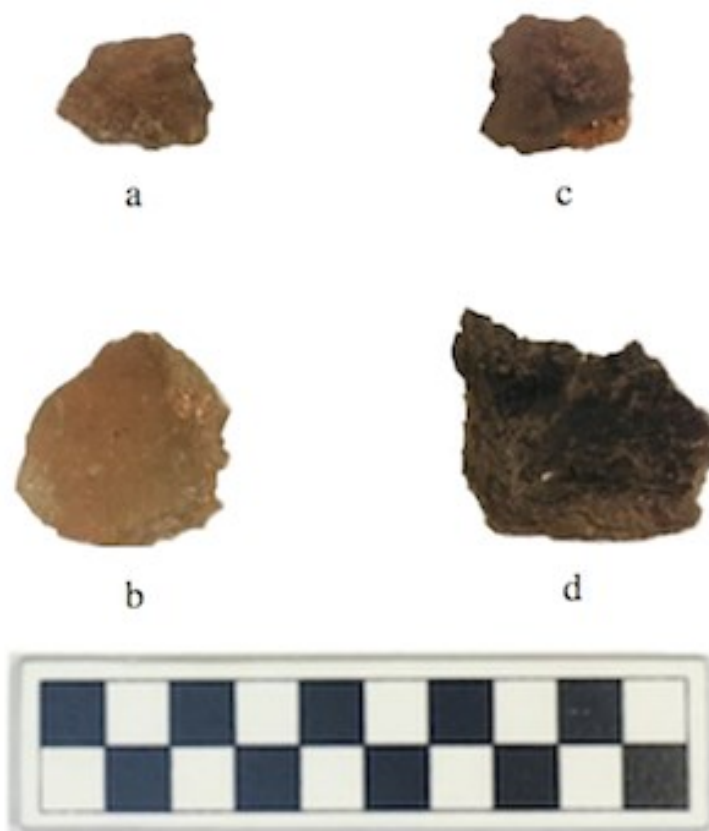


Figure 12. Ceramics; a-c, rim; d.

K. Polished Bone

Number of Specimens: 7

Artifact Number: A69, A215, A216, A287, A302, A303

Form: Fragments of small mammal bones with evidence of polishing.

Size Range: 0.8-3.1 L x 0.4-0.9 W x 0.1-0.9 T cm

Material Type: Bone

Functional Analysis

The Swenson site assemblage was analyzed using a functional categorization that included weapons (points, $n=98$), general utility tools (bifaces, knives, etc., $n=46$), fabricating tools (hammerstones, cores, perforators/drills, $n=39$) domestic gear (groundstone and pottery, $n=155$) and decorative items (polished bone, $n=7$, see Figure 13). The assemblage is dominated by domestic items that account for 46% of the total, though this reflects the large number of small pottery sherds recovered ($n=151$). Weapons are the dominate category accounting for 29% of the total assemblage. Desert Side-Notched points account for 25% of the total weapons, while Bliss ($n=5$), Rose Spring ($n=14$), and Eastgate ($n=5$) points are present. General utility and fabricating tools account of 11% and 12% respectively. Decorative items account for less than one percent of the total.

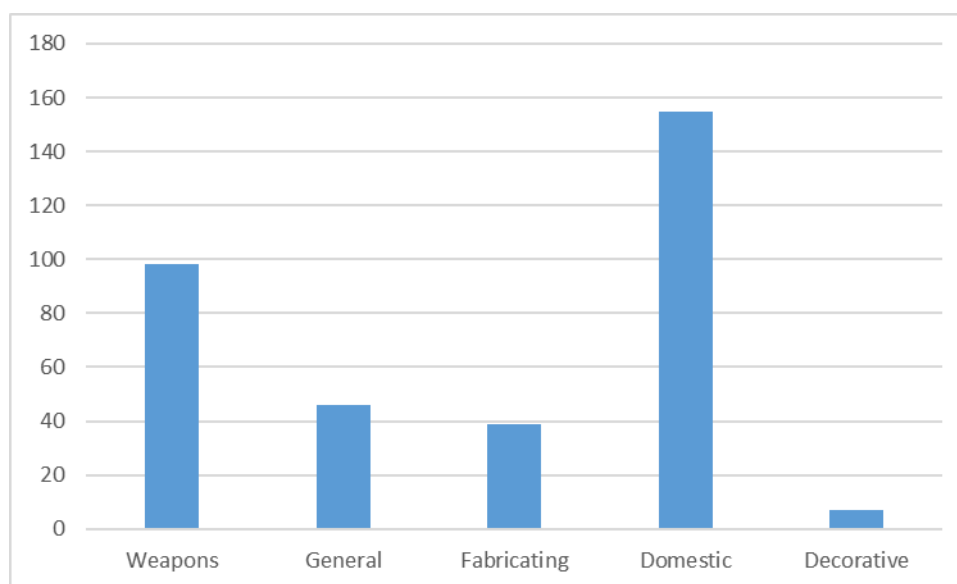


Figure 13. Frequency of artifacts by category.

Use-Wear Analysis

A sample of 49 lithic artifacts were selected from the assemblage containing 335 artifacts. Terminology chosen to describe wear patterns is consistently drawn from Ahler (1979) and Odell (1979). Odell's (1979) polar coordinate grid was used to identify specific use-wear locations by dividing each specimen into eight equal units of comparison. The specimen, no matter its size, is laid onto the center of the grid with the ventral side down and the proximal end oriented toward the observer (Odell

1979). The polar coordinate grid is composed of eight 45 degree units which progress clockwise from 1 to 8 (Odell 1979).

Each artifact in the sample was initially examined with a handheld magnifying glass. The observer started with a scan of the ventral and dorsal surfaces. Then the margins on both the ventral and dorsal sides were observed clockwise from polar coordinates 1 to 8 using a low power magnification (10X). The location of evident use-wear was then plotted using Odell's (1979) polar coordinate grid. Examinations were conducted three times for each specimen in the sample. As with any subjective examination where the methods and terminology vary (Ahler 1979), a more conservative assessment of the specimens is necessary to not skew the overall picture of the site. Only observations that were noted in all rounds of observation have been recorded.

Results

10-EL-1417 #72

The specimen is a 3.1 cm long, obsidian worked flake. By orienting the triangular end of the flake as the distal end (polar coordinates 1 and 8), the specimen displays wear on the proximal margin. The edge is slightly blunted with an unmodified cross-section.

10-EL-1417 #255

The specimen is a 2.5 cm long, cryptocrystalline worked flake. Like A72, the specimen exhibits wear on the right proximal margin. There is evidence of blunting at polar coordinate 3. Like A72, use-wear is minimal and isolated to one location on the specimen.

10-EL-1417 #64

The specimen is a 2.6 cm long, cryptocrystalline scraper. Wear is evident on the left lateral margin of the dorsal side. The cross-section is unmodified. Evidence of multiple abrasions appears in polar coordinates 6 and 7. Abrasions are blunted sections of the lateral margin.

10-EL-1417 #126

The specimen is a 2.4 cm long, cryptocrystalline scraper. The specimen is oriented on the polar grid with the convex end of the scraper as the distal end. Coordinates 1,2, and 3 on the right lateral margin exhibit the most abrasions of any of the specimens sampled. Both blunting and smoothing are present under low magnification.

10-EL-1417 #250

The specimen is a 2.1 cm long, cryptocrystalline scraper with wear on the left lateral margin. The orientation was the same as other scrapers examined (convex end as distal end). Wear was minimal blunting observed under low magnification at polar coordinates 7 and 8.

10-EL-1417 #68

The specimen is a 2.7 cm long, cryptocrystalline biface with wear on both lateral margins at the distal end. Small abrasions were observed under low magnification at polar coordinates 1 and 8. The abrasions consisted of small blunted areas on the margins.

10-EL-1417 #3

The specimen is a 2.5cm long, cryptocrystalline projectile tip. This was the only specimen out of the sample of projectiles that displayed any signs of use-wear. Wear was observed at polar coordinates 1 and 8 at the tip of the projectile fragment. The wear examined included a small grinded section at the tip.

Discussion

Of the 49 artifacts examined under low magnification, only seven showed evidence of use-wear (see Figure 14). Most use-wear was observed on the scrapers and worked flakes, with abrasions consistently on the distal end. All observations of 10-EL-1417 are consistent with previous examinations of lithic tool assemblages from Snake River Plain excavations (Fruhlinger 2004; Plew and Willson 2013). Only 14.29% of the sample specimens display any use-wear, with most use-wear on the distal end of specimens, on the polar coordinates 1, 2, 7, and 8.

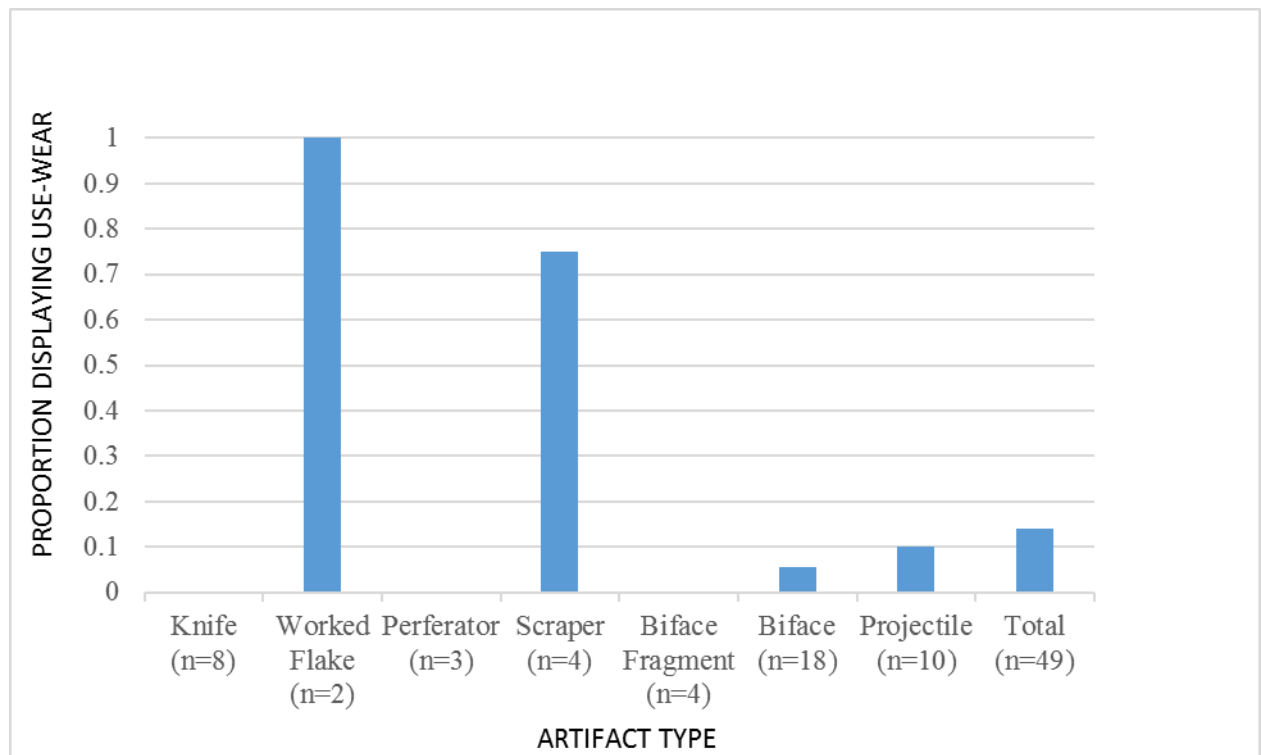


Figure 14. Frequency of artifacts displaying use-wear.

While the proportion of artifacts exhibiting use-wear in the sample is very low, certain artifact types exhibit a high proportion of specimens displaying use-wear (e.g., worked flakes and scrapers). Though it is impossible to infer specific tasks from the abrasions on the seven artifacts, the proportion of artifacts displaying use-wear is consistent with the expected function of the artifact types. This can lead to an inference of likely activities at 10-EL-1417. For example, abrasions on polar coordinates 1 and 2 of one scraper are consistent with the expected function of most scrapers.

Lithic Debitage Analysis

Material Type

A total of 14,209 lithic flakes were recovered during the excavation. Basalt accounts for 70.25% (n=10,116) of the total collection of lithic flakes. Obsidian accounts for 19% (n=2721) and CCS for 11% (n=1562) of the total (Figure 15). The high proportion of basalt is similar to what is seen in nearby sites: Three Island Crossing (57.4% basalt), Knox (56.4% basalt), and King Hill Creek (80.4% basalt) (Plew and Willson 2013) and most likely reflect use of the nearby Bell Mare basalt quarry (Plew and Chavaria 1992).

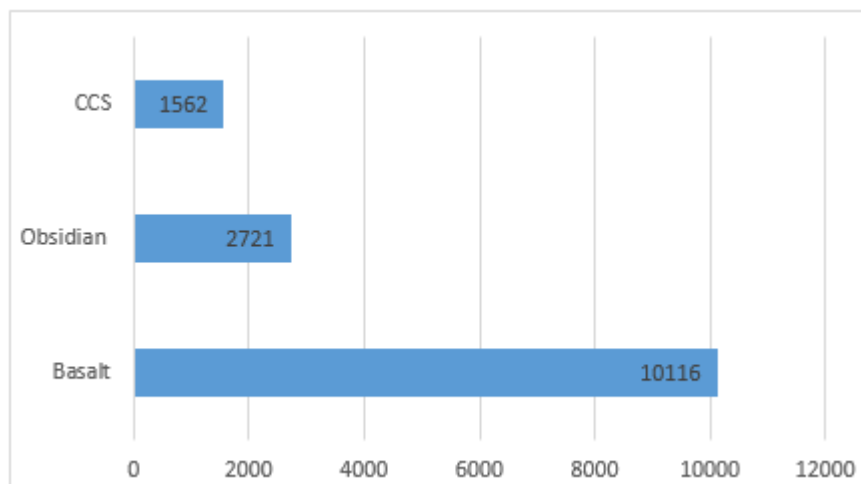


Figure 15. Frequency distribution of lithic debris by material type.

Size Range

Size range analysis suggests the same reduction strategy and high mobility that frequency of raw material indicates. The analysis indicates that 46% of flakes excavated are less than 1 cm in diameter. Similarly, 38% of flakes were between 1 and 2 cm in diameter. Less than 0.5% of flakes were greater than 5cm long (Figure 16). Again, comparing the data to nearby sites, at Knox site 63% of the flakes

in the assemblage were less than 1 cm in diameter and at 10-EL-216 80% of the flakes were less than 1 cm in diameter (Plew and Willson 2013). This is consistent as noted with the size range at King Hill Creek and Three Island Crossing (Plew and Willson 2013). The frequency of late stage flakes (<1 cm) suggests re-tooling or re-sharpening activities but does not exclude the production of artifacts on site.

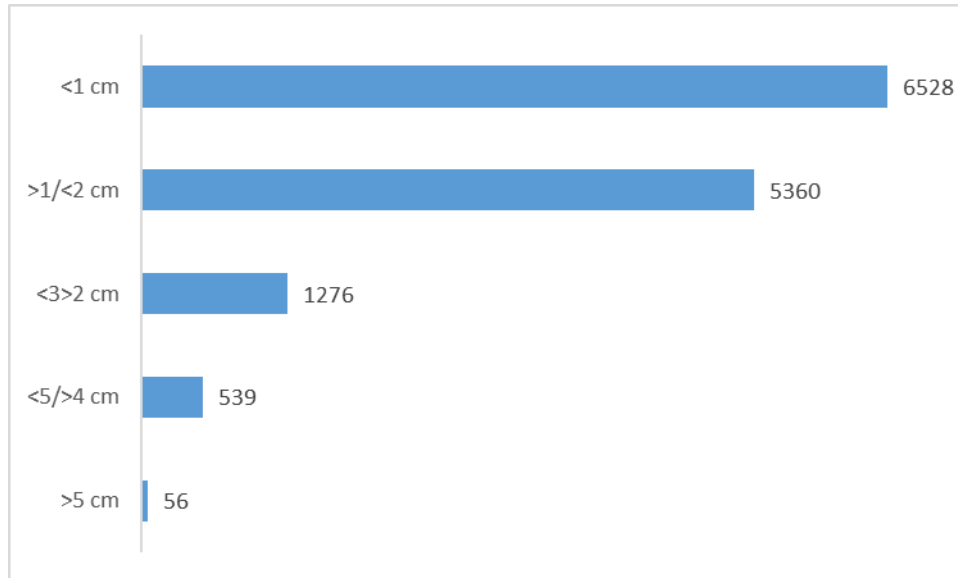


Figure 16. Flake size frequency distribution.

Use-Wear Analysis of Lithic Debitage

A flake sample was taken from every excavated level of three different units at 10-EL-1417. A sample of five flakes was examined macroscopically and then under 10X magnification from each level of the four units creating a sample of 115 flakes from a total of 23 10 cm levels. Flakes selected were in the 3-5cm and >5cm size range. In levels where the number of large flakes recovered was low, the sample remained n=5 by utilizing the next lowest size range (i.e., 2-3cm). The analysis revealed no signs of use-wear on any of the 115 flakes in the sample. The high proportion of basalt is also a likely factor in minimal signs of use-wear at 10-EL-1417 since basalt is much less likely to sustain damage than other materials such as obsidian.

Ceramic Analysis

Specimens recovered (n=151) were plain-ware pottery sherds with a brownish-gray color. The material composition of the ceramic specimens was a fine-grained sand. The largest specimen was 7cm long and 0.8cm thick, with a lipped rim, clearly the piece of a larger vessel with a diameter

Greater than 10cm based on the curvature (Sutton and Arkush 1996). Since residential mobility was a focus of our study we examined the ceramics recovered during testing as a basis for evaluating the hypothesis proposed by Simms, Bright and Ugan (1997) that the quality of ceramics reflects time investments that in turn reflect degrees of mobility. The sherds are thick and rather poorly made but with some surface treatment. Temper is sand and crushed basalt, which are locally available. Given that crudity is a primary measure of time investment in the manufacture of pottery we might conclude that ceramics from 10-EL-1417 represent limited time investment in manufacture and thereby greater mobility— though numerous factors may influence the relative quality of pottery.

Geochemical Characterizations

Six items, were submitted for X-Ray Fluorescence (XRF) analysis. The assessments indicate that volcanic glass was acquired regionally from known sources in southcentral Idaho. Table 1 lists results of specimens analyzed by Northwest Research Obsidian Studies Laboratory. Sources include Brown's Bench (n=3, 50%) located on the border of Idaho and Nevada in the South Hills near Twin Falls, Idaho, the adjacent Browns Bench Area (n=1, 16.7%) and the Cannonball Mountain source (n=2, 33.4%) located in the vicinity of Fairfield, Idaho. Though materials recovered from 10-EL-1417 are from areas at some distance from the site, the mechanisms by which these materials were acquired or transported are not discernable (Willson 2007). The identified obsidians are located available within 80-100 kilometers from site 10-EL-1417 and as such generally fit the expectations for the distance distribution of volcanic glass proposed by Holmer (1997) and Plager (2001).

Table 1. Geochemical Analysis of Items for the Swenson Site.

GEOCHEMICAL SOURCE	N=	PERCENTAGE
Browns Bench	3	50.0
Browns Bench Area	1	16.7
Cannonball Mountain	2	33.4
TOTAL	6	100

Faunal Analysis

A total of 4,757 faunal remains were recovered from site 10-EL-1417 over the course of the field excavations in the summers of 2016 and 2017. Of those recovered 2%, (n=90) were identifiable, and consist largely of a deer and rabbit remains (n=41) and remains of fish (n=28), and rodents (n=21). The fish remains are salmonid remains—most probably trout. Unidentifiable skeletal remains included 4,667 charred or green fragments. Green bone fragments account for 12.76%,(n=607) of the total unidentifiable bone. Of interest is the fact that charred bone accounts for c. 87% (n=4,060) of the total unidentifiable remains.

There was no evidence of cut marks or other evidences of modification on the bone. Not in association with the prehistoric component, Feature 3 consisted of the remains of a domestic sheep, and recovered from 4S 1E and 4S 2E at site 10-EL-1417. Invertebrate faunal remains include freshwater shellfish fragments found across the site. Also notable was the inconsistent presence of fire cracked rocks found across the site and the varying frequencies at depth. Figure 18 shows the distribution of fire cracked rock using a gradient color scale with grey signifying 0 FCR, and increasing redness indicates a high frequency for that unit within that 10cm level.

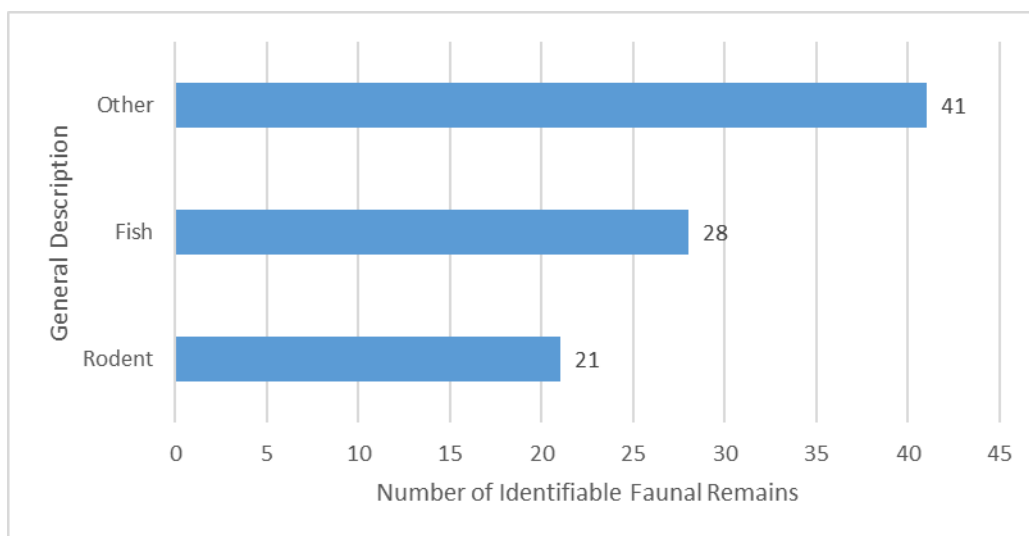


Figure 17. Distribution of identifiable faunal remains.

	4S 1E	4S 2E	6S 1E	8S 0E	8S 2E	8S 2W	8S 4W	9S 3W	10S 2W	15S 4W	17S 2E	18S 4E	19S 4E	19S 6W	21S 6W	22S 5W	25S 1W	25S 5W	26S 6E	29S 5E
0-10 cm	4	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	2	0	1	0
10-20 cm	6	39	13	0	0	0	0	12	5	14	10	0	10	0	4	2	0	0	4	2
20-30 cm	3	17	0	0	0	0	1	5	2	0	4	5	10	2	2	3	0	0	3	0
30-40 cm	16	7	0	10	0	1	1	0	0	35	4	10	0	0	6	4	8	0	0	0
40-50 cm	12	10	0	0	0	0	0	0	0	5	4	0	0	0	7	9	4	0	0	0
50-60 cm	0	2	0	5	0	0	6	3	5	0	3	0	0	0	3	23	10	9	7	0
60-70 cm	0	7	0	1	4	0	0	4	0	13	0	0	0	0	0	49	8	9	0	0
70-80 cm	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
80-90 cm	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
90-100 cm	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
100-110 cm	0	0	0	0	0	0	16	3	0	0	0	0	0	0	0	0	0	0	0	0
110-120 cm	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 18. Distribution of fire-cracked rock by unit provenience and depth.

Summary and Discussion

10-EL-1417 is located on private land north of the Snake River between Glens Ferry and King Hill, Idaho. Excavations during May and June of 2016, and May 2017, sought to further explore site functions, age of deposits, and the extent to which we might infer about levels of mobility. The most extensive post-depositional alteration to 10-EL-1417 was caused by the construction of a railroad line lying 10-20 meters beyond the northern edge of the site. Top layers of disturbed sediment were consistently thicker in the units west of the y-axis (nearer to present day railroad). These disturbed layers were composed of poorly sorted sand and gravel mixture, such as unit 8S/2W, which extended like this to a depth of 25-30 cm, with a light brown color (Munsell reading of 10YR 4/2). Other post-depositional considerations include evidence of ground surface fire and an aeolian deposit under the railroad disturbance layer.

Grain sizes were categorized as pebbles (>2 mm), very coarse grained sand (1-2 mm), coarse grained sand (0.5-1 mm), medium grained sand (0.25-0.5 mm), fine grained sand (0.125-0.25 mm), very fine grained sand (0.063-0.125 mm), and silt and clay (<0.063 mm). The two smallest categories were not differentiated in this analysis.

The general stratigraphic trend of increasing variability in sediment type in the upper 50 cm is consistent with expectations based on the post-depositional history of the site. High variability in the up

per 50 cm includes coarse to very coarse grain sand, along with higher frequency of pebbles. From a depth of 50-120 cm, the sediment becomes less variable, with the dominant grain types being fine to very fine-grained sand, silt and clay. This suggests higher levels of disturbance in the upper 50 cm, compared to the upper 50 cm of units farther from the area of railroad construction.

A composite bone sample taken from the lower level of the excavation was submitted to Beta Analytical. The sample returned a conventional radiocarbon age of 590 \pm 30 BP (1298-1370 AD, Beta-476562). The date falls within an expected time range compared to nearby Late Archaic sites in the middle Snake River Plain. Three Island Crossing has a radiocarbon range of 580 \pm 180 BP (TX 57-24) to 970 \pm 330BP (TX 57-23) (Meatte 1990). Bliss has a range of 250 \pm 110BP (RL 1501) to 1140 \pm 120BP (RL 1500) (Plew 1981).

Categories of material remains present, based on type and function, were weapons (projectile points), general utility tools (knives, bifaces, scrapers, etc.), fabricating tools (cores, hammerstones, and perforators), domestic gear (groundstone and pottery), and decorative items (polished bone). The number of specimens included 98 weapons, 46 general utility tools, 39 fabricating tools, 155 domestic, and 7 decorative (Figure 13).

There were 151 ceramic specimens recovered. All specimens were pottery sherds with a brownish-gray color. The material composition of the specimens was a fine-grained sand. The size largest specimen was 7 cm long and 0.8 cm thick. We might conclude that ceramic from 10-EL-1417 represent limited time investment in manufacture and thereby greater mobility. This is due to the thickness, minimal surface treatment, and composition of sand and crushed basalt, which are both locally available.

Use-Wear analysis was performed on a sample of 49 lithic artifacts, using terminology and methods from Ahler (1979) and Odell (1979). The sample identified 2 worked flakes, 3 scrapers, 1 biface, and 1 projectile point, constituting 14.29% of the artifact samples. Specific tasks cannot be inferred from the location of abrasions on the artifacts, but the majority of use-wear is on the distal end of artifacts, within polar coordinates 1,2, 7, and 8. Proportional occurrence of visible use-wear is consistent with examinations of other lithic tool assemblages from Snake River Plain excavations (Fruhlinger 2004; Plew and Willson 2013).

Lithic debitage analysis of the 14,209 flakes recovered from 10-EL-1417 showed that basalt accounted for the greatest proportion of the total, at 70.25%. Obsidian accounts for 19% (n=2721) and cryptocrystalline silica, CCS, for 11% (n=1562). The high proportion of basalt is similar to nearby sites: Three Island Crossing (57.4% basalt), Knox (56.4% basalt), and King Hill Creek (80.4% basalt), owing to the proximity of the Bell Mare basalt quarry (Plew and Willson 2013). The size range of lithic flakes is also similar to nearby sites. The analysis indicates that 46% of flakes are less than 1 cm in diameter, with another 38% between 1-2 cm in diameter. The small size of flakes suggests re-tooling rather than production, which is consistent with the location of the nearby Bell Mare basalt quarry where initial production would have likely occurred. An analysis of a sample of lithic debitage (n=115) also revealed no signs of useware.

Six items were submitted for X-Ray Fluorescence (XRF) analysis. All specimens were acquired from three regional sources within 80-100 kilometers from site 10-EL-1417. These include Brown's Bench (n=3, 50%), located on the border of Idaho and Nevada in the South Hills near Twin Falls, Idaho, the adjacent Brown's Bench area (n=1, 16.7%) and the Cannonball Mountain source (n=2, 33.4%) located in the vicinity of Fairfield, Idaho. These fit the expectations for the distance distribution of volcanic glass proposed by Holmer (1997) and Plager (2001).

A total 4,757 faunal remains were recovered, 2% (n=90) were identifiable, consisting of deer and rabbit remains (n=41), fish remains (n=28), and rodents (n=21). Fish remains were salmonid, most probably trout. Unidentifiable remains included charred bone fragments (n=4,060, c. 87%) and green bone fragments (n=607, c. 13%). There was no evidence of cut marks or other evidence of modification on the bone. Invertebrate faunal remains include freshwater shellfish fragments found across the site.

As a primary research question, Kelly's index of residential mobility was used to correlate assemblage data with levels of mobility. By measuring technological dimensions of the site assemblage with units of measurement that place materials on a dichotomous scale (low, high; common, rare; etc.), a likely mobility pattern can be ascertained from the site (Kelly 2001). Roberts (2015) showed that other non-chipped stone materials can be utilized to address mobility in the same manner. These other materials include pottery, groundstone, presence of fire hearths, and evidence of storage (Roberts 2015).

Kelly's mobility pattern assesses the frequency of certain technologies and correlates them with levels of mobility: from highly residential to low residential mobility. Arbitrary criteria for categorizing measurements were established based on previous applications of Kelly's residential mobility index for nearby Snake River Plain sites such as 10-EL-438 and 10-EL-215 (Plew and Willson 2013). "Common" and "high" occurrence of formal tools was defined as >30% occurrence within total number of formal tools, while "rare" was defined as <20% (Plew and Willson 2013). For non-artifact

Table 2. Kelly's Residential Mobility Index.

	High Residential Mobility	Low Residential Mobility	10-EL-1417
Bifaces as Cores	Common	Rare	Rare
Bifaces as Bi-products	Rare	Common	Rare
Bipolar Knapping/Scavenging	Rare	Medium to Common	Rare
Flake Tools	Rare to Medium	Common	Rare
Fire-Cracked Rock	Rare	Common	Rare
Site Size/Density	Small/Low	Large/High	Small/Low
Tool/Debitage Ratio	High	Low	Low
Biface/Flake Tool Ratio	High	Low	Low
Complete Flakes	Rare	Common	Rare
Proximal Flake Fragments	Common	Rare	Common
Distal Flake Fragments	Common	Rare	Common
Angular Debris	Rare	Common	Rare
Assemblage Size/Diversity	Low Slope	High Slope	Low Slope
Lithic Raw Material	CCS/Volcanic	Siltstone, Tuff, Rhyolite	CCS/Volcanic

specimens (e.g., lithic debris, faunal remains, or botanical remains), assemblages are “small” if under 5,000 specimens, “medium” if between 5000 and 10,000 specimens, and “large” if over 10,000 specimens. For artifacts, the respective ranges are: under 200, 200-500, and over 500. Using Kelly’s index, the assemblage of 10-EL-1417 suggests high residential mobility. Measurements show 11 of the 14 dimensions indicate high residential mobility for 10-EL-1417 (Table 2).

The lack of cultural features and evidence of storage also indicate high mobility. This is consistent with previous assessments of Snake River sites as representing highly mobile groups on the forager end of the spectrum (Plew and Willson 2013). It also suggests production of multifunctional tools based on prey choices encountered temporarily due to seasonal mobility (Plew 2016). A comparison of local sites shows that high residential mobility is common in the area, though the Knox site (10-EL-1577) falls in the range of low residential mobility (Table 3).

Table 3. Summary of Index Correlation for Local Sites.

Site	Correlation of Criteria	Level of Residential Mobility
10-EL-1417	11/3	High
Swenson (10-EL-1417)	10/4	High
King Hill Creek (10-EL-110)	12/2	High
Knox (10-EL-1577)	12/2	Low
10-EL-216	13/1	High
10-CN-6	12/2	High
10-EL-215	10/4	High

Kelly’s residential mobility index offers a clear way to think about relative mobility in terms of what the assemblage suggests is the most likely pattern of mobility. This assemblage suggests high residential mobility and expedient tool production. This is consistent with the use-wear analysis which suggested minimal use of tools probably due to high mobility and abundant raw material which could be easily produced and altered. This is also consistent with the indicators highlighted by Roberts (2015), including a lack of evidence of storage, few features, few groundstones, and simple, utilitarian pottery. All of these indicators suggest a foraging strategy that moves groups to resources, the utilization of task specific sites, and the production of multifunctional tools to adapt to local, seasonal resources.

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BOOK REVIEW

Approaching Bear River: Historic, Geomorphic, and Archaeological Investigations at the Bear River Massacre National Historic Landmark

Kenneth C. Reid, editor

**Monographs in Idaho Archaeology and Ethnology No. 2,
Archaeological Survey of Idaho 2017
203 pp. \$25 (paper)**

Reviewed by DARBY C. STAPP

Journal of Northwest Anthropology

I am pleased to recommend Ken Reid's edited volume, "Approaching Bear River: Historic, Geomorphic, and Archaeological Investigations at the Bear River Massacre National Historic Landmark" to the readers of *Idaho Archaeologist*. The monograph presents the results of a multidisciplinary investigation focused on a tragic landscape located in southeastern Idaho, where over 250 Native Americans perished at the hands of federal soldiers on January 29, 1863. While descendants of those who died that day remember and commemorate the event annually, for most non-Indians, the deadly event has faded from our collective memory. The effort of Reid and his team has helped correct this situation, first by working with local media to announce their research findings, and now with the publication of this report.

The Bear River Massacre National Historic Landmark was proposed and accepted by the National Park Service in 1990. The event is regarded as one of the worst massacres in the history of the American West. It is recognized by the National Park Service's American Battlefield Protection Program (ABPP) as one of only four battlefields associated with the Civil War located in the American West. In recognition of the 150th birthday of both the creation of Idaho Territory and the events of Bear Valley, in 2013 the Idaho Historical Society applied to the APPB for funding to map and survey the battlefield, conduct archeological and geophysical field surveys, and amend the National Historic Landmark form. The grant application was successful, and from 2014 through 2015, Ken Reid and his team conducted the work to better understand the present-day landscape and its relationship to the historic events. In 2017, the results of the research were published.

The monograph is well illustrated, rich in history, and thorough in describing the research design, methods, and results. Readers will gain much from reading this case study, especially from the way Reid and his team integrated the historical documentation—period accounts, maps, and oral history—with the geomorphology to understand the present-day landscape. In particular, the case study

is a valuable example that illustrates how to implement such a project involving a site such as a massacre that brings pain to those associated with it. As a result of this project, tribal and non-tribal communities now have a better awareness of the Bear Creek Massacre and its significance. Further, the knowledge gained about the present-day landscape will assist the National Park Service and the Northwestern Band of the Shoshone Nation in their management and interpretation of this important place.

Reid begins Chapter 1 by setting the stage for the events of January 29, 1863. The focus of the event was the Shoshone winter village of Bia Ogoi ("Big River"), located at the confluence of Bear River and Beaver Creek, approximately 10 miles north of Franklin, Idaho, in the southeastern corner of the state. The village, under the leadership of Chief Bear Hunter and others, included about 70 lodges housing a composite band of 500 men, women, and children. The village had had good relations with Franklin residents during the first few years of Franklin's existence (it was founded in 1860), but by 1863, tensions in both communities were high.

Shoshoni raids under Chief Bear Hunter during the winter of 1862–63 provoked Federal retaliation. Troops under Col. Patrick E. Connor set out from Ft. Douglas, Utah, in the deep snow of January 1863 towards Chief Bear Hunter's camp, 120 miles north near present-day Preston, Idaho. The Native American camp included about 300 Shoshoni warriors defensively placed in the Battle Creek ravine west of Bear River with high embankments in which the Indians had cut access trails. Shortly after dawn on January 29, Connor's troops appeared across the river and began crossing. Before all of the men had crossed and Connor had arrived, some troops made an unsuccessful frontal attack which the Indians easily repulsed inflicting numerous casualties. When Connor took over, he sent troops to where the ravine debouched through the bluffs. Some of these men covered the mouth of the ravine to prevent any escape while others moved down the rims, firing on the Indians below. This fire killed many of the warriors, but some attempted to escape by swimming the icy river where other troops shot them. The battle stopped by mid-morning. The troopers had killed most of the warriors plus a number of women, children and old men—and captured many of the women and children. (CWSAC Battle Summary, Bear River (BOA Ogoi), <https://www.nps.gov/abpp/battles/id001.htm>)

The Shoshone position, barricaded, camouflaged, and alerted, was stoutly defended. In four hours of fighting, twenty-five soldiers were killed or mortally wounded, and another forty-nine wounded severely enough to require surgical attention. Frostbite hospitalized almost as many more. Connor spent the remaining hours of daylight burning the Shoshone lodges, counting their dead and collecting their firearms, rounding up a herd of one hundred and seventy-five ponies, and arranging for his own dead and wounded to be brought back across the river into a night bivouac. It had been a hard day, capping a hard week...The count of Shoshone casualties after the battle varies with reporters and their closeness to the event, but probably included at least 250 dead, with hundreds of survivors left wounded, homeless, and unattended." (Reid 2017:17)

Reid then reviews the interpretive treatment of the Bear River massacre site by locals and by historians. As noted, Bear River has been compared with more well known nineteenth-century events such as the Sand Creek massacre in Colorado Territory in 1864 and twentieth-century events such as the My Lai massacre in Vietnam in 1968. One scholar has referred to Bear River massacre as the worst war crime ever committed against Indians by American soldiers (Reid 2017:18–19). While Reid questions whether such conclusions are warranted given the superficial nature of the research that

has led to such conclusions, the interaction was certainly horrendous; the lack of awareness of the events by most Americans makes matters even worse.

In Chapter 2, Reid provides a brief site description of the Bear River Massacre National Historic Landmark, which is nearly 1,700 acres in size, and virtually all privately owned. There were at least 28 private owners when the Landmark was established in 1990, a situation that would create challenges for Reid and his team down the road. There is a small right-of-way for U.S. Highway 91, and nineteen acres are owned by the Northwestern Band of the Shoshone Nation, a gift from the Trust for Public Land.

Although Bear River was designated a National Historic Landmark in 1990, little interpretive effort has been expended by the NPS since then. Using a special resource study and Environmental Assessment prepared by the Park Service in 1995, the Idaho Transportation Department developed seven interpretive panels at an overlook and turnout on U.S. Highway 91 in 2005.

When Reid and his team started their research in 2014, they had little to go on in terms of present-day landscape description. Although the Park Service records indicated archaeological survey had been conducted, there was no archaeological site number assigned to it in the Idaho archaeological site system. According to the 2012 *Update to the Civil War Sites Advisory Commission Report on the Nation's Civil War Battlefields*, there had been little change to the landscape since 1863. As Reid's team would learn, this was far from the truth.

Chapter 3 (Historic Background) begins with "Research Objectives," which include research goals and methods. Research goals focused on the following questions:

Where was the Shoshone village?

Where was the core area of combat?

What are the battlefield boundaries and what impacts have affected it since 1863?

What evidence is there for earlier occupations within the Landmark?

Methods are then presented in five parts: archaeological context, ethnographic context, historic context, written sources, graphic sources, oral history and oral tradition, and historic maps. This section is less a discussion of methods and more a review of existing information pertaining to each topic. The discussions are detailed and well-illustrated.

The second part of Chapter 3 is entitled "The Bear River Engagement." Thirty-three pages of details are included concerning the events that led up to the massacre, the attack from both vantage points, and the aftermath. Interspersed are various tidbits, such as the accepted definitions for military terms massacre, battle, engagement, and skirmish. We learn about key individuals, military tactics, weapons, and more, all discussed in relation to the events at Bear River. We also learn that the Bear Creek massacre appears to have led to peace treaties and relative calm across the region. We also learn that the force the federal troops displayed may have kept the peace with the Mormon communities, which at this time were in conflict with the U.S. Government. For me, this was the strongest part of the monograph, or at least the most interesting. Reid clearly spent a large amount of time reading, digesting, and analyzing the myriad sources that were available to him. The section concludes with a listing of archaeological manifestations that might be encountered once fieldwork would begin.

Chapter 4, “KOCO Analysis,” presents the analysis of the battlefield elements following the classification approach developed by the American Battlefield Protection Program, and identified by the acronym KOCO:

Key and decisive terrain
Observation and fields of fire
Cover and concealment
Obstacles
Avenues of approach/withdrawal

The chapter begins with a brief discussion of the environmental context of the surrounding region to assist in considering how terrain structured the battlefield. Using the KOCO methodology, fifteen elements were defined for the six categories (fields of fire is its own category). Each element was then evaluated for its contributions to the engagement along with its present-day integrity. Each element is described in the text and summarized in a table (4.1), which includes name (ideally the name used historically), location, relevance, field comment, KOCO analysis, integrity assessment, and references. I found the theoretical underpinnings of the KOCO methodology intriguing; it made me think of how I might adapt this approach to my own work documenting and analyzing cultural landscapes and associated traditional use areas.

Chapter 5 presents the results of geomorphic investigations, which were conducted by Joel L. Pederson, a geologist from Utah State University; this work was made possible with support from Idaho Heritage Trust. Using aerial photographs, historical accounts, and on-the-ground surveys, Pederson was able to produce a Quaternary geologic map for Battle Creek, Bear River, and associated areas. The second part of the chapter is a narrative of quaternary geologic history. Based on the investigations, many of the 1863 surfaces have been continually reworked by channel meanders, floods, slope failures, and landslides (meaning they no longer exist or are buried). For example, the confluence of Bear River and Battle Creek, where the Shoshone village was located, appears to have shifted several hundred feet to the south. Drawing on various sources of information, the project team modeled the 1863 channel positions for Bear River and Battle Creek to identify the likely location of the village and the core area of combat.

Chapter 6 presents the results of archaeological field and laboratory investigations and was prepared by project team members Kenneth P. Cannon, Molly Boeka Cannon, Jonathan M. Peart, Houston Martin, and John Blong. Archaeological field investigations were focused on those portions of the Landmark where landowner permission could be obtained; the focus was along the terraces of Battle Creek, as defined by the geological work, where the most intense fighting occurred. While one six-acre parcel was surface surveyed, the majority of investigation involved geophysical surveys of 3.7 acres, including magnetic gradiometer survey (15 blocks), ground penetrating radar survey (5 blocks), and metal detector surveys (25 blocks, totaling 9,930 m²). Maps with images (scans) from each block are provided, which will be of interest to geophysicists. The anomalies identified by the magnetic gradiometer and ground penetrating radar surveys, however, were not ground truthed and therefore could not be identified for relevance to the research questions. For the metal detector survey, 1,469 of the 2,285 hits were excavated.

The remainder of the chapter focuses on the artifacts recovered during the metal detector survey. The majority of artifacts were associated with farming activities, and no artifacts were unequivocally associated with the events of 1863. However dozens of ammunition-related artifacts were recovered, some of which could date to the 1800s; these are described in detail in the report. Horseshoes and horse tack, railroad spikes, and square nails are also described.

Chapter 7 presents the summary and assessment, and was prepared by Ken C. Reid, Kenneth P. Cannon, Molly Boeka Cannon, and Joel L. Pederson. Summaries of each chapter are provided, along with a brief summary of the outreach and consultation that occurred with tribes and private land-owners. Answers to the research questions are then presented. Most significant is the information collected concerning post-1863 impacts, which stands in marked contrast to the NPS statement that little impact had occurred to the landscape since 1863. Documented were a meandering river, homesteading, a narrow gauge railroad, a canal, landslides, and a reservoir blowout. Chapter 7 concludes with a set of recommendations concerning future archaeological research, management of the Landmark, and a proposed mitigation associated with an offsite project.

I thoroughly enjoyed reading the monograph for four main reasons. First, the Bear River massacre was a major event in western history, and it was embarrassing that I was not aware of it; my ignorance has been corrected thanks to Reid's efforts. Second, the Bear River project reminded me of the multidisciplinary nature of archaeological research. What other discipline could have produced similar results? Historians could not care less about the surface manifestations and archaeological deposits; geologists generally ignore "disturbed" sediments associated with humans. Archaeologists will make use of anything that contributes to our understanding.

Third, I was interested in how Reid would handle a setting associated with such pain as a massacre of 250 ancestors. How does one reopen such wounds with a research project when there is no immediate need to do so? I do not know what compelled Ken to pursue this project, but it was a setting that warranted physical examination, and archaeology is the discipline to do that. Further, Bear River, one of the worst massacres in American history lies dormant in the minds of the public; archaeology, with its distinct ability to capture the imagination of young and old, is well-suited to the task of educating the people about an important event such as this. Nevertheless, just because we can do something does not mean we should do something. And if a project were to bring pain to a group of descendants, should we do it? In this case, I would probably defer to the affected community; were they neutral, I would have to conclude that it would be wrong to keep the Bear Creek Massacre in the shadows of history. People, especially from the dominant society, need to know what happened that day; it might, it should, help them understand their Indian neighbors just a little bit better. So, for me, this would be a project I would consider important to pursue.

And fourth, I was interested in how Reid and his team interacted with the two tribal groups associated with the Bear Creek site. No formal consultation took place, though I am not clear why; presumably, the undertaking, funded with federal dollars from the National Park Service would have required compliance with Section 106 of the National Historic Preservation Act—and as a result formal consultation with the State Historic Preservation Office, Tribal groups, and others—but that does not appear to have been necessary. However, while there was no direct formal consultation with either group, interspersed throughout the monograph are snippets that describe the interactions and discussions that occurred over the years with both the Northwestern Band of the Shoshone Nation and the Shoshone-Bannock Tribes of Fort Hall. The closing paragraph of the Acknowledgments section provides insight to impact of the interactions:

Finally, while we have included tribal perspectives on what happened at Bia Ogoi wherever such testimony was publicly accessible, we have not tried to claim the tribe's voice in narrating the causes, the scale, and the consequences of this tragedy. As this project drew to a close, we were pleased to be asked to support the tribe's grant proposal to the National Park Service, and still more pleased when funds were awarded to the Shoshone to protect and interpret the site in their own terms. Annually, since the 2013 sesquicentennial, it has been an honor and a privilege for project staff to attend the January 29th commemoration sponsored by the North-

western Band of the Shoshone Nation. These experiences at the Landmark—however cold, however icy the roads, however deep the snow—have brought the emotional weight of the Bear River tragedy home to us in ways not conveyed by historic documents, maps, sediments, and artifacts. We deeply appreciate the welcome we have received from tribal members and staff of the Northwestern Band, and the support they have shown for the work reported here. (p. 16)

As a reviewer, I should point out that the monograph is not perfect. First and foremost, there should have been an index (research reports with no index is a pet peeve of mine). The monograph also would have benefitted from a final read-through. Beyond a few formatting and typographical errors, Table 6.10 is called out as Table 13, Figure 7.2 is not legible, and there are references to inclusion of a site form as Appendix A, but no appendix is included. Also perplexing is the statement in the Abstract (p. 13) that “...the results of the fieldwork have been noninvasive and nonintrusive.” Beyond not knowing the difference between noninvasive and nonintrusive, 1,469 metal detector hits were excavated with 50 cm² excavation units; aren’t those invasive, or at least intrusive? Finally, the many uses of the term “historic” should have been “historical.”

These nits aside, I am glad Ken Reid and his team took the effort to publish their research and make it readily available through the *Archaeological Survey of Idaho Monographs in Archaeology and Ethnology* series. Such efforts take an enormous amount of time, most of which is usually unfunded, and revenues rarely cover expenses. The benefit of educating the public, tribes, agencies, and others, however, are significant. It's what we must do to complete the circle.

